Review and Analysis of Service Quality Plan Structure

In The Massachusetts Department of Public Utilities Investigation Regarding Service Quality Guidelines For Electric Distribution Companies and Local Gas Distribution Companies

Philip Q Hanser*
David E. M. Sappington**
William P. Zarakas*

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* Principal, *The Brattle Group*.
** Lanzillotti-McKethan Eminent Scholar, Department of Economics, University of Florida

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I. INTRODUCTION

In its December 11, 2012 order, the Massachusetts Department of Public Utilities (DPU or Commission) opened a review of the service quality plans for the State's electric distribution utilities and local gas distribution companies (DPU 12-120). The DPU identified nine topics for review, which we classify as topics dealing with service quality metrics (i.e., the addition, deletion or modification of service quality metrics)[1] and the "structure" of the plan. A plan's structure consists of its performance targets (or benchmarks), deadbands, penalties and incentives (or in this case, offsets).[2] National Grid has requested that *The Brattle Group* assess the structure of the Service Quality (SQ) plans for the Massachusetts Electric Company and Nantucket Electric Company (d/b/a National Grid), and for Boston Gas, Colonial Gas and Essex Gas (also d/b/a National Grid).

The literature on incentive regulation provides substantial guidance concerning the principles and guidelines that should be considered when designing service quality plans.[3] These principles and guidelines include establishing reasonable targets for the company to achieve, including a neutral zone (or deadband) to limit the financial implications of events that are beyond the company's control, and implementing symmetric rewards and penalties.

Our review of the Commission's dockets and orders that address utility SQ plans indicates that the DPU has incorporated many of these principles and guidelines into plan design.[4] It is our understanding that the SQ plans in place in Massachusetts were developed to ensure that utilities do not compromise service quality while pursuing financial goals. The general plan design also suggests that the DPU favors allowing the utilities managerial discretion (in the policies and productive inputs they employ) in meeting service quality targets.

The Commission is now examining utility performance under the SQ plans and determining how to improve plan design, while remaining loyal to overall SQ plan

1 Covering topics 3, 4, 5, 6, 7 and 9.

2 The topics identified by the DPU which deal with plan structure include topics 1, 2 and 8.

3 See, for example: Brian Williamson, "Incentives for Service Quality: Getting the Framework Right," *The Electricity Journal*, 14(5), June 2001, 62–70; Virenda Ajodhia and Rudi Hakvoort, "Economic Regulation of Quality in Electricity Distribution Networks," *Utilities Policy*, 13(3), September 2005, 211-221; Paul Joskow, "Incentive Regulation and Its Application to Electricity Networks," *Review of Network Economics*, 7(4), December 2008; and Paul Joskow, "Incentive Regulation in Theory and Practice: Electricity Distribution and Transmission Networks," in Nancy Rose (ed.), *Economic Regulation and Its Reform*, University of Chicago Press, publication forthcoming (2013).

4 DTE 99-84, DTE 04-116, DPU 07-51, DPU 07-52 and DPU 12-120.

objectives. In DPU 12-120, the Commission is seeking specific input to refine the structure that it has had in place for several years. Our comments reflect our understanding of the economic and regulatory principles and guidelines that underlie incentive regulation and SQ plans, as well as our review of utility performance with respect to the various service quality metrics. As we will discuss, data trends, distributions and variances are important considerations in refining an SQ plan, notably in determining deadbands and the thresholds for triggering penalties and rewards (or offsets).

In this report, we first provide an overview of the generally accepted guidelines that apply to the design of service quality plans. Next, we provide a brief summary of the key components of the service quality plans in place in Massachusetts. Third, we examine the performance data for each service quality metrics and present the results of our analysis concerning the distribution of service quality metric performances. Finally, we present our conclusions and recommendations concerning the structure of SQ plans in Massachusetts, specifically with respect to the setting of benchmarks and deadbands and the use of penalty and reward provisions.

II. PRINCIPLES OF INCENTIVE REGULATION AND SERVICE QUALITY PLANS

Incentive regulation refers to policies including, but not necessarily limited to, explicit financial penalties and/or rewards, to encourage a regulated firm (e.g., an electric or gas utility) to achieve desired and clearly stated performance goals.[5] Service Quality (SQ) plans are a form of incentive regulation which typically have targets and ranges for one or more service quality metrics (such as system reliability, as measured by SAIDI and/or SAIFI) and a threshold level of performance below which the company is penalized for inferior performance and, in some cases, a threshold level of performance above which the company is rewarded for superior performance. The prevailing penalties and rewards (e.g., the maximum penalty for each service quality metric) typically are codified through a formula.

In Massachusetts, the SQ plans for the National Grid companies include a penalty range, in which the company is required to distribute the specified financial penalties to its customers, and a range in which the company is credited with an amount that can be used to offset penalties that would otherwise be incurred on other metrics (within the same reporting period).

SQ plans also attempt to motivate utility managers to achieve operating efficiencies and enhance customer welfare. That is, SQ plans are designed to ensure that the utility invests in and operates with specific aspects of the customer experience firmly in mind.

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[5] David E.M. Sappington, Johannes P. Pfeifenberger, Philip Hanser and Gregory N. Basheda, "The State of Performance-Based Regulation in the U.S. Electric Utility Industry," *The Electricity Journal*, 14(8), October 2001, 71-79.

Well-designed SQ plans adhere to the following guiding principles:[6]

- Plans and associated metrics and formulas must be clear, transparent and easily understood.

- Plans should provide the company with appropriate motivation. That is, the plan should be designed so that the company – through diligent investments and operational decisions – can reasonably expect to influence performance.

- Penalties and incentives should be designed to reflect acceptable levels of risk and reward. Specifically, inappropriate penalty or reward thresholds that ensure the utility will always exceed or never achieve specified targets can discourage the company and harm customers.

- The term and commitment to the plan should be sufficiently long so that the company has the incentive to make investment and operational decisions with long term interests in mind.

- The structural elements of a plan (i.e., performance targets, deadbands and penalty / reward provision) are all interrelated and need to be determined in an integrated manner.

These principles have a direct bearing on the design, or structure, of SQ plans:

- <u>Performance Targets</u>. Performance targets should be set to balance relevant benefits and costs. Although extremely high levels of service quality might be feasible, they may come at a very high cost; that is, a cost that exceeds the value that customers place upon such levels of service quality. Ideally, a performance target should be set at the level where the incremental benefit that consumers derive from increased performance is equal to the incremental cost of increased performance. Targets should be set at levels that a utility can reasonably achieve. Setting a performance target at a level that is unreasonably demanding or too easily achieved removes the motivation that is a key principle underlying SQ plans. Automatically raising performance targets based on recent accomplishments could also undermine the motivation underlying an SQ plan.

- <u>Neutral Zones or "Deadbands"</u>. In practice, it is difficult to identify precisely the ideal levels of service quality because there is considerable uncertainty about the relevant benefits and costs of service quality. Furthermore, the relationship between utility actions to enhance service quality and realized service quality typically is stochastic. Consequently, it is appropriate to implement a neutral zone or a deadband; i.e., a range around the target level of performance in which the utility's financial position does not vary with the realized level of service quality. The extent of this range should reflect the prevailing randomness

[6] Sappington *et al.* (2001) and Joskow (2013), *op. cit.*

associated with achieving target levels of service quality. An overly constricted (i.e., tight) deadband can leave the utility susceptible to substantial variation in factors that are largely beyond its control.

- Incentives: Penalties and Rewards. Rewards for exceptional performance and penalties for substandard performance should reflect the corresponding benefits and costs of exceptional and substandard performance. Such a reward and penalty structure presents the utility with appropriate incentives to pursue the best interests of consumers, taking account of the costs of increasing service quality. The utility will employ its substantial knowledge of the costs of enhancing service quality to maximize consumer net benefits (accounting for relevant costs) when the rewards/penalties it faces for superior/substandard performance reflect relevant consumer valuations. Symmetric rewards and penalties are appropriate if increases above and declines below the specified target generate comparable benefits and losses for consumers.

These structural elements of an SQ plan need to applied in an integrated manner; poor coordination among structural elements could compromise overall SQ plan intent. As discussed, performance targets should approximate the level where the incremental benefit that consumers derive from increased performance is equal to the incremental cost of providing higher levels of performance. However, because limited information typically precludes identification of the ideal levels of service quality, deadbands should not be restrictively narrow. Furthermore, symmetrical penalties and rewards help ensure that customers are compensated for losses in value (from substandard performance) and utilities are compensated for the costs incurred in delivering higher levels of performance.

III. THE MASSACHUSETTS SERVICE QUALITY PLANS

The Massachusetts SQ plans include:

- A target value for each service quality metric, based on an average of the utility's performance in a fixed 10 year period,[7] which is referred to as the service quality metric's benchmark value.

- A neutral range, or deadband, set at one standard deviation around the benchmark value, with the standard deviation calculated based on the 10 years of annual observations that are employed to calculate the benchmark (unless 10 years of data are not available).

[7] "If data for this ten-year period is not available to the Company, the Company shall use the maximum number of years of data available, so long as three years are available. As the Company collects additional data, that data shall be included in benchmarking until ten years' worth of data is collected, after which the benchmark shall consist of the fixed ten-year average of the data. This benchmarking methodology shall be employed for all SQ performance measures." DPU 07-51 and DPU 07-52.

- A penalty provision that is triggered when the performance on a service quality metric falls on the "negative," or poor performance side of the neutral band. The maximum amount of the penalty for a particular metric is prescribed as a percentage of the total possible penalty level (i.e., 2.5% of the company's annual transmission and distribution revenues). The penalty amount levied is graduated, depending on how far actual performance diverges from the target level.[8]

- A revenue offset is created when performance on a service quality metric falls on the "positive," or superior performance, side of the neutral band. If realized, the revenue offset may be used to offset monetary penalties on other performance measures during the year in question. The offset cannot be carried forward to offset penalties in future years.

The DPU is currently beginning its review of these SQ plans (in DPU 12-120) and is seeking comment on modifying the structure of the plans (as well as considering adding, deleting or modifying specific service quality metrics). In this regard, the DPU has invited comments on:

- Benchmarks – whether the SQ plans should: continue to use company specific 10 year performance as the basis for a fixed target; use a target based on the performance of utilities across the country or region; or adjust the target to reflect improved performance over time.

- Penalties Ranges / Deadbands – whether the deadbands in the SQ should be tightened from their current widths; that is, should penalties and/or offsets be triggered at lesser levels of divergence from the target.

- Offsets – whether offsets earned should be allowed to reduce a penalty in all or only in selected categories of service quality metrics.

As noted above, it appears that the DPU's objective in specifying SQ plans is to provide reasonable bounds within which utilities are expected to provide service to their customers.

IV. SERVICE QUALITY TARGET PERFORMANCE

Performance targets ideally should be set at the level where the incremental benefit that consumers derive from increased performance is equal to the incremental cost of providing higher levels of performance. Defining this level requires substantial knowledge of the costs of enhancing service quality and the corresponding benefits that

[8] For all metrics except Gas Odor Response, the DPU has applied a quadratic ("parabolic") formula: Penalty for service metric = 0.25 * ((observed result – benchmark value)^2 / standard deviation) * maximum penalty for the service metric. Thus, the penalty increases as it approaches two standard deviations, and reaches its maximum value at two standard deviations.

consumers derive from increased service quality. This information can be difficult to secure in practice.[9]

Estimating customer valuations of service quality can be particularly challenging, as the estimation requires extensive research, surveys and analyses of the preferences of individual customers. Utilities sometimes study customer perceptions of value, including analyses of customer "willingness to pay" and estimates of the "value of lost load" (VOLL). When effectively completed, such studies inform an estimate of the incremental value that customers derive from improvements in service quality. However, such studies can be quite costly, and so are not routinely conducted by utilities, especially at the service quality metric level.[10]

In light of the limited information on relevant costs and benefits of enhanced service quality that typically is available, proxies for the ideal levels of service quality are sought. Historic utility performance data – either for the industry overall or for individual companies – can serve to inform a useful estimate if the past interactions of utility management, customers, and regulators have managed to produce levels of service quality that reasonably approximate ideal levels.

National benchmarking data (i.e., indicators of average or best-in-class performance) may be superior to individual company data in this regard because a large data set can offer more assurance that customer expectations and valuations are reflected in observed outcomes, as utilities seek to satisfy their customers' needs. Such studies can be informative if they control adequately for all relevant differences across utilities. However, such controls are difficult, if not impossible, to implement in practice. Electric and gas utilities frequently undertake benchmarking studies which compare company performance over a range of metrics with the corresponding performance of a "peer panel" of utilities. These studies are typically based on publicly available data (notably FERC Form 1 data and reports filed by utilities with state regulatory commissions) and on proprietary data sources. Industry benchmarking is difficult to employ in a service quality plan because of the difficulties in measurement and comparison across utilities.

The historic performance of a single utility might also be employed to establish a target level of service quality. This approach eliminates the need to control for relevant differences among utilities. However, the utility's historic performance will provide a reasonable target only if the utility has been providing service quality levels that balance relevant benefit and costs. In practice, historical data for Massachusetts utilities are perhaps the only data set that the Commission can reasonably expect to be available at a detailed and consistent level.

Averaging historic performance over ten (or so) years can help to provide a reasonable, albeit imperfect, basis for establishing service quality metric performance targets. The

9 The requisite information includes the utility's costs of providing each service quality metric as well as customer valuation of each service quality metric.

10 These studies are based on surveys of customers, frequently conducted at a national level.

use of average performance to determine metric benchmarks helps to avoid adopting unusually high or unusually low levels of performance as a target. The Massachusetts SQ plans use a fixed 10 year period for averaging (1996 – 2005)[11] as opposed to a rolling average of the most recent 10 years of available data. Use of a fixed period for averaging, based on a representative range of performance, can help to avoid penalizing the utility for increasing the service quality it delivers. Automatically raising a performance target to reflect higher levels of achieved service quality without a compelling, documented basis for the increase can limit the utility's incentive to deliver enhanced service quality.

In some cases, realized levels of service quality may have increased due to advances in technologies, enhanced investments and/or specific improvements in business processes. In these cases, the Commission might consider using more recent performance data in setting a benchmark, provided the evidence is clear and the causes of the observed trend in realized service quality are well understood. Even in such instances, though, caution should be exercised to ensure that benchmarks are not continually and automatically escalated, thereby limiting the utility's incentive to improve performance on an ongoing basis.

Identifying a recent trend in service quality, by itself, should not provide a basis for abandoning the ten year averaging convention. Trend analysis must always be used cautiously, and not as license to set unrealistically ambitious or unduly lenient performance targets. Many of the data upon which the service quality measures are based lack the statistical distribution characteristics which permit an appeal to large sample statistical theory. Only very clear and significant changes in performance levels can support a hypothesis that service quality levels have shifted permanently. Thus, understanding the cause of the trend is crucially important in ensuring that any observed shift in performance reflects a corresponding shift in the incremental benefits and/or costs of enhanced service quality.

We reviewed the trends in service quality metrics, and have included a graphic depiction for each service quality metric as **Exhibit I**. Analysis of these trends indicates that some of the service quality levels continue to exhibit considerable variability. See, for example, the metrics for electric system reliability. However, review of the trends associated with some other service quality metrics indicate that performance appears to have stabilized at a level above the ten year historic average. These service quality metrics include: Emergency Calls Answered and Response to Odor Calls (for all of the gas companies) and Lost Time Accident Rate, On-Time Meter Reads, Bill Adjustments per 1,000 Customers, and Service Appointments Kept (for both gas and electric companies).

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[11] This is the case except for establishing a benchmark for Gas Odor Calls, for service quality metrics for which less than 10 years of data are currently available (or for which data in this time period are not available), and with respect to CKAIDI and CKAIFI.

These latter service quality metrics are candidates for adjusting the target level of quality.[12] That is, the target might reflect more recent levels of performance rather than historic ten year averages, provided that the Commission is confident that the trend represents a systemic shift in underlying benefits or costs. For example, consistently achieved high performance in the On Time Meter Reads metrics may reflect the successful testing and deployment of automated meter reading (AMR) or advanced metering infrastructure (AMI) – which may suggest that the utility can reasonably expect to reach this level of performance on an ongoing basis. However, the Commission should balance any change in these service levels with the need to maintain appropriate incentives to utilities to consider improvements in service quality that provide benefits to customers.

V. PERFORMANCE VARIABILITY AND DEADBANDS

The purpose of the deadband (i.e., the range of performance levels in which the utility neither incurs financial penalties nor receives financial rewards) is: (1) to recognize that service quality performance is subject to randomness; (2) to ensure that utilities are not unduly penalized or rewarded for events that are largely beyond their control; and (3) to recognize the possibility that incremental benefits and costs are not precisely aligned in the benchmark.

The SQ benchmarks in Massachusetts are based on ten year averages, or as many years available, for each of the metrics. Deadbands are set symmetrically around the benchmark performance target. The DPU is currently investigating whether the width of the deadband, which is set equal to the standard deviation of historic service metric performance, should continue to reflect the standard deviation of historic performance data. The standard deviation (or its square, the variance) is a common and well accepted indication of the range and variability of a series of observations.

This approach to deadbands reflects the presumption of a "normal" distribution of performance metric outcomes.[13] This presumption (of a normal distribution) in setting a deadband is important because it assumes that performance will ultimately fall within one standard deviation of the average about two-thirds of the time. That is, the deadband will accommodate the impact of random events. Furthermore, the service quality metric averages will converge to the normal distribution in the long run,[14] even if they exhibit a non-normal distribution in the shorter term. Thus, the presumption of a normal distribution in setting a deadband is not unreasonable.

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12 The Commission is using a different (and seemingly) reasonable approach to setting the benchmark for Gas Odor Calls.

13 See, for example, Chapter 8 of J.F. Kenney and E.S. Keeping, *Mathematics of Statistics*, Part One, 3rd ed., Princeton, N.J.: D. Van Nostrand Company, 1954.

14 See, for example, Chapters 4 and 5 of Patrick Billingsley, *Probability and Measure*, 3rd ed., New York: John Wiley & Sons, 1995.

We examine: (1) the frequency distributions; and (2) the variability of service quality metric performance over the years of data availability. Trends in the variability of data provide some indication of the extent to which performance data variability is "tighter" (i.e., exhibits a lower degree of variance) in recent years than was the case earlier in the averaging period. Evidence of reduced performance variability within a normally distributed service quality metric could possibly justify tightening the associated deadband. However, this would not be the case concerning evidence of tightened data variability within non-normal distributions. Statistically, such tighter data variability may reflect a more short term phenomena, and should not be interpreted to suggest a more permanent change.

A. DATA VARIANCE

We analyzed changes in data variability by comparing variances (i.e., the square of the standard deviations) over time. Specifically, we estimated the standard deviations of the variances of each service quality metric benchmark in two time periods:[15] (1) the 10 year period used to compute the benchmarks and deadbands; and (2) the most recent 10 years of data. This analysis is summarized in **Exhibit II**.[16]

The results from this analysis are notable because they indicate that utility performance with respect to the various service quality metrics continues to exhibit substantial variation. That is, performance variability has not declined systematically over time.

However, for a few of the service quality metrics (such as Appointments Met uniformly across both gas and electric utilities, or Odor Calls across all of the gas utilities), performance variability appears to have decreased (tightened), possibly reflecting a shift to consistently higher levels of performance. Even for these metrics, the analysis is not fully conclusive about whether apparent reduced levels of data variability warrant modifying the current one standard deviation width of the deadband. Part of the reason lies in the robustness of the data set itself. Specifically, the sample sizes of the

[15] The benchmarks and deadbands for the metrics were simultaneously set and are based on the same set of data. As noted above, the benchmarks are the mean of the annual service quality metrics, and the deadband is based on the standard deviation. Because the standard deviation is a measure of variability and is based on data from a sample, it too varies with the choice of data. If the data were known to be exactly normal, deriving the standard deviation of the standard deviation would be a relatively straightforward exercise. Unfortunately, it is clear that the vast majority of the metrics do not approximate the normal distribution. Nonetheless, we can compute a standard deviation for the variance (i.e., the square of the standard deviation) and use that as a basis for understanding how variable our estimates are. We do not lose or distort any information by using the variance (instead of standard deviation) because of the direct relationship between these two statistical measures of variability.

[16] The table in **Exhibit II** shows: (1) the variance for the 10 years used to calculate the benchmark for each metrics; (2) the standard deviation of that variance; (3) the variance for the most recent ten years of data reported or each metric; (4) the standard deviation (of the benchmark variance) divided by the variance (of the benchmark); and (5) the percentage difference between the benchmark variance to the variance computed on the most recent ten years of the data.

underlying data are small, and the "convergence rates" to the true mean and true standard deviation depend on the sample size.[17] A given sample size determines the level of precision with which a sample mean estimates the "true" (or population) mean. For a given level of precision of the mean, a larger sample size is required in order to achieve the same level of precision for a standard deviation. Thus, a small sample size presents concerns for setting a benchmark; it presents an even larger problem for determining the width of the deadband.

As indicated above, decisions to modify SQ plan deadbands requires consideration of both changes in data variability and an understanding of the distribution of service quality metric data.

B. Data Distribution

Much of the data that we deal with on an everyday basis is symmetrical,[18] which means that results generally fall symmetrically around the average. In particular, some observations will fall on one side of the average and a roughly equal number will fall on the other side. Deadbands centered around a target are well suited for this type of distribution. Deadbands in SQ plans typically are designed under the assumption that performance results are normally distributed and, thus, are unimodal and symmetrically distributed,[19] properties of the normal distribution. Under an assumption of normality, there is a roughly 64% chance that an observation is within one standard deviation of the mean; the deadband width accommodates performance that is within +/- 32% of target levels.

"Non-normal" data sets do not exhibit these tendencies. Observations may commonly fall far from the center (i.e., the mean). Furthermore, with asymmetrical distributions, observations on one side of center may not be counterbalanced by observations on the other side of center. Using a symmetrical deadband for a service quality metric with a non-normal distribution may produce unintended results. There is a greater likelihood that randomness will drive a specific result out of the deadband (and into the penalty or offset range) than would be the case under a normal distribution centered about its mean.[20]

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[17] The convergence rate indicates how quickly an estimator converges to its population value. For example, for a sample coming from a population with finite mean and variance, the sample mean converges to the population mean directly in proportion to the size of the sample. Again, see Billingsley (1995), *loc. cit.*

[18] A common example that is used in explaining basic concepts in statistics and probability is the coin toss. If we toss a coin and measure how many heads or tails arise, and if we continue to toss the coin for a sufficiently large number of times, we will observe a symmetrical set of results. That is, we will observe roughly the same number of heads as tails.

[19] A function $f(x)$ is a unimodal if for some value m, it is monotonically increasing for $x \leq m$ and monotonically decreasing for $x \geq m$. In this case, the maximum value of $f(x)$ is $f(m)$ and there are no other local maxima.

[20] Although it may be appealing to make an argument that the central limit theorem could be applied to the performance metrics, that argument lacks validity. The sample size of ten upon which the metrics are calculated does not permit an appeal to the large sample theory that is required. In this

We have reviewed the distribution of service quality metric performance, and include a graphic depiction of the frequency distributions for each service quality metric in **Exhibit III**. A visual review of these frequency distributions suggests that the historic distributions of some of the service quality metrics are symmetric while the frequency distributions of some of the other metrics are (decidedly) asymmetric. For example, for the gas utilities (i.e., Boston Gas Company, Essex Gas, and Colonial Gas), the service quality metric Lost Time Accident Rate (LTAR) appears skewed towards the origin on the horizontal axis and disperses with higher LTARs. Similarly, the SAIDI and SAIFI service quality metrics for the electric utilities (i.e., Massachusetts Electric and Nantucket Electric) exhibit similar skewness towards the origin. On the other hand, several other metrics have a nearly uniform[21] distribution across their range.

The extent to which data reflects a normal distribution can also be discerned by measuring its skewness and its "peakedness" (or kurtosis).[22] The table included in **Exhibit IV** provides a statistical accompaniment to the frequency distributions included in **Exhibit III**. Specifically, it provides estimates of skewness and kurtosis for: (1) the annual means from which the service quality benchmarks are derived; and (2) the annual means for the same service quality metric based on all of the years for which data is available. If the data reflected a normal distribution exactly, the skewness coefficient would be zero and the kurtosis coefficient would be three. Few of the service quality metric distributions have skewness or kurtosis values that would suggest that they come from normal distributions. We included an estimate of skewness and kurtosis for an expanded sample set because including more observations increases the likelihood that the observed means would approximate the normal distribution. However, the skewness and kurtosis values suggest that most of the service quality metrics data do not reflect normal distributions even in the expanded sample.[23]

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regard, it is important to remember that under the weak law of large numbers, the sample mean converges to the population mean at the rate *n*, i.e., the sample size. However, the distribution of the standardized sample mean converges at the rate of square root of *n* to the normal distribution, a much slower convergence rate. Thus, the distribution of all metrics will be dominated by their small sample distributions, none of which clearly exhibit a normal distribution. See Billingsley, *loc. cit*.

21 A discrete uniform distribution is a probability distribution which takes on only a finite number of values all of which are equally likely to be observed, i.e., every one of its n possible values has equal probability 1/n.

22 Skewness is a measure of symmetry, or more precisely, the lack of symmetry. A distribution, or data set, is symmetric if it looks the same to the left and right of the center point. Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution. That is, data sets with high kurtosis tend to have a distinct peak near the mean, decline rather rapidly as we move away from the mean, and have thick tails. Data sets with low kurtosis tend to have a flat top near the mean rather than a sharp peak. See, for example, Chapter 4 of James B. Ramsey, *The Elements of Statistics*, Belmont, CA: Duxbury/Wadsworth Group, 2002.

23 Here again, an appeal to the central limit theorem is valid only for large samples. None of the sample sizes for either the benchmark or the data generated to date meet this requirement.

Revisiting the metrics discussed above, the skewness statistics for the Boston Gas, Essex Gas, and Colonial Gas for LTAR are -0.24, 0.79, and 0.98, respectively, for the benchmark years and 0.29, 1.13, and 1.19, respectively, for all years through 2011. These differ substantially from the normal distribution's value of zero for skewness. The kurtosis for LTAR for the gas companies also differ substantially from the value of three that would arise if the data reflected a normal distribution. The kurtosis statistics for Boston Gas, Essex Gas, and Colonial Gas are 1.57, 2.02, 2.58, respectively, for the benchmark years and are 2.00, 2.79, 3.32, respectively, for all years through 2011.

Similar results were found for the electric utilities; that is, the distribution of performance results did not indicate that they reflected a normal distribution. The skewness statistic for SAIFI for Massachusetts Electric and Nantucket Electric's are 0.89 and 0.52, respectively, for the benchmark years, and 1.07 and -0.04, respectively, for all years. The skewness statistic for SAIDI for those companies was 0.41 and 0.81, respectively, for the benchmark years, and 0.79 and 0.23, respectively, for all years.

Finally, the kurtosis statistics for SAIFI for Massachusetts Electric and Nantucket Electric are 2.36 and 2.20, respectively, for the benchmark years, and 2.49 and 1.35, respectively, for all years. The kurtosis statistic for SAIDI for those companies was 2.08 and 2.40, respectively, for the benchmark years, and 0.79 and 0.23, respectively, for all years. Again, these statistics are strongly suggestive that the electric companies' service quality benchmarks for SAIDI and SAIFI deviate significantly from the normal distribution.

These findings are not completely unexpected. Some of the data are bounded in value between zero and unity, and tend to cluster at one end or the other. Other data come from distributions that are known to be non-normal; for example, measures of electric system reliability.[24] This, in combination with the relatively small sample size upon which the metrics are based, will yield metrics that are not normally distributed.

C. DEADBANDS

The foregoing analysis leads us to conclude that the deadbands around service quality metric benchmarks should not be tightened based on recent observations of lessened levels of data variability by itself. We base our conclusion on two key findings.

First, the analysis of standard deviations and variances indicates that performance results continue to be variable. The variances for several service quality metrics appear to have tightened in recent years, but such trends cannot be acted upon in isolation. Second, the skewness and kurtosis analysis indicates that the performance data for most of the service quality metrics are not associated with a normal distribution. That is, the SQ plans have not been in place long enough for performance data to approach a normal distribution. Modifying the deadbands based on short term observations would negate the long run statistical behavior underlying the plan's structural design.

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[24] See, for example, Chapters 7 - 10 of Roy Billinton and Ronald N. Allan, *Reliability Evaluation of Power Systems*, 2d ed., New York: Plenum Press, 1996.

We presume that the deadbands in the SQ plans were established initially to reflect normal variation around estimated ideal levels of service quality. Modifying the deadbands solely on the basis of short term observations could undermine the integrity of the plans. Detailed analysis that demonstrates a sustained shift in performance variability could provide a justification for modifying SQ plan deadbands. However, the width of deadbands should be modified only if there is sufficient data to indicate and explain a significant and long lasting change in performance variability.

VI. PENALTIES AND REWARDS

Incentive regulation plans typically include a system of penalties and rewards. Penalties in SQ plans help to ensure that service quality does not decline below established standards. Rewards that reflect the relevant incremental benefits of enhanced service quality encourage the utility to increase service quality when it can do so at an incremental cost that is less than the corresponding incremental benefit to customers. Explicit financial rewards compensate the utility for the cost incurred in increasing service quality. A plan that imposes penalties for substandard performance with no rewards for performance that exceeds the benchmark can induce a less than ideal level of service quality effort by the utility. Improving service quality levels comes at a cost; a utility may have limited incentive to enhance service quality when the utility does not see the prospect of some compensation for the costs it incurs to enhance service quality.

Limited knowledge of ideal service levels suggests that penalties and rewards for exceptional or sub-standard performance should be symmetrical unless there is substantial evidence that customer gains/losses from performance above/below the specified standard differ substantially.

The SQ plans in Massachusetts employ revenue offsets in place of explicit financial rewards for exceptional service quality performance. Under the current plan structure, performance exceeding a standard deviation above the benchmark value for a given service quality metric will receive a credit which can be used to "offset" penalties incurred (in the same period) in any of the other service quality metrics. An explicit financial reward for improved service quality typically is a more effective tool in encouraging a utility to strive for improvements in service quality levels than is a revenue offset provision. This is the case in part because the revenue offset provides a financial benefit to the utility only if it delivers sub-standard performance on some service quality metric. The explicit financial reward, in contrast, provides an incentive to increase service quality on each metric, regardless of the level of service quality delivered on other metrics. Thus, unless there is solid evidence that the current service quality targets exceed ideal levels of service quality (that balance relevant benefits and costs), we recommend that rewards be incorporated into the SQ plans in Massachusetts.

Several modifications to the SQ plan's penalty and reward structure are being examined as part of the DPU's current investigation:

- Whether the plan should incorporate explicit financial rewards;
- Whether the plan should limit the revenue offset provisions; and,
- Whether the penalties for service quality below target levels should be increased.

As noted above, the revenue offset approach employed in the Massachusetts SQ plans rewards the utility for exceptional performance on a particular service quality metric if (and only if) it simultaneously provides sub-standard performance on another service quality metric. Yet the utility typically must incur higher costs to increase the level of service quality it delivers on any metric, regardless of the level of service quality it is delivering on other metrics. Consequently, the revenue offset approach may not provide appropriate incentives for enhanced service quality. Explicit financial rewards for exceptional levels of service quality can avoid this limitation of revenue offsets.

Proposals to limit the use of revenue offsets (by constraining the service quality metrics to which offsets can be applied) reflect a concern that the utility will "game" its ability to easily exceed the benchmark on some service quality metrics because of improvements in technology and/or business processes. Limiting the use of revenue offsets in this manner will diminish the utilities' incentives to enhance service quality on certain metrics. Constraining the revenue offset will also limit a utility's incentive to employ its substantial knowledge of its production technology to deliver most efficiently the array of service quality performance levels that consumers value most highly.

Potential gaming behavior is limited by three other safeguards. First, the allocation (or weights) of the maximum penalty help to ensure that a utility will not ignore high priority areas of service quality (and avoid a penalty) by focusing on lower priority areas.[25] The table below summarizes the percentages of the maximum penalty amount that are assigned to each service quality metric.

[25] In the current SQ plans, the maximum penalty that can be assessed on the utility is 2.5% of its annual revenues for its distribution and transmission operations (i.e., excluding revenues associated with power supply for electric utilities and excluding revenues from gas supply for gas utilities).

Allocation of Penalties By Service Quality Metric

	Electric Service Quality Metrics	Penalty Percentage	Gas Service Quality Metrics
Reliability and Safety	SAIDI SAIFI	45.0%	Class I / Class II Odor Calls
	Lost Work Time Rate	10.0%	Lost Work Time Rate
Customer Service and Billing	Telephone Answering	12.5%	Emergency Telephone Answering Non-Emerg Telephone Answering
	Service Appointments	12.5%	Service Appointments
	On Cycle Meter Reads	10.0%	On Cycle Meter Reads
Customer Satisfaction	Consumer Division Cases	5.0%	Consumer Division Cases
	Billing Adjustments	5.0%	Billing Adjustments
		100%	

While each element of service quality is important to customers (which is the reason they are included as a service quality metric), the percentage weighting reflects the levels of importance that the DPU places upon specific areas of service quality. The weighting indicates that reliability and safety are the most important elements of service quality. High performance levels in these areas also tend to be among the most expensive to deliver, especially the SAIDI and SAIFI metrics for electric utilities. The substantial weights applied to these areas make it difficult, if not impossible, for a utility to consistently fail to meet performance targets in these areas and be held financially harmless by focusing its efforts on enhancing other areas of service quality. For example, even the most exceptional performance in On Cycle Meter Reads and Billing Adjustments typically will not offset sub-standard performance in one of the electric system reliability metrics (i.e., SAIDI and SAIFI) and cannot possibly offset sub-standard performance in both.

The second safeguard involves the process by which benchmarks are set. We recommend that evidence of permanent and explainable shifts in performance capabilities be employed to adjust the benchmark level of service quality to reflect the new ideal level of quality. This ability to adjust target performance levels can help to ensure that a utility is not able to count on performance that exceeds the specified target on one service quality metric to offset sub-standard performance on another metric.

The third safeguard reflects the DPU's overall regulatory authority. The DPU has the authority to initiate focused reviews and investigations if it observes that a utility is consistently failing to meet specified targets for particular service quality metrics.

The final area (within the penalty and reward structure) being examined by the DPU involves the maximum penalty level that can be assessed for sub-standard performance on each service quality metric. Currently, the maximum penalty that a utility can incur under the SQ plans is 2.5% of the utility's annual revenues for its distribution and transmission operations. This maximum penalty is imposed only if a utility's realized performance is below the lower bound of the deadband on all of the service quality metrics in the plan.[26] The Commission is considering a proposal to modify the penalty structure so that the maximum penalty (i.e., 2.5% of annual T&D revenues) can be levied if the utility's realized performance is below the lower bound of the deadband for only a sub-group of service quality metrics.[27]

This proposal changes the percentage weightings that the Commission has developed for the SQ plans, and treats each group of service metrics symmetrically. Such symmetric treatment encourages the utility to afford the same priority to performance on all service quality metrics. Such encouragement is at odds with past Commission assessments of the different valuations that customers place on different service quality metrics.

A policy that imposes the maximum penalty on each of several performance dimensions also can diminish performance incentives inappropriately. To illustrate, suppose a utility recognizes that unavoidable sub-standard performance on one service quality metric will force it to incur the maximum penalty in a given year. Because the maximum penalty is already being imposed, the utility cannot be further penalized if its performance on another metric falls below the established standard. Consequently, the utility faces little incentive to deliver desired levels of service quality on other metrics.

In the absence of compelling evidence that customer preferences have shifted substantially in recent years, a symmetric treatment of all service quality metrics seems ill-advised.

VII. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

The structure of the SQ plans in Massachusetts should be developed in an integrated and consistent manner. Such integration and consistency entail ensuring that the combination of structural elements – service quality performance targets, deadbands, and penalty / offset provisions – are aligned to accomplish the Commission's goals of ensuring that service quality is not degraded. From a practical implementation standpoint, the SQ plan should be designed to allow utilities to employ their substantial knowledge of their production technologies and processes to address customer needs most efficiently, while including safeguards against undesirable gaming.

Performance targets should reflect the levels of service quality at which the incremental benefit that consumers derive from increased quality is roughly equal to the incremental cost of enhanced quality. Deadbands recognize the difficulties of identifying ideals of service quality perfectly, and also allow for exogenous random events and the unavoidable difficulties that managers face when they work diligently to achieve

[26] The maximum penalty for each of the service quality metrics is determined by the percentage allocations identified above.

[27] Specifically, the proposal applies the maximum penalty amount to each three groups of service quality metrics, as is highlighted in the table above (Reliability and Safety, Customer Service and Billing, and Customer Satisfaction). The maximum penalty that can be levied on the utility is capped at the 2.5% of annual T&D revenues amount, even if the utility provides service out of the deadband levels in all three groups.

performance goals. In the absence of compelling evidence that customers value performance above and below established targets asymmetrically, symmetric penalties and rewards can provide utilities with appropriate incentives to deliver most efficiently the levels of service quality that best serve customers' needs.

It is appropriate to revise service quality standards to reflect compelling, systematic evidence of substantial shifts in either customer valuations of service quality or utility costs of delivering service quality. However, SQ plans that constantly ratchet up performance standards to reflect recent increases in realized levels of service quality can reduce a utility's incentive to deliver enhanced service quality.

Accordingly, we recommend that:

- Performance targets (i.e., benchmarks) should be based on a fixed ten year period, unless trend and/or causation analyses indicate that structural changes have shifted appropriate performance targets. In these cases, benchmarks can be modified to reflect more recent data or, in special circumstances, the averaging process may be bypassed (as was the case with the Gas Odor Call metric).

- A thorough causation analysis should be conducted before the 10 year average methodology is modified. This ensures that trends based on temporary exogenous factors do not inappropriately result in the adoption of a higher level of performance as the "new normal."

- Deadbands should remain at their current widths. Recent trends with respect to performance variability generally do not indicate that performance ranges have tightened. Going forward, it could be appropriate to reset (e.g., tighten) deadbands, but only if careful causation analysis produces compelling evidence that performance variability has changed substantially and systematically.

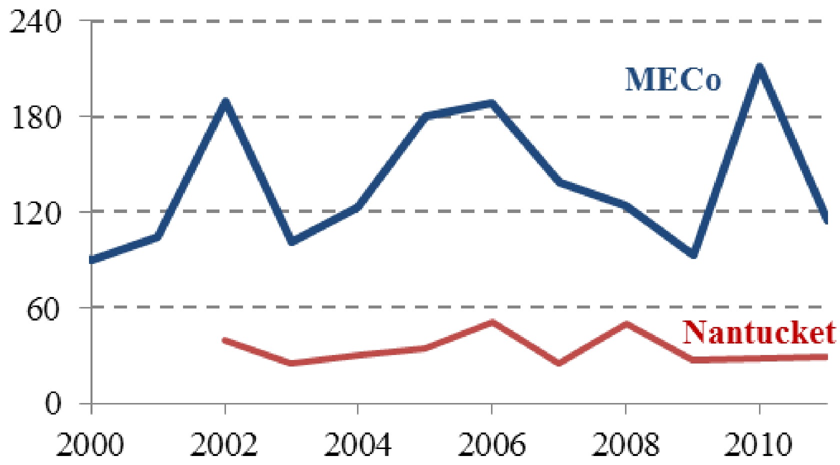
- Explicit financial rewards should be added to the SQ plan penalty / reward structure. At a minimum, the revenue offset provisions should remain as currently specified. A utility should be able to use superior performance on one service quality metric to offset penalties that it might otherwise face on other service quality metrics. Constraining the use of revenue offsets limits a utility's ability to employ its knowledge and expertise to deliver the levels of service quality that balance relevant benefits and costs of enhanced service quality.

- The penalty structure should not be modified to impose the maximum penalty if the utility's realized performance is below the lower bound of the deadband on only a sub-group of service quality metrics. Such modification would encourage utilities to treat all service quality metrics symmetrically, which is at odds with past Commission assessments of the different valuations that customers place on different dimensions of service quality.

- The DPU should use the reporting process to ensure that performance on any service quality metric does not remain consistently below its target level without good reason.

Exhibit I
Service Quality Metric Performance Trend Analysis

SAIDI



SAIFI

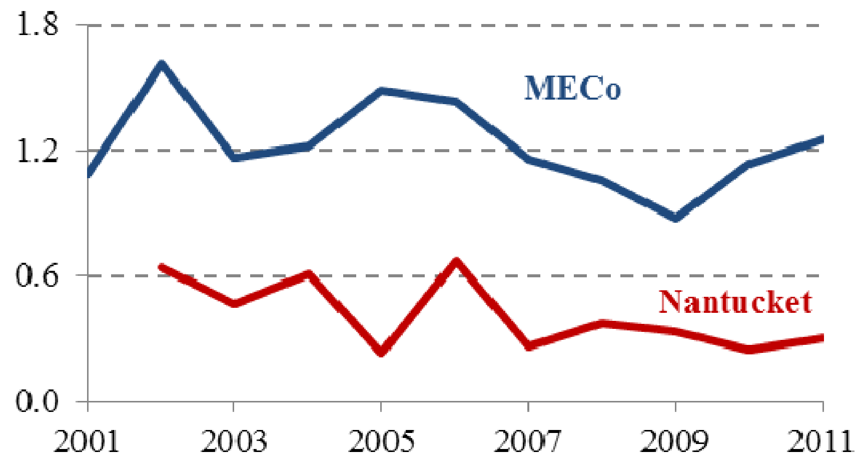
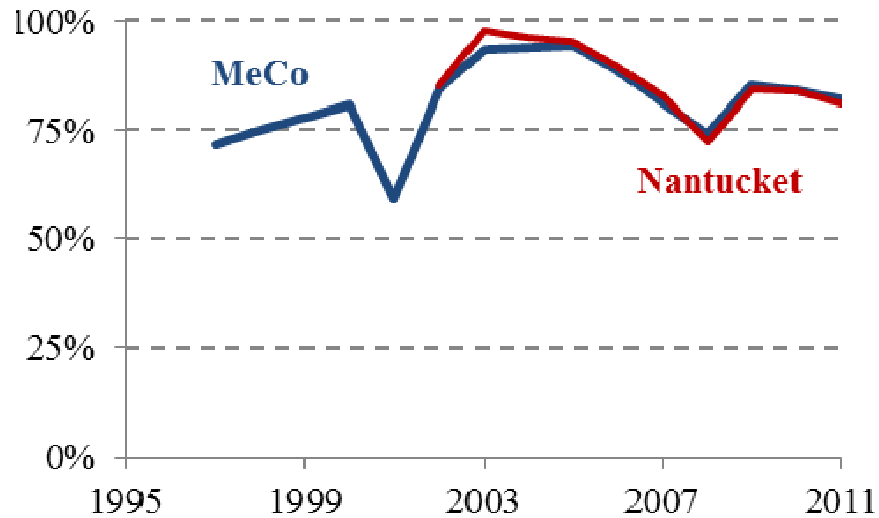


Exhibit I
Service Quality Metric Performance Trend Analysis

Response to Phone Calls (Electric)



Response to Odor Calls (Gas)

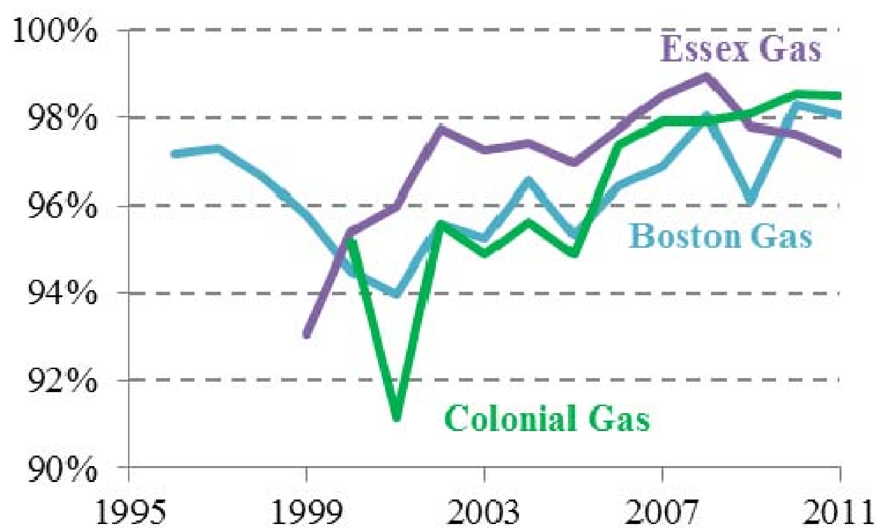
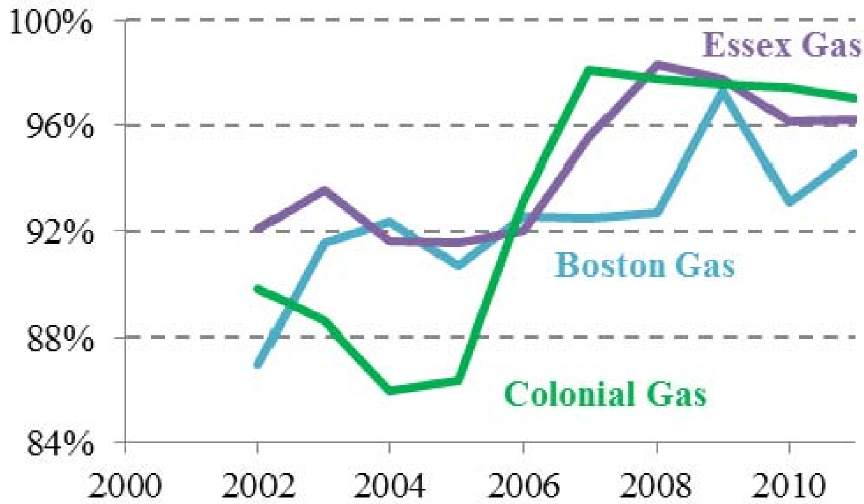


Exhibit I
Service Quality Metric Performance Trend Analysis

Emergency Call Answered (Gas)



Non-Emergency Call Answered (Gas)

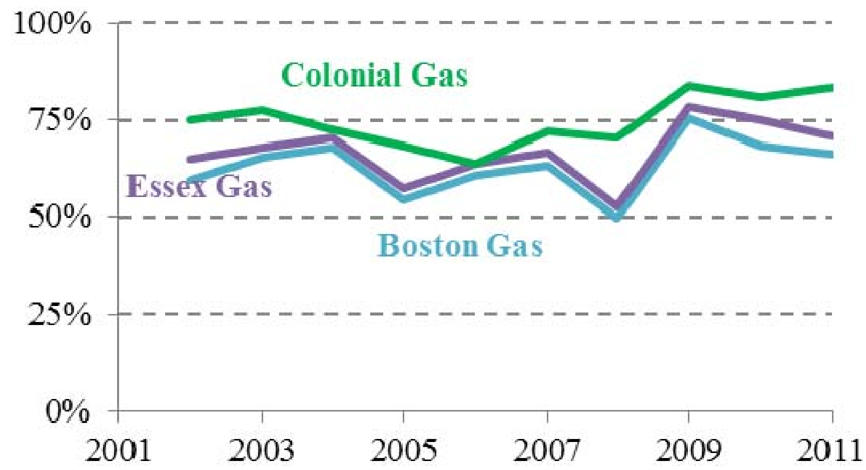
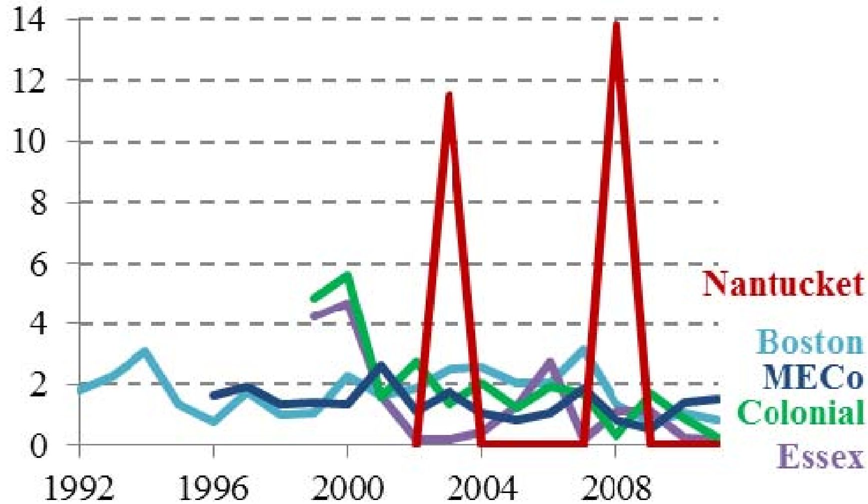


Exhibit I
Service Quality Metric Performance Trend Analysis

Lost Time Accident Rate



DTE Cases per 1,000 Res. Customers

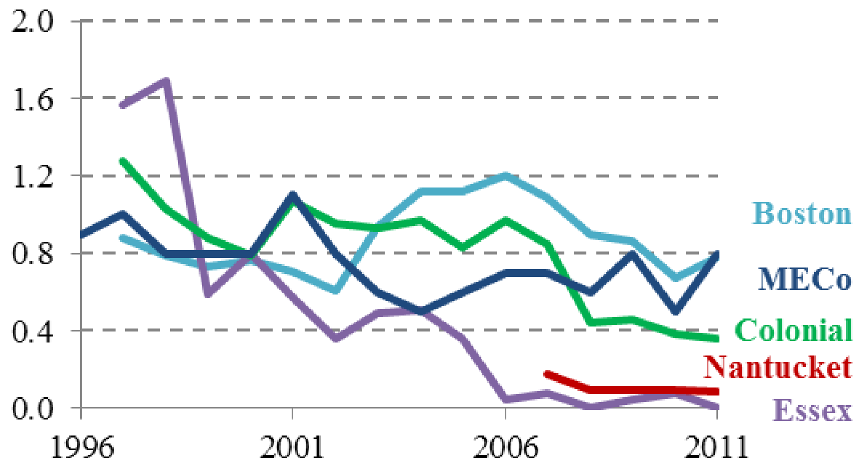
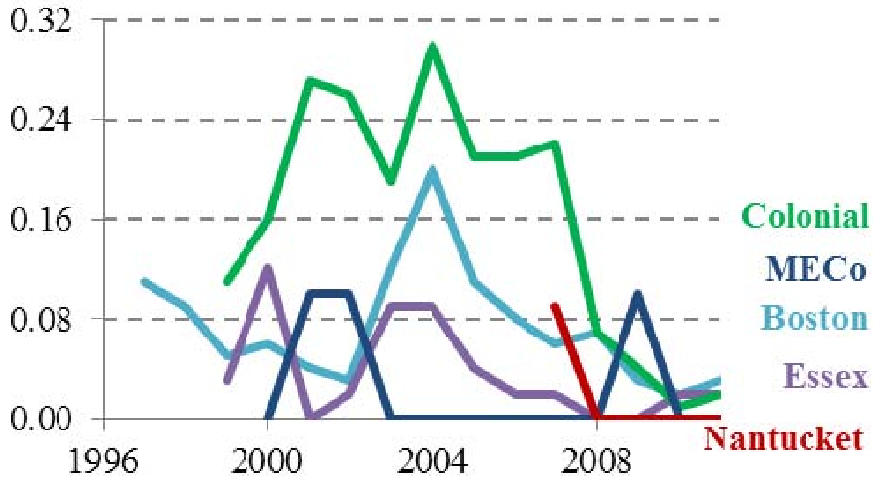


Exhibit I
Service Quality Metric Performance Trend Analysis

Bill Adjustment per 1,000 Customers



Service Appointment Kept

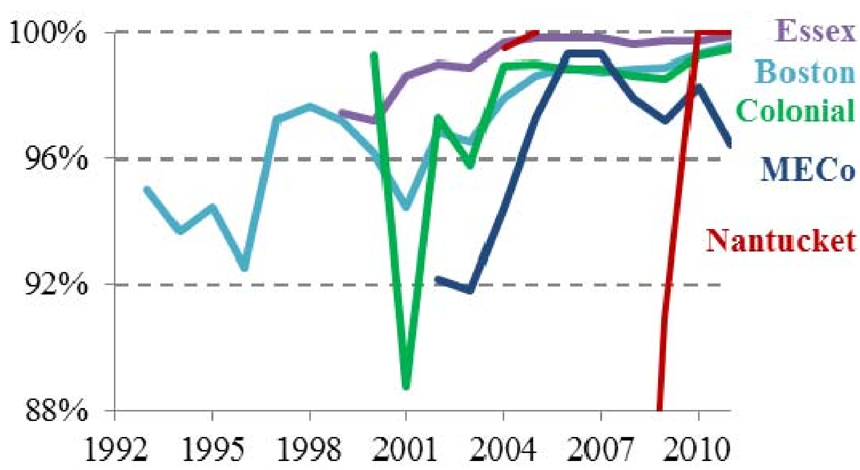


Exhibit I
Service Quality Metric Performance Trend Analysis

On Time Meter Read

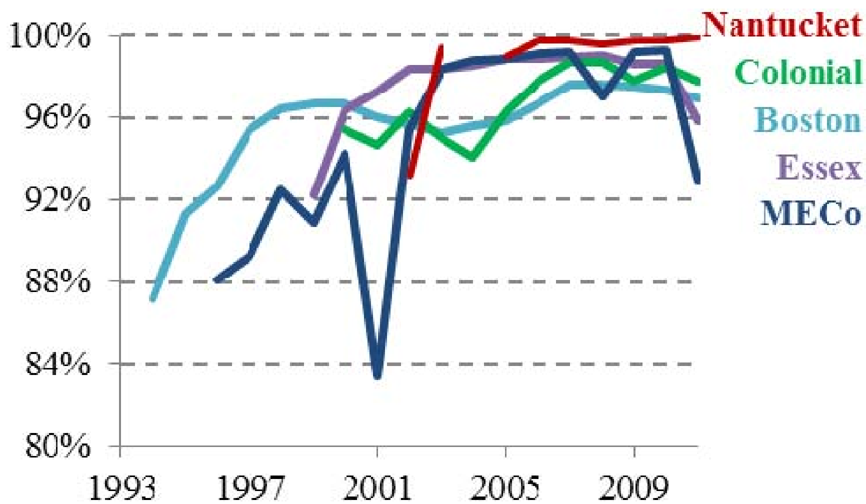


Exhibit II
Historical Variance Analysis

	Variance (Benchmark Years) [1]	Std. Dev. of Variance (Benchmark Years) [2]	Variance (Latest 10 Yrs) [3]	[2]/[1] [4]	[3]/[1] - 1 [5]	Abs Value of {[3]-[1]}/[2] [6]
Boston Gas Co.						
Odor Call	0.0003	0.0000	0.0001	11.3%	-57.3%	5.1
LTAR	0.3969	0.1001	0.6230	25.2%	57.0%	2.3
Emergency Calls	0.0007	0.0004	0.0007	48.8%	-0.7%	0.0
Non-Emergency Calls	0.0059	0.0021	0.0054	35.0%	-9.0%	0.3
Appt Kept	0.0003	0.0001	0.0001	43.7%	-67.2%	1.5
Meter Reads	0.0001	0.0001	0.0001	58.6%	-35.5%	0.6
DTE Cases	0.0400	0.0103	0.0410	25.7%	2.5%	0.1
Bill Adj	0.0025	0.0011	0.0031	43.3%	25.6%	0.6
Essex Gas Co.						
Odor Call	0.0003	0.0001	0.0000	42.9%	-87.7%	2.0
LTAR	2.8224	0.8955	0.6796	31.7%	-75.9%	2.4
Emergency Calls	0.0007	0.0002	0.0007	23.0%	-5.9%	0.3
Non-Emergency Calls	0.0064	0.0022	0.0059	34.1%	-7.9%	0.2
Appt Kept	0.0001	0.0000	0.0000	33.6%	-87.4%	2.6
Meter Reads	0.0004	0.0003	0.0001	59.2%	-79.5%	1.3
DTE Cases	0.2809	0.1045	0.0435	37.2%	-84.5%	2.3
Bill Adj	0.0016	0.0005	0.0011	33.0%	-33.6%	1.0
Colonial Gas Co.						
Odor Call	0.0003	0.0002	0.0002	62.4%	-25.0%	0.4
LTAR	2.7225	1.0399	0.5957	38.2%	-78.1%	2.0
Emergency Calls	0.0026	0.0005	0.0025	19.5%	-4.1%	0.2
Non-Emergency Calls	0.0040	0.0013	0.0045	32.2%	11.7%	0.4
Appt Kept	0.0010	0.0007	0.0001	64.2%	-87.9%	1.4
Meter Reads	0.0003	0.0001	0.0003	23.1%	-8.8%	0.4
DTE Cases	0.0196	0.0086	0.0713	44.1%	263.9%	6.0
Bill Adj	0.0049	0.0017	0.0115	34.1%	134.0%	3.9
Mass Electric						
SAIFI	0.0313	0.0113	0.0596	36.0%	90.3%	2.5
SAIDI	1572.9156	586.5586	1885.4339	37.3%	19.9%	0.5
LTA	0.2601	0.1122	0.1622	43.1%	-37.6%	0.9
Calls	0.0130	0.0046	0.0040	35.1%	-68.9%	2.0
Appts Met	0.0008	0.0002	0.0007	28.4%	-11.2%	0.4
Meter Reads	0.0027	0.0008	0.0002	30.5%	-94.2%	3.1
DPU Cases	0.0400	0.0107	0.0134	26.8%	-66.4%	2.5
Billing Adjs	0.0023	0.0006	0.0018	25.6%	-23.8%	0.9
Nantucket Electric						
SAIFI	0.0635	0.0217	0.0324	34.1%	-49.0%	1.4
SAIDI	223.2036	48.1141	146.0934	21.6%	-34.5%	1.6
LTA	17.6400	7.6121	28.7725	43.2%	63.1%	1.5
Calls	0.0154	0.0050	0.0063	32.7%	-59.1%	1.8
Appts Met	0.0085	0.0053	0.0077	62.1%	-8.7%	0.1
Meter Reads	0.0011	0.0005	0.0004	44.8%	-61.5%	1.4
DPU Cases	0.0400	0.0096	0.0050	24.0%	-87.5%	3.6
Billing Adjs	0.0010	0.0007	0.0010	72.7%	0.0%	0.0

Exhibit III
Service Quality Metric Performance Frequency Distributions
Boston Gas Co.

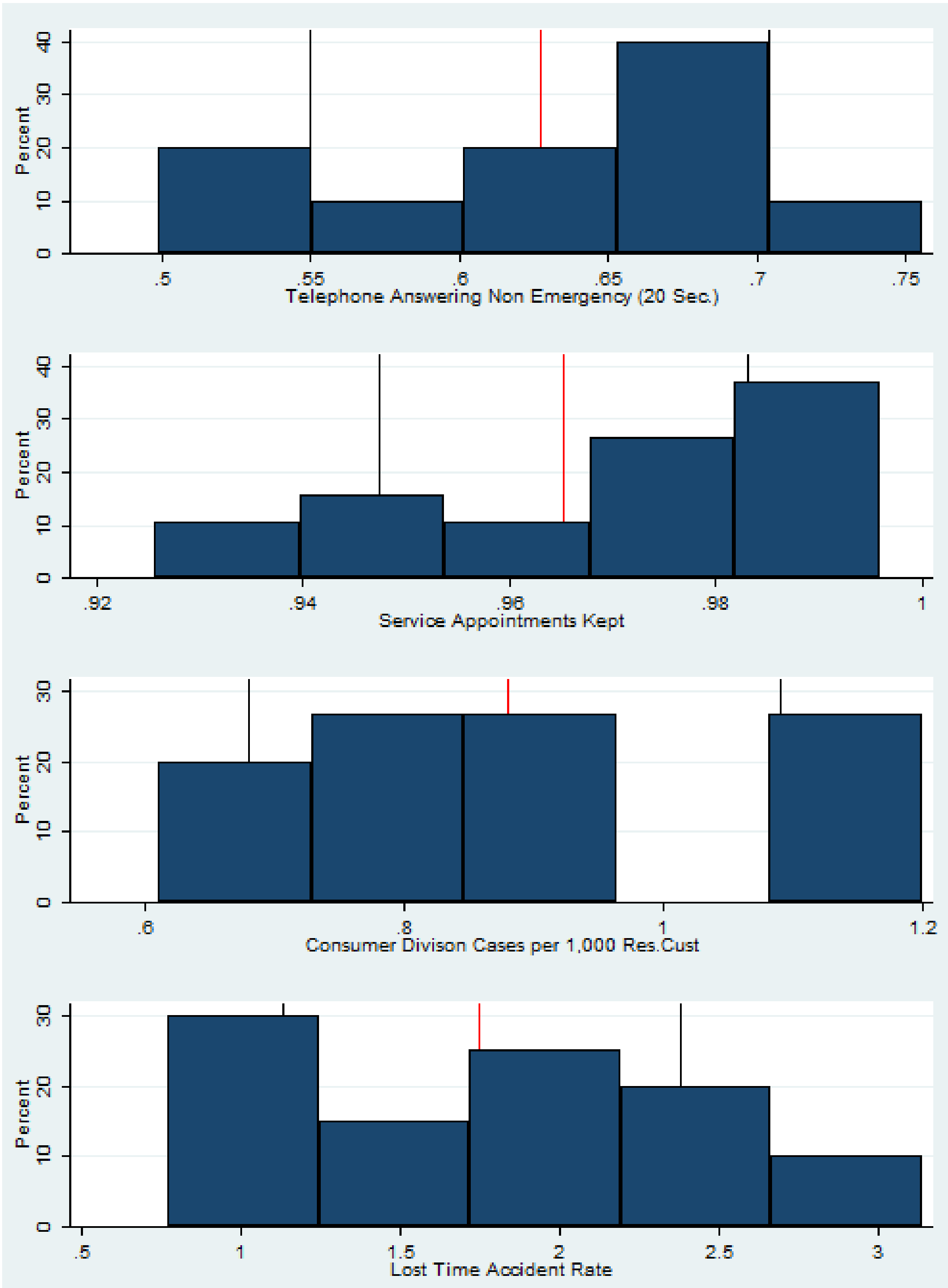


Exhibit III
Service Quality Metric Performance Frequency Distributions
Boston Gas Co.

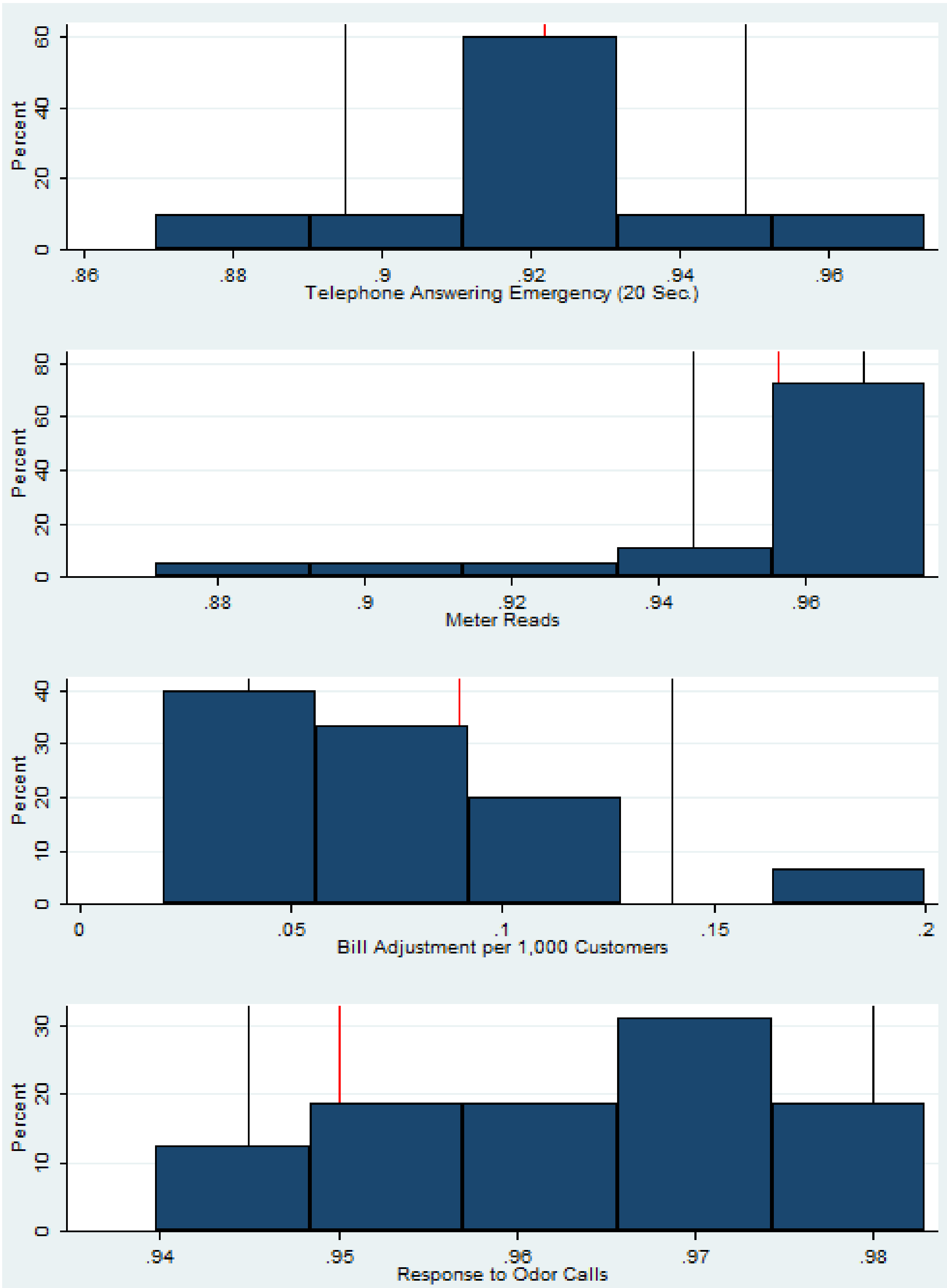


Exhibit III
Service Quality Metric Performance Frequency Distributions
Essex Gas Co.

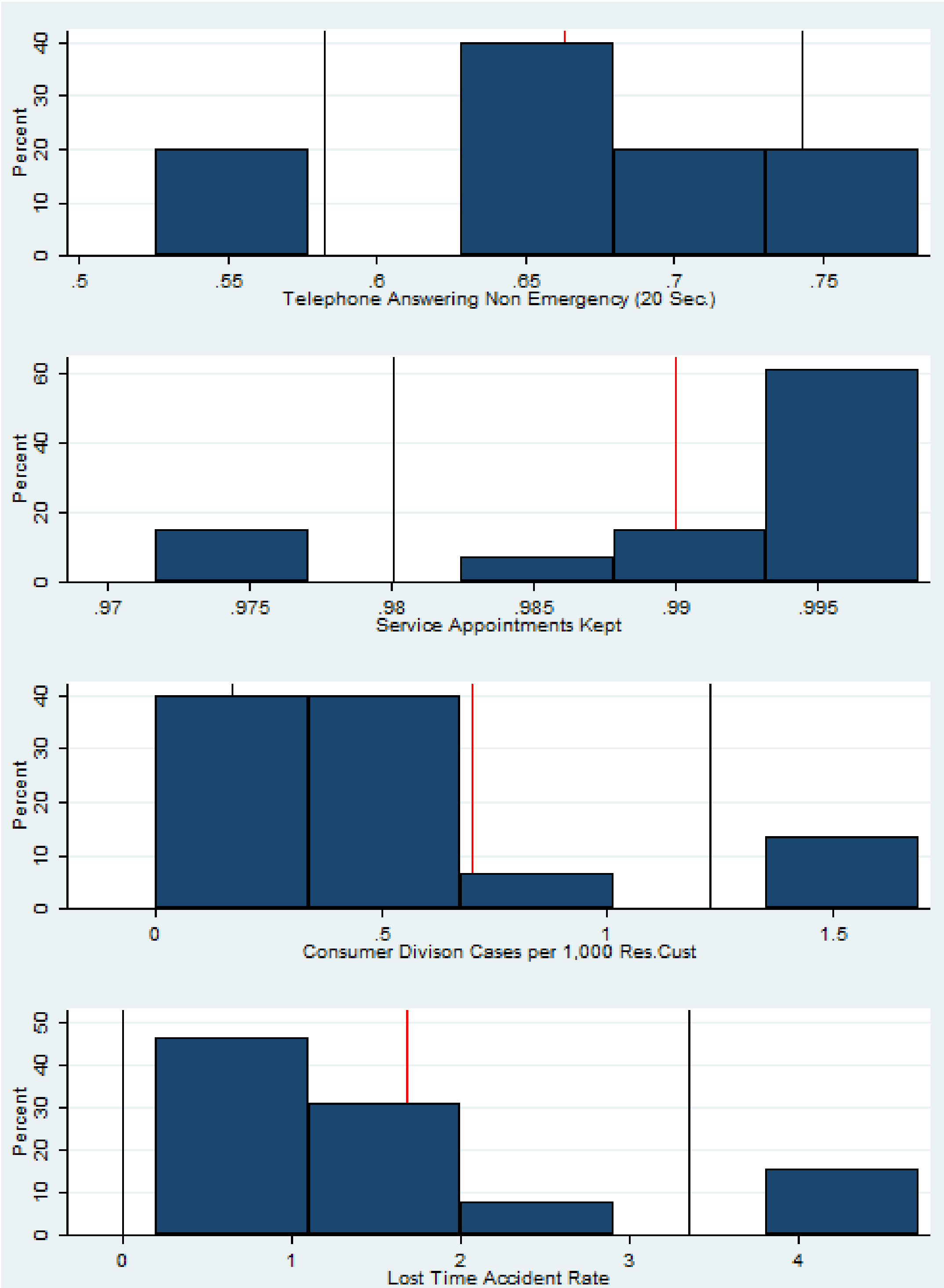


Exhibit III
Service Quality Metric Performance Frequency Distributions
Essex Gas Co.

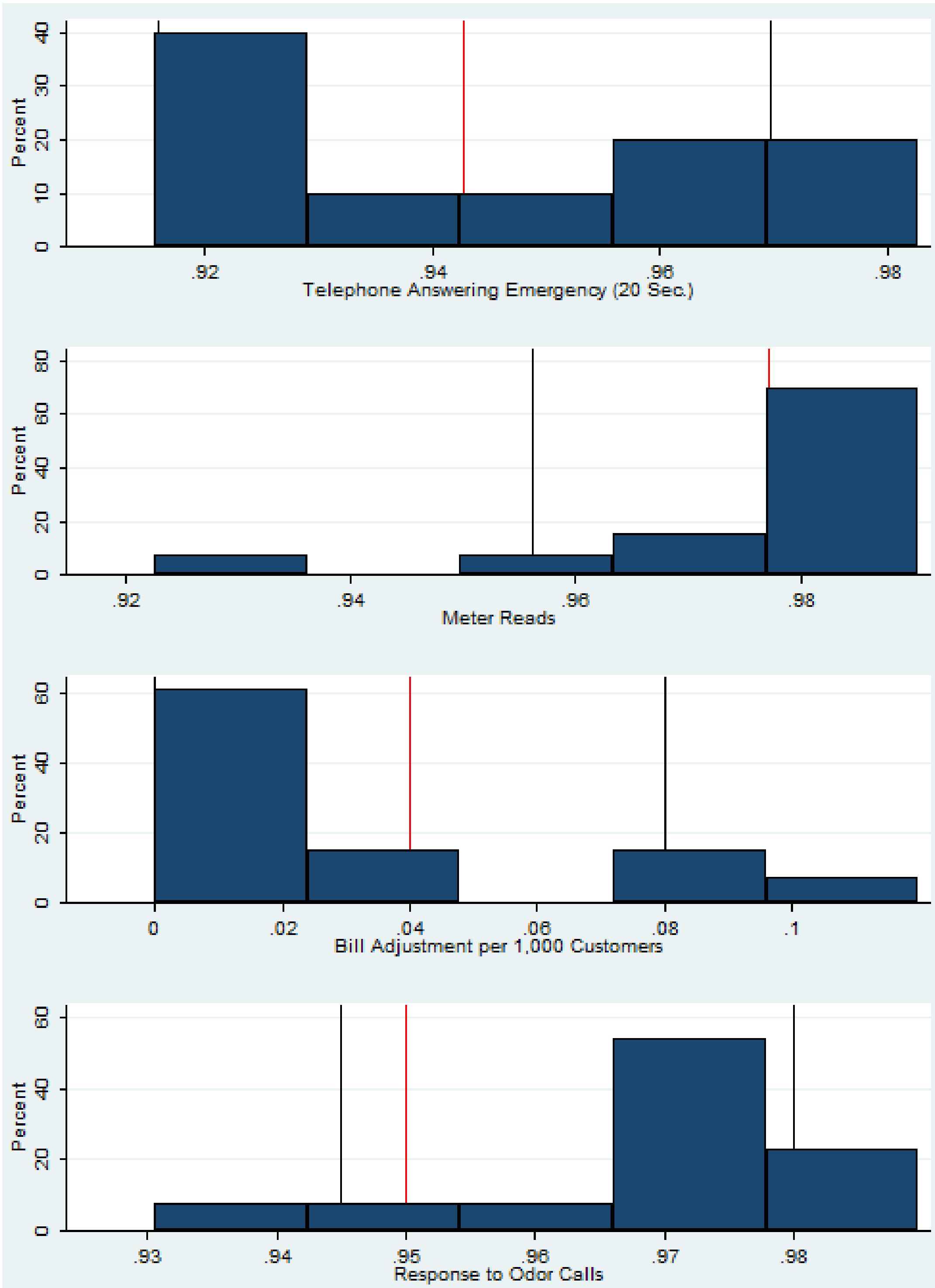


Exhibit III
Service Quality Metric Performance Frequency Distributions
Colonial Gas Co.

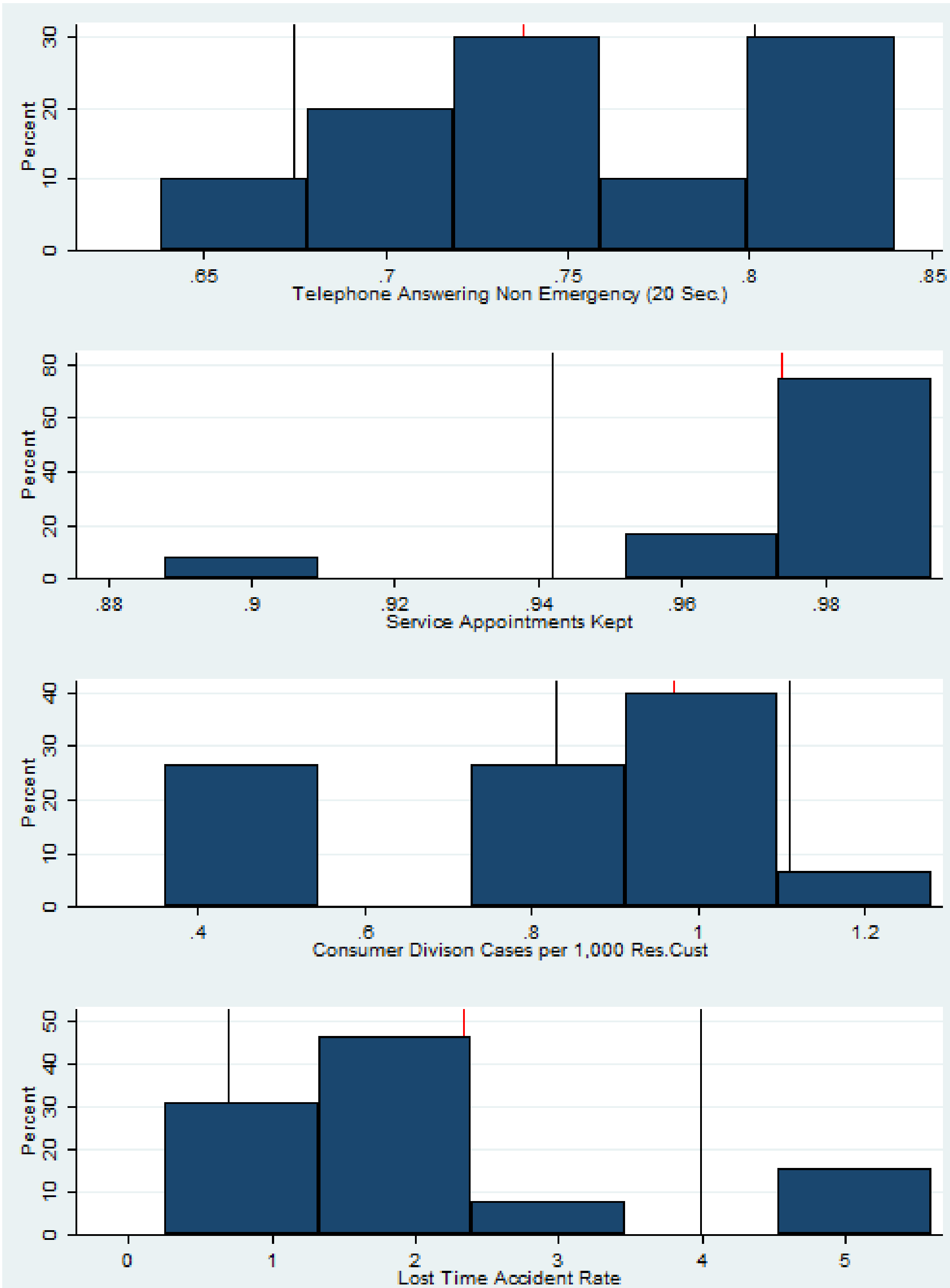


Exhibit III
Service Quality Metric Performance Frequency Distributions
Colonial Gas Co.

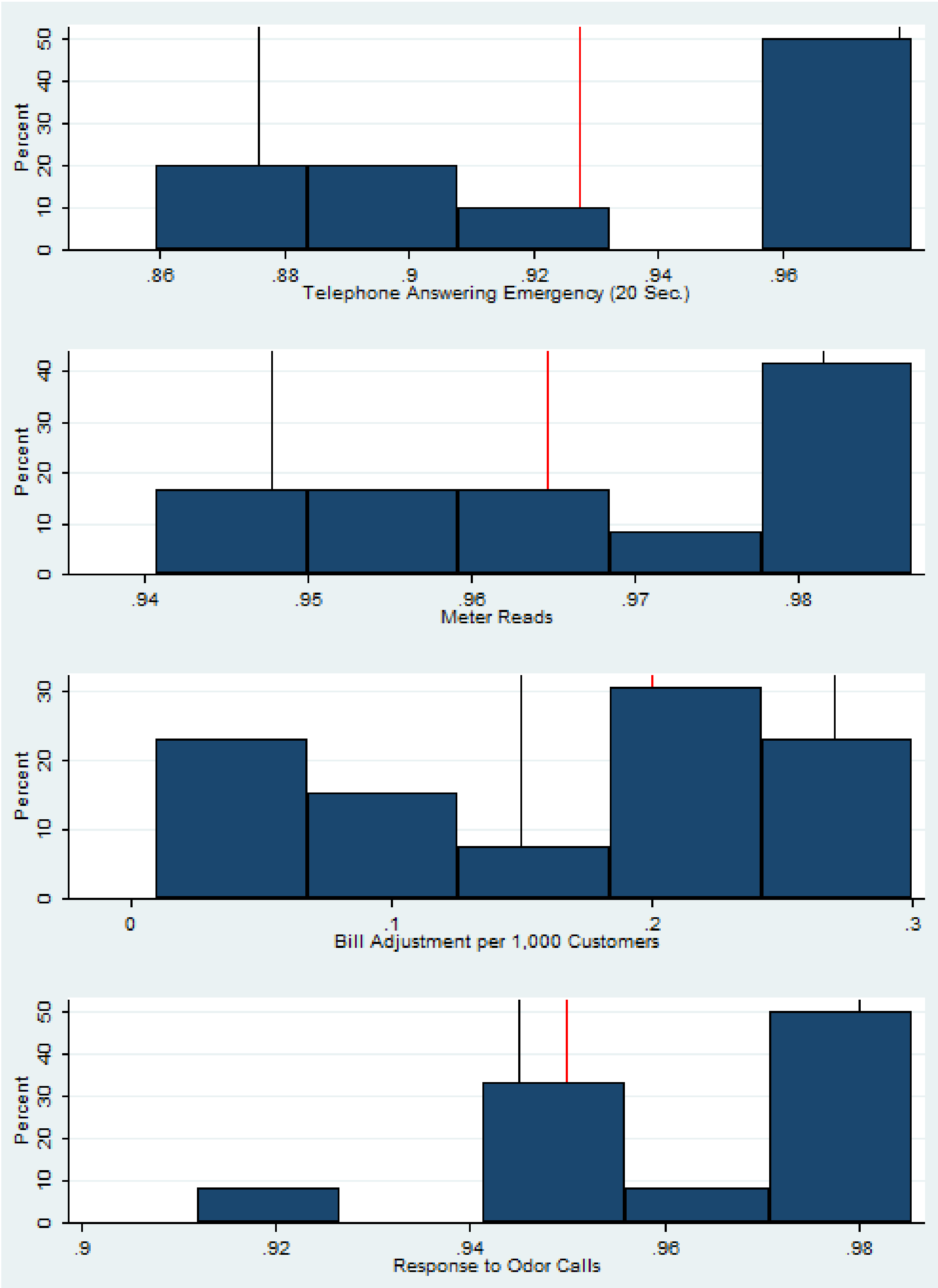


Exhibit III
Service Quality Metric Performance Frequency Distributions
Mas Electric Co.

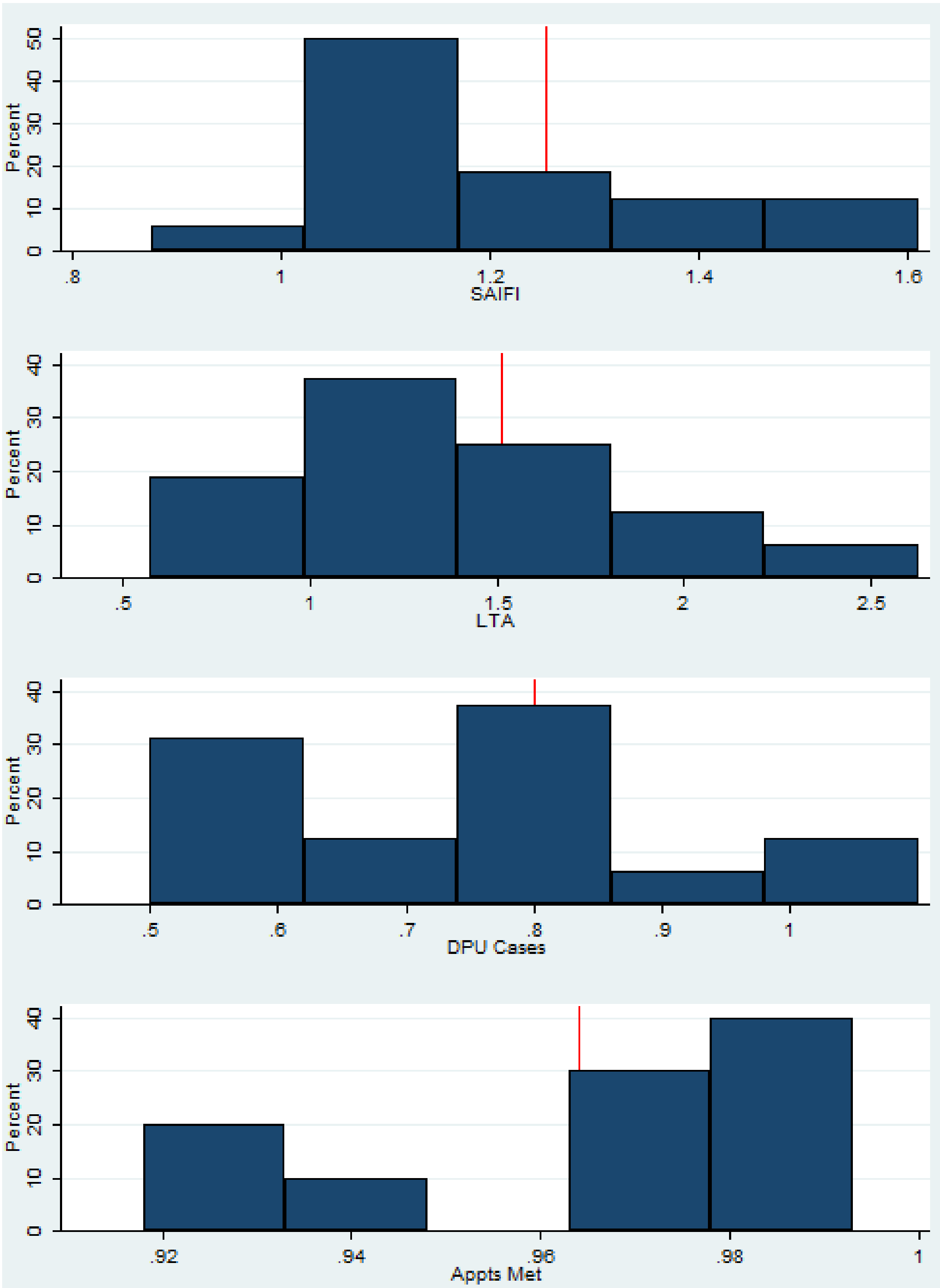


Exhibit III
Service Quality Metric Performance Frequency Distributions
Mas Electric Co.

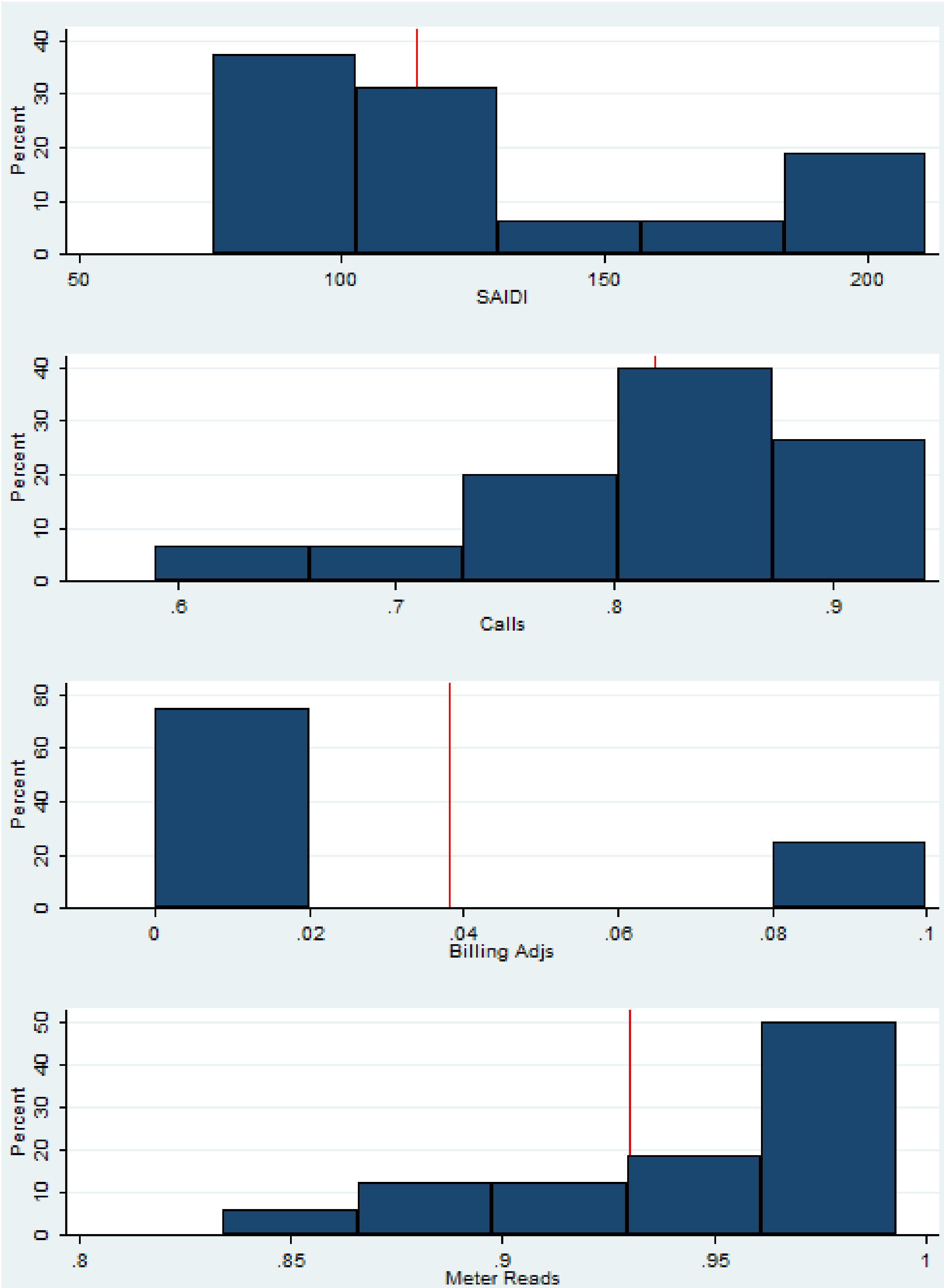


Exhibit III
Service Quality Metric Performance Frequency Distributions
Nantucket Electric Co.

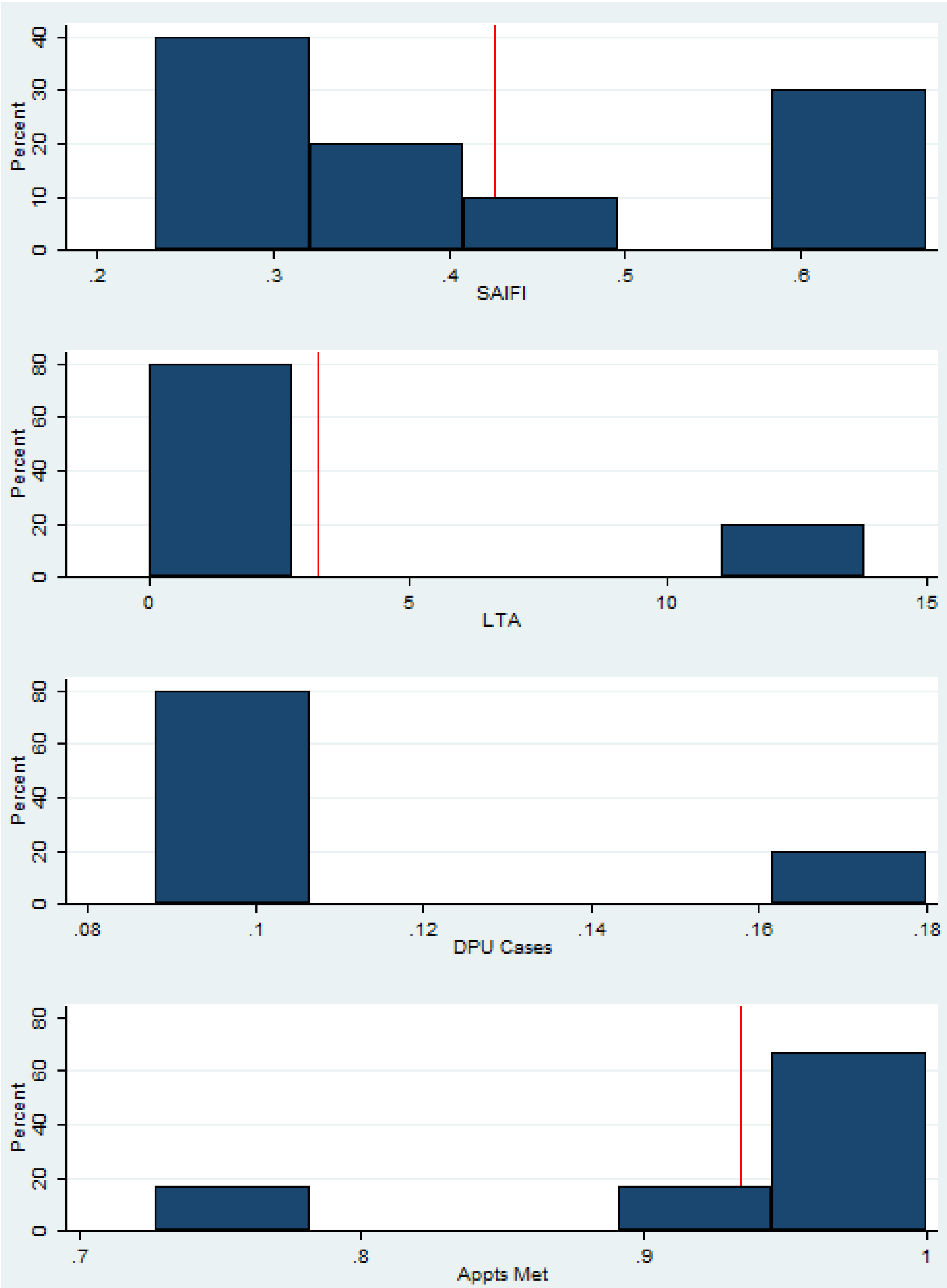


Exhibit III
Service Quality Metric Performance Frequency Distributions
Nantucket Electric Co.

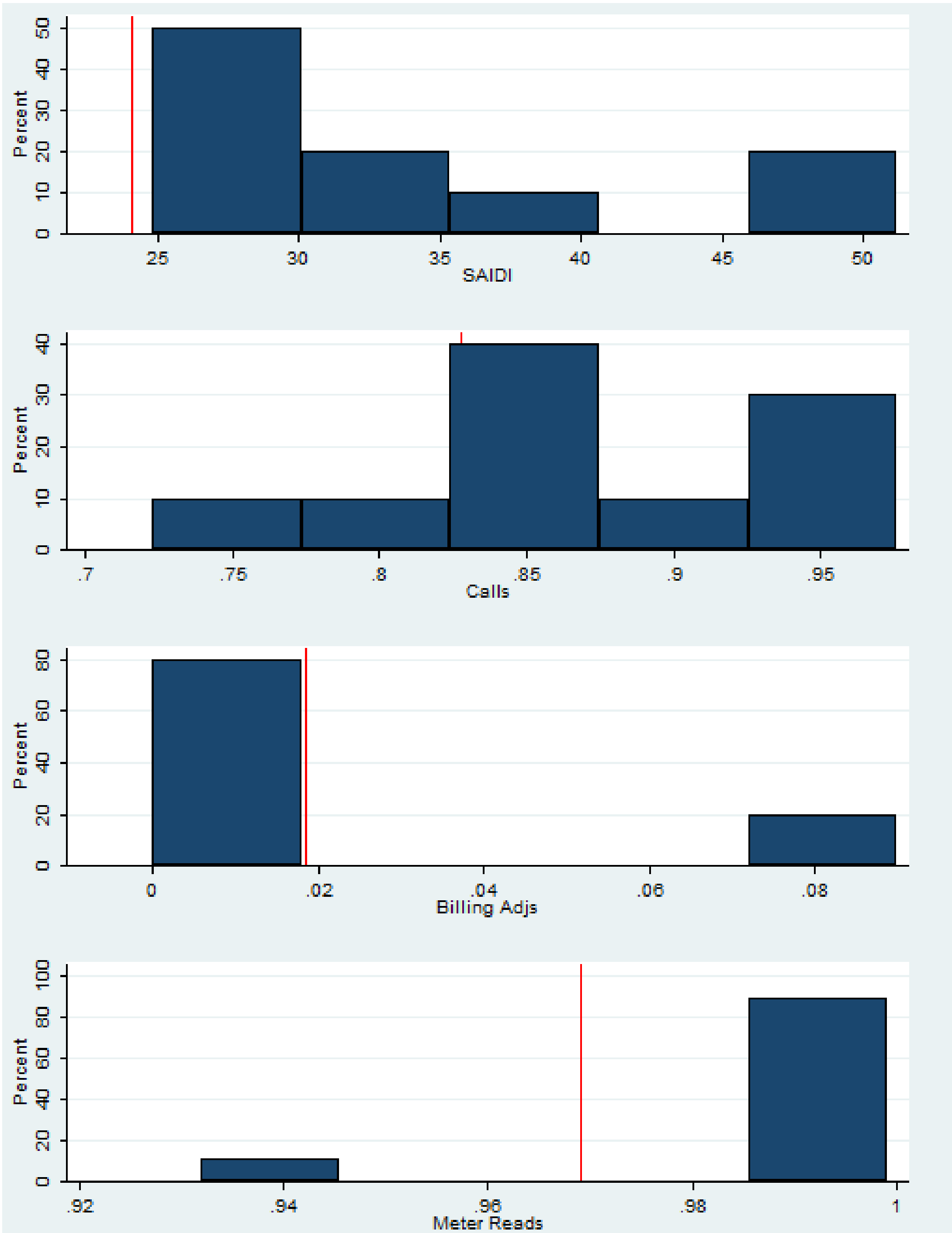


Exhibit IV
Skewness and Kurtosis Analysis

	Benchmark Years		All Years (Incl. 2011)	
	Skewness	Kurtosis	Skewness	Kurtosis
Boston Gas Co.				
Odor Call	-0.15	1.76	-0.19	2.09
LTAR	-0.24	1.57	0.29	2.00
Emergency Calls	-0.08	3.46	-0.26	3.29
Non-Emergency Calls	-0.08	2.15	-0.22	2.34
Appt Kept	-1.09	3.14	-0.61	2.14
Meter Reads	-1.67	4.98	-1.97	6.23
DTE Cases	0.32	1.56	0.39	1.82
Bill Adj	0.90	3.10	1.18	3.98
Essex Gas Co.				
Odor Call	-1.03	3.21	-1.38	4.42
LTAR	0.79	2.02	1.13	2.79
Emergency Calls	0.33	1.35	0.15	1.32
Non-Emergency Calls	-0.21	2.07	-0.36	2.25
Appt Kept	-0.86	2.17	-1.24	3.01
Meter Reads	-1.86	5.13	-1.84	5.39
DTE Cases	0.94	2.49	1.23	3.38
Bill Adj	0.70	1.89	1.05	2.62
Colonial Gas Co.				
Odor Call	-0.85	3.03	-0.92	3.12
LTAR	0.98	2.58	1.19	3.32
Emergency Calls	-0.16	1.18	-0.34	1.28
Non-Emergency Calls	0.13	1.93	-0.01	1.72
Appt Kept	-2.09	5.83	-2.36	7.22
Meter Reads	0.06	1.43	-0.25	1.46
DTE Cases	0.91	3.31	-0.43	2.03
Bill Adj	-0.44	2.11	-0.24	1.56
Mass Electric				
SAIFI	0.89	2.36	0.41	2.57
SAIDI	1.07	2.49	0.79	2.08
LTA	0.83	3.03	0.72	3.25
Calls	-0.60	2.30	-0.70	3.14
Appts Met	-0.63	1.68	-0.72	1.93
Meter Reads	-0.39	1.96	-1.00	2.78
DPU Cases	0.04	1.98	0.38	2.27
Billing Adjs	0.83	1.59	1.11	2.14
Nantucket Electric				
SAIFI	0.52	2.20	0.81	2.78
SAIDI	-0.04	1.35	0.23	2.40
LTA	1.36	3.08	1.62	3.91
Calls	-0.43	2.10	-0.36	2.76
Appts Met	-1.95	5.09	-2.13	5.87
Meter Reads	-1.32	3.31	-1.86	5.27
DPU Cases	0.79	2.43	1.29	3.66
Billing Adjs	2.53	7.30	2.89	9.25

Exhibit IV
Skewness and Kurtosis Analysis

	Benchmark Years		Lastest 10 Yrs (Incl. 2011)
	Mean	Std. Dev.	Mean
Boston Gas Co.			
Odor Call	95.82%	1.11%	96.67%
LTAR	1.75	0.63	1.82
Emergency Calls	92.19%	2.68%	92.46%
Non-Emergency Calls	62.72%	7.70%	63.07%
Appt Kept	96.52%	1.79%	98.42%
Meter Reads	95.63%	1.15%	96.61%
DTE Cases	0.89	0.20	0.93
Bill Adj	0.09	0.05	0.08
Essex Gas Co.			
Odor Call	96.92%	1.72%	97.73%
LTAR	1.68	1.68	0.78
Emergency Calls	94.28%	2.69%	94.47%
Non-Emergency Calls	66.26%	8.00%	66.71%
Appt Kept	99.00%	0.99%	99.60%
Meter Reads	97.71%	2.10%	98.42%
DTE Cases	0.70	0.53	0.20
Bill Adj	0.04	0.04	0.03
Colonial Gas Co.			
Odor Call	95.87%	2.12%	96.94%
LTAR	2.34	1.65	1.42
Emergency Calls	92.74%	5.14%	93.17%
Non-Emergency Calls	73.79%	6.32%	74.74%
Appt Kept	97.40%	3.20%	98.46%
Meter Reads	96.46%	1.68%	97.08%
DTE Cases	0.97	0.14	0.71
Bill Adj	0.20	0.07	0.15
Mass Electric			
SAIFI	1.254	0.177	1.203
SAIDI	114.32	39.66	145.17
LTA	1.51	0.51	1.16
Calls	81.9%	11.4%	86.3%
Appts Met	96.4%	2.9%	96.5%
Meter Reads	93.0%	5.2%	98.3%
DPU Cases	0.8	0.2	0.6
Billing Adjs	0.0	0.0	0.0
Nantucket Electric			
SAIFI	0.426	0.253	0.421
SAIDI	24.06	14.94	36.09
LTA	2.31	4.20	2.53
Calls	82.8%	12.4%	86.7%
Appts Met	96.0%	9.2%	96.4%
Meter Reads	97.2%	3.3%	99.0%
DPU Cases	0.3	0.2	0.2
Billing Adjs	0.0	0.0	0.0