STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Case 08-E-0539 - Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Electric Service

MANDATORY HOURLY PRICING PROGRAM EVALUATION REPORT

Prepared by KEMA, Inc.

for

Consolidated Edison Company of New York, Inc.

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Mandatory Hourly Pricing Program Evaluation

Report

Prepared for: Consolidated Edison Company of New York, Inc.
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1. Executive Summary

KEMA was contracted during the fourth quarter of 2011 by Consolidated Edison Company of New York ("CECONY") to conduct an evaluation of the Mandatory Hourly Pricing (MHP) program. The evaluation consisted of two primary components:

- **Impact Evaluation** – The impact evaluation was a quantitative analysis of the MHP program's impact on customer's on-peak load, system peak demand and off-peak energy consumption. In this component, the project team conducted a rigorous analysis of up to seven years[1] of hourly load information for 272 current MHP full service customers and 1,478 retail access customers.

- **Process Evaluation** – The process evaluation component focused on identifying the sentiments of current customers as well as those that have migrated to alternative suppliers. This aspect of the research used interviews with 107 customers[2].

1.1 Key Findings of the Impact Analysis

The evaluation determined that MHP had minimal impact on energy usage. The price elasticity modeling analysis estimated a difference in energy usage for all full service customers of less than 0.2% of the total energy subjected to MHP prices.

The cost comparison estimated that the average participant bill was approximately 0.7% higher than what would have been paid if they were not on hourly pricing and were paying alternative rates for energy. Considering the minimal impact on energy use, the differences between MHP prices and alternative rates may not be substantial enough to influence full service customers to change their energy usage and demand patterns. In addition, for customers who stated that they have the ability to reduce energy during high price periods, the data analysis showed no significant difference between the estimated energy use with MHP and without MHP.

An investigation of MHP prices showed a very narrow range—not significantly different than the rates the participants would have paid off of the MHP rate structure.

The interval load data analysis determined that the off-peak energy use for the full service customers decreased slightly from 51.2% of the total annual energy use in 2009 to 50.9% in 2011. This is an indication that overall, customers are not exhibiting behavioral changes in reaction to price. In effect, customers are using slightly more of their energy during on-peak periods than they were in 2009.

[1] The amount of available data depended on when the hourly load metering was installed.
[2] Interviews were conducted with 34 full service and 73 retail access customers.

1.2 Key Findings of the Process Evaluation

Only 272 or 15% of all customer accounts with interval meters installed to enable MHP rate participation, remained a full service Con Edison customers after they became MHP-eligible. The remaining 85% of MHP-eligible customers were already either retail access customers or elected to change to retail access after being switched to MHP.

Figure 1 presents three key findings from the MHP customer survey:

1) Just over half of the customers that remained on MHP (8% of total eligible) are actually aware that they are on the MHP rate.

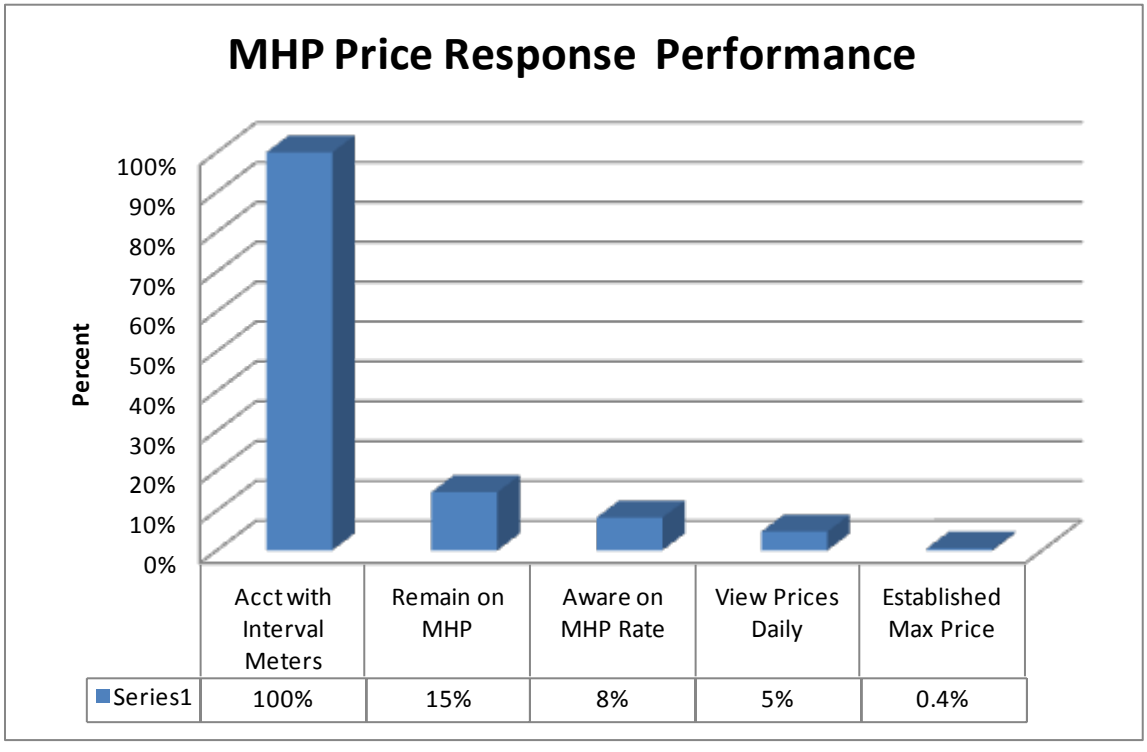
2) Over half of the customers that are aware that they are on the MHP rate view energy prices on a daily basis.

3) Finally, about 3% of the customers that remained on MHP (0.4% of total eligible customers) actually establish a maximum price threshold per kWh at which they would consider reducing load.

Only one survey respondent indicated that they had established a maximum price threshold, however, this customer refused to provide the price. Only two customers (5% of the surveyed full service customers) from the previous 2009 evaluation survey stated that they have a maximum price of around $0.20 per kWh at which point they would consider changing their demand pattern in response.[3] Of the 2,013 customer accounts that had interval meters installed to enable participation in the MHP rate, only one customer (0.05%) indicated that it shifted load in response to hourly pricing.

[3] The average day-ahead price is$0.048/kWh so $0.20/kWh represents about a four times multiplier.

Figure 1: Key Survey Findings



For MHP to be effective, customers need to be aware of hourly prices, be willing to identify a maximum price threshold at which they would consider reducing demand, and develop a load reduction implementation plan[4] that they could activate. Unfortunately, the vast majority of participants are not viewing prices daily and have not established a maximum price threshold where they would be willing to reduce demand, even though Con Edison has provided tools and direction to do so.

When 34 MHP full service customers were queried about load reduction strategies, the strategies they most often cited included utilizing Energy Management System (EMS) controls (32%), reducing lighting (3%), and reducing "shift" or facility processes (3%). In addition, six percent (6%) indicated "other strategies", which included operating emergency generation and reducing HVAC.

Barriers to Reducing Load

Approximately 50% of the survey respondents indicated that they could not reduce energy during the high-priced period. This is a significant increase over the 15% who responded this way in the previous (2009) survey. In the current survey, 69% of customers cited barriers to

[4] The load reduction implementation plan would identify loads that could be reduced and the specific actions to be implemented.

their ability to shift loads or respond to price signals; the remaining 31% did not know their ability to shift loads or respond to price signals. The four primary barriers identified were:

1) Insufficient resources to pay attention to hourly prices;
2) Inflexible labor schedule;
3) Managing electricity use is not a priority in the organization; and
4) The cost of responding simply outweighs the savings benefit.

These barriers are similar to those noted in previous evaluations.

Education, Website and Training

CECONY has been active in outreach activities. A review of customer outreach activities indicates a total of twelve live customer forums and information exchanges were conducted between 2009 and 2011.

All full service MHP customers receive a message with every bill that indicates they are being billed on the MHP rate.

In 2011, the Customer Care for Energy Management Website replaced the Demand Monitoring Software (DMS). Customer survey results revealed that about 18% of MHP full service customers have used the website. Most use the website on a weekly basis (33%) or less than once a month (33%); none use it on a daily basis.

The Customer Care for Energy Management Website is capable of sending automated price alerts to end users when the day-ahead price is expected to exceed a target threshold price for energy. Although 35% of full service MHP customers responding to the survey are aware of this capability only 3% have actually established a pricing alert. While an additional 24% of respondents were unaware of the functionality, they are interested, and would consider signing up for an alert notification. The alert can be customized and set by the user once they've gained access to the web site.

Conclusions from discussions with CECONY staff revealed that from 2009-2010 CECONY has created a series of informational documents available and distributed to the public, specifically, account holders and interested parties regarding the MHP rate structure and Reactive Power; see Appendix C: *The New Reactive-Power Charge and Mandatory Hourly Pricing* informational series; and *Smarter Energy Management* newsletter series. These informational documents are available via the CECONY website, www.coned.com/reactivepower. The Customer Care for Energy Management web site can be reached via the URL, www.coned.com/customercare. This information has been circulated via email distribution and mass mailings.

CECONY account executives and Customer Operations worked together to identify and confirm contact information for the 500kW to 1500 kW customers (Tier II and Tier III customers). These Tier II and Tier III customers were sent letters explaining the need for the installation of interval meters. In addition, customer forums directed to MHP were developed and implemented several times over the last three years. Customer forum efforts included but were not limited to:

- Presentations on MHP tariff pricing;
- Demonstration of the Customer Care for Energy Management website and user manual;
- Distribution of informational newsletters;
- The development of a centralized email address for customers to use when asking questions;
- Collection of attendees' contact information.

At the end of each customer forum CECONY distributed evaluation surveys that asked participants to rate the forum information. The survey data was compiled with feedback and improvements were incorporated into the next forum event.

Although customer outreach activities were conducted, generally, customers did not actively engage in acquiring information about MHP. During the transition period only 15% of full service MHP respondents read CECONY customer letters, newsletters and e-mails, 3% visited Con Ed rates site and 9% contacted customer service. Since beginning service on MHP rates, 76% of the current full service MHP customers have taken no action towards acquiring information about MHP.

MHP participants were asked if they had information about MHP necessary to develop a strategy to respond to hourly pricing signals; approximately 68% of MHP full service respondents indicated that they required more information. All of the comments from the surveyed customers focused on CECONY having more correspondence with customers, including providing more information about hourly pricing.

Additional Improvements

MHP participants were asked what actions, within the last 24 months, they have taken to implement strategies to offset load demand: 26% of 34 full service MHP respondents said they have had energy audits at their facilities, 17% have had technical assessments conducted, and 17% have installed on-site or distributed generation. Seven percent stated that they have used load management software, and 3% claimed to have shifted electricity demand in the last 24 months.

ESCO Survey Results

Surveys conducted with ESCO customers revealed that two-thirds of the customer base switched to an alternate service provider when the MHP rate structure became applicable to their service.

1.3 Implications for Expansion of MHP

If the MHP program were expanded to smaller (Tier IV) customers, i.e., those with billing demand >300 kW to 500 kW, the current MHP rates are likely to have minimal impact on their energy use. The analysis performed estimated that on average, the Tier IV customer would have increased their energy usage over the previous twelve months by less than one-quarter or one percent (0.24%). In addition, the analysis indicates that the average Tier IV customer would have spent approximately 1% more on their electric bill over the past twelve months by virtue of being on the MHP rate structure.[5]

1.4 Summary of Findings

Current Implementation

MHP is a default rate and as such most of the MHP full service customer survey respondents either, don't know they are on an hourly pricing rate, or haven't identified a better alternative energy provider option. The quantitative analysis of interval data from full service customers did not demonstrate any reaction to price either in isolation or when compared to similar size and type retail access customers.

Even though MHP has been expanded, the results from the current evaluation are consistent with the last evaluation[6], i.e., MHP has shown no material effect on the load shape of the participating customers. This suggests that in terms of promoting customer response to hourly price signals, to date, the MHP rate has not succeeded. There is little evidence in this or the previous evaluation in support of MHP as an effective tool for allowing the remaining default full service customers to modify their demand and energy usage in response to the hourly prices. Given that only 15% of the MHP-eligible customers are taking service on the MHP rate, the cost effectiveness of the current strategy is questionable.

Future Expansion of the MHP

A majority of current customers that qualify for MHP (85%) are retail access customers. Additionally most of the customers (72%) that would have interval meters installed if MHP were

[5] This analysis does not include any additional meter charge due to metering functionality and communication costs.
[6] In particular, when comparing the last evaluation to the current evaluation, the results of the largest customers who have been on the MHP program for both evaluations are consistent.

further expanded are already retail access customers. As such, most of the metering costs to further expand MHP would be spent on customers that would not be on the MHP rate. For those that would be put on the rate, there is no reasonable expectation that they would have any reaction to price. In fact, if migration patterns are consistent with previous MHP expansion, about two thirds of the new MHP customers could be expected to migrate to alternative energy suppliers within six months of being switched to MHP. Accordingly, there is not a compelling economic or operational rationale to pursue expansion to smaller customers.

1.5 Recommendations

The analysis indicates that the MHP program has failed to impact the overall electrical usage pattern of the full service customers exposed to the rate or retail access customers given access to their usage information. Extending MHP to customers with bill demands over 300 kW would only burden these customers and the rate base with additional interval metering cost. Therefore, expansion of the MHP program cannot reasonably be recommended.

The Commission provided the following statement as the goal for implementing Mandatory Hourly Pricing; "The goal in implementing hourly pricing is to realize the benefits of reducing the electric system's peak period demand and shifting load to off-peak, less expensive time periods."[7] At the time of the initial implementation of MHP only customers with monthly peak demand of >1,500 kW were included, because these larger customers were believed to be the best equipped to respond to hourly pricing. The current evaluation includes these larger customers as well as customers with monthly peak demand between >500 kW and 1,500 kW. As identified in this evaluation, MHP has had no effect on the energy usage patterns of any of the customer groups that have been exposed to hourly pricing as CECONY full service customers or the hourly usage as retail access customers.

Another issue impacting the effectiveness of MHP in achieving desired load shifts or reductions is the weakness of the pricing signal. MHP customers have been resistant to establishing a threshold price level as a criterion to reduce load. Two survey respondents from the previous evaluation (2009) indicated a threshold price of about $0.20/kWh before they would consider reducing load. From 2009 through 2011, the day-ahead energy price has exceeded $0.25/kWh for a total of 10 hours. All ten hours occurred during 2011 and the prices were between $0.25/kWh - $0.30/kWh. A threshold price of $0.20/kWh - $0.25/kWh represents about four to five times the mean day-ahead energy price of $0.048. Given the low number of hours and small potential energy savings, it is not difficult to understand why participants have not responded to MHP.

[7] Case 03-E-0641 Order Denying Petitions for Rehearing and Clarification in Part Adopting Mandatory Hourly Pricing Requirements (April 24,2006) p. 1.

2. Mandatory Hourly Pricing Evaluation

2.1 Introduction

This report presents the research and findings conducted by KEMA for the multi-year evaluation of the Consolidated Edison Company of New York, Inc. (CECONY) Mandatory Hourly Pricing (MHP) rate structure required in Case 03-E-0641, Proceeding on Motion of the Commission Regarding Expedited Implementation of Mandatory Hourly Reporting for Commodity Service.

The current evaluation includes a new customer rate class covered in the 2008 expansion order of MHP to customers with demands over 500 kW, which CECONY implemented in two phases. The evaluation consisted of load data review, customer surveys and analysis of future participation in MHP.

Under MHP (Rider M), customers are charged a rate based on the hourly New York Independent System Operator (NYISO) posted zonal day-ahead market price for energy. These energy charges vary depending on time of day, season and other market conditions. Table 1 provides a listing of customers by demand size that had interval meters installed for MHP (column 2) as well as the number of customers that remained full service customers[8] after the initiation of MHP service (column 3).[9] As shown in column 4, the overall percentage remaining as full service customers on MHP averaged about 15% with the percentage decreasing the longer the customer was exposed to the MHP rate.[10]

Table 1: Summary of MHP Customers

Customer Size	Quantity of Customers		Percent Remaining	MHP Start	Years Post MHP
	Interval Meter	Remain on MHP			
> 1,500 kW	654	61	9.3%	2006	5
>1,000 kW to 1,500 kW	189	30	15.9%	2009	3
>500 kW to 1,000 kW	1,170	203	17.4%	2011	1
Total	**2013**	**294**	14.6%		

The larger customers (>1,500 kW or greater) have been on MHP for over five years beginning on May 1, 2006. The next tier of customers (>1,000 kW to 1,500 kW) have been on the MHP

[8] "Full Service" customers are those that purchase energy form CECONY under the MHP rate. "Retail access" customers purchase energy from an alternative supplier and are not on the MHP rate.
[9] A large percentage of customers that had interval meters installed to enable them to participate in MHP were already retail access customers at the time they would have been switched to the MHP rate.
[10] The table provides a static distribution of customers at the start of the evaluation. The statement about customer migration is based the fact that there were 73 full service customers with peak demand of >1,500 kW at the time of the last evaluation.

rate beginning on November 1, 2009 and have two years' experience on the MHP rate. Finally, the smallest customers (>500 kW to 1,000 kW) have been on the MHP rate for one year beginning on May 1, 2011.

Throughout the report customers will be referred to by demand size bin as follows;

- **Tier I** monthly demand > 1,500 kW,
- **Tier II** monthly demand > 1,000 kW to 1,500 kW, and
- **Tier III** monthly demand > 500 kW to 1,000 kW.

2.2 Primary Evaluation Objectives

The goal of this evaluation was to examine the way in which the MHP rate structure was executed and determine its impact on customers. Specifically, the primary evaluation objectives for this study were to:

1. Determine the impact of the current MHP rates on full-service customers and customers that have migrated to retail access on peak load, system peak and off-peak;
2. Organize and administer:
   a) A customer survey to examine customer reactions after their experience on MHP,
   b) An Energy Service Company (ESCO) survey with customers who have migrated to an alternative supplier to examine former MHP customer sentiments about the rate structure;
3. Assess the implications if MHP were to be expanded to an additional Tier of customers in the >300 – 500 kW range. Specifically, if the MHP rate were expanded, what demand and energy impacts on the system peak and at other time periods might occur, and how should such expansion be managed most effectively.

Portions of the data analysis performed for this evaluation were guided by the directives set forth by the NYSPSC[11], including many aspects of the interval load data analysis. The remainder of the evaluation was conducted based on the needs identified by CECONY.

All terms used within this document are defined in Appendix I.

This final evaluation report consists of the following:

1. Executive Summary
2. Introduction
3. Impact Evaluation;
4. Process Evaluation;
5. Major Findings and Recommendations;
6. Statistical Methods Selection and Support; and
7. Appendices A – J.

[11] Case 03-E-0641, Order, Adopting Staff Recommendations, issued and effective December 17, 2007.

3. Impact Evaluation

The impact analysis objective was to quantify the impacts on hourly demand, energy use, peak demand, system peak and off-peak energy use for customers that qualify for MHP. These customers include "full service" customers and "retail access" customers.

3.1 Price Elasticity Results

The impact analysis relied on statistical models to evaluate the price elasticity (price responsiveness) of the MHP participants. These models were developed using customer interval load data gathered before the customers were placed on a MHP rate and interval load data gathered while the customers were on the MHP rate.

3.1.1 Initial Analysis – Seasonal

There were 1,750 customers that were eligible for the MHP rate that had interval data available for this analysis. This is a substantial increase since the 2009 evaluation, as more and smaller customers became eligible for the MHP tariff. The distribution of the participants available for this analysis is shown in Table 2.

Table 2: Participants Available to the Analysis

	Full Service		Retail Access		Total	
Demand Level	n	Percent	n	Percent	n	Percent
>500 kW to 1,000 kW	197	72%	925	63%	1,122	64%
>1000 kW to 1,500 kW	29	11%	154	10%	183	10%
>1500 kW	46	17%	399	27%	445	25%
Total	272	100%	1,478	100%	1,750	100%

An initial analysis was performed to ascertain if any customers demonstrate elasticity. This initial analysis was limited to the hours around the times most likely to contain New York Control Area (NYCA) system peaks, by season. For summer, these hours were between 1 pm and 5 pm, which coincides with the NYCA system peak over the previous five years. For winter, the hours between 5 pm to 7 pm were identified as the peak hours. The winter peak hours were chosen based on the historical cold weather peak demands for Zone J.

The price elasticity was estimated using statistical models. When the models produced statistically insignificant price coefficients or produced models that had an inconsistent sign of the price coefficient, these participants were considered inelastic, i.e., they did not demonstrate any price response.

Table 3 shows the percent of customers by seasonal elasticity classification (winter, summer), by demand size and by customer type. The initial analysis found that 86% of the full service customers and 89% of the retail access customers were inelastic, while only 1% of full service and 2% of retail access customers displayed elasticity in both winter and summer periods. The remaining 12% of full service customers and 9% of retail access customers had some evidence of elasticity in either the winter or the summer season. These results indicate that only about 1% to 2% of the participants exhibited consistent behavioral change. About 9% to 12% of the participants exhibited partial behavioral changes, meaning their sensitivity to price is time dependent or that they are more sensitive to price depending on season. Almost nine of 10 participants did not exhibit any behavioral change in this initial analysis. The percent of customers that are inelastic is higher than in the previous 2009 evaluation, which found that 67% of the largest full service customers were inelastic. Of the customers that were determined to be elastic, the percentage of customers within size groups that demonstrate any elasticity increases with the size. None of the >500 kW to 1,000 kW full service customers displayed elasticity in both periods. Three percent of the >1,000 kW to 1,500 kW full service customers and 5% of the >1500 kW full service customers displayed elasticity in both seasons.

Table 3: Customer Elasticity Classification

Full Service									
Winter Season	Summer Season	>500 kW to 1,000 kW		>1,000 kW to 1,500 kW		>1500 kW		Total	
		n	Percent	n	Percent	n	Percent	n	Percent
Yes	Yes	0	0%	1	3%	2	5%	3	1%
Yes	No	1	1%	3	10%	7	16%	11	4%
No	Yes	21	11%	0	0%	1	2%	22	8%
No	No	170	89%	25	86%	34	77%	229	86%
Retail Access									
Winter Season	Summer Season	>500 kW to 1,000 kW		>1,000 kW to 1,500 kW		>1500 kW		Total	
		n	Percent	n	Percent	n	Percent	n	Percent
Yes	Yes	6	1%	0	0%	21	5%	27	2%
Yes	No	16	2%	16	10%	37	9%	69	5%
No	Yes	43	5%	3	2%	14	4%	60	4%
No	No	841	93%	135	88%	327	82%	1303	89%

The initial analysis suggests that prices during the analysis period had little effect on behavioral shifts in customer usage, a conclusion consistent with the 2009 evaluation. The price signal is simply not strong enough to influence a customer to change its consumption pattern.

The prices that participants experienced were in a very narrow range. For example, Figure 2 displays the cumulative distribution of prices for weekday hours between 5 pm and 7 pm from January 2004 through February 2012. This figure determined that 99% of the prices during this 5 pm to 7 pm time period were between 2.7 cents and 21 cents. Most customers became eligible for MHP rates in 2011. The distribution of 2011 prices show that 97% of the prices were below 14.4 cents. This range is not significantly different than the rates the participants would have paid if they were not on the MHP rate structure. There were no significant price spikes.

Figure 2: Distribution of 5 pm to 7 pm Hourly Prices

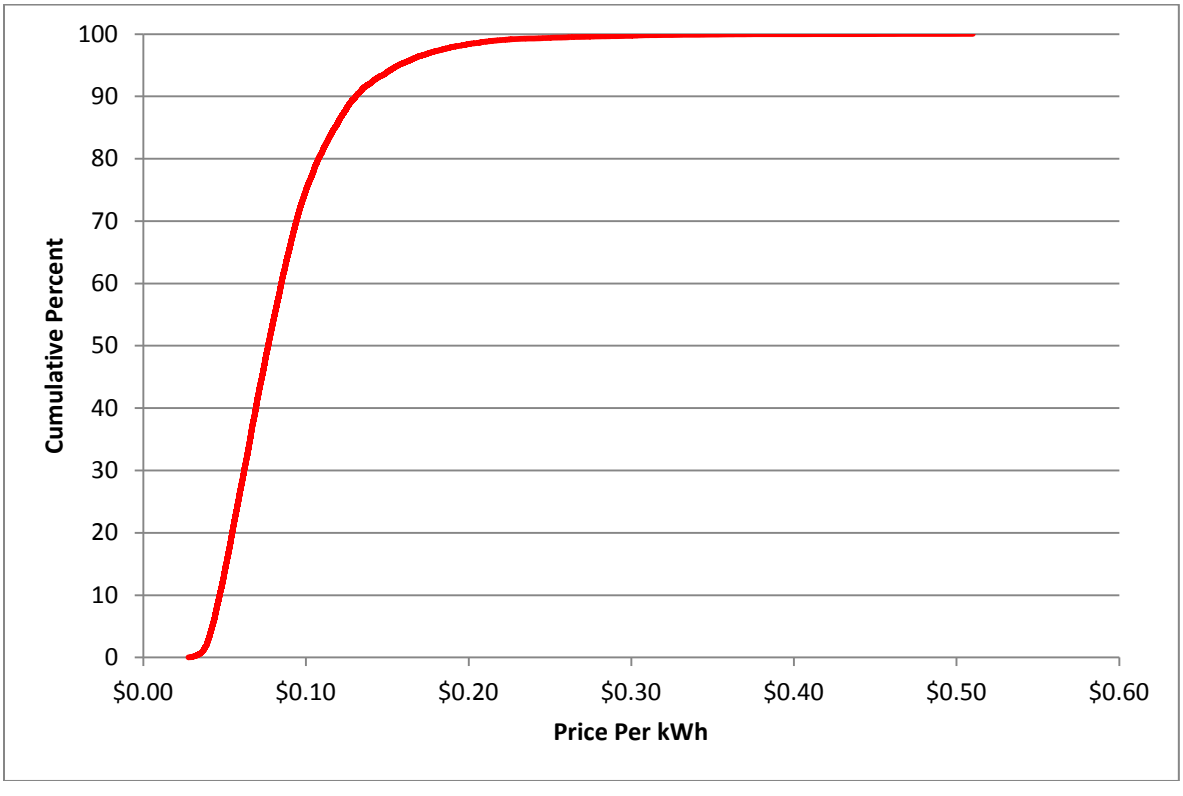


Table 4 presents the mean and maximum prices for energy under MHP and the alternative rate[12] for each year from 2006 to 2011. Zone J prices are used in this example because approximately 92% of the customers eligible for MHP are in Zone J. However, the prices in Zones H & I are not significantly different and follow the same pattern. The result is that the average MHP prices across all hours were lower than the alternative rates, but the maximum MHP prices were significantly higher than the alternative rates. The last two columns provide

[12] The alternative rate was calculated using the MHP prices, as applied to average customer profiles based on month, day or the week, demand category, zone and PSC Service Class.

the percent difference between the MHP energy component and the alternative rate, which shows that the mean price was 3% lower over the period, and the maximum price, was 73% higher under MHP.

Table 4: Average and Maximum Prices

	MHP[13]		Alternative Rate		Percent Difference	
Year	Mean Price	Max Price	Mean Price	Max Price	Mean Price	Max Price
2006	$0.065	$0.510	$0.067	$0.090	-3%	467%
2007	$0.074	$0.222	$0.076	$0.093	-3%	139%
2008	$0.089	$0.376	$0.091	$0.139	-2%	171%
2009	$0.044	$0.170	$0.045	$0.074	-2%	130%
2010	$0.051	$0.224	$0.053	$0.072	-4%	211%
2011	$0.048	$0.363	$0.049	$0.074	-2%	391%
Total	$0.055	$0.510	$0.057	$0.139	-4%	267%

Table 5 presents the percentage of hours that the MHP prices were above certain levels for each year from 2006 to 2011. This table shows that prices exceeded 25 cents less than 0.2% of the time during 2006 through 2011. There were no hours during 2007, 2008 and 2010 when the MHP energy price exceeded 25 cents per kWh. Customers are not being exposed to significantly higher prices than on their alternative rate, and consequently, a majority of MHP customers displayed no price elasticity.

[13] The MHP price shown here is the NYISO Zonal Day Ahead Market price. Customers on MHP are also subject to an ancillary services charge and a transmission service charge that is fixed charge which is updated on a monthly basis. The Zonal Day Ahead Market price is the dynamic component of the price that customers would view and react on.

Table 5: Frequency of Hours by Price Bin

Price Bin ($/kWh)	2006	2007	2008	2009	2010	2011	Total
> $0.45	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
$0.40-$0.45	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
$0.35-$0.40	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%
$0.30-$0.35	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%
$0.25-$0.30	0.1%	0.0%	0.4%	0.0%	0.0%	0.1%	0.1%
Total	**0.5%**	**0.0%**	**0.6%**	**0.0%**	**0.0%**	**0.1%**	**0.2%**
Hours > $0.25	**31**	**0**	**49**	**0**	**0**	**10**	**90**

KEMA investigated other programs for any benchmarks that would identify prices where customers would be inclined to reduce load. There does not appear to be any publicly available data from other jurisdictions that reviews pricing thresholds for Commercial and Industrial (C&I) customers on mandatory day-ahead pricing rates and when they begin to reduce load consumption.

3.1.2 Second Analysis - Hourly Demands

For customers that qualify for the MHP rate, operating schedule is an important determinant of load pattern. Therefore, the analysis factored in the effects of a customer's operating schedule by analyzing price elasticity at each individual hour. In addition, the analysis did not assume that an elasticity was constant across the load shape, i.e., the elasticity could change depending upon the schedule. Accordingly, the same models used in the initial analysis were applied to each individual hour of the day for each day of the week, for each season (356 models per site). Similar to the initial results, when a customer had an insignificant price coefficient or if the price coefficient had an inconsistent sign, the elasticity was considered zero for that hour.

Table 6 presents the results for the average full service customer by year for 2009 through 2011. It reveals that the MHP rate structure had minimal impact on energy usage with a minimal overall increase of less than 0.2% during the three-year period from 2009 to 2011. The data also shows that the average participant MHP bill was approximately 0.7% higher than the rates for customers paying alternative rates for energy. Although the program expanded into smaller customers during the period, the conclusions are consistent by year. Considering the minimal impact on energy use, the differences between MHP prices and the alternative rate do not appear to be substantial enough to influence participants to change their energy usage and

demand patterns despite the increase in costs.[14]

Table 6: Average Full Service Customer Results By Year

Year	Energy Usage (kWh)			Energy Cost		
	MHP Rate	Alternative Rate	Pct Difference	MHP Rate	Alternative Rate	Pct Difference
2009	5,786,038	5,776,637	0.16%	$ 259,583	$ 259,778	-0.08%
2010	6,636,332	6,626,853	0.14%	$ 358,814	$ 357,038	0.50%
2011	3,029,654	3,023,591	0.20%	$ 154,717	$ 153,108	1.05%
Total	5,437,908	5,428,252	0.18%	$ 277,498	$ 275,491	0.73%

These results were analyzed by customer segment and presented in Table 40 and Table 41 in Appendix E. Most customer segments reveal that they pay slightly more on MHP than if they were paying alternative rates. All segments showed minimal changes. Please see Table 42 in Appendix E of this report, which presents individual customer findings of the price elasticity analysis.

3.2 Interval Load Data

Interval load data from 2004 to 2011 was compiled for each of the CECONY customers who had been taking service under the MHP rate structure. The following metrics were calculated for each of the 272 full service customers in this group by calendar year at the request of the NYSPSC:

- % kWh Off-Peak / Annual kWh
- Load factor
- Coincident NYCA system peak

The on-peak period was defined by the NYSPSC to be non-holiday weekdays between 8 am and 10 pm. The load factor is calculated by dividing the annual kWh by the hours in a year (typically 8,760) divided by the non-coincident peak kW. The annual NYCA system peaks were found to have occurred as follows:

- 2004 – June 9 at hour ending 5 pm – 28,433 MW

[14] NYISO prices are used to calculate energy costs in both cases. The difference between the two is that MHP uses actual NYISO day-ahead hourly price and the alternate rate utilizes average price over the customers billing cycle.

- 2005 – July 26 at hour ending 5 pm – 32,075 MW
- 2006 – August 2 at hour ending 2 pm – 33,939 MW
- 2007 – August 8 at hour ending 5 pm – 32,169 MW
- 2008 – June 9 at hour ending 5 pm – 32,432 MW
- 2009 – August 17 at hour ending 4 pm – 33,452 MW
- 2010 – July 6 at hour ending 5 pm – 33,454 MW
- 2011 – July 21 at hour ending 5 pm – 33,939 MW

3.2.1 Off-Peak Energy Use

KEMA calculated the percentage of annual energy use that occurs during the off-peak period for each customer that qualified for the MHP rate. An indicator of behavioral change is an increase in this percentage. An increase in this metric would mean that the percentage of annual energy use that occurs during the on-peak period decreased. One of the factors that could contribute to a customer reducing its on-peak energy use is a response to higher daytime prices.

Table 7 presents the percentage of annual load that is off-peak for each year from 2004 to 2011 as calculated from the interval load data. This table shows the percentage of off-peak energy usage for full service customers, retail access customers, and all customers included in the analysis. Additionally, these data were averaged by customer segment (by NAICS Code) and presented in Table 35 and Table 36 in Appendix E. The data shows that the percentage of off-peak kWh remained relatively stable over the period. The data also shows that MHP customers have slightly higher off peak usage than non-MHP customers. A load shape that is favorable to MHP prices may keep customers from seeking retail access. The change in the off peak percentage differential between the two groups (last column) over time is attributed to the inclusion of smaller customers starting in 2009. Looking at the time period from 2009 to 2011 the data indicates both customer groups experience similar minimal decreases in the percentage of off peak load of about 0.3%. Given the minimal impact and the fact the both customer groups experience a similar change, it is difficult to attribute the change to the MHP rate. The most likely cause of the shift could be other business factors unrelated to hourly energy pricing.

Table 7: Percentage of Off-Peak Energy

Year	Full Service Off Peak %	Retail Access Off Peak %	All Customers Off Peak %	Difference FS vs. RA
2004	51.2%	49.9%	50.0%	1.2%
2005	51.7%	50.4%	50.5%	1.2%
2006	51.7%	50.4%	50.5%	1.3%
2007	51.6%	50.6%	50.7%	0.9%
2008	51.6%	50.9%	50.9%	0.8%
2009	51.7%	51.0%	51.1%	0.7%
2010	51.4%	50.9%	51.0%	0.5%
2011	51.4%	51.0%	51.1%	0.3%
Total	51.5%	50.7%	50.8%	0.8%

3.2.2 Load Factor

Multiple influences could affect the load factor of a facility including operating hours, production schedules, or the economy. Price of energy is one factor that could lead to a decrease in load factor. For example, a customer may peak at a certain demand depending on the needs of a facility. However, if the price of energy is being monitored, it is assumed that energy consumption will decrease as price increases.

Table 8 presents the average full service customer and retail access customer load factors by demand size for each year from 2009 to 2011 as calculated from actual interval load data. Load factors were also calculated for each customer segment and presented in Table 37 and Table 38 in Appendix E.

Load factor for each customer was calculated by dividing the annual energy use (kWh) by the hours in a year (typically 8,760) by the non-coincident peak kW.[15] This factor represents the ratio of the actual energy use of a customer to the maximum energy that would be used if the load is at its peak for all hours of the year.[16] The total group of customers saw its load factors decrease by a total of almost three percentage points between 2009 and 2011. Two reasons why a load factor may decrease for a particular customer: the total peak demand increased year-to-year with little change in the annual energy usage, or the annual energy usage decreased with little change in the peak demand.

[15] If a customer had more than 180 days of data, the load factor was based on the available data. Those customers with less than this amount of data were omitted from the analysis.
[16] Load factor is a metric that is typically utilized when interval load data is not available. Since this study relied heavily on historical interval load data, a metric such as off-peak energy use is a better tool for investigating changes resulting from an hourly pricing program.

Table 8: Load Factors

Full Service				Difference
Customer Size	2009	2010	2011	2009-2011
>500 kW to 1,000 kW	52.4%	44.7%	42.7%	-9.8%
>1,000 kW to 1,500 kW	48.0%	47.5%	51.7%	3.7%
>1,500 kW	48.9%	45.9%	44.7%	-4.2%
Retail Access				**Difference**
Customer Size	2009	2010	2011	2009-2011
>500 kW to 1,000 kW	46.4%	44.1%	43.8%	-2.7%
>1,000 kW to 1,500 kW	47.4%	49.1%	48.9%	1.5%
>1,500 kW	55.5%	53.5%	53.0%	-2.5%

Individual customer metrics, which include percentage of off-peak energy usage, load factor and customer demand coincident with NYCA system peak, were calculated for all full service customers and are presented in Table 39 in Appendix E of this report. These tables include the coincident NYCA system peak kW for each customer. The contribution to the NYCA system peak for the entire group of MHP customers in each of the previous six years is shown in Table 9.

Table 9: Aggregate Contribution to Peak All Customers Exposed to MHP

Date	Hour Ending	Con Ed Peak (MW)	Aggregate MHP Coin (kW)	Contribution
August 2,2006	2 PM	33,939	815,681	2.40%
August 8,2007	5 PM	32,169	892,424	2.77%
June 9,2008	5 PM	32,432	863,018	2.66%
August 17,2009	4PM	30,844	1,127,772	3.66%
July 6,2010	5 PM	33,452	1,738,683	5.20%
July 21,2011	5 PM	33,454	1,714,336	5.12%
Peak for Period		33,939	1,738,683	5.12%

However, since most customers that qualify for the MHP rate have chosen an alternative energy provider, the contribution of full service customers to the New York Control Area (NYCA) peak is significantly different than the entire group of customers that would be subject to MHP rates (i.e., the aggregate of full service and retail access customers), under the current tariff. Table 10 provides the contribution to the NYCA system peak attributable to the full service customers that remain on the MHP rate; the average contribution for the six-year period is almost 0.6%. This is significantly lower than the potential contribution of over 5% that would be achieved if all of the customers that qualify for the MHP rate chose to remain full-service customers.

Table 10: Aggregate Contribution to Peak Full Service Customers

Date	Hour Ending	Con Ed Peak (MW)	Aggregate MHP Coin (kW)	Contribution
August 2,2006	14	33,939	52,052	0.15%
August 8,2007	17	32,169	57,143	0.18%
June 9,2008	17	32,432	56,729	0.17%
August 17,2009	16	30,844	92,807	0.30%
July 6,2010	17	33,452	189,810	0.57%
July 21,2011	17	33,454	189,498	0.57%
Peak for Period		33,939	189,810	0.56%

3.2.3 Load Duration Curves

Figure 3 presents the annual load duration curves for the average of MHP eligible customers from 2004 through 2011. The load duration curves display the total percentage of time the average demand of the MHP eligible customers is below a particular load. This chart shows the effects of the inclusion of smaller customers, as the average load decreases substantially in 2010 and 2011. An alternative way to look at the load duration is the total percentage of time the average demand of the MHP eligible customers is below a percent of the annual maximum demand.

Figure 3: Annual Load Duration Curves 2004 – 2011, Nominal Basis

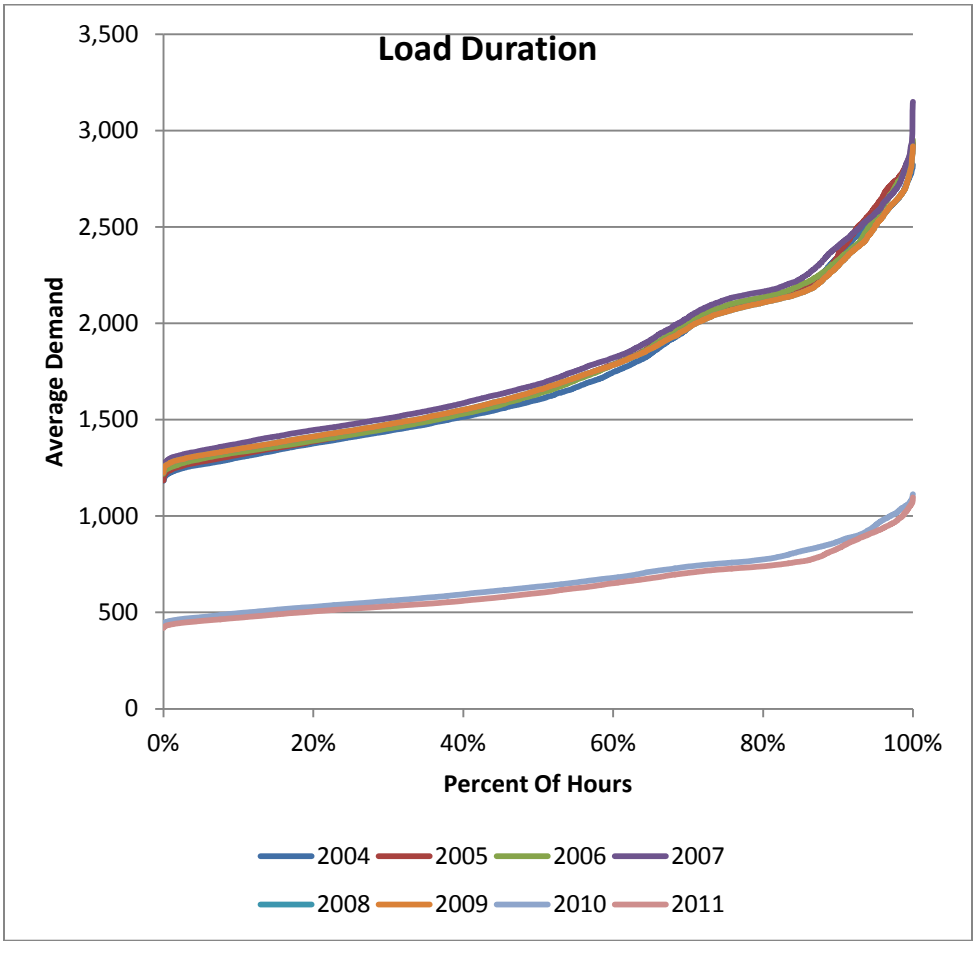
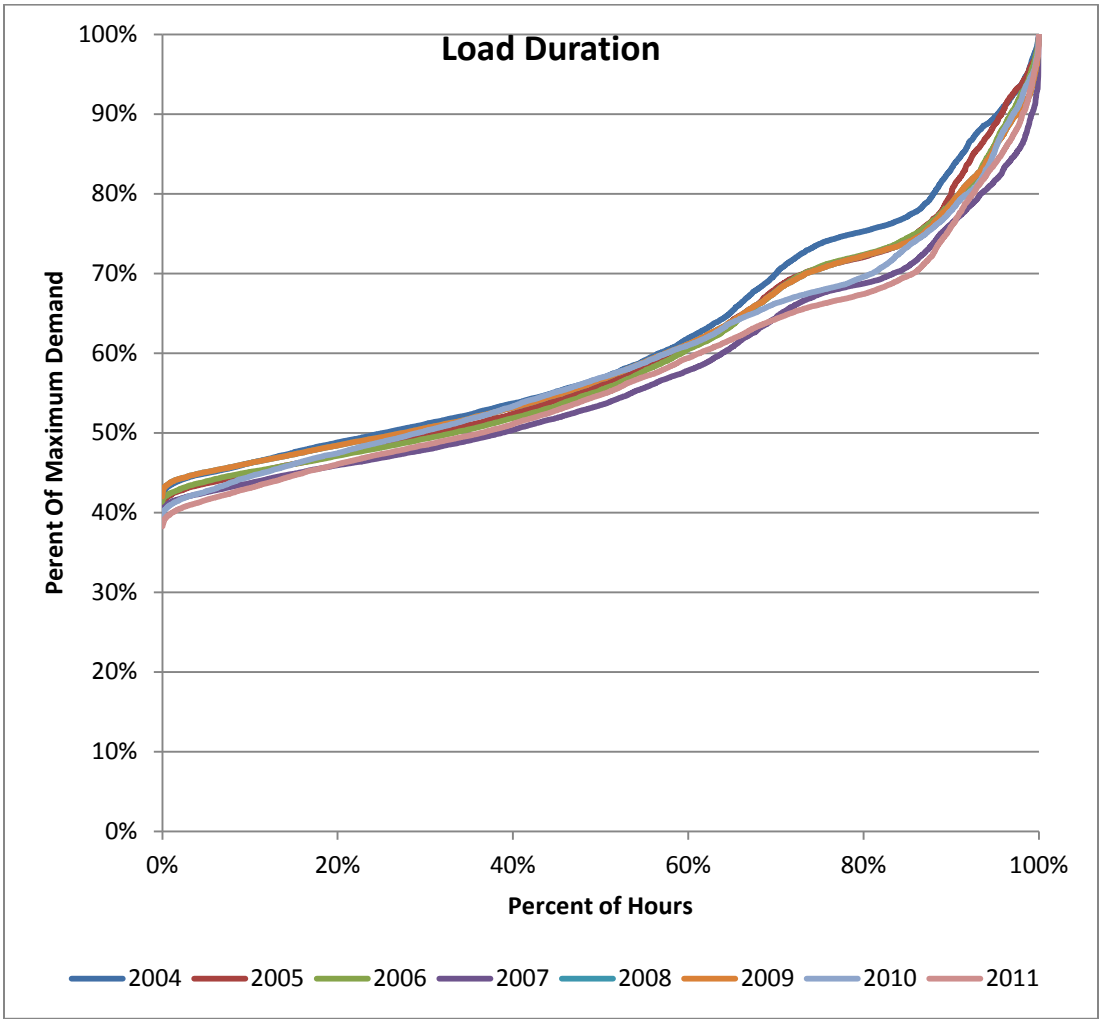


Figure 4 shows the relative load duration curves, based on the group's average demands. This Figure shows that each year approximately 90% of the average load is between 45% and 80% of the annual maximum demand. This suggests a very consistent hourly load without a lot of spikes. The majority of these customers are commercial-type properties, which tend to have very consistent load patterns with an established base load during the early morning and late night hours, and an increased load during normal business hours.

Figure 4: Annual Load Duration Curves 2004 –2011-Relative Basis



These curves demonstrate that MHP average customers' load shapes have not changed over time. A comparison of these curves demonstrates that there are no substantive differences year to year. The annual load curves appear to be following the same general trend each year, which is an indication that the group as a whole follows a steady load pattern from year-to-year. If customers were regularly reacting to price signals, the slope of the curve would change from year to year where a higher percentage of the load would occur at lower demands. The curves do not reflect this type of behavior.

4. Process Evaluation

The process evaluation was based on a survey of MHP eligible customers. This survey was designed to provide insight into behavioral decisions and experiences made by current MHP customers, as well as to gather information on what motivated customers to migrate to an alternate supplier.

The survey was conducted by KEMA and CECONY from February 2012 - March 2012 (see Section 4.2, and Appendix C). A total of 107 responses were gathered from CECONY's full service MHP and retail access customers. This section of the report summarizes the key findings from the customer survey. Appendix C presents the results for the remaining survey questions. Appendix G presents the analytical findings of the participant responses.

Methodology & Analytics

The NYSPSC requested[17] that customer demand data be presented for each of the surveyed MHP customers. Specifically, the non-coincident and NYCA coincident peak demand values were to be reported. The table containing the data for the surveyed MHP customers is provided in Table 45 in Appendix E of this report.

For 107 participants, survey results were analyzed based on the criteria of the following variables: customer demand size (Tier I (>1,500 kW), Tier II (>1,000 kW to 1,500 kW) and Tier III (>500 k to 1,000 kW)), customer classification as defined by the North American Industry Classification System (NAICS), Percentage of Residential Usage (PRES) code[18], and elasticity. Approximately eight customers were identified as full service customers but the respondents claimed to be ESCO customers.

4.1 CECONY Staff Interviews

A group of CECONY staff interviews were conducted to discuss MHP program issues including program education and outreach efforts.

Outreach and Education

With the expansion of the MHP rate structure in 2009 and 2011 to customers with loads >1,000 kW to 1,500kW (Tier II), and >500 kW to 1,000 kW (Tier III) respectively, a significant outreach

[17] Case 03-E-0641, Order, Adopting Staff Recommendations, issued and effective December 17, 2007.
[18] PRES Code represents the percentage of building use that the customer claims to be residential.

campaign was developed by CECONY staff.[19] [20] [21] [22] A cross-functional MHP project team including but not limited to employees from Accounting, Customer Operations, Energy Efficiency, and Public Affairs, was established.

The team first worked with CECONY account executives to preliminarily identify and confirm customers that would be included in Tiers II and III. This was followed by acknowledgement letters being sent to customers to inform them about the installation of interval meters, see Appendix C [18]. Customer forums commenced as early as 2006 as part of the initial implementation of MHP; as shown in Table 11, live customer forums were also developed and implemented several times beginning in 2009. During live customer forums, Company personnel collected attendees' email addresses and phone numbers; made presentations on MHP tariff pricing; demonstrated the Customer Care for Energy Management website and user manual, see Appendix C, www.coned.com/customercare ; distributed informational newsletters; and provided attendees with a centralized email address for questions, intervalmetering@coned.com.

At the end of each live customer forum, CECONY distributed evaluation surveys. Attending participants were asked to rate the forum information; the survey data was complied, feedback was considered and incorporated into the next live forum event.[23]

From 2009-2010 CECONY had created a series of informational documents, which were made available and distributed to the public, specifically, account holders and interested parties, regarding the MHP rate structure and Reactive Power; see Appendix C: *The New Reactive-Power Charge and Mandatory Hourly Pricing* informational series; and *Smarter Energy Management* newsletter series. These informational documents are available via the CECONY website, and have been circulated via email distribution and mass mailings.

According to CECONY staff, a public announcement of the amendments to Rider M was published and accessible by the public in the respective newspapers within Zone H, I, and J.

[19] Q: B6a. How were customers first notified and informed about the pending MHP tariff?
[20] Q: B6b. How were follow ups done to ensure the correct contact people understood and recognized the pertinent facts about Rider M, and the choice they could make between that and Retail Access?
[21] Q: B6c. What are the steps taken or indications checked to ensure a customer is fully informed, satisfied, and comfortable with the level of information and support given by CECONY for this initiative?
[22] Q: B7b. For customers who transitioned to MHP in 2010 and 2011: What resources of time were planned to properly communicate the changes concerning MHP?
[23] Q: B9a5. Regarding seminars, how much are these elements, one implements, recorded and compared to the goals?

Table 11: Live Customer Outreach and Education Forums

Live Customer Forum Topic Event	Date	Venue
Hourly Pricing Information Exchange	February10th, 2009	Irving Place - Auditorium
ESCO Forum: Mandatory Hourly Pricing	October 8th, 2009	Irving Place - Auditorium
Reactive Power / Hourly Pricing Info Exchange	February16th, 2010	Irving Place - Auditorium
ESCO Forum: Reactive Power and Mandatory Hourly Pricing	March 4th, 2010	Irving Place - Edison Room
Customer Forum: Reactive Power and Mandatory Hourly Pricing	March 18th, 2010	Irving Place - Edison Room
Customer Forum: Reactive Power and Mandatory Hourly Pricing	March 18th and 22nd, 2010	Irving Place - Auditorium
Reactive Power presentation to the NYC Department of Citywide Administrative Services	October 27th, 2010	Their offices - 1 Centre Street
Understanding Power Factor presentation to NYC Board of Education	January 19th, 2011	Their offices - Long Island City
Corporate Customer Forum: Mandatory Hourly Pricing and Reactive Power	March 11th, 2011	Irving Place - Auditorium
ESCO Forum: Reactive Power and Mandatory Hourly Pricing	November 18th, 2011	Irving Place - Edison Room
Standby Customer Forum: Customer Care for Energy Management web site	November 15th, 2011	Irving Place - Pine Room
Demand Response Stakeholders Meeting: Reactive Power and Customer Care for Energy Management web site	December 19th, 2011	Irving Place - Edison Room

4.2 Customer Demographics

Table 12 presents the distribution of respondents by location. Of the total 2,013 MHP customers, 88% have facility locations in New York City (specifically 62% in Manhattan) while the other 12% of facility locations are in Westchester County. All of the survey respondents, with the exception of customers with facilities in Westchester County (Zone I and H), are located in NYISO Zone J.

KEMA compared the survey population to the entire group of MHP customers that CECONY serves (Table 12). Of the 107 survey respondents, 89% have facility locations in New York City (with 59% in Manhattan) and the other 11% of facility locations are located in Westchester County.

Table 12: Facility Locations

Location	Total Surveyed	Percent of all Responses	Total MHP Customers	Percent of all MHP Customers
New York City	**94**	**89%**	**1788**	**88%**
Manhattan	63	59%	1257	62%
Bronx	8	8%	118	6%
Brooklyn	7	7%	184	9%
Queens	14	13%	189	9%
Staten Island	2	2%	40	2%
Westchester County	**13**	**11%**	**225**	**12%**
Total	**107**	**100%**	**2013**	**100%**

Table 13 shows the total MHP population, and the 107 survey respondents as classified by NAICS. The sample is relatively proportional to the population distribution for each of the NAICS categories. The largest group of customers in both the population and the survey sample are classified as code 53 - Real Estate, Rental and Leasing.

Table 13: Population by NAICS Classification[24]

NAICS Description Major Header 2 digit	Two digit NAICS code	Sample Count	% of Sample	Population Count	% of Population
No Code	00	9	8.4%	135	6.7%
Utilities	22	0	0.0%	4	0.2%
Construction	23	2	1.9%	63	3.1%
Manufacturing	31-33	6	5.6%	54	2.7%
Wholesale Trade	42	4	3.7%	45	2.2%
Retail Trade	44-45	10	9.3%	173	8.6%
Transportation/Warehousing	48-49	0	0.0%	22	1.1%
Information	51	6	5.6%	85	4.2%
Finance and Industry	52	7	6.5%	94	4.7%
Real Estate, Rental, Leasing	53	21	19.6%	558	27.7%
Professional, Scientific, and Technical Services	54	5	4.7%	96	4.8%
Management of Companies and Enterprises	55	0	0.0%	10	0.5%
Admin, Waste, Remediation Services	56	3	2.8%	57	2.8%
Educational Services	61	3	2.8%	65	3.2%
Health Care and Social Assistance	62	9	8.4%	134	6.7%
Arts, entertainment, and Recreation	71	2	1.9%	45	2.2%
Accommodation and Food Services	72	9	8.4%	88	4.4%
Other Services (except Public Administration)	81	3	2.8%	74	3.7%
Public Administration	92	0	0.0%	26	1.3%
Not Classified	99	8	7.5%	185	9.2%
Total		**107**	**100.0%**	**2,013**	**100.0%**

Respondents were provided a list of facility types by which to classify themselves, (see Table 14). The majority of respondents described themselves as commercial office buildings with residential housing facilities also among the larger groups of respondents. Several respondents indicated that their facility type was something other than those provided in the list.

KEMA compared the 107 survey respondents against the NAICS classification table. Among customer respondents, whether full service or retail access, the largest classification was code 53 - Real Estate, Rental and Leasing. Twenty-two respondents were identified as Residential Housing facilities.

[24] "No Code" means that no NIACS code was provided in the data, "Not Classified" is a NIACS code of 99, which means the building is either mix use with no use constituting 50% of the space or the building is unclassifiable.

Table 14: Sample Facility Type[25]

Group	Full Service (n=33)	Retail Access (n=72)	Overall (n=105)
Commercial Office Building	6.1%	33.3%	24.8%
Residential Housing	33.3%	15.3%	21.0%
Hospital/ Health Care	6.1%	13.9%	11.4%
Lodging/ Entertainment	12.1%	5.6%	7.6%
Manufacturing	9.1%	5.6%	6.7%
Other	12.1%	4.2%	6.7%
Warehouse/ Distribution	3.0%	5.6%	4.8%
Retail	0.0%	6.9%	4.8%
Data Center	6.1%	4.2%	4.8%
Education College/ University	6.1%	2.8%	3.8%
Power Generator	6.1%	0.0%	1.9%
Refused	0.0%	2.8%	1.9%

Other

- Commercial Real Estate
- Outpatient Center
- Multi-tenant office property
- Empty building
- Subway tunnel
- Tunnel construction project
- Three-shift transportation

4.3 Hourly Pricing Conditions

Table 15 shows the percent of customers that have someone at their facility who tracks hourly prices on a daily basis. Sixty eight percent of the survey respondents do not have a person responsible for tracking hourly prices. As a result there cannot be an expectation of price response from these customers.

[25] Q F5: What description best reflects your organization?

Table 15: Daily Monitoring of Hourly Pricing

Group	Yes	No
Tier I (n=10)	40%	60%
Tier II (n=8)	13%	88%
Tier III (n=16)	38%	63%
Non-Residential (n=26)	42%	58%
Residential (n=8)[26]	0%	100%
Overall (n=34)	**32%**	**68%**

A maximum response threshold price is valuable to identify, to determine whether the prices that the customers have experienced were significant enough to provoke a change in behavior. Table 16 shows the distribution of customers that indicate that they have established a maximum threshold price that would trigger a response. Only one respondent stated it had a maximum price threshold at which it would start to reduce energy. However, this customer would not disclose their threshold price. A review of this customer's energy usage shows that it did not demonstrate any load reduction based on the results of the price elasticity analysis and was classified as inelastic.

Table 16: Operational Maximum Price Target [27]

Group	Yes	No	Don't Know
Tier I (n=10)	10%	90%	0%
Tier II (n=8)	0%	100%	0%
Tier III (n=16)	0%	100%	0%
Overall (n=34)	**3%**	**97%**	**0%**

Table 17 shows MHP participants' opinion on the desirability of actively viewing day-ahead hourly pricing information. The information was analyzed by PRES code and tier class. Non-residential buildings with a monthly demand of >1,000 kW-1,500 kW, Tier II, are most likely to think it is desirable to view day ahead hourly pricing. Generally, about half of the non-residential customers, as opposed to only 13% of the residential customers, feel it is desirable to view day ahead hourly pricing.

[26] For the purposes of this report "Residential" refers to customers with primarily residential use.
[27] Q: A1. Do you have a maximum hourly price threshold that you target for reducing energy consumption?

Table 17: Desirability to View Day Ahead Hourly Pricing [28]

Group	Yes	No	Don't Know
Tier I (n=10)	40%	50%	10%
Tier II (n=8)	63%	38%	0%
Tier III (n=16)	31%	63%	6%
Non-Residential (n=26)	50%	42%	8%
Residential (n=8)	13%	88%	0%
Overall (n=34)	**41%**	**53%**	**6%**

MHP participants were asked if they had information about MHP necessary to develop a strategy to respond to hourly pricing signals (Table 18). All of the residential customers and 93% of the smallest MHP customers (Tier I) indicated that they did not have enough information to develop a strategy to respond to hourly pricing signals. The larger customers (Tier I & II) were more confident about their knowledge; nonetheless, half of them indicated they would need more information.

Table 18: Customer feels they have the Information necessary about Hourly Pricing [29]

Group	Yes	No	Don't Know
Tier I (n=10)	40%	40%	20%
Tier II (n=8)	50%	50%	0%
Tier III (n=16)	6%	94%	0%
Non-Residential (n=26)	35%	58%	8%
Residential (n=8)	0%	100%	0%
Overall (n=34)	**26%**	**68%**	**6%**

Table 19 shows that the majority of MHP participants did not know if they were fully informed and comfortable with the information received from CECONY regarding the MHP rate structure since the expansion occurred in 2009 and 2011.

[28] Q: V5. Do you feel it is helpful to be able to view hourly commodity prices a day in advance?
[29] Q: V6. Do you feel you have the necessary information to develop a strategy for responding to hourly pricing?

Table 19: Fully Informed about MHP[30]

Group	Yes	No	Don't Know
Tier I (n=10)	40%	20%	40%
Tier II (n=8)	38%	38%	25%
Tier III (n=16)	19%	13%	69%
Overall (n=34)	**29%**	**21%**	**50%**

Table 20 shows the how MHP customers received information regarding the MHP rate. Forty four percent of the customer indicated that they had not received any information. Within Tier class II, 50% said they received information directly from CECONY regarding MHP. Twelve percent said that they have received information from industry associations or consultants.

Table 20: Have Received Information about MHP[31]

Group	Have not received any information on MHP	CECONY	ESCO	NYSERDA	NYISO website	Industry association or consultant	Media or trade publication	Don't Know
Tier I (n=10)	20%	20%	0%	0%	0%	20%	0%	40%
Tier II (n=8)	25%	50%	0%	0%	0%	25%	0%	0%
Tier III (n=16)	69%	19%	6%	0%	0%	0%	0%	6%
Overall (n=34)	**44%**	**26%**	**3%**	**0%**	**0%**	**12%**	**0%**	**15%**

Table 21 shows the responses of the MHP participants when asked if their facility had the flexibility to shift operations in response to hourly pricing signals. Sixty eight percent of respondents, including 100% of the residential customers, responded, “No.”

[30] Q: V7. Did your organization take any steps to ensure that you were fully informed and comfortable with information you received from CECONY regarding the MHP program since the program began?
[31] Q: V6a. Have you received information about Mandatory Hourly Pricing from…?

Table 21: Shifting Operations in Response to Hourly Pricing [32]

Group	Yes	No
Tier I (n=10)	40%	60%
Tier II (n=8)	13%	88%
Tier III (n=16)	38%	63%
Non-Residential (n=26)	42%	58%
Residential (n=8)	0%	100%
Overall (n=34)	**32%**	**68%**

MHP participants were asked what actions, within the last 24 months, they had taken to implement strategies to offset change in their energy consumption pattern. Of the respondents, 26% stated they had had energy audits at their facilities, 17% had conducted technical assessments, and 17% had installed on-site or distributed generation. Seven percent used load management software, and 3% shifted electricity demand in the last 24 months as shown in Table 22.

Table 22: Active Implementation Strategies[33]

Activities	Reported Past Activities Total	Percent of All Respondents	Future Planned Activities Total	Percent of All Respondents
Management website (n=30)	0	0%	16	53%
Energy audit (n=31)	8	26%	6	19%
Participate in Con Ed energy efficiency program(s) (n=29)	0	0%	12	41%
Improve energy efficiency (n=31)	1	3%	10	32%
Switch to electricity supplier other than local utility (n=29)	1	3%	9	31%
Technical Assessment (n=30)	5	17%	4	13%
Install on-site or distributed generation (n=29)	5	17%	2	7%
Shift electricity demand (n=30)	1	3%	6	20%
Participate in NYISO load mgt programs (n=29)	1	3%	5	17%
Use load management software (n=30)	2	7%	3	10%

When respondents were asked about whether they might be planning to change their energy consumption pattern over the next 12 months, 53% expressed interest in reviewing the

[32] Q: V3. Does your facility have the flexibility to shift operations in response to hourly prices?

[33] Q: A8. In your response to the hourly electricity pricing program, I'm going to ask you about what actions you have already taken during the past 24 months, or anticipate taking during the next 12 months?

Customer Care for Energy Management website; 41% said they would consider participating in additional CECONY energy efficiency programs; while 31% said they would switch to an electricity supplier other than a utility. Only 20% said they would change their electric consumption pattern over the next 12 months.

Table 23 presents the responses from MHP participants when asked if their facility had strategies in place to reduce energy consumption during high price periods. Fifty percent of the 34 respondents replied that they could not reduce energy consumption.

Table 23: Energy Reduction Strategies during High Pricing Events[34]

Group	No, cannot reduce energy for high pricing periods	Utilize EMS controls for reducing energy	Reduce HVAC	Fuel Switching	Reduce Lighting	Reduce or Shift Processes	Other Strategy	Don't Know
Tier I (n=10)	70%	20%	0%	0%	0%	0%	10%	0%
Tier II (n=8)	50%	13%	0%	0%	0%	13%	13%	13%
Tier III (n=16)	38%	50%	0%	0%	6%	0%	0%	6%
Non-Residential (n=26)	58%	23%	0%	0%	0%	4%	8%	8%
Residential (n=8)	25%	63%	0%	0%	13%	0%	0%	0%
Overall (n=34)	**50%**	**32%**	**0%**	**0%**	**3%**	**3%**	**6%**	**6%**

Table 24 presents a cross reference between customers who reported having the capability to reduce load by utilizing at least one type of load reduction strategy and estimated energy use with and without MHP. The data analysis determined that there was little difference between the estimated energy use with and without MHP for each load reduction strategy. A look at this data reveals that all of the customers had a slight increase in energy use while on MHP.

[34] Q: A4. Are you able to reduce your energy usage (or consumption) for high pricing periods? If yes, what strategies are implemented?

Table 24: Self-Reported Load Reduction vs. Estimated Energy Use

Reported Reduction Strategy	Number of Customers	Average Modeled kWh		
		With MHP	Without MHP	Percent Difference in kWh
Reduce HVAC	1	1,275,138	1,271,219	-0.31%
Reduce Lighting	2	1,194,801	1,192,661	-0.18%
Reduce or Shift Processes	1	6,315,667	6,314,534	-0.02%
Utilize EMS	10	3,719,069	3,716,660	-0.06%
Utilize Generators	2	22,434,826	22,430,174	-0.02%
Total	**16**	**34,939,502**	**34,925,247**	**-0.04%**

Respondents were next asked to identify barriers, real or anticipated, in responding to hourly pricing. Table 25 shows that 22% of the MHP respondents have insufficient resources to pay attention to hourly pricing; while 31% "Don't Know" what barriers their facilities are encountering.

Table 25: Load Shift Barriers[35]

Group	Insufficient resources to pay attention to hourly prices	Inflexible labor schedule	Managing electricity use is not a priority in my organization	The cost of responding outweighs the savings	Negative previous experience with day-ahead hourly pricing	No barriers have been encountered	All of the above barriers mentioned	Other	Don't Know
Tier I (n=10)	20%	20%	10%	10%	0%	0%	0%	0%	40%
Tier II (n=8)	63%	0%	0%	13%	0%	0%	0%	25%	0%
Tier III (n=14)	0%	14%	14%	0%	0%	0%	14%	14%	43%
Overall (n=32)	**22%**	**13%**	**9%**	**6%**	**0%**	**0%**	**6%**	**13%**	**31%**

From the results of the survey, it can be concluded that "inflexible labor schedules" are a barrier to MHP success. Customers do not have the staff available to devote time to monitoring and reducing load. Load reductions at these facilities may have to be done manually by going to each piece of equipment and turning it off or adjusting it. For some facilities, these activities simply involve too much time to implement and reverse to achieve the cost benefit.

When MHP participants were asked how they thought hourly pricing has affected or will affect their businesses 59% responded "Not very much at all". Positive and negative comments were recorded verbatim and shown below Table 26.

[35] Q: A6. What barriers has your facility experienced in responding to hourly electricity supply prices?

Table 26: How Hourly Rate Structure has Affected Your Business[36]

Group	Positively	Not very much at all	Negatively	Don't Know
Tier I (n=10)	20%	60%	10%	10%
Tier II (n=8)	0%	75%	25%	0%
Tier III (n=14)	29%	50%	21%	0%
Overall (n=32)	**19%**	**59%**	**19%**	**3%**

Positive comments

- "Because I may be able to save some, play with my EMS that I can save during those [peak] hours and I think the results would be positive but like I said I need more information to go about this but I guess I have enough tools to make MHP much more affordable and reduce my consumption."
- "Since we moved over our bills have been lower."
- "Keeping track of history of usage and pricing of electricity. They haven't noticed huge jumps in the energy usage in comparison to pricing. Energy usage has been constant compared to cost."

Negative comments

- "It's the reason we're moving out of this location."
- "It doesn't make economical sense to run 2-3 shifts and through peak times we're considering cutting back on our labor force and delaying the operations."
- "Because we're running our machines, 24/7 we don't have other options like running at different times of the day."
- "Because electricity is a significant portion of our budget."

4.4 Education and Outreach

Information Sources

When MHP participants were asked how they received information regarding the MHP rate structure, (see Table 20), 44% indicated that they have not received any information.

Table 29 further demonstrates the lack of active engagement by MHP participants. Only 3% of participants reported that they had received and read the outreach material provided by CECONY, and another 3% reported that they actively used the CECONY rates website, www.coned.com/rates.

Respondents were asked a series of questions regarding the information that they received during the transition to MHP. Specifically, respondents were asked what type of information

[36] Q: S4. How do you think hourly pricing has affected or will affect your business?

was provided. These responses are presented in Table 27.

Table 27: Participated in Outreach and Education[37]

Group	Received and read customer letters, newsletters, emails	Attend customer forums	Visit the Con Ed rates site at Coned.com/rates	Sign up for the Customer Care for Energy Management website	Contact customer service	None of the above	Other	Don't Know
Tier I (n=10)	0%	0%	10%	0%	20%	60%	10%	0%
Tier II (n=8)	0%	0%	0%	0%	0%	63%	0%	38%
Tier III (n=16)	6%	0%	0%	0%	6%	81%	0%	6%
Overall (n=34)	**3%**	**0%**	**3%**	**0%**	**9%**	**71%**	**3%**	**12%**

Table 28 shows the responses of participants when asked whether they had attended seminars or workshops or spoken with a utility representative since becoming subject to the MHP rate structure. Six percent of the respondents said that they had attended a workshop.

Table 28: Engagement Customers in Seminars, Workshops, or with Utility Representatives [38]

Group	Yes, Seminar	Yes, Workshop	Yes, spoke with utility	None of the above	Other	Don't Know
Tier I (n=10)	0%	10%	10%	60%	20%	0%
Tier II (n=8)	0%	13%	0%	75%	13%	0%
Tier III (n=16)	0%	0%	0%	88%	13%	0%
Overall (n=34)	**0%**	**6%**	**3%**	**76%**	**15%**	**0%**

MHP customers were asked how CECONY could improve MHP (S6). They were also asked to provide specific improvements and recommendations on marketing, and outreach and education that would be helpful in managing their facility with respect to hourly pricing (S7). The response frequencies along with verbatim responses are provided below.

[37] Q: V7a. Did your organization…? [Read from the following topics listed in the table]
[38] Q: V8. Have you attended a seminar, workshop or speak with anyone from your utility since the change to mandatory hourly pricing?

Q: S6. What, if anything, could CECONY do to improve the MHP program?

- Provide more information. (n=6)
- Don't know enough about it. (n=5)
- Nothing. (n=5)
- Improve the website. (n=3)
- Explain it better. (n=3)
- Send a representative to us. (n=2)
- "Residential if it involves shutting things off, there is not much hope for residential. It's unfortunate but true."
- "This phone call."
- "I have more information, go to website, and check out bill, how much is my demand if I had that from Con Ed live I could come up with dollars and cents. I need more help from Con Ed. I may need some equipment installed at the meter to get this on my computer."
- "Reminding us of the rates, previous and include a forecast or projection on a monthly basis on the average expected as previous rates per kWh."

Q: S7. Are there any other specific improvements and recommendations you have on marketing, outreach and education that would be helpful in managing your facility with respect to hourly pricing?

- No. (n=6)
- Don't know enough about it (n=4)
- "Email is good because they did respond to the messages on curtailment or a fax."
- "Educate our staff; reach out to us when we're enrolled in the program."
- "Mailing would be most effective with this company, calls tend not to get answered."
- "Getting information is a start."
- "Tell us that you have programs."
- "The original letter we received was confusing; it didn't tell you how to use it or to go to the website every day. I have never looked at since I originally created a user ID. The program is not user friendly and doesn't tell us how this program helps. The jargon and terms are not in laymen's language. Furthermore it doesn't tell us what our magic number [targeted to reduce consumption] should be. We never felt this program was beneficial to us. The times they offered the seminars were not convenient."
- "I think it has to take into consideration the possibility are in res applications as opposed to commercial and how to reach the tenants and how to really implement a change of behaviors."
- "I need more help."

Table 29 to Table 33 all refer to the Customer Care for Energy Management Website, which went live in 2011 replacing the Demand Monitoring Software (DMS). Table 29 shows that only 18% of MHP participants use the website, with the largest user base being Tier I customers--non-residential customers and customers that were determined to have some price elasticity.

Table 29: Active Use of the Customer Care for Energy Management Website[39]

Group	Yes	No	Don't Know
Tier I (n=10)	30%	70%	0%
Tier II (n=8)	25%	75%	0%
Tier III (n=16)	6%	88%	6%
Non-Residential (n=26)	23%	73%	4%
Residential (n=8)	0%	100%	0%
Elastic (n=3)	67%	33%	0%
Non-Elastic (n=28)	11%	86%	4%
Not Enough Data to Determine (n=3)	33%	67%	0%
Overall (n=34)	**18%**	**79%**	**3%**

Table 30 provides the user history reported from the survey participants, which shows that no one uses the tool on a daily basis. A third of the website users reported using it on a weekly basis or less than once a month.

Table 30: Usage Frequency of the Customer Care for Energy Management Website[40]

Group	Daily	Weekly	Monthly	Less than once a month	Other	Don't Know
Tier I (n=3)	0%	67%	0%	33%	0%	0%
Tier II (n=2)	0%	0%	50%	50%	0%	0%
Tier III (n=1)	0%	0%	0%	0%	100%	0%
Overall (n=6)	**0%**	**33%**	**17%**	**33%**	**17%**	**0%**

Table 31 provides the customer care website usefulness ratings, which indicate that half of the users find the website useful. Note that the single Tier 3 user who found the website useful indicated that they visited the website about twice a week during the summer months, and this response was recorded as “Other” in the table above.

[39] Q: A7. Have you used the Customer Care for Energy Management online tool at www.coned.com/customercare ?

[40] Q: A7a. If yes, how often do you use it?

Table 31: Is the Customer Care Website Useful[41]

Group	Yes	No	Don't Know
Tier I (n=3)	33%	33%	33%
Tier II (n=2)	50%	50%	0%
Tier III (n=1)	100%	0%	0%
Elastic (n=2)	0%	50%	50%
Non-Elastic (n=3)	100%	0%	0%
Not Enough Data to Determine (n=1)	0%	100%	0%
Overall (n=6)	**50%**	**33%**	**17%**

Which features do you use?

- Interval data (n=3)
- Energy analysis, load trending, and usage variance
- Hourly profiles
- "Just what the day-ahead pricing is and the trending they have available and what the prices are in the zone we are in."
- Our demand

Table 32 provides the responses of all MHP customers regarding their awareness of the Customer Care for Energy Management Website capabilities to send automated alerts to end users. While 35% were aware of this capability, only 3% had actually established alerts. An additional 24% of respondents were unaware of the functionality but were interested and would consider signing up for an alert notification.

[41] Q: A7b. Do you find the tools useful?

Table 32: Awareness of Automated Alerts[42]

Group	Yes, and I have alerts established	Yes, but I have not yet established alerts	No, I did not know that functionality was available, but I am not interested	No, I did not know that functionality was available, but I am interested in using it	Don't Know
Full Service (n=34)	3%	32%	24%	35%	6%
Tier I (n=10)	0%	30%	40%	20%	10%
Tier II (n=8)	13%	0%	25%	63%	0%
Tier III (n=16)	0%	50%	13%	31%	6%
Non-Residential (n=26)	4%	23%	31%	35%	8%
Residential (n=8)	0%	63%	0%	38%	0%
Elastic (n=3)	0%	0%	67%	33%	0%
Non-Elastic (n=28)	4%	39%	14%	39%	4%
Not Enough Data to Determine (n=3)	0%	0%	67%	0%	33%
Overall (n=34)	**3%**	**32%**	**24%**	**35%**	**6%**

When asked if they would continue to use the Customer Care website, two thirds of the users, including the entire Tier I customers, indicated that they would (Table 33).

Table 33: Will Continue to Use Customer Care Website[43]

Group	Yes	No
Tier I (n=3)	100%	0%
Tier II (n=2)	50%	50%
Tier III (n=1)	0%	100%
Overall (n=6)	**67%**	**33%**

4.5 Summary of Process Findings

The customer survey findings indicate that CECONY full service customers are not actively engaged in monitoring energy prices or implementing strategies to reduce energy usage in response to price. Although about a third (32%) of full service customers indicated that they

[42] Q: A5. Did you know that the Customer Care for Energy Management website can send you automated email alerts if your demand or next day's price per kWh are above or below your customized threshold?

[43] Q: A7e. Will you continue to use it in the future?

had someone at their facility that monitored price on a daily basis (Table 15), only 3%, (one respondent) indicated that they had established a maximum energy price threshold for starting to reduce load. Half (50%) of full service customers indicated that they had no ability to reduce load, and another 6% indicated that they did not know if they could reduce load.

Most customers that remained on MHP, (78%) indicated that MHP had a positive or little affect on their business and (44%) were either unaware that they were on the rate. When asked why they had not switched to an alternate energy supplier (ESCO), about a third (32%) indicated that they did not know, another 32% either had a mistrust of ESCOs or did not like the prices offered, and another 25% indicated that they had a lack of viable options.

Although the survey and the quantitative analysis evaluation has focused on hourly pricing and price responsiveness, it is important to keep in mind that MHP is a *default* rate. These customers are not actively selecting to be on MHP so that they can access hourly pricing. Instead, they are being required to have their energy priced hourly or seek an alternative supplier. When viewed in this context, it is not unexpected that customers are not actively seeking to reduce energy usage or even become fully informed or engaged about how they can participate in the hourly pricing component of the program.

5. Major Findings and Recommendations

This section presents the major findings and recommendations associated with the impact and Process evaluations of this report.

5.1 Impact Analysis

The price elasticity analysis determined that MHP had minimal impact on customer energy usage. The models used to compare the usage of customers on the MHP rate to the customers on an alternative rate resulted in a difference in average energy usage under the MHP rate of less than 0.2% (increase) of the total kWh.

The cost comparison revealed that the energy charge of the average participant's bill was approximately 0.7% higher than what would have been paid if they were not on hourly pricing and were paying alternative rates for energy. Considering the minimal impact on energy use, it could be determined that the differences between MHP prices and the alternate rates may not be substantial enough to influence participants to change their energy usage and demand patterns.

An investigation of prices indicated that the prices that participants experienced were in a very narrow range. This range was not significantly different than the rates the participants would have paid had they not been on the MHP rate structure.

The interval load data analysis of off-peak energy use for full service and retail access customers indicated that both groups experienced a minimal increase in off-peak energy usage. Because both groups exhibited similar behavior, an inference can be drawn that overall, customers are not exhibiting behavioral changes in reaction to the MHP rate.

The interval data analysis conducted as part of this evaluation differed from the previous MHP evaluation because this analysis reviewed the available data for all customers that were eligible for MHP including retail access customers that are not subject to the MHP rate. Comparison of both groups was performed for three metrics: (1) total energy usage, (2) percentage of off-peak usage and (3) load factor. The results of the analysis indicated that on an absolute basis MHP had virtually no effect on the performance of the full service customers for any of the metrics. Additionally a comparison of the two group's performance metrics demonstrated similar impacts over times, which are indicative of no impact of MHP on the full service customers.

5.2 Process Evaluation

KEMA used the results of the MHP customer survey to analyze the issues and impacts on both

the current full-service MHP customers, retail access customers who would have been subject to MHP but take service from an ESCO, and a potential Tier IV group of customers. The MHP customer survey responses were broken out by customer segment to determine which customers may require additional training or support. The survey results were next analyzed to determine which groups of customers are likely to reduce load during high pricing periods, install or increase distributed generation, increase energy efficiency, or adapt other behavioral changes.

Current Education and Outreach

Generally, customers were not actively engaged in acquiring information about MHP. During the transition period only 15% of customers acknowledged that they received and read CECONY customer letters, (3%) reviewed newsletters or e-mails, (3%) visited Con Ed rates site, or (9%) contacted customer service. Since entering the MHP rate structure, 76% of the customers have still taken no action.

Operational Adjustments

According to the survey responses to R.4, which asked whether the respondent or another managed the customer's energy use, three stated that their facility's energy is managed by an energy consultant (Q. 7). Most other customers who responded to this question stated that they manage their energy in-house.

Half of the full service customers indicated that they could not reduce energy during high price events, with another 6% indicating that they were not sure what they could do. Of the 46% that stated that they could reduce energy during high price events, 32% indicated that they could utilize EMS controls to reduce energy usage. Other possible energy reduction strategies included reducing lighting, reducing or shifting processes, utilizing generators and reducing HVAC usage.

As presented in Table 24 of section 4.3, the customers who reported the capability to reduce energy use demonstrated no significant reduction in their estimated energy use with and without MHP. Actually, the analysis showed that customers *all* evidenced a slight increase in energy consumption when modeled on the MHP rate.

Barriers to Reducing Load

There were three primary barriers to reducing load cited by respondents to A.6: 1) insufficient resources to monitor hourly prices; 2) inflexible labor schedule; and 3) managing electricity use is not a priority in my organization.

A number of respondents cited that the cost associated with responding outweighs the savings. None of the respondents indicated that there were any barriers, or that they had a negative previous experience with day ahead hourly pricing. The single most common barrier cited was that customers do not know what the barriers are. This indicates that the customers do not consider electricity price as a high priority.

5.3 ESCO Customer Survey Results

In addition to surveying current MHP customers, KEMA also conducted surveys with ex-MHP customers, including a group who currently receive their electricity supply through an ESCO. The ESCO customer survey instrument is provided in Appendix B of this report.

KEMA surveyed a total of 65 ESCO customers for this evaluation. These customers include 25 commercial office buildings, eight housing complexes, six retail facilities, four healthcare facilities, six hotels, three manufacturing facilities, and two educational facilities. Similar to the MHP customer survey, a majority of the ESCO customers, approximately 85%, are located in Manhattan.

The main purpose of this survey was to collect information regarding each customer's decision to switch to an ESCO. Therefore, the ESCO survey began by asking a series of questions related to this decision. The ESCO customers were asked about the timing of their switch. Half of the respondents indicated that they were already with an ESCO at the time they became eligible for MHP. Of the 12 customers that responded and made the choice, two thirds switched to an ESCO immediately and one third (four of 12) remained on MHP for a test period.

ESCO customers were then asked why they switched to an alternative energy supplier. Just over two thirds (68%) indicated that they were either already with an ESCO or were unresponsive to the question. The majority of the remaining respondents (25%) stated that they expected their utility charges to increase if they purchased supply under the MHP program. According to these customers, the volatility of an hourly pricing rate structure would make it difficult to budget for their electricity costs.

5.3.1 Implications for MHP Expansion

There are 1,406 additional customers with demand >300 kW to 500 kW. These are the most likely customers that would be included if the MHP rate structure is expanded. Approximately 1,016 (72%) are already retail access customers. Accordingly, if this customer group were required to take MHP service after the interval meters are installed, at most 390 customers (28%) would be served under the MHP rate. Past experience shows that a portion of these customers would also migrate to retail access,

An analysis of this potential new expansion customer group was performed. The objective of this analysis was to determine what effect this rate structure will have on their costs. The analysis was based on twelve months of historical billing data. The billing data was used to estimate what each customer would have paid over the same span, had they been on the MHP rate structure.

The analysis applied the results of the price elasticity analysis of current Tier III (>500 kw-1,000 kW) MHP customers. The effects on energy and costs determined from the price elasticity analysis were segmented by NAICS code and applied to the billing information of the target expansion group.

This type of billing analysis provides an estimate of what the average customer, segmented by NAICS code, would have paid over the previous twelve months, had they been on the MHP rate structure.

5.4 Recommendations

At the time of the initial implementation of MHP, only customers with monthly peak demand of greater than 1,500 kW were included, because these larger customers were believed to be the best equipped to respond to hourly pricing. The vision was that by exposing these large customers to more accurate price signals, peak usage would be reduced, and result in lower average electrical usage. However, the initial evaluation of MHP in 2009 indicated that MHP had no effect on the energy usage patterns of those MHP participants.

The current evaluation includes these larger customers as well as customers with monthly peak demand >500 kW to 1,500 kW. As identified in this evaluation, MHP has had no effect on the energy usage patterns of any of the customer groups that have been exposed to hourly pricing either as CECONY full service customers or retail access customers. This was the first time the quantitative analysis was conducted on the retail access customers that were eligible for the MHP rate.

Given that MHP has failed to demonstrate any effectiveness at reducing peak load with the larger customers in the Con Ed service territory that are the best equipped to reduce load, it would not be reasonable to recommend further expansion to lower demand customers.

6. Statistical Methods Selection and Support

6.1 Impact Analysis of Current MHP Customers

At the start of this evaluation, KEMA requested all available interval load data for the period 2004 through 2011, for the entire set of full service customers that currently reside on MHP and customers that qualify for MHP, but have migrated to retail access. This included data for all customers included in the analysis from the period before the customers were placed on MHP, as well as data from the period of being on or eligible for MHP.[44] Data cleaning was conducted on all of the load data as was necessary to develop the analysis (i.e. missing data, checked against billing data, and checked for spikes or other anomalies).

6.1.1 Price Elasticity Analysis

One of the objectives of the evaluation was to determine the impact of hourly pricing on current MHP customers' on-peak, off-peak, and annual energy usage, and system coincident peak. To measure how customers react to changes in prices, the elasticity of demand was estimated. Price elasticity is the ratio of the percent change in one variable to the percent change in another variable[45].

One approach to determining elasticity is using a "Cobb Douglas" production function. Accordingly, for this analysis, the cost function of the Cobb-Douglas production function was used. The model generally takes the form:

$$LogD=\beta_0+ \beta_1 logP+\beta_2 logW+ \Sigma\beta_i logX$$

Where:

D = Demand
P = Price
W = Weather
X = Other structural variables influencing demand[46]
β = Estimated parameters.

This model shows that demand 'D' can be predicted by price, weather and other variables. The model is a "double log" model. The double-log model was chosen because the interpretation of

[44] The length of the pre and post varied by customer size and was dependent on the timing of installation of the interval meter and the start date of the MHP tariff.
[45] An alternative approach to this data analysis was considered but not chosen because elasticity is the most widely used concept in economic modeling to describe the demand for goods (in this case electricity) as a function of income and prices. The elasticity method was chosen because of its focus on price. A description of the alternative method is provided in Appendix C.
[46] There were no other structural variables available for the analysis.

the results is straightforward and the model tends to be the model of choice for industry practitioners.

The benefit of the double log form is that the coefficients can easily be translated into elasticity. In the model shown above, the coefficient for price ("β1") can be interpreted as the "price elasticity" of demand. This means for each incremental change in price, demand will change by the coefficient ("β1").

Table 17 shows the range of elasticity values. When the elasticity is zero, price has no influence on demand. When the coefficient of elasticity, β1, is negative[47], demand will decrease as price increases and the customer is deemed to be price responsive or have positive price elasticity.

Table 34: Interpretation of Elasticity

n = 0	Perfectly inelastic.
0 > n > -1	Relatively inelastic.
n = -1	Unit (or unitary) elastic.
-1 > n > -∞	Relatively elastic.
n = -∞	Perfectly elastic.

For this analysis, historical hourly interval load data and the historical hourly prices were available. For the analysis, the general model form was:

$$\text{Log } D_{i,t} = \beta_0 + \beta_1 \log P_t + \beta_2 \log DD$$

Where:

$D_{i,t}$ = The demand of customer i during time period t

P_t = The zonal hourly price of electricity during time period t

DD = Hourly degree hours, based on 65F

This model predicts the demand as a function of temperatures and prices. The model yields the impact of changing prices, while controlling for temperature effects. In this model, the coefficient β1 is the estimated price elasticity. Process loads or base loads such as lighting and plug loads are implicit in the model. These are the expected loads at a particular hour that are then adjusted by the price and temperature components of the model.

[47] Economists often refer to price-elasticity of demand as a positive value although the actual value is generally negative due to the negative relationship between price and quantity demanded.

The analysis was performed in several steps:

1. The data needed for the analysis was gathered and inspected. This data included: hourly load data for each participant; hourly price data from the NYISO; and hourly temperature data for the period. Also, alternative rate data from the tariffs of customers not in the program were obtained.

2. An initial analysis was performed to determine the extent of the participant's price elasticity using only the hours around the typical coincident (system) peak . To perform this analysis, data was separated into two seasons. The seasons were based on the hourly temperature being above (i.e., summer) or below (i.e., winter) 65F. For each customer, for each season, an initial model was estimated.

3. Based on the results of the initial analysis, a more comprehensive analysis was performed. For this analysis, models were developed for each customer, for each hour and by weekday type. This was done for two reasons. First, one of the primary drivers of a customer's load is schedule. Accordingly, the price impact of the MHP rate structure may change by hour according to the schedule. Second, this method is not predicated on the notion that participant's elasticity is constant across schedule and loading. This means that a customer may have the ability to respond to price during some hours of the day and not at others. Their ability to reduce energy is not constant and may change by hour. For example, an office building might have the flexibility to reduce HVAC loads at 4 pm, but wouldn't consider reducing their HVAC loads during the early part of the day.

The first step in the analysis was to estimate hourly models for each participant for each season. Each model was examined to determine the models adequacy in predicting demand. Of particular interest were the values of the coefficients for the price variable. As discussed above, this coefficient is the estimated price elasticity for the specific customer, day of the week and hour.

Specifically, the coefficient of the price variable was examined for each customer for each season, day and hour. This analysis was used to determine if price had a significant influence on predicting demand. All hours that demonstrated elasticity had a coefficient for price, (the estimate of price elasticity) statistically different than zero and the coefficient had the correct sign. When the model produced an estimate of price elasticity with an inconsistent sign, (i.e., negative elasticity, or demand increases when price increase) the variable was assumed to be insignificant (i.e., zero[48]). Similarly when a test to determine if the elasticity was statistically different than zero failed (i.e., there was a significant probability that the elasticity is different than zero), price was assumed to have an insignificant influence on demand.

[48] A determination that the coefficient was insignificant indicated the customer is 'inelastic', or had no reaction to price changes during the analysis period, for the range of prices available for the analysis.

6.1.2 Interval Load Data Analysis

An interval load data analysis was conducted on a total of 1,750 customers (272 full service customers and 1,478 retail access customers) using actual hourly interval data. At the request of the NYSPSC, changes in off-peak load[49] and load factor[50] were calculated for each customer by calendar year.

KEMA also determined the coincident NYCA system peak for each year from 2008 to 2011. This value represents the demand for each customer at the time of the annual NYCA system peaks.

Average MHP customer load duration curves were also generated for each year from 2004 to 2011. These load duration curves were used to illustrate the differences in load from year to year including the two years prior to the start of the MHP rate structure and three years after the transition to hourly pricing.

6.2 Process Evaluation

The process evaluation consisted of surveys developed for both current MHP customers and retail access customers who have migrated to an ESCO.

6.2.1 Customer Survey

The customer survey was designed to examine the reactions of each customer towards the MHP rate structures. This includes the 272 customers who are currently on the MHP tariff. A second survey was designed for customers who have enrolled with an ESCO since the MHP rate structure began.

The core questions of the NYSPSC survey were combined with additional questions requested by CECONY and organized into a comprehensive survey document. KEMA worked closely with CECONY staff to create the two survey instruments. The primary objective was to produce a survey instrument of manageable length that was able to incorporate all of the NYSPSC core questions as well as the additional information desired by CECONY. Each survey instrument

[49] The off-peak load was calculated as the percent of annual energy use (kWh) that occurs during the off-peak period. The off-peak period was defined as all hours outside of the non-holiday weekday hours between 8 am and 10 pm.

[50] Load factor was defined as the annual energy usage (kWh) divided hours per year (typically 8,760) divided by the non-coincident peak demand.

underwent three revisions before they were considered final. The MHP and ESCO customer surveys that were utilized for this evaluation are provided in Appendix A and Appendix B, respectively.

Interview Logistics

The MHP customers were contacted prior to the survey by CECONY and told to expect a call from a CECONY sponsored consultant regarding an energy survey. CECONY provided KEMA with a list of current MHP customers including a contact name and phone number.

KEMA estimated that each interview would take approximately twenty minutes to complete. From experience, KEMA finds interviews lasting any longer tend to be more difficult to schedule and leads to less substantive answers at the end. The latter is a commonly recognized industry condition called "respondent fatigue", where interviewees begin to revert to simple, unconsidered answers in order to get through to the end. KEMA utilized a number of techniques, detailed in Appendix D, to avoid this phenomenon and increase participation.

Survey Results

A total of 34 full service customers and 73 retail access customer responses were collected as part of the survey effort. KEMA subsequently segregated and tabulated results by: MHP customers (full service); non-MHP customers (retail access); Tier I customers (1,500 kW or larger); Tier II customers (1,000 kW to 1,499 kW), and Tier III customers (500 kW to 999 kW). Additional cross tabulations were made on a number of survey questions of particular interest for the evaluation. This included cross referencing the customers who stated that they have or could reduce load with the results of the price elasticity analysis. The data was also segmented and analyzed based on residential and non-residential customers and by NAICS code.

Behavioral Impacts

KEMA utilized the results of the full service and retail access customer survey results to analyze the potential issues or impacts on both the current MHP and potential future MHP customers.

Several of the MHP customer survey responses were categorized by customer segment to assess the behavior of each segment and how that would translate to potential future MHP customers.

KEMA reviewed the survey questions related to the education and outreach provided to the current MHP and retail access customers above 500kW. This analysis provided more details about which customer segments are likely to have a sufficient level of understanding of hourly pricing and to determine which customers may require additional training or support.

KEMA analyzed the results of the survey questions regarding the operational adjustments made by current MHP customers in response to MHP. The topics investigated included which types of customers are utilizing energy consultants to assist them in managing their energy, which types are shifting demand in response to hourly pricing and how many customers have installed on-site generation or improved their energy efficiency.

The survey results were also studied to determine which groups of customers are most likely to face barriers when it comes to reducing load during high pricing periods. KEMA investigated the most common barriers to reducing load and the reasons for them.

6.2.2 Analysis of the Expansion of the MHP Program

Currently, customers with demand of 500 kW or larger are enrolled in the MHP rate structure. There are 1,406 customers who have demands of 300 to 500 kW that are being considered for the MHP rate structure expansion in the future. According to CECONY, approximately 1,016 of these customers (72%) are already taking service from an ESCO.

One of the objectives of this evaluation is to assist CECONY in assessing the impact of the expansion of the program as well as how to most effectively manage the transition of the remaining full-service customers who will may go onto the MHP rate structure in the future.

Billing Analysis

KEMA performed an analysis on each of the 390 additional full service customers and 1,009 retail access customers to determine what effect this rate structure would have on them. CECONY provided KEMA with the complete list of the >300 to 500 kW customers including the NAICS codes. The previous twelve months of billing data were supplied and used to estimate what each customer would have paid over the previous year, had they been on the MHP rate structure.

The billing analysis was conducted by utilizing the results from the price elasticity analysis of the smallest MHP customers (>500 kW to 1,000 kW) and by full service and retail access customer type. The effects on energy and costs determined from the price elasticity analysis were segmented by NAICS code and applied to the billing information for the potential future MHP customers.

This type of billing analysis provides us with a summary of what the effect would be if these customers were served under MHP. Specifically, it provides an estimate of what the average full service customer or average retail access customer, segmented by NAICS code, would have paid over the previous twelve months, had they been on the MHP rate structure. A

summary of the results of this analysis were discussed in Section 5-4, and detailed results segmented by NAICS code are presented in Table 43 and Table 44 in Appendix E.

A. Appendix A – Customer Survey Notification Letter