FILE

DUKE ENERGY OHIO EXHIBIT_____

BEFORE

THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application of Duke Energy Ohio for Authority to Establish a Standard Service Offer Pursuant to Section 4928.143, Revised Code, in the Form of an Electric Security Plan, Accounting Modifications and Tariffs for Generation Service.	)	Case No. 14-841-EL-SSO
In the Matter of the Application of Duke Energy Ohio for Authority to Amend its Certified Supplier Tariff, P.U.C.O. No. 20.	)	Case No. 14-842-EL-ATA

PUBLIC VERSION

DIRECT TESTIMONY OF

MARC W. ARNOLD

ON BEHALF OF

DUKE ENERGY OHIO, INC.

May 29, 2014

TABLE OF CONTENTS

PAGE

Attachments:

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Marc W. Arnold, and my business address is139 East Fourth Street, Cincinnati, Ohio 45202.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am employed by Duke Energy Business Services LLC (DEBS) as the Director of Engineering and Construction Planning for Ohio and Kentucky. DEBS provides various administrative and other services to Duke Energy Ohio, Inc., (Duke Energy Ohio or the Company) and other affiliated companies of Duke Energy Corporation (Duke Energy).

Q. PLEASE BRIEFLY DESCRIBE YOUR EDUCATION AND PROFESSIONAL EXPERIENCE.

A. I received a Bachelor of Science in Business from St. Leo University and a Master's Degree in Business from Indiana Wesleyan University. I began my career at Cinergy Corp., as a Distribution Designer in 2001, and have held a variety of positions of increasing responsibility across Duke Energy in the areas of electric system distribution engineering.

Q. PLEASE DESCRIBE YOUR DUTIES AS DIRECTOR OF ENGINEERING AND CONSTRUCTION PLANNING.

A. As the Director of Engineering and Construction Planning, I am responsible for the distribution integrity programs for Duke Energy's regulated utility operations in Ohio and Kentucky. I am also responsible for engineering and design for line

extensions for new businesses in the Duke Energy Ohio and Duke Energy Kentucky, Inc., (Duke Energy Kentucky) service territories.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE PUBLIC UTILITIES COMMISSION OF OHIO?

A. No.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THESE PROCEEDINGS?

A. The purpose of my testimony is to provide an overview of how Duke Energy Ohio maintains the reliability of its distribution system and the investments necessary to continue to provide safe, reliable, and reasonably priced service to its approximately 700,000 distribution customers located in southwestern Ohio. I also will discuss the challenges the Company faces in maintaining its distribution system; including, but not limited to, efforts necessary to continue to meet its customers' power quality expectations. I then support Duke Energy Ohio's plan to implement its Distribution Capital Investment Rider (Rider DCI) and discuss the initiatives the Company will undertake to enhance and improve the safety and reliability of its infrastructure to better meet its customers' growing reliability needs.

Q. PLEASE DESCRIBE THE ATTACHMENTS FOR WHICH YOU ARE RESPONSIBLE.

A. I am sponsoring the following attachments:

- Attachment MWA-1 – Graphic depiction of the age of Duke Energy Ohio's distribution facilities.

- Attachment MWA-2 – Excerpt from the J.D. Power and Associates (J.D. Power) 2014 study, showing the power quality and reliability performance rankings.

- Attachment MWA-3 – Excerpt from J.D. Power 2013 Residential Electric Study.

- Attachment MWA-4 – Customer satisfaction results for Ohio/Kentucky for calendar year 2013.

- Attachment MWA-5 – Residential survey required by the Public Utilities Commission of Ohio (Commission) for calendar year 2013 and the first quarter 2014.

- Attachment MWA-6 – Non-residential survey required by the Commission for calendar year 2013 and the first quarter 2014.

- Attachment MWA-7 – Distribution Program Details.

II. DUKE ENERGY OHIO'S ELECTRIC DISTRIBUTION SYSTEM

Q. PLEASE BRIEFLY DESCRIBE DUKE ENERGY OHIO'S EXISTING ELECTRIC DISTRIBUTION INFRASTRUCTURE.

A. The Duke Energy Ohio electric delivery system is used, among other things, to provide electric service to approximately 700,000 customers located throughout southwestern Ohio. Duke Energy Ohio owns and operates all of its electric distribution and local transmission facilities.

Duke Energy Ohio's electric delivery system includes approximately 238 substations, 15 transmission substations (locations with 69 kilovolt (kV) or higher operating voltages) having a combined capacity of approximately 8,923,438 kilovolt-amperes (kVA), 194 distribution substations (locations that supply one or more circuits at 35 kV or lower voltage) having a combined capacity of approximately 6,795,371 kVA, and 29 joint transmission and distribution

substations (locations with 69 kV or higher operating voltages that also have 35 kV or lower voltage) having a combined capacity of approximately 7,297,320 kVA. The Duke Energy Ohio electric delivery system includes various other equipment and facilities, such as control rooms, computers, capacitors, street lights, meters and protective relays, and telecommunications equipment and facilities.

Q. PLEASE GENERALLY DESCRIBE HOW THE ELECTRIC DISTRIBUTION INFRASTRUCTURE IS DESIGNED, CONSTRUCTED, MANAGED AND OPERATED.

A. The electric distribution infrastructure is designed to receive bulk power at transmission voltages, reduce the voltage to 34.5 kV, 12.5 kV, or 4 kV, and deliver power to customers' premises. The distribution infrastructure generally consists of substation power transformers, switches, circuit breakers, wood pole lines, underground cables, distribution transformers, and associated equipment. The physical design of the distribution system is also generally governed by the National Electrical Safety Code, which I understand has been adopted by the state of Ohio in Ohio Administrative Code (O.A.C.) 4901:1-10-06.

Duke Energy Ohio operates the distribution facilities it owns in accordance with good utility practice. Duke Energy Ohio continuously runs the system with a workforce that provides customer service 24 hours per day, 7 days per week, 365 days per year, and includes trouble response crews. The Company monitors outages

with various systems, such as Supervisory Control and Data Acquisition, Distribution Outage Management System (DOMS), Electric Trouble Data Mart, and Outage Information System.

Q. HOW DOES DUKE ENERGY OHIO DISCOVER AND ADDRESS SYSTEM OUTAGES TODAY?

A. Customers typically report outages by telephone through Duke Energy's call center. The call center creates an outage report through a telephone software application that interfaces with DOMS, a state-of-the-art outage management software application that Duke Energy Ohio implemented in 2011 to improve its ability to monitor and respond to outages. DOMS analyzes the calls and identifies for Duke Energy Ohio's dispatchers the piece of equipment (*e.g.,* circuit breaker, recloser, fuse, transformer) that is the probable location of the outage. The dispatcher contacts the field trouble response person through the radio system to direct them to the probable equipment location to make repairs and restore electric service. Generally, the field trouble response person inspects the circuit or segment of line in question to identify and report the cause of the outage. The dispatcher records the date, time, duration, and cause of the outage in DOMS.

Dispatchers continuously monitor weather conditions, both in anticipation of and during weather events. When lightning, wind, or ice storms hit Duke Energy Ohio's service territory, line crews are paged, called, or held over to respond. Duke Energy Ohio will call in several hundred employees, as necessary, to respond to severe storms, including Duke Energy's utility employees stationed in Kentucky, Indiana, North Carolina, South Carolina, and Florida. If necessary, Duke Energy

Ohio will contact other utilities for additional line crews, through a mutual assistance program.

Q. PLEASE GENERALLY DESCRIBE HOW DUKE ENERGY OHIO CURRENTLY MONITORS AND MAINTAINS ITS DISTRIBUTION INFRASTRUCTURE AND ITS PERFORMANCE.

A. Duke Energy Ohio maintains its distribution infrastructure in accordance with good utility practice by adhering to inspections, monitoring, testing, and periodic maintenance programs. Examples of these existing programs include, but are not limited to, the following: (1) substation inspection program; (2) line inspection program; (3) ground-line inspection and treatment program; (4) vegetation management program; (5) underground cable replacement program; (6) capacitor maintenance program; and (7) dissolved gas analysis.

Duke Energy Ohio also uses various reliability indices to measure the effectiveness of its maintenance programs and system reliability. Duke Energy Ohio follows the Commission's Electric Service and Safety Standards (ESSS), as set forth in O.A.C. Chapter 4901:1-10. The Company also uses various indices to measure the effectiveness of its maintenance programs and system reliability.

Q. YOU STATED THAT DUKE ENERGY OHIO USES VARIOUS INDICES TO MEASURE THE EFFECTIVENESS OF ITS MAINTENANCE PROGRAMS AND SYSTEM RELIABILITY. PLEASE EXPLAIN THESE RELIABILITY INDICES.

A. Reliability indices are generally recognized standards for measuring the number, scope, and duration of outages. Ohio requires electric distribution utilities to report

annually on these reliability indices. These indices are defined as follows:

- Customer Average Interruption Duration Index (CAIDI) is the average interruption duration or average time to restore service per interrupted customer and is expressed by the sum of the customer interruption durations divided by the total number of customer interruptions.
- System Average Interruption Duration Index (SAIDI) is the average time each customer is interrupted and is expressed by the sum of customer interruption durations divided by the total number of customers served.
- System Average Interruption Frequency Index (SAIFI) is the system average frequency index and represents the average number of interruptions per customer. SAIFI is expressed by the total number of customer interruptions divided by the total number of customers served.

Q. HOW HAS DUKE ENERGY OHIO'S DISTRIBUTION INFRASTRUCTURE PERFORMED, AS MEASURED BY THESE RELIABILITY INDICES?

A. Duke Energy Ohio has performed well. Its reliability scores have always exceeded Duke Energy Ohio's standards for CAIDI and SAIFI established in consultation with Commission Staff pursuant to O.A.C. 4901:1-10-10(B)(2). As referenced in Case No. 14-0493-EL-ESS, the Company's latest reliability index scores available for calendar year 2013 are: CAIDI = 117.8 excluding storms, 121.56 with no exclusions; SAIDI = 115.44 excluding storms, 160.46 with no exclusions; and SAIFI = 0.98 excluding storms, 1.32 with no exclusions. The performance

standards for the above reliability index scores are CAIDI 118.14 and SAIFI 1.24 respectively.[1]

Q. PLEASE DESCRIBE SOME OF THE FACTORS THAT THE COMPANY MUST CONSIDER IN PROVIDING CUSTOMERS WITH SAFE, RELIABLE, AND REASONABLY PRICED ELECTRIC SERVICE.

A. Duke Energy Ohio weighs various factors in selecting the electric delivery infrastructure improvement projects in which to invest. By way of example, the Company will give consideration to customer expectations, its planning criteria, any requirements mandated by either regulatory authorities or reliability councils, and government-mandated projects.

Q. HOW DOES DUKE ENERGY OHIO BALANCE ALL OF THESE FACTORS?

A. From a planning perspective, electric system studies are performed annually to determine where and when system modifications are needed to ensure load is adequately served. When these needs are identified, multiple solutions are developed, addressing not only the capacity need, but potential opportunities to maintain or improve reliability and operating flexibility. Recommendations are made and discussed with the operations staff to ensure that a balanced, workable plan has been developed.

In the course of maintaining and operating the electric distribution system, Duke Energy Ohio identifies equipment and hardware that requires repair or replacement. Blanket budgets have been established to cover small items, but

[1] There is no target established for SAIDI.

specific projects are developed for larger expenditure items. These items are triggered as a result of operating issues, new load growth, or the various inspections, monitoring, and testing programs I described above.

III. CHALLENGES FACING DUKE ENERGY OHIO'S DISTRIBUTION FACILITIES

Q. WHAT ARE THE MAJOR CHALLENGES FACING DUKE ENERGY OHIO'S DISTRIBUTION SYSTEM?

A. There are several challenges to managing Duke Energy Ohio's electric distribution system. Perhaps the biggest challenges relate to aging infrastructure, obsolescence of equipment, and the need to regularly review the system and its operation for appropriate upgrades or replacements. Satisfying changing customer expectations also presents a challenge for Duke Energy Ohio.

Q. PLEASE EXPLAIN HOW THE AGE OF THE ELECTRIC DISTRIBUTION SYSTEM AND OBSOLESCENCE OF EQUIPMENT PRESENT A CHALLENGE TO THE COMPANY.

A. Aging distribution systems are a major challenge for all utilities. Indeed the majority of the outages experienced by customers are due, at least in part, to the aging of the distribution system. Much of Duke Energy Ohio's electric distribution equipment is over 30 years old. Such equipment typically lasts from 30 to 50 years if preventative maintenance is performed on a regular schedule. By way of example, there are some portions of the Company's underground network in downtown Cincinnati with equipment dating back to the 1920s that is in need of replacement in order to maintain and improve customer reliability. Attachment

MWA-1 shows a graphic depiction of the age of Duke Energy Ohio's distribution facilities.

Another challenge Duke Energy Ohio and other utilities are seeing is that replacement parts are becoming harder to find and, when they are located, can be quite expensive. For example, this very issue surfaced during Hurricane Sandy with Consolidated Edison, Inc., (a/k/a ConEd) reaching out to mutual assistance partners attempting to locate rare fuses.

Q. PLEASE EXPLAIN FURTHER HOW CUSTOMERS' EXPECTATIONS PRESENT A CHALLENGE.

A. Customers are now using equipment that is highly sensitive to voltage fluctuations; therefore, customers are more sensitive to power quality than they have been in the past. Customers are demanding highly reliable service that minimizes the number of voltage fluctuations. These changing expectations can present a challenge for Duke Energy Ohio as it attempts to prudently and reasonably balance reliable service with cost.

Q. ARE THE PRACTICES AND PROGRAMS YOU DESCRIBED ABOVE COUPLED WITH THE CURRENT LEVEL OF SPENDING SUFFICIENT FOR THE COMPANY TO MAINTAIN ITS PRESENT LEVEL OF SERVICE RELIABILTY AND MEET CUSTOMER EXPECTATIONS?

A. I do not believe so. Customer expectations are evolving as technology changes. Customers are requiring a higher degree of reliability, performance, and response. They are expecting service restorations to be made more quickly, as so much of their daily life depends upon the availability of electricity. This ranges from the ability to

power and charge cellular phones, computers, and other mobile devices, in order to maintain communication access, to heating and cooling homes. Although Duke Energy Ohio's current practices have served it well in the past, the Company must continue to evolve to meet these growing customer expectations. Duke Energy Ohio cannot be stagnant and simply rely upon the premise that past practices will continue to be sufficient to maintain future performance. Rather, it must adapt its practices and implement new programs to respond to industry demands, changes in technology, and continually evolving customer needs and expectations.

Q. DOES THE COMPANY MEASURE OR ATTEMPT TO QUANTIFY CUSTOMER EXPECTATIONS?

A. Yes.

Q. PLEASE EXPLAIN.

A. Duke Energy and Duke Energy Ohio continuously evaluate customer satisfaction and expectations as well as the Company's performance, through third-party national benchmarking and regional surveys generated by Duke Energy. Specifically, Duke Energy subscribes to and participates in the J.D. Power annual electric utility residential customer and business customer satisfaction studies. Duke Energy also conducts its own surveys of residential, small/medium business, and large business customers, including community leaders, on a corporate and regional level for Ohio and Kentucky.

Duke Energy Ohio also performs a quarterly survey at the direction of the Commission, using a study that includes questions authored by the Commission. The Duke Energy surveys are generally done electronically and are emailed to a

random sample of customers throughout the year on a quarterly basis. Based upon the results of all these surveys, the Company gauges its performance in relation to customer expectations.

Q. PLEASE DESCRIBE THE MOST RECENT J.D. POWER SURVEYS AND WHAT THEY INDICATE WITH RESPECT TO CUSTOMER EXPECTATIONS, SATISFACTION, AND PERFORMANCE.

A. J.D. Power is well known for setting the standard for measurement of consumer opinion and customer satisfaction in many key industries. J.D. Power annually surveys electric utilities' residential and business customer satisfaction. Duke Energy's Midwest utilities (Ohio, Kentucky, and Indiana) participate in these annual studies.

The J.D. Power electric utility business customer satisfaction study, established in 2000, calculates overall customer satisfaction based on six performance areas: (1) corporate citizenship, (2) communications, (3) price, (4) billing and payment, (5) power quality and reliability, and (6) customer service. For 2014, the most recent study for which results are available, J.D. Power measured business customer satisfaction for the country's Midwest large electric utilities, serving over 25,000 business customers. Duke Energy Midwest scored 666 points in the Overall Customer Satisfaction Index, which is above the national average. Attachment MWA-2 is a true and accurate copy of an excerpt from the 2014 J.D. Power study, showing the power quality and reliability performance rankings.

Attachment MWA-3 is an excerpt from the J.D. Power 2013 Residential Electric study that supports the conclusion that customer outage tolerances are [redacted] The [redacted] indicates that, on a national average, overall satisfaction is [redacted] even among customers who are experiencing "perfect power" or no outages. This means that customer expectations are high with respect to the power quality and reliability of their electric utility service.

Q. PLEASE DESCRIBE THE DUKE ENERGY CUSTOMER SURVEYS AND WHAT THEY INDICATE IN TERMS OF CUSTOMER EXPECTATIONS REGARDING POWER QUALITY AND THE COMPANY'S PERFORMANCE.

A. Duke Energy's Customer Satisfaction Team conducts continuous customer satisfaction studies of the residential, small/medium business, and large business customer segments for each of Duke Energy's utility operating companies. Attachment MWA-4 is a true and accurate copy of the Ohio and Kentucky excerpt of the Midwest Summary Presentation for fourth quarter of 2013. This presentation shows the customer satisfaction results for Ohio/Kentucky for calendar year 2013. The results are expressed on the basis of the percentage of respondents who are highly satisfied and the percentage who are least satisfied. Using a ranking system of one to ten, customers who rated the Company an eight or higher are considered to be highly satisfied and those who rated the Company a four or below are considered least satisfied. Page 11 of this excerpt directly addresses the performance of Duke Energy Ohio and Duke Energy Kentucky

relative to customer power quality and reliability expectations across the Ohio/Kentucky region.

Q. PLEASE DESCRIBE THE COMMISSION RELIABILITIY SURVEYS AND WHAT THEY INDICATE IN TERMS OF CUSTOMER EXPECTATIONS REGARDING POWER QUALITY AND THE COMPANY'S PERFORMANCE.

A. Attachments MWA-5 and MWA-6 are excerpts from summaries of the Company's most recent Commission-required residential and non-residential surveys, respectively. The surveys, showing data for calendar year 2013 through the first quarter of 2014, were performed online to random samples of customers. While the Company does not use these surveys for planning purposes, they are useful as tools to indicate what our customers expect in terms of power quality and service. These surveys, among other things, tested customer tolerances for service interruptions and how the Company has performed in relation to those expectations.

For example, the non-residential customer surveys provide information regarding customer tolerances for, among other things, service interruptions of less than five minutes and greater than five minutes, as well as storm-related outages. There are also follow-up questions related to the number and duration of outages actually experienced by these same customers. As can be seen from these surveys, business customers have very high expectations related to the number and duration of outages. On page 5, the customers were asked how many momentary outages they would find acceptable over a 12-month period. Over 80

percent of the customers expect two or fewer momentary outages over a 12-month period. These expectations, while varying somewhat during these surveys, do show that customers' expectations are increasing regarding power quality. Duke Energy Ohio has performed relatively well in meeting these expectations.

Similar surveys were performed for residential customers. Again, these results indicate that Duke Energy Ohio's residential customer have increasing expectations of reliability and power quality.

Q. WHAT DO THESE SURVEYS INDICATE IN TERMS OF DUKE ENERGY OHIO'S STRATEGY TO MEET CUSTOMER POWER QUALITY AND RELIABILITY EXPECTATIONS?

A. Even though the majority of Duke Energy Ohio's customers appear to be satisfied with the Company's reliability and power quality, there is room for improvement. And failure to be proactive to resolve issues before they manifest will result in a decline in system performance and customer satisfaction. In order to meet these high expectations, Duke Energy Ohio must be proactive and take corrective actions before a problem manifests itself. Identifying these issues and employing the necessary resources presents challenges from a budgeting perspective when the sole source of operating and maintenance capital is limited to base rates established through base rate proceedings.

Q. WHAT IS THE COMPANY PROPOSING IN THESE PROCEEDINGS TO ADDRESS THESE CHALLENGES?

A. Duke Energy Ohio is proposing an infrastructure modernization plan and recovery mechanism consistent with Ohio Revised Code 4928.143(B)(2)(a) and O.A.C.

4901:1-35(g) as part of this electric security plan (ESP). The distribution infrastructure plans and the associated recovery mechanism, Rider DCI, are designed to balance the needs of the Company to maintain its financial stability with its commitment to customers to minimize costs and continue to provide safe, reliable, and reasonably priced service.

Q. PLEASE DESCRIBE RIDER DCI.

A. The objective of Rider DCI is to allow the Company to implement new initiatives to enhance the safety and reliability of its delivery system, recover a return of and on incremental capital investment in electric distribution plant, and recover the associated property tax and depreciation expenses from the date certain of Duke Energy Ohio's last electric distribution rate case. Duke Energy Ohio witness Peggy A. Laub fully explains how Rider DCI will work and be adjusted. In summary, the rider will recover the Company's incremental distribution capital investment, including, but not limited to ongoing maintenance capital, as well as the cost to implement various specific programs or initiatives designed to maintain and/or enhance the safety and reliability of the Company's distribution system. The programs to be implemented under the infrastructure modernization plan are designed to meet customer expectations, manage costs, and proactively address the aging infrastructure issues through a targeted and coordinated approach. Attachment MWA-7 is a detailed analysis of the forecasted costs under the Company's infrastructure modernization plan, including estimated customer rate impacts.

Q. WHAT IS THE ANTICIPATED IMPACT TO THE COMPANY'S CURRENT RELIABILITY AND PERFORMANCE THROUGH THE PLANS PROPOSED FOR INCLUSION UNDER RIDER DCI?

A. Although Duke Energy Ohio cannot guarantee that system reliability or customer satisfaction will improve in terms of specific reliability index scores or a particular level of performance from implementing its infrastructure improvement plans, doing nothing is sure to erode both. There are factors that impact the Company's reliability that are simply beyond its control, such as the frequency and severity of major storms. Nonetheless, the programs selected by the Company are designed to address those issues that are predictable and controllable, such as replacement of obsolete and aging infrastructure that becomes less reliable as it approaches the end of its useful life. Proactively addressing vulnerable spots on the distribution system is the most effective way to attempt to improve reliability and will provide benefits to customers.

Q. PLEASE SUMMARIZE THESE CUSTOMER BENEFITS.

A. By implementing these programs together, the Company is better able to manage and control its costs and its workforce resources. That should allow for a more efficient process. The new equipment that replaces and updates the Company's aging distribution equipment will likely be more resilient to loading due to extreme weather conditions. Because many of these programs will be implemented throughout the Company's service territory, ultimately every customer will benefit from these efficiencies and system hardening. Rider DCI and the infrastructure modernization programs proposed therein will allow Duke

Energy Ohio to take a holistic, coordinated approach to addressing these identified areas of concern, in contrast to the current, reactive strategy inherent in a pure base rate recovery model.

Q. PLEASE IDENTIFY THE PROGRAMS INCLUDED IN DUKE ENERGY OHIO'S INFRASTRUCTURE MODERNIZATION PLAN, THE COSTS OF WHICH WOULD BE RECOVERABLE UNDER RIDER DCI.

A. Duke Energy Ohio is currently proposing a total of nineteen programs (both new programs and enhancements to existing programs) as part of its overall infrastructure modernization plan, with recovery through Rider DCI. Attachment MWA-7 provides a list and the estimated cost of the infrastructure maintenance programs to be included under Rider DCI through the term of this ESP. Consistent with the intent of Rider DCI, which is to allow the Company to proactively address reliability issues through a coordinated and targeted strategy, the Company anticipates that Rider DCI will continue to evolve, with technological advances or changes in field conditions, to include additional programs or revisions and modifications to the initial programs over time. The current programs in the infrastructure modernization plan are as follows:

- Transformer Retrofit Program
- Vegetation Clearing/Right-of-Way Acquisition/Facility Modification
- Underground Cable Injection
- Underground Cable Replacement
- DTUG-Online Dissolved Gas Analysis (DGA), Sump Pump, Oil Monitoring (Network)

- Manhole Lid Retrofit Program
- Manhole/Vault Capital Rebuild (Network)
- Network Secondary Main Replacement
- Vault Network Protector/Transformer Change Out
- Redesign of Worst Congested Underground Structures
- URD Submersible Transformer Upgrades
- Distribution Substation Protection (Physical Security)
- Upgrade Live Front Transformers
- Upgrade Distribution Transformer Substations (Unique Customer Locations)
- PILC Replacement (Feeder Exits)
- Distribution Operations Center and Mobile Logistics Modernization
- Ownership of Underground Residential Services
- Conversion of Old 4kV Feeders
- Recloser Replacement
- Circuit Sectionalization

Q. PLEASE DESCRIBE THE TRANSFORMER RETROFIT PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Transformer Retrofit Program proactively replaces aging Completely Self Protected (CSP) transformers throughout the Company's distribution system and is intended to result in fewer transformer-related customer outages. The installation of CSPs was prevalent from approximately 1965 through the 1990s. CSP transformers are internally fused on the secondary side of the transformer

and when overloaded have and continue to cause outages. In addition to CSP transformer replacements, the program will include adding external lightning arresters, squirrel guards, and covered lead wires for additional protection from outages. By installing high-voltage fuses and lightning arresters on the line side of this device, the Company will significantly reduce the line exposure. This program will encompass the entire overhead distribution system in Duke Energy Ohio's service area. The program is intended to enhance the overall customer experience, reliability, and the Company's operational integrity and will eventually reduce operating and maintenance (O&M) costs by reducing outages attributed to the older equipment.

Q. PLEASE DESCRIBE THE VEGETATION CLEARING/RIGHT-OF-WAY ACQUISITION/FACILITY MODIFICATION PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Vegetation Clearing/Right-of-Way Acquisition/Facility Modification Program identifies dead or high risk trees or vegetation, within or along the right-of-way, that pose a hazard or danger for the Company's overhead lines. Dead or at-risk trees outside of the Company's easements cause numerous outages annually. Proactively addressing these potential threats would potentially avert a future outage. This capital program allows the acquisition of additional easements for vegetation management clearing purposes to remove additional trees and vegetation and reduce tree-related outages. This program will encompass the entire overhead service area, but with a primary focus on wooded areas and along rights-of-way. The Company will make contact with the

customer prior to removing the trees or vegetation. The benefits anticipated will positively impact customer experience, reliability, and the overall integrity of the distribution system through fewer outages. However, the benefits of this program extend beyond the Company's distribution service and its customers, as dead or dying trees also threaten the general public. This is an integrity-related program anticipated to assist in maintaining and even improving the Company's CAIDI and SAIDI.

Q. PLEASE DESCRIBE THE UNDERGROUND CABLE INJECTION PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Underground Cable Injection Program is designed to extend the life of existing underground cable. Cable injection is a process that infuses a di-electric gel into the cable refurbishing it for approximately fifty percent of the cost of replacing it. This program will reduce future repairs with a cable warranty program and should reduce future O&M costs associated with current cable repairs. Cable injection can be accomplished for about one-third of the cost of replacement. In addition, the technique the Company is using comes with a 25-year warranty that will further mitigate future costs. Anytime upgrades are needed that necessitate cable replacements, outages are required. These outages can be lengthy. The injection process requires less time in terms of outage duration. This program will encompass the existing underground service area and there will be a primary focus on underground runs of cable that have failed and that have been identified by Duke Energy Ohio's engineers as candidates for injection treatment. The benefits anticipated from this program will positively

impact customer experience, reliability, and the overall integrity of the distribution system through fewer outages.

Q. PLEASE DESCRIBE THE UNDERGROUND CABLE REPLACEMENT PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Underground Cable Replacement Program consists of replacement of existing underground cable that the Company determines to be at the end of its useful life and that cannot be treated properly under the Underground Cable Injection Program. The Company has discovered that soil conditions in southwest Ohio can cause the neutral in non-jacketed cable to deteriorate over time. This program, like the associated Underground Cable Injection Program, will encompass Duke Energy Ohio's entire underground service area, where injection was not feasible. The benefits anticipated from this program will positively impact customer experience, reliability, and the overall integrity of the distribution system through fewer outages. Fewer outages should, in the future, result in O&M savings.

Q. PLEASE DESCRIBE THE DTUG-ONLINE DGA, SUMP PUMP, OIL MONITORING (NETWORK) PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The DTUG-Online DGA, Sump Pump, and Oil Monitoring Program will allow the installation of dissolved gas analysis and oil monitoring using a communication network. Downtown Cincinnati is primarily commercial in nature. And, as a result, reliability is one of the key attractions for commercial tenants in the downtown Cincinnati area. The type of distribution equipment in

the downtown Cincinnati underground network is significantly more expensive to own, maintain, and operate than that equipment used in the suburbs. The vaults, manholes, and conduit system in downtown Cincinnati date back to the early 1900s, with some equipment still in service dating as far back as the 1920s. The advantage to this program is that it provides data back to the Company that could potentially diagnose or forecast a future equipment failure. While DGA monitoring is completed today and tested at our facility, this program will allow for real-time monitoring. The program will encompass the entire downtown Cincinnati underground network. The benefits anticipated from this program will positively impact customer experience, reliability, and the overall integrity of the downtown Cincinnati underground network distribution system through fewer outages.

Q. PLEASE DESCRIBE THE MANHOLE LID RETROFIT PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Manhole Lid Retrofit Program involves the installation of Swiveloc Manhole Covers along pedestrian areas in proximity to Duke Energy Ohio's downtown Cincinnati underground network. The primary focus of this program is safety – that of the general public and the Company's employees and contractors. When gases build up in the underground system and a source of ignition is added, a volatile explosion could occur with sufficient force to launch even a 200-pound cast-iron manhole lid into the air. This program focuses on securing these lids along the Duke Energy Ohio underground network in downtown Cincinnati so that, if such an event occurs, the lid will merely lift slightly to release the pressure

of gases but continue to rest on the manhole. The benefits anticipated from this program will positively impact customer experience through maintaining and enhancing safety, reliability, and the overall integrity of the downtown Cincinnati underground network distribution system.

Q. PLEASE DESCRIBE THE MANHOLE/VAULT CAPITAL REBUILD PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Manhole/Vault Capital Rebuild Program is designed to enhance the safety of Duke Energy Ohio's delivery system and involves complete restoration of concrete structures, including all racking of cables in manholes along Duke Energy Ohio's underground network. This program constitutes a structural rebuilding of the infrastructure that has deteriorated due to age, road traffic, and the presence of other underground facilities and utilities. The issues addressed by the program include, but are not limited to, water damage due to leaky vault and manhole roofs, salt contamination, and structural deterioration due to the public roadway vibrations. If the Company does not proactively and aggressively address this issue, the damaged vaults could pose a safety issue for the general public due to the potential risk of collapse. The program will encompass the entire downtown Cincinnati underground network. The benefits anticipated from this program will positively impact customer experience through enhancing safety, reliability, and the overall integrity of the downtown Cincinnati underground network distribution system through fewer outages.

Q. PLEASE DESCRIBE THE NETWORK SECONDARY MAIN REPLACEMENT PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Network Secondary Main Replacement Program is designed to maintain and enhance reliability through the replacement of 600 volt PILC cable that provides a necessary safety net for the secondary system through a network redundancy for the downtown Cincinnati distribution system. The existing cable is, in most cases, more than 40 years old and thus, because of age, has an increased likelihood of failure. The redundant network in downtown Cincinnati is vital to attracting new business, not to mention retaining existing businesses, especially those that require a high degree of reliability, such as data centers and financial institutions. An advantage that developers and current businesses have in the downtown network is that its redundancy eliminates the need for these businesses to have separate back-up generation in most cases. For example, in new downtown buildings, as well as some current downtown buildings, the redundant downtown system alleviates the need to own and maintain back-up generation to power emergency equipment such as fire systems. The benefits anticipated from this program will positively impact customer experience through enhancing safety, reliability, and the overall integrity of the downtown Cincinnati underground network distribution system through decreasing the likelihood of outages. It would also continue to allow these buildings and business to not have to secure separate back-up generation resources.

Q. PLEASE DESCRIBE THE VAULT NETWORK PROTECTOR/TRANSFORMER CHANGE OUT PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Vault Network Protector/Transformer Change Out Program is designed to both proactively and reactively replace older vault protectors and transformers. This program would include a transition from wall-mounted protectors to transformer-mounted protectors, where possible. Although Duke Energy Ohio currently has a rigorous preventative maintenance program in place for this equipment, there are circumstances where replacing the equipment is more cost effective and yields greater reliability. This is primarily due to the age of some of the infrastructure, resulting in a greater risk for failure. In addition, because much of this equipment is unique in nature, there is a potential risk of longer outage durations in the event of a failure, due to long lead times to acquire replacement equipment. The benefits anticipated from this program will positively impact customer experience through maintaining and enhancing reliability and the overall integrity of the downtown Cincinnati underground network distribution system through decreasing the likelihood of outages.

Q. PLEASE DESCRIBE THE REDESIGN OF WORST CONGESTED UNDERGROUND STRUCTURES PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Redesign of Worst Congested Underground Structures Program will allow the redesign and rebuilding of congested and overcrowded manholes and vaults. There are several underground structures that were built and installed in place due

to the congestion of other utilities located in the street. Over time and as a result of previous equipment failure and replacement, as well as general load growth, these structures have become congested and pose a reliability risk due to the close proximity of other conductors. The benefits anticipated from this program will be seen by decreasing the likelihood of outages due to congestion in an underground structure. Although this program will not eliminate all outages, this program allows for Duke Energy to keep the impact isolated to one circuit

Q. PLEASE DESCRIBE THE URD SUBMERSIBLE TRANSFORMER UPGRADE PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The URD Submersible Transformer Upgrade Program will allow for the removal of overhead transformers that were installed in underground vaults and will further include installing pad mounted equipment and relocating all connections above ground. A submersible transformer is an overhead transformer that has been retrofitted with underground bushings so that it can be installed below grade. These installations were prevalent and customary prior to the time that pad mounted transformers became the standard. These submersible transformers present a safety and reliability concern, as a utility employee must lie on the ground to work on this equipment. Outages relating to submersible transformers can be lengthy. When these devices fail today, the Company replaces them with a ground mounted transformer. The replacement of submersible transformers will be performed in conjunction with the Cable Injection/Replacement Programs I previously described. These facilities exist in areas where services were installed

during the mid-1970s and 1980s throughout the Duke Energy Ohio service territory. The benefits anticipated from this program will positively impact customer experience through maintaining and enhancing reliability and the overall integrity of the Company's service area through decreasing the likelihood and the length of outages.

Q. PLEASE DESCRIBE THE DISTRIBUTION SUBSTATION PROTECTION PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Distribution Substation Protection Program will facilitate the upgrade of security measures, including but not limited to installation of cameras, higher fences, and other theft deterrents at Company substations in locations of high risk of theft. The Company is experiencing more frequent attempts at vandalism and theft at its substations. To the untrained person, accessing these areas, especially through an act of vandalism, presents a serious risk of injury or death. Equipment in these substations is used to provide service to customers. If equipment that is in service is stolen, an outage may occur. The equipment must be replaced, which, in turn, increases costs to all customers. Duke Energy Ohio intends to implement the described measures throughout its service territory with a priority focus in those areas at the highest risk of theft or vandalism. The benefits anticipated from this program will positively impact customer experience through maintaining and enhancing reliability, reducing O&M expense in the future, and improving safety.

Q. PLEASE DESCRIBE THE UPGRADE LIVE FRONT TRANSFORMERS PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Upgrade Live Front Transformers Program is designed to enable replacement of 40- to 50-year-old equipment, including but not limited to transformers without insulated HV bushings. Live front transformers were installed during the 1970s and they limit the Company's ability to expand its underground system. These devices are also difficult to maintain in that they must be fully de-energized before they can be worked on. This program would identify these devices and replace them. This program will encompass the entire Duke Energy Ohio service territory with a primary focus on three-phase transformers. The benefits anticipated from this program will positively impact customer experience by maintaining and enhancing reliability and the overall integrity of the Company's service area through decreasing the likelihood of outages and the length of outages.

Q. PLEASE DESCRIBE THE UPGRADE DISTRIBUTION TRANSFORMER SUBSTATION PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Upgrade Distribution Transformer Substations Program is intended to address unique and non-standard customer locations and installations. Duke Energy Ohio has several unique transformer installations that do not have a replacement alternative readily available. This current situation creates the potential for reliability issues, not to mention an extended down time for the customer, if the facilities need to be repaired. Non-standard transformers are not only a risk to the customer in relation to the longer duration of an outage, but also a concern to the Company. As a result of the evolution of the electric industry

and aesthetic attempts to keep transformers out of the public view, several installations in the Company's territory are non-standard and required special-order equipment at the time they were installed. This unique equipment is considered obsolete in many cases and, in order to continue serving customers with these types of installations, such equipment must be upgraded before a failure occurs. The program would identify and facilitate updating of these stations before an equipment failure occurs. This program will encompass the entire Duke Energy Ohio service territory. The benefits anticipated from this program will positively impact customer experience through maintaining and enhancing reliability and the overall integrity of the Company's service area through decreasing the likelihood of outages and the length of outages.

Q. PLEASE DESCRIBE THE PILC REPLACEMENT PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The PILC Replacement program includes replacement of old paper and lead substation exit cables from the substation to the overhead/underground lines. The PILC cables are approaching the end of their useful life and this program would accelerate replacement. These cables are the first section of a feeder and, in most cases, their failure could cause an outage to thousands of customers. The PILC cable was a standard installation for many years. However, the oil and papers have been breaking down over time. Infrared scanning has determined that replacement of the PILC cables must be accelerated. This program will encompass the entire Duke Energy Ohio service territory with a primary focus on 13kv substations. The benefits anticipated from this program will positively

impact customer experience through maintaining and enhancing reliability and the overall integrity of the Company's service area through decreasing the likelihood of outages and the length of outages.

Q. PLEASE DESCRIBE THE DISTRIBUTION OPERATIONS CENTER AND MOBILE LOGISTICS MODERNIZATION PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Distribution Operations Center and Mobile Logistics Modernization Program focuses on optimizing and upgrading the Company's facilities to a more mobile workforce. The program includes modernizing distribution office data equipment and mobile technology and exploring opportunities for consolidating activities. Utility trucks are carrying Mobile Data Terminals that need to be docked nightly, as well as tablets and other handheld equipment. Each district will have an Information Technology room where these devices will be kept and docked for upgrades. Duke Energy Ohio is investing in its operation centers to provide more timely response and to increase customer satisfaction. Once implemented, the program will provide for real-time updates from the field during construction and outage events. This program will encompass Duke Energy Ohio's Service Distribution Operation Centers. The benefits anticipated from this program will positively impact customer experience through improved communications and information for customers, thereby enhancing reliability and the overall integrity of the Company's distribution system.

Q. PLEASE DESCRIBE THE OWNERSHIP OF UNDERGROUND RESIDENTIAL SERVICES PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. Upon implementation, the Ownership of Underground Residential Services Program would allow Duke Energy Ohio to take ownership and control of customer underground services that must be repaired or replaced. Currently, Duke Energy Ohio owns and maintains all overhead electric service drops to the customers' premises. However, the underground services remain the sole responsibility of the customers. Consequently, if a repair is needed on these underground services, it is the customer's responsibility. The Company is proposing to change this going forward such that if an underground service needs repair or replacement, the Company would make such a repair, take ownership of the service, and then become responsible for future maintenance. Duke Energy Ohio's proposal to take over ownership of these services will allow for faster restoration for the customer and will decrease customer confusion relating to ownership of and responsibility for these services. Many other utilities in the United States, including five of Duke Energy's seven regulated companies, install, own, and maintain the underground residential services. This program will encompass the entire Duke Energy Ohio service territory where these underground services exist. The benefits anticipated from this program will positively impact customer experience through maintaining and enhancing reliability and the overall integrity of the Company's service area through decreasing the likelihood of outages and the length of outages.

Q. PLEASE DESCRIBE THE CONVERSION OF OLD 4KV FEEDERS PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Conversion of Old 4kV Feeders Program facilitates the continuing upgrade of primary distribution voltage along 4kV Feeders. These feeders were installed more than 50 years ago. The current 4kv stations are expensive to maintain due to age and provide a significant limit on future expansion. The additional funding through this program will accelerate the upgrades and allow for more load capability. This program would accelerate the schedule into a 5-year plan from the current 10-year plan so as to allow for greater availability for capacity and improved reliability through replacement of old equipment. This program will encompass the entire Duke Energy Ohio service territory, with a focus on the older suburbs. The benefits anticipated from this program will positively impact customer experience through maintaining and enhancing reliability and the overall integrity of the Company's service area through decreasing the likelihood of outages and the length of outages.

Q. PLEASE DESCRIBE THE RECLOSER REPLACEMENT PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Recloser Replacement Program accelerates the replacement and upgrade of reclosers to electronic controls. The recloser plays a key role in protecting the main line of the circuit and isolating outages to a smaller group of customers. Annually, this replacement encompasses approximately 100 locations or 300 units on the system. This program will encompass the entire Duke Energy Ohio service territory. The benefits anticipated from this program will positively impact

customer experience through maintaining and enhancing reliability and the overall integrity of the electric distribution system.

Q. PLEASE DESCRIBE THE CIRCUIT SECTIONALIZATION PROGRAM, ITS PURPOSE, AND THE ANTICIPATED BENEFITS.

A. The Circuit Sectionalization Program, as the name implies, sectionalizes Duke Energy Ohio's distribution feeders to be broken down into smaller isolated segments rather than all relaying back to a large device. This program works in conjunction with the Company's Transformer Retrofit and Recloser Replacement Program, to break down the distribution feeders into smaller circuits with relays and protection schemes. This helps isolate outages, when they occur, to smaller groups and keeps the main lines energized. This program will encompass the entire Duke Energy Ohio service territory. The benefits anticipated from this program will positively impact customer experience through maintaining and enhancing reliability by reducing the number of customers impacted by outages and the enhancing overall integrity of the electric distribution system.

Q. ARE THE PROGRAMS YOU DESCRIBED ABOVE THE ONLY PROGRAMS TO BE INCLUDED IN THE INFRASTRUCTURE MODERNIZATION PLAN?

A. As I previously stated, the Company anticipates that infrastructure modernization plan will continue to evolve with technological advances or changes in field conditions to include additional programs or revisions and modifications to the initial programs over time. The Company needs to be able to modify the list of programs and to shift dollars to similar or new programs as technology evolves.

An example of such a shift would be through our URD cable replacement program where there may be a future introduction of new injection technologies.

The Company continually strives to find new and better ways to employ technology, proactively address system infrastructure issues in a cost-effective way, and improve reliability.

Q. ARE THE FORECASTED COSTS LISTED IN MWA-7, THE INFRASTRUCTURE MODERNIZATION PLAN, REASONABLE FOR THE WORK AND SERVICES TO BE PERFORMED?

A. Yes. The costs forecasted for Rider DCI are consistent with other costs incurred through the normal operation of the Company. Rider DCI will allow timely recovery of the Company's costs for the programs included therein, to ensure the Company can continue these programs. The rider will be trued-up for actual costs and audited by the Commission to ensure that the Company is not over-recovering.

Q. HOW WILL THE COMPANY'S PERFORMANCE UNDER THE INFRASTRUCTURE MODERNIZATION PLAN BE MEASURED?

A. Performance will be measured primarily through the reporting indices I described previously. It is anticipated that these programs will allow the Company to maintain and improve CAIDI, SAIFI, and SAIDI.

IV. CONCLUSION

Q. WERE ATTACHMENTS MWA-1 THROUGH MWA-7 COMPILED BY YOU OR UNDER YOUR SUPERVISION?

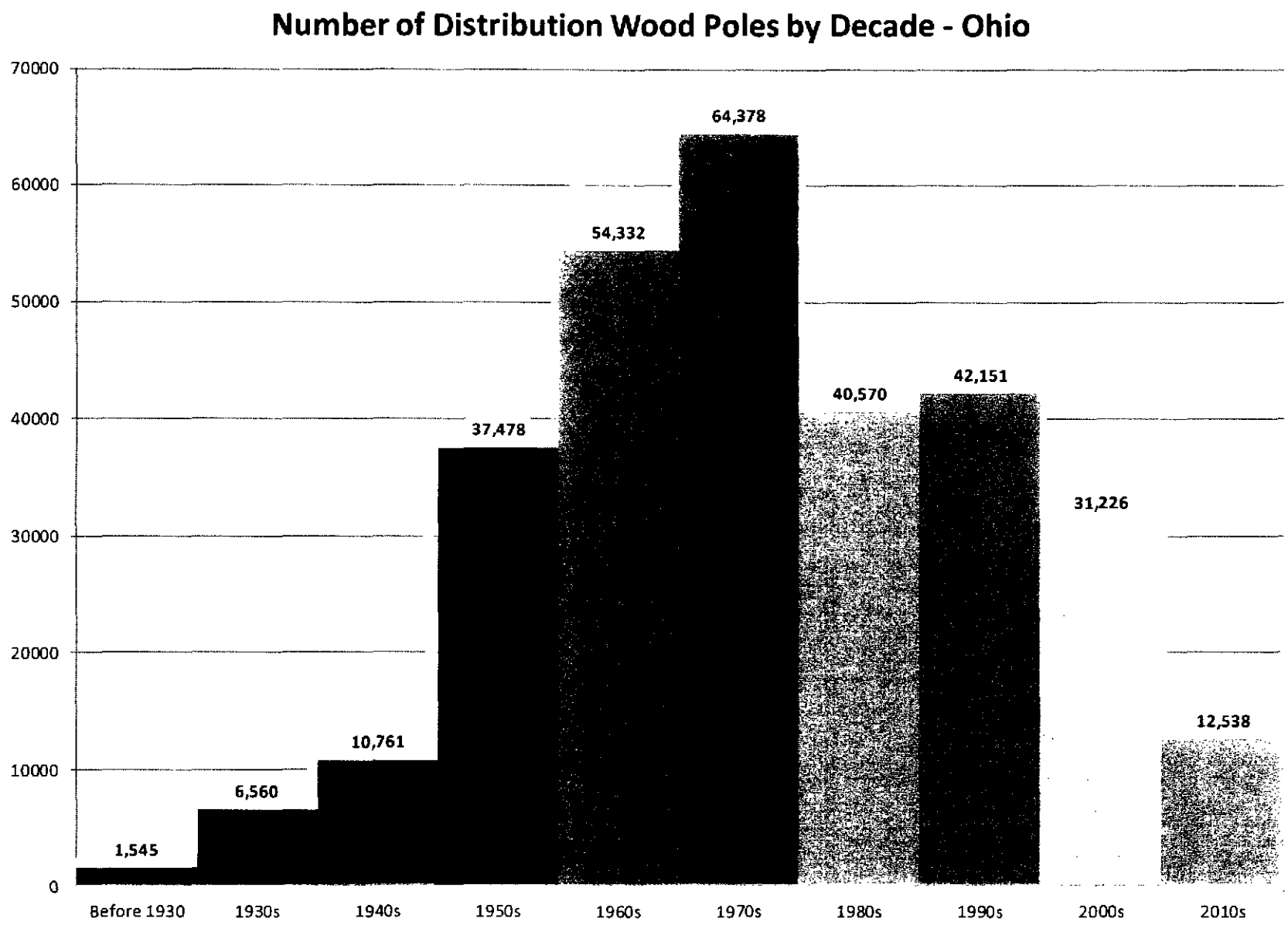
A. Yes.

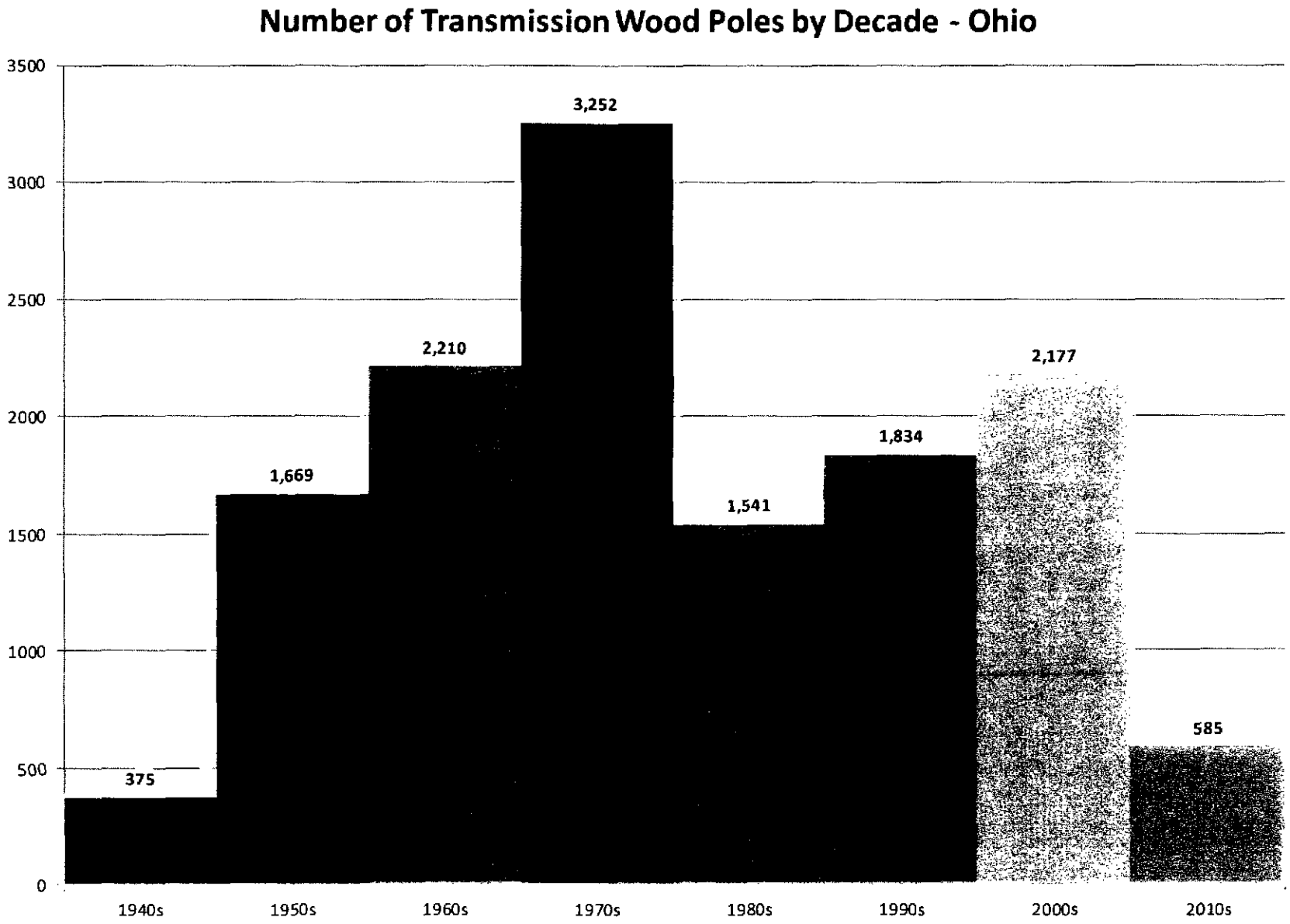
Q. IS THE INFORMATION CONTAINED IN ATTACHMENTS MWA-1 THROUGH MWA-7 TRUE AND ACCURATE TO THE BEST OF YOUR KNOWLEDGE AND BELIEF?

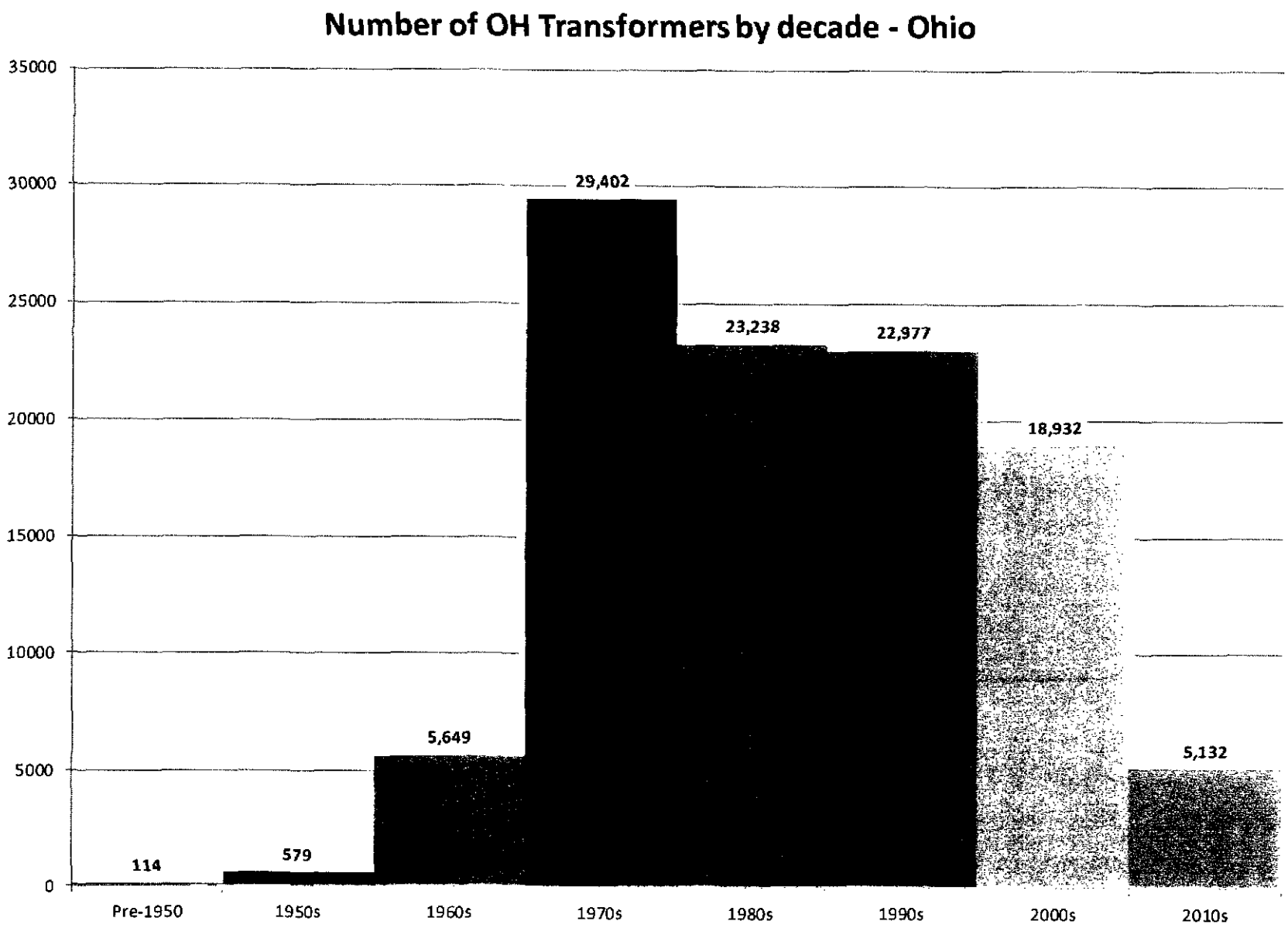
A. Yes.

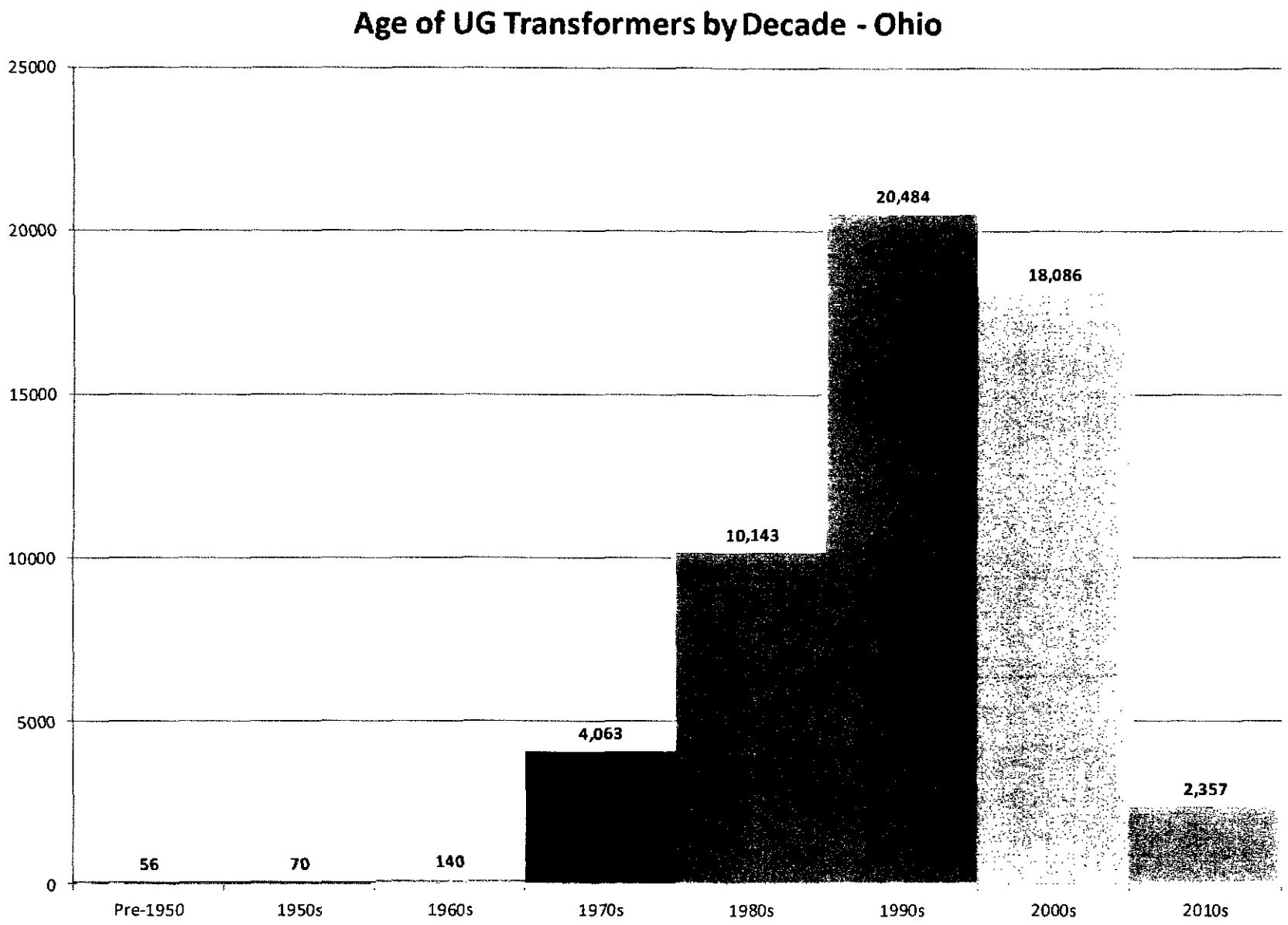
Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

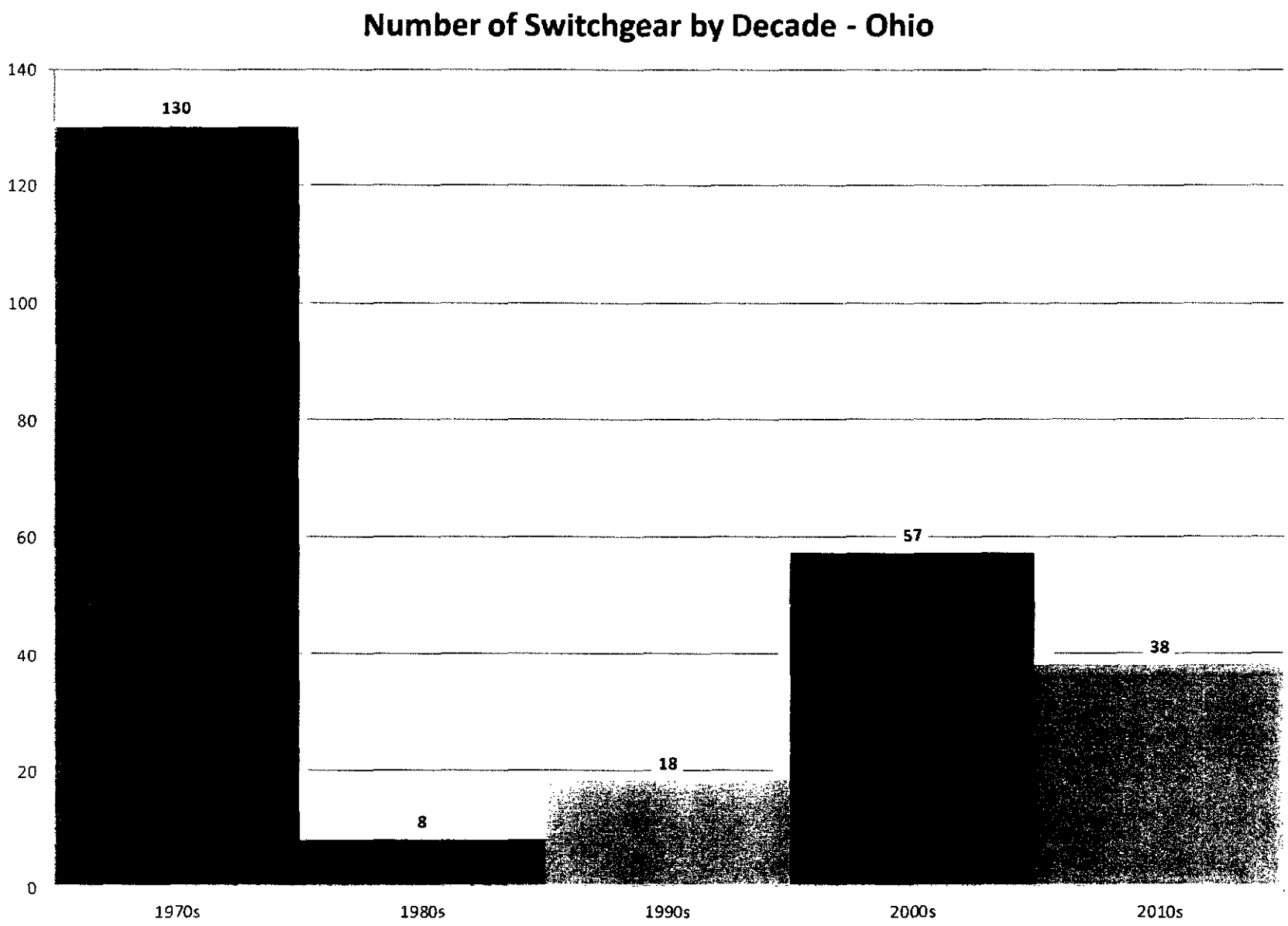
A. Yes.


Number of Distribution Wood Poles by Decade - Ohio
70000
60000
50000
40000
30000
20000
10000
0
1,545
6,560
10,761
37,478
54,332
64,378
40,570
42,151
31,226
12,538
Before 1930
1930s
1940s
1950s
1960s
1970s
1980s
1990s
2000s
2010s


Number of Transmission Wood Poles by Decade - Ohio
3500
3000
2500
2000
1500
1000
500
0
375
1,669
2,210
3,252
1,541
1,834
2,177
585
1940s
1950s
1960s
1970s
1980s
1990s
2000s
2010s


Number of OH Transformers by decade - Ohio
35000
30000
25000
20000
15000
10000
5000
0
114
579
5,649
29,402
23,238
22,977
18,932
5,132
Pre-1950
1950s
1960s
1970s
1980s
1990s
2000s
2010s


Age of UG Transformers by Decade - Ohio
25000
20000
15000
10000
5000
0
56
70
140
4,063
10,143
20,484
18,086
2,357
Pre-1950
1950s
1960s
1970s
1980s
1990s
2000s
2010s


Number of Switchgear by Decade - Ohio
140
120
100
80
60
40
20
0
130
8
18
57
38
1970s
1980s
1990s
2000s
2010s

ATTACHMENT MWA- 2

CONFIDENTIAL PROPRIETARY TRADE SECRET

ATTACHMENT MWA- 3

CONFIDENTIAL PROPRIETARY TRADE SECRET

ATTACHMENT MWA- 4

CONFIDENTIAL PROPRIETARY TRADE SECRET

Ohio PUC R bility Residential Sur y Results

Q1-14 Up e

Prepared By

Duke Energy Market Research & Customer Insights

DUKE ENERGY®

Completed Survey Counts

- Online survey emailed to a random sample of residential OH customers
- Email invitations mailed in Waves

Residential Regulated

	Q1-13	Q2-13	Q3-13	Q4-13	YE-13	Q1-14
Sample Size	1350	1350	1050	1350	5100	1250
Completed Surveys	100	88	56	81	325	80
Response Rate	7%	7%	5%	6%	6%	6%

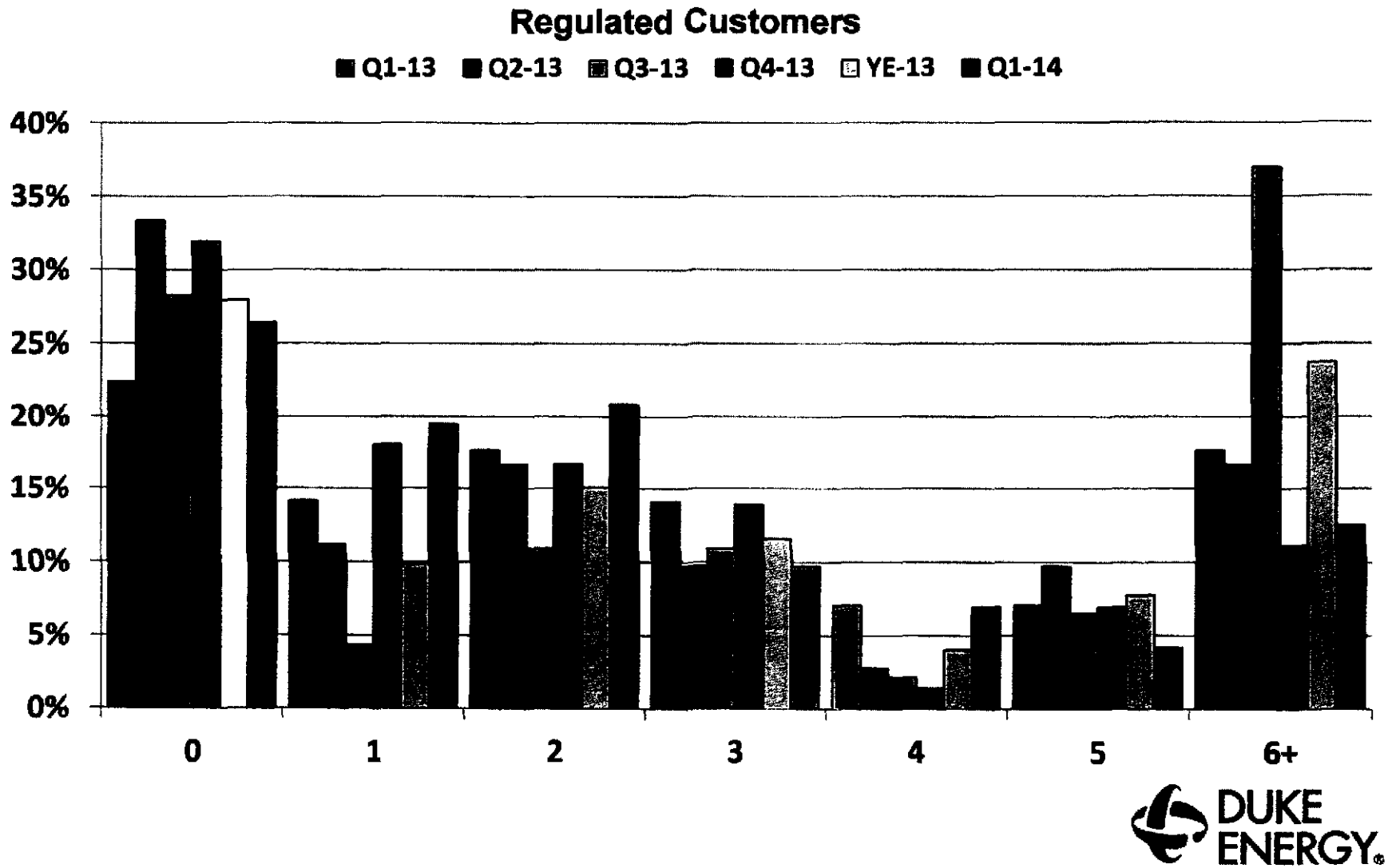
Residential Non-Regulated

	Q1-13	Q2-13	Q3-13	Q4-13	YE-13	Q1-14
Sample Size	575	190	450	570	1785	555
Completed Surveys	39*	63	48	52	202	43
Response Rate	7%	33%	11%	9%	11%	8%

*Use caution when interpreting results; low sample sizes

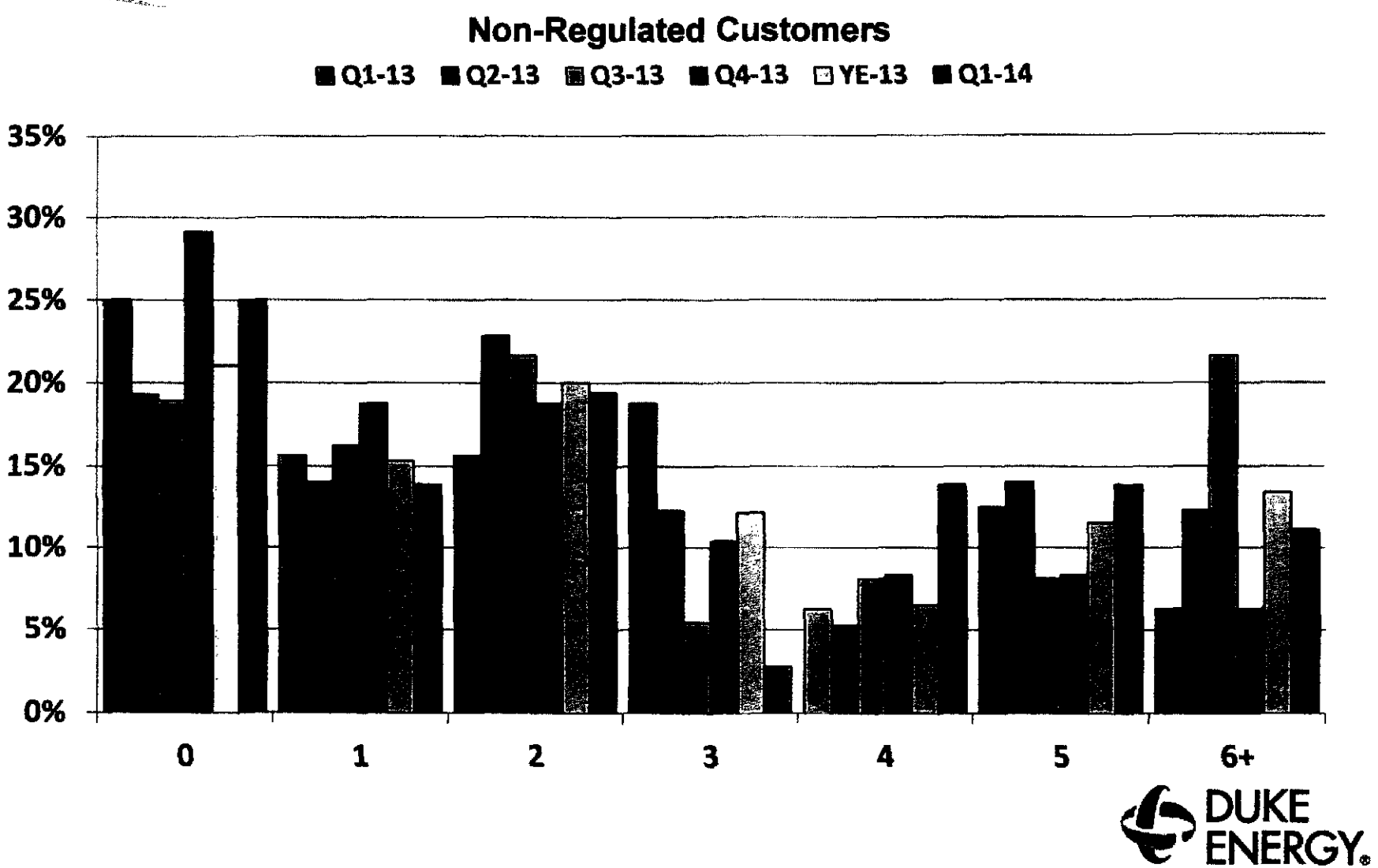
DUKE ENERGY.

How many brief interruptions of 5 minutes or less have you experienced at your home in the past 12 months?



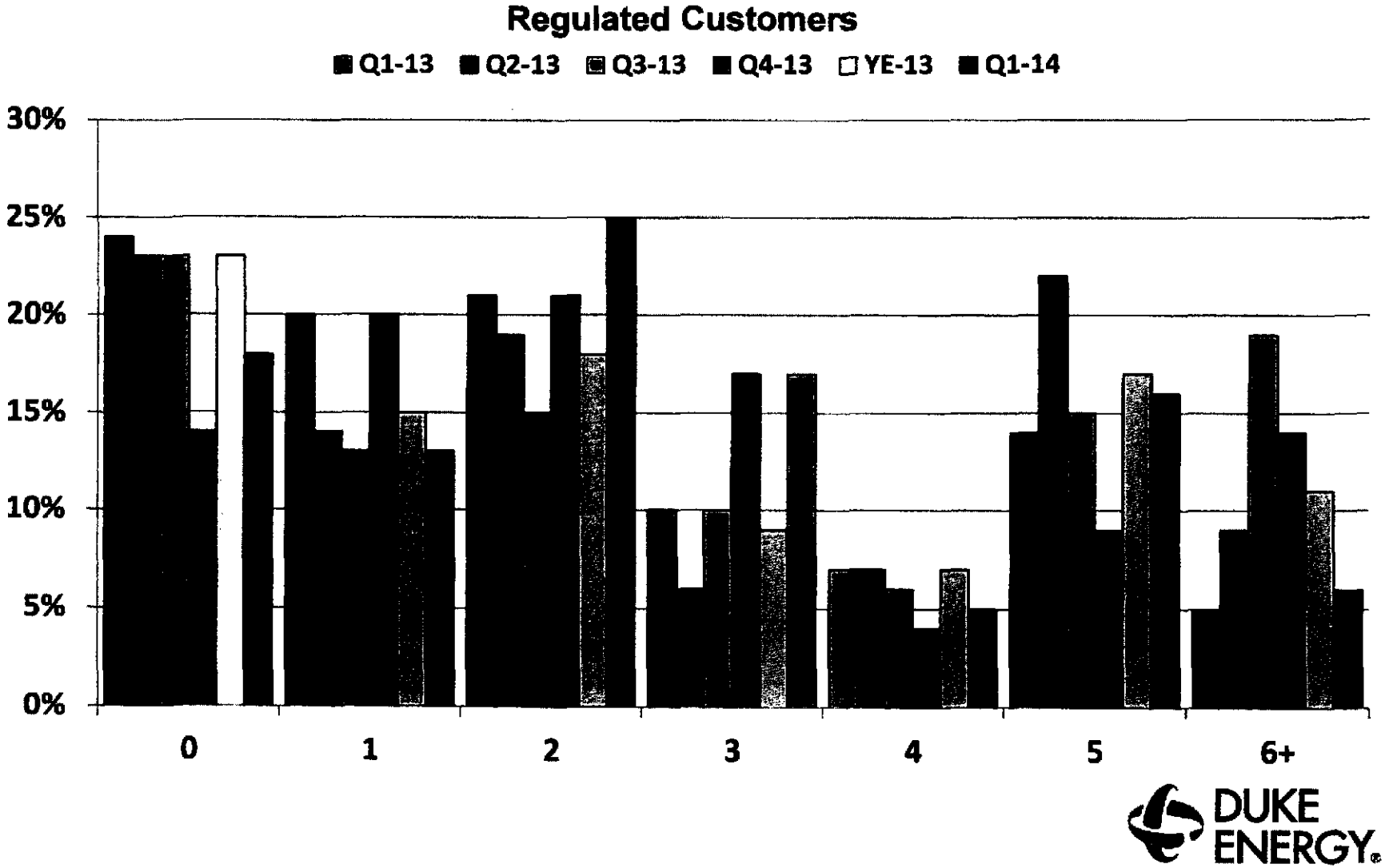
DUKE ENERGY®

How many brief interruptions of 5 minutes or less have you experienced at your home in the past 12 months?



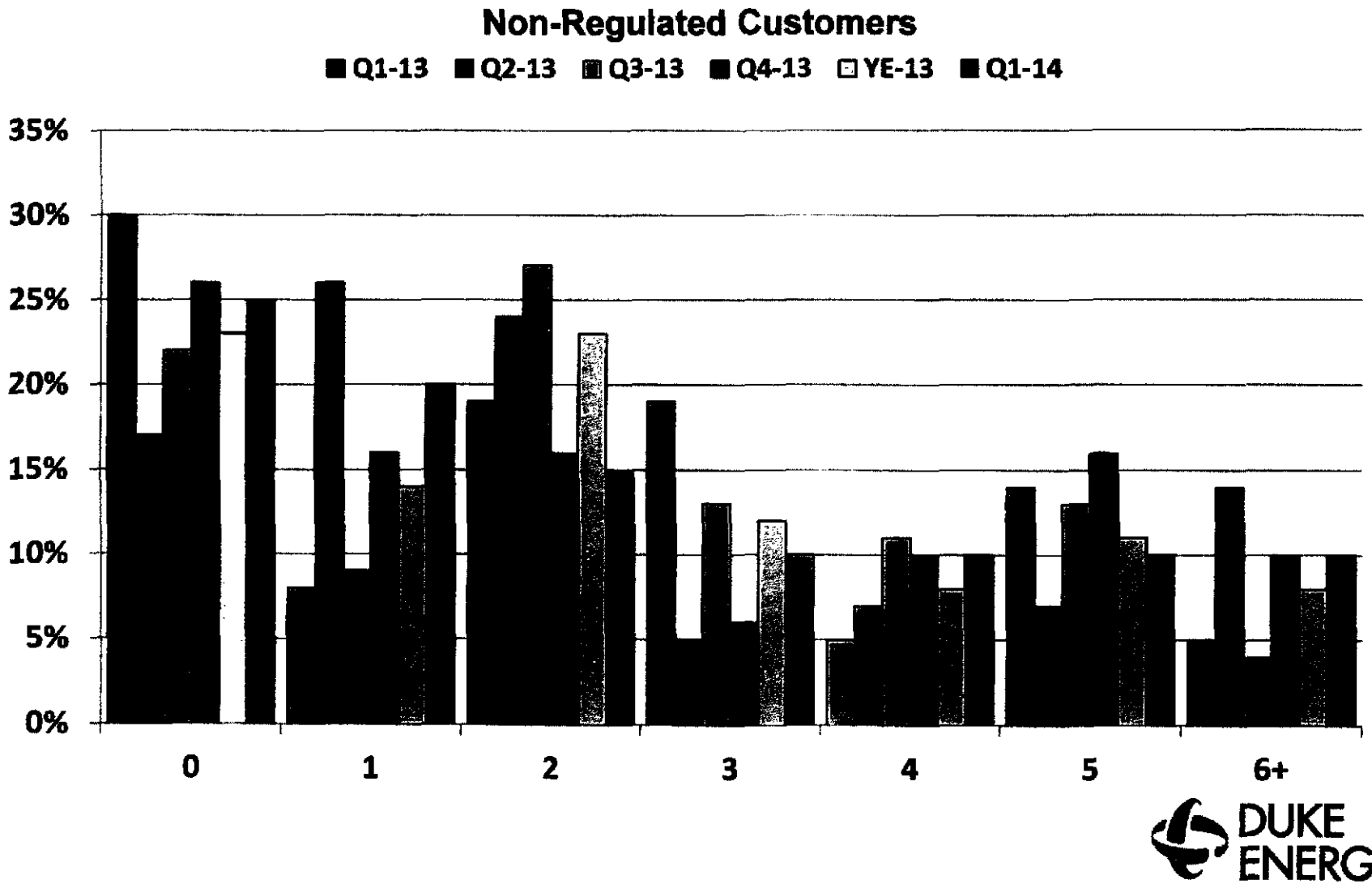
DUKE ENERGY®

How many brief interruptions of 5 minutes or less would you consider acceptable during a 12 month period?



DUKE ENERGY®

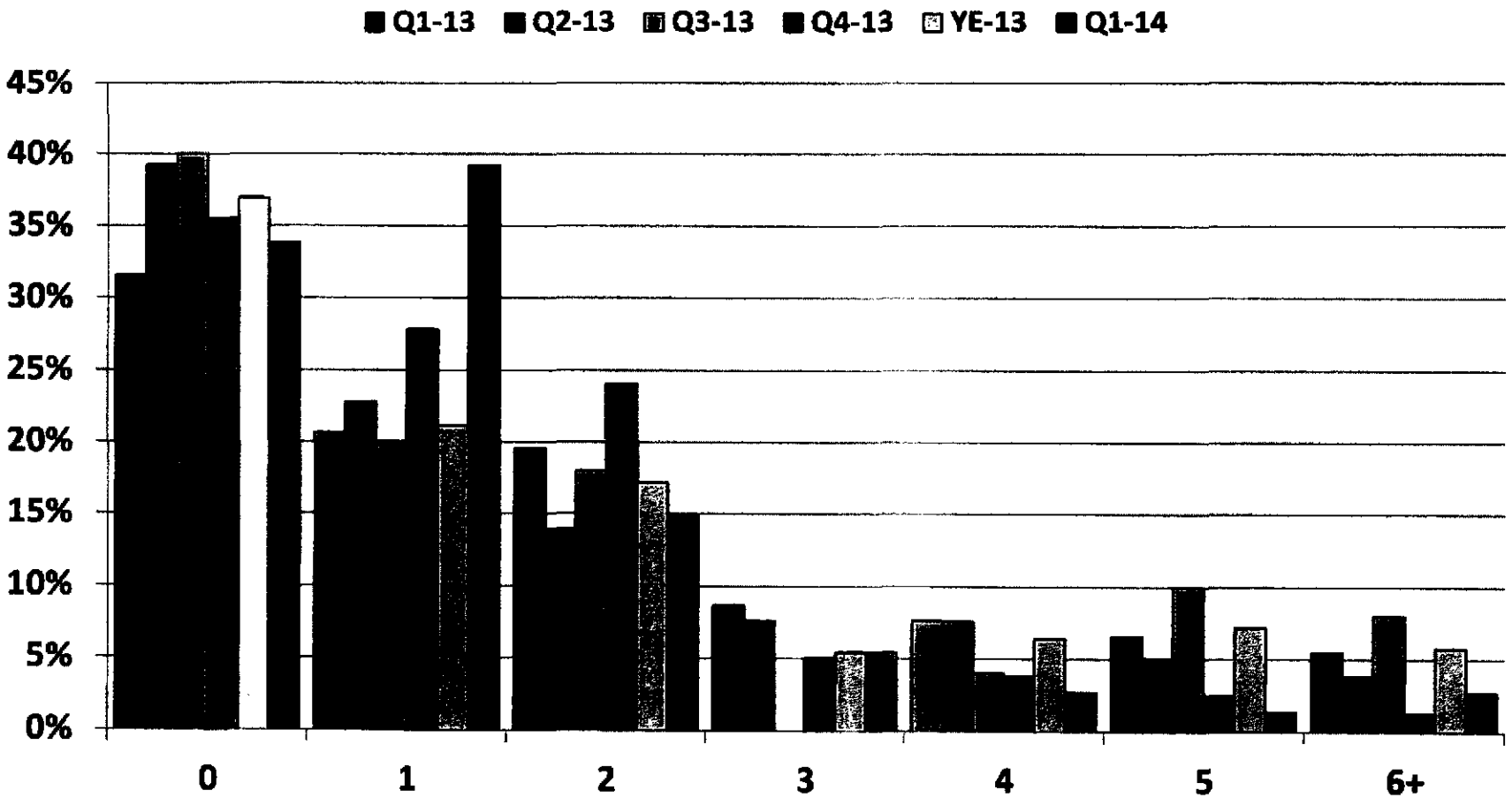
How many brief interruptions of 5 minutes or less would you consider acceptable during a 12 month period?



DUKE ENERGY.

How many lengthy interruptions of more than 5 minutes have you experienced at your home in the past 12 months?

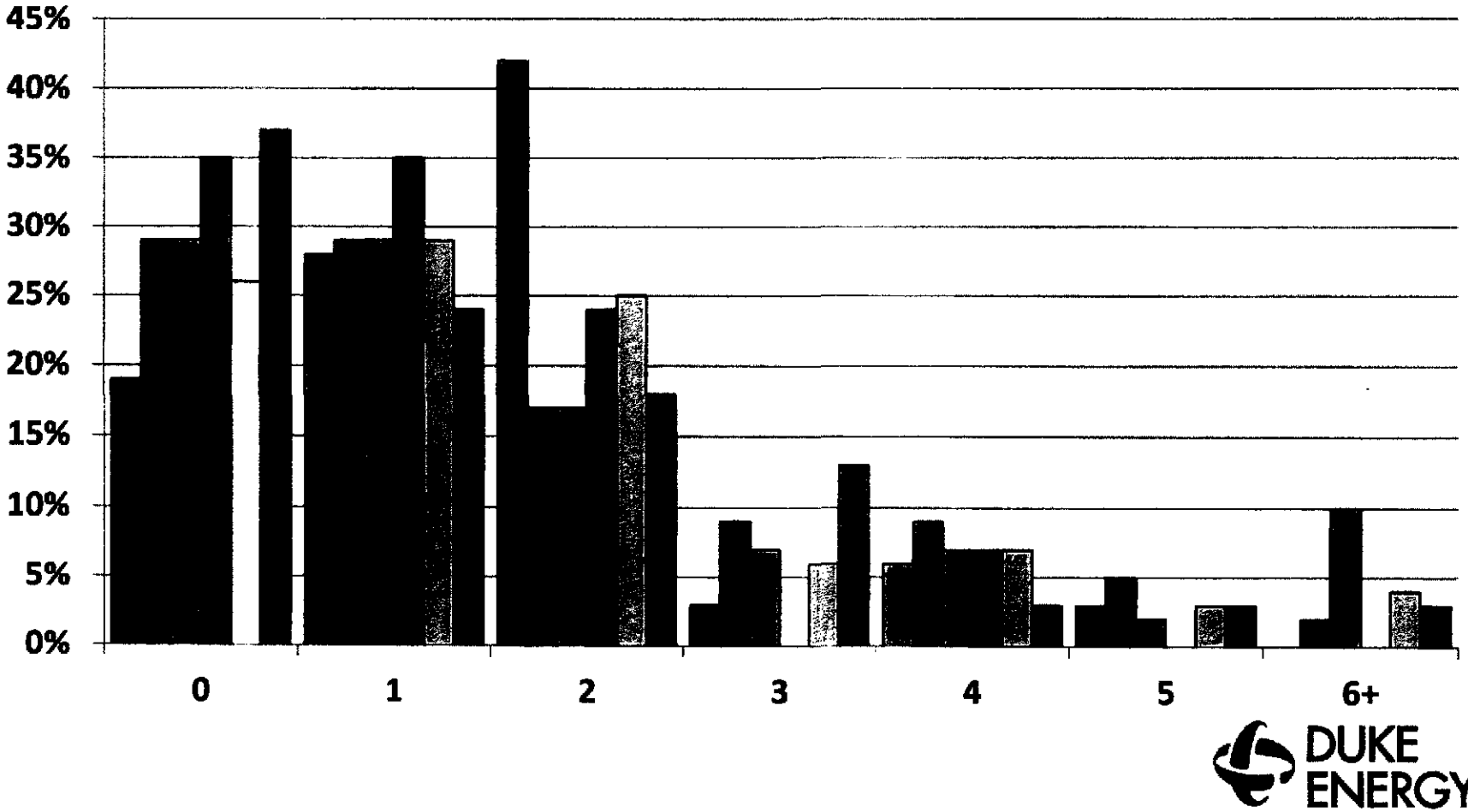
Regulated Customers



DUKE ENERGY®

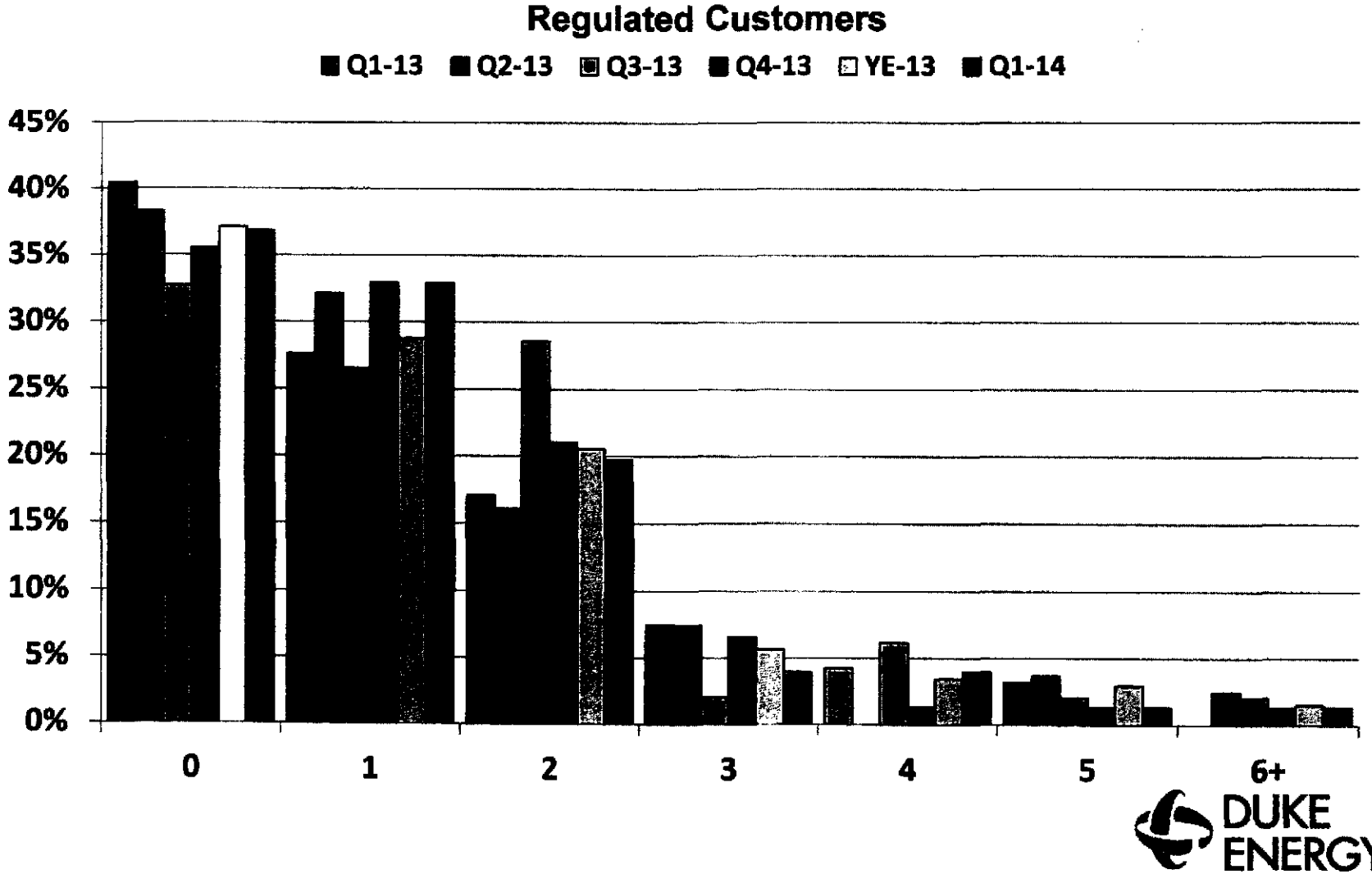
How many lengthy interruptions of more than 5 minutes have you experienced at your home in the past 12 months?

Non-Regulated Customers



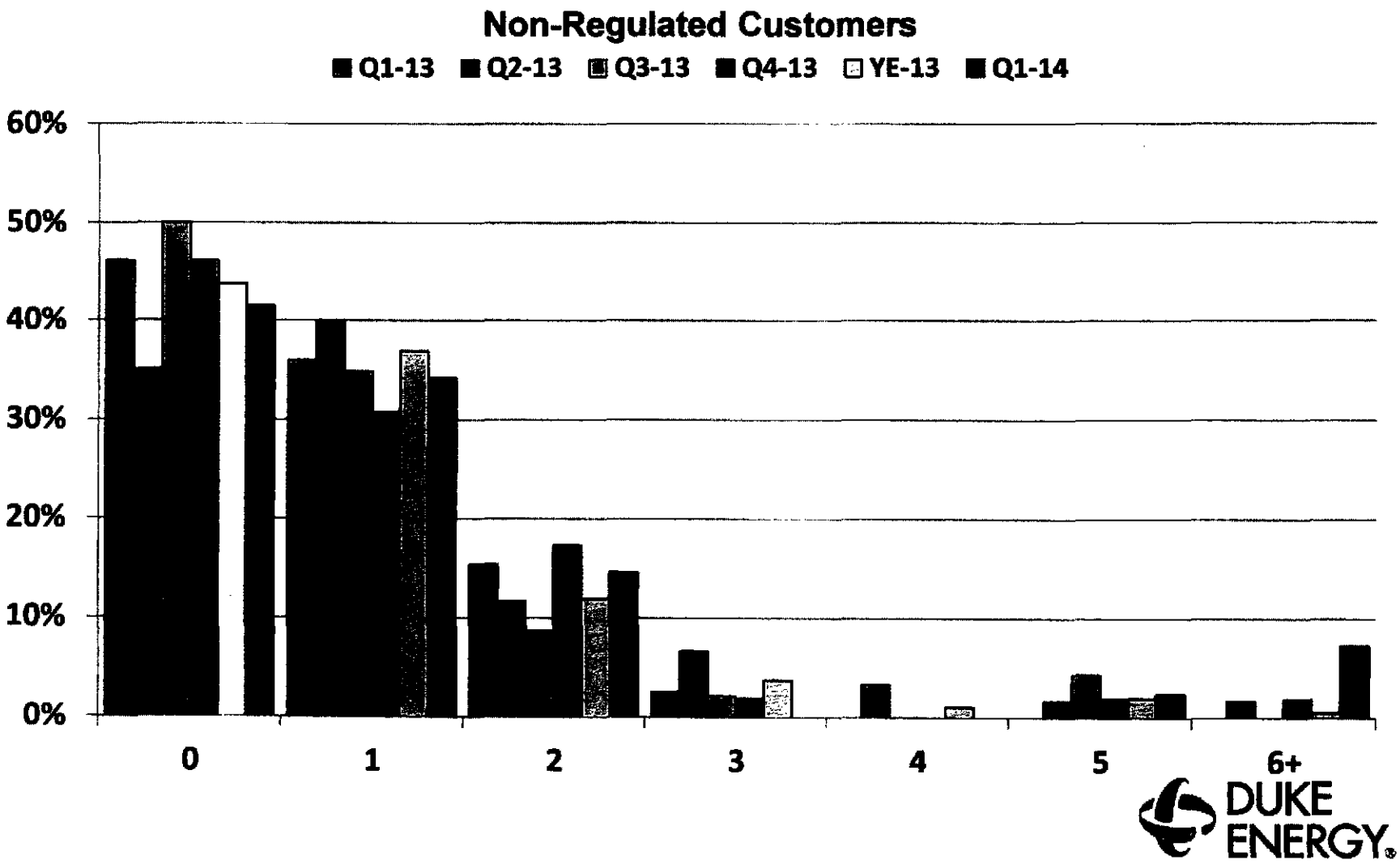
DUKE ENERGY®

How many lengthy interruptions of more than 5 minutes would you consider acceptable during a 12 month period?



DUKE ENERGY®

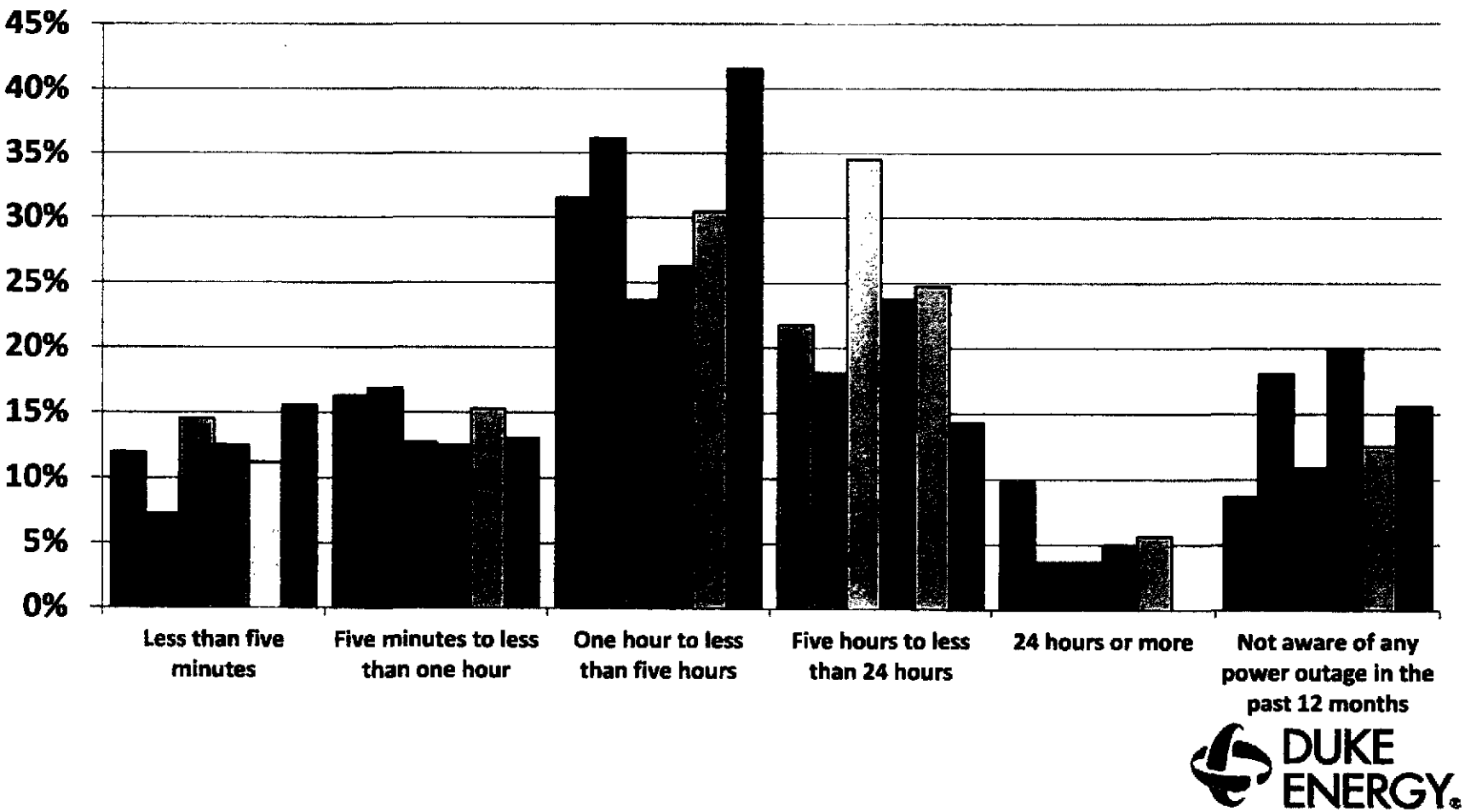
How many lengthy interruptions of more than 5 minutes would you consider acceptable during a 12 month period?



DUKE ENERGY®

Would you estimate your longest power outage in the past 12 months to be:

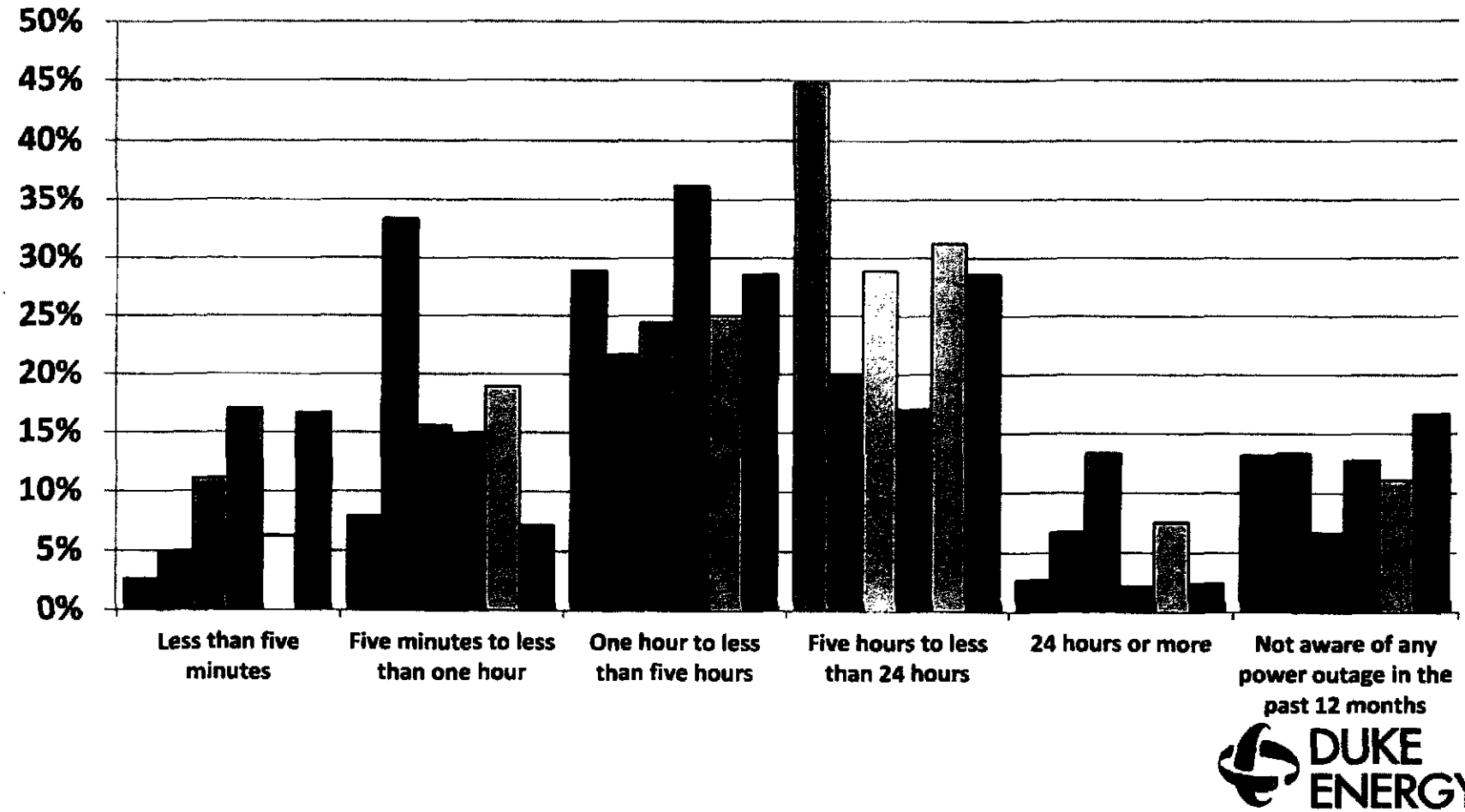
Regulated Customers



DUKE ENERGY.

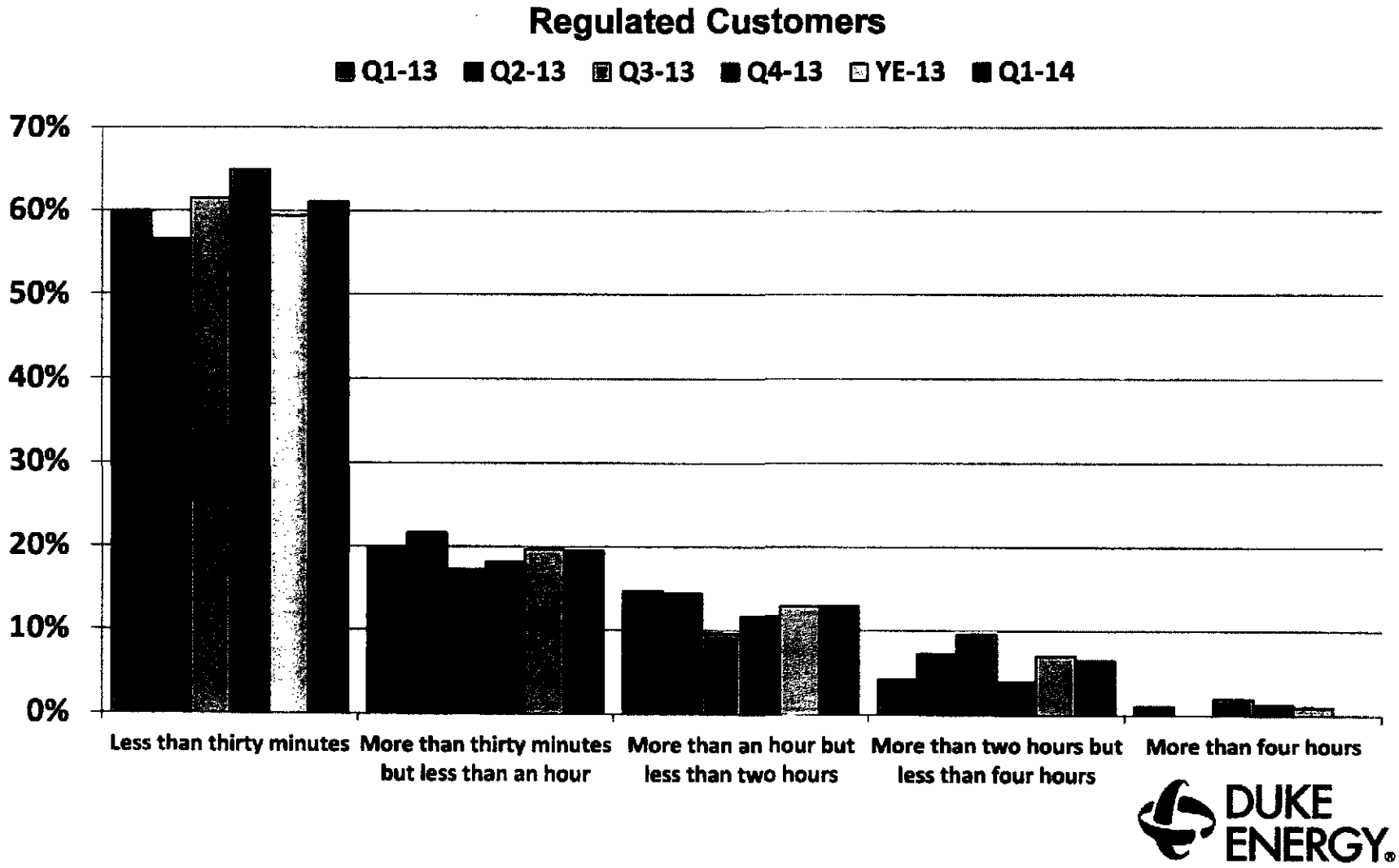
Would you estimate your longest power outage in the past 12 months to be:

Non-Regulated Customers



DUKE ENERGY®

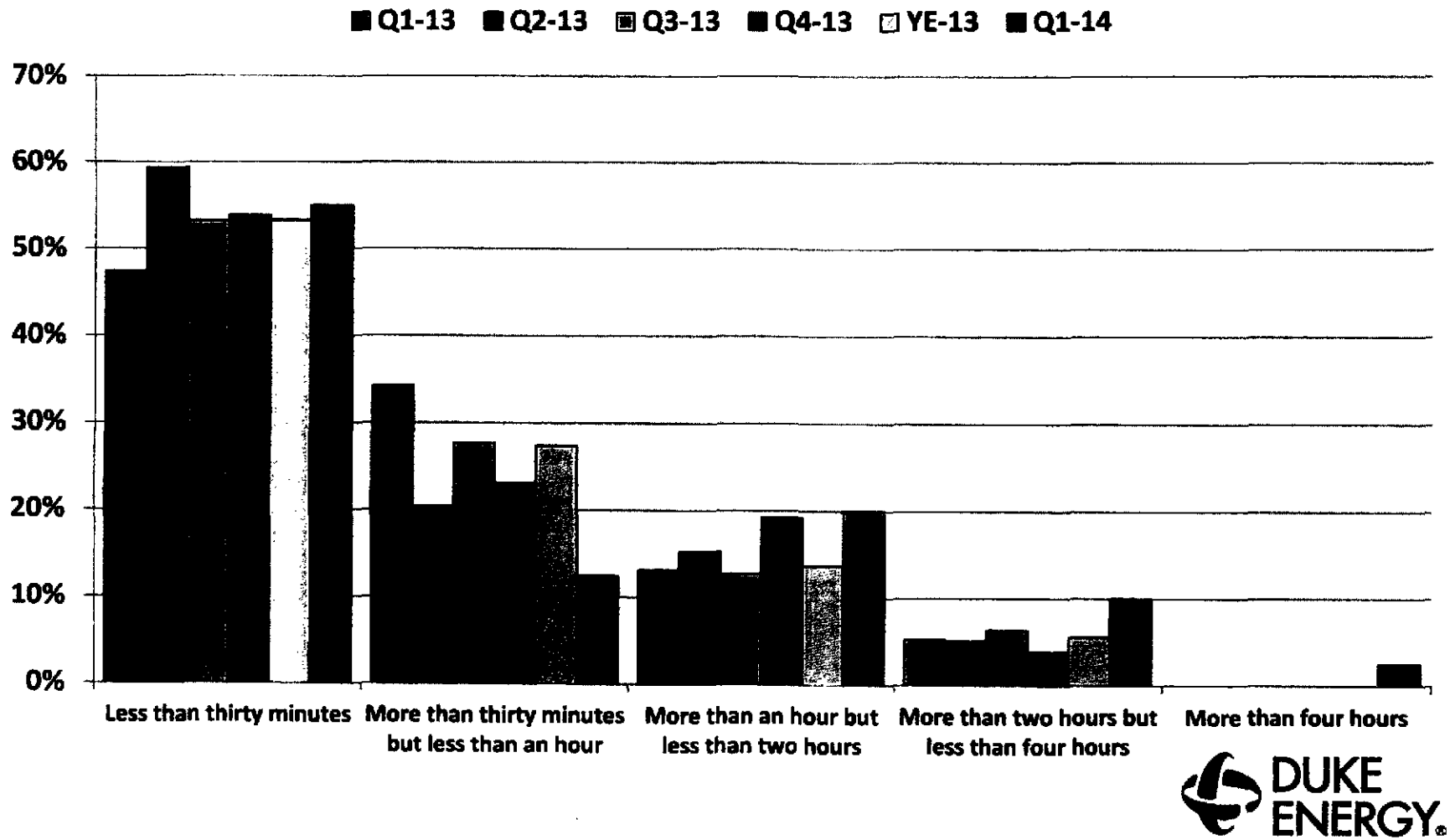
What do you consider to be an acceptable length of a prolonged outage that was not storm related?



DUKE ENERGY®

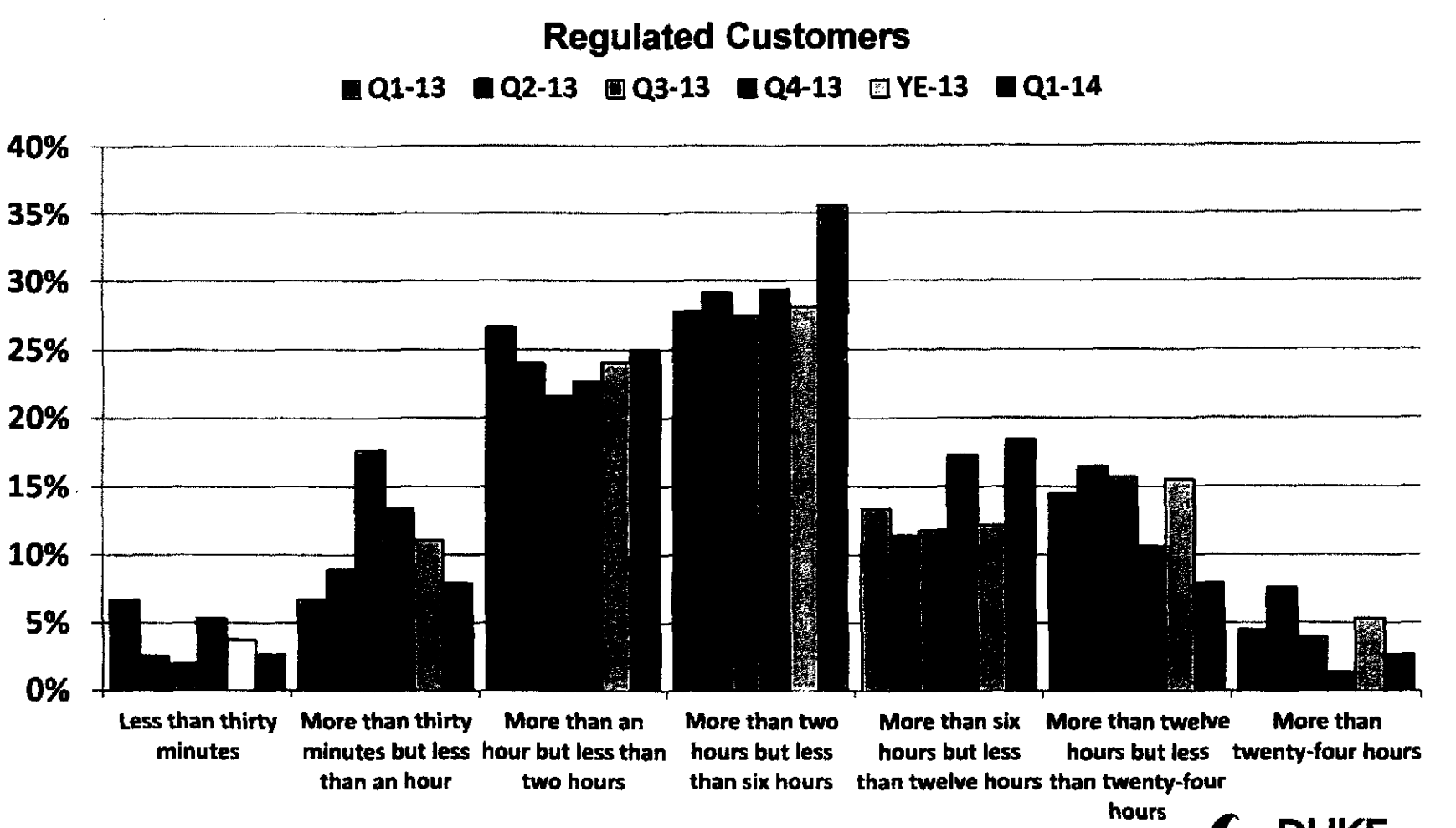
What do you consider to be an acceptable length of a prolonged outage that was not storm related?

Non-Regulated Customers



DUKE ENERGY.

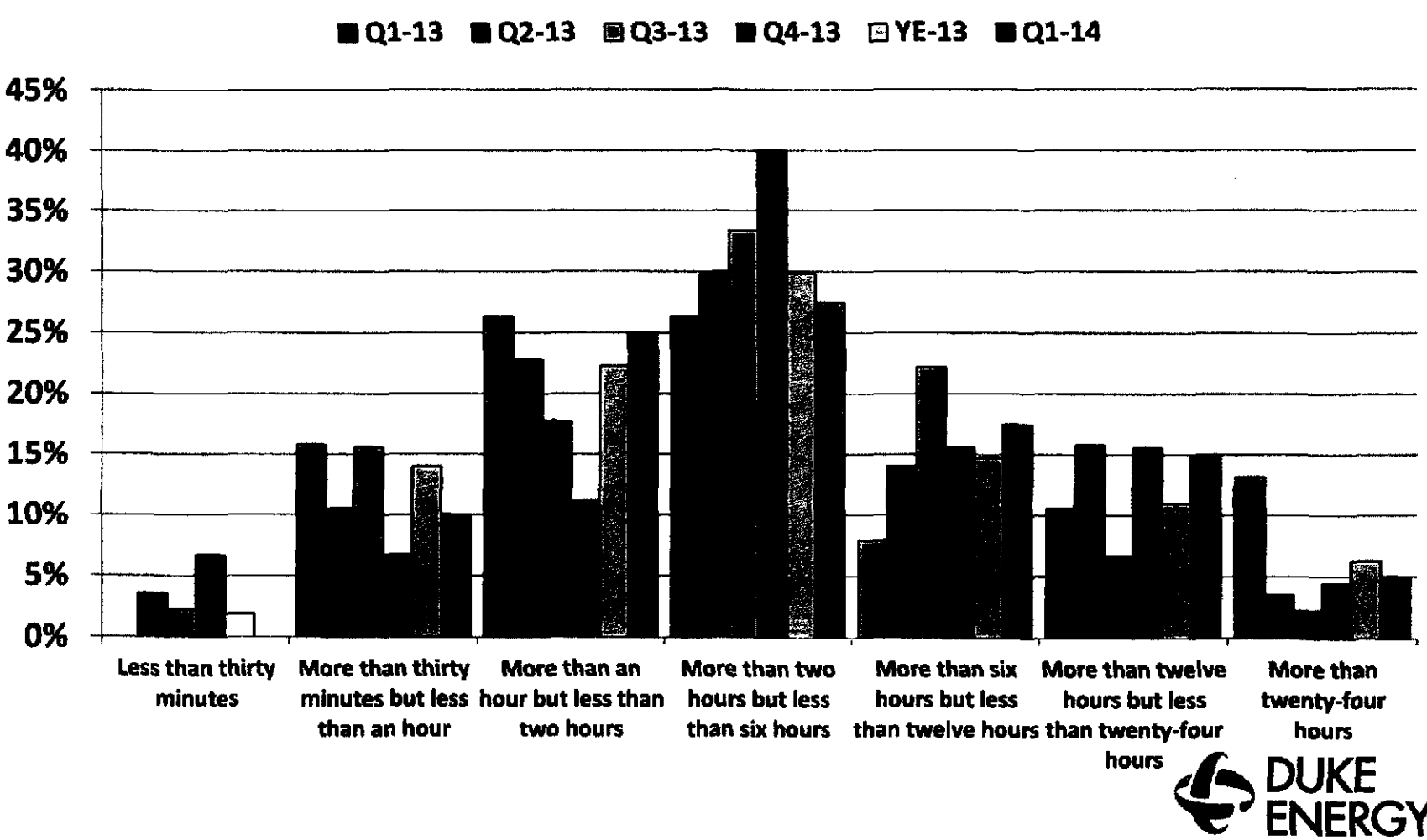
What do you consider to be an acceptable length of a prolonged outage that was storm related?



DUKE ENERGY®

What do you consider to be an acceptable length of a prolonged outage that was storm related?

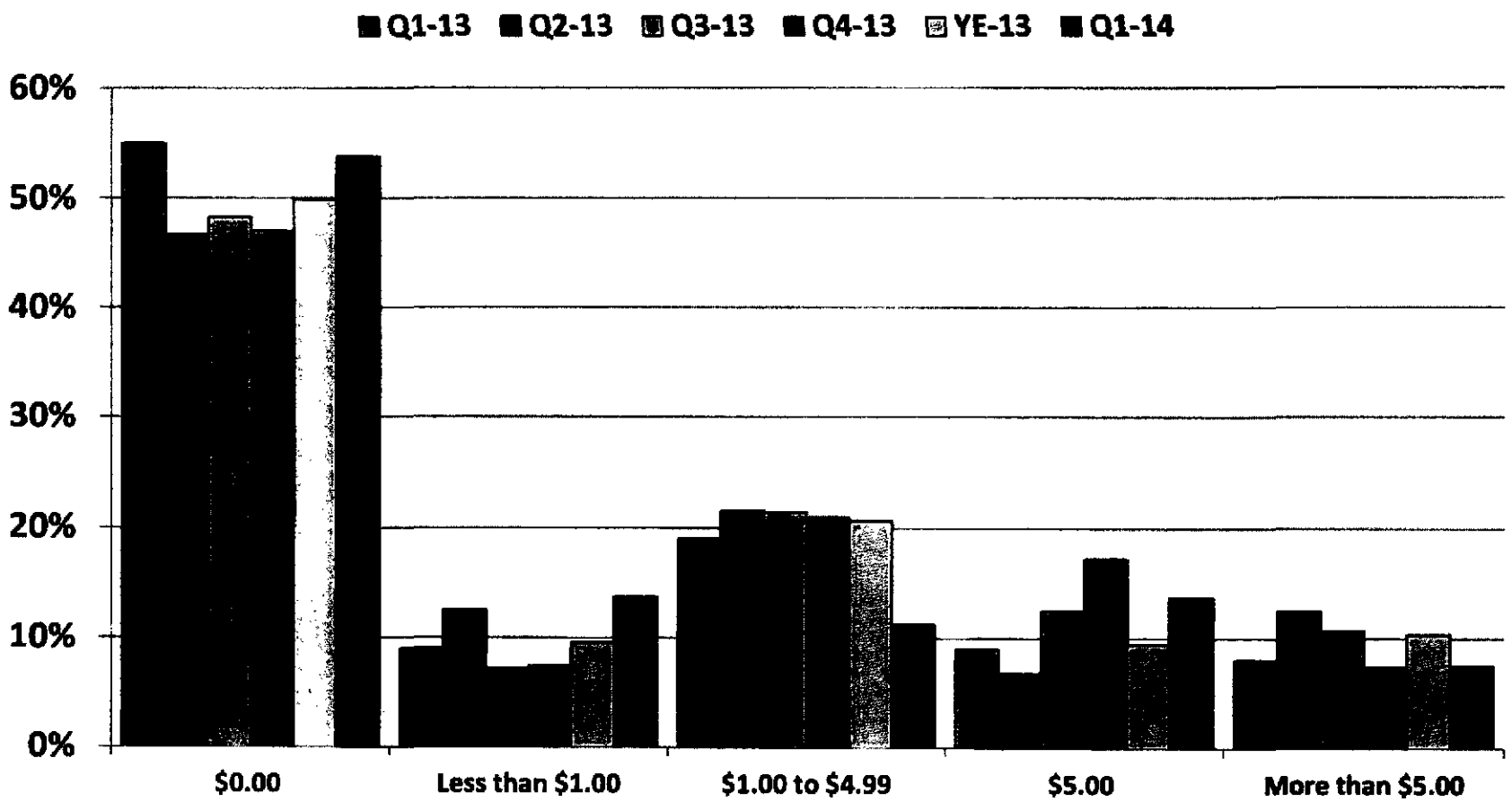
Non-Regulated Customers



DUKE ENERGY®

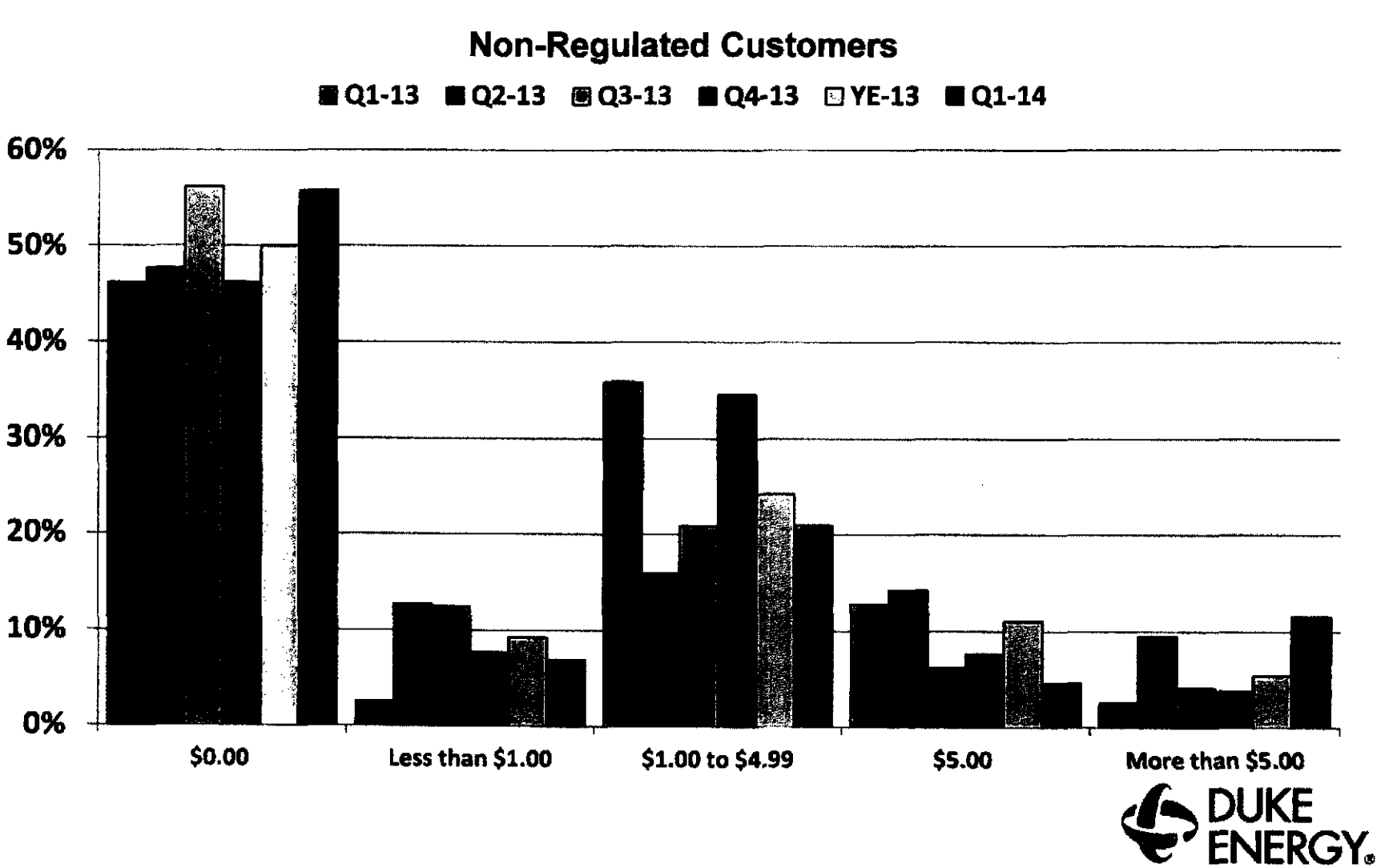
During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a <u>1 hour</u> electric service outage to your residence?

Regulated Customers



DUKE ENERGY®

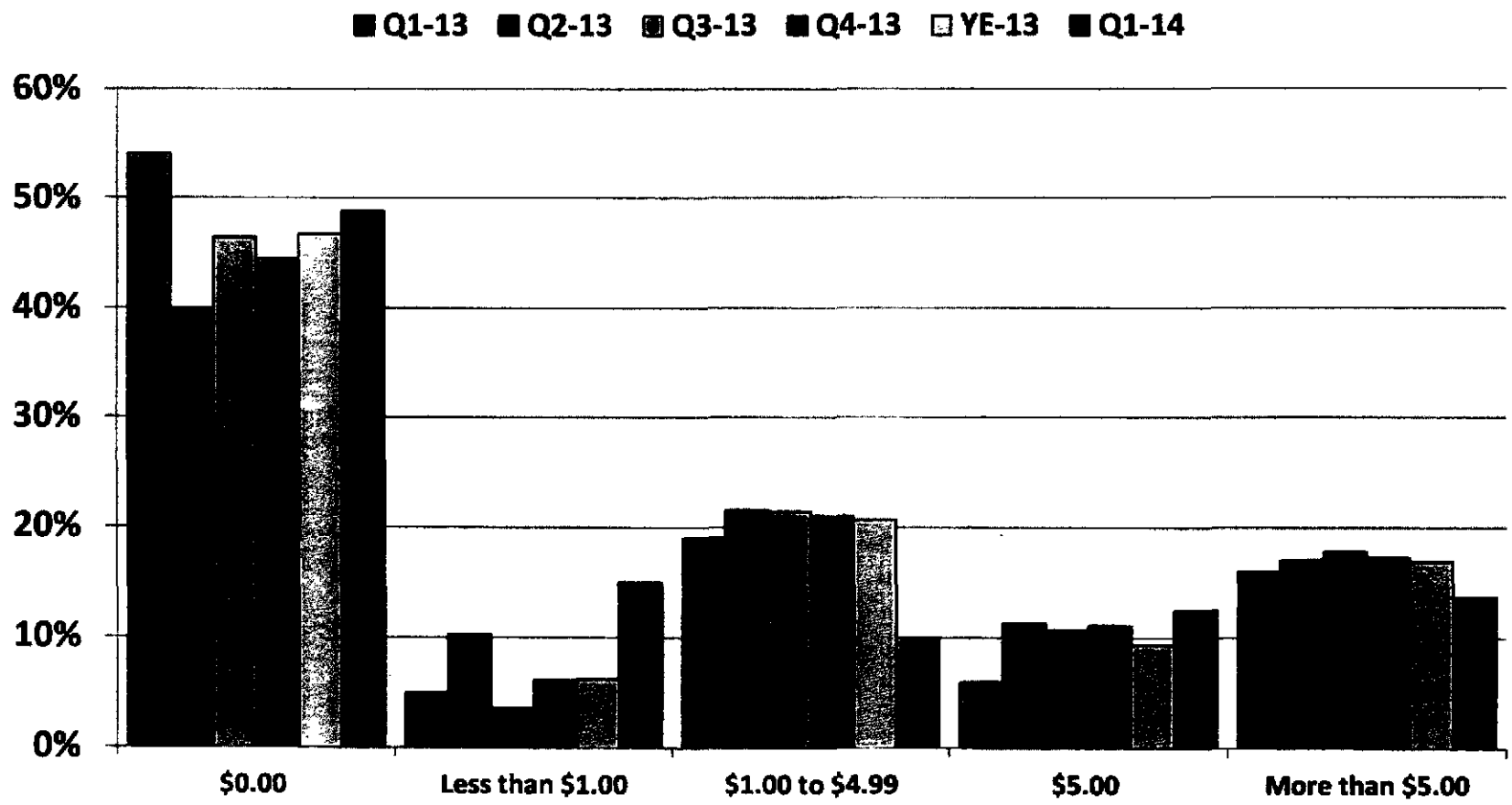
During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 1 hour electric service outage to your residence?



DUKE ENERGY®

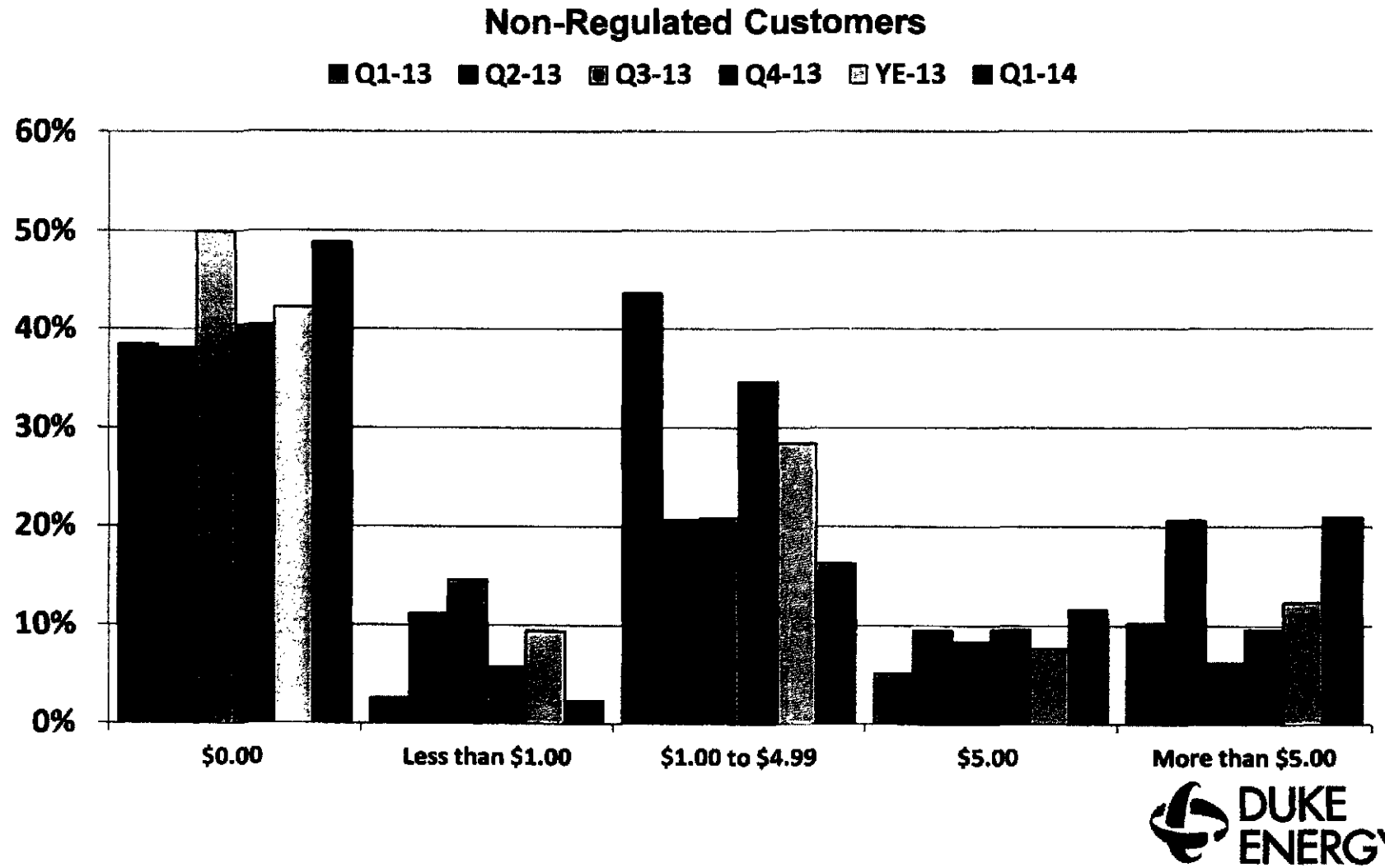
During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 2 hour electric service outage to your residence?

Regulated Customers



DUKE ENERGY®

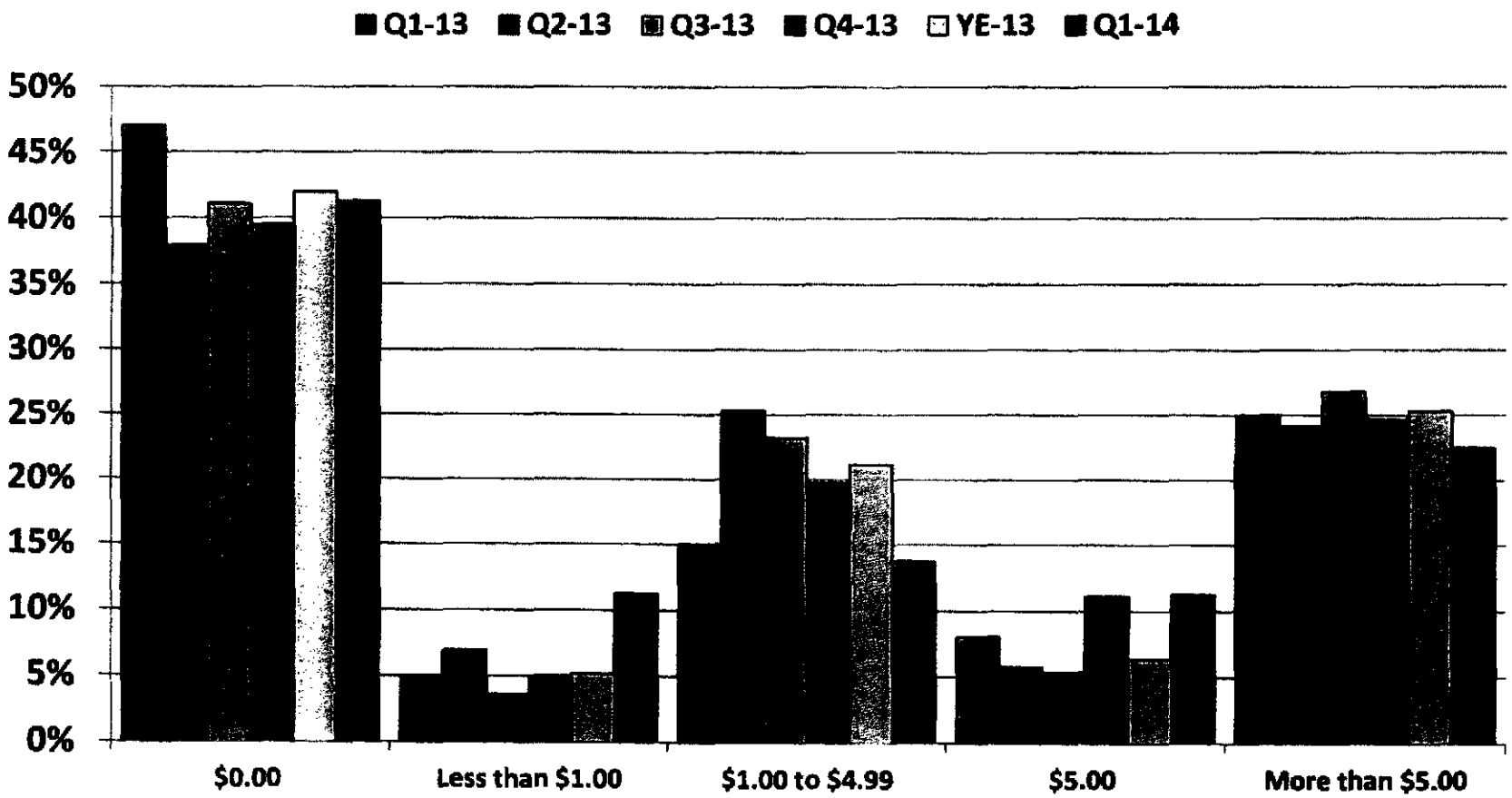
During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 2 hour electric service outage to your residence?



DUKE ENERGY.

During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 4 hour electric service outage to your residence?

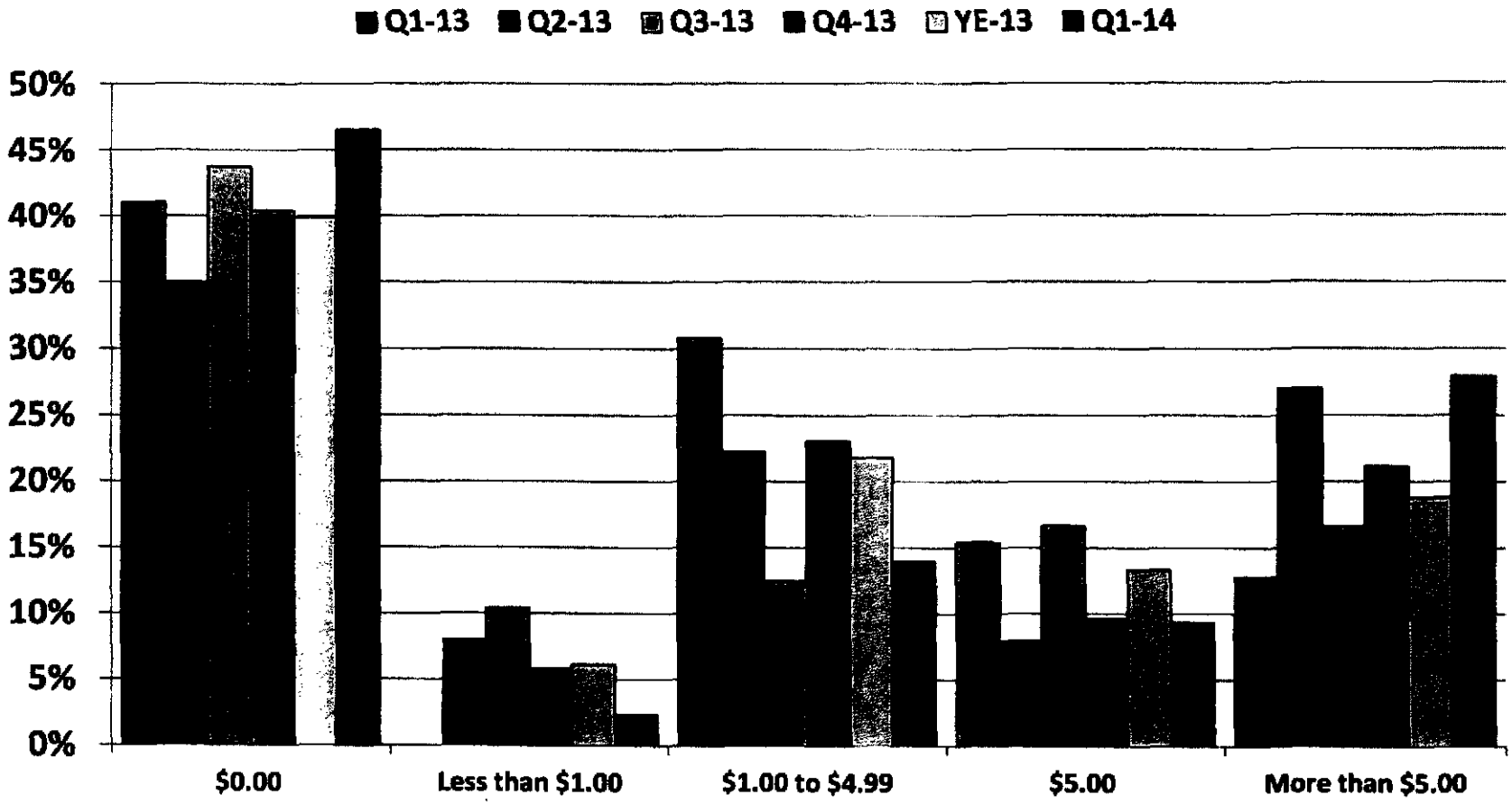
Regulated Customers



DUKE ENERGY®

During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 4 hour electric service outage to your residence?

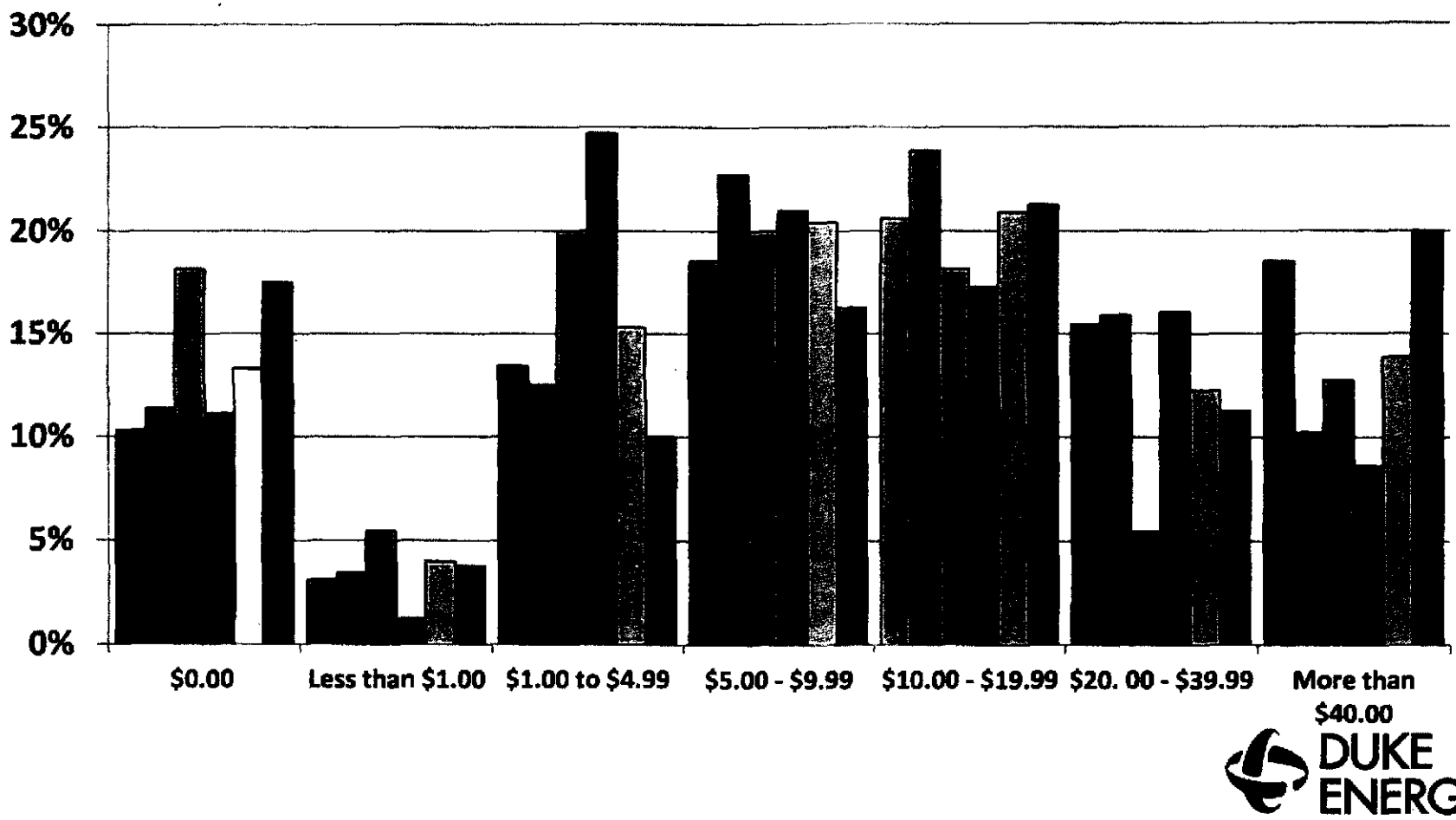
Non-Regulated Customers



DUKE ENERGY®

How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your residence for 1 hour?

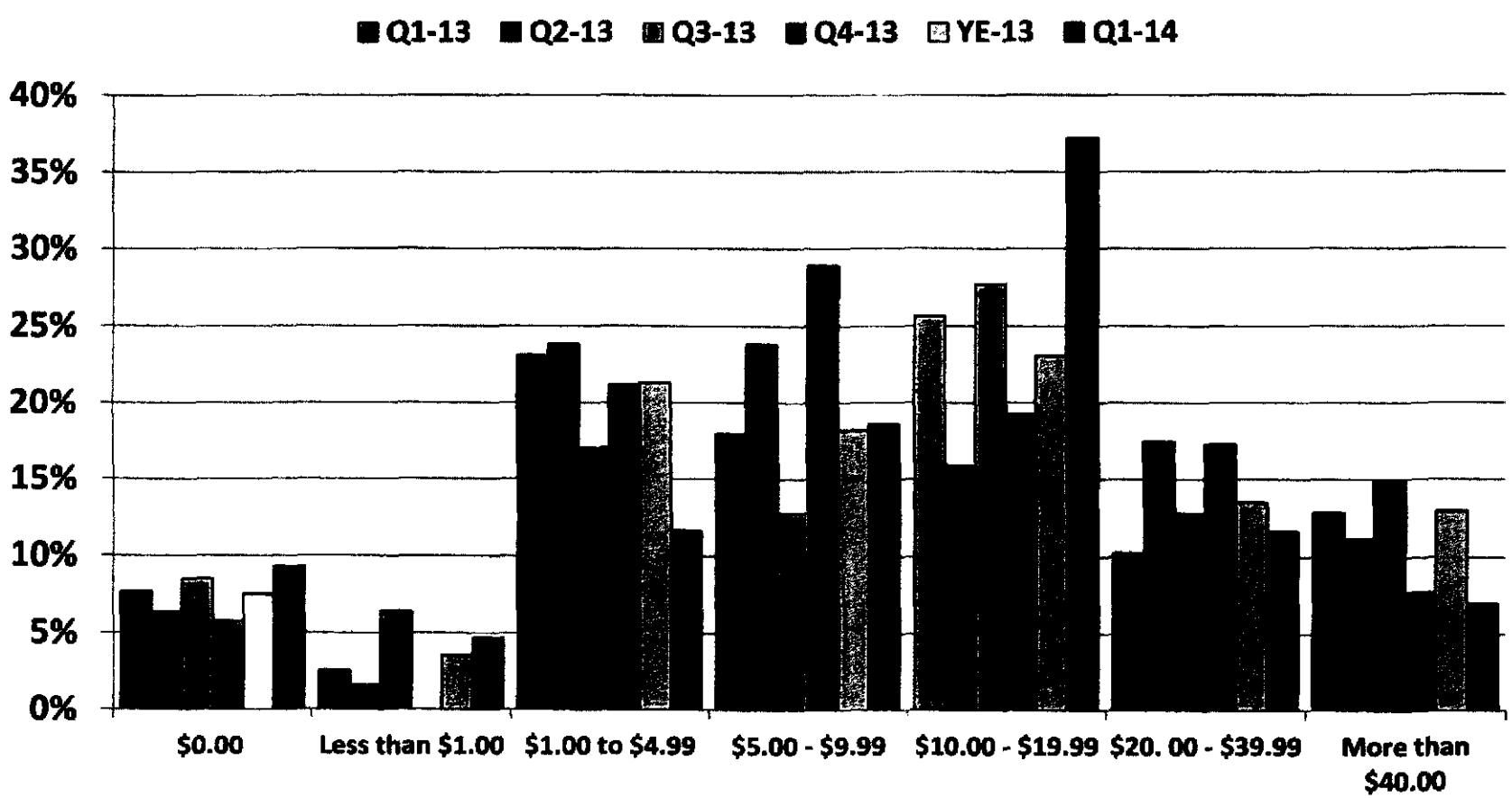
Regulated Customers



DUKE ENERGY®

How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your residence for 1 hour?

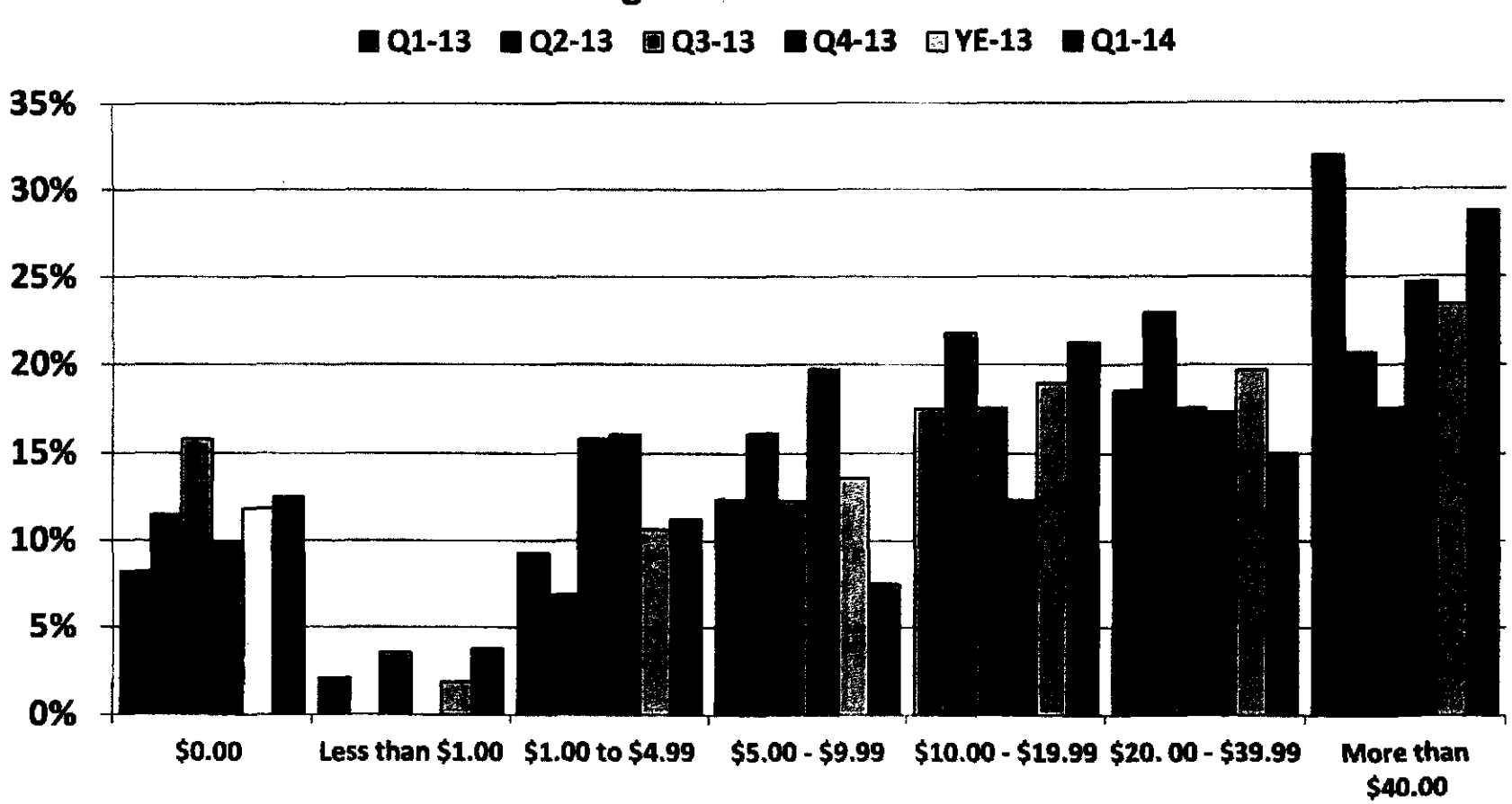
Non-Regulated Customers



DUKE ENERGY®

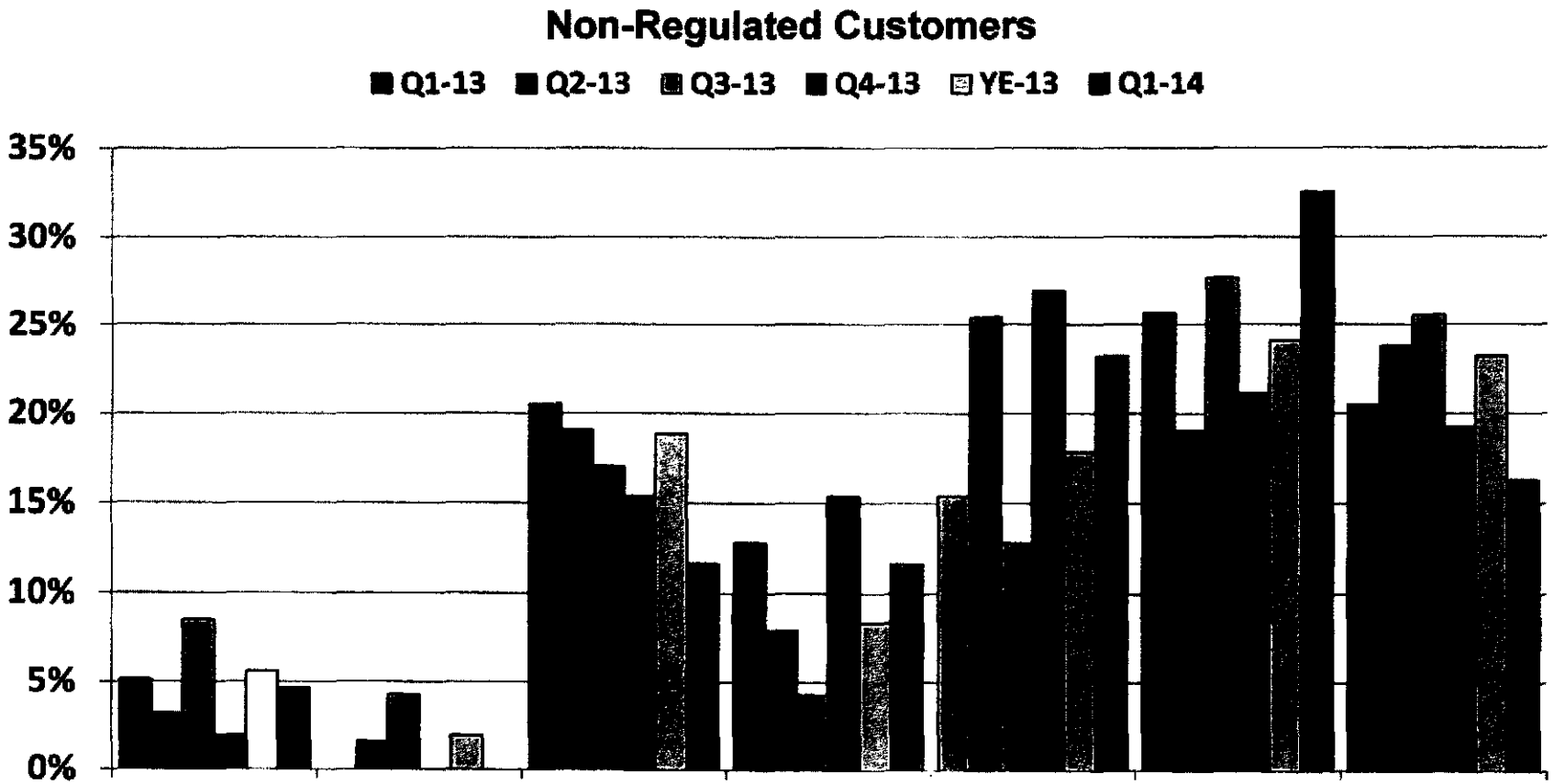
How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your residence for 2 hours?

Regulated Customers



DUKE ENERGY®

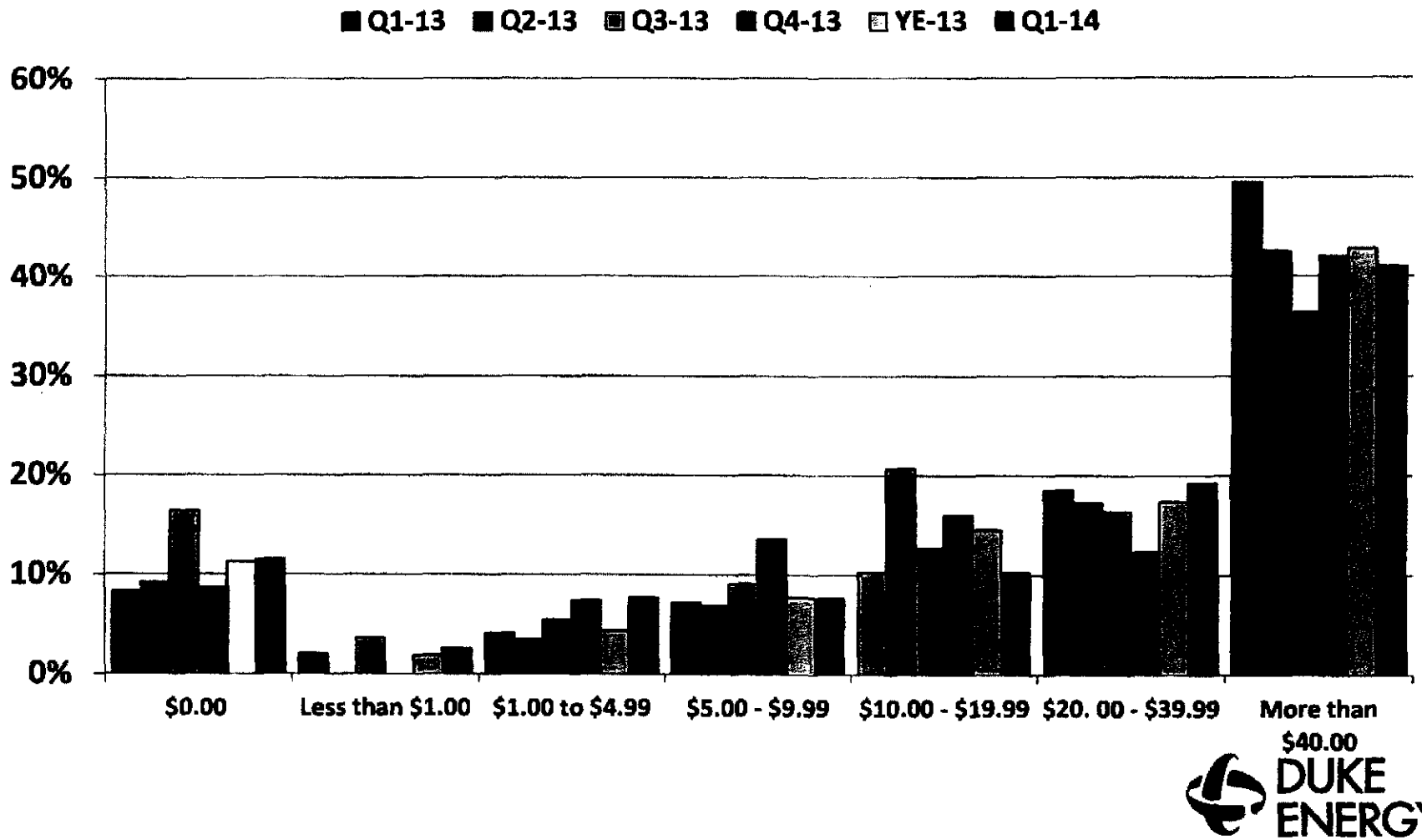
How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your residence for 2 hours?



DUKE ENERGY®

How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your residence for 4 hours?

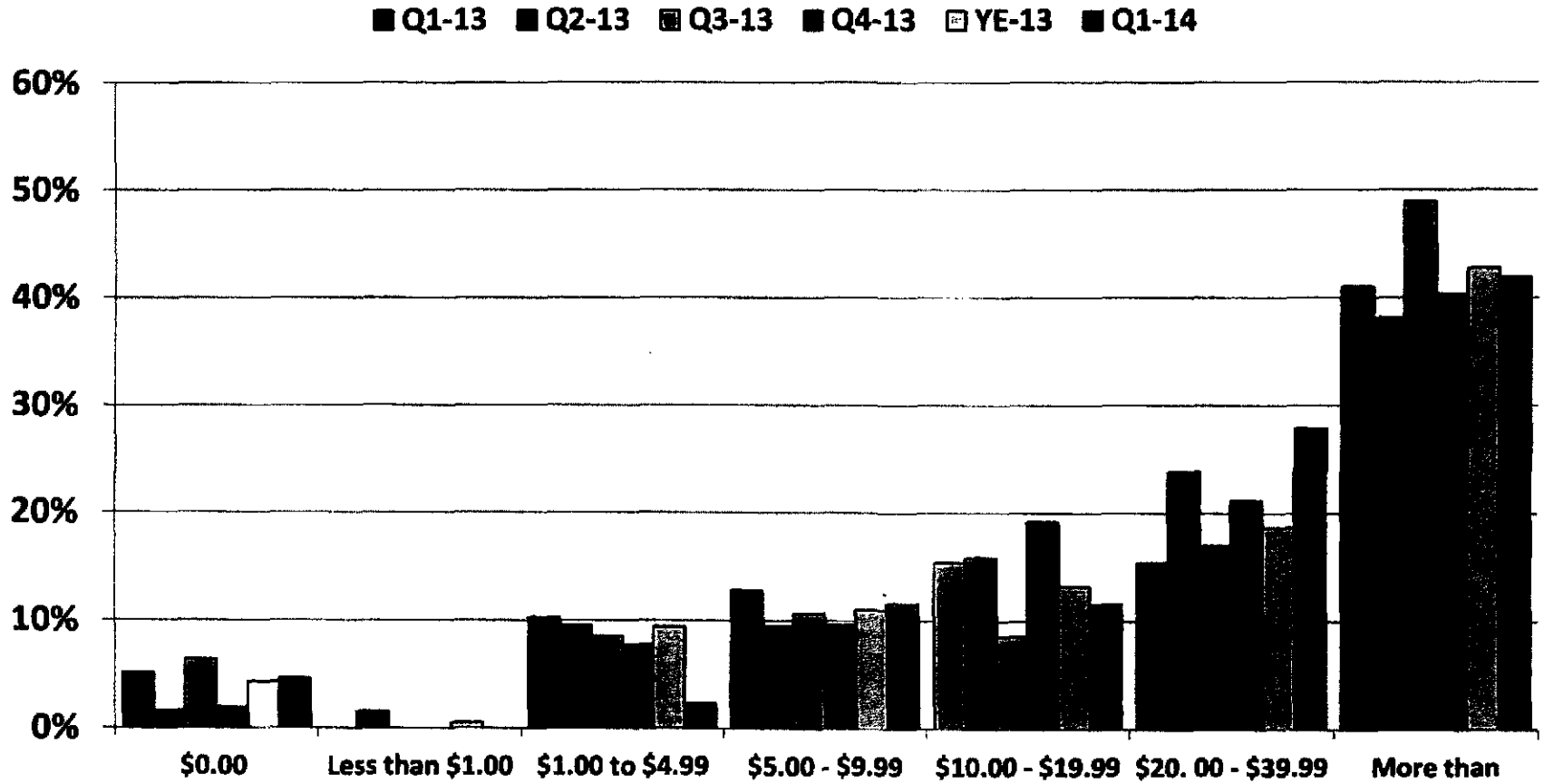
Regulated Customers



DUKE ENERGY.

How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your residence for 4 hours?

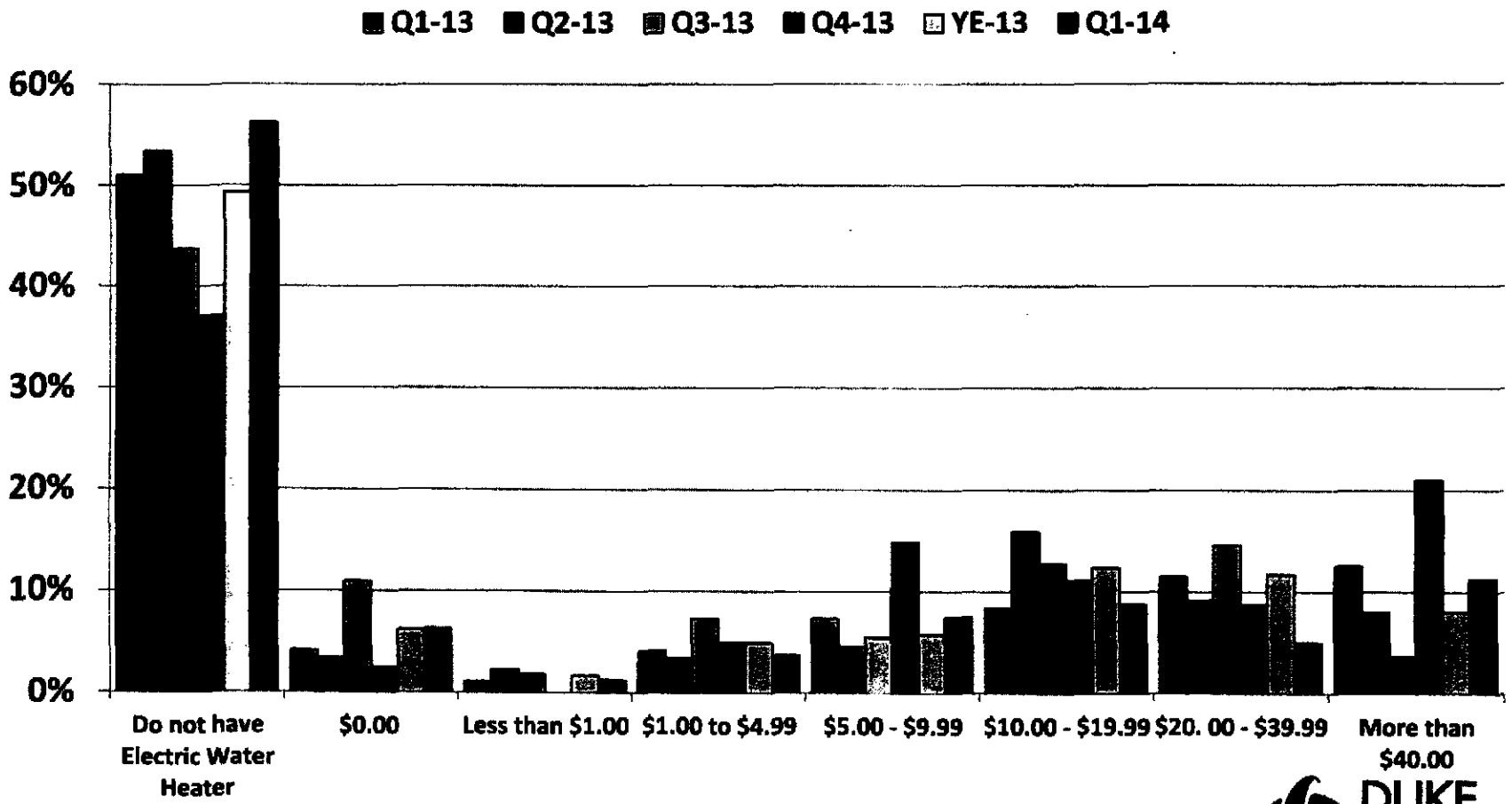
Non-Regulated Customers



DUKE ENERGY.

How much of a credit to your electric bill would you require from the utility to allow the electric company to control the operation of the hot water heater within your residence during a time when its system is under stress?

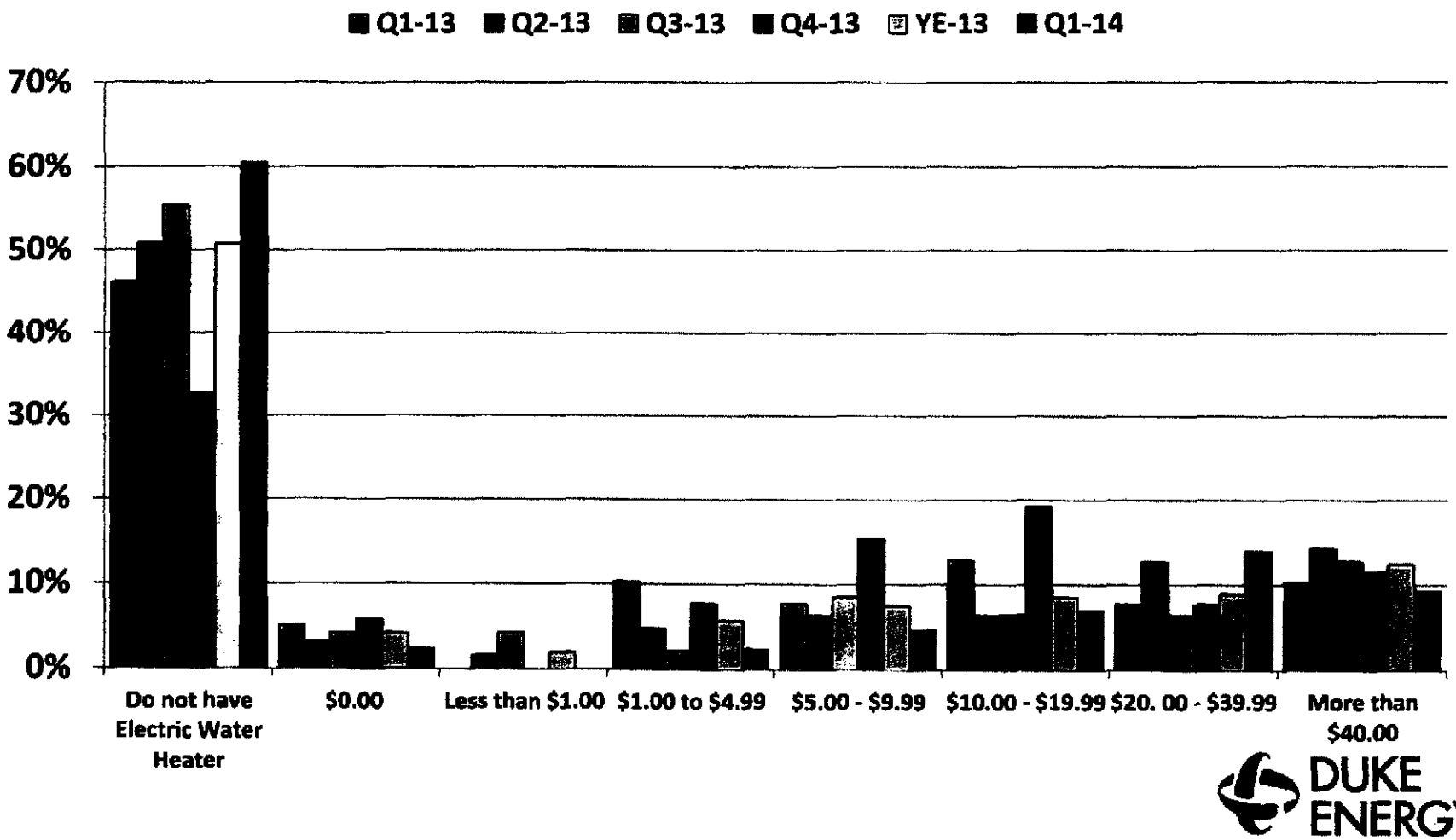
Regulated Customers



DUKE ENERGY®

How much of a credit to your electric bill would you require from the utility to allow the electric company to control the operation of the hot water heater within your residence during a time when its system is under stress?

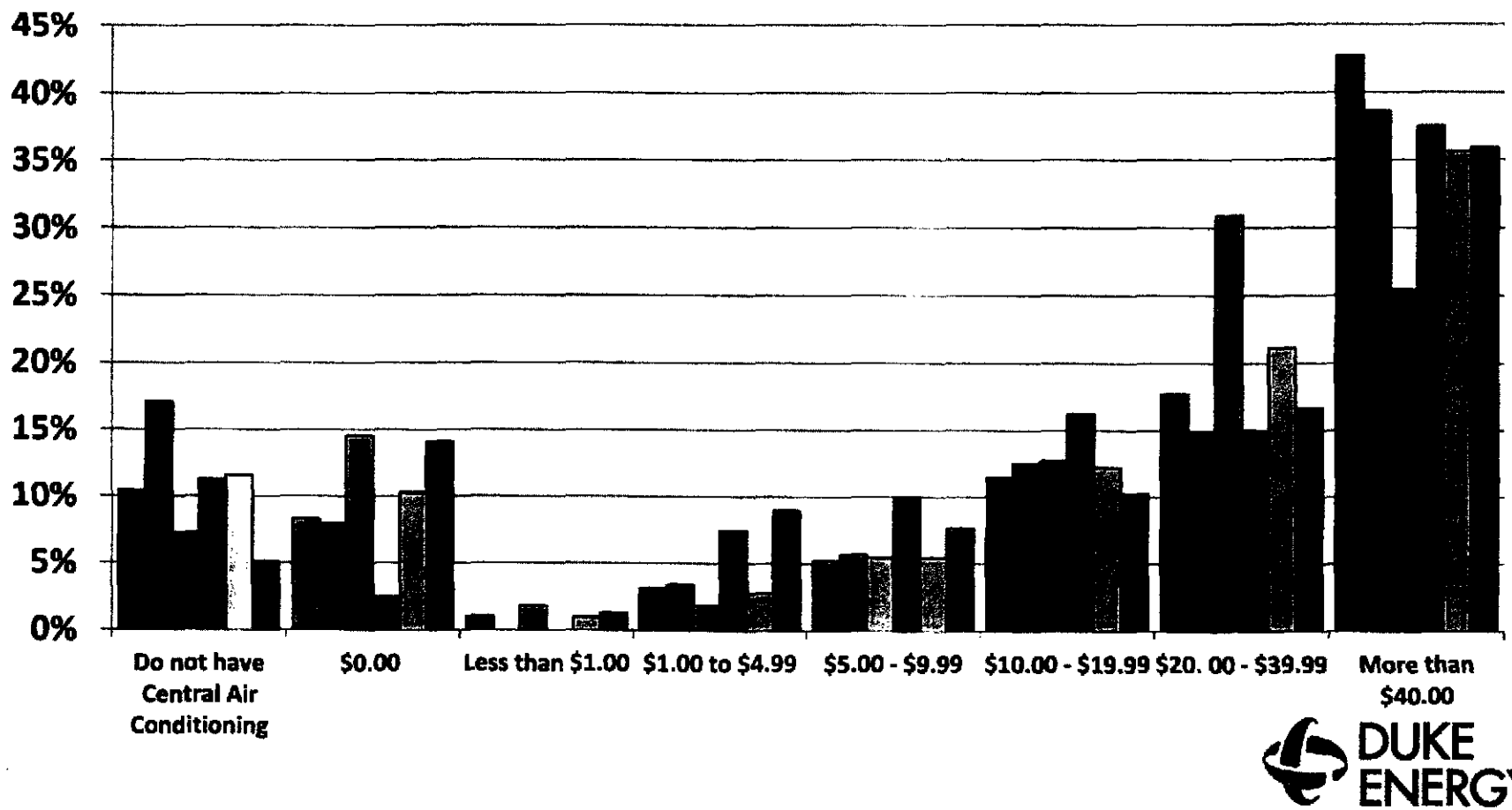
Non-Regulated Customers



DUKE ENERGY.

How much of a credit to your electric bill would you require from the utility to allow the electric company to control the operation of the central air conditioning within your residence during a time when its system is under stress?

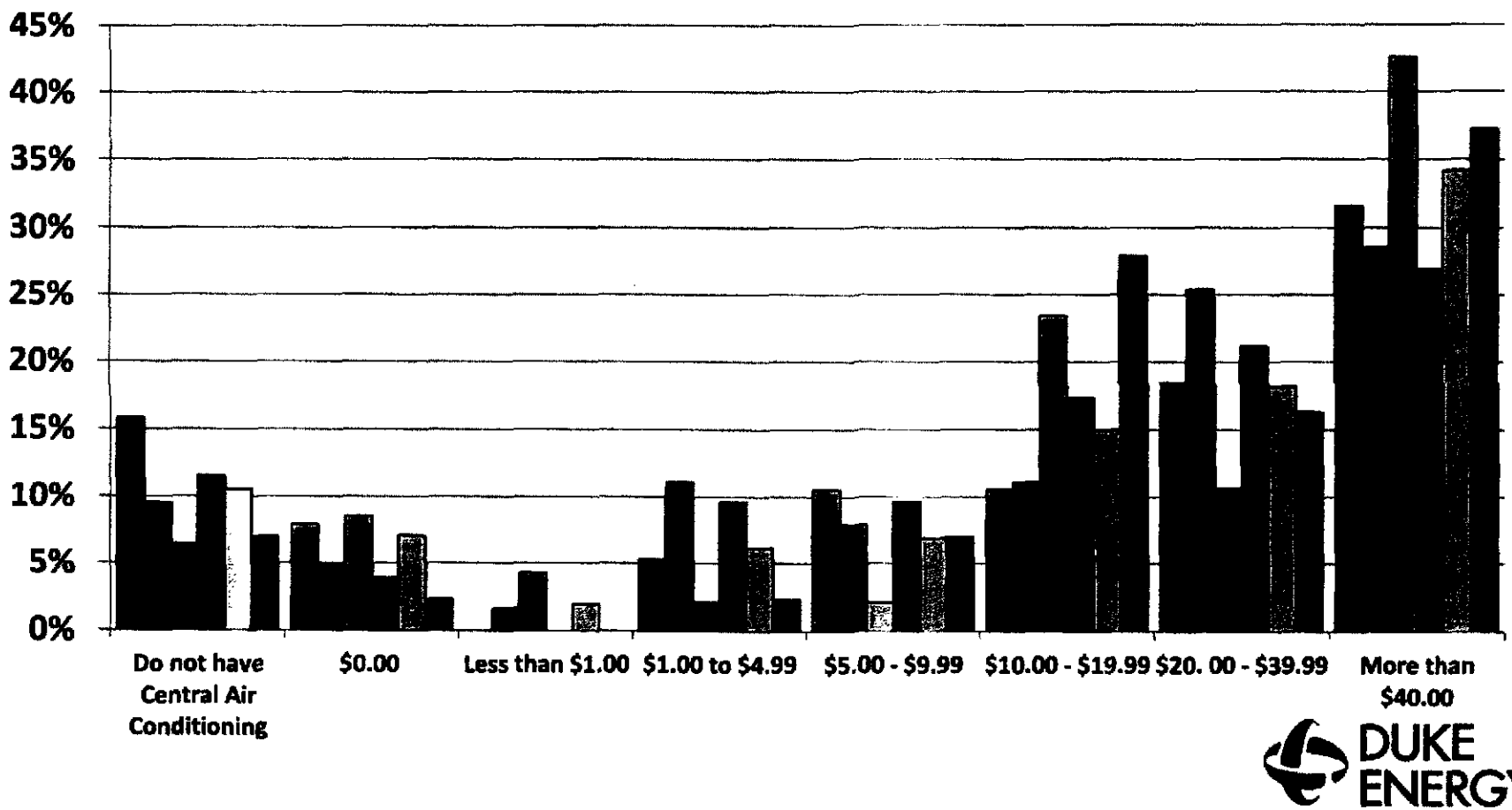
Regulated Customers



DUKE ENERGY.

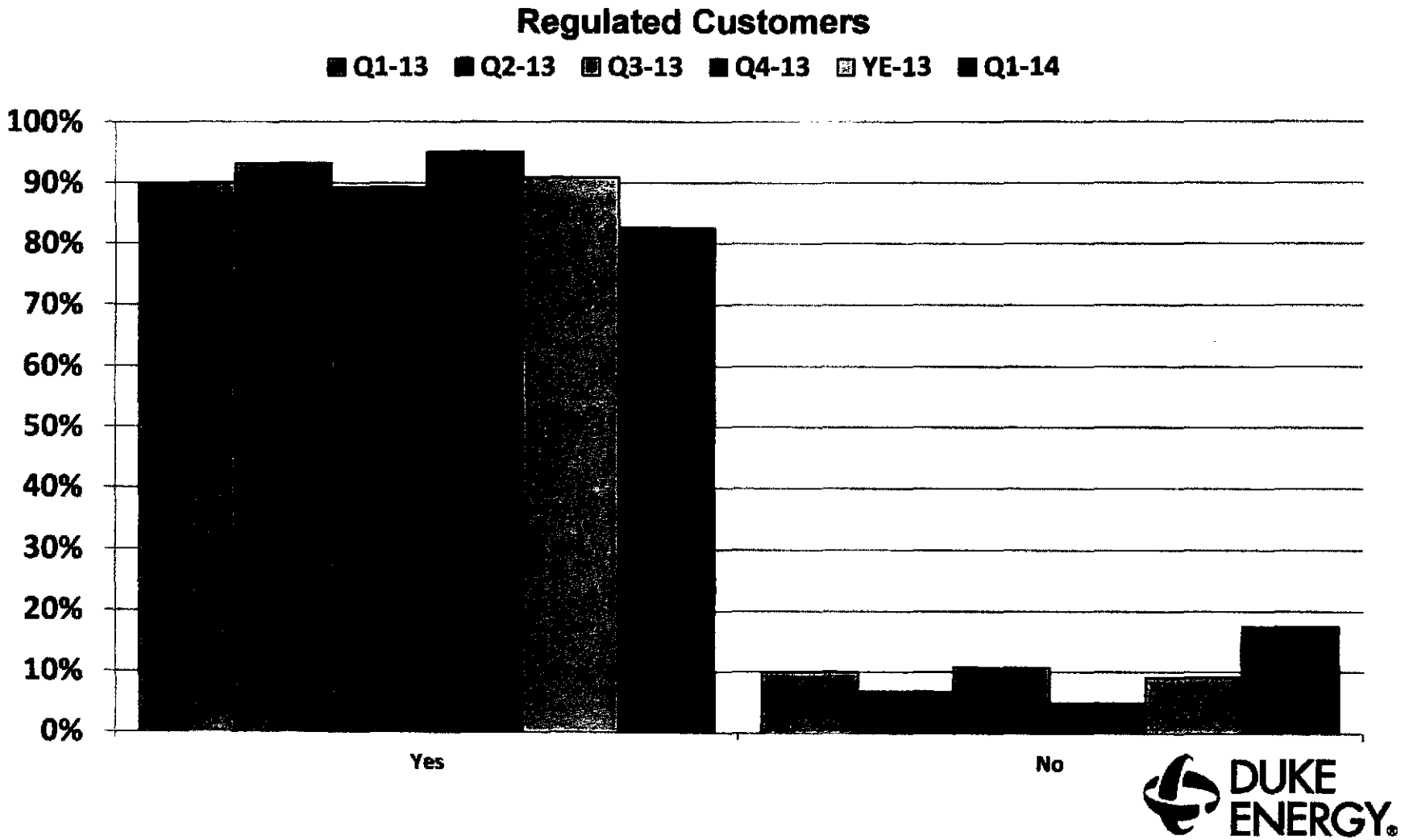
How much of a credit to your electric bill would you require from the utility to allow the electric company to control the operation of the central air conditioning within your residence during a time when its system is under stress?

Non-Regulated Customers



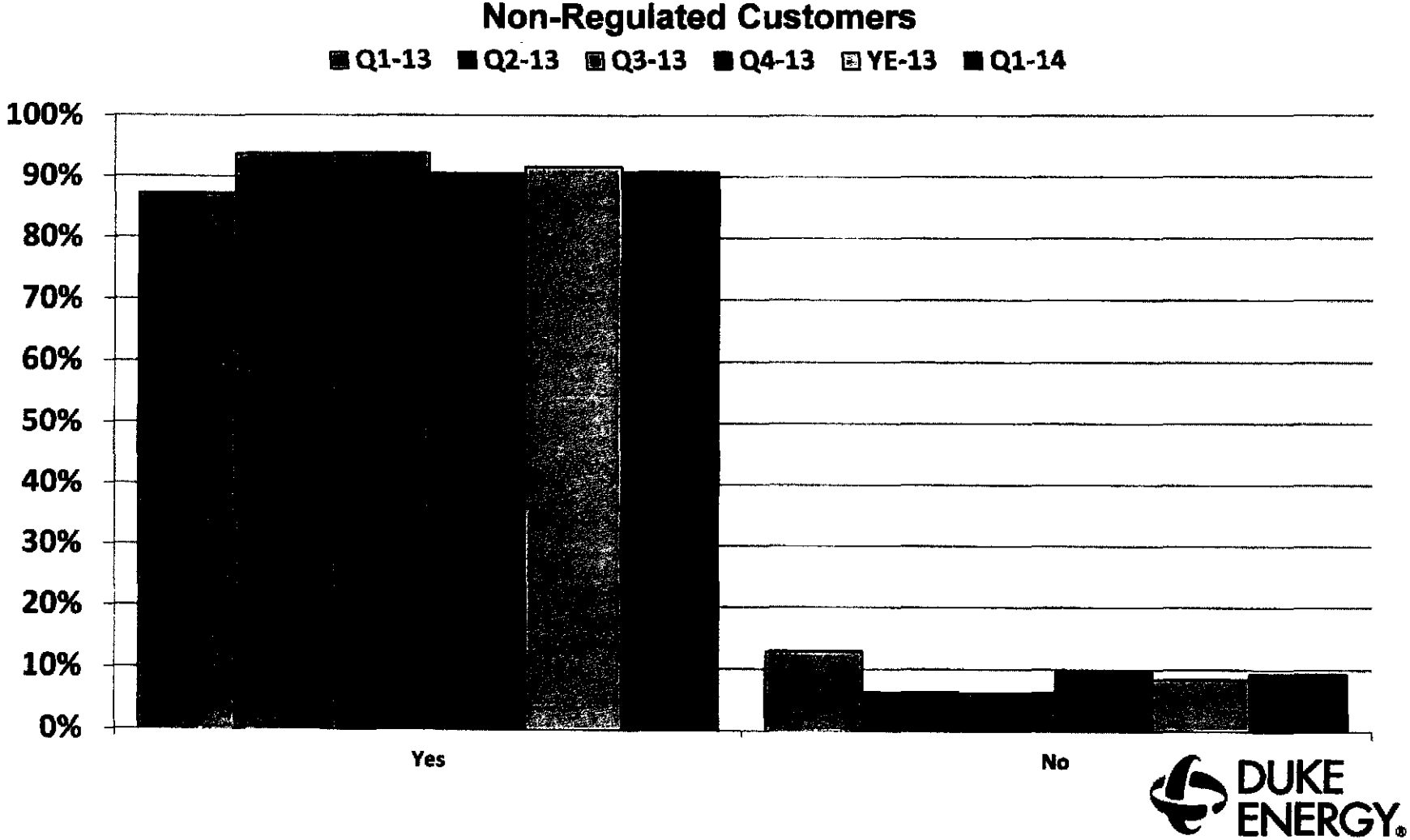
DUKE ENERGY.

During a time when your electric company's system is under stress and the company calls on its customers to conserve electricity, would you be willing to take measures to conserve your household electric usage?



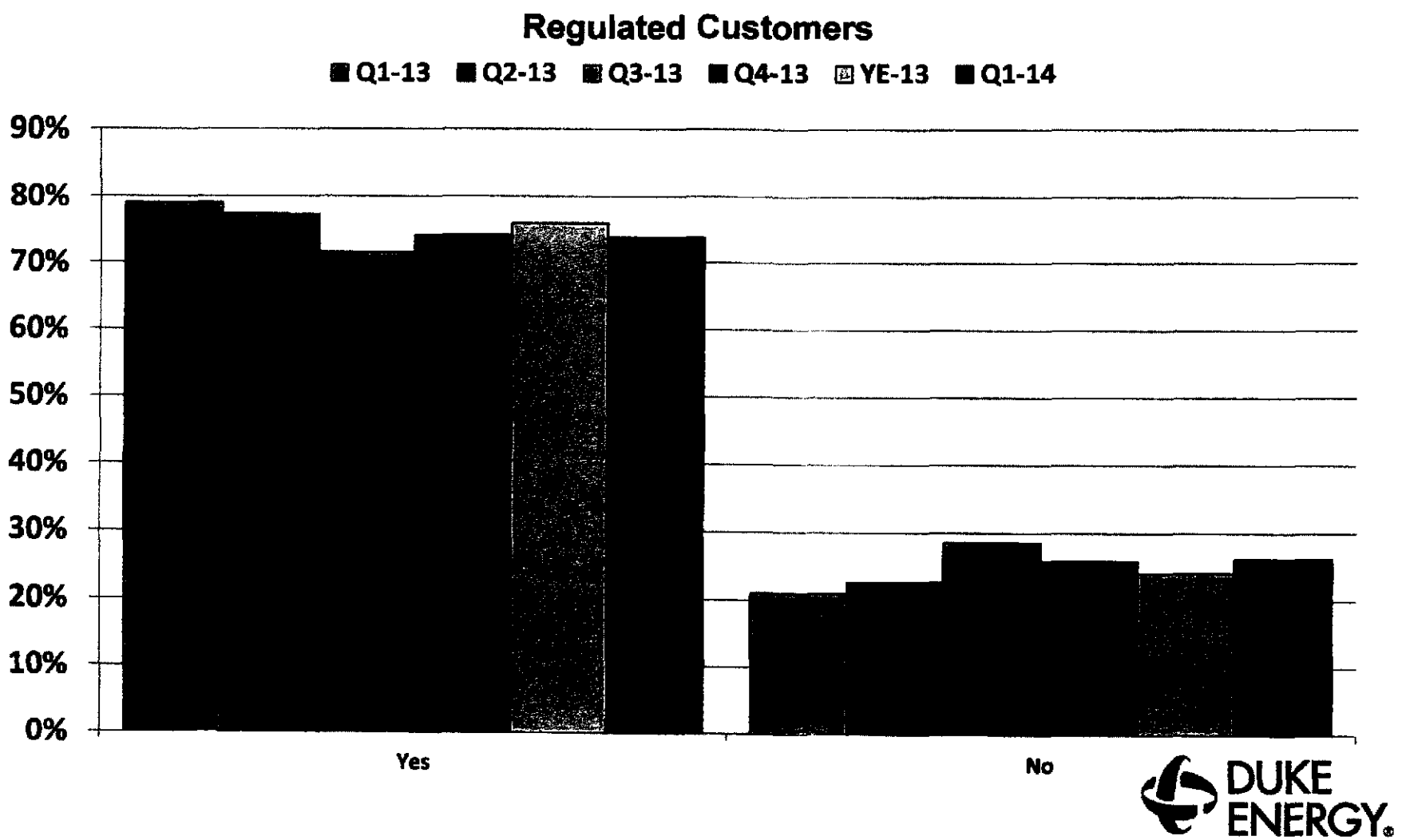
DUKE ENERGY®

During a time when your electric company's system is under stress and the company calls on its customers to conserve electricity, would you be willing to take measures to conserve your household electric usage?

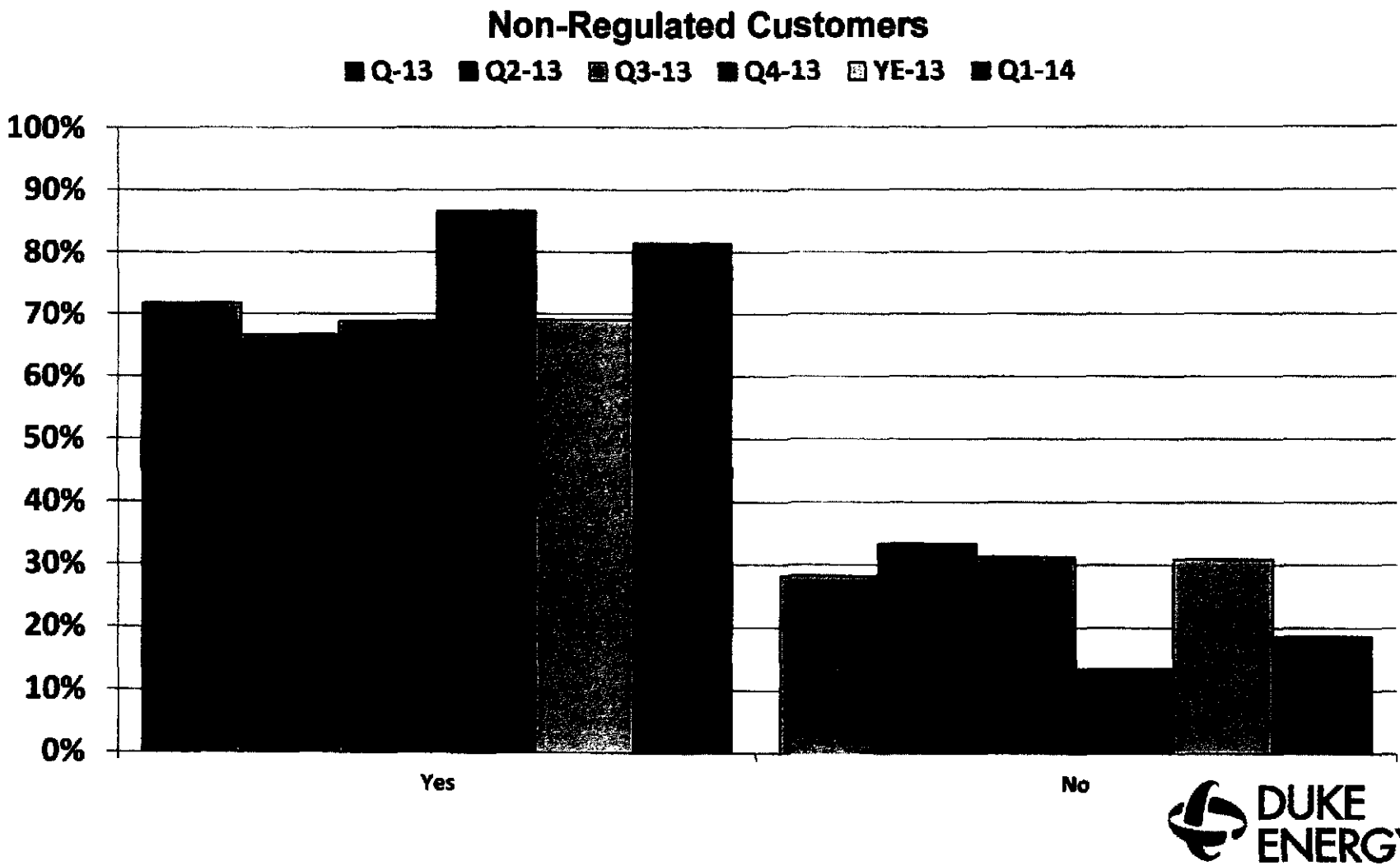


DUKE ENERGY®

In helping with your energy conservation, would you be interested in new technology that lets you automate the settings for air conditioning or different appliances to reduce electricity use when the cost to produce and deliver electricity is high?



In helping with your energy conservation, would you be interested in new technology that lets you automate the settings for air conditioning or different appliances to reduce electricity use when the cost to produce and deliver electricity is high?



DUKE ENERGY.

Ohio PUC Reliability Business Survey Results

Q1-14 Update

Prepared By

Duke Energy Market Research & Customer Insights

DUKE ENERGY.

Completed Survey Counts

- **Online survey emailed to a random sample of business customers**
- **Email invitations mailed in Waves**

Business Regulated

	Q1-13	Q2-13	Q3-13	Q4-13	YE-13	Q1-14
Sample Size	1257	686	789	1000	3732	1080
Completed Surveys	48	21*	32	36	137	48
Response Rate	4%	3%	4%	4%	4%	4%

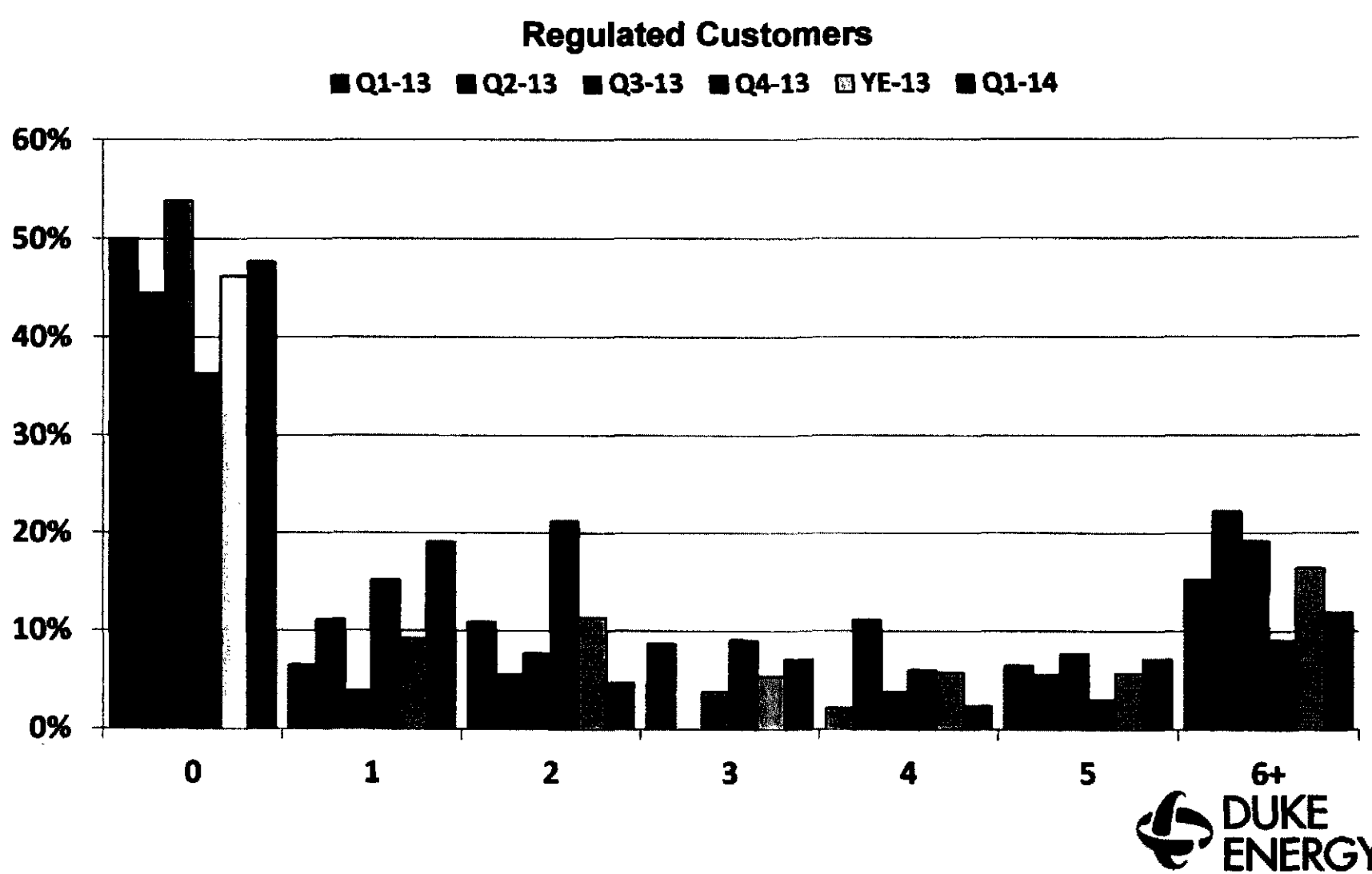
Business Non-Regulated

	Q1-13	Q2-13	Q3-13	Q4-13	YE-13	Q1-14
Sample Size	976	1141	1017	1000	4134	920
Completed Surveys	47	60	60	32	199	54
Response Rate	5%	5%	6%	3%	5	6%

*Use caution when interpreting results; low sample sizes

DUKE ENERGY.

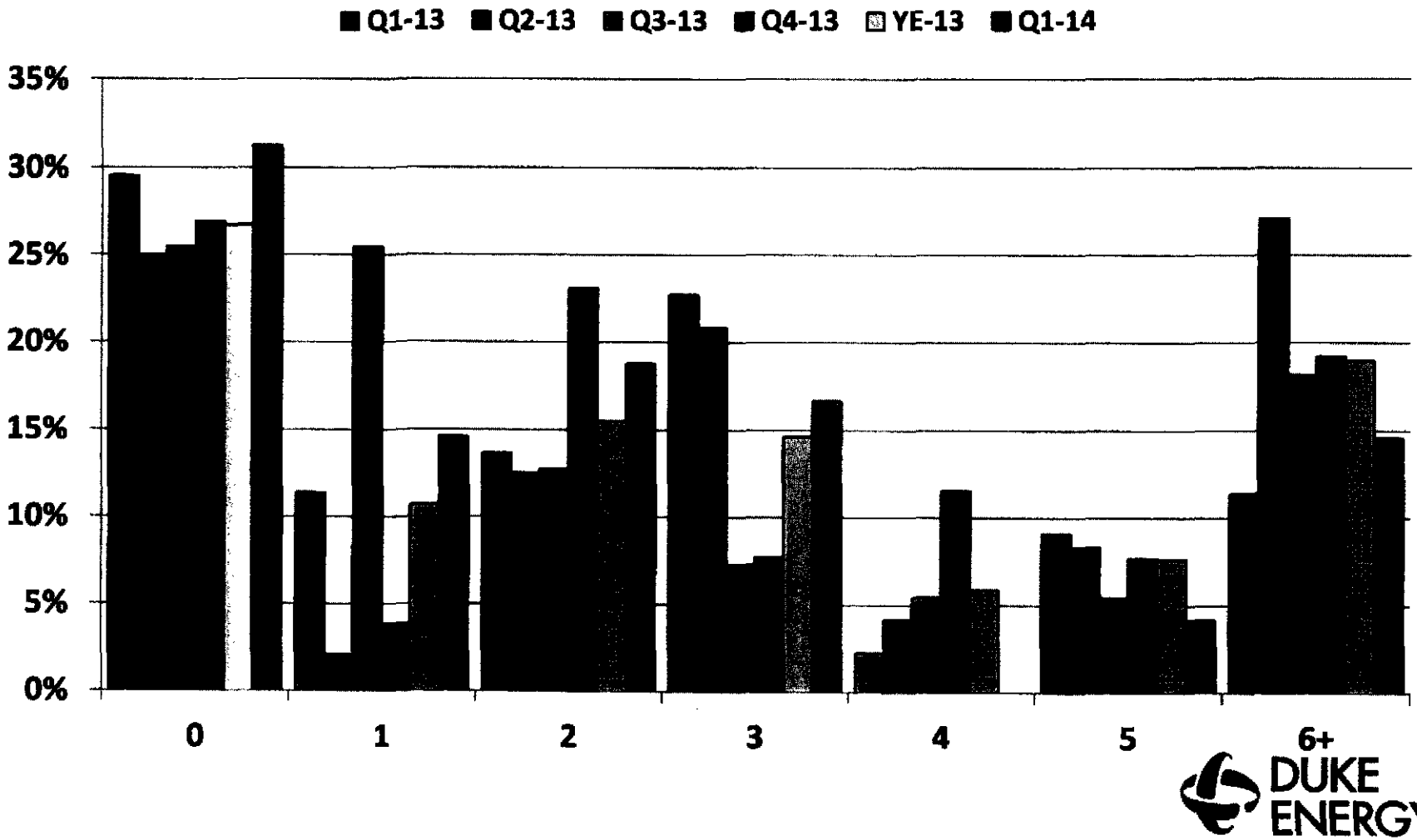
How many brief interruptions of 5 minutes or less have you experienced at your business in the past 12 months?



DUKE ENERGY.

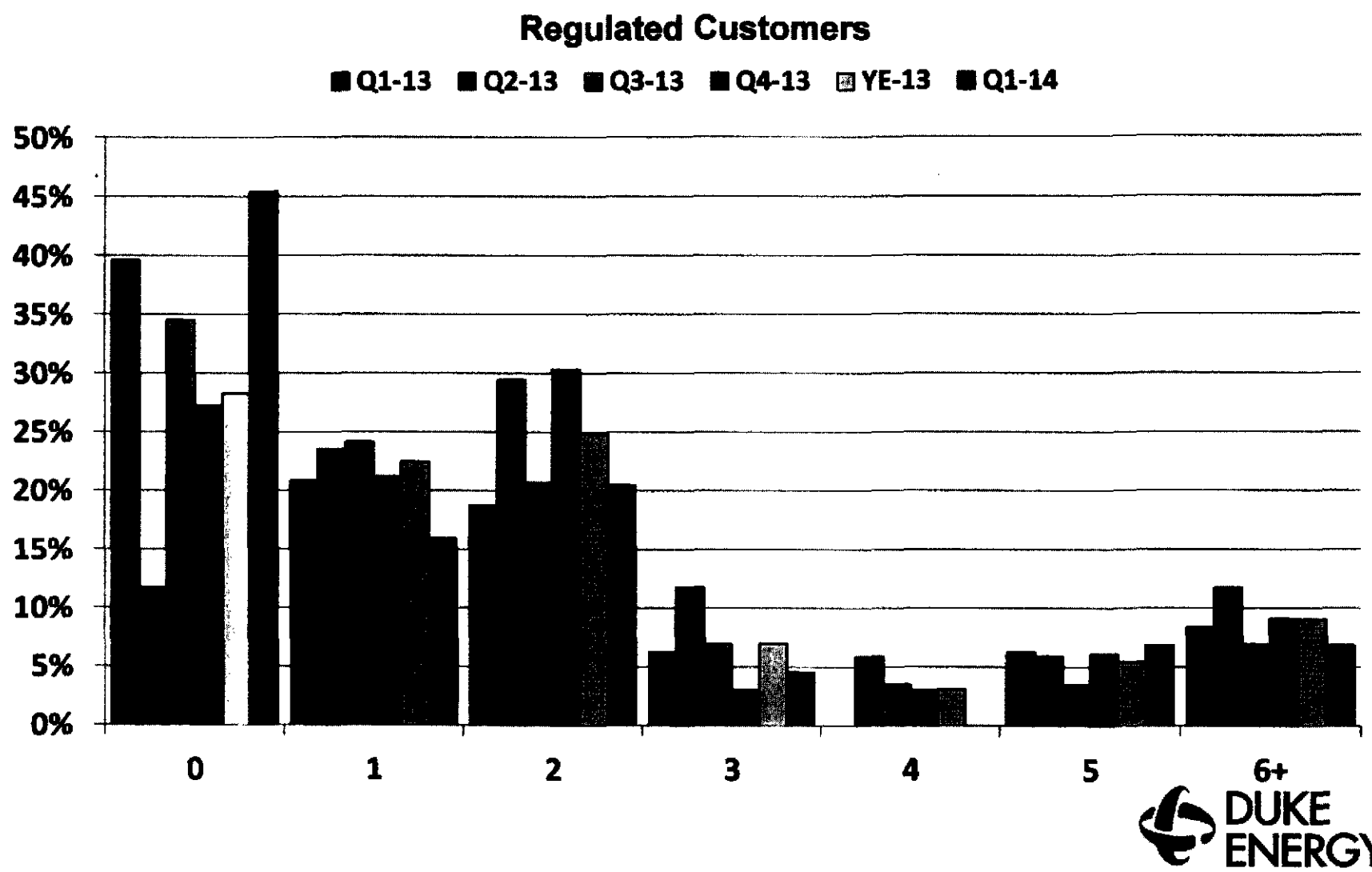
How many brief interruptions of 5 minutes or less have you experienced at your business in the past 12 months?

Non-Regulated Customers



DUKE ENERGY.

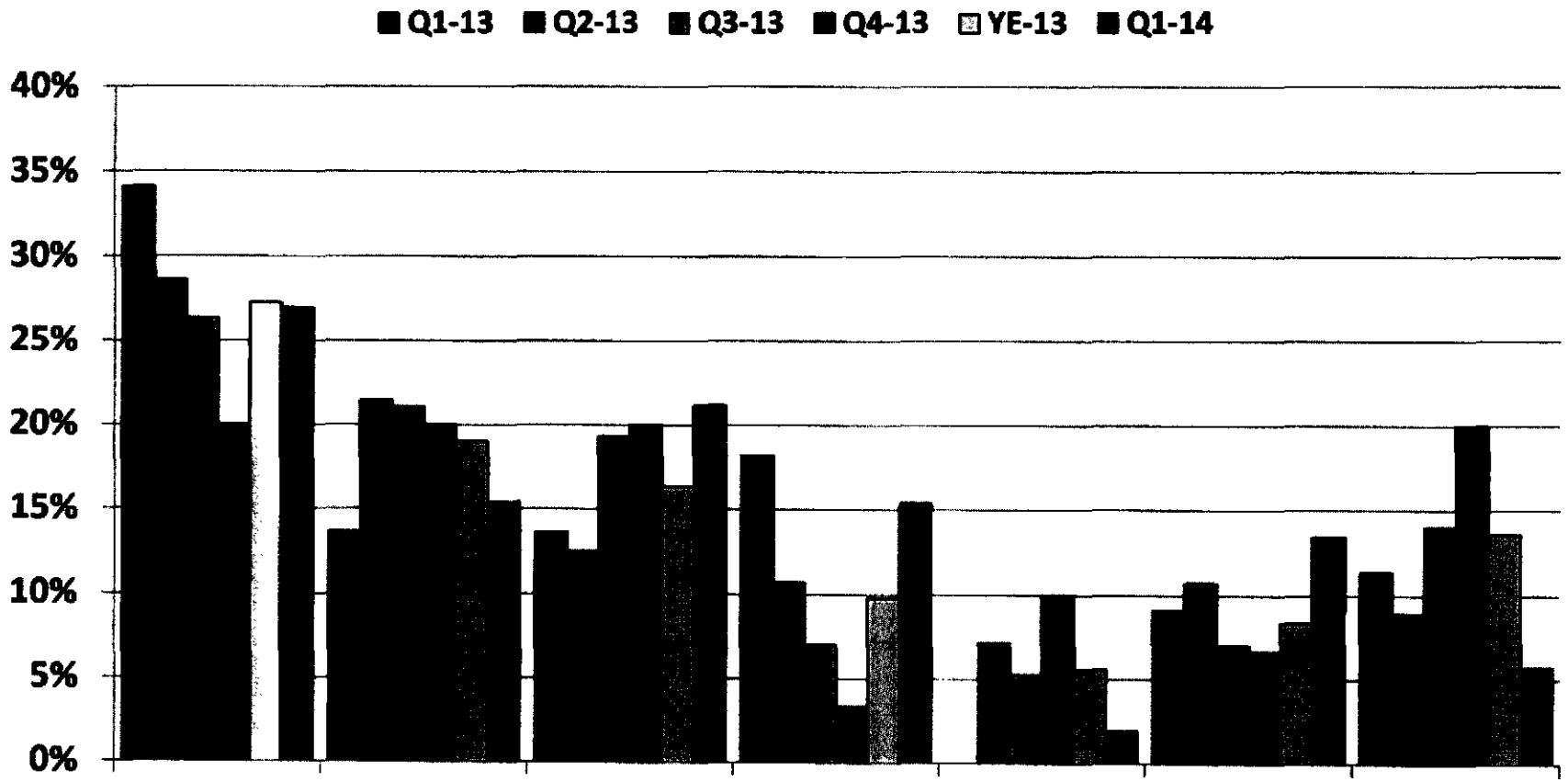
How many brief interruptions of 5 minutes or less would you consider acceptable during a 12 month period?



DUKE ENERGY.

How many brief interruptions of 5 minutes or less would you consider acceptable during a 12 month period?

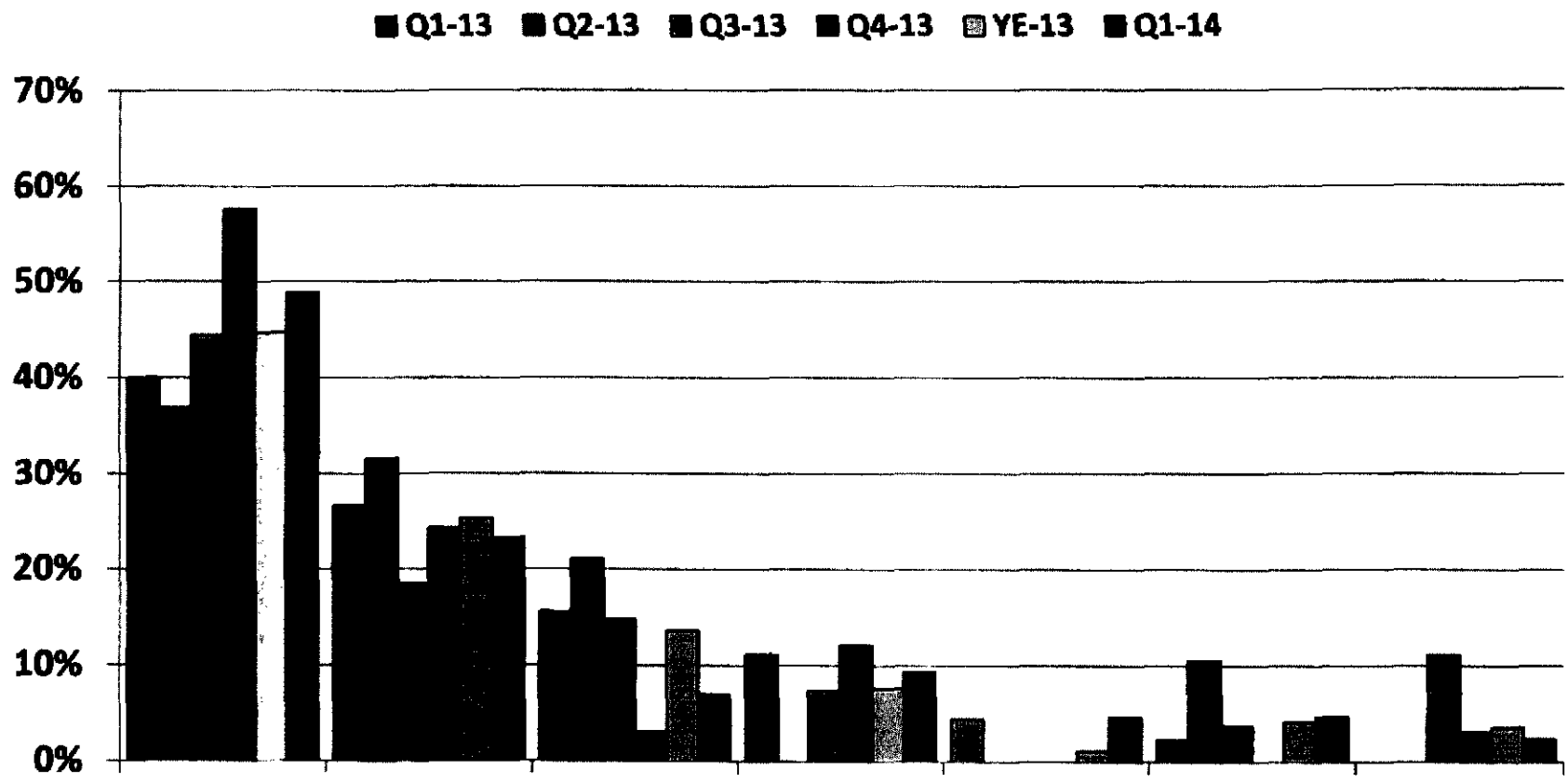
Non-Regulated Customers



DUKE ENERGY®

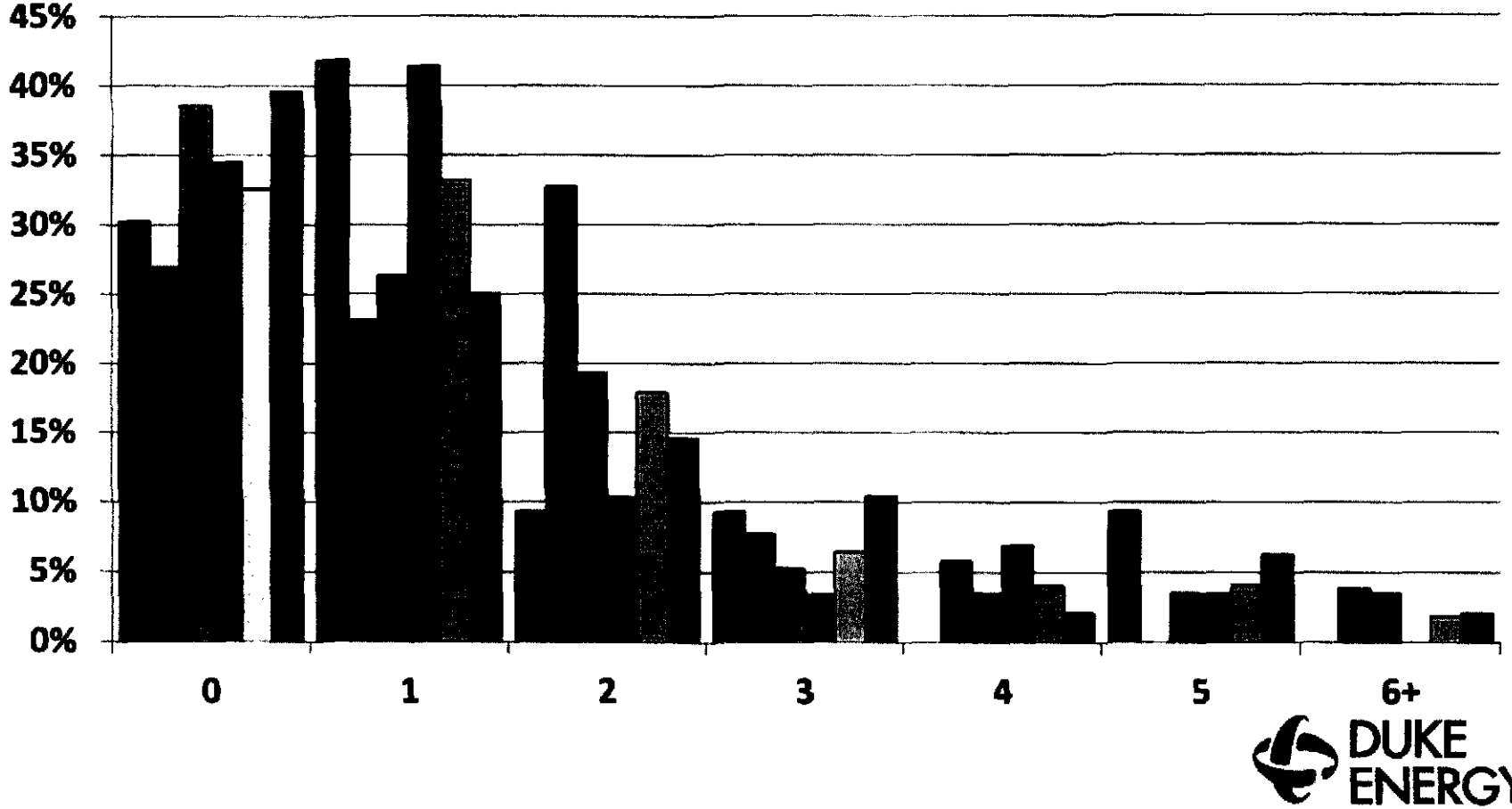
How many lengthy interruptions of more than 5 minutes have you experienced at your business in the past 12 months?

Regulated Customers



DUKE ENERGY.

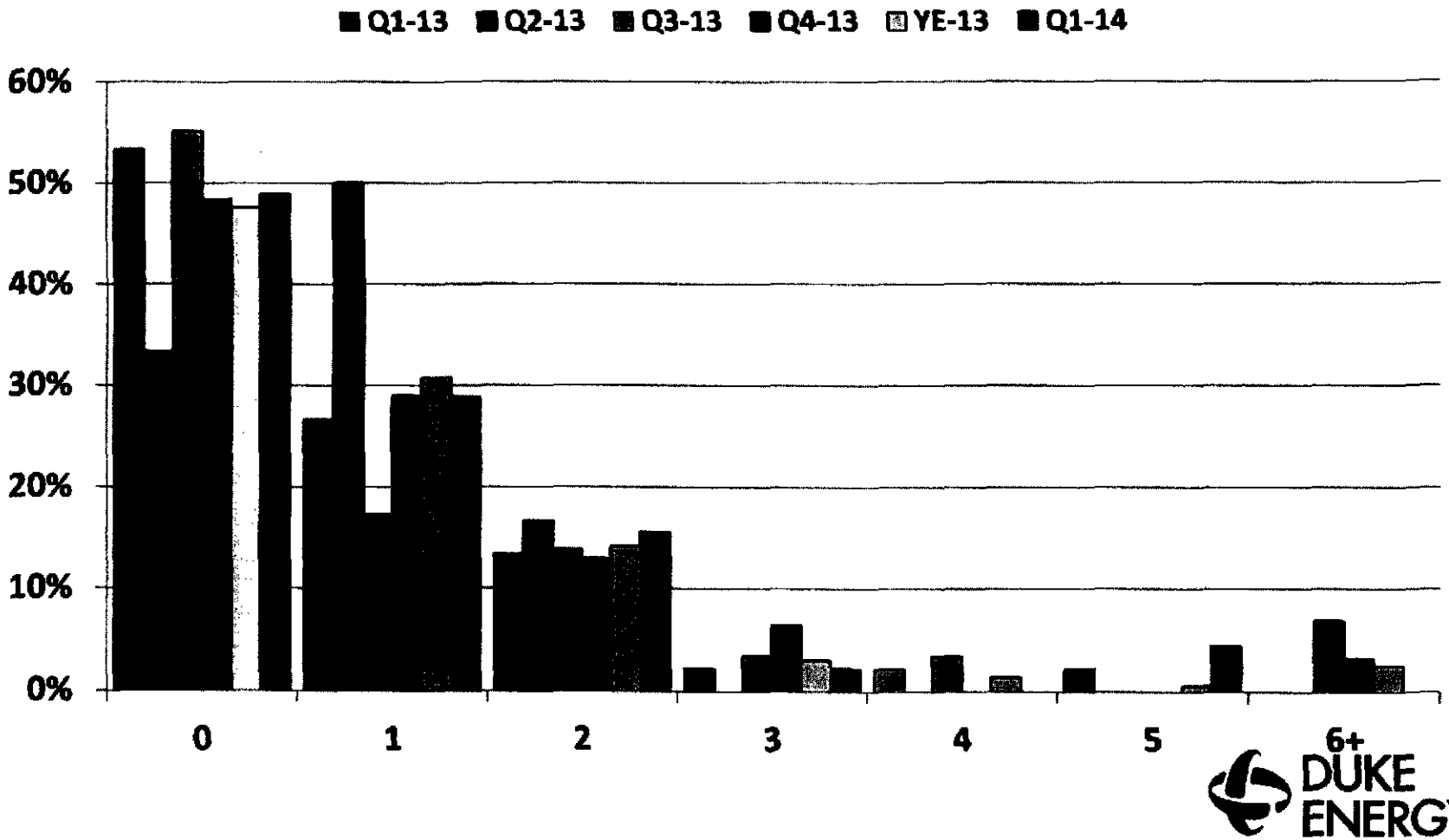
How many lengthy interruptions of more than 5 minutes have you experienced at your business in the past 12 months?



DUKE ENERGY.

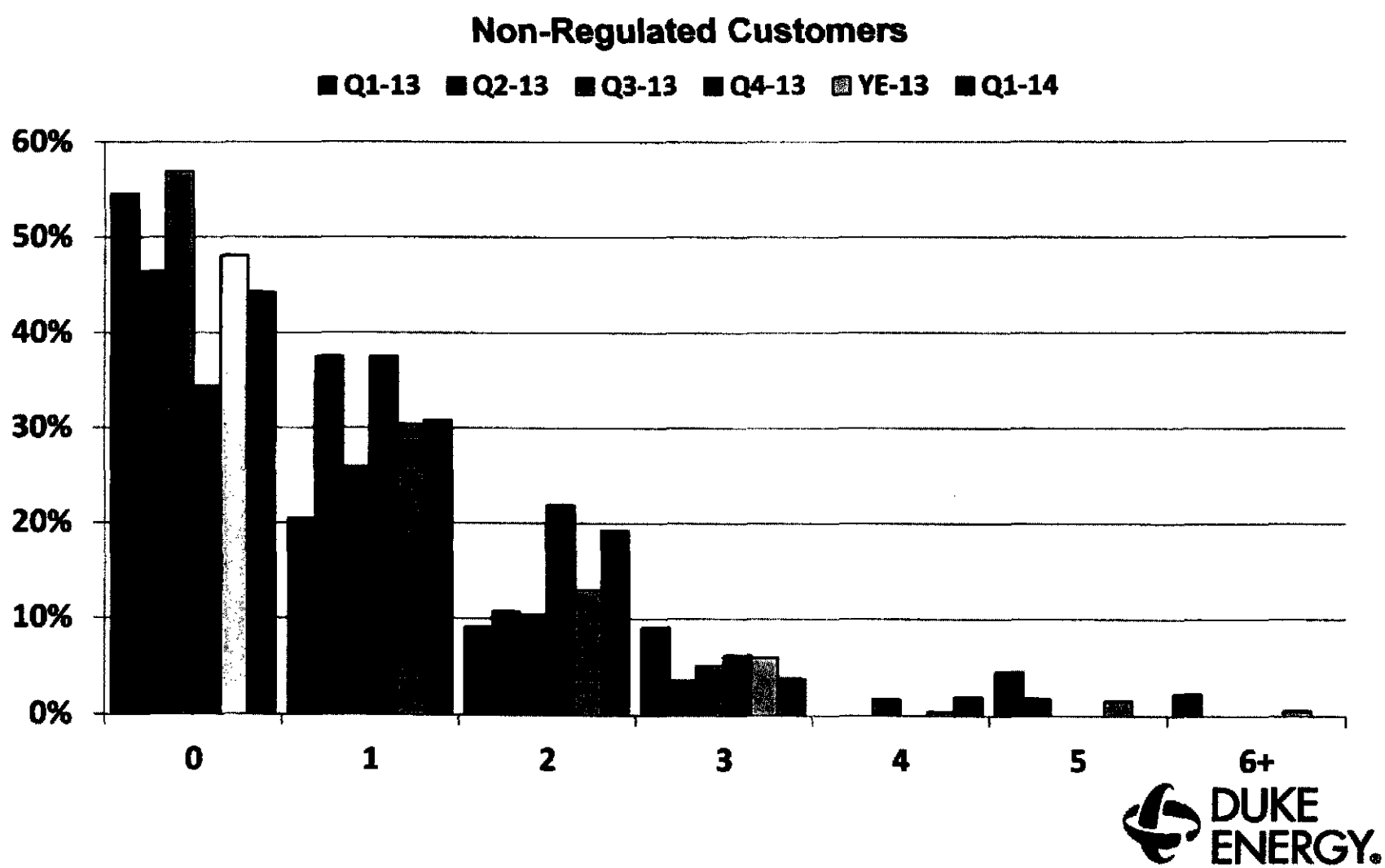
How many lengthy interruptions of more than 5 minutes would you consider acceptable during a 12 month period?

Regulated Customers



DUKE ENERGY.

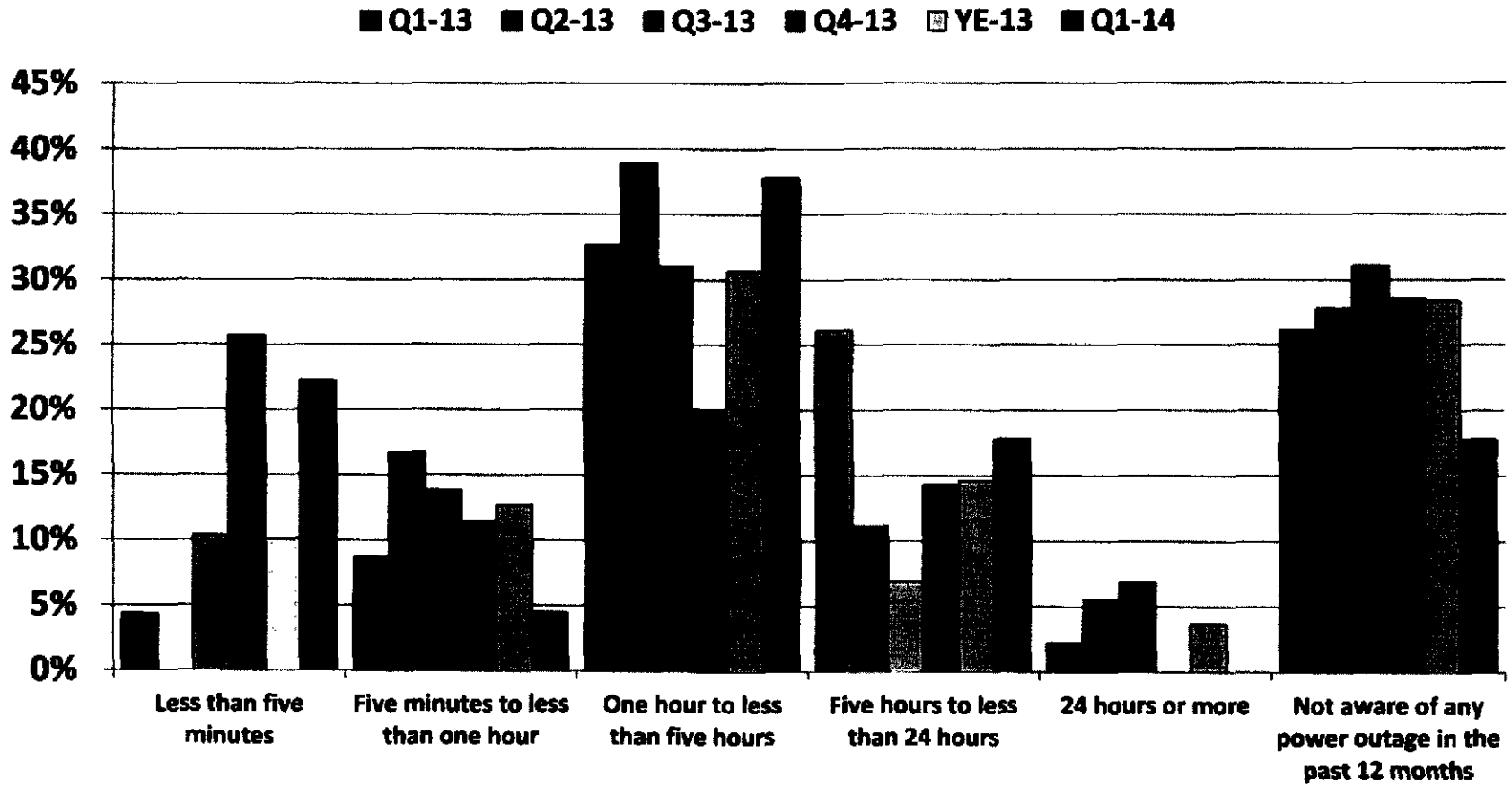
How many lengthy interruptions of more than 5 minutes would you consider acceptable during a 12 month period?



DUKE ENERGY.

Would you estimate your longest power outage in the past 12 months to be:

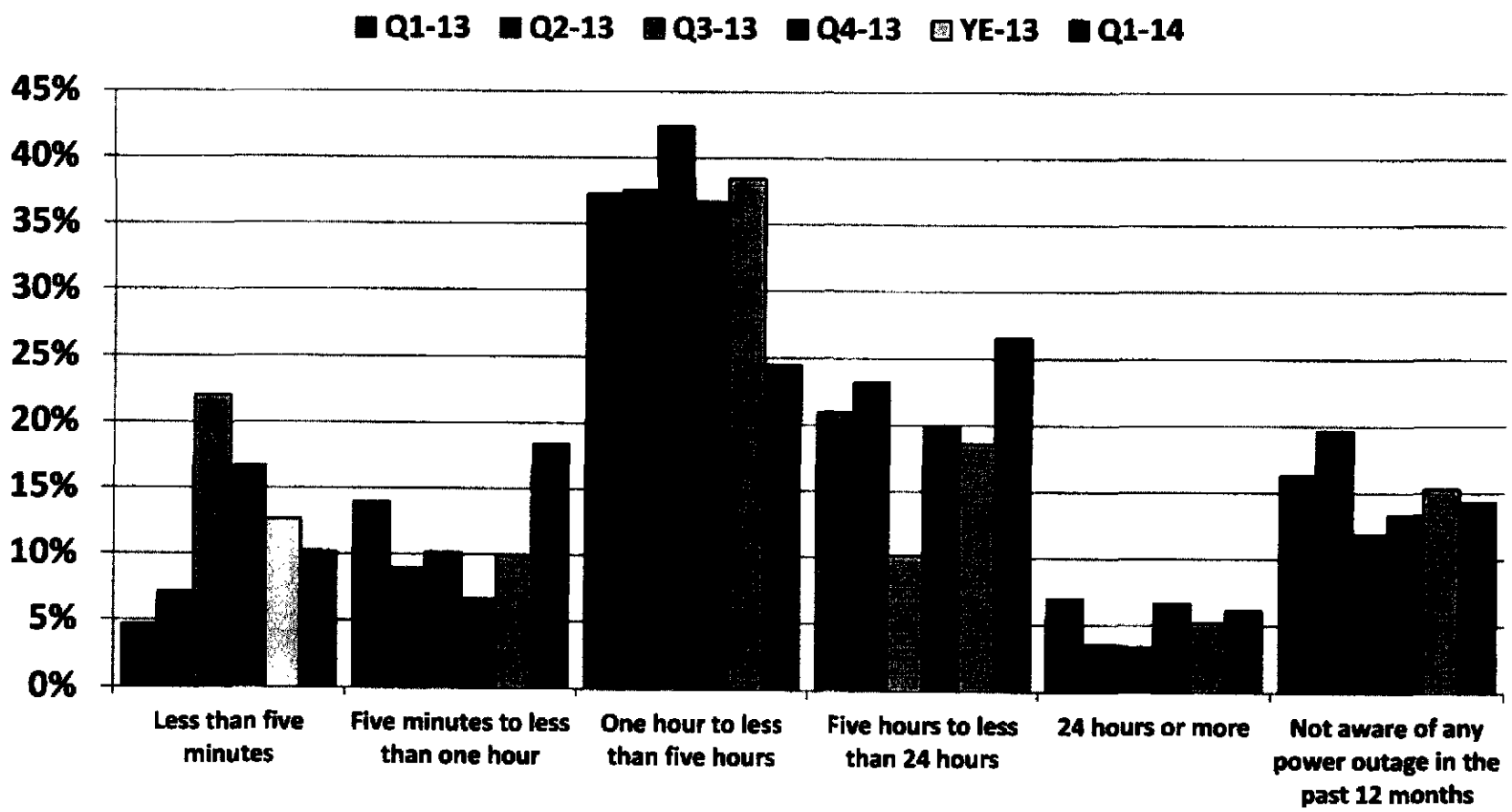
Regulated Customers



DUKE ENERGY.

Would you estimate your longest power outage in the past 12 months to be:

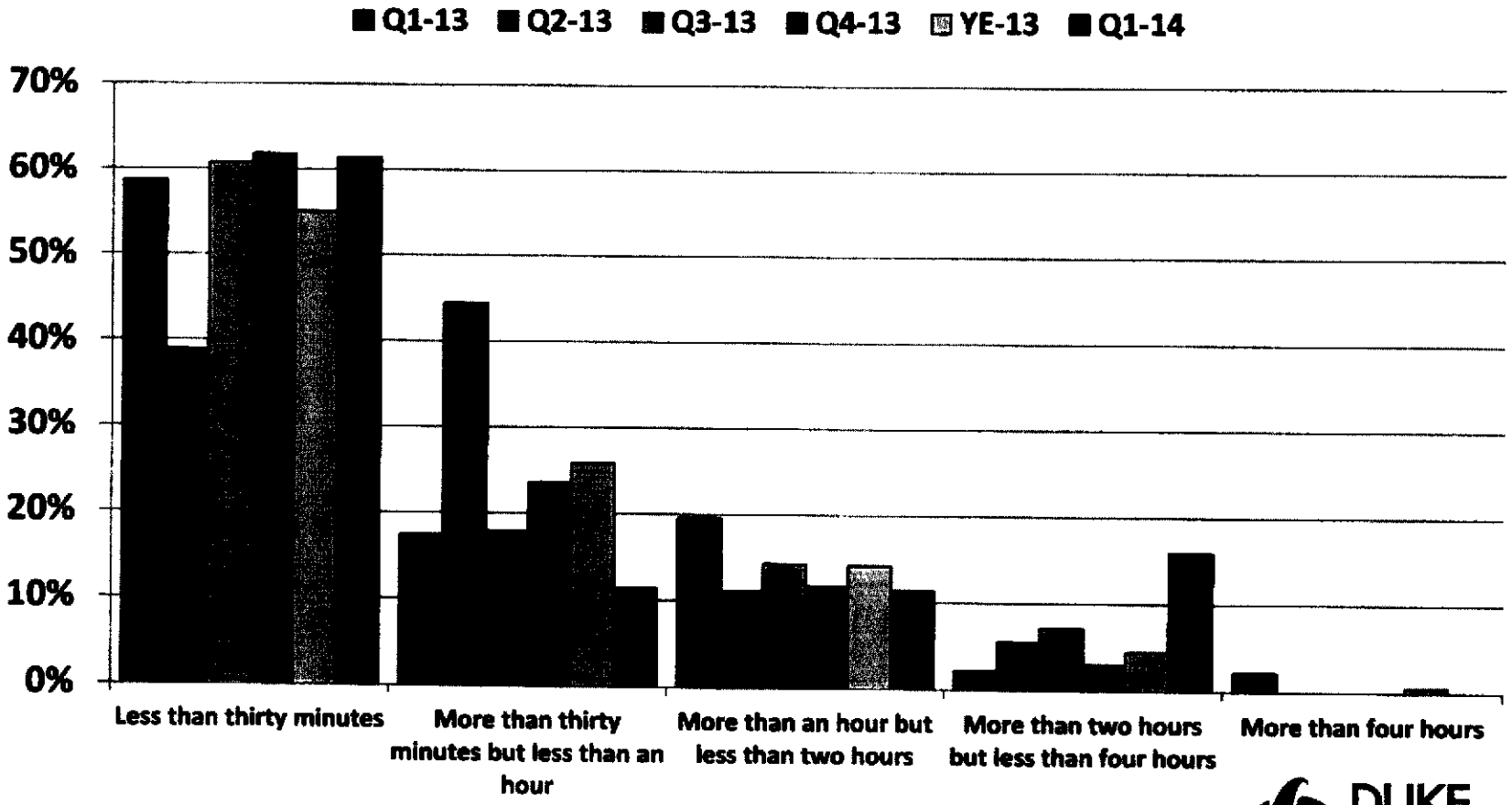
Non-Regulated Customers



DUKE ENERGY®

What do you consider to be an acceptable length of a prolonged outage that was not storm related?

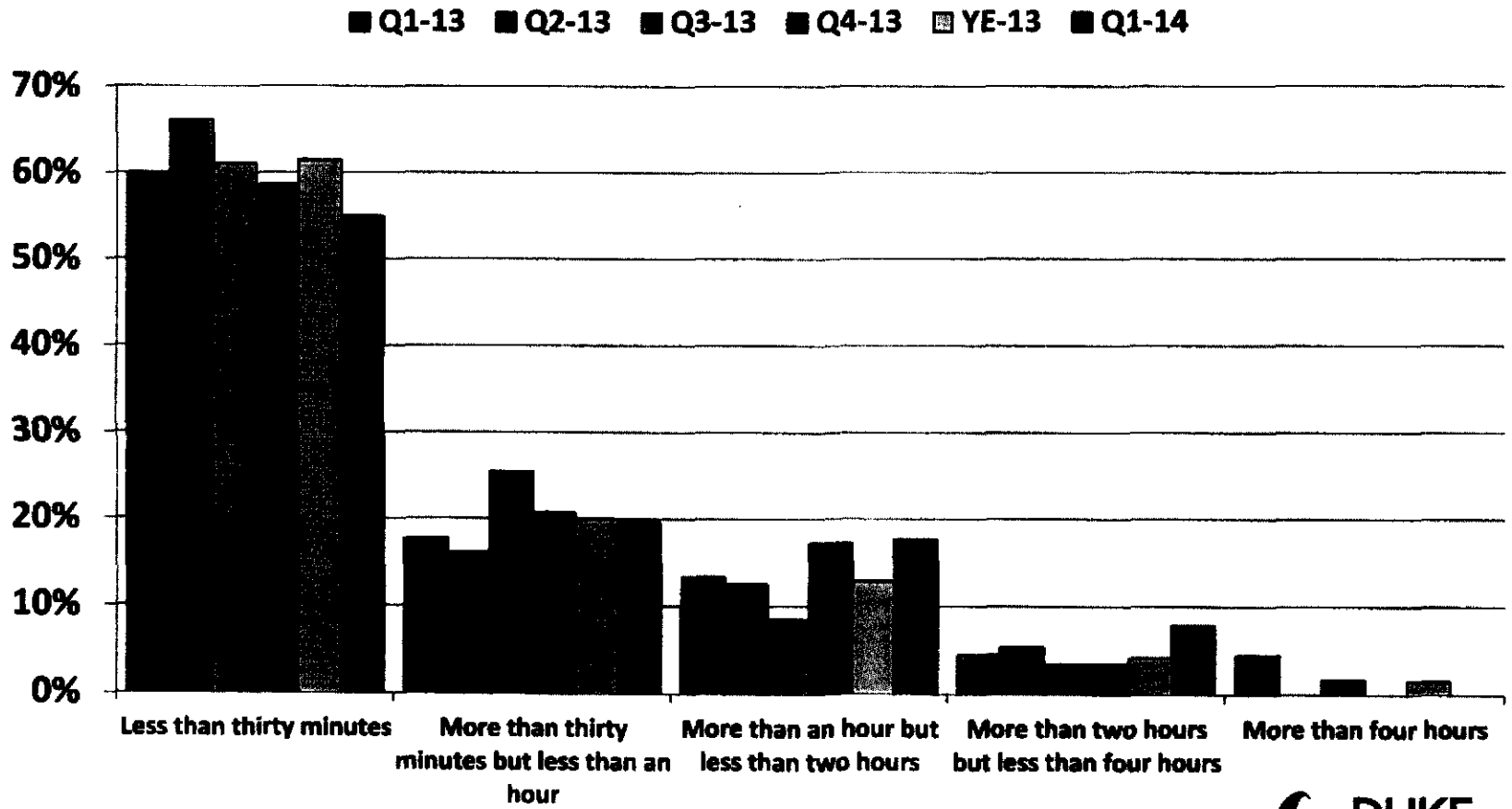
Regulated Customers



DUKE ENERGY.

What do you consider to be an acceptable length of a prolonged outage that was not storm related?

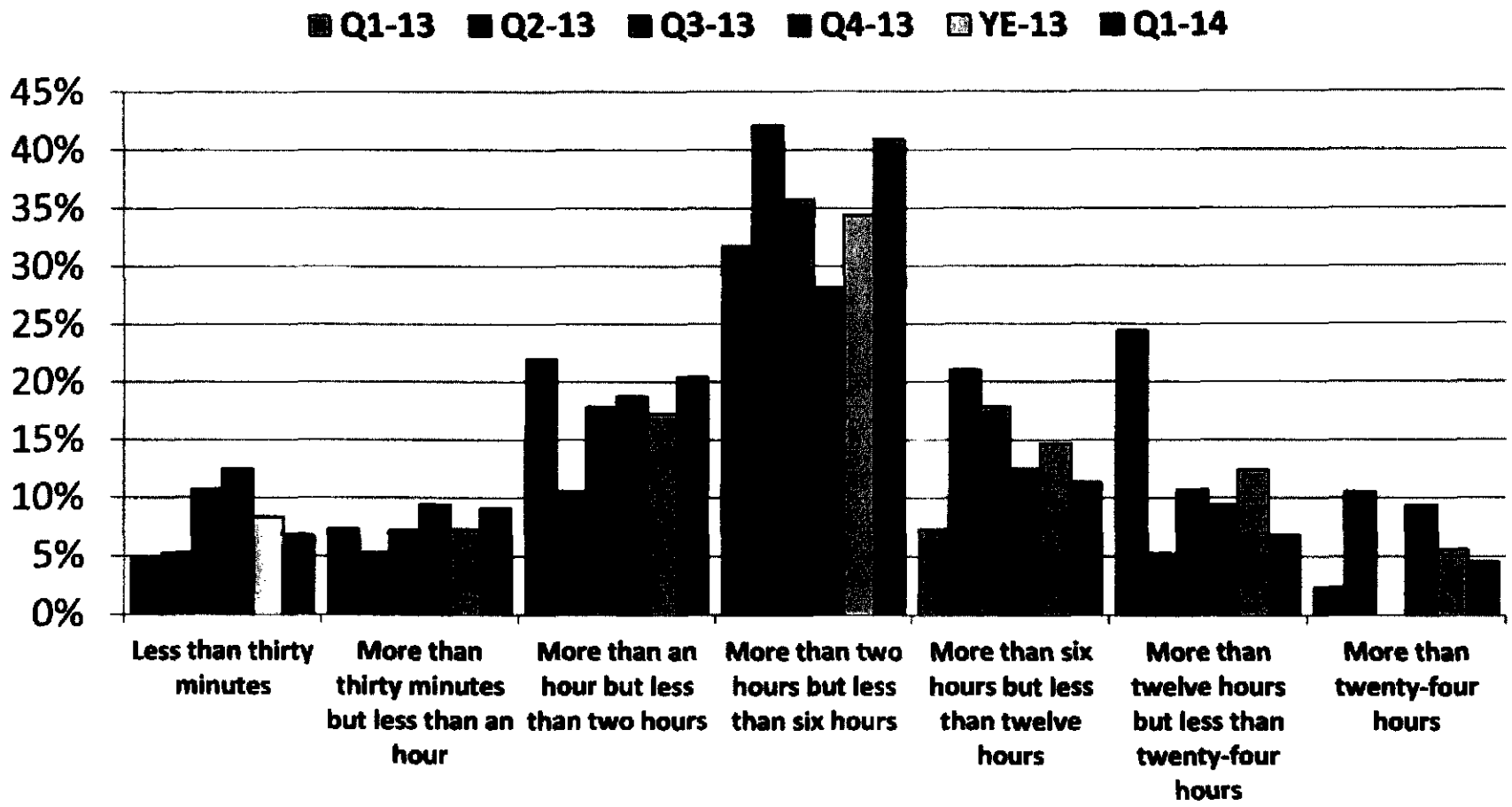
Non-Regulated Customers



DUKE ENERGY®

What do you consider to be an acceptable length of a prolonged outage that was storm related?

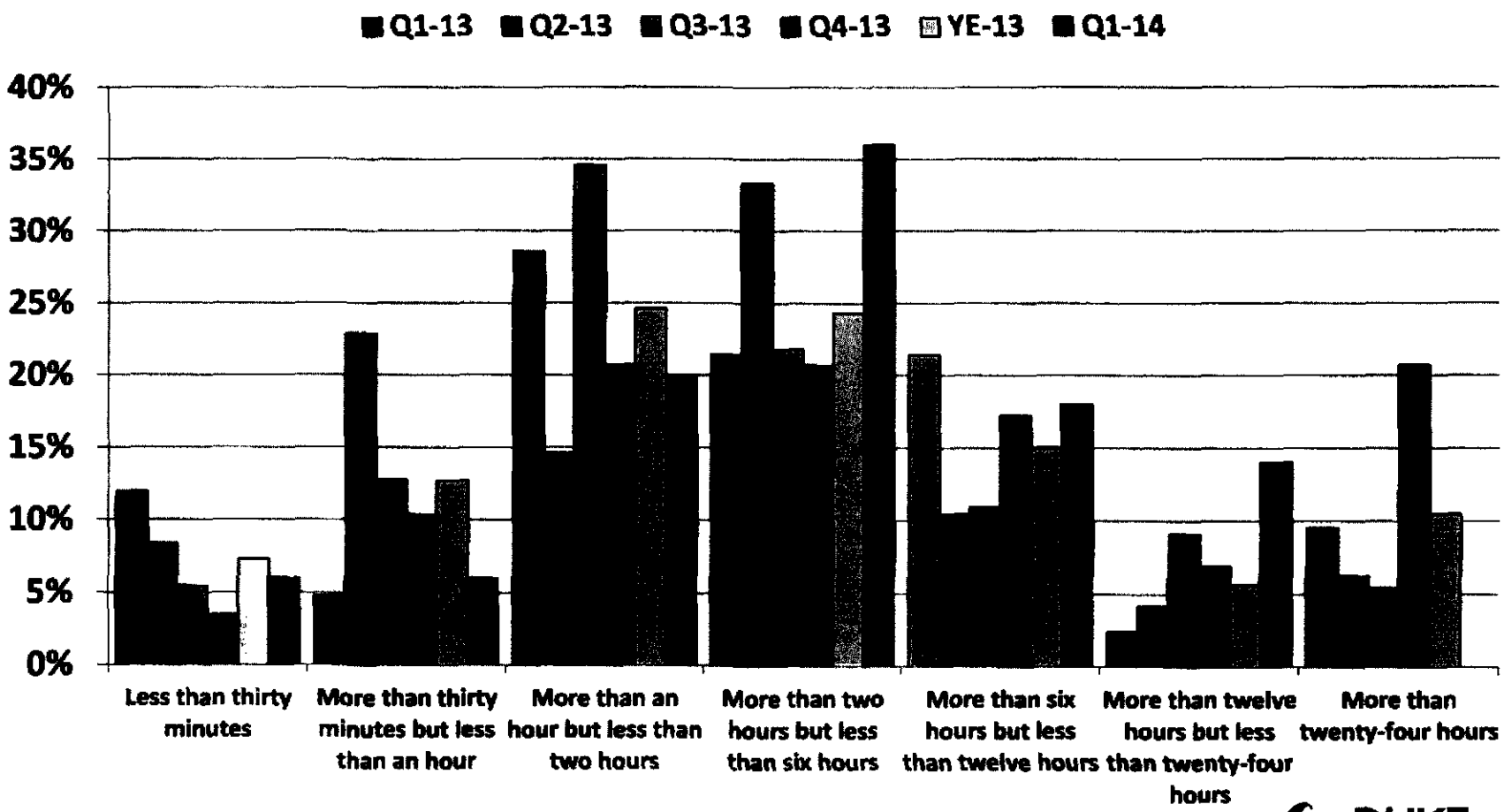
Regulated Customers



DUKE ENERGY.

What *do you consider to be an acceptable length* of a prolonged outage that was storm related?

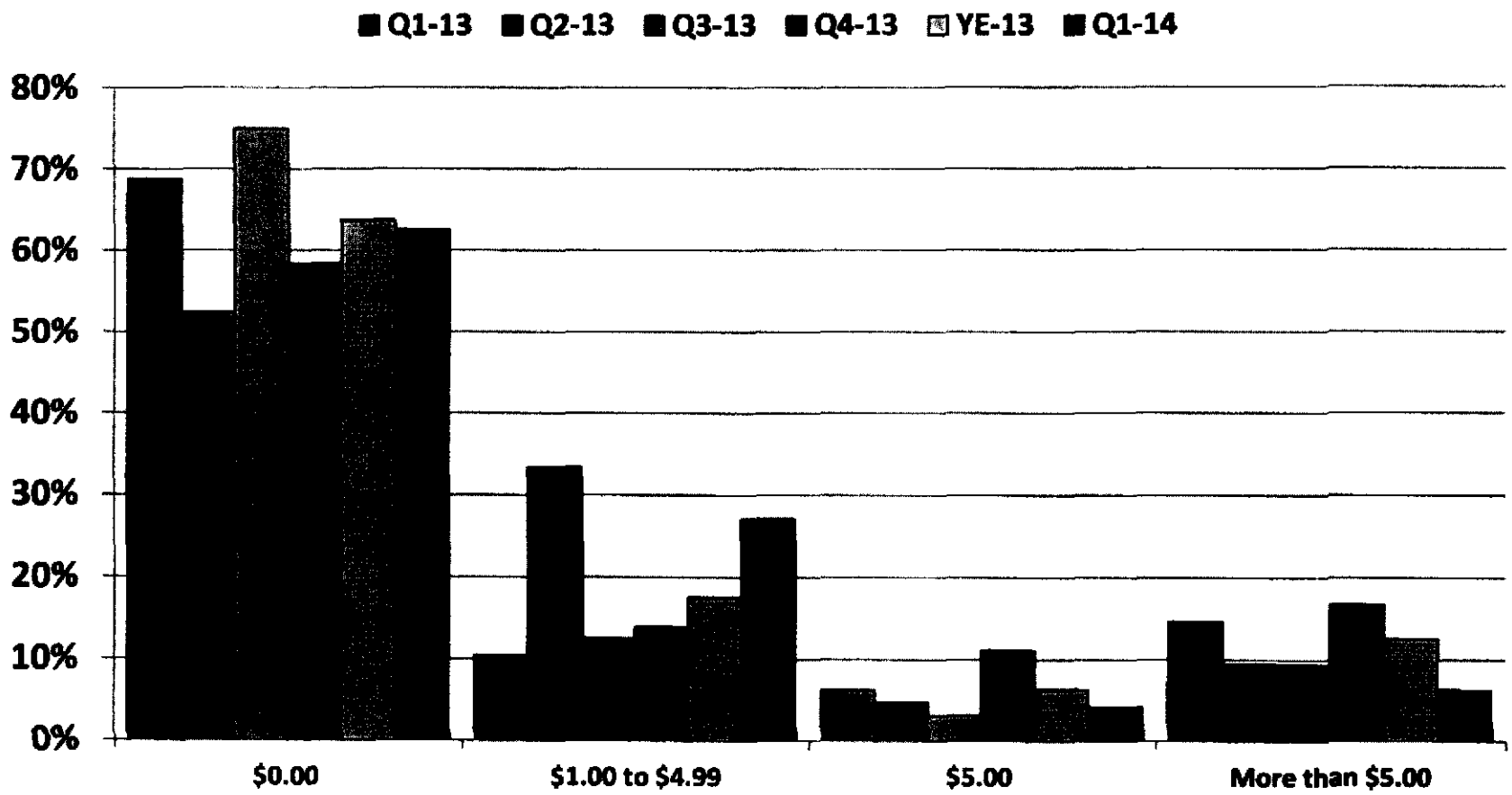
Non-Regulated Customers



DUKE ENERGY.

During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a <u>1 hour</u> electric service outage to your business?

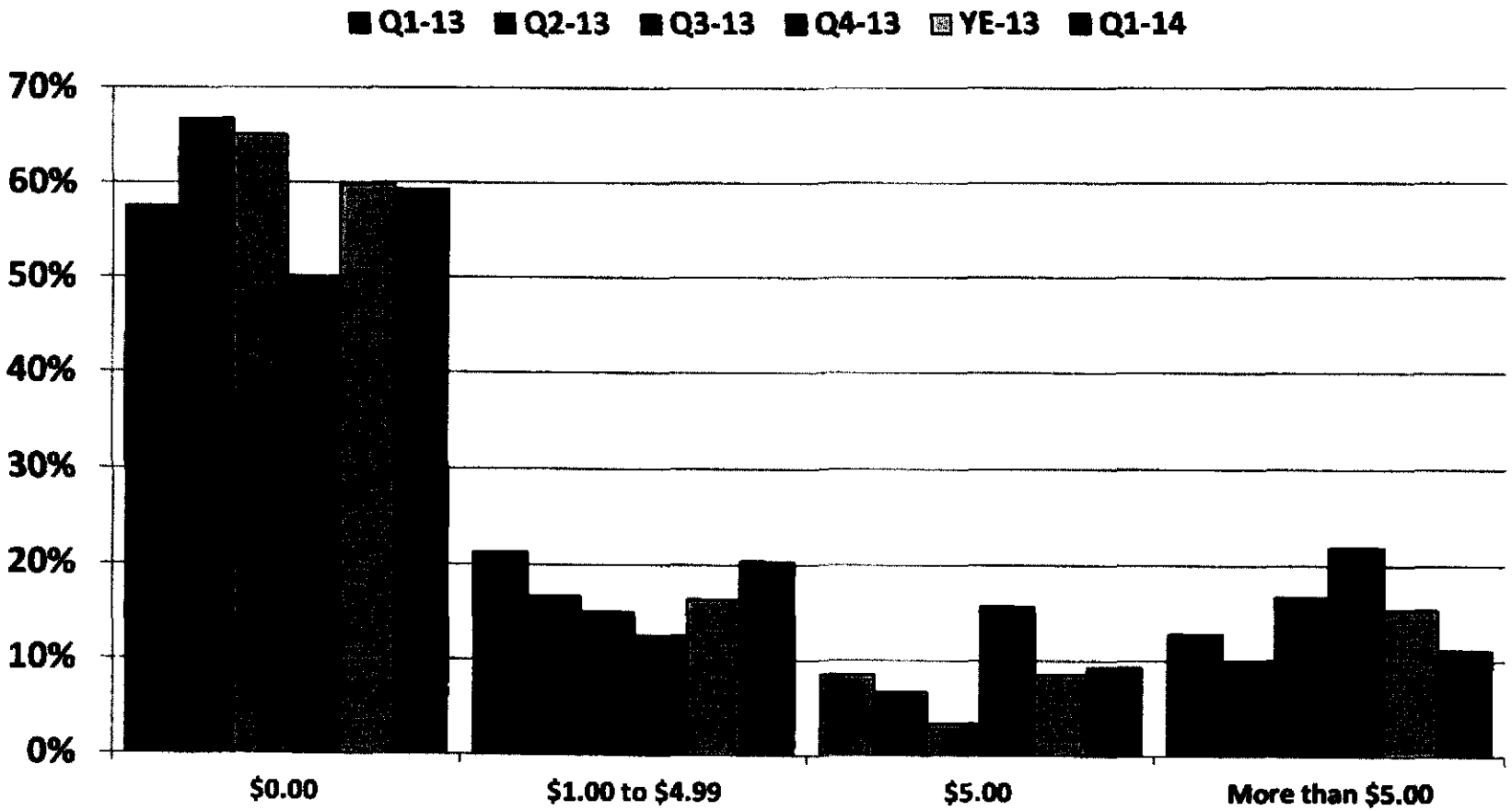
Regulated Customers



DUKE ENERGY.

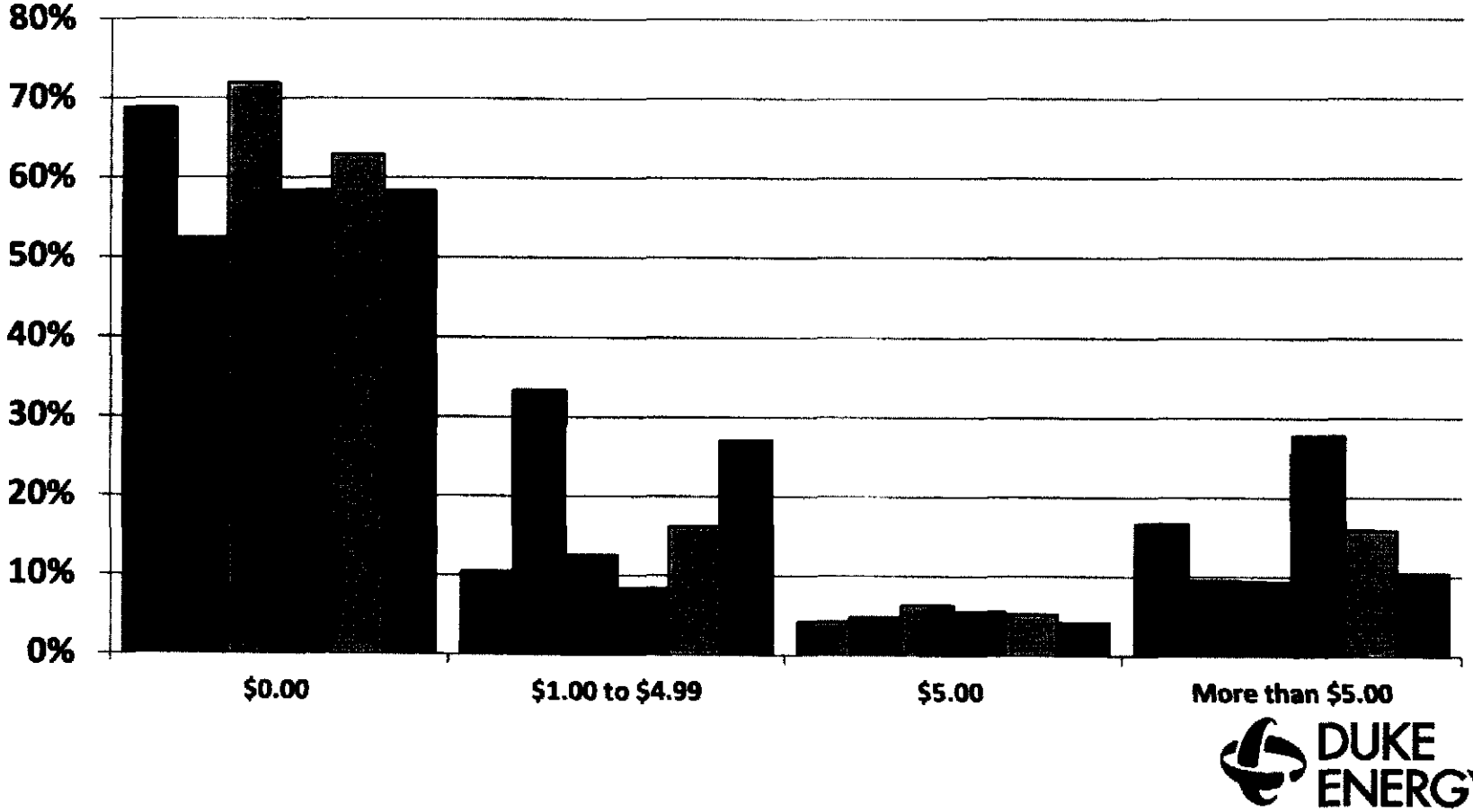
During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 1 hour electric service outage to your business?

Non-Regulated Customers



DUKE ENERGY®

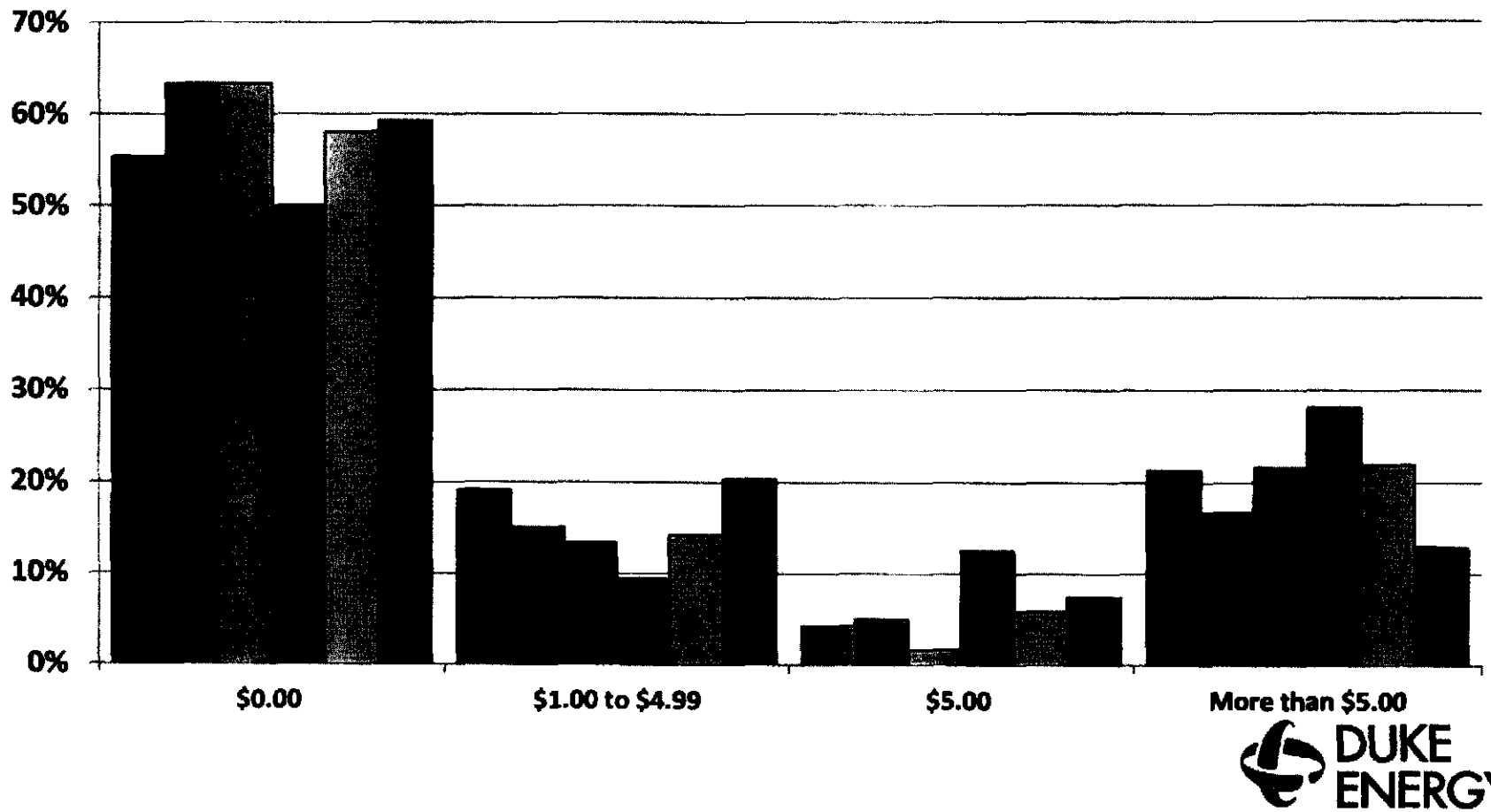
During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 2 hour electric service outage to your business?



DUKE ENERGY.

During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 2 hour electric service outage to your business?

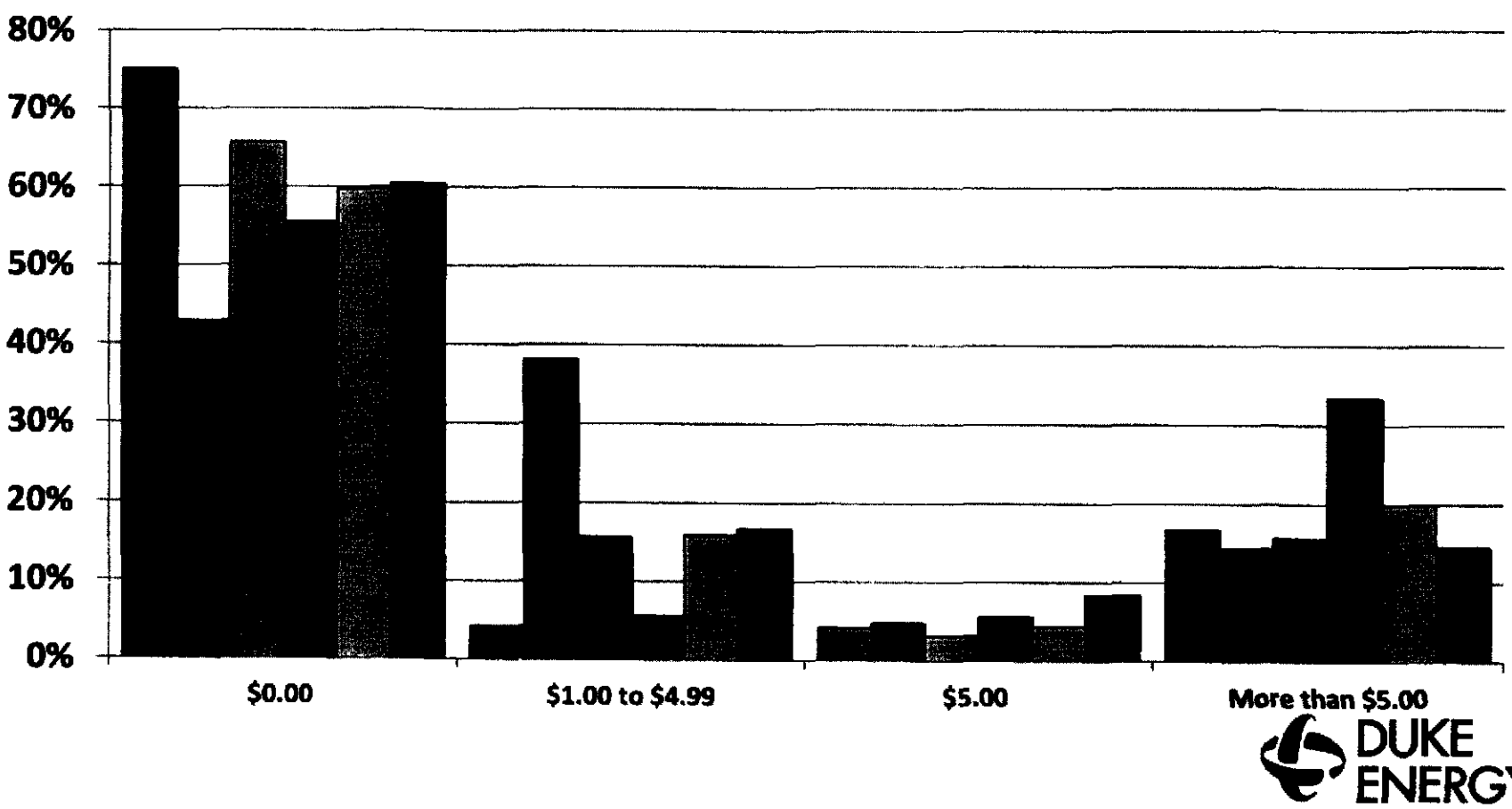
Non-Regulated Customers



DUKE ENERGY®

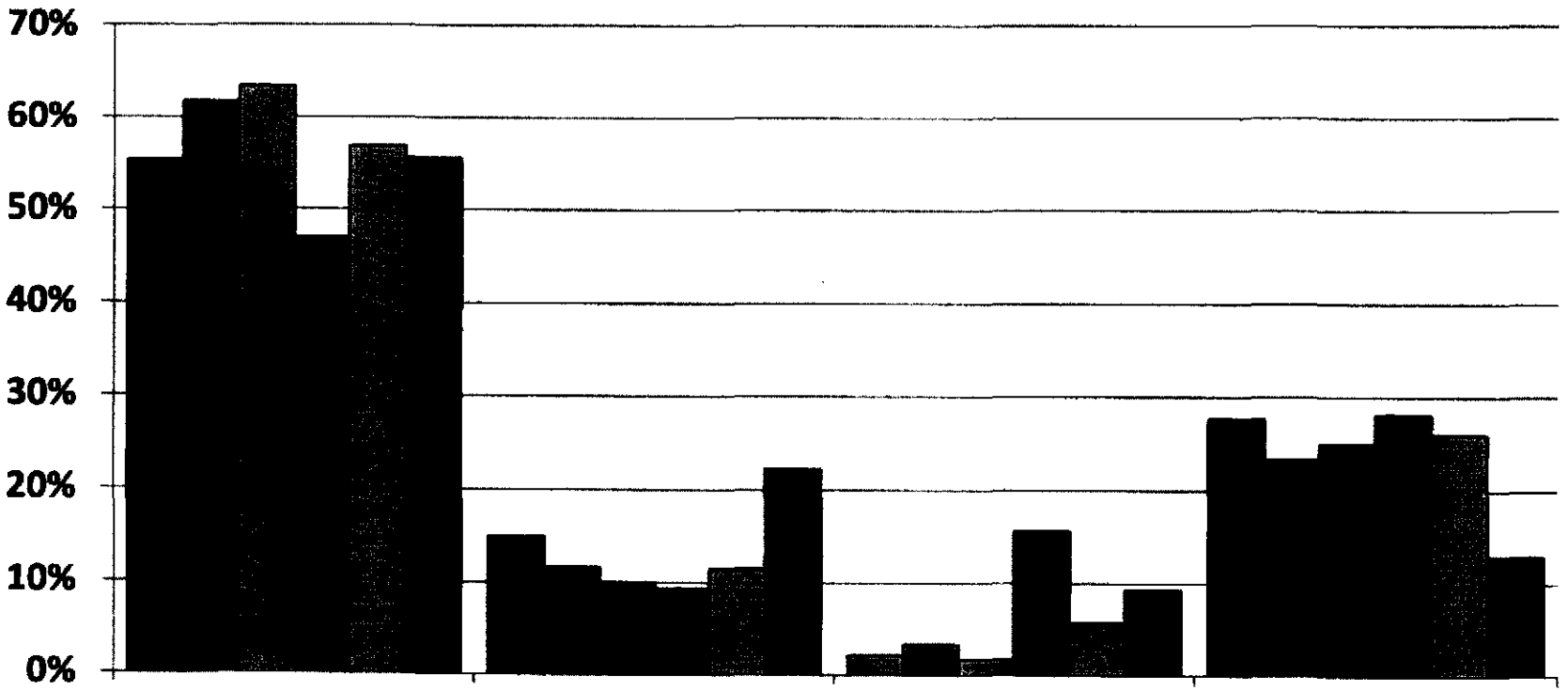
During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 4 hour electric service outage to your business?

Regulated Customers



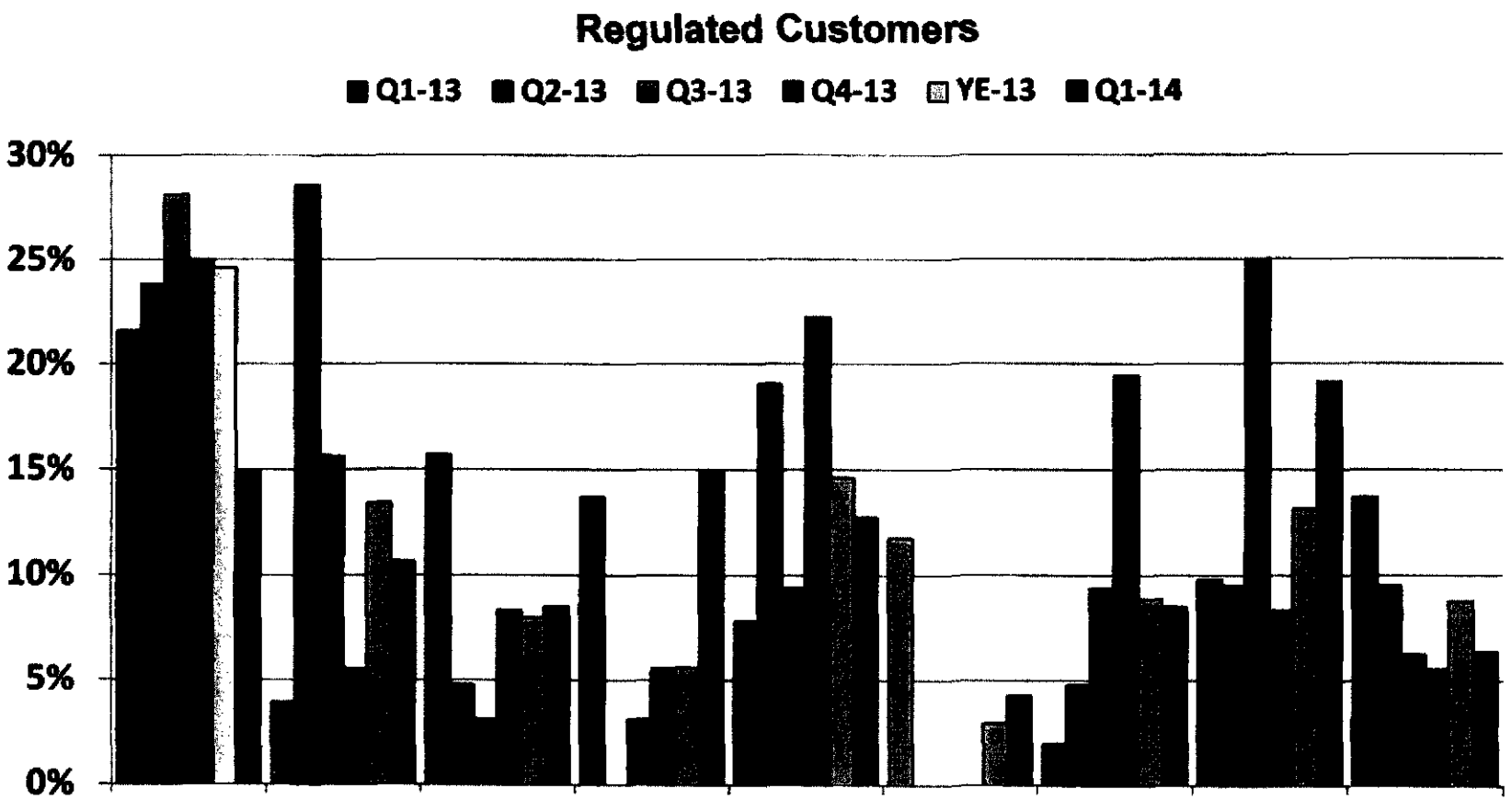
DUKE ENERGY.

During a specified period of system stress, such as a hot summer day, what is the maximum amount that you would be willing to pay and have included in your electric bill in order to avoid a 4 hour electric service outage to your business?



DUKE ENERGY.

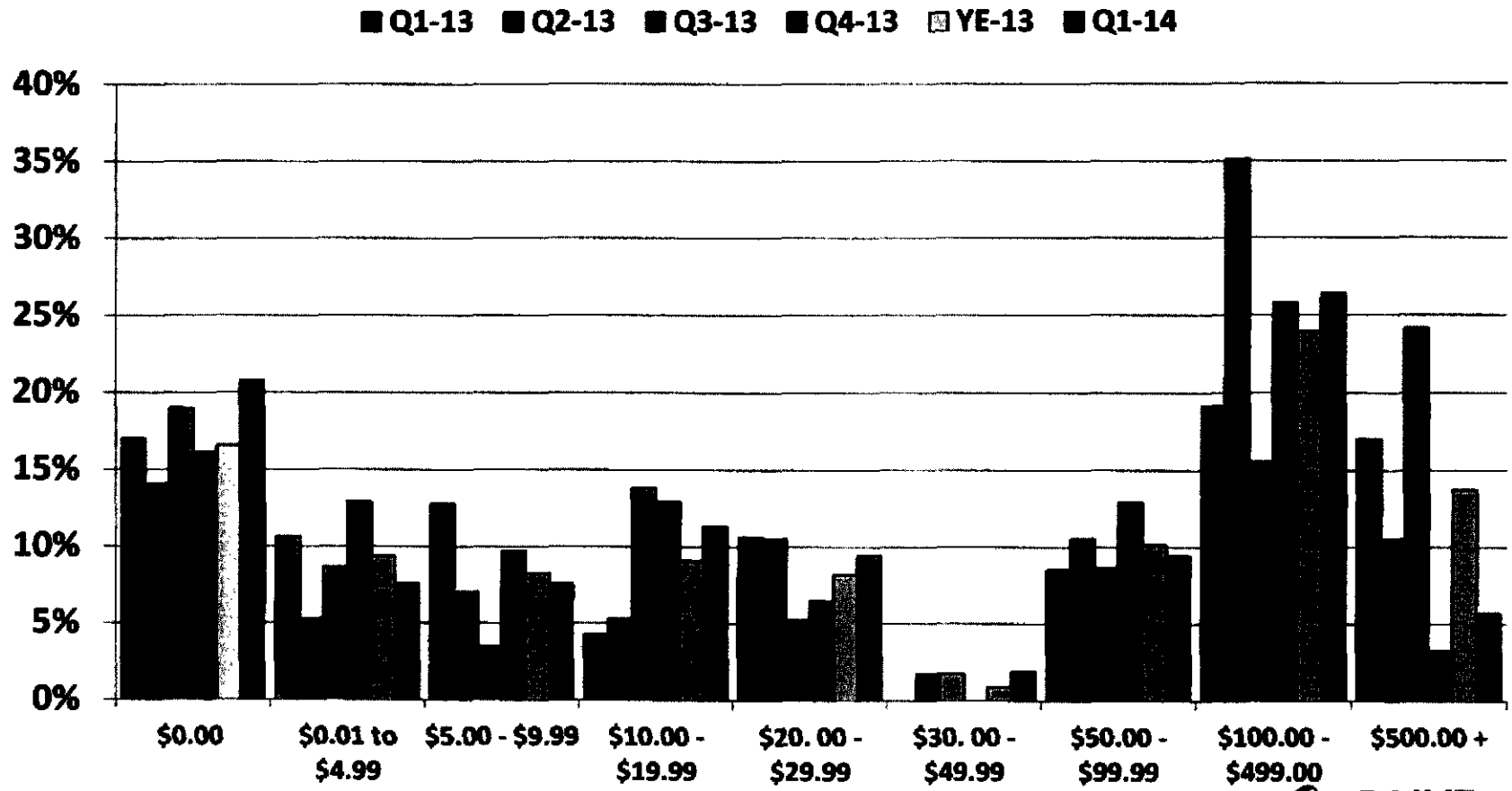
How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your business for 1 hour?



DUKE ENERGY.

How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your business for 1 hour?

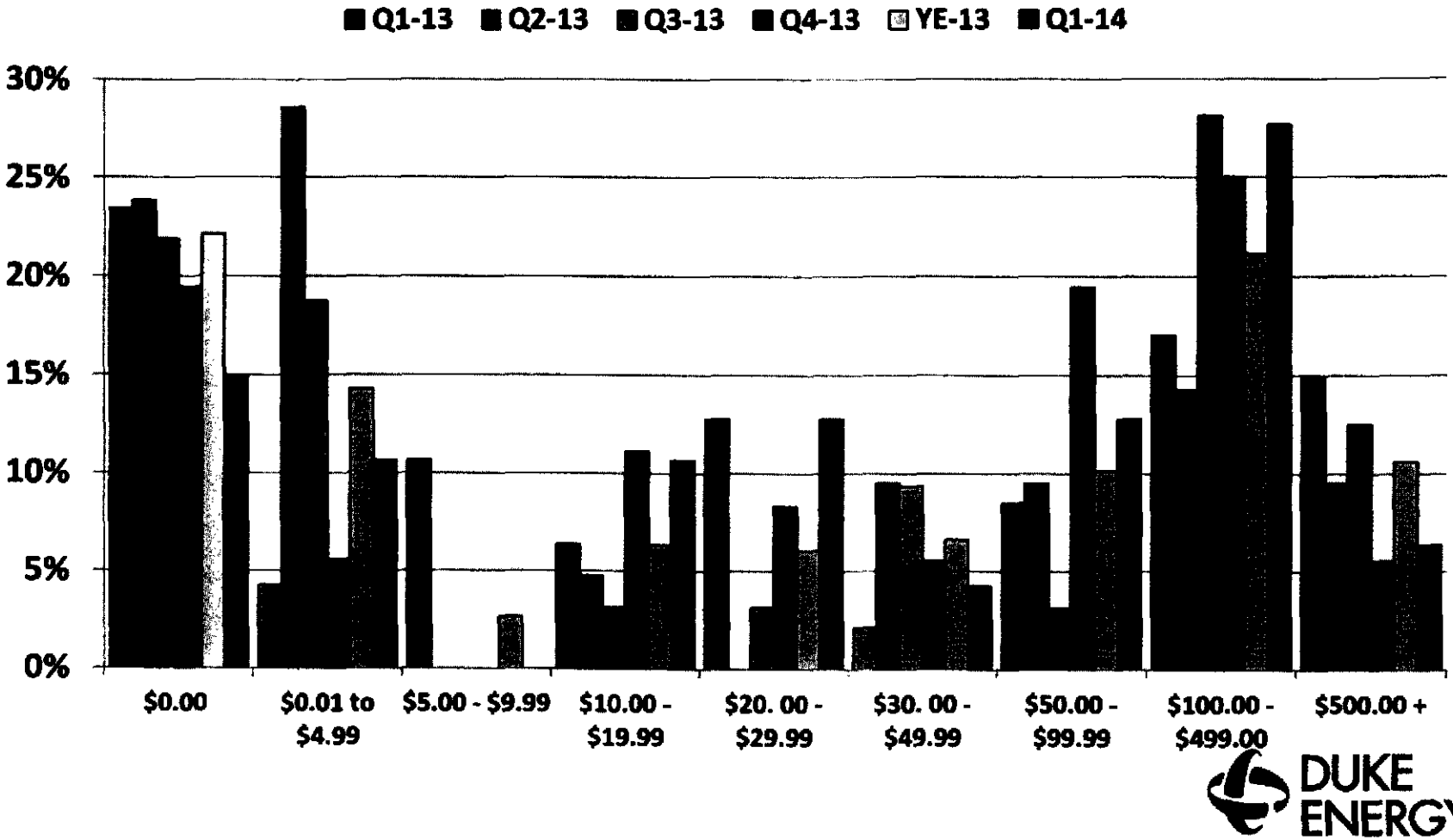
Non-Regulated Customers



DUKE ENERGY.

How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your business for 2 hours?

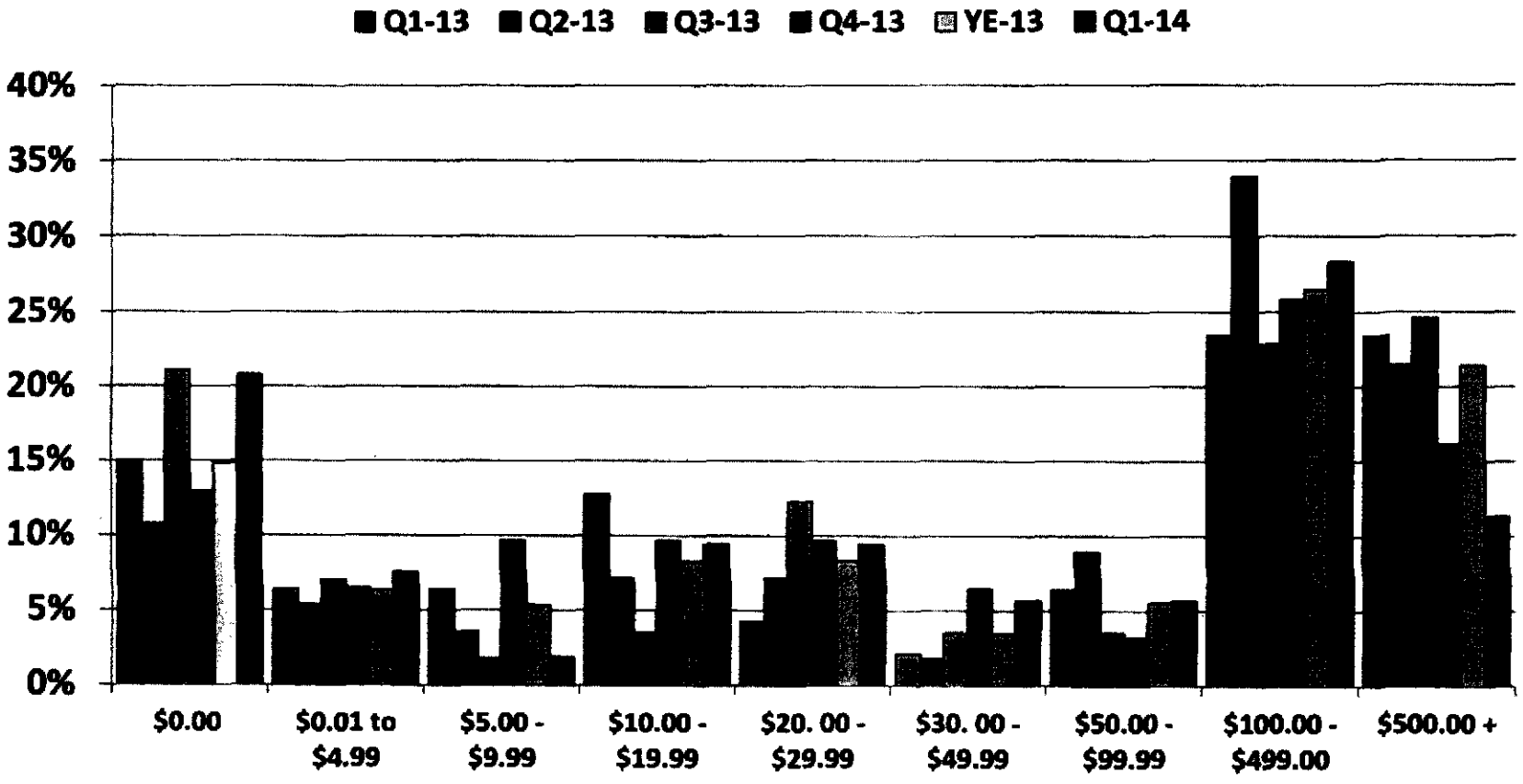
Regulated Customers



DUKE ENERGY®

How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your business for 2 hours?

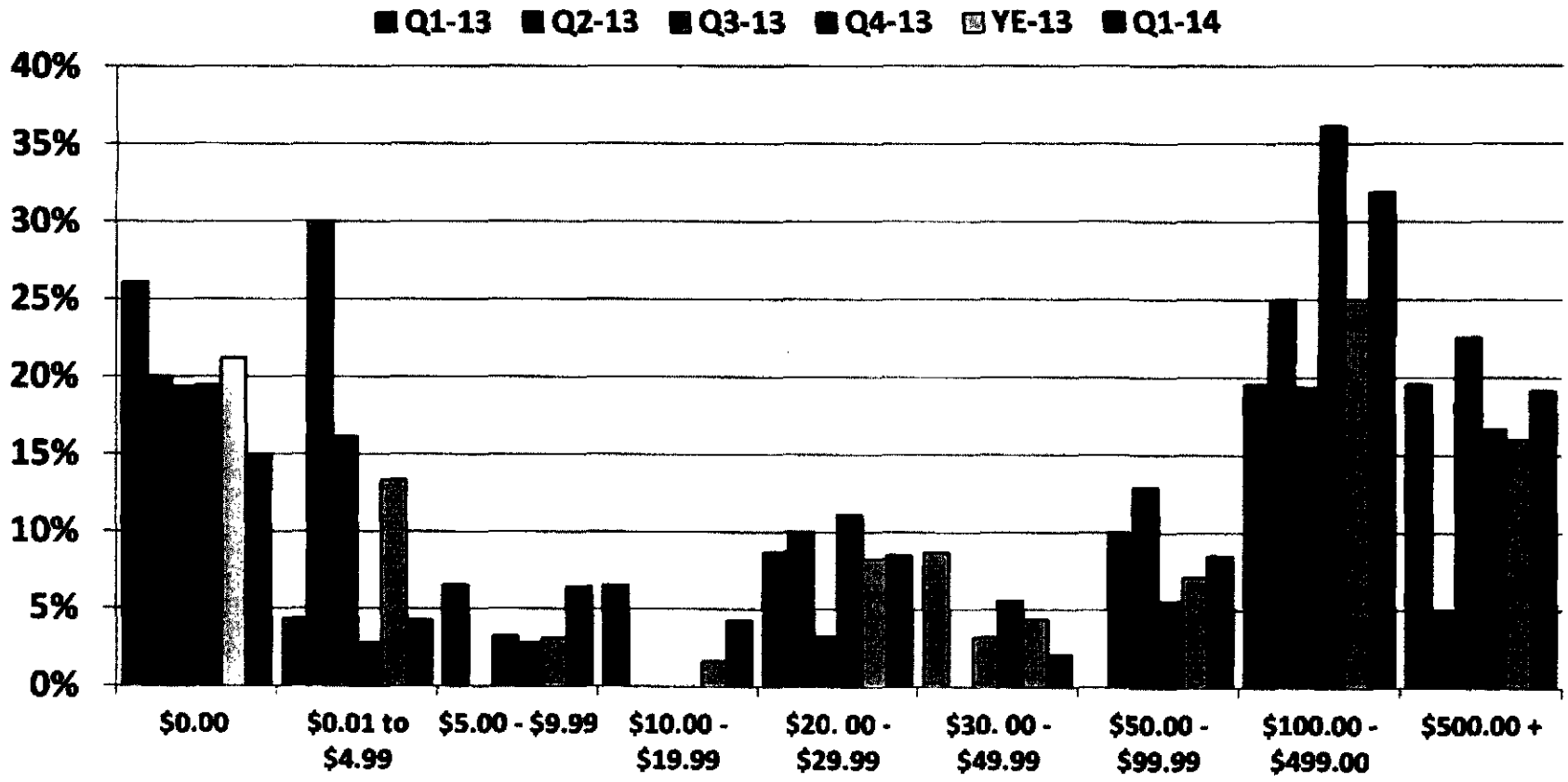
Non-Regulated Customers



DUKE ENERGY.

How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your business for 4 hours?

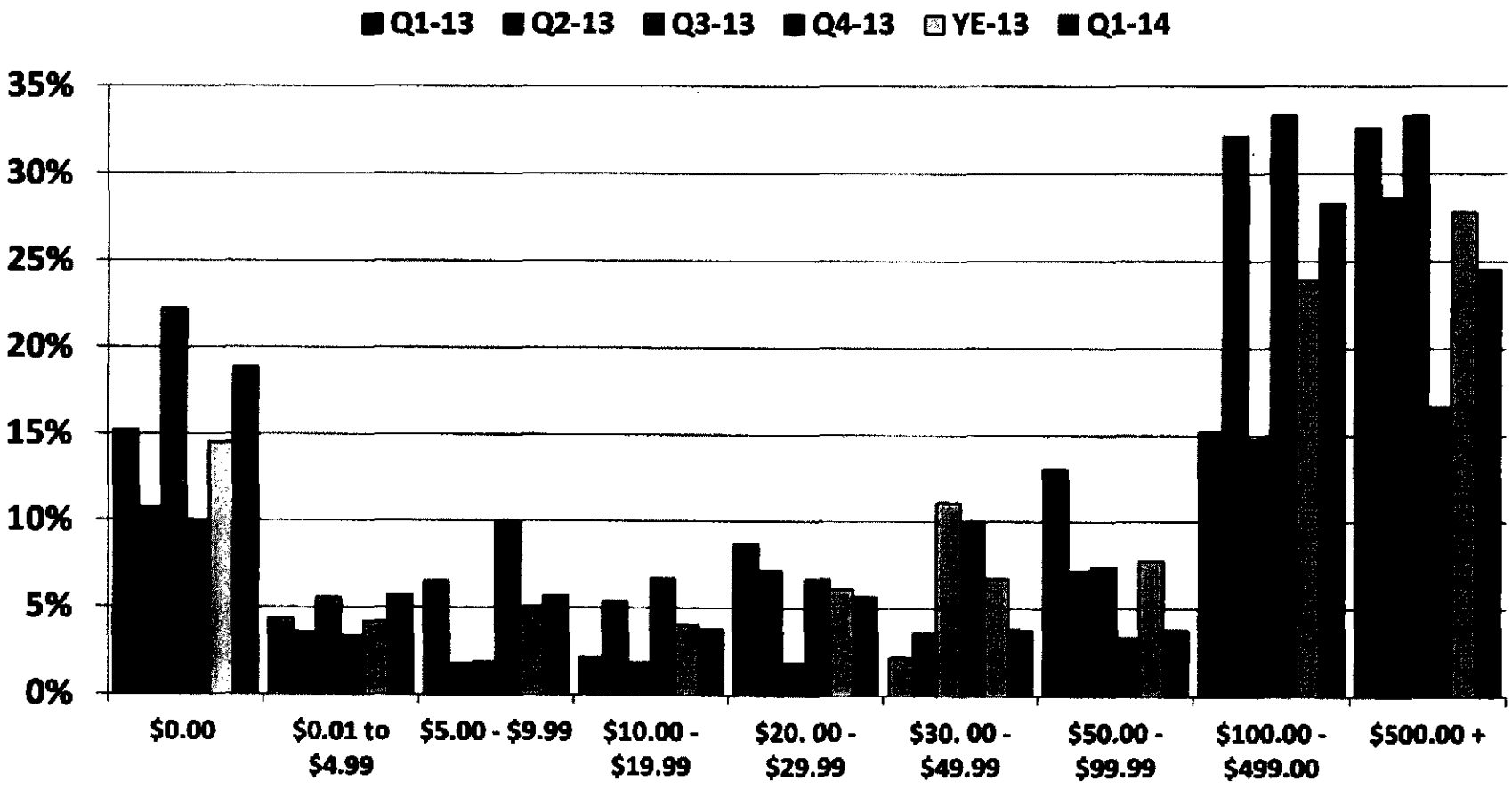
Regulated Customers



DUKE ENERGY.

How much of a credit to your electric bill would you require from the utility to allow the electric company to interrupt service to your business for 4 hours?

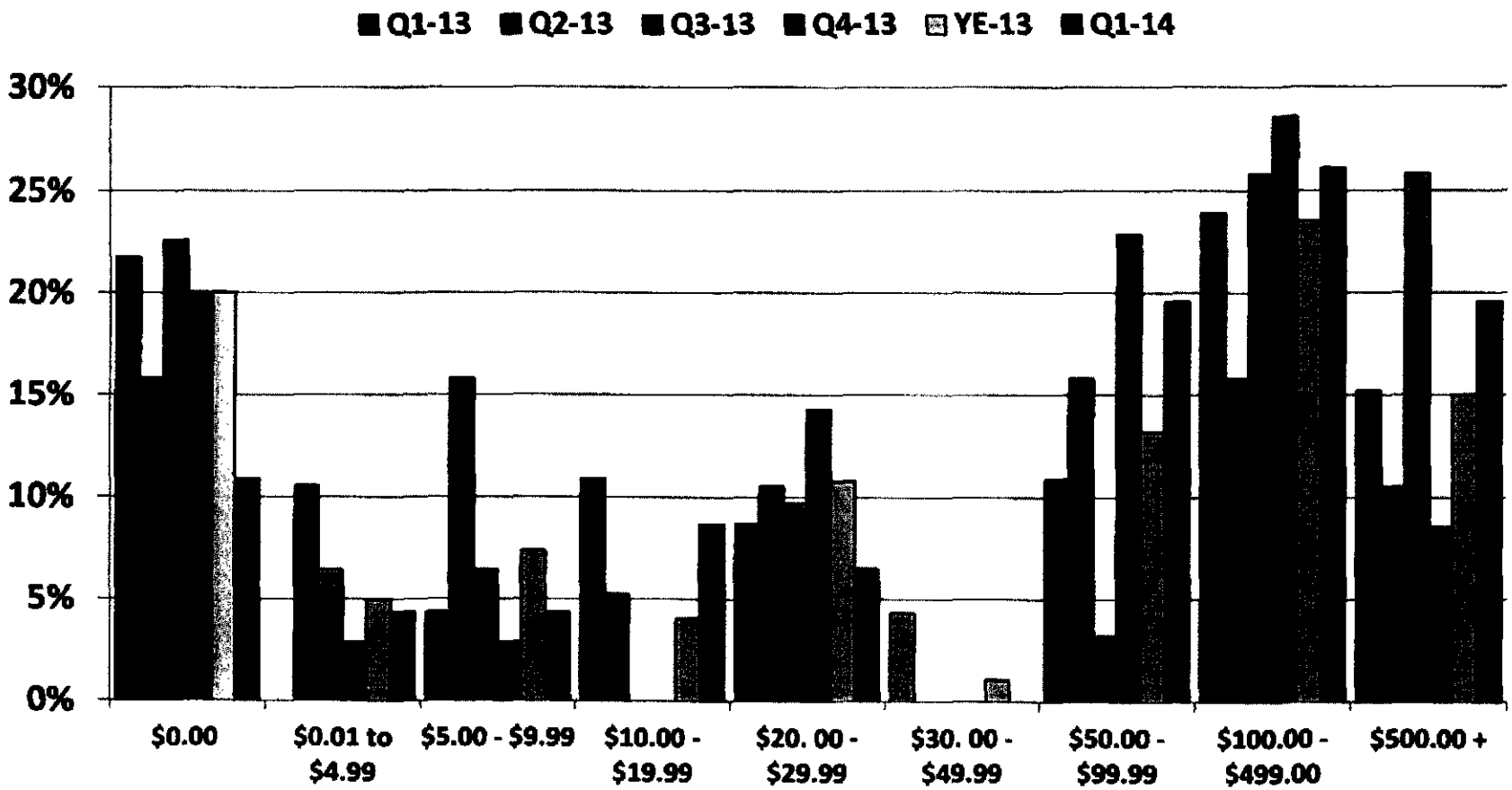
Non-Regulated Customers



DUKE ENERGY®

How much of a credit to your electric bill would you require from the utility to allow the electric company to control the usage of certain electrical equipment within your business during a time when its system is under stress?

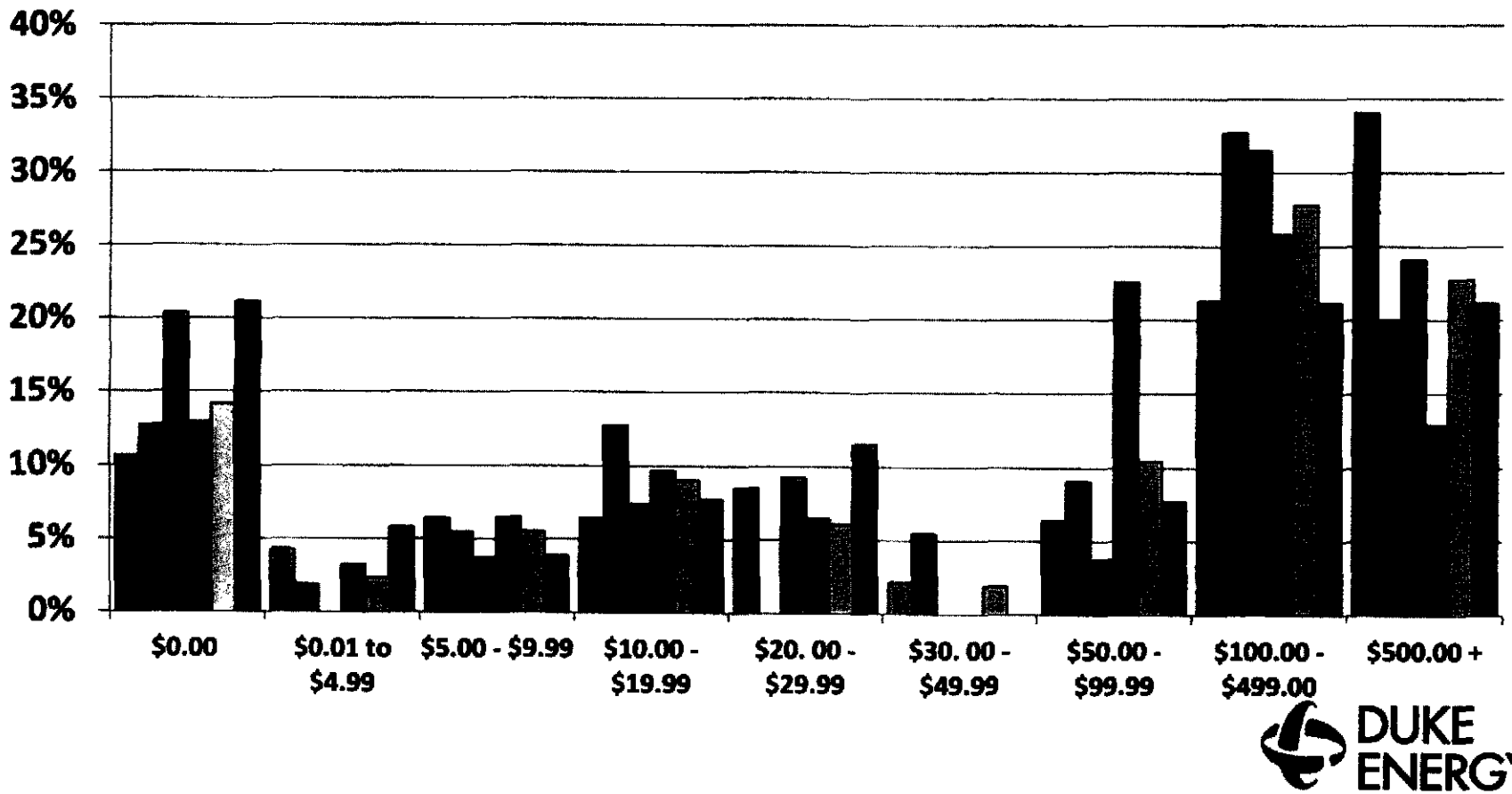
Regulated Customers



DUKE ENERGY.

How much of a credit to your electric bill would you require from the utility to allow the electric company to control the usage of certain electrical equipment within your business during a time when its system is under stress?

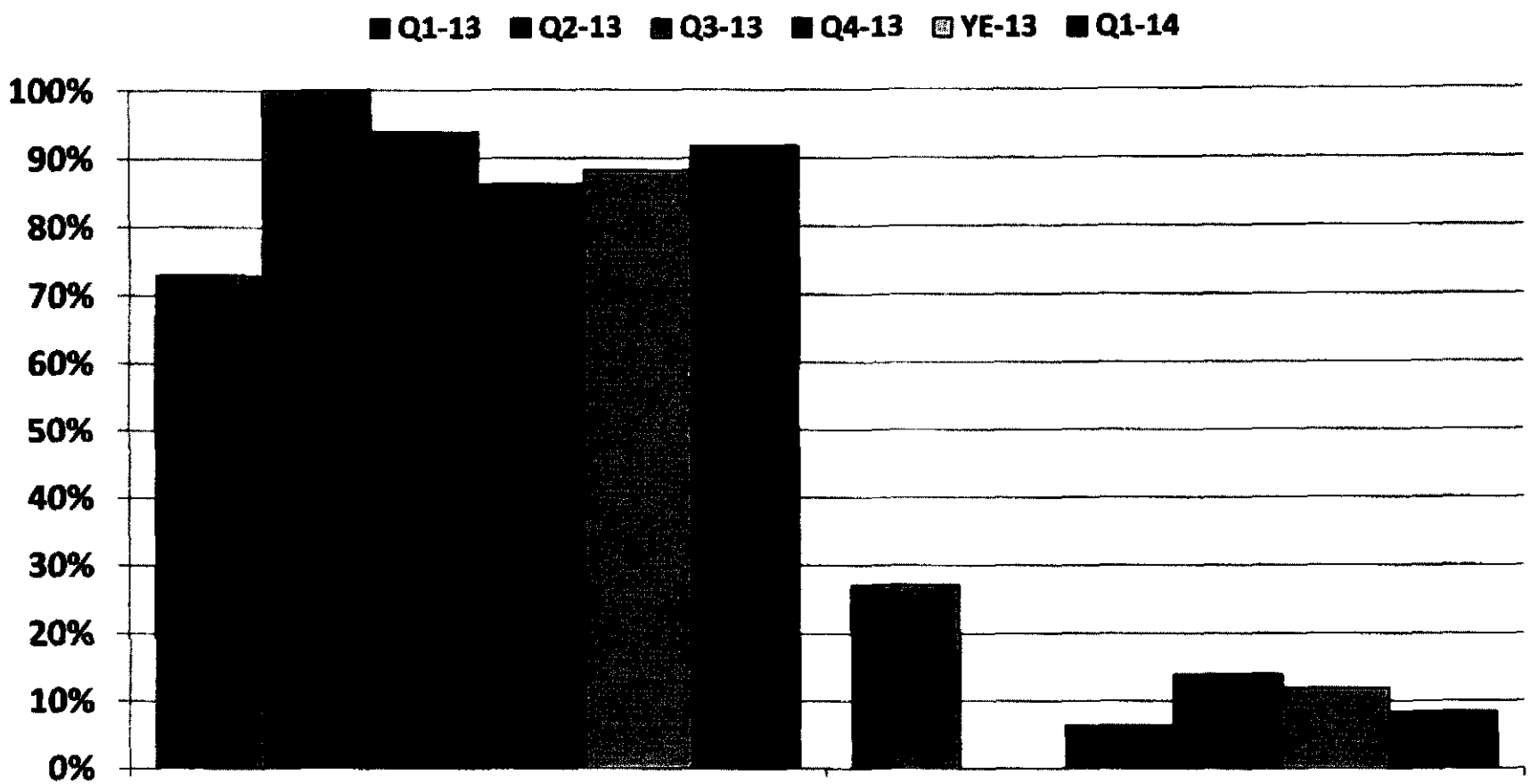
Non-Regulated Customers



DUKE ENERGY®

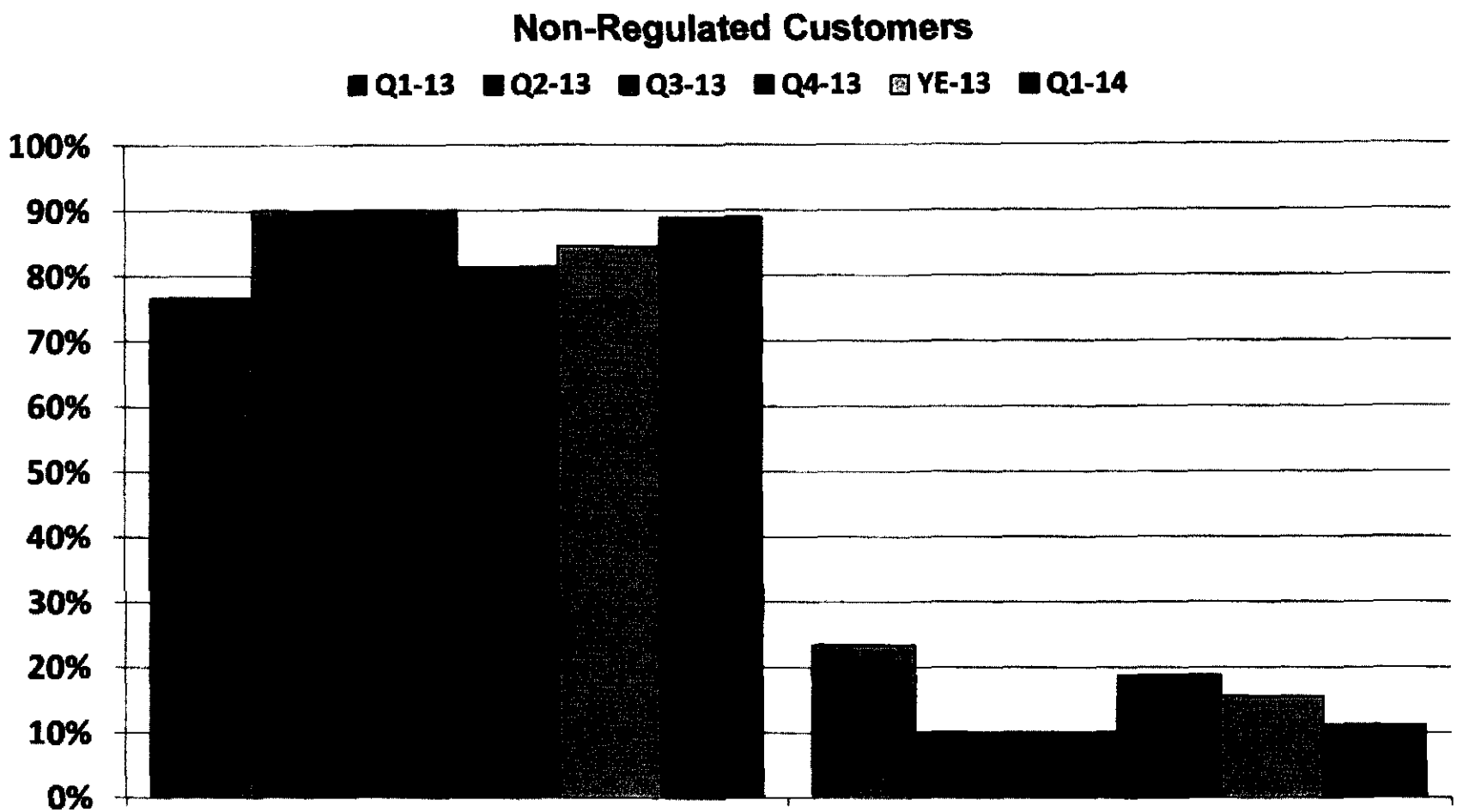
During a time when your electric company's system is under stress and the company calls on its customers to conserve electricity, would you be willing to take measures to conserve your business's electric usage?

Regulated Customers



DUKE ENERGY®

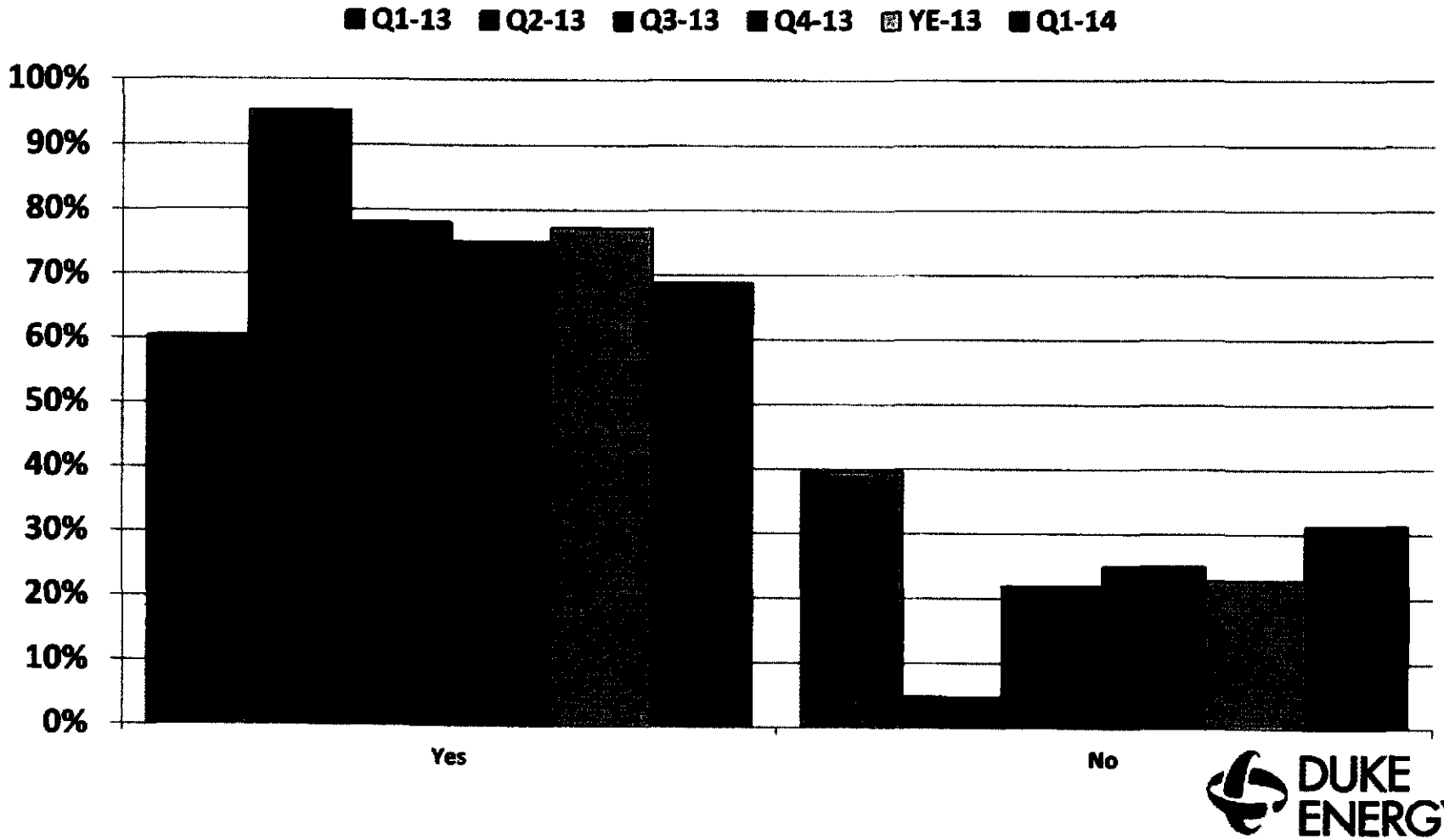
During a time when your electric company's system is under stress and the company calls on its customers to conserve electricity, would you be willing to take measures to conserve your business's electric usage?



DUKE ENERGY®

In helping with your energy conservation, would you be interested in new technology that lets you automate the settings for different electrical equipment to reduce electricity use when the cost to produce and deliver electricity is high?

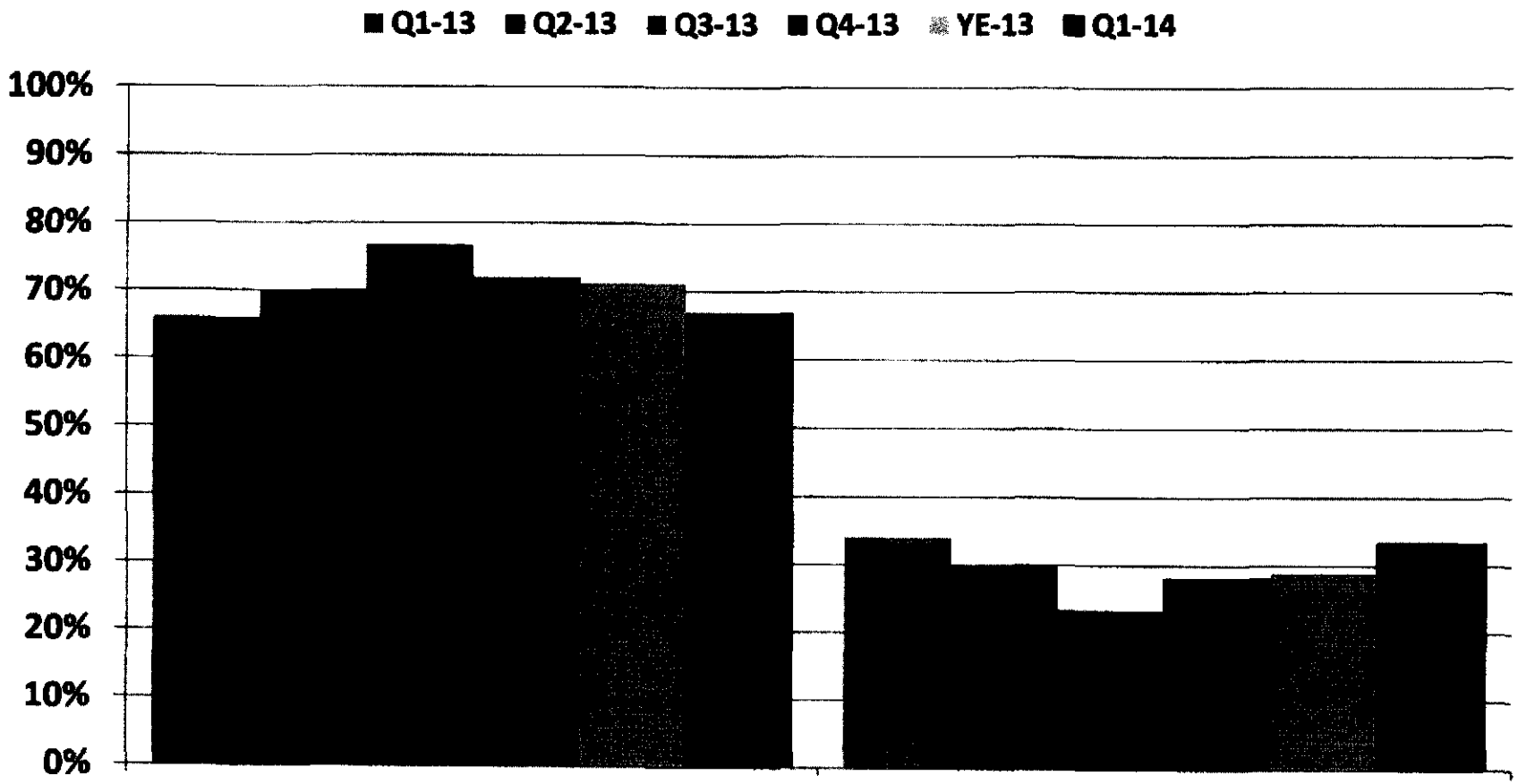
Regulated Customers



DUKE ENERGY®

In helping with your energy conservation, would you be interested in new technology that lets you automate the settings for different electrical equipment to reduce electricity use when the cost to produce and deliver electricity is high?

Non-Regulated Customers



DUKE ENERGY®

ATTACHMENT MWA- 7

CONFIDENTIAL PROPRIETARY TRADE SECRET