Case 13-E-0030, 13-G-0031, 13-S-0032

Index to Liu's Exhibits

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-1
Date of Response: 01/29/2013
Responding Witness:

Question No. :E-078
Sales and Peak Load Forecast - Provide actual and weather normalized annual electric sales and system peak load for the past five years. Provide an explanation of the weather normalization procedure utilized by the company.

Response:

Actual and weather normalized annual electric sales for the past five years are provided in the following attached file:

DPS-1-E078 Delivery Volumes Actual and Weather Adjusted - 5 years.xls

For electric sales, the percentage change in sales due to weather is calculated by applying the estimated coefficients of the cooling degree days (CDD) and heating degree days (HDD) variables included in the sales forecasting models to the variation of CDD from its normal and the variation of HDD from its normal respectively.

Actual and weather normalized annual system peak load for the past five years are as follows:

Year	Peak Date	Time	TV (°F)	Actual Peak (MW)	Weather Adjusted Peak (MW)
2008	06/10/2008	17:00	85.1	12,987	13,700
2009	08/21/2009	15:00	82.8	12,242	13,575
2010	07/06/2010	17:00	86.7	12,963	13,150
2011	07/22/2011	16:00	88.7	13,275	13,100
2012	07/18/2012	13:00	86.2	12,836	13,100

The Company's weather normalization procedure for system peak load is as follows:

After collecting the daily system peak demand and the daily maximum temperature variable[1] from May to August, the Company will remove weekend and holiday data. The Company will then rebuild the peak demand for specific days during which SCR/DSM/DR[2] programs were called based on initial estimates of reduced load. The temperature variable on these days will not be revised.

Following, the Company will solve using the best fit regression model for the temperature variable and corresponding peak demand in order to normalize for weather. Different test statistics will be used to validate the results. The final model chosen will be submitted and reviewed with the NYISO to ensure consistency with NYISO guidelines.

Footnotes:

1. Summer Temperature Variable (TV):

DB= The average of the highest dry bulb for three consecutive hours from 9 AM to 9 PM. WB= The average of the highest wet bulb for three consecutive hours from 9 AM to 9 PM.
ADW= The average of the day's DB and WB

*T V= Current Day ADW * 0.7 + Prior day ADW * 0.2 + Second-Prior Day ADW * 0.1*

2. SCR/DSM/DR= Special Case Resources/ Demand Side Management/ Demand Reduction

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-XXXX
DPS-1-E078

2013 RATE CASE DELIVERY VOLUMES - -GWHs

	Actual	Weather Adjusted
2008	58,323	58,524
2009	56,667	57,498
2010	58,693	57,461
2011	57,826	57,030
2012	57,201	57,188

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-1
Date of Response: 01/29/2013
Responding Witness:

Question No. :E-079
Sales and Peak Load Forecast - Provide a description of the methodology for the peak load forecast, including assumptions and model design.

Response:

See the following files that were provided in response to DPS-1-E077:

DPS-1-E077 CECONY Top-Down Commercial Sector Forecasting Manual DPS.doc
DPS-1-E077 CECONY Top-Down Residential Sector Forecasting Manual DPS.doc
DPS-1-E077 Economic Forecasting Manual DPS.doc

CECONY Top-Down Commercial Sector Forecasting Manual

Prepared by:

Demand Forecasting Section

Consolidated Edison
4 Irving Place
New York, New York 10003-3598

July 2012

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Overview

The Demand Forecasting section of the Resource Planning department in the Energy Management organization prepares long-term electric peak demand forecasts. The Peak Demand Forecast is an annual forecast of peak demand growth issued at the end of the summer for 10 years following (For Integrated Long Range Plans – 20 years). It is presented as the Service Area Peak Demand Forecast and as the Network Area Peak Demand Forecast (*See Network Area Forecast Manual*). It is the combination of the summer peak demand growth most recently experienced and the growth expected to be realized over a 10 year period from known projects, the economy, and consumer behavior (i.e. energy efficiency efforts).

The commercial sector top-down approach that is part of the summer analysis is one of several components analyzed to determine the level of demand growth achieved from the prior summer. The other two components are the residential and governmental sectors. To determine the future growth, the top-down commercial forecasting process is used in conjunction with the bottom-up approach to allocate demand growth based on an econometric commercial energy model and new construction projects. Using both methodologies allows for growth to be determined from two perspectives, with both playing an equally important role in the forecasting process.

The commercial top-down approach utilizes an econometric model developed by the Revenue & Volume Forecasting (RVF) section in the Accounting Department for the Consolidated Edison Company of New York, Inc. (CECONY) commercial customers to determine the demand within the commercial sector primarily. Certain economic variables utilized in the econometric model are developed by Moody's Analytics and Demand Forecasting, and certain Company-specific variables originate in RVF, such as number of commercial customers by service classification.

The commercial forecasting process involves the following steps:

1. Supply economic forecasts to Accounting;
2. Receive econometric model results from Accounting;
3. Convert commercial volumes to commercial sendout; and
4. Derive the Incremental Commercial Demand Growth from the sendout growth using a Load Factor Analysis

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Step 1: Supply Economic Forecasts to Accounting

In order for the commercial volumes model to be completed, Demand Forecasting must develop and send the long-term annual (30-year) forecasts for CECONY service area Private Non-Manufacturing Employment (PNME) and U.S. Gross Domestic Product (GDP) to the RVF section. PNME includes all employment except government and manufacturing. GDP is the broadest measure of the economy's health. A sample of the GDP and PNME forecasts are depicted in Figure 1.

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Step 2: Receive Econometric Model Results from Accounting

When the commercial volumes econometric model is completed, RVF sends the output of the model to Demand Forecasting. The output Demand Forecasting needs from this model is the total commercial volumes forecast, which is an energy model. A sample of the output from the model is shown in Figure 2, with the information used for the commercial demand forecast highlighted in yellow. This result needs to be converted to peak demand so it can be used to determine the incremental MW growth over the long-term forecast horizon.

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Step 3: Convert Econometric Model Results to Sendout

The first step to beginning the conversion is to convert the commercial sales forecast obtained in Step 2 to a sendout forecast. Commercial sendout is needed since load factor involves sendout and demand.

To begin the process of the conversion, you need the percentage to be used as the ratio of commercial sales to sendout. To calculate this, the historical adjusted volumes and sendout information is needed and can be obtained from RVF. This spreadsheet is internally refered to as the "Box Score". The 2011 Box Score is in Figure 3.

Calculate the relationship between the adjusted volumes and sendout in order to utilize the percentage relationship needed to convert the commercial volumes into commercial sendout. The numbers highlighted in blue are the end of the year numbers used to calculate the percent ratio. The final result of this calculation is seen in highlighted in yellow. The ratio is used to convert commercial volumes into commercial sendout. The ratio can sometimes be calculated by using the prior year's relationship, or an average of several years. The determining factor on how many year's worth of data to use could be if the ratio changes by a large amount from one year to next, causing the need for a smoothing effect so the forecast does not jump up or down one year and then potentially move back the next year. Some consistency is required to ensure some fluidity to the growth in commercial sendout, which directly impacts commercial demand growth.

The formula to calculate sendout is:

Commercial Sendout = (Commercial Sales) / Ratio of Sales to Sendout)

The final worksheet that tabulates the commercial sendout using the ratio is shown in Figure 4.

(one after box score)

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Step 4: Convert Sendout to Peak Demand

System Forecast Analysis

Commercial Peak Load Forecast

2008-2017

08-27-07

Growth smoothed over ten years - used in forecast

(Commercial Peak)

	Year	2006 Commercial Peak	Difference		2006 Commercial Sendout	Load Factor			% Growth	LF Growth
Historical	2006	6,580			31,367	54.4%		2006 - BASE YEAR		
	2007	6,710	130		32,447	55.0%	Still an estimate - 2007 not over as of time of this forecast.		2.0%	0.63%
5-Year Forecast	2008	6,807	97	95	32,977	55.1%	LY (Leap Year)		1.4%	0.10%
	2009	6,908	100	90	33,491	55.3%			1.5%	0.20%
	2010	6,977	69	90	33,859	55.4%			1.0%	0.05%
	2011	7,083	106	85	34,561	55.7%			1.5%	0.30%
	2012	7,155	71	85	35,162	55.9%	LY (Leap Year)		1.0%	0.25%
Long-Term Forecast	2013	7,239	84	85	35,733	56.3%		0.2%	1.2%	0.40%
	2014	7,323	84	85	36,373	56.7%		Avg. LF growth 2008-2012	1.2%	0.35%
	2015	7,411	88	85	37,038	57.0%			1.2%	0.35%
	2016	7,483	72	85	37,697	57.3%	LY (Leap Year)		1.0%	0.30%
	2017	7,586	103	85	38,342	57.7%			1.4%	0.35%

10-Year	MW growth 2008-2017 =	88	CAGR Commercial Peak (2007-2017): 1.2% (10-Year)	Average Growth of Commercial Peak:	1.3%	2005-2015
5-Year	MW growth 2008-2012 =	89	CAGR Commercial Peak (2005-2010): 1.3% (5-Year)	Average Growth of Commercial Peak:	1.3%	2005-2010
2nd 5-Year	MW growth 2012-2017 =	86	CAGR Commercial Peak (2010-2015): 1.1% (5-Year)	Average Growth of Commercial Peak:	1.2%	2010-2015
20-Year	MW growth 2008-2028 =	Not updated	CAGR Commercial Peak (2005-2010): 1.1% (20-Year)	Average Growth of Commercial Peak:	1.2%	2005-2025

Average MW growth 2015-2025 =	91
Average MW growth 2025-2035 =	98

Notes:

2006 and 2007 Commercial Sendout numbers from column F in the tab called Sales-Sendout Forecast 2007 - derived from Accounting's (Charles Akabay) commercial volumes long-term forecast

2006 base year load factor established from actual sendout.

	Actual	Rounded
Sum 2008-2012 Growth	444	445
Sum 2013-2017 Growth	431	425
Total Growth	876	870

Figure 1.

	Private Non-manufacturing Employment						Private Non-manufacturing Employment			
	NYC	West.	Service Area	U.S. GDP (bill. $2000)			NYC	West.	Service Area	U.S. GDP
				ACTUAL						
1990	2,691.4	312.3	3,003.7	7,112.5		**1990**				
1991	2,542.7	297.6	2,840.3	7,100.5		**1991**	-5.5%	-4.7%	-5.4%	-0.2%
1992	2,470.6	288.3	2,758.9	7,336.6		**1992**	-2.8%	-3.1%	-2.9%	3.3%
1993	2,483.0	286.2	2,769.3	7,532.7		**1993**	0.5%	-0.7%	0.4%	2.7%
1994	2,530.9	288.4	2,819.3	7,835.5		**1994**	1.9%	0.7%	1.8%	4.0%
1995	2,570.1	293.0	2,863.1	8,031.7		**1995**	1.5%	1.6%	1.6%	2.5%
1996	2,621.7	298.3	2,920.0	8,328.9		**1996**	2.0%	1.8%	2.0%	3.7%
1997	2,688.2	304.6	2,992.8	8,703.5		**1997**	2.5%	2.1%	2.5%	4.5%
1998	2,770.6	310.9	3,081.5	9,066.9		**1998**	3.1%	2.1%	3.0%	4.2%
1999	2,865.0	320.5	3,185.6	9,470.3		**1999**	3.4%	3.1%	3.4%	4.4%
2000	2,972.0	328.7	3,300.7	9,817.0		**2000**	3.7%	2.6%	3.6%	3.7%
2001	2,971.2	330.9	3,302.0	9,890.7		**2001**	0.0%	0.6%	0.0%	0.8%
2002	2,875.5	327.3	3,202.8	10,048.8		**2002**	-3.2%	-1.1%	-3.0%	1.6%
2003	2,848.0	328.4	3,176.4	10,301.0		**2003**	-1.0%	0.3%	-0.8%	2.5%
2004	2,874.1	332.5	3,206.6	10,675.8		**2004**	0.9%	1.3%	1.0%	3.6%
2005	2,932.7	334.7	3,267.4	11,003.4		**2005**	2.0%	0.6%	1.9%	3.1%
2006	3,002.5	341.1	3,343.6	11,319.4		**2006**	2.4%	1.9%	2.3%	2.9%
				FORECAST						
2007	3,058.4	346.7	3,405.2	11,545.8		**2007**	1.9%	1.7%	1.8%	2.0%
2008	3,084.8	349.3	3,434.1	11,869.1		**2008**	0.9%	0.7%	0.8%	2.8%
2009	3,109.0	351.5	3,460.5	12,225.1		**2009**	0.8%	0.6%	0.8%	3.0%
2010	3,142.9	354.5	3,497.4	12,579.7		**2010**	1.1%	0.8%	1.1%	2.9%
2011	3,180.3	358.0	3,538.3	12,957.1		**2011**	1.2%	1.0%	1.2%	3.0%
2012	3,214.8	361.2	3,575.9	13,345.8		**2012**	1.1%	0.9%	1.1%	3.0%
2013	3,246.2	364.1	3,610.3	13,732.8		**2013**	1.0%	0.8%	1.0%	2.9%
2014	3,277.8	367.0	3,644.8	14,131.1		**2014**	1.0%	0.8%	1.0%	2.9%
2015	3,307.8	369.7	3,677.4	14,540.9		**2015**	0.9%	0.7%	0.9%	2.9%
2016	3,335.1	372.0	3,707.1	14,962.5		**2016**	0.8%	0.6%	0.8%	2.9%
2017	3,364.1	374.6	3,738.7	15,396.5		**2017**	0.9%	0.7%	0.9%	2.9%
2018	3,392.5	377.1	3,769.6	15,842.9		**2018**	0.8%	0.7%	0.8%	2.9%
2019	3,419.7	379.5	3,799.2	16,302.4		**2019**	0.8%	0.6%	0.8%	2.9%
2020	3,447.5	382.0	3,829.5	16,775.2		**2020**	0.8%	0.7%	0.8%	2.9%
2021	3,474.1	384.3	3,858.3	17,261.6		**2021**	0.8%	0.6%	0.8%	2.9%
2022	3,496.5	386.0	3,882.5	17,762.2		**2022**	0.6%	0.4%	0.6%	2.9%
2023	3,518.3	387.6	3,906.0	18,277.3		**2023**	0.6%	0.4%	0.6%	2.9%
2024	3,538.9	389.1	3,927.9	18,807.4		**2024**	0.6%	0.4%	0.6%	2.9%
2025	3,559.3	390.5	3,949.8	19,352.8		**2025**	0.6%	0.4%	0.6%	2.9%
2026	3,579.2	391.9	3,971.1	19,914.0		**2026**	0.6%	0.4%	0.5%	2.9%
2027	3,596.0	392.9	3,988.9	20,491.5		**2027**	0.5%	0.3%	0.4%	2.9%
2028	3,612.5	393.9	4,006.4	21,085.8		**2028**	0.5%	0.3%	0.4%	2.9%
2029	3,627.9	394.8	4,022.7	21,697.3		**2029**	0.4%	0.2%	0.4%	2.9%
2030	3,642.9	395.6	4,038.6	22,326.5		**2030**	0.4%	0.2%	0.4%	2.9%
2031	3,659.9	396.8	4,056.7	22,974.0		**2031**	0.5%	0.3%	0.4%	2.9%
2032	3,677.7	398.0	4,075.7	23,640.2		**2032**	0.5%	0.3%	0.5%	2.9%
2033	3,694.8	399.1	4,093.9	24,325.8		**2033**	0.5%	0.3%	0.4%	2.9%
2034	3,715.1	400.7	4,115.8	25,031.2		**2034**	0.6%	0.4%	0.5%	2.9%
2035	3,739.8	402.7	4,142.5	25,757.1		**2035**	0.7%	0.5%	0.6%	2.9%
2036	3,764.1	404.6	4,168.7	26,504.1		**2036**	0.6%	0.5%	0.6%	2.9%
2037	3,788.5	406.6	4,195.1	27,272.7		**2037**	0.6%	0.5%	0.6%	2.9%

Difference for the Period	Forecast/Actual as of: NYC	West.	Service Area	U.S. GDP			Compound Growth Rates Forecast/Actual as of: NYC	West.	Service Area	U.S. GDP
1997-2007	370.2	42.2	412.4	2,842.3			1.3%	1.3%	1.3%	2.9%
2007-2012	156.3	14.4	170.8	1,800.0			1.0%	0.8%	1.0%	2.9%
2007-2017	305.7	27.8	333.5	3,850.7			1.0%	0.8%	0.9%	2.9%
2007-2037	730.1	59.8	789.9	15,726.9			0.7%	0.5%	0.7%	2.9%

Energy Management
Prepared by Courtney Brooks
Notes:
Historical data for NYC through 2007Q2 from NY State Department of Labor
Historical data for Westchester through 2004 from BLS, 2005-2007 Estimates from Economy.com July Database Update
2007 forecast is generated by ConEd Energy Management
2008 - 2036 forecast is generated via Economy.Com growth rates from the August 2007 Delivery
2037 forecast is generated by ConEd Energy Management
U.S. GDP Growth Rate are from Blue Chip Economic Forecasts

Updated August 24, 2007

Figure 2.

FROM ACCOUNTING - Econometric Model Results

Long-Term CECONY Commercial Forecast

	CSALE	PRICE	PNEMP	GDP	NC09	WCDD	WHDD	Billing Days
2000	26,718.7	8.808	3,300.7	9,817.0	110.567	1368.04	4146.76	365.46
2001	27,296.7	8.649	3,302.0	9,890.7	112.927	1660.26	3922.46	365.49
2002	27,601.2	7.694	3,202.8	10,048.8	115.589	1791.85	3802.77	365.39
2003	27,482.7	8.536	3,176.4	10,301.0	117.595	1530.74	4547.95	365.40
2004	28,157.9	8.114	3,206.6	10,675.8	119.636	1649.83	4140.39	365.40
2005	29,116.5	9.068	3,267.4	11,003.4	121.769	1792.47	4184.98	365.30
2006	29,045.9	8.302	3,343.6	11,319.4	123.115	1536.13	3487.83	363.99
2007	**30,046.0**	8.302	3,405.2	11,545.8	125.383	1598.06	4060.88	365.49
2008	**30,536.3**	8.302	3,434.1	11,869.1	127.447	1549.14	4101.96	366.09
2009	**31,013.0**	8.302	3,460.5	12,225.1	129.600	1549.09	4099.72	366.09
2010	**31,353.1**	8.302	3,497.4	12,579.7	131.795	1549.11	4049.82	364.01
2011	**32,003.8**	8.302	3,538.4	12,957.1	134.039	1549.11	4080.92	365.30
2012	**32,559.9**	8.302	3,576.0	13,345.8	136.331	1549.12	4086.11	365.49
2013	**33,088.4**	8.302	3,610.3	13,732.8	138.670	1549.15	4084.09	365.40
2014	**33,681.7**	8.302	3,644.9	14,131.1	141.049	1549.15	4084.09	365.25
2015	**34,297.2**	8.302	3,677.5	14,540.9	143.469	1549.15	4084.09	365.25
2016	**34,907.4**	8.302	3,707.1	14,962.5	145.931	1549.15	4086.11	365.25
2017	**35,505.1**	8.302	3,738.7	15,396.5	148.434	1549.15	4084.09	365.25
2018	**36,119.2**	8.302	3,769.6	15,842.9	150.981	1549.15	4084.09	365.25
2019	**36,736.4**	8.302	3,799.2	16,302.4	153.571	1549.15	4084.09	365.25
2020	**37,355.6**	8.302	3,829.5	16,775.2	156.206	1549.15	4086.11	365.25
2021	**37,983.1**	8.302	3,858.3	17,261.6	158.886	1549.15	4084.09	365.25
2022	**38,612.5**	8.302	3,882.5	17,762.2	161.612	1549.15	4084.09	365.25
2023	**39,226.9**	8.302	3,906.0	18,277.3	164.385	1549.15	4084.09	365.25
2024	**39,847.3**	8.302	3,927.9	18,807.4	167.205	1549.15	4086.11	365.25
2025	**40,465.0**	8.302	3,949.8	19,352.8	170.074	1549.15	4084.09	365.25
2026	**41,092.7**	8.302	3,971.1	19,914.0	172.992	1549.15	4084.09	365.25
2027	**41,725.9**	8.302	3,988.9	20,491.5	175.960	1549.15	4084.09	365.25
2028	**42,350.9**	8.302	4,006.4	21,085.8	178.979	1549.15	4086.11	365.25
2029	**42,979.7**	8.302	4,022.7	21,697.3	182.049	1549.15	4084.09	365.25
2030	**43,612.4**	8.302	4,038.6	22,326.5	185.173	1549.15	4084.09	365.25
2031	**44,251.7**	8.302	4,056.7	22,974.0	188.350	1549.15	4084.09	365.25
2032	**44,913.9**	8.302	4,075.7	23,640.2	191.581	1549.15	4086.11	365.25
2033	**45,587.3**	8.302	4,093.9	24,325.8	194.868	1549.15	4084.09	365.25
2034	**46,267.3**	8.302	4,115.8	25,031.2	198.211	1549.15	4084.09	365.25
2035	**46,978.4**	8.302	4,142.5	25,757.1	201.612	1549.15	4084.09	365.25
2036	**47,729.4**	8.302	4,168.7	26,504.1	205.071	1549.15	4086.11	365.25
2037	**48,484.9**	8.302	4,195.1	27,272.7	208.589	1549.15	4084.09	365.25

Dependent Variable: LOG(CSALE2/(BDA/BDA_BASE))
Method: Least Squares
Date: 08/27/07 Time: 15:15
Sample: 1981 2013
Included observations: 33
Convergence achieved after 22 iterations
Backcast: 1980

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.214139	0.653918	3.385961	0.0024
LOG(PRICE(-2))	-0.03824	0.01853	-2.063623	0.05
LOG(GDP*NC09)	0.275184	0.025112	10.95818	0
LOG(PNEMP(-1))	0.506367	0.107215	4.722917	0.0001
WCDD	5.29E-05	6.53E-06	8.098236	0
WHDD	1.80E-05	2.74E-06	6.565304	0
D2000	0.022907	0.002707	8.463326	0
AR(1)	0.746367	0.127052	5.874518	0
MA(1)	0.996832	0.065619	15.19118	0

R-squared	0.999308	Mean dependent var	10.11091
Adjusted R-squared	0.999078	S.D. dependent var	0.192968
S.E. of regression	0.00586	Akaike info criterion	-7.21421
Sum squared resid	0.000824	Schwarz criterion	-6.80607
Log likelihood	128.0344	F-statistic	4333.88
Durbin-Watson stat	1.793678	Prob(F-statistic)	0

Inverted AR Roots	0.75
Inverted MA Roots	-1

Figure 3.

CONSOLIDATED EDISON ELECTRIC SYSTEM
2006 SENDOUT AND DELIVERY (GWh)

	ACTUAL SENDOUT								ADJUSTED SENDOUT				
			VS. 2005		VS. Budget		2006			VS. 2005		VS. Budget	
MONTH	2005	2006	GWh	%	GWh	%	Budget	2005*	2006	GWh	%	GWh	%
JAN	4,994	4,847	(147)	(2.9)	(192)	(3.8)	5,039	4,902	5,047	145	3.0	8	0.2
FEB	4,361	4,416	55	1.3	(76)	(1.7)	4,492	4,391	4,428	37	0.8	(64)	(1.4)
2 MO	9,355	9,263	(92)	(1.0)	(268)	(2.8)	9,531	9,293	9,475	182	2.0	(56)	(0.6)
MAR	4,769	4,775	6	0.1	(58)	(1.2)	4,833	4,701	4,785	84	1.8	(48)	(1.0)
3 MO	14,124	14,038	(86)	(0.6)	(326)	(2.3)	14,364	13,994	14,260	266	1.9	(104)	(0.7)
APR	4,350	4,347	(3)	(0.1)	(130)	(2.9)	4,477	4,310	4,378	68	1.6	(99)	(2.2)
4 MO	18,474	18,385	(89)	(0.5)	(456)	(2.4)	18,841	18,304	18,638	334	1.8	(203)	(1.1)
MAY	4,457	4,738	281	6.3	(44)	(0.9)	4,782	4,709	4,808	99	2.1	26	0.5
5 MO	22,931	23,123	192	0.8	(500)	(2.1)	23,623	23,013	23,446	433	1.9	(177)	(0.7)
JUN	5,699	5,529	(170)	(3.0)	88	1.6	5,441	5,343	5,520	177	3.3	79	1.5
6 MO	28,630	28,652	22	0.1	(412)	(1.4)	29,064	28,356	28,966	610	2.2	(98)	(0.3)
JUL	6,396	6,595	199	3.1	396	6.4	6,199	6,095	6,288	193	3.2	89	1.4
7 MO	35,026	35,247	221	0.6	(16)	0.0	35,263	34,451	35,254	803	2.3	(9)	(0.0)
AUG	6,650	6,297	(353)	(5.3)	274	4.5	6,023	5,978	6,219	241	4.0	196	3.3
8 MO	41,676	41,544	(132)	(0.3)	258	0.6	41,286	40,429	41,473	1,044	2.6	187	0.5
SEP	5,643	4,927	(716)	(12.7)	(147)	(2.9)	5,074	5,055	5,109	54	1.1	35	0.7
9 MO	47,318	46,471	(847)	(1.8)	111	0.2	46,360	45,484	46,582	1,098	2.4	222	0.5
OCT	4,797	4,737	(60)	(1.3)	(67)	(1.4)	4,804	4,720	4,748	28	0.6	(56)	(1.2)
10 MO	52,115	51,208	(907)	(1.7)	44	0.1	51,164	50,204	51,330	1,126	2.2	166	0.3
NOV	4,535	4,579	44	1.0	(93)	(2.0)	4,672	4,586	4,627	41	0.9	(45)	(1.0)
11 MO	56,651	55,787	(864)	(1.5)	(49)	(0.1)	55,836	54,790	55,957	1,167	2.1	121	0.2
DEC	4,946	4,841	(105)	(2.1)	(251)	(4.9)	5,092	4,893 **	4,993	100	2.0	(99)	(1.9)
12 MO	61,597	60,628	(969)	(1.6)	(300)	(0.5)	60,928	59,683	**60,950**	1,267	2.1	22	0.0

	ACTUAL DELIVERY VOLUMES								ADJUSTED DELIVERY VOLUMES				
			VS. 2005		VS. Budget		2006			VS. 2005		VS. Budget	
MONTH	2005	2006	GWh	%	GWh	%	Budget	2005*	2006	GWh	%	GWh	%
JAN	4,694	4,627	(67)	(1.4)	(130)	(2.7)	4,757	4,704	4,741 **	37	0.8	(16)	(0.3)
FEB	4,495	4,464	(31)	(0.7)	(105)	(2.3)	4,569	4,456	4,559	103	2.3	(10)	(0.2)
2 MO	9,188	9,091	(97)	(1.1)	(235)	(2.5)	9,326	9,160	9,300	140	1.5	(26)	(0.3)
MAR	4,421	4,335	(86)	(1.9)	(106)	(2.4)	4,441	4,368	4,324	(44)	(1.0)	(117)	(2.6)
3 MO	13,610	13,426	(184)	(1.4)	(341)	(2.5)	13,767	13,528	13,624	96	0.7	(143)	(1.0)
APR	4,064	4,027	(37)	(0.9)	15	0.4	4,012	3,941	4,059	118	3.0	47	1.2
4 MO	17,674	17,453	(221)	(1.3)	(326)	(1.8)	17,779	17,469	17,683	214	1.2	(96)	(0.5)
MAY	3,955	3,933	(22)	(0.6)	(72)	(1.8)	4,005	3,900	3,964	64	1.6	(41)	(1.0)
5 MO	21,628	21,386	(242)	(1.1)	(398)	(1.8)	21,784	21,369	21,647	278	1.3	(137)	(0.6)
JUN	4,660	4,659	(1)	0.0	(20)	(0.4)	4,679	4,645	4,715	70	1.5	36	0.8
6 MO	26,288	26,045	(243)	(0.9)	(418)	(1.6)	26,463	26,014	26,362	348	1.3	(101)	(0.4)
JUL	5,550	5,657	107	1.9	256	4.7	5,401	5,270	5,452	182	3.5	51	0.9
7 MO	31,838	31,702	(136)	(0.4)	(162)	(0.5)	31,864	31,284	31,814	530	1.7	(50)	(0.2)
AUG	5,911	5,904	(7)	(0.1)	376	6.8	5,528	5,385	5,568	183	3.4	40	0.7
8 MO	37,749	37,606	(143)	(0.4)	214	0.6	37,392	36,669	37,382	713	1.9	(10)	0.0
SEP	5,775	5,255	(520)	(9.0)	33	0.6	5,222	5,187	5,448	261	5.0	226	4.3
9 MO	43,523	42,860	(663)	(1.5)	246	0.6	42,614	41,856	42,829	973	2.3	215	0.5
OCT	4,925	4,570	(355)	(7.2)	(3)	(0.1)	4,573	4,676	4,635	(41)	(0.9)	62	1.4
10 MO	48,448	47,431	(1,017)	(2.1)	244	0.5	47,187	46,532	47,465	933	2.0	278	0.6
NOV	4,300	4,328	28	0.7	(44)	(1.0)	4,372	4,310	4,334	24	0.6	(38)	(0.9)
11 MO	52,748	51,759	(989)	(1.9)	200	0.4	51,559	50,842	51,799	957	1.9	240	0.5
DEC	4,588	4,516	(72)	(1.6)	(84)	(1.8)	4,600	4,565 **	4,621	56	1.2	21	0.5
12 MO	57,336	56,276	(1,060)	(1.8)	117	0.2	56,159	55,407	**56,421**	1,014	1.8	262	0.5
				% of Adjusted Volumes to Adjusted Sendout for 2006					**92.6%**				

Figure 4.

From Electric Volume & Revenue Forecasting

		COMMERCIAL VOLUMES FORECAST PRELIMINARY	Growth	COMMERCIAL SENDOUT FORECAST	
	2005				
	2006	29,046		31,367	
Budget Forecast (5-Year)	2007	30,046	3.4%	**32,447**	3.4%
	2008	30,536	1.6%	**32,977**	1.6%
	2009	31,013	1.6%	**33,491**	1.6%
	2010	31,353	1.1%	**33,859**	1.1%
	2011	32,004	2.1%	**34,561**	2.1%
	2012	32,560	1.7%	**35,162**	1.7%
Long-Term Forecast	2013	33,088	1.6%	**35,733**	1.6%
	2014	33,682	1.8%	**36,373**	1.8%
	2015	34,297	1.8%	**37,038**	1.8%
	2016	34,907	1.8%	**37,697**	1.8%
	2017	35,505	1.7%	**38,342**	1.7%
	2018	36,119	1.7%	39,006	1.7%
	2019	36,736	1.7%	39,672	1.7%
	2020	37,356	1.7%	40,341	1.7%
	2021	37,983	1.7%	41,018	1.7%
	2022	38,613	1.7%	41,698	1.7%
	2023	39,227	1.6%	42,362	1.6%
	2024	39,847	1.6%	43,032	1.6%
	2025	40,465	1.6%	43,699	1.6%
	2026	41,093	1.6%	44,377	1.6%
	2027	41,726	1.5%	45,060	1.5%
	2028	42,351	1.5%	45,735	1.5%
	2029	42,980	1.5%	46,414	1.5%
	2030	43,612	1.5%	47,098	1.5%
	2031	44,252	1.5%	47,788	1.5%
	2032	44,914	1.5%	48,503	1.5%
	2033	45,587	1.5%	49,230	1.5%
	2034	46,267	1.5%	49,965	1.5%
	2035	46,978	1.5%	50,733	1.5%
	2036	47,729	1.6%	51,544	1.6%
	2037	48,485	1.6%	52,360	1.6%

Con Edison:
Assumed ratio of 92.6% from 2006 Box Score. Applied it to 2007 beyond.

CECONY Top-Down Residential Sector Forecasting Manual

DRAFT (8/18)

Prepared by:

Demand Forecasting Section

Consolidated Edison
4 Irving Place
New York, New York 10003

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1

Overview

The residential sector top-down approach that is part of the summer analysis is one of several components analyzed to determine the level of demand growth achieved from the prior summer. The other two components are the commercial and governmental sectors. To determine the future growth, the top-down residential forecasting process is used in conjunction with the bottom-up approach to allocate demand growth based on new construction projects and internal customer growth from appliances. Using both methodologies allows for growth to be detrmined from two perspectives, with both playing an equally important role in the forecasting process.

The residential top-down approach utilizes an appliance end-use model for the CECONY service area to determine the demand within the residential sector. The end-use model is an Excel spreadsheet that contains cells where data should be entered and formulas that will automatically calculate numbers, such as the number of appliances (to be discussed in Section 3). The main inputs into the residential end-use model are: number of households, saturation[1] of appliances, coincident use[2] of appliances, household occupancy[3], and hourly use per unit of an appliance (in kWh/hr). The top-down residential forecasting process is depicted in the Figure 1. This information from these inputs is converted to a MW value through a formula, which will be discussed in Section 3 of this document.

The residential forecasting process involves the following steps:

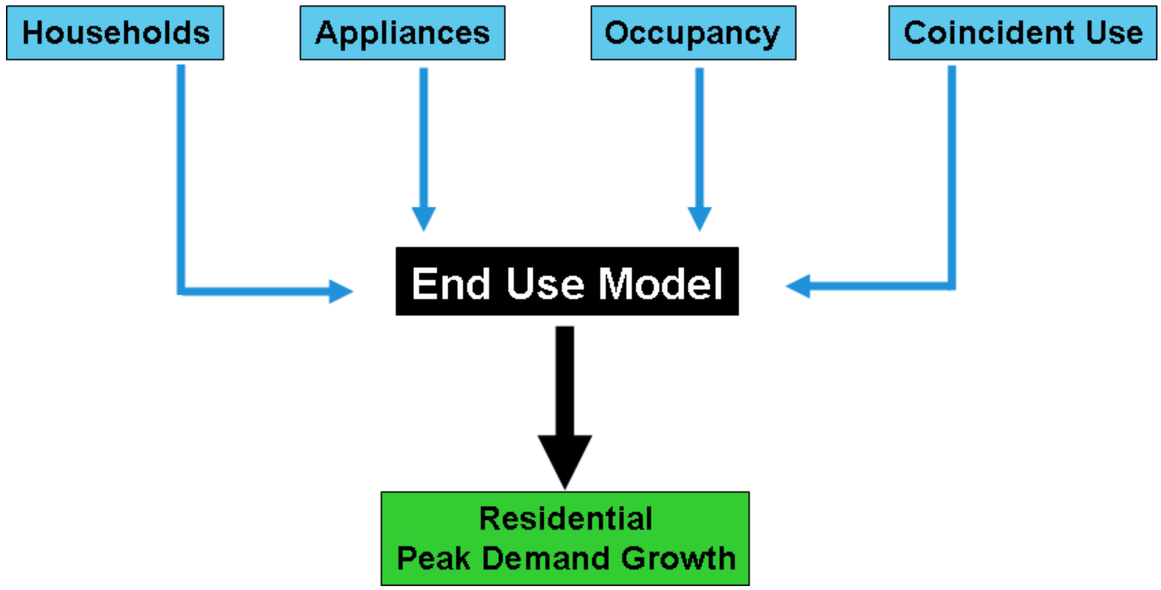
1. Conduct appliance surveys;
2. Establish the Base Residential Peak Demand for the current summer; and
3. Derive the Incremental Demand Growth from the calculated growth in the model inputs

[1] Saturation refers to the % of households that have an appliance. Data is obtained from the telephone survey.

[2] Coincident use refers to the % of occupied and unoccupied households that have an appliance on during the most likely time of the summer peak demand, which is typically between 3 and 5 pm on a weekday. Data is obtained from the telephone survey.

[3] Household Occupancy represents the % of households that have someone at home during the most likely time of the summer peak demand, which is typically between 3 and 5 pm on a weekday. Data is obtained from the telephone survey.

Figure 1 Residential Top Down Process



2

Appliance Surveys

Each summer, three types of surveys are conducted in order to obtain information on air conditioners and other appliances. Air conditioning is the appliance of main importance since historically it has comprised about 75% of the residential peak demand. The three surveys conducted each summer are a telephone survey, a photographic survey, and a Company Intranet survey. Some of the information from these surveys is used as a direct input into the residential end-use model. Other information is utilized to understand customer behavior which assists with assumptions made in the residential forecast and model input.

2.1 Telephone Survey

The telephone survey began in the early 1990's and is conducted by a consultant that has experience with planning the implementation of the survey and analyzing the results from the surveys. The consultant provides a proposal for the cost and methodology involved with parsing the sample to obtain a mix of customers by borough and income type. The survey involves obtaining about 2,500 completed surveys from customers in New York City and Westchester County over the course of five survey days**.** Once the survey questions are finalized, Demand Forecasting's goal is to have the consultant perform the surveys on hot days in July or August that are as close to the weather design criteria as possible. Selecting the days to survey involves looking at the week and day-ahead weather forecasts to determine if the weather may be hot enough. However, once the survey is set up by the consultant, there is a point of no return as to the cancellation of the survey for that day if the weather changes. Therefore, communication with the consultant about the timing is crucial in case the weather forecast changes.

The primary objective of this survey is to obtain data on appliance saturation, appliance coincident usage, household occupancy, and customer behavior that are needed to establish the base residential peak demand (discussed in Section 3) and the residential peak demand forecast (discussed in Section 4). Demand Forecasting works annually with the consultant on the questions that should be asked of the customers answering the survey, and by providing a sample of customers in each borough for the consultant to use for the calls. From time to time, questions may be added or taken out of the survey in order to obtain information about a specific issue that may affect usage of appliances during the summer. For example, when electricity prices were expected to rise, some questions about price were added to the survey in the customer behavior section to determine any shifts in usage. Another example would be when we added a question on whether people leave their air conditioning on for a pet, since it could help explain one of the causes for usage of air conditioning in unoccupied homes. This type of information is used more for explaining the reasons behind the results that are seen from the survey and in the residential demand once all the inputs are entered into the model and the year-over-year demand must be explained.

2.2 Photographic Survey

The photographic survey is conducted toward the mid to end of July in order to determine growth in the installation of room air conditioning units in about 90 residential multi-family buildings based on a sample of buildings selected by the Energy Services Department in the Company in 1999 based on areas where they believed there was potential for growth. Photographs are taken of the different sides of each building in the sample over the course of a few weeks. Figure 2 shows sample photographs taken in the summer 2008 of a residential building in Queens at 140-10 Franklin Avenue and one in Westchester County at 2 North Broadway in the City of White Plains**.** The air conditioners in these photographs are analyzed with the ones from the summer of 2007 to determine the net gain or loss at these locations.

Once all the photographs are taken to match the prior year's photographs, the additional and missing air conditioning units relative to the prior summer are counted to determine if the net difference between the prior and current year is negative, unchanged, or positive for each location in the survey in order to determine the overall growth from the prior summer. Once the

Figure 2 - Sample Photos from Photographic Survey

140-10 Franklin Avenue, Queens, NY

2 North Broadway, White Plains, New York

total net difference is calculated for each location, it is added or subtracted to the base number of units to come up with the new count of room air conditioning units in the survey.

To calculate the growth rate from the prior summer to the current summer, the following formula should be used:

$$[(\# \text{ AC Units}_t - \# \text{ AC Units}_{t-1}) / \# \text{ AC Units}_{t-1}] * 100 = \% \text{ Growth};$$

where t = year

For example, using the numbers in Table 1, the growth rate for the Bronx would be calculated as follows:

[(371 – 357)/357)] * 100 = 3.92% (rounded to 4.0%)

Table 1 Sample Photographic Survey Results

PHOTOGRAPHIC SURVEY - SUMMER 2007 RESULTS

Borough	Summer 2006	Summer 2007	Growth	% Growth
Bronx	357	371	14	4%
Brooklyn	309	311	2	1%
Manhattan	1558	1624	66	4%
Queens	284	285	1	0%
Westchester	532	550	18	3%
Total	3040	3141	101	**3%**

The calculation above is used for all the boroughs in the survey and the service area total. In the summer 2007, there was an overall increase of about 3.0% in room air conditioners installed from the summer 2006.

This information is used to assess if there was growth in the number of air conditioning units installed and if this result is consistent with the information obtained in the telephone survey. The information is used mostly to assess the trend in the growth, but is not the primary source of data for the end-use model since this survey cannot provide saturation information, which is the base assumption about AC units in the end-use model.

2.3 Intranet Survey

Each summer, the Company performs an annual survey on its Intranet system that allows employees of CECONY that live in New York City or Westchester County to fill out a survey about air conditioning in their homes. The Company first introduced this survey in the summer of 1998. The results from the survey are primarily used to gather information on the saturation of air conditioning, penetration4 of air conditioning, and coincident usage of air conditioning on a hot summer afternoon. Table 2 displays the information obtained from the Intranet survey from the summers of 2005, 2006, and 2007 that may be used in the residential summer analysis for the given year and potentially for future growth.

Table 2 Sample Internet Survey Results

CECONY Intranet Survey Results

	2005		2006		2007	
TOTAL SURVEYS (1)	1542		989		1314	
SATURATION OF A/C (2)						
RAC	1267	82%	792	80%	1057	80%
CAC	215	14%	158	16%	213	16%
HOUSEHOLDS W/ NO A/C	60	4%	39	4%	44	3%
TOTAL HH WITH A/C	1482	96%	950	96%	1270	97%
PENETRATION OF A/C (3)						
RAC	3231	210%	1937	196%	2703	206%
CAC	261	17%	176	18%	252	19%
NET ADDITIONS (3)	350	11%	177	9%	292	11%
COINCIDENT USE OF A/C (6)						
RAC	1505	47%	906	47%	1158	43%
CAC	156	60%	121	69%	146	58%

Notes:
(1) Total Surveys represnts the total number of CECONY employees that responded to the survey.
(2) Saturation represents the percentage of households that have or do not have the appliance. Percentages based on total surveys.
(3) Penetration represents the number of appliances in the household in percentage form. Percentages based on Total Surveys.
(4) New Unit and Replacement Unit numbers are based on survey questions.
(5) Net Additions is equal to the difference between new A/Cs and replacement A/Cs.
(6) Coincident Use represents the % of households that have an appliance on during a hot summer afternoon.

[4] Penetration of an appliance represents the number of units in a household expressed as a percentage. For example if the penetration of room air conditioners is 200%, that means that there are 2 room air conditioners in the average home in the service area.

3

Establishing the Base Residential Peak Demand

The base residential peak demand is determined once all of the inputs (number of households, household occupancy, saturation, coincident use, use/unit) are placed in the end-use model. The telephone survey provides most of these inputs, which includes saturation of appliances in the model, coincident use, and household occupancy.

3.1 Number of Households

The number of households is an input into the end-use model and is developed by applying Moody's Analytics forecast to actual Census household data. As of 2007, it is estimated that there are 3.45 million households in the CECONY service area. This number represents exactly what it states, the number of households in the service area, and should not be confused with the number of customers. The number of households should be more than the number of customers since an apartment building can count as one customer, but it could contain many households.

Once the forecast is developed by Demand Forecasting using Moody's Analytics' growth rates off of the Census data, the forecast number for the current year would be placed in the end-use nodel as well as the forecast for the future years in the model. The forecast issued in 2007 for the years 2007-2017 is shown in Table 3. Therefore, the numbers that would be placed in the model would be the forecast numbers for the years 2007, 2012, and 2017, which are highlighted in yellow in the figure. This information is critical to the model since it is used in the calculation of number of appliances (see section 3.2).

Table 3 Sample Household Forecast

2007-2017 Service Area Household Forecast	
Year	**Number of Households**
2000	3,358,730
2001	3,385,351
2002	3,399,590
2003	3,415,199
2004	3,429,419
2005	3,443,880
2006	3,445,048
2007	3,447,504
2008	3,464,860
2009	3,484,422
2010	3,505,742
2011	3,526,862
2012	3,546,295
2013	3,562,841
2014	3,578,469
2015	3,593,129
2016	3,606,460
2017	3,616,636

3.2 Appliances

Saturation Data

The saturation of appliances is a good place to begin when inputting data into the end-use model since it is the most basic piece of information obtained from the survey. An example of saturation would be that about 80% of households have one room air conditioning unit. Therefore, 80% would be entered into the proper cell of the Excel spreadsheet model as 0.80.

These saturation percentages are analyzed to ensure the current year's data is consistent and reasonable when compared to the prior year(s). For example, if the saturation level for primary air conditioning is slightly lower than the level seen from the prior year, but the weather on the days surveyed was not as hot, it would be reasonable to keep the saturation at the prior year's level to compensate for the cooler weather experienced on the days of the survey in the current year.

In addition, if the growth in the number of primary units showed a decline, no growth, or only minor growth since the saturation level inputted was the same as the prior year, this is when the data from the Intranet and photographic survey is helpful. If there is growth seen from these two surveys, it would be reasonable to assume a minor growth factor in primary ac units to reflect the growth from either or both of these surveys. This could mean growth of around 0.2-0.5% depending on the change it brings to the number of units. Ultimately, the growth in saturation and number of units both must adhere to reasonable assumptions based on the information gained from the surveys. Although some judgment is involved in this process, results tend to be consistent from one year to the next and the model inputs requires minor adjustments to account for issues of weather or trends. Once saturation information is obtained, the information is entered into the end-use model in the column labeled *saturation*.

Number of Appliances

This information is strictly a calculated number based on saturation percentage and number of households. The formula used to convert the number of households in a given year and saturation for a particular appliance in that same year to the number of appliances is:

$$(\text{Saturation } (\%)_{a,t} * \# \text{ Households}_t) = \text{Number}_{a,t},$$

where a = appliance and t = year

An example from 2007 would be the calculation of the number of primary room air conditioning units:

$$(80.2\%_{\text{primary room unit (2007)}} * 3{,}447{,}504_{(2007)}) = 2{,}764{,}898 \text{ primary units}$$

3.3 Household Occupancy

Depending on the weather during days the survey is conducted and time of day, a straight average of all days all times of the surveys may not be the best calculation to use to determine the household occupancy during a hot summer afternoon. The afternoon survey (from 3:00 PM to around 5:00-5:30 PM) occupancy data is typically a better gauge of the occupancy during the expected system peak demand (between about 3 – 5 PM). However, since the evening survey takes place from around 5:00 PM to 7:30 PM, it may be deemed necessary to average in occupancy data depending on the weather during the days the survey took place since the time of the peak demand and the evening survey time are overlapping. Even if the system peak in a given survey year does not occur after 5 PM, the peak demand has been reached after 5 PM so the evening session may need to be taken into account. The times of the afternoon and evening surveys are typically the same from year to year, but could vary slightly to ensure that the number of surveys completed each day meets the target of 500.

The day of the week the survey takes place is also an important factor when deriving the average household occupancy. If we survey on a Monday or Friday due to circumstances of hot weather or a heat wave that takes place on these weekdays, we would most likely not use those days in the household occupancy calculation since we would expect occupancy to be different than other weekdays due to extended long weekends customers may take in the summer months. Since we are looking to survey on five hot days, sometimes these days fall on a Monday or Friday and it is better to survey on those days rather than choose a Tuesday, Wednesday, or Thursday that are not as hot just because they fall on a weekday we would hit a peak. Although the household occupancy percentage may be lower on a Monday or Friday, the people that do answer the survey will be answering the questions we need to be answered to obtain the necessary information for the model. Therefore, surveying on a Monday or Friday may only modify the number of days to be used in the household occupancy calculation since all five days may not be used to calculate the household occupancy percentage used as in imput to the model.

Resonableness and consistency of the occupancy data from all survey days is also looked at during the decision making process. If the data from one day of the survey looks much different than the other days, we may discuss this issue with the consultant and if there is no obvious reason why this is the case, we may choose to not include this day in the calculation of the average household occupancy.

The final determination of the average household occupancy requires some judgement based on looking at the factors mentioned, which are primarily weather on the days of the survey, day of the week survey is performed, the survey session (afternoon or evening), and reasonableness and consistency of data obtained from survey (is it consistent with other days). Once the household occupancy percentage is calculated, the information is entered into the end-use model in the cell for the *household occupancy* data. For example, the household occupancy in 2007 was 52.5%. This is used in the calculation of coincident use discussed on page 12.

3.4 Coincident Use

Coincident usage is needed since it is the input that estimates the use of an appliance at the time the CECONY system typically peaks, which is between 3 and 5 PM. Coincident usage is the next input to the model. This information is gathered from the telephone survey by asking customers if they are using a particular appliance at the time they are being surveyed (if contacted between 3 and 5 PM) or if they were home and using it earlier that day between 3 and 5 PM if they are surveyed in the evening session. This determines the usage of this specified appliance in occupied households.

To determine usage of unoccupied households, customers are asked if they keep a particular appliance on between 3 and 5 PM on a hot summer day even if they are not at home. In the case of air conditioning, the survey expands on this concept by asking if customers leave their air conditioning on for a pet. This information is used to determine the usage of specific appliances in unoccupied homes.

Once the household occupancy percentage is determined (as explained above) and the coincident use of occupied amd unoccupied homes is known, the formula to derive the total coincident use percentage to be utilized in the end-use model is the following:

[(% Coincident Use$_a$ Occupied Households * % Household Occupancy) + (% Coincident Use$_a$ Unoccupied Households * (1 - % Household Occupancy)] * 100 = % Coincident Use,
where a = appliance

An example from 2007 would be the calculation of the coincident use of primary room air conditioning units:

$$[(0.95_{\text{(primary ac unit)}} * 0.525) + (0.23_{\text{(primary ac unit)}} * (1 - 0.525)] * 100 = 60.8\%$$

Once the coincident use is calculated for appliances, the information is entered into the end-use model in the column labeled *coincident use.*

3.5 Use Per Unit

The use per unit represents the hourly energy use of an appliance in kWhr/hr. The hourly use per unit can be computed from energy data obtained by hour, month or year, depending on what is available. By hour would be the best way to obtain the data, but by year would be the next preferred unit since months have different number of days which makes the yearly number the preferred reference. Hourly data can be used as is, but annual energy use of an appliance (kWhr) needs to be convereted to hourly by dividing by the number of hours in a year (8,760 hours), to get the hourly use of the appliance (note: leap year is not taken into account since it is not representing a typical or average year and would not have a significant impact). The information has been obtained from the Association of Home Appliance Manufacturers (AHAM) in the past and is updated on a periodic basis. It is not necessary to update the information annually since standards do not vary greatly from year to year. In addition, we do take efficiency standards into account when the model calculates the base year demand and forecasted demand. This is done by applying an efficiency reduction to the new and replacement unit use per unit when government standards are in effect or mandated for some known time in the future.

Using the annual energy use of an appliance, the following formula would be used to determine the hourly usage for this appliance:

(Annual Energy$_a$ kWhr) / (8,760 hours) = # kWhr/hr,

where a = appliance

The use per unit forsome appliances was updated in 2002, and each year this measure must be updated to account for replacement units and efficiency standards set forth by the government. This update requires some information about room air conditioning units. The first piece of information needed is the life span of room units, which is 15 years in our model. Another piece of information is needed to account for new government energy efficiency standards that were put in place that required certain appliances to be more efficient by 2006. For example, room air conditioners were going to become 15% more efficient by 2006. Therefore, this is another assumption the calculation of use per unit for the current model year and the forecasted use per unit numbers.

The calculation of the use per unit in 2007 for primary room air conditioning units would follow the steps below based on what is known from the model and the assumptions made about the appliance:

Known or Assumed:

Number of primary ac units in summer 2007[5]:	2,764,898
Current Use per Unit:	1.03 kWhr/hr

[5] Calculated from saturation and number of households (see Section 3.2)

Efficiency:	15%
Life Span of Typical ac unit:	15 years

Step 1: Calculate the number of units from the prior summer that are replacement units

$$\textbf{(Total Number Appliance}_{at} \textbf{ / Life Span}_{a}\textbf{) = New Replacement Units / Year}$$

Using Primary AC Units as an example to calculate replacement units from summer 2006 to 2007:

Replacement Units Calculation:
(2,764,898 $_{\text{primary AC units (2007)}}$ / 15 years $_{\text{primary AC unit}}$) = 184,327 replacement units

Step 2: Calculate the additional number of units from the prior summer to the current summer

(The current summer's number of units is known since the number of units for the current summer is calculated from saturation and number of households)

$$\textbf{(Total number Appliance}_{at} \textbf{ - Total number Appliance}_{at-1}\textbf{) = \# Additional Units}$$

Using Primary AC Units as an example to calculate additional units from summer 2006 to 2007:

Additional Units Calculation:
(2,764,898 $_{\text{primary AC units (2007)}}$ – 2,758,538 $_{\text{primary AC units (2006)}}$) = 6,360 replacement units

Step 3: Calculate the total number of new units from the prior summer.

$$\textbf{Replacement Units}_{at} \textbf{ + Additional Units}_{at} \textbf{ = Total New Units}_{at}$$

Using Primary AC Units as an example to calculate total new units from summer 2006 to 2007:

Total New Units Calculation:
(184,327 $_{\text{primary AC units (2007)}}$ + 6,360 $_{\text{primary AC units (2007)}}$) = 190,687 Total New Units $_{\text{primary AC units (2007)}}$

Step 4: Calculate the number of new units that are unchanged from the prior summer.

$$\textbf{(Total number Appliance}_{at} \textbf{ – Total New Units}_{at}\textbf{) = Number Unchanged Appliance}_{at}$$

Using Primary AC Units as an example to calculate number of units unchanged from summer 2006 to 2007:

Total Unchanged Units Calculation:
(2,764,898 $_{\text{primary AC units (2007)}}$ + 190,687 $_{\text{new primary AC units (2007)}}$) = 2,574,212 Total Unchanged Units $_{\text{primary AC units (2007)}}$

Step 5: Calculate the impact of efficiency for additional units that are new from the prior summer (due to replacement or additional)

(Use per Unit $_{a(t-1)}$) - (Use per Unit $_{a(t-1)}$ * Efficiency % reduction) = Use per Unit of New Appliance $_{at}$

where a = appliance and t = year

Using Primary AC Units as an example to calculate use per unit of new units from summer 2006 to 2007:

Use per Unit of New Units Calculation:
(1.03 kWhr/hr) – (1.03 kWhr/hr * 0.15) = 1.03 – 0.1545 = 0.8755 kWhr/hr (rounded to 0.88)

This factor only gets applied to the new units added from the prior summer.

Step 6: Calculate the new total use per unit for an appliance in the model

(Number of New Units * Use per Unit New Units) + (Number of Unchanged Units * Current Use per Unit) = Use per Unit of Appliance $_{at}$

where a = appliance and t = year

Using Primary AC Units as an example to calculate use per unit of new units from summer 2006 to 2007:

Use per Unit of New Units Calculation:
(190,687 * 0.88) + (2,574,212 * 1.03) = 1.02 kWhr/hr

The information for the appliance usage is entered into the end-use model for each appliance in the *use per unit (U/U)* column. For 2007, the number entered would be 1.02. The unit of kilowatts is converted to MW when the final calculation is performed to determine the MW impact of each appliance. This formula divides this result by 1,000 to compensate for the unit of measurement for the use per unit.

To account for energy efficiency of specific appliances that need to adhere to modified government standards, the use per unit calculation utilized in the forecast of this input takes new efficiency standards into account.

3.6 Conversion to MW

Once all of the required inputs are entered into the end-use model, the model calculates the MW demand of the appliances by using the following formula:

$$(\text{Use per Unit}_a * \text{Number of Units}_a * \text{Coincident Use}_a) / 1000 = MW_a,$$

where a = appliance

Using Primary AC Units as an example to calculate the demand for an appliance in MW:

Demand (MW) Calculation:

(1.02 * 2,764,898 * 0.608) / 1,000 = 1,714 MW

3.7 Customer Behavior

There is some information that is obtained from the telephone survey that is not a direct input into the end-use model, which primarily includes customer behavior. There are specific questions asked during the survey which allows for an understanding about customer behavior, allowing some more intelligence into the summer experience and assisting with judgement calls that need to be made during the summer analysis and forecasting process.

Figure 3 below is a sample excerpt from the 2007 summer telephone survey which shows the customer behavior questions as they are read to the customer:

Figure 3 Sample Excerpt from Summer Telephone Survey

Next, I'm going to read you a list of things some people do to save energy.
Please tell me which of these you have done in your home in the last year

1. **Yes**
2. **(Not sure)**
3. **No**

72a. Replaced an old air conditioner with a more energy efficient model.

72b. Replaced regular light bulbs with energy-saving compact fluorescent lights

72c. Modified behaviors in the home – such as turning lights off, using energy-savings settings on dishwashers or air conditioners

72d. Replaced a major appliance other than an air conditioner with a more energy efficient model.

Next, I'm going to read you some statements about using electricity, and for each, I'd like you to tell me whether you agree strongly, agree somewhat, or disagree with the statement.

1. **Agree strongly**
2. **Agree somewhat**
3. **Disagree**

73. My household is using air conditioning less this summer compared to past years.

74. We would try to reduce our energy usage to do our part for the environment, even if it didn’t reduce our energy bill by very much.

75. During very warm and humid weather, my personal comfort, and the comfort of my family is a higher priority than reducing energy usage.

76. We are trying to cut back on our air conditioning usage in our household this summer, regardless of how warm and humid it might get.

77. Saving money on our electric bill is the main reason I take actions to use electricity more efficiently.

78. When it is very warm and humid, it is particularly important for people in this community to conserve electricity to make sure our area has enough electricity.

See Figures 4 through 6 for the survey results from the questions above.

Figure 4 Sample Results from Summer 2007 Telephone Survey

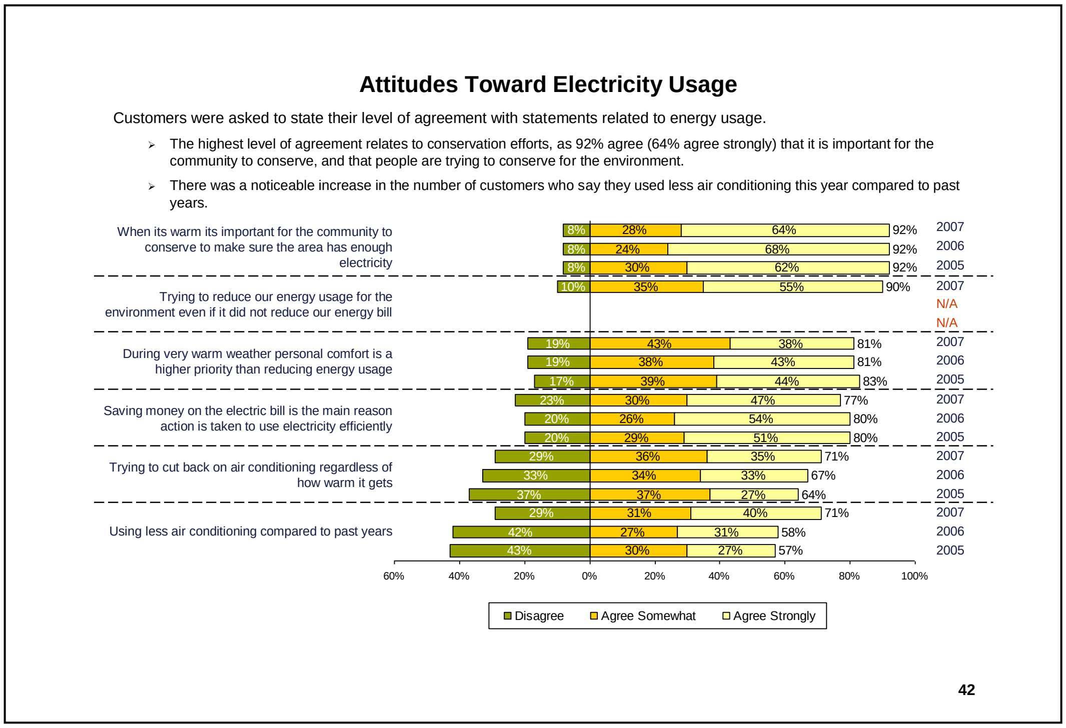


Figure 5 Sample Results from Summer 2007 Telephone Survey

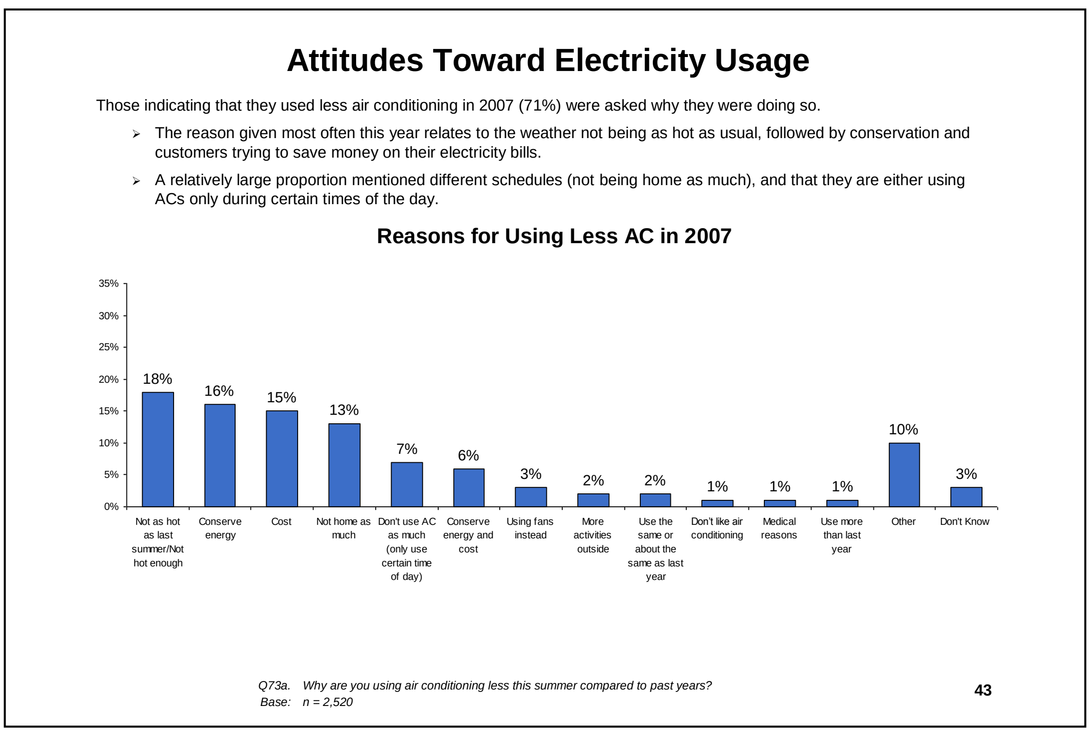
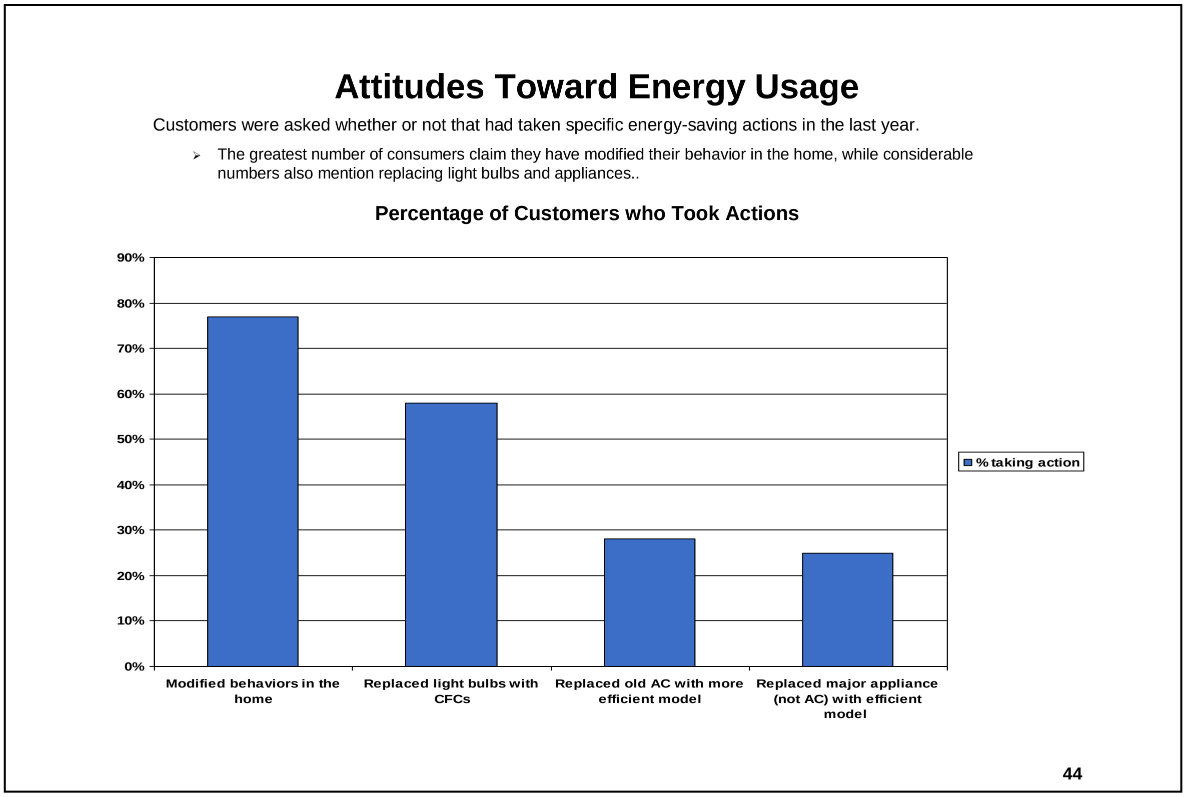


Figure 6 Sample Results from Summer 2007 Telephone Survey



The conclusions one can draw from these charts are the following:

- Most people still agree that it is important to conserve energy to make sure there is enough electricity
- Most people (90%) tried to reduce energy usage in 2007 for the environment even if it did not reduce their energy bill **(this could be seen in usage numbers for secondary and tertiary ac units)**
- While most people still agree (81%) in 2007 compared to 2006 that their personal comfort is a higher priority than reducing energy usage when it is very warm, less people strongly agreed with this statement in 2007 (38%) compared to 2006 (43%)
- More people tried to cut back on air conditioning usage in 2007 (71%) compared to 2006 (58%) and 2005 (57%). (same comment as above)
- About 20% of people cut back on air conditioning usage in 2007 due to weather that was not as hot as the summer 2006.
- Almost 80% of respondents modified their behaviors in their homes in 2007 to try to reduce their energy usage.

4

Developing the Residential Peak Demand Forecast

The residential forecast is developed on a five-year ahead basis and the five-year growth is brought down to an annual growth in MW based on the notion that growth will be higher in the beginning years and slow in the later years due to a saturation effect. Forecasting on a five-year ahead basis allows for the forecast to be developed on a timely basis and does not impact the forecasting ability of the model since the purpose is to determine the long-range forecast. The process of developing this model for each year of the ten-year forecast would be extremely tedious, time-consuming, and would not add to the accuracy to the forecast.

When determining what assumptions to make about future levels of growth into the end-use model, looking back at the most recent past is the best place to begin as well as thinking about the potential trends that could occur in customer behavior from the knowledge obtained from the telephone survey. The only major input that is provided is the forecast of number of households, which is developed by Moody's Economy.com and the Demand Forecasting section. These numbers are entered directly into the model.

4.1 Forecast of Appliances

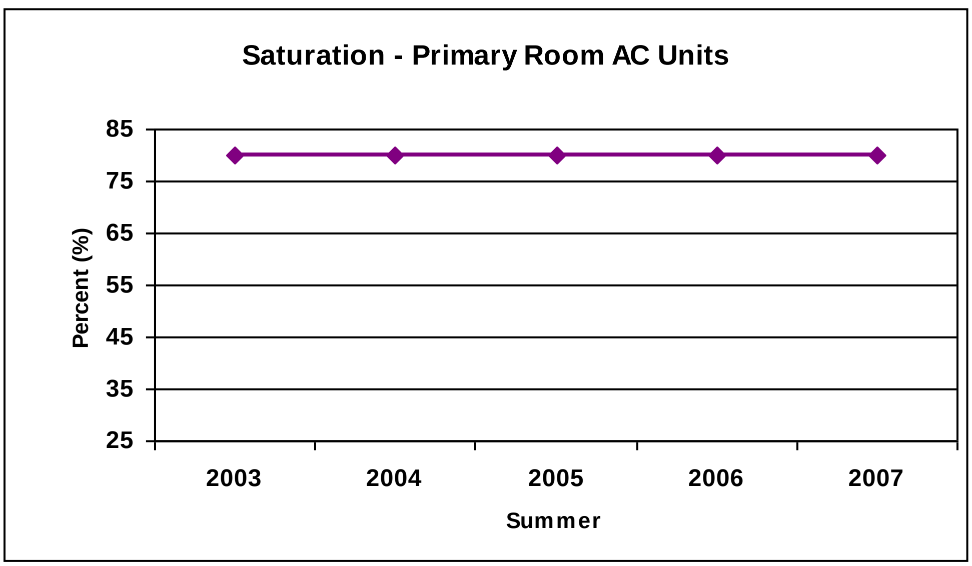
Saturation Forecast

In developing the forecast of appliance saturation, it is most beneficial to observe the trend in the most recent year or two, more if necessary, such as if the rate changed a lot you can go back a little further to see if this is an anamoly. The reason for using the most recent data is due to the fact that the more recent trend gives insight into the patterns occurring with customers in the most recent past that are more likely to continue in the future. These changes could be based on customer behaviors or for another reason, such as the fact that the cost to purchase an air conditioner has declined or the fact that computers are becoming more prevalent in people's homes compared to even three or four years ago.

When forecasting the saturation of air coniditoning room units, there are three categories: primary units, which represent the percentage of households with one unit; secondary units, which represent the percentage of households with two units; and tertiary units, which represents the percentage of households with three or more units.

When forecasting the saturation of primary units, the historical data is helpful for determining what the growth rate should be. From the saturation data from 2003 to 2007 shown in Figure 7, it can be seen that primary ac saturation has not changed much during this time period. Therefore, the saturation for this appliance would remain the same. However, it is important to look at the number of units if the saturation level is being kept constant. The saturation level may sometimes need to be increased by a small amount (up to 0.5%) in order to have a reasonable growth in the number of units from the forecast base to the next period being forecasted.

Figure 7 Sample Saturation Data for Primary Room AC Units



Figures 8 and 9 show the growth in saturation for secondary and tertiary air conditioners and illustrate the point about using the most recent growth trend when forecasting future growth. Growth in these units has been higher in the past two summers[6] (from summer 2005 through summer 2007) compared to the growth from the summer of 2003 through summer 2005.

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[6] Summer is defined as July and August

Figure 8 Sample Saturation Data for Secondary Room AC Units

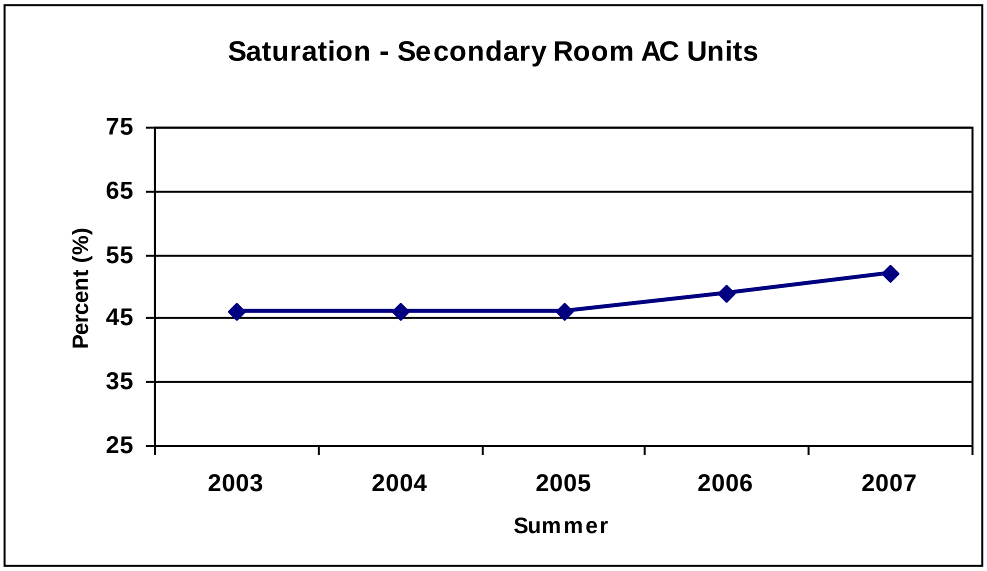
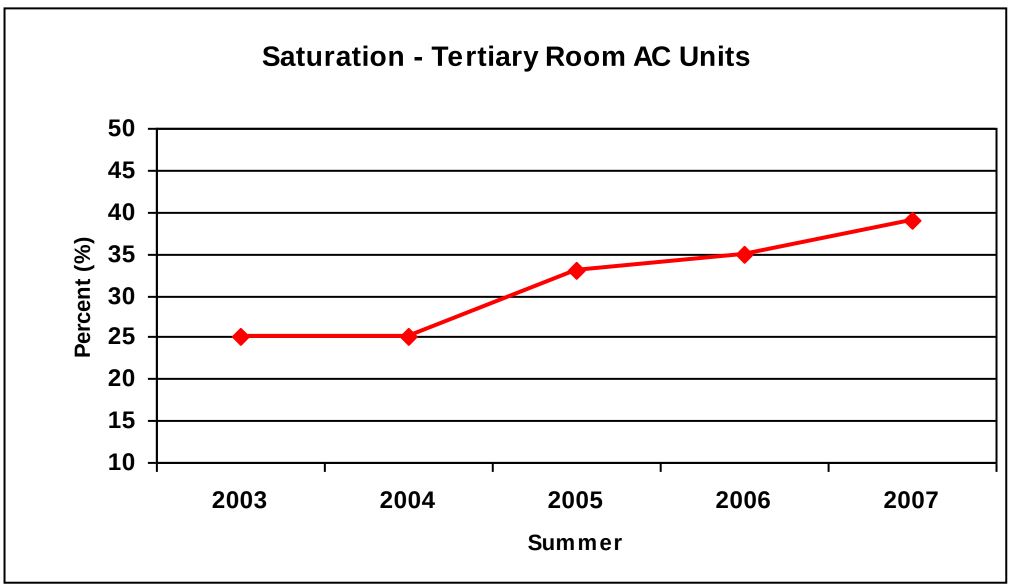


Figure 9 Sample Saturation Data for Tertiary Room AC Units



This can be explained partly from the weather experienced in the summers of 2005, 2006, and 2007 compared to the summers of 2003 and 2004. As shown in Table 4, there were more 90 degree days in the summers of 2005, 2006, and 2007 than in 2003 and 2004. This contributes to the purchases of air conditioning units, causing a larger increase when the weather is hotter.

Table 4 Weather Comparion

Days @ or above 90 degrees (Central Park)

	2003	2004	2005	2006	2007
July	2	0	8	4	2
August	2	1	9	3	4
Total	4	1	17	7	6

This historical data is used to develop an assumption about future growth. We can now see that the growth in saturation observed from the survey is related to the weather experienced. Since we forecast to a specific weather design criteria, we know that the design condition relies on hot weather so that saturation would tend to increase in the beginning years of the forecast period at a pace closer to the rate from 2005 through 2007 than the one seen from 2003 to 2005 and could slow slightly in the next few years due to a saturation effect that growth won't continue at the same rate forever. To measure the accuracy of the five-year ahead forecast, the forecast for 2007 back in 2002 can be used. The Table 5 shows forecast accuracy for room air conditioners and the forecasted number of air coniditoning units for the summer 2007 and the actual number of appliances as of in 2007.

Table 5 AC Unit Forecast Accuracy

Type of AC Unit	2007 Forecast (Developed in 2002)	2007 Actual	Forecast Accuracy
Primary AC Unit	2,784,910	2,764,898	-0.7%
Secondary AC Unit	1,890,988	1,792,702	-5.2%
Tertiary AC Unit	1,065,830	1,344,527	26.1%

Due to the larger than forecasted increase in tertiary ac units, the forecasted growth of these units was increased when the forecast was developed in 2007 with the assumption that this trend would continue. Some possible reasons why households may now have three or more ac unit sin their homes is that ac units have became less expensive to purchase and less of a luxury item, hence more of a necessity. Therefore, the saturation for tertiary units in 2012 in the forecast developed in 2002 was 35%, but it was rasied to 47% in the forecast issued in 2007. This reflects the fact that the higher growth in these units is expected and is based, in part, on the experience seen from 2002 to 2007.

The same rationale would hold when forecasting the growth in central air conditioning units, but since the saturation of these units has not changed dramatically in the past five years (as can be seen in Figure 10), it is prudent to assume a more conservative growth rate over the next ten so as to not overforecast the number of central air conditioners to be added to the service area since this appliance has a big impact on demand. Despite a small increase in saturation, the number of these appliances grows at a healthy rate due to the increase in the number of households used in the model. The accuracy in predicting the number of units five years ahead can be seen from the 2002 forecast. When the forecast was developed for the summer of 2007 back in 2002, it was estimated that there would be about 388,500 cenral air conditioning units in the service area. Upon establishing the base demand in 2007, it was determined that the actual number of central air conditioning units was 399,000. This translates into a 2.9% error in a five-year ahead forecast.

Figure 10 Sample Saturation Data for Central AC Units

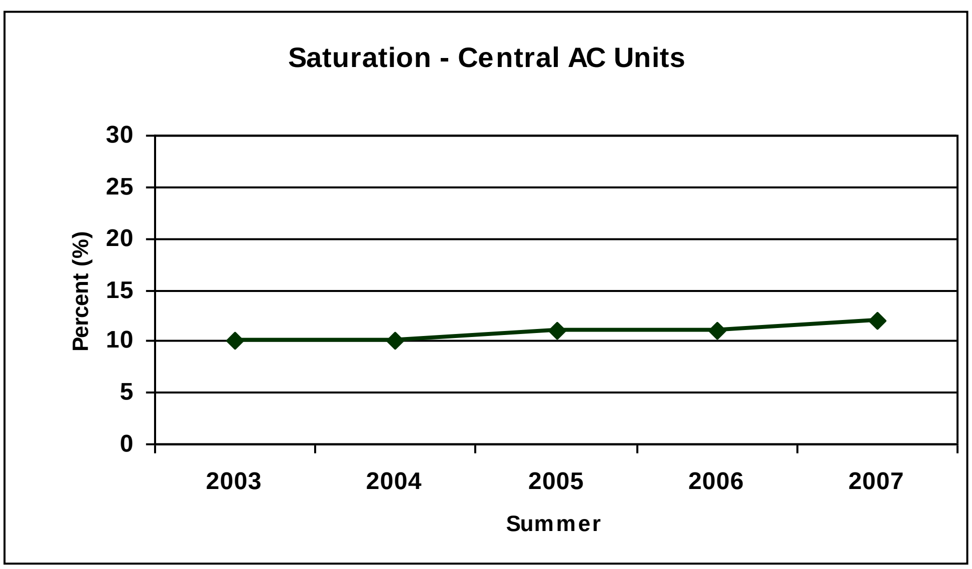
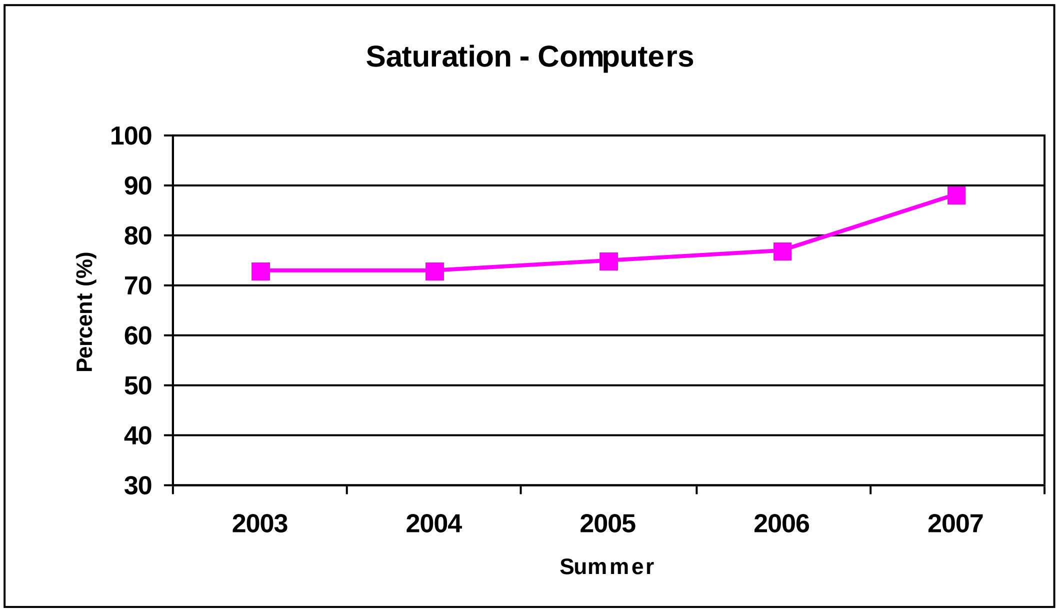


Figure 11 Sample Saturation Data for Computers



Economic Forecasting Manual

DRAFT

Prepared for:

Consolidated Edison
4 Irving Place
New York, New York 10003-3598

Prepared by:

Demand Forecasting Section

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Table of Contents

1

Overview

Economic forecasts are used in the forecasting process of all three of Con Edison's lines of business, electric, gas, and steam.

The electric forecasting process relies on the economic forecasts the most heavily of the three lines of business. The electric Demand Forecasting process involves a top-down as well as a bottom-up evaluation for each of the major sectors in the economy, commercial and residential. Economic forecasts are used in both the top down approach, as well as the bottom up approach in the electric forecast.

In the top-down approach, economic forecasts are utilized in both the commercial sector and residential sector. Private Non-Manufacturing Employment (PNM Employment) is a key driver in the commercial model, as is U.S. Gross Domestic Product (U.S. GDP). Key economic indicators affecting residential demand is the number of households, which is a reflection of population growth and building permits issued.

The bottom-up approach relies upon PNM Employment, which in the short-term is converted into future office space and demand to project the commercial office sector demand, as well as households, which represents the dwelling unit demand in the short term.

The electric section of the Revenue and Volume Forecasting Department is provided the U.S. GDP, PNM Employment, households, residential building permits, and consumer price index forecasts.

The gas section of the Revenue and Volume Forecasting Department is provided the U.S. GDP, PNM Employment, and residential building permit forecasts.

The steam section of the Revenue and Volume Forecasting Department is provided the U.S. GDP, PNM Employment, residential building permits, and an office vacancy forecast. Office vacancy is used to assess the time that would be needed to phase in a commercial office demand. A low vacancy rate would mean that an office building would fill up with tenants quickly and require less time to reach its full loading projection because there is significant demand for office space.

2

U.S. Gross Domestic Product

The actual U.S. Gross Domestic Product (GDP) values are obtained from the Bureau of Economic Analysis (BEA). The 2006 real GDP figure from the BEA was $11,319.4 billion chained 2000 dollars (as of August 2007). Year-over-year percent changes in real Gross Domestic Product annual series were applied to this 2006 figure to generate the forecast.

The forecast comes from the annual consensus forecast from the Blue Chip Economic Indicators monthly publication. The current year (year 1, which was 2007 for the 2007 forecast) and following year's (year 2, 2008) consensus forecast is taken from the most recent publication available at the time the forecast is generated. The 2007 consensus percentage change as of August 2007 was 2.0 percent. This 2.0 percent change was applied to the 2006 historical figure of $11,319.4 billion chained 2000 dollars to obtain the 2007 forecast of $11,545.8 billion chained 2000 dollars. The 2008 consensus percent change as was 2.8 percent. This 2.8 percent was applied to the 2007 forecast of $11,545.8 billion chained 2000 dollars to obtain the 2008 US GDP forecast of $11,869.1 billion chained 2000 dollars.

Table 1 US GDP Data

	U.S. GDP	**(bill. $2000)**
	ACTUAL	
2006	11,319.4	2.9%
	FORECAST	
2007	11,545.8	2.0%
2008	11,869.1	2.8%

Blue Chip Economic Indicators issues long term forecasts every March and October. The most recent long-term forecast growth rates are used for the forecast for years 3-30, 2009-2037. The Blue Chip publication reports years 3-7 growth rates (2009-2013) explicitly in the long-range consensus forecast, and a five year average growth rate for years 8-12 (2014-2018). The growth rates from 2009-2013 were applied to the previous year's forecast (as was done to generate the 2007 and 2008 forecast described above) to generate the forecast for the respective years. The five year average growth rate was assumed for each of the years from 2014 to 2037 and was applied to the previous year's forecast to obtain the long-term U.S. GDP forecast.

The GDP forecast is provided to the electric, gas, and steam sections of the Revenue and Volume Forecasting Department.

3

Private Non-Manufacturing Employment

3.1 Private Non-Manufacturing Employment

Private Non-manufacturing Employment (PNM) is used as the employment measure for both NYC and Westchester. PNM employment is total employment minus government employment and minus manufacturing employment. Demand Forecasting uses this specific employment measure due to the shrinking manufacturing sector (in both size and weight in the economy) in the NYC area.

3.2 New York City Employment

The historical figures are from the New York State Department of Labor which takes part in the Bureau of Labor Statistics' Current Employment Statistics (CES) program that conducts a survey on a monthly basis. The employment estimates are adjusted every March in what is called a benchmark revision. The monthly PNM employment series is averaged to determine an annual historical figure.

Table 2 New York City Employment Data

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average	YOY % Change Annual
2006	2,924.8	2,942.4	2,970.9	2,983.5	3,003.8	3,022.5	2,993.2	2,988.2	3,018.8	3,035.4	3,064.2	3,082.7	**3,002.5**	2.4

Moody's Analytics provides an annual and a quarterly forecast for NYC delivered at the end of April and August every year (as part of a semi-annual delivery). Moody's Analytics also maintains an online database, called Databuffet, for NYC data at a monthly frequency. Databuffet is updated once a month with the most recent forecast. All of Moody's Analytics' forecasts are seasonally adjusted, while the historical NYC data is not seasonally adjusted.

To create a monthly forecast for the current year (i.e. 2007 for the 2007 forecast) and following year (2008 for the 2007 forecast) (required by Revenue and Volume Forecasting

Department of Con Edison), the seasonally adjusted figures need to be converted to non-seasonally adjusted values.

The economic forecasts are created in the summer. Therefore, some monthly data does exist for the current year. To estimate the rest of the current year, for instance 2007, the monthly year-over-year percent changes for the remaining months are downloaded from Databuffet. These growth rates are applied to the year earlier historical figures.

Table 3 New York State Employment Forecast using Databuffet

2006	January	February	March	April	May	June	July	August	September	October	November	December	
NYS Historical Figures	2,924.8	2,942.4	2,970.9	2,983.5	3,003.8	3,022.5	2,993.2	2,988.2	3,018.8	3,035.4	3,064.2	3,082.7	3,002.5333

2007	January	February	March	April	May	June	July	August	September	October	November	December	
NYS Historical Figures	2,990.8	3,011.3	3,032.5	3,044.0	3,065.7	3,084.0	3,052.2						
YOY Monthly % Change from Databuffet.com								1.68%	1.61%	1.53%	1.44%	1.35%	
Estimated Actuals	2,990.8	3,011.3	3,032.5	3,044.0	3,065.7	3,084.0	3,052.2	3,038.5	3,067.5	3,081.9	3,108.4	3,124.3	3,058.4381

The monthly forecast for the following year, in this case 2008, utilizes the latest quarterly and annual Moody's Analytics growth rates from the semi-annual delivery. The quarterly growth rates are applied to the prior year's quarterly PNM employment figures (which are the monthly actuals averaged by quarter).

Table 4 Quarterly Employment Forecast

	Q1	Q2	Q3	Q4	Annual Average
2007 Quarterly	3,011.5	3,064.6	3,052.8	3,104.9	3,058.4
2008 Quarterly Growth Rates (Economy.com)	1.14%	0.86%	0.72%	0.73%	0.8623%
2008 Quarter Estimates	3,045.8	3,091.0	3,074.8	3,127.4	3,084.8

The quarterly values are then proportioned out by month using the average contribution of that month's employment to the quarter for the last 12 years.

Table 5 Quarterly Employment Data Proportioned into Months

Year	January	February	March	April	May	June	July	August	September	October	November	December	Annual Average
2007	2990.8	3011.3	3032.5	3044.0	3065.7	3084	3052.2						
2006	2924.8	2942.4	2970.9	2983.5	3003.8	3022.5	2993.2	2988.2	3018.8	3035.4	3064.2	3082.7	3,002.5
2005	2,861.8	2,875.5	2,895.3	2,917.3	2,927.5	2,941.2	2,915.8	2,917.2	2,949.9	2,965.6	2,997.8	3,027.1	2,932.7
2004	2,801.6	2,820.6	2,846.8	2,853.2	2,873.7	2,884.7	2,867.8	2,859.4	2,881.1	2,909.5	2,931.4	2,959.3	2,874.1
2003	2,818.7	2,828.0	2,837.9	2,837.2	2,851.7	2,854.6	2,823.3	2,812.4	2,840.0	2,869.9	2,891.9	2,909.8	2,848.0
2002	2,832.7	2,853.4	2,866.1	2,871.0	2,889.5	2,892.1	2,854.9	2,847.5	2,861.3	2,893.6	2,915.3	2,929.1	2,875.5
2001	2,980.8	2,995.0	3,008.9	2,990.9	3,007.3	3,010.2	2,964.0	2,951.5	2,953.8	2,912.0	2,934.7	2,944.9	2,971.2
2000	2,886.9	2,907.3	2,930.2	2,949.4	2,962.1	2,985.9	2,952.2	2,946.8	2,988.4	3,021.6	3,055.4	3,077.6	2,972.0
1999	2,796.8	2,815.6	2,834.1	2,840.3	2,846.2	2,863.9	2,846.0	2,849.0	2,859.9	2,909.5	2,944.7	2,974.5	2,865.0
1998	2,694.5	2,707.9	2,730.8	2,743.5	2,757.0	2,772.8	2,762.6	2,761.8	2,780.6	2,819.2	2,845.9	2,870.6	2,770.6
1997	2,619.2	2,632.1	2,659.9	2,664.2	2,674.8	2,692.3	2,677.1	2,672.5	2,703.9	2,729.1	2,751.6	2,781.7	2,688.2
1996	2,545.9	2,577.3	2,594.9	2,603.8	2,621.1	2,634.0	2,602.6	2,603.6	2,624.3	2,660.4	2,687.2	2,705.6	2,621.7
1995	2,523.2	2,532.1	2,553.0	2,556.7	2,568.8	2,579.8	2,544.7	2,547.4	2,575.9	2,597.4	2,622.0	2,640.2	2,570.1
Average For 12 Years	2,790.6	2,807.6	2,827.8	2,817.6	2,832.0	2,844.5	2,817.0	2,813.1	2,836.5	2,860.3	2,886.8	2,908.6	2,836.9

	January	February	March	April	May	June	July	August	September	October	November	December	
2008 Monthly Estimates Using Average Monthly Contribution	**3,026.3**	**3,044.7**	**3,066.6**	**3,076.0**	**3,091.7**	**3,105.4**	**3,069.1**	**3,064.9**	**3,090.3**	**3,100.4**	**3,129.2**	**3,152.8**	**3084.8**

These monthly forecasted levels are then averaged for the quarter.

Table 6 Quarterly Employment Forecast

2008	Q1	Q2	Q3	Q4	Average
2008 Quarterly Forecast	**3,045.84**	**3,091.00**	**3,074.78**	**3,127.43**	3,084.8

The quarterly year-over-year growth rates are then determined the forecasted levels, which may stray slightly from the quarterly growth rates from the semi-annual delivery. The quarterly growth rates from the latest semi-annual delivery are then applied for the rest of the forecast. After the current and following year's adjustment, all of the quarterly growth rates will average to the annual growth rates in the annual semi-annual delivery. The NYC PNM Employment is forecasted out 30 years through this process.

The NYC PNM employment forecast is provided to the electric, gas, and steam sections of the Revenue and Volume Forecasting Department and is utilized in the Demand Forecasting Section.

3.3 Westchester Employment

The historical figures through 2004 are from the Bureau of Labor Statistics Current Employment Survey (CES) program, at which point the BLS discontinued the series. The figures beyond 2004 to the current period are estimated by applying Moody's Analytics' growth rates to the historical 2004 values. These growth rates are updated on a monthly basis by Moody's Analytics and the Company downloads the updated rates from Databuffet. For the 2007 forecast, 2005 and 2006 are estimated.

Table 7 Employment Estimates Using Databuffet

2004	January	February	March	April	May	June	July	August	September	October	November	December	Annual Average
BLS Historical Figures	321.9	321.2	326.7	329.1	332.9	336.8	335.5	334.2	334.2	337.8	338.7	341.5	332.5
2005	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	
YOY Monthly % Change from Databuffet.com	1.37%	1.11%	0.87%	0.65%	0.48%	0.36%	0.30%	0.31%	0.38%	0.49%	0.65%	0.83%	
Estimated Actuals	326.3	324.8	329.5	331.3	334.5	338.0	336.5	335.2	335.5	339.5	340.9	344.3	334.7
2006	**January**	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	
YOY Monthly % Change from Databuffet.com	1.04%	1.24%	1.45%	1.66%	1.85%	2.01%	2.14%	2.23%	2.28%	2.30%	2.29%	2.25%	
Estimated Actuals	329.7	328.8	334.3	336.8	340.7	344.8	343.7	342.7	343.1	347.3	348.7	352.1	341.1

To create a monthly forecast for the current year (in this example 2007) (required by Revenue and Volume Forecasting Department of Con Edison), the same process is used as the historical estimates – the Databuffet year-over-year growth rates are applied to the year earlier monthly estimate.

Table 8 Monthly Employment Forecast

2007	January	February	March	April	May	June	July	August	September	October	November	December	
YOY Monthly % Change from Databuffet.com+	2.20%	2.12%	2.04%	1.94%	1.84%	1.73%	1.62%	1.52%	1.41%	1.32%	1.22%	1.13%	
Estimated Actuals	336.9	335.8	341.1	343.3	346.9	350.8	349.3	347.9	348.0	351.8	353.0	356.1	346.7435

To create a monthly forecast for the following year, the same process is used for NYC is followed (described above).

The Westchester PNM Employment is forecasted out 30 years through this process. After the current and following year's adjustment, all of the quarterly growth rates will average to the annual growth rates in the annual semi-annual delivery.

The Service Area's PNM employment forecast is the sum of NYC and Westchester's forecasts.

The Westchester PNM employment forecast is provided to the electric, gas, and steam sections of the Revenue and Volume Forecasting Department and is utilized in the Demand Forecasting Section.

4

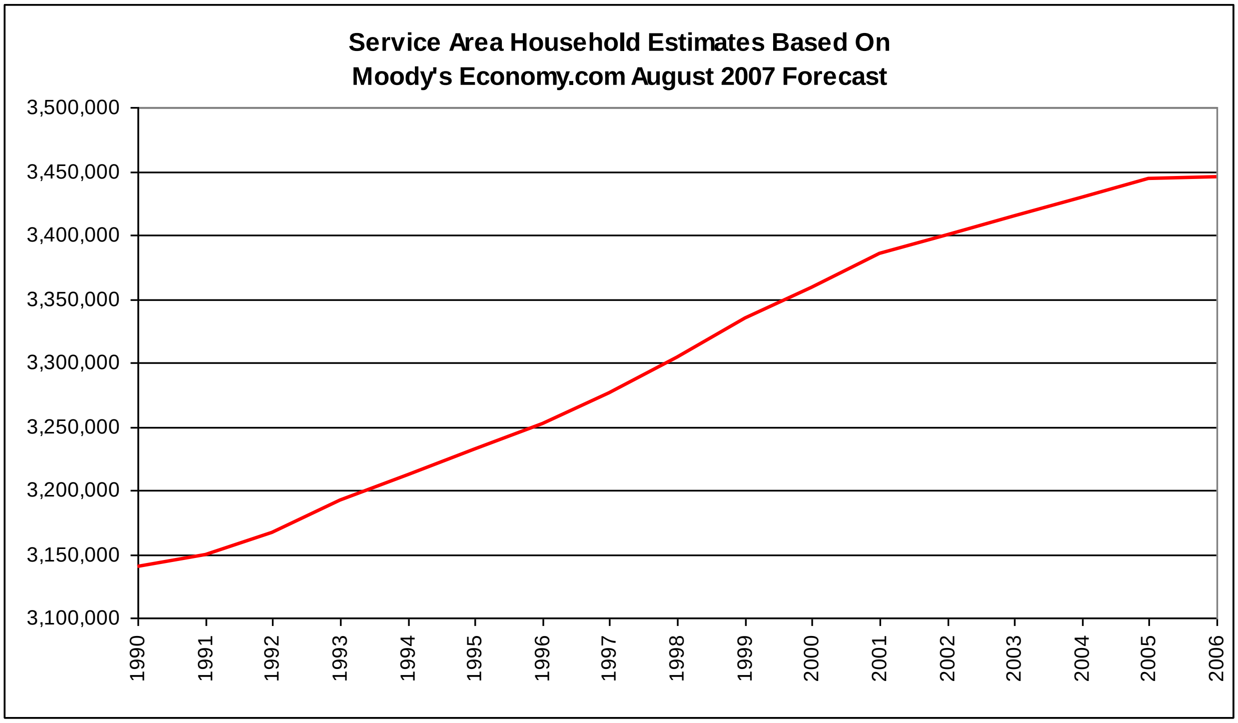
Households

Historical households' data by county is from the decennial census conducted by the US Census Bureau (1980, 1990, 2000, etc.). Since there are slight differences between Census Bureau figures and Moody's Analytics census year data, intercensal years for both NYC and Westchester are estimated. These estimates are produced by applying Moody's Analytics annual growth rates from the latest semi-annual delivery to the previous decennial census. For example, growth rates for 1991-1999 are applied to the 1990 census figure. The August 2007 Households Estimates are below based on Moody's Economy.com August 2007 semi-annual delivery.

Table 9 Household Estimates

Year	New York City, 2000 Census	Westchester, 2000 Census	New York City, Economy.com	Westchester, Economy.com	New York City, Estimates	Westchester, Estimates	Service Area, Estimates, 2008 Budget
1990	2,819,401	320,030	2,824.18	320.3	2,819,401	320,030	3,139,431
1991			2,833.10	321.37	2,828,306	321,099	3,149,405
1992			2,848.15	323.69	2,843,330	323,417	3,166,748
1993			2,871.77	325.4	2,866,910	325,126	3,192,036
1994			2,890.79	326.55	2,885,898	326,275	3,212,173
1995			2,909.21	328.06	2,904,287	327,783	3,232,071
1996			2,928.14	329.51	2,923,185	329,232	3,252,417
1997			2,950.95	330.71	2,945,956	330,431	3,276,388
1998			2,977.00	332.88	2,971,962	332,599	3,304,562
1999			3,004.77	335.39	2,999,685	335,107	3,334,793
2000	3,021,588	337,142	3,025.44	338.06	3,021,588	337,142	3,358,730
2001			3,048.77	341.39	3,044,888	340,463	3,385,351
2002			3,060.74	343.68	3,056,843	342,747	3,399,590
2003			3,075.46	344.59	3,071,544	343,654	3,415,199
2004			3,088.67	345.62	3,084,737	344,681	3,429,419
2005			3,102.78	345.99	3,098,830	345,050	3,443,880
2006			3,103.39	346.55	3,099,439	345,609	3,445,048

Figure 1 Service Area Household Estimates



The households forecast is generated using the same technique - applying Moody's Analytics growth rates from the latest semi-annual delivery to the latest decennial census figures for NYC and Westchester (2000 in this case). The Service Area forecast is the sum of NYC and Westchester forecasts.

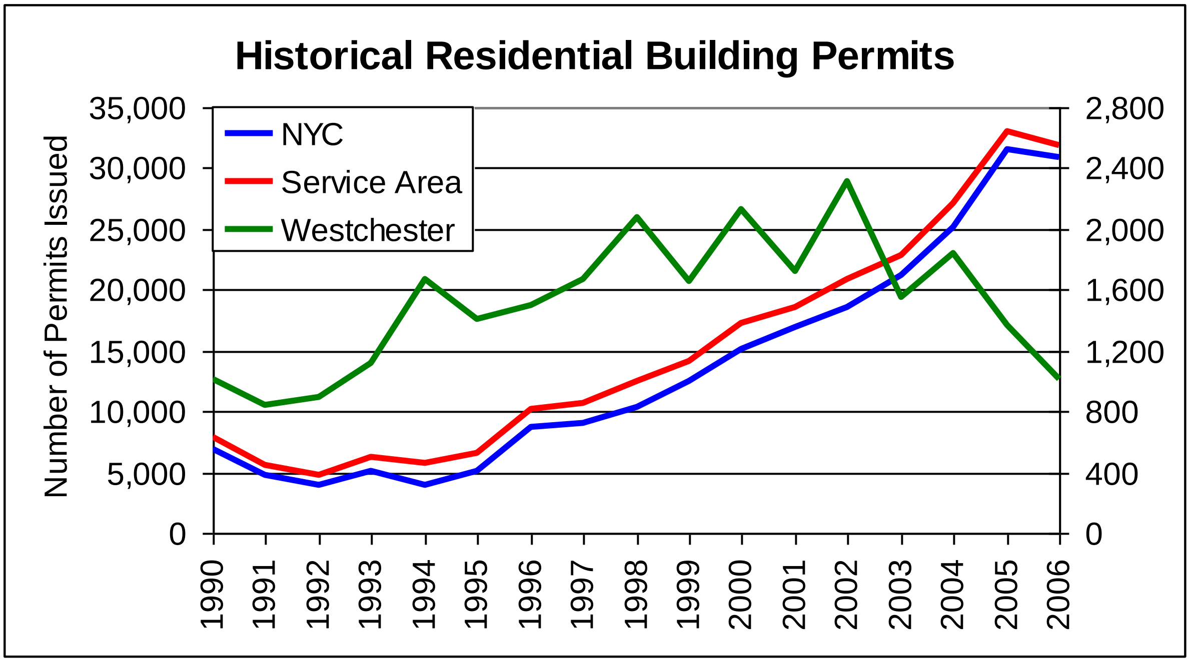
The household forecast is provided to the electric section of the Revenue and Volume forecasting Department and is utilized in the Demand Forecasting Section.

5

Residential Building Permits

A residential building permit represents the number of new privately-owned housing units authorized to be built. A housing unit is a house, an apartment, a group of rooms or a single room intended for occupancy as separate living quarters. The historical values for NYC and Westchester residential building permits are from the US Census Bureau. The data is reported by county, so NYC is the sum of the five counties, Bronx, Kings, New York, Queens, and Richmond. The December year-to-date values are used for annual figures for all counties.

Figure 2 Historical Residential Building Permits



Moody's Analytics provides a forecast for NYC as a whole and Westchester County. The forecast for NYC and Westchester is generated by applying the annual growth rates from Moody's Analytics' semi-annual delivery to the actuals with the exception of the current year, for instance 2007 in the 2007 forecast.

Moody's Analytics generally takes one to two months to create the forecasts for the semi-annual delivery. As such, by the time the forecast arrives and is utilized by the Company, additional monthly year-to-date figures are available from the US Census Bureau. Therefore, the current year's forecast is adjusted based on the current year-to-date permit levels at the time the forecast is created. A lower and upper bound is determined based on the lowest (or second lowest) and highest (or second highest) monthly gains from the last five to seven years for the remainder of the months in the year. Generally the forecast adjustment is made by assuming a historically based monthly average gain for the remaining months that will bring the forecast between the lower and upper bound. Based on the current economic environment, the Company determines which bound the current forecast year should be closer to.

For example, when the 2007 forecast was generated, historical residential building permit data was available through April. The year-to-date April figure for NYC was 10,073, which was more than half off from the Moody's Analytics April semi-annual forecast for 2007 of 21,066. In order to adhere to the Moody's Analytics 21,066 forecast, the average monthly gain of building permits would have had to have been 1,374. Since 2001, NYC has experienced only three single months with gains lower than 1,374. To expect six consecutive months of gains this low would be unrealistic. As a result, the NYC 2007 forecast was adjusted upward. The average monthly gain from May to December from 2001 to 2006 was approximately 2,000 new permits, so Demand Forecasting assumed that 2,000 permits would be added each month for the remaining eight months of 2007. This assumption would bring the 2007 forecast for NYC to 26,073. The same process was followed for Westchester to adjust its 2007 forecast as well.

The remainder of the annual residential building permit forecast applies Moody's Economy.com growth rates to the current year's forecast. The service area forecast is the sum of NYC's and Westchester's forecasts.

Table 10 Residential Building Permits Issued

HOUSING UNITS
AUTHORIZED BY BUILDING PERMITS ISSUED
Number of Dwelling Units

				YOY % Change		
Year	NYC	Westch.	Total	NYC	Westch.	Total
2006	30,927	1,006	31,933			
2007	26,073	967	27,040			
2008	21,206	819	22,024	-18.7%	-15.4%	-18.5%
2009	20,487	815	21,302	-3.4%	-0.5%	-3.3%
2010	20,777	803	21,580	1.4%	-1.4%	1.3%
2011	21,295	779	22,074	2.5%	-3.0%	2.3%
2012	21,764	764	22,528	2.2%	-1.9%	2.1%
2013	21,238	755	21,993	-2.4%	-1.2%	-2.4%
2014	20,214	752	20,966	-4.8%	-0.3%	-4.7%
2015	19,224	723	19,947	-4.9%	-3.8%	-4.9%
2016	18,703	707	19,410	-2.7%	-2.2%	-2.7%
2017	18,210	690	18,900	-2.6%	-2.5%	-2.6%

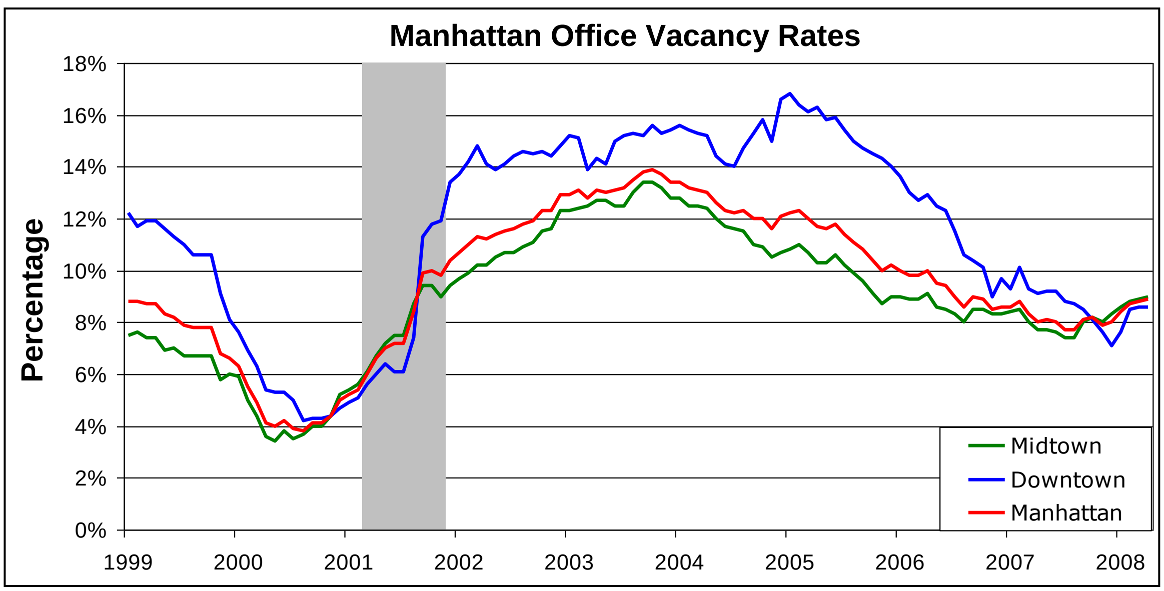
The residential building permit forecast is provided to the electric, gas, and steam sections of the Revenue and Volume Forecasting Department and the Demand Forecasting Section.

6

Manhattan Office Vacancy Rates

Historical office vacancy rates are from CB Richard Ellis and its predecessor Insignia/ESG's availability rate. The data is available for three areas in Manhattan, Downtown, Midtown, and Midtown South. A Manhattan rate is generated by calculating the percentage of total available space out of total office space.

Figure 3 Manhattan Office Vacancy Rates



The vacancy rate forecast is based on the PNM Employment forecast. Office employment is estimated to be 73% of private non-manufacturing employment based on historical analysis of industries in the office sector and the ratio to private non-manufacturing employment. Manhattan office employment accounts for the bulk of office employment in NYC, approximately 76%. The estimated 200 square feet per employee measure (a conventional measure used by the industry) is multiplied by the change in office employment to determine the change in Manhattan occupied space.

	NYC Private Nonmfg. Employment			NYC Off.Empl.	Man. Off.Empl.	Man. Occ. Office Space
	Level (000's)	Change %	Change (000's)	Change (000's) (*.73)	Change (000's) (*.76)	Change (000's) (*200SF)
Actual 2006	**3,003**	**2.4%**	**69.9**	-	-	**7,238**
Forecast						
2007	3,057	1.8%	54.4	39.7	30.2	6,039

Vacancy rates are forecasted based on the change in occupied space and the change in total space. The change in total space is determined by new construction and demolition, which is estimated dynamically so that the vacancy rate remains within a reasonable level based on historical experience. Vacancy rates are assumed to work toward an equilibrium level of around 7-8%. In the last boom of the mid-1990s to early 2001-vacancy rates dropped to the 3% range. However, the Company believes that that was a very low level and should not be assumed for the forecast.

	Total Space (12/31)	**New Const.**	**Demol.**	**Occup. Space (12/31)**	**Vacant Space (12/31)**	**Vac. Rate (12/31)**	**Change In Occup. Space**
2006	**285,933**	**2,307**	**0**	**261,562**	**24,371**	**8.5%**	**7,238**
Forecast							
2007	289,433	4,000	500	267,601	21,832	7.5%	6,039

The forecast completed in 2008 contains two variations from the process described above. The July 2008 office space forecast uses an updated assumption for the percentage of office employment in private non-manufacturing employment based on 2008 industry employment data. Office employment is now estimated to be 70% of private non-manufacturing employment. The July 2008 forecast also utilizes an average demolition estimate (converted from Mlbs) provided by the steam Revenue and Volume Forecasting Department as the demolition forecast. The new construction forecast is then estimated to keep the vacancy rate within its reasonable level (described above).

The Manhattan Office Vacancy forecast is provided to the steam section of the Revenue and Volume Forecasting Department.

7

Steam Service Area New Housing Units

The number of new housing units in the steam service area is based on the Moody's Analytics residential building permit forecast described above. Actual residential building permit data is released by county by the U.S. Census Bureau and the total sum of NYC's five counties account the NYC's total residential building permits.

Moody's Analytics' residential building permit forecast is for all of NYC and is not separated by county. Therefore, in order to generate a residential building permit forecast for Manhattan alone, a 5-year historical relationship between NYC and Manhattan is used. For instance, from 2002-2006, Manhattan's permits accounted for 26 percent of New York City's total permits. Therefore, the 26 percent is applied to the NYC residential building permit forecast in 2007 to generate the Manhattan residential building permit forecast.

	NYC Permits	Man Permits^
2007	26,073	6,779
2008	21,206	5,514
2009	20,487	5,327
2010	20,777	5,402
2011	21,295	5,537
2012	21,764	5,659
2013	21,238	5,522
2014	20,214	5,256
2015	19,224	4,998
2016	18,703	4,863
2017	18,210	4,735

It is then assumed that it takes an average of two years for a residential building permit to become a new housing unit. Thus, the Manhattan permit forecast is lagged two years.

2009	6,779
2010	5,514
2011	5,327
2012	5,402
2013	5,537
2014	5,659
2015	5,522
2016	5,256
2017	4,998

It is then assumed that the steam service area is 80 percent of Manhattan.

2009	6,779	80%	5,423
2010	5,514	80%	4,411
2011	5,327	80%	4,261
2012	5,402	80%	4,322
2013	5,537	80%	4,429
2014	5,659	80%	4,527
2015	5,522	80%	4,418
2016	5,256	80%	4,204
2017	4,998	80%	3,999

Finally, the number of dwelling units known in large projects is then added to this steam service area residential permit forecast to represent the new housing unit forecast for the steam service area.

2009	6,779	80%	5,423	500	5,923
2010	5,514	80%	4,411	500	4,911
2011	5,327	80%	4,261	1,500	5,761
2012	5,402	80%	4,322	1,000	5,322
2013	5,537	80%	4,429	1,000	5,429
2014	5,659	80%	4,527	500	5,027
2015	5,522	80%	4,418	700	5,118
2016	5,256	80%	4,204	0	4,204
2017	4,998	80%	3,999	0	3,999

The CPI forecast is provided to the steam section of the Revenue and Volume Forecasting Department.

8

Consumer Price Index

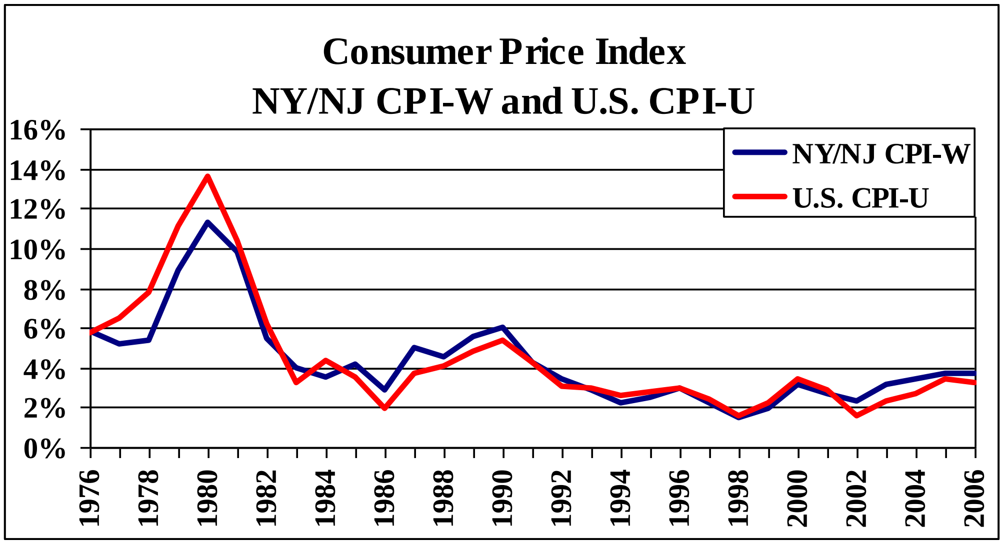
The historical U.S. Consumer Price Inex –All Urban Consumers (CPI-U) and the local New York, Northern New Jersey, Long Island, Connecticut, and Pennsylvania Consumer Price Index – Urban Wage Earners and Clerical Workers (NY/NJ CPI-W) figures are obtained from the Bureau of Labor Statistics Consumer Price Index program. The all items, not seasonally adjusted series are collected and the monthly series is averaged to create an annual figure for the year. The year-over-year growth rate is then determined and used in the forecast process. The year-over-year percent change in 2006 for the U.S. CPI-U was 3.2 percent and 3.7 percent for the NY/NJ CPI-W.

The annual forecast for the U.S. CPI-U comes from the Blue Chip Economic Indicators monthly publication. The current year (year 1, which was 2007 for the 2007 forecast) and following year's (year 2, 2008) consensus forecast is taken from the most recent publication available at the time the forecast is generated. The 2007 census forecast for the U.S. CPI-U as of June 2007 was 2.0 percent. The 2008 consensus forecast for the U.S. CPI-U was 2.4 percent.

Blue Chip Economic Indicators issues long term forecasts every March and October. The most recent long-term forecast growth rates are used to develop the forecast for years 3 on, 2009 on. The Blue Chip publication reports years 3-7 growth rates (2009-2013) explicitly in the long-range consensus forecast, and a five year average growth rate for years 8-12 (2014-2018). The five year average growth rate is assumed for each of the years within the time frame (in this case 2014-2018), as well as the years after that. The use of the Blue Chip forecasts for escalation rate forecasts is by agreement with the New York State Public Service Commission.

The forecast for the NY/NJ CPI-W is based on the historical relationship between the US CPI-U and the NY/NJ CPI-W.

Figure 4 Consumer Price Index



The two series tend to follow each other very closely, so it is assumed that the NY/NJ CPI-W forecast will match the U.S. CPI-U forecast if the latest historical figures for the two series match. If there is a slight difference between the NY/NJ CPI-W and US CPI-U in the latest historical figure, then it is assumed that the local NY/NJ CPI-W forecast will converge to the U.S. CPI-U within the next several years.

Table 11 Consumer Price Index Comparison

		NY-NENJ CPI-W	U.S. CPI-U
Actual	**2004**	**3.4**	**2.7**
	2005	**3.7**	**3.4**
	2006	**3.7**	**3.2**
Forecast	**2007**	**2.4**	**2.0**
	2008	**2.7**	**2.4**
	2009	**2.5**	**2.3**
	2010	**2.3**	**2.3**
	2011	**2.3**	**2.3**
	2012	**2.3**	**2.3**
	2013	**2.3**	**2.3**
	2014	**2.3**	**2.3**
	2015 & On	**2.3**	**2.3**

The CPI forecast is provided to the electric section of the Revenue and Volume Forecasting Department.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032
Response to DPS Interrogatories – Set DPS-7
Date of Response: 03/19/2013
Responding Witness: Steam Forecasting Panel

Question No. :S0030
Subject: Steam Forecasting - 6. Regarding the definition of normal weather referred to on page 7, line 12 of the Steam Forecasting Panel's pre-filed testimony, explain why the 30 calendar years period ended 2011 was used instead of 10 calendar years as preferred by the NYPSC? (See page 14 of the June 17, 2011 NYPSC Order in Case 10-E-0362)
http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=41BF8CB8-0553-4E28-BACF-582977C88AD3

Response:
The Company does not believe that the Commission's June 17, 2011 order in Case 10-E-0362 or June 22, 2009 order in Case 08-E-0887 preclude a party from arguing for a 30-year weather average rather than a 10-year weather average. This is evidenced by Staff's position in the Company's last gas and steam rate filings (Cases 09-S-0794 and 09-G-0795) favoring use of a 30-year average despite the Commission's June 22, 2009 order in Case 08-E-0887. The Company believes its use of a rolling 30 year average includes any trends in temperature patterns without being overly impacted by any one year as might occur with a shorter time period. A shorter time period (i.e., a 10 year period) on an annual rolling basis could reflect temporary increases or decreases in the level of degree days rather than any long term trend. The weighting of any one year in a 10 year normal would be more significant than a 30 year average.

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-8
Date of Response: 03/06/2013
Responding Witness: Electric Forecsting Panel

Question No. :E0043
Subject: Weather Assumptions for Sales Volume Forecast - 1. Does the Panel use a 30-year average as normal weather for electric volume forecast? 2. If the Panel used a 30-year average based normal weather, provide the delta in sales volume and revenue for the effected classes as result of the change to a 10-year average based normal weather assumption. 3. If the Panel used a 30-year average based normal weather, will the Panel change to a 10-year average based normal weather when submitting an updated forecast?

Response:

1. Does the Panel use a 30-year average as normal weather for electric volume forecast?

   Response: Yes.

2. If the Panel used a 30-year average based normal weather, provide the delta in sales volume and revenue for the effected classes as result of the change to a 10-year average based normal weather assumption.

   Response: See the attached file, DPS-8-E0043 Sales Forecast Comparison - 10yr vs 30yr normals.xlsx, for the changes in sales volume, by service classification, that result from changing the normal weather from 30-year averages to 10-year averages of historical actual weather. To calculate the corresponding changes in revenue would require a study that does not exist.

   The Company objects to this request to the extent it asks for data that does not currently exist.

3. If the Panel used a 30-year average based normal weather, will the Panel change to a 10-year average based normal weather when submitting an updated forecast?

   Response: No.

Consolidated Edison Company of New York, Inc.
Case 13-E-0030
DPS-8-E0043
Comparison of Sales Forecasts - Normal Weather based on 30-year averages vs. Normal Weather based on 10-year averages

	Forecast Based on 30-year Normals (GWh)						Forecast Based on 10-year Normal			
	SC 1	**SC 2**	**SC 8**	**SC 9**	**SC 12**	**TOTAL**	**SC 1**	**SC 2**	**SC 8**	**SC 9**
2012Q3	4,627.605	587.191	640.142	7,819.313	75.507	13,749.757	4,748.592	593.235	652.648	7,878.964
2012Q4	3,251.075	511.378	460.642	6,658.970	94.728	10,976.794	3,255.322	511.412	461.681	6,664.391
2013Q1	3,348.833	563.767	454.918	6,517.759	165.229	11,050.507	3,355.233	564.749	455.565	6,523.318
2013Q2	3,053.871	501.562	430.526	6,567.710	85.324	10,638.995	3,060.475	502.066	431.694	6,575.350
2013Q3	4,678.710	586.823	634.650	7,930.467	76.177	13,906.828	4,802.266	592.920	647.174	7,991.557
2013Q4	3,282.461	509.843	455.666	6,738.166	95.219	11,081.356	3,286.224	509.833	456.608	6,743.087
2014Q1	3,385.843	562.594	451.777	6,601.748	166.037	11,168.001	3,392.247	563.564	452.414	6,607.320
2014Q2	3,093.842	500.749	428.028	6,655.259	85.716	10,763.594	3,100.568	501.258	429.192	6,663.035
2014Q3	4,765.518	586.700	633.637	8,047.992	76.503	14,110.349	4,892.876	592.865	646.290	8,110.712
2014Q4	3,330.906	508.179	453.055	6,819.295	95.596	11,207.032	3,334.189	508.124	453.908	6,823.705
2015Q1	3,444.995	561.619	450.038	6,696.424	166.651	11,319.727	3,451.442	562.577	450.665	6,702.016
2015Q2	3,153.344	500.435	427.315	6,761.526	86.011	10,928.632	3,160.285	500.954	428.489	6,769.514
2015Q3	4,819.739	583.590	627.865	8,139.980	76.745	14,247.920	4,947.673	589.678	640.319	8,202.977
2015Q4	3,402.979	509.654	453.241	6,948.353	95.873	11,410.100	3,406.630	509.627	454.136	6,953.152
2016Q1	3,505.478	561.110	448.803	6,795.667	168.340	11,479.397	3,509.895	561.755	449.224	6,799.489
2016Q2	3,202.349	499.483	425.322	6,853.743	86.224	11,067.121	3,209.278	499.987	426.475	6,861.716
2016Q3	4,910.872	583.106	627.393	8,255.526	76.918	14,453.815	5,040.218	589.148	639.741	8,318.949
2016Q4	3,456.085	507.686	452.036	7,022.718	96.068	11,534.593	3,460.187	507.688	452.991	7,027.991
RY 1	14,576.109	2,158.223	1,966.497	28,124.294	423.852	47,248.975	14,719.881	2,165.811	1,981.803	28,204.772
RY 2	14,821.057	2,155.299	1,958.459	28,546.284	425.280	47,906.379	14,966.029	2,162.836	1,973.608	28,627.659
RY 3	15,074.784	2,151.385	1,953.555	28,927.653	427.549	48,534.926	15,219.578	2,158.578	1,968.431	29,008.144

Consolidated Edi
Case 13-E-0030
DPS-8-E0043
Comparison of S

	s (GWh)		Delta (GWh)					
	SC 12	TOTAL	SC 1	SC 2	SC 8	SC 9	SC 12	TOTAL
2012Q3	76.150	13,949.589	120.987	6.044	12.506	59.651	0.643	199.832
2012Q4	94.253	10,987.059	4.247	0.034	1.039	5.420	-0.475	10.265
2013Q1	166.524	11,065.388	6.399	0.982	0.647	5.558	1.295	14.881
2013Q2	85.008	10,654.593	6.603	0.504	1.167	7.639	-0.316	15.598
2013Q3	76.852	14,110.769	123.556	6.097	12.524	61.090	0.674	203.941
2013Q4	94.742	11,090.494	3.762	-0.010	0.943	4.921	-0.477	9.139
2014Q1	167.338	11,182.884	6.404	0.970	0.636	5.572	1.301	14.883
2014Q2	85.398	10,779.451	6.726	0.508	1.164	7.776	-0.318	15.856
2014Q3	77.180	14,319.923	127.359	6.166	12.653	62.720	0.677	209.574
2014Q4	95.117	11,215.043	3.283	-0.055	0.853	4.410	-0.479	8.011
2015Q1	167.957	11,334.656	6.446	0.958	0.627	5.592	1.306	14.928
2015Q2	85.692	10,944.933	6.940	0.518	1.173	7.988	-0.319	16.301
2015Q3	77.424	14,458.071	127.934	6.088	12.453	62.997	0.679	210.151
2015Q4	95.393	11,418.938	3.652	-0.027	0.895	4.799	-0.480	8.839
2016Q1	169.660	11,490.022	4.417	0.644	0.421	3.822	1.320	10.625
2016Q2	85.904	11,083.359	6.929	0.504	1.153	7.973	-0.320	16.238
2016Q3	77.598	14,665.654	129.346	6.042	12.348	63.423	0.681	211.840
2016Q4	95.587	11,544.443	4.101	0.003	0.955	5.273	-0.481	9.851
RY 1	425.033	47,497.300	143.771	7.589	15.306	80.478	1.181	248.325
RY 2	426.466	48,156.597	144.972	7.538	15.148	81.375	1.186	250.219
RY 3	428.749	48,783.479	144.793	7.192	14.876	80.491	1.200	248.553

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-13
Date of Response: 03/19/2013
Responding Witness: Electric Forecasting Panel

Question No. :E0097

Subject: Impact of DSM on Sales - 1. For all the programs and sources stated on pages 18-19 of the Forecasting Panel's testimony, from which the Forecasting Panel has reflected an adjustment of DSM savings on electric sales, provide detailed numbers by program or source and by year, the projections of incremental DSM savings that summed up to 810, 1147, and 1420 GWhs for rate years 2014, 2015, and 2016, as shown on page 1, Exhibit ___ (FP-6). Support your numbers by relevant documentation. 2. Explain in detail how the Forecasting Panel uses the information of the mentioned three NYSERDA's documents, as stated on pages 19-20 of your testimony, to develop the projected DSM savings. Provide the workpapers and copies of the relevant pages of the documents to support your explanation. 3. Provide a table that compares projected and actual DSM savings, in MWH and MW, respectively, on an annual incremental basis by program since 2009. The DSM savings projected for years prior to 2012 should be consistent with those used by the Forecasting Panel in Case 09-E-0428, Exhibit FP-6 and Exhibit FP-13. The actual savings and the projections for 2012 and beyond should be consistent with those presented in this case in Exhibit FP-6 and workpapers "DPS-1-E066 DSM Backup.xlsx." The table should be in a template like the attached table below, with a hypothetical example filled in the first row: (INSERT TABLE) Explain the differences, line by line, in Column 4. 4. Explain any changes that Con Edison has made since last rate case in the process of projecting the impact of DSM savings on Con Edison's electric sales forecast.

Response:

1. For all the programs and sources stated on pages 18-19 of the Forecasting Panel's testimony, from which the Forecasting Panel has reflected an adjustment of DSM savings on electric sales, provide detailed numbers by program or source and by year, the projections of incremental DSM savings that summed up to 810, 1147, and 1420 GWhs for rate years 2014, 2015, and 2016, as shown on page 1, Exhibit ___ (FP-6). Support your numbers by relevant documentation.

   Response:

   The following includes a breakdown of the savings sources that totaled the 810, 1147, and 1420 GWhs referenced for rate years 2014, 2015 and 2016, respectively.

Source	2012 - 2014	2012 - 2015	2012 - 2016
Con Edison EEPS Programs (GWh)	(435)	(620)	(804)
NYSERDA EEPS Programs (GWh)	(375)	(527)	(616)
All Programs (GWh)	(810)	(1,147)	(1,420)

Con Edison EEPS targets not achieved within the 2009-2011 program cycle were forecasted to occur in subsequent years, based on the premise that achieving program targets set for the 2009-2011 timeframe is necessary if the “15 by 15” energy efficiency targets for the various program administrators are to be reached. This is also based on the assumption that the Commission approves the use of non-committed funds for the outer years.

Con Edison savings were derived using the targets set in Case 07-M-0548, in the “Order Authorizing Efficiency Programs, Revising Incentive Mechanism, and Establishing a Surcharge Schedule” issued October 25, 2011, the “Order Approving Utility Target Adjustments” issued February 17, 2012 in the same case, and performance projections from the Con Edison EEPS program administrators. Program administrator projections offer the best indication of future program performance, since consideration is given to program budgets, the historical performance of the programs, the effects of process improvements, energy conservation measure potential, etc.

2. Explain in detail how the Forecasting Panel uses the information of the mentioned three NYSERDA’s documents, as stated on pages 19-20 of your testimony, to develop the projected DSM savings. Provide the workpapers and copies of the relevant pages of the documents to support your explanation.

<u>Response:</u>

NYSERDA program achievement data is generally reported at the state level. In order to determine the impact of NYSERDA’s Energy Efficiency Programs within Con Edison’s territory, the share of these state-wide program achievements attributable to Con Edison’s territory is quantified through the allocation calculations described below. Projections for DSM savings are then assigned to the various electric service classes in order to quantify their impact on sales.

The Company makes use of available public information for NYSERDA Programs in order to report program achievements and projections within its territory. The Company relied upon the following sources:

NYSERDA "EEPS MONTHLY REPORT" –

These reports (or "Scorecards") provide the incremental energy savings added each month and other relevant program data for EEPS programs administered by NYSERDA. This achievement information is used to develop a baseline for the impact of energy efficiency programs on sales in order to project the impact of future achievements above this baseline.

NYSERDA "NEW YORK'S SYSTEM BENEFITS CHARGE PROGRAMS EVALUATION AND STATUS" –

The NYSERDA quarterly reports add context to the program performance data presented in the monthly reports. In particular, the report for the quarter ending March 2011 (dated May 2011) provided valuable information related to the performance of specific NYSERDA programs in Con Edison's territory. Knowledge of how individual programs perform in Con Edison's territory allows the Company to associate program achievement information to specific customer segments and ultimately, the service classes used in sales projections.

The Company identified the percentage of state-wide energy efficiency program savings attributable to Con Edison's territory using the March 2011 Quarterly Report.

NYSERDA EEPS Programs Included in Forecast	% to Con Edison	Page
Existing Facilities Program	23%	3-12
EmPower Program	10%	4-25
FlexTech Technical Assistance Program	28%	3-24
Single family Home Performance Program	4%	4-16
Multifamily Performance Program	85%	4-16
Multifamily Performance Program (Low Income)	55%	4-19
Products Program	53%	4-21

These percentage allocations of program savings to Con Edison territory are applied to achievements previously reported and those projected for future years.

***NYSERDA "PETITION FOR MODIFICATION OF ENERGY EFFICIENCY PORTFOLIO STANDARD BUDGETS AND TARGETS"* dated March 30, 2012**

This document serves as the basis for the forecasts of future achievements projected for NYSERDA programs in the Company's service territory. Only a subset of the NYSERDA programs listed in the document was incorporated into the Company's forecast at 18-20. These programs included in the forecast are listed in the table above. The following programs were not included for the reasons listed below:

High Performance New Construction Program - Though the program can affect the efficiency of equipment installed by the customer during the construction stage, this impact would be captured by the Company when it estimates the customer's load following a request for service. The program impacts would be captured in base load projections, so their impact was omitted from the energy efficiency forecasts.

Agriculture Energy Efficiency Program – The customer segment targeted by the program design does not appear to have a significant level of potential in the Company's Service territory.

Industrial and Process Efficiency - The customer segment targeted by the program design does not appear to have a significant level of potential in the Company's Service territory.

3. Provide a table that compares projected and actual DSM savings, in MWH and MW, respectively, on an annual incremental basis by program since 2009. The DSM savings projected for years prior to 2012 should be consistent with those used by the Forecasting Panel in Case 09-E-0428, Exhibit FP-6 and Exhibit FP-13. The actual savings and the projections for 2012 and beyond should be consistent with those presented in this case in Exhibit FP-6 and workpapers "DPS-1-E066 DSM Backup.xlsx." The table should be in a template like the attached table below, with a hypothetical example filled in the first row:

Program-Year	Projected Savings	Actual Savings	Difference from Projection (%)

EEPS program 1, 2009	135 GWH	105 GWH	78

Explain the differences, line by line, in Column 4.

Response:

2012 Comparison as per Exhibit FP-6 (in this case) and "DPS-1-E066 DSM Backup.xlsx".

Program, Year	Projected Savings (GWh)	Actual Savings (GWhs)	Difference from Projection (%)
Con Edison Targeted Demand Side Management, 2012	4.11	4.03	2%
NYSERDA SBC III, 2012	2.77	2.77	0%
NYSERDA EEPS, 2012	54.08	47.83	12%
Con Edison EEPS, 2012	102.04	89.37	12%
All DSM,2012	**163.00**	**144.00**	**12%**

Program, Year	Projected Savings (MWs)	Actual Savings (MWs)	Difference from Projection (%)
Con Edison Targeted Demand Side Management, 2012	13.41	12.75	5%
NYSERDA SBC III, 2012	35.33	35.33	0%
NYSERDA EEPS, 2012	83.57	55.05	34%
Con Edison EEPS, 2012	157.69	147.88	6%
All DSM,2012	**290.00**	**251.00**	**13%**

2012

2012 figures include the impact to the 6 months ending December 2012.

Some energy efficiency programs have been modified since this forecast was prepared. Most notably, the targets for NYSERDA's Statewide Residential Point-of-Sale Program have increased significantly. It's inclusion in the Company's forecast would likely increase the energy efficiency savings projected.

Con Edison Targeted Demand Side Management –

Small variation in actual savings versus projections.

NYSERDA SBC III Programs-

No variations since incremental savings were due to installations already in place just after base year.

NYSERDA EEPS –

Achievements reported include impacts of EEPS Phase 1 (2009-2011) and Phase 2 (2012-2015) energy efficiency installed in 2012. Though NYSERDA programs have realized a higher percentage of savings across its programs state-wide, the subset of programs included in the forecast have a lower achievement rate than the NYSERDA's portfolio as a whole in 2012.

Con Edison EEPS –

Achievements reported include impacts of EEPS Phase 1 and Phase 2 energy efficiency installed in 2012. Programs continue to increase incremental savings over time. Commercial projects in particular can have lengthy lead times before energy efficiency measures that have been committed to by the customer are installed and recognized as achieved.

2009- 2011 Comparison as per Exhibit FP-6, Case 09-E-0428.

Note: The percentages presented represent the difference from projections, as requested in the interrogatory. These are not percent achieved of the forecast. Note the results shown are cumulative year over year starting calendar year 2009.

Program, Year	Projected Savings (GWh)	Actual Savings (GWhs)	Difference from Projection (%)
Con Edison Targeted Demand Side Management, 2009	104.54	20.61	80%
NYSERDA SWP, 2009	152.65	4.41	97%
NYSERDA SBC III, 2009	149.43	68.84	54%
NYSERDA EEPS, 2009	34.80	0.00	100%
Con Edison EEPS, 2009	15.58	0.11	99%
All DSM,2009	**457.00**	**93.98**	**79%**
Con Edison Targeted Demand Side Management, 2010	282.85	54.18	81%
NYSERDA SWP, 2010	246.89	4.41	98%
NYSERDA SBC III, 2010	338.42	72.78	78%
NYSERDA EEPS, 2010	81.48	36.93	55%
Con Edison EEPS, 2010	114.36	33.69	71%
All DSM,2010	**1064.00**	**202.00**	**81%**
Con Edison Targeted Demand Side Management, 2011	312.22	54.53	83%
NYSERDA SWP, 2011	242.22	2.79	99%
NYSERDA SBC III, 2011	414.98	50.73	88%
NYSERDA EEPS, 2011	103.74	76.44	26%
Con Edison EEPS, 2011	146.84	54.20	63%
All DSM, through March 2011	**1220.00**	**238.68**	**80%**

Program, Year	**Projected Savings (MWs)**	**Actual Savings (MWs)**	**Difference from Projection (%)**
Con Edison Targeted Demand Side Management, 2009	121.24	103.55	15%
NYSERDA SWP, 2009	211.02	9.83	95%
NYSERDA SBC III, 2009	861.90	173.72	80%
NYSERDA EEPS, 2009	94.12	0.00	100%
Con Edison EEPS, 2009	43.01	0.23	99%
All DSM,2009	**1331.28**	**287.33**	**78%**
Con Edison Targeted Demand Side Management, 2010	424.95	186.05	56%
NYSERDA SWP, 2010	298.69	9.83	97%
NYSERDA SBC III, 2010	843.01	184.95	78%
NYSERDA EEPS, 2010	202.97	35.43	83%
Con Edison EEPS, 2010	298.45	79.98	73%
All DSM,2010	**2068.08**	**496.25**	**76%**
Con Edison Targeted Demand Side Management, 2011	502.72	180.41	64%
NYSERDA SWP, 2011	333.19	4.13	99%
NYSERDA SBC III, 2011	1115.47	138.67	88%
NYSERDA EEPS, 2011	278.85	70.09	75%
Con Edison EEPS, 2011	416.92	125.07	70%
All DSM, through March 2011	**2647.15**	**518.38**	**80%**

<u>2009-2011</u>

2009 and 2010 figures are presented on a calendar year basis; the 2011 rate year figures include the impact to the 12 months ending March 2011 to be consistent with the format of the previous filing (electric rate year).

The timing relative to when energy conservation measures are installed is very important, since energy savings persist over time. If energy efficiency measures are installed earlier, the measures have more time to realize savings over the forecast period. Because of this persistence, the earlier in the forecast period the measure is installed, the greater the cumulative savings recorded for this period.

In addition, the energy efficiency programs included in these forecasts are quite dynamic, in that targets and budgets have often been modified from the time they were originally set. This can also play into the level of savings each program was ultimately able to realize.

Con Edison Targeted Demand Side Management –

The Targeted Demand Side Management program focuses on reducing load to defer or eliminate the need for specific capital projects required in addressing load growth. These capital projects may subsequently no longer be required if in time the load doesn't materialize or some other solution addresses the capacity constraint. Some Targeted DSM projects were scaled down or eliminated once the need for the load reduction was no longer there. In addition, revisions were made to the way peak demand and energy savings were calculated as a result of an Evaluation of the Targeted Demand Side Management Program performed in 2009.

NYSERDA System-Wide Program –

This program had projected savings through 2010 in the forecast prepared for Case 09-E-0428. The program however ended in early 2009.

NYSERDA SBC III Programs-

Achievements for the program administrator may have been higher as reporting was limited.

NYSERDA EEPS –

Achievements for the program administrator may have been higher, especially in 2009. However, regular public reporting of achievements were not available until the monthly "Scorecards" became available.

Con Edison EEPS –

These programs encountered a "ramp-up" period starting late 2009, when program administration began, and continuing through the middle of 2011. The Commission has approved significant modifications to program budgets and targets, both for 2009-2011 and for 2012-2015.

As shown above in the forecast comparison chart the initial ramp up period had a significant impact on performance against forecast. While the 2011 period suggests stronger forecast alignment, the performance in that year was not large enough to overcome the shortfall in the 2009 and 2010 years. The performance in 2011, as program flux began to reduce and cause and effect associations recognized, provides reason for confidence in the forecasting process moving forward. As with any forecasting process, the input of actual performance feedback informs the future forecast models and associated confidence. This can be seen by the reduced level of variation experienced in 2012.

4. Explain any changes that Con Edison has made since last rate case in the process of projecting the impact of DSM savings on Con Edison's electric sales forecast.

Response:

Annual Energy Savings

At the time of the last rate case, the EEPS programs had not started to realize savings as the programs had yet to get off the ground. Energy and demand savings projections were made using the program goals as guidance, since program administrators did not have historical or other data on how the programs would perform.

Achievements for the various NYSERDA programs forecasted were assumed to have the same percentage share of statewide achievements allocated to Con Edison's territory. However, as previously indicated, historical information reported by NYSERDA on individual program performance in Con Edison territory has now allowed for a more accurate forecast.

Peak Demand Conversions

Before the programs began, the Company's forecasts assumed a certain distribution of the types of energy conservation measures that would be installed for each program. This distribution ultimately determined the load factors that would be used in converting the reported energy savings by program to demand savings. Both energy and demand savings are provided in the DSM forecast used to determine the programs' impact on sales.

Since the Company now has granular historical data for the Con Edison measures that are actually being installed to achieve energy and demand savings, it can now derive a more representative conversion of energy savings to peak demand. In addition, using annual hourly load shapes for the individual measures installed, the Company can now project the monthly peak impact of savings previously installed. For NYSERDA, the Company used the implied load factors for its programs derived from the EEPS December 2011 Annual Report.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-23
Date of Response: 03/27/2013
Responding Witness: Electric Forecasting Panel

Question No. :E0324

Subject: DSM Impact on Sales - 1. Provide the updated estimated impact of DSM on sales, as shown in Exhibit FP-6, page 1, that reflects the latest known actual data. Provide the dates through which the update reflects the actual energy efficiency achievements. 2. Provide the update "DPS-1-E066 DSM Backup.xlsx", that reflects the latest known actual data. Provide the dates through which the update reflects the actual energy efficiency achievements.

Response:

1. Provide the updated estimated impact of DSM on sales, as shown in Exhibit FP-6, page 1, that reflects the latest known actual data. Provide the dates through which the update reflects the actual energy efficiency achievements.

   Response: Please see the attached file, DPS-23-E0324a Exhibit FP-6 Update.xlsx. The update reflects actual energy efficiency achievements through December 2012.

2. Provide the update "DPS-1-E066 DSM Backup.xlsx", that reflects the latest known actual data. Provide the dates through which the update reflects the actual energy efficiency achievements.

   Response: Please see the attached file, DPS-23-E0324b DSM Backup.xlsx. The update reflects actual energy efficiency achievements through December 2012.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
SALES AND SENDOUT ADJUSTMENTS

Impact of DSM on Sales - GWhs

	Con Ed DSM Impact							**Total Con Ed**	**Total NYPA**
RATE YEAR SUMMARY	SC 1	SC 2	SC 5	SC 8	SC 9	SC 12	SC 13	**Sales impact**	**Sales Impact**
12 months ending December 2013	(51)	(14)	0	(4)	(203)	0	0	(272)	(49)
12 months ending December 2014	(105)	(28)	0	(16)	(453)	0	0	(602)	(84)
12 months ending December 2015	(162)	(42)	0	(27)	(710)	0	0	(941)	(87)
12 months ending December 2016	(206)	(56)	0	(36)	(959)	0	0	(1,257)	(87)

Incremental Over Base Yr: Con Edison, NYSERDA, NYPA

		Base Year Actuals																					
PSC SC	**MW's**	**Jan-12**	**Feb-12**	**Mar-12**	**Apr-12**	**May-12**	**Jun-12**	**Jul-12**	**Aug-12**	**Sep-12**	**Oct-12**	**Nov-12**	**Dec-12**	**Jan-13**	**Feb-13**	**Mar-13**	**Apr-13**	**May-13**	**Jun-13**	**Jul-13**	**Aug-13**	**Sep-13**	**Oct-13**
8	CONV	7	7	7	7	7	7	7	7	7	7	7	7	0	1	1	1	1	1	1	2	2	2
8	TOD	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0
	TOTAL	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	0	1	1	1	1	1	1	2	2	2
9	CONV	76	78	80	82	84	87	88	89	91	92	93	95	21	21	23	23	23	23	24	25	27	28
9	TOD	33	33	34	34	36	36	37	39	40	42	42	45	13	14	16	17	16	20	19	18	21	20
	TOTAL	**109**	**111**	**114**	**116**	**120**	**123**	**125**	**128**	**131**	**134**	**135**	**140**	34	35	39	40	39	43	43	43	48	48
12	CONV	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
12	TOD	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	0	0
	TOTAL	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	0	0	0	0	0	0	0	0	0	0
5	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL w/out NYPA	121	123	126	128	132	135	137	140	143	146	147	152	34	36	40	41	40	44	44	45	50	50
62	NYPA	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
8	NYPA	5	5	5	5	5	5	5	5	5	5	5	5	0	0	0	0	0	0	0	0	0	0
9&91	NYPA	11	11	12	12	13	13	13	13	14	14	14	14	4	5	4	4	5	5	9	9	8	8
	TOTAL NYPA ONLY	17	17	18	18	19	19	19	19	20	20	20	20	4	5	4	4	5	5	9	9	8	8
	TOTAL SYSTEM	**138**	**140**	**144**	**146**	**151**	**154**	**156**	**159**	**163**	**166**	**167**	**172**	**38**	**41**	**44**	**45**	**45**	**49**	**53**	**54**	**58**	**58**

		Base Year Actuals																					
PSC SC	**GWH's**	**Jan-12**	**Feb-12**	**Mar-12**	**Apr-12**	**May-12**	**Jun-12**	**Jul-12**	**Aug-12**	**Sep-12**	**Oct-12**	**Nov-12**	**Dec-12**	**Jan-13**	**Feb-13**	**Mar-13**	**Apr-13**	**May-13**	**Jun-13**	**Jul-13**	**Aug-13**	**Sep-13**	**Oct-13**
1	CONV	27	27	28	28	28	29	29	29	30	30	30	30	4	4	3	4	4	4	4	4	4	4
1	TOD	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	0	0	0	0	0	0	0
	TOTAL	**28**	**28**	**29**	**30**	**30**	**31**	**31**	**31**	**32**	**32**	**32**	**32**	5	5	4	4	4	4	4	4	4	4
2	CONV	3	3	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	1	1	1	1	1
2	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	1	1	1	1	1	1	1	1	1	1
8	CONV	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	0	1	1
8	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	0	0	0	0	0	0	0	0	1	1
9	CONV	26	27	28	29	29	30	31	31	32	32	32	33	8	8	8	8	9	9	9	10	10	11
9	TOD	12	13	13	13	14	14	14	15	16	16	16	17	6	5	7	7	6	8	8	8	8	8
	TOTAL	**38**	**40**	**41**	**42**	**43**	**44**	**45**	**46**	**48**	**48**	**48**	**50**	14	13	15	15	15	17	17	18	18	19
12	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	TOD	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
	TOTAL	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	0	0	0	0	0	0	0	0	0	0
7	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0	0	0	0	0	0	0	0	0	0
5	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL w/out NYPA	72	74	76	78	79	81	82	83	86	86	86	88	20	19	20	20	20	22	22	23	24	25
62	NYPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	NYPA	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0
9&91	NYPA	5	5	5	5	5	5	6	6	6	6	7	8	3	3	3	3	4	5	5	5	5	5
	TOTAL NYPA ONLY	6	6	6	6	6	6	7	7	7	7	8	9	3	3	3	3	4	5	5	5	5	5
	TOTAL SYSTEM	**78**	**80**	**82**	**84**	**85**	**87**	**89**	**90**	**93**	**93**	**94**	**97**	**23**	**22**	**23**	**23**	**24**	**27**	**27**	**28**	**29**	**30**

Incremental Over Base Yr: Con Edison,

PSC SC	MW's	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15
8	CONV	2	2	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	6	6	6	6
8	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	2	2	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	6	6	6	6
9	CONV	29	31	52	52	54	54	54	55	56	57	59	60	62	63	85	85	87	87	87	88	89	90
9	TOD	21	22	35	35	38	39	38	41	41	40	43	42	43	44	57	58	60	61	60	64	64	62
	TOTAL	50	53	87	87	92	93	92	96	97	97	102	102	105	107	142	143	147	148	147	152	153	152
12	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL w/out NYPA	52	55	90	90	95	96	95	100	101	101	106	106	109	112	147	148	152	153	153	158	159	158
62	NYPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	NYPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9&91	NYPA	8	9	12	12	12	12	11	11	11	11	10	10	10	10	13	13	12	12	11	11	11	11
	TOTAL NYPA ONLY	8	9	12	12	12	12	11	11	11	11	10	10	10	10	13	13	12	12	11	11	11	11
	TOTAL SYSTEM	**60**	**64**	**102**	**102**	**107**	**108**	**106**	**111**	**112**	**112**	**116**	**116**	**119**	**122**	**160**	**161**	**164**	**165**	**164**	**169**	**170**	**169**

PSC SC	GWH's	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Aug-15
1	CONV	4	5	8	9	8	8	9	8	8	9	8	9	9	9	13	13	13	13	13	13	13	14
1	TOD	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0
	TOTAL	4	5	9	10	9	8	9	8	8	9	8	9	9	9	14	14	14	13	13	13	13	14
2	CONV	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4
2	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4
8	CONV	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2
8	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2
9	CONV	12	12	20	20	20	20	21	21	21	22	22	23	24	24	32	32	32	32	33	34	33	34
9	TOD	9	9	15	14	15	16	15	17	17	16	17	17	18	18	24	23	24	25	24	26	26	26
	TOTAL	21	21	35	34	35	36	36	38	38	38	39	40	42	42	56	55	56	57	57	60	59	60
12	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL w/out NYPA	28	29	47	47	47	47	48	49	49	50	52	54	56	56	75	74	75	75	75	78	78	80
62	NYPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	NYPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9&91	NYPA	4	4	7	7	7	8	8	8	7	7	7	7	6	5	8	8	8	8	8	8	7	7
	TOTAL NYPA ONLY	4	4	7	7	7	8	8	8	7	7	7	7	6	5	8	8	8	8	8	8	7	7
	TOTAL SYSTEM	**32**	**33**	**54**	**54**	**54**	**55**	**56**	**57**	**56**	**57**	**59**	**61**	**62**	**61**	**83**	**82**	**83**	**83**	**83**	**86**	**85**	**87**

Incremental Over Base Yr: Con Edison,

PSC SC	MW's	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
8	CONV	6	6	7	7	7	7	7	7	8	8	8	8	8	8	9	9
8	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	6	6	7	7	7	7	7	7	8	8	8	8	8	8	9	9
9	CONV	92	93	95	97	118	118	120	120	120	120	122	123	125	126	127	129
9	TOD	65	64	65	66	79	80	82	83	81	85	84	83	85	84	85	86
	TOTAL	157	157	160	163	197	198	202	203	201	205	206	206	210	210	212	215
12	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL w/out NYPA	163	163	167	170	204	205	209	210	209	213	214	214	218	218	221	224
62	NYPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	NYPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9&91	NYPA	10	10	10	10	13	13	12	12	11	11	11	11	10	10	10	10
	TOTAL NYPA ONLY	10	10	10	10	13	13	12	12	11	11	11	11	10	10	10	10
	TOTAL SYSTEM	**173**	**173**	**177**	**180**	**217**	**218**	**221**	**222**	**220**	**224**	**225**	**225**	**228**	**228**	**231**	**234**

PSC SC	GWH's	Sep-15	Oct-15	Nov-15	Dec-15	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
1	CONV	13	13	14	14	17	17	17	17	17	16	16	16	16	16	16	16
1	TOD	0	0	0	0	1	1	1	0	0	0	1	1	1	1	1	1
	TOTAL	13	13	14	14	18	18	18	17	17	16	17	17	17	17	17	17
2	CONV	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5
2	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5
8	CONV	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
8	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
9	CONV	35	36	36	37	45	44	45	45	45	46	46	46	47	48	48	49
9	TOD	26	26	27	27	33	32	33	34	33	34	34	34	34	34	35	35
	TOTAL	61	62	63	64	78	76	78	79	78	80	80	80	81	82	83	84
12	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	TOD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	CONV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	TOTAL w/out NYPA	80	82	84	85	103	101	103	103	103	104	105	105	106	107	108	109
62	NYPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	NYPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9&91	NYPA	7	7	6	5	8	8	8	8	8	8	7	7	7	7	6	5
	TOTAL NYPA ONLY	7	7	6	5	8	8	8	8	8	8	7	7	7	7	6	5
	TOTAL SYSTEM	**87**	**89**	**90**	**90**	**111**	**109**	**111**	**111**	**111**	**112**	**112**	**112**	**113**	**114**	**114**	**114**

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032
Response to DPS Interrogatories – Set DPS-23
Date of Response: 03/27/2013
Responding Witness: Electric Forecasting Panel

Question No. :E0325
Subject: Normal Weather Assumption for Sales Forecast - 1. Provide the 10-year average based normal weather data for all the weather variables that were used to generate the estimates in responding to IR DPS E-0043. 2. Provide the spreadsheet files, with all formula accessible, for developing both the 30-year average and the 10-year average based normal weather for all weather variables used in the forecasting model. 3. Provide actual data for the daily cooling and heating degree days through December 31, 2012 that are required to develop both the updated 30-year and the update 10-year average based normal weather forecasts using the spreadsheet files provided in response to #2 above.

Response:
1. Provide the 10-year average based normal weather data for all the weather variables that were used to generate the estimates in responding to IR DPS E-0043.

Response: Please see attached file, DPS-23-E0325a Normal Weather based on 10yrs ending 2011.xlsx.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR QUARTERLY CON EDISON VOLUME FORECASTING MODELS
NORMAL WEATHER BASED ON 10-YEARS ENDING DECEMBER 31, 2011

Observation	WCDD0	WCDD3	WHDD0
2012Q3	1,205.43	1,205.43	0.15
2012Q4	170.14	0.00	931.95
2013Q1	0.00	0.00	2,452.66
2013Q2	260.32	0.00	617.36
2013Q3	1,205.34	1,205.34	0.30
2013Q4	165.43	0.00	941.72
2014Q1	0.00	0.00	2,449.73
2014Q2	264.33	0.00	610.33
2014Q3	1,206.12	1,206.12	0.40
2014Q4	160.60	0.00	951.56
2015Q1	0.00	0.00	2,447.04
2015Q2	268.29	0.00	603.18
2015Q3	1,201.90	1,201.90	0.48
2015Q4	160.86	0.00	961.11
2016Q1	0.00	0.00	2,447.22
2016Q2	261.92	0.00	614.45
2016Q3	1,203.61	1,203.61	0.29
2016Q4	165.52	0.00	943.95

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR MONTHLY CON EDISON VOLUME FORECASTING MODEL
NORMAL WEATHER BASED ON 10-YEARS ENDING DECEMBER 31, 2011

Observation	CDD0	HDD0
2012M07	466.0	0.0
2012M08	435.0	0.0
2012M09	251.0	8.0
2012M10	53.0	196.0
2012M11	0.0	398.0
2012M12	0.0	748.0
2013M01	0.0	903.0
2013M02	0.0	767.0
2013M03	0.0	600.0
2013M04	27.0	286.0
2013M05	97.0	96.0
2013M06	302.0	0.0
2013M07	466.0	0.0
2013M08	435.0	0.0
2013M09	251.0	8.0
2013M10	53.0	196.0
2013M11	0.0	398.0
2013M12	0.0	748.0
2014M01	0.0	903.0
2014M02	0.0	767.0
2014M03	0.0	600.0
2014M04	27.0	286.0
2014M05	97.0	96.0
2014M06	302.0	0.0
2014M07	466.0	0.0
2014M08	435.0	0.0
2014M09	251.0	8.0
2014M10	53.0	196.0
2014M11	0.0	398.0
2014M12	0.0	748.0
2015M01	0.0	903.0
2015M02	0.0	767.0
2015M03	0.0	600.0
2015M04	27.0	286.0
2015M05	97.0	96.0
2015M06	302.0	0.0
2015M07	466.0	0.0
2015M08	435.0	0.0
2015M09	251.0	8.0
2015M10	53.0	196.0
2015M11	0.0	398.0
2015M12	0.0	748.0
2016M01	0.0	903.0
2016M02	0.0	791.0
2016M03	0.0	600.0
2016M04	27.0	286.0
2016M05	97.0	96.0
2016M06	302.0	0.0
2016M07	466.0	0.0
2016M08	435.0	0.0
2016M09	251.0	8.0
2016M10	53.0	196.0
2016M11	0.0	398.0
2016M12	0.0	748.0

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR QUARTERLY SENDOUT FORECASTING MODEL
NORMAL WEATHER BASED ON 10-YEARS ENDING DECEMBER 31, 2011

Observation	HDD	CDD
2012Q3	8.0	1,152.0
2012Q4	1,342.0	53.0
2013Q1	2,270.0	0.0
2013Q2	382.0	426.0
2013Q3	8.0	1,152.0
2013Q4	1,342.0	53.0
2014Q1	2,270.0	0.0
2014Q2	382.0	426.0
2014Q3	8.0	1,152.0
2014Q4	1,342.0	53.0
2015Q1	2,270.0	0.0
2015Q2	382.0	426.0
2015Q3	8.0	1,152.0
2015Q4	1,342.0	53.0
2016Q1	2,294.0	0.0
2016Q2	382.0	426.0
2016Q3	8.0	1,152.0
2016Q4	1,342.0	53.0

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR MONTHLY NYPA VOLUME FORECASTING MODELS
NORMAL WEATHER BASED ON 10-YEARS ENDING DECEMBER 31, 2011

Observation	HDDCYCA	HDDCALA	CDDCALA
2012M07	0.00	0.0	466.0
2012M08	0.00	0.0	435.0
2012M09	0.15	8.0	251.0
2012M10	74.68	196.0	53.0
2012M11	285.42	398.0	0.0
2012M12	571.85	748.0	0.0
2013M01	866.35	903.0	0.0
2013M02	885.58	767.0	0.0
2013M03	700.73	600.0	0.0
2013M04	410.76	286.0	27.0
2013M05	173.75	96.0	97.0
2013M06	32.85	0.0	302.0
2013M07	0.00	0.0	466.0
2013M08	0.00	0.0	435.0
2013M09	0.30	8.0	251.0
2013M10	75.58	196.0	53.0
2013M11	282.21	398.0	0.0
2013M12	583.93	748.0	0.0
2014M01	868.95	903.0	0.0
2014M02	887.20	767.0	0.0
2014M03	693.58	600.0	0.0
2014M04	407.29	286.0	27.0
2014M05	171.58	96.0	97.0
2014M06	31.46	0.0	302.0
2014M07	0.00	0.0	466.0
2014M08	0.00	0.0	435.0
2014M09	0.40	8.0	251.0
2014M10	78.19	196.0	53.0
2014M11	287.53	398.0	0.0
2014M12	585.84	748.0	0.0
2015M01	874.39	903.0	0.0
2015M02	883.49	767.0	0.0
2015M03	689.16	600.0	0.0
2015M04	403.82	286.0	27.0
2015M05	169.38	96.0	97.0
2015M06	29.98	0.0	302.0
2015M07	0.00	0.0	466.0
2015M08	0.00	0.0	435.0
2015M09	0.48	8.0	251.0
2015M10	80.72	196.0	53.0
2015M11	292.63	398.0	0.0
2015M12	587.76	748.0	0.0
2016M01	877.04	903.0	0.0
2016M02	879.97	791.0	0.0
2016M03	690.21	600.0	0.0
2016M04	410.38	286.0	27.0
2016M05	171.87	96.0	97.0
2016M06	32.20	0.0	302.0
2016M07	0.00	0.0	466.0
2016M08	0.00	0.0	435.0
2016M09	0.29	8.0	251.0
2016M10	77.32	196.0	53.0
2016M11	290.25	398.0	0.0
2016M12	576.38	748.0	0.0

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-23
Date of Response: 03/27/2013
Responding Witness: Electric Forecasting Panel

Question No. :E0326

Subject: Sales Forecast Data - 1. Provide the updated historical data for sales of all classes and all explanatory variables, in the format of the Forecasting Panel Workpapers (attachment to the response to DPS-E077), that were used to develop the Company's sales forecasting model. The update should include the actual data through December of 2012 and reflect any changes since the forecast was developed. 2. Provide the forecast for all the explanatory variables, including weather and economic inputs, that are based on the historical data through December 2012 and the forecast last released by Moody's Analytics. Provide the release date as well.

Response:

1. Provide the updated historical data for sales of all classes and all explanatory variables, in the format of the Forecasting Panel Workpapers (attachment to the response to DPS-E077), that were used to develop the Company's sales forecasting model. The update should include the actual data through December of 2012 and reflect any changes since the forecast was developed.

   Response: Please see attached file, DPS-23-E0326a Model Data updated through Dec 2012.xlsx

2. Provide the forecast for all the explanatory variables, including weather and economic inputs, that are based on the historical data through December 2012 and the forecast last released by Moody's Analytics. Provide the release date as well.

   Response: The forecast for all the explanatory variables are included in the attached file, DPS-23-E0326a Model Data updated through Dec 2012.xlsx. The forecast from Moody's Analytics was issued on December 10, 2012, and they created the delivery on January 17, 2013.

The forecast for the weather variables in the above file are based on averages over the 30 years ending 2012. Normal weather variables that are based on averages over the 10 years ending 2012 are in the attached file, DPS-23-E0326b Normal Weather based on 10yrs ending 2012.xlsx.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR QUARTERLY CON EDISON VOLUME FORECASTING MODELS - ACTUAL DATA ENDING 2012Q4

Observation	BDA0	D1992Q2	D1994Q4	D1995Q2	D1995Q4	D1997Q2	D2007Q4	DPYR	GWH02	GWH08	GWH17	GWH49A	NC02	NC08	NC17	NC49	PNEMP N	PRICE02S	PRICE08S	PRICE17S	PRICE49S	WCDD0	WCDD3	WHDD0
1983Q1	1.0025	0	0	0	0	0	0	184,567	415.900	345.100	1,959.600	3,810.400	275.364	1.692	2,413.644	69.280	2,672.2	29.965	11.204	15.254	21.311	0.00	0.00	2,225.03
1983Q2	1.0001	0	0	0	0	0	0	187.146	371.500	317.500	1,746.100	3,825.400	275.339	1.682	2,417.346	69.313	2,718.9	31.249	11.021	15.872	21.830	229.10	0.00	698.88
1983Q3	1.0004	0	0	0	0	0	0	190.333	460.500	490.100	2,678.700	4,864.800	272.681	1.678	2,411.006	69.050	2,719.1	33.185	12.810	16.173	25.749	1,315.54	1,315.54	2.62
1983Q4	0.9983	0	0	0	0	0	0	194.151	404.900	352.900	1,895.100	4,043.800	272.983	1.668	2,422.750	70.424	2,793.2	31.995	11.724	16.238	23.097	171.17	0.00	991.11
1984Q1	1.0046	0	0	0	0	0	0	197.948	431.100	346.300	2,040.900	4,020.500	274.264	1.658	2,429.862	70.883	2,761.9	30.285	10.292	15.312	20.289	0.00	0.00	2,585.12
1984Q2	0.9990	0	0	0	0	0	0	201.724	397.700	328.400	1,864.400	4,015.100	275.026	1.678	2,433.390	71.310	2,823.0	30.662	10.931	15.464	21.444	249.10	0.00	730.15
1984Q3	1.0011	0	0	0	0	0	0	204.022	455.100	460.400	2,405.500	4,976.300	274.446	1.681	2,433.393	73.134	2,814.0	33.768	13.031	16.299	26.015	1,121.16	1,121.16	8.33
1984Q4	0.9992	0	0	0	0	0	0	204.775	396.800	353.600	1,940.900	4,202.900	275.405	1.690	2,439.878	73.719	2,867.5	31.272	11.414	15.726	22.634	162.44	0.00	875.65
1985Q1	1.0034	0	0	0	0	0	0	205,520	432.100	349.400	2,057.800	4,148.600	277.970	1.711	2,443.593	74.187	2,835.1	29.204	9.857	14.715	19.589	1.26	0.00	2,376.58
1985Q2	1.0001	0	0	0	0	0	0	206.260	392.000	328.700	1,811.200	4,225.100	279.025	1.729	2,447.631	74.773	2,873.5	29.266	10.093	14.658	20.312	319.83	0.00	513.09
1985Q3	1.0017	0	0	0	0	0	0	208.044	453.000	449.700	2,406.300	5,031.300	279.282	1.722	2,449.325	76.009	2,883.3	30.862	11.445	14.647	23.453	1,132.52	1,132.52	8.34
1985Q4	0.9981	0	0	0	0	0	0	210.936	411.000	356.000	2,020.000	4,414.100	281.595	1.731	2,455.237	76.557	2,935.5	28.792	9.938	14.013	20.052	197.88	0.00	932.07
1986Q1	1.0030	0	0	0	0	0	0	213.796	453.600	357.200	2,135.900	4,361.000	285.455	1.717	2,458.210	77.141	2,890.8	27.973	9.068	13.585	18.129	3.74	0.00	2,551.58
1986Q2	1.0000	0	0	0	0	0	0	216.641	406.500	337.200	1,929.800	4,435.700	287.239	1.723	2,460.104	77.648	2,937.4	27.918	9.538	13.461	18.879	333.69	0.00	514.41
1986Q3	1.0032	0	0	0	0	0	0	218.309	463.000	444.900	2,496.800	5,315.500	287.881	1.725	2,461.441	79.175	2,956.4	28.272	10.053	12.947	20.663	1,007.73	1,007.73	10.51
1986Q4	0.9924	0	0	0	0	0	0	218.705	428.700	354.400	2,082.500	4,616.500	291.971	1.744	2,467.573	79.698	2,997.4	25.641	8.374	12.294	17.032	177.83	0.00	1.038.90
1987Q1	1.0074	0	0	0	0	0	0	219,097	463.300	357.900	2,202.200	4,505.400	297.716	1.766	2,470.896	80.200	2,954.7	25.115	7.616	11.974	15.500	0.00	0.00	2,473.05
1987Q2	1.0001	0	0	0	0	0	0	219.486	425.600	347.500	2,054.800	4,637.100	299.304	1.763	2,473.813	80.741	3,005.3	24.953	8.117	11.698	16.360	312.31	0.00	576.03
1987Q3	1.0000	0	0	0	0	0	0	222.603	492.200	480.600	2,790.500	5,653.600	298.168	1.767	2,475.551	82.429	3,012.2	26.543	9.350	11.907	19.275	1,125.51	1,125.51	3.13
1987Q4	0.9954	0	0	0	0	0	0	228.626	441.200	362.100	2,134.400	4,813.100	301.611	1.770	2,481.738	83.048	3,062.5	24.710	8.020	11.697	16.527	96.66	0.00	1,041.76
1988Q1	1.0072	0	0	0	0	0	0	234.618	482.000	365.500	2,289.800	4,769.400	305.114	1.776	2,484.702	83.794	2,990.8	23.913	7.430	11.345	15.150	0.00	0.00	2,528.95
1988Q2	1.0001	0	0	0	0	0	0	240.577	429.700	340.700	2,060.400	4,760.100	306.625	1.783	2,488.202	84.222	3,016.7	23.207	7.397	10.911	15.030	215.25	0.00	712.63
1988Q3	1.0004	0	0	0	0	0	0	243.730	520.700	519.600	3,141.200	5,986.600	305.564	1.785	2,489.655	85.914	3,008.0	24.387	8.189	10.758	17.327	1,237.89	1,237.89	6.94
1988Q4	0.9941	0	0	0	0	0	0	243.952	447.100	362.400	2,193.600	4,947.800	309.089	1.785	2,495.608	86.564	3,063.5	23.299	7.131	10.768	15.374	108.33	0.00	1,130.34
1989Q1	1.0091	0	0	0	0	0	0	244,171	494.300	374.900	2,366.900	4,918.700	314.639	1.789	2,498.450	87.078	3,006.2	22.373	6.508	10.378	13.728	3.81	0.00	2,388.61
1989Q2	0.9836	0	0	0	0	0	0	244.389	439.300	348.000	2,098.500	4,851.200	315.381	1.795	2,502.917	87.416	3,042.5	23.420	7.307	10.835	15.206	256.23	0.00	647.22
1989Q3	1.0006	0	0	0	0	0	0	246.754	510.200	492.000	2,914.500	6,024.000	313.134	1.797	2,503.222	88.748	3,018.9	24.705	8.509	10.736	18.119	1,089.36	1,089.36	10.37
1989Q4	0.9941	0	0	0	0	0	0	251.407	472.300	387.900	2,344.600	5,235.100	314.830	1.797	2,509.574	89.039	3,057.3	22.797	7.096	10.312	14.964	176.58	0.00	1,195.19
1990Q1	1.0098	0	0	0	0	0	0	256.011	500.800	382.800	2,413.700	5,035.400	315.499	1.798	2,514.250	89.714	3,002.6	23.045	6.848	10.535	14.523	8.76	0.00	2,245.82
1990Q2	1.0011	0	0	0	0	0	0	260.589	442.300	347.300	2,100.800	4,971.900	315.116	1.801	2,519.405	89.935	3,020.5	23.707	7.318	10.886	15.762	180.70	0.00	638.11
1990Q3	1.0011	0	0	0	0	0	0	261.233	521.100	506.800	3,032.200	6,107.500	313.745	1.803	2,521.819	90.850	2,996.5	23.730	7.603	10.112	17.219	1,151.92	1,151.92	12.61
1990Q4	0.9948	0	0	0	0	0	0	257.654	469.500	391.100	2,353.300	5,282.500	314.263	1.808	2,526.071	91.072	2,995.1	22.767	6.929	10.163	15.111	242.88	0.00	811.25
1991Q1	1.0074	0	0	0	0	0	0	254.113	496.800	382.800	2,420.900	4,972.600	314.797	1.804	2,528.641	91.106	2,852.0	22.603	6.643	10.207	14.282	4.05	0.00	2,122.23
1991Q2	1.0001	0	0	0	0	0	0	250.591	463.200	394.300	2,334.800	5,217.100	313.113	1.806	2,532.199	91.191	2,856.8	22.963	7.222	10.321	15.198	416.26	0.00	550.79
1991Q3	1.0017	0	0	0	0	0	0	249.520	535.600	543.500	3,292.900	6,181.200	309.803	1.811	2,530.193	92.486	2,813.7	23.886	7.774	10.126	17.632	1,195.50	1,195.50	5.60
1991Q4	0.9937	0	0	0	0	0	0	251.086	465.800	394.300	2,370.100	5,189.200	310.743	1.818	2,534.865	92.741	2,838.8	22.097	6.803	9.815	14.641	156.83	0.00	943.71
1992Q1	1.0076	0	0	0	0	0	0	252.643	506.900	392.400	2,474.200	5,006.400	312.931	1.818	2,538.286	92.968	2,743.6	21.301	6.057	9.488	13.229	0.00	0.00	2,346.15
1992Q2	1.0000	1	0	0	0	0	0	254.193	448.800	362.400	2,189.100	4,959.800	311.777	1.825	2,541.884	93.022	2,768.3	21.945	6.542	9.901	14.112	181.88	0.00	839.07
1992Q3	0.9996	1	0	0	0	0	0	254.837	502.000	473.900	2,768.000	5,938.500	307.902	1.830	2,545.190	93.625	2,742.9	23.789	8.208	10.352	18.166	956.45	956.45	5.39
1992Q4	1.0030	1	0	0	0	0	0	254.536	476.400	396.900	2,421.600	5,167.200	306.645	1.832	2,554.094	93.244	2,780.7	22.528	6.964	10.160	15.123	128.25	0.00	1,165.25
1993Q1	1.0150	1	0	0	0	0	0	254.239	519.000	403.300	2,564.800	5,107.700	306.067	1.826	2,559.529	93.321	2,724.8	21.360	6.200	9.678	13.198	0.00	0.00	2,532.83
1993Q2	0.9847	1	0	0	0	0	0	253.943	450.000	366.000	2,187.900	4,953.800	306.298	1.830	2,561.343	93.419	2,767.3	23.177	7.551	10.797	15.690	230.15	0.00	573.50
1993Q3	1.0001	1	0	0	0	0	0	254.235	541.900	546.200	3,351.700	6,211.800	304.708	1.828	2,561.608	94.343	2,761.6	23.671	8.243	10.516	18.216	1,263.03	1,263.03	6.26
1993Q4	0.9955	1	0	0	0	0	0	255.155	471.500	394.800	2,411.100	5,137.600	305.302	1.832	2,567.352	94.629	2,823.4	22.327	7.217	10.318	15.169	109.36	0.00	965.34
1994Q1	1.0072	1	0	0	0	0	0	256.065	530.700	410.500	2,629.700	5,163.000	305.572	1.832	2,572.285	95.080	2,762.5	21.157	6.449	9.858	13.404	0.00	0.00	2,907.82
1994Q2	0.9991	1	0	0	0	0	0	256.970	459.500	375.400	2,273.200	5,043.500	304.550	1.834	2,576.357	95.209	2,816.6	21.740	6.971	10.138	14.408	243.33	0.00	573.88
1994Q3	1.0004	1	0	0	0	0	0	258.639	541.900	552.000	3,367.800	6,273.000	302.726	1.835	2,577.946	96.202	2,819.0	22.594	7.693	10.097	17.305	1,205.51	1,205.51	0.27
1994Q4	0.9941	1	1	0	0	0	0	261.119	463.500	396.200	2,389.300	5,221.500	303.404	1.840	2,583.600	96.285	2,878.9	21.556	6.588	9.725	14.071	127.04	0.00	774.09
1995Q1	1.0090	1	1	0	0	0	0	263,572	518.000	405.600	2,570.200	5,114.300	303.376	1.847	2,588.086	96.402	2,820.3	20.942	6.380	9.741	13.207	0.00	0.00	2,318.60
1995Q2	0.9836	1	1	1	0	0	0	266.012	450.800	372.600	2,257.700	4,978.200	301.859	1.847	2,589.699	97.776	2,861.8	22.078	7.150	10.222	14.834	218.12	0.00	632.60
1995Q3	1.0006	1	1	1	0	0	0	268.398	545.400	569.100	3,513.400	6,304.600	299.265	1.847	2,589.662	98.572	2,851.2	22.361	7.808	9.986	17.342	1,258.72	1,258.72	2.29
1995Q4	0.9941	1	1	1	1	0	0	270.712	470.000	412.800	2,509.800	5,457.700	298.633	1.848	2,594.833	99.797	2,918.9	21.163	6.673	9.674	13.941	195.41	0.00	1,079.25
1996Q1	1.0090	1	1	1	1	0	0	273.014	517.500	418.700	2,709.800	5,273.200	298.842	1.851	2,596.841	100.320	2,860.6	21.446	6.704	9.879	13.929	0.00	0.00	2,733.66
1996Q2	0.9990	1	1	1	1	0	0	275.302	452.900	390.300	2,385.900	5,163.700	298.052	1.851	2,597.509	100.785	2,918.7	21.722	7.176	9.981	14.963	246.54	0.00	772.71
1996Q3	1.0010	1	1	1	1	0	0	277.492	514.600	538.700	3,215.400	6,278.600	296.614	1.853	2,596.176	101.881	2,911.2	22.375	7.595	9.972	17.011	1,118.25	1,118.25	3.13
1996Q4	1.0026	1	1	1	1	0	0	279.578	466.300	414.800	2,573.100	5,379.600	297.177	1.853	2,599.058	102.589	2,989.6	21.105	6.627	9.564	14.314	116.22	0.00	1,063.26
1997Q1	1.0000	1	1	1	1	0	0	281.642	497.100	409.500	2,652.100	5,242.600	297.975	1.855	2,602.070	102.833	2,930.6	21.325	6.578	9.744	13.978	0.00	0.00	2,275.35
1997Q2	1.0001	1	1	1	1	1	0	283.694	437.200	377.800	2,326.900	5,173.800	296.651	1.855	2,602.895	103.263	2,980.6	21.077	6.701	9.665	14.079	111.32	0.00	725.88
1997Q3	1.0015	1	1	1	1	1	0	286.173	515.700	558.500	3,433.800	6,465.400	295.170	1.856	2,602.814	104.463	2,991.9	22.245	7.748	9.812	16.888	1,085.82	1,085.82	10.17
1997Q4	1.0086	1	1	1	1	1	0	289.094	463.800	422.900	2,629.600	5,621.700	295.658	1.855	2,609.667	105.394	3,068.0	21.328	6.726	9.595	14.397	152.33	0.00	1,127.58
1998Q1	1.0074	1	1	1	1	1	0	291.984	488.400	407.700	2,660.100	5,316.800	297.183	1.855	2,615.824	105.420	3,014.7	20.726	6.360	9.502	13.802	7.62	0.00	2,041.73
1998Q2	1.0001	1	1	1	1	1	0	294.857	443.000	396.500	2,442.200	5,458.400	297.078	1.853	2,620.153	105.328	3,069.5	21.064	6.760	9.317	13.969	277.13	0.00	537.39
1998Q3	1.0000	1	1	1	1	1	0	297.134	534.600	583.200	3,691.800	6,720.900	296.446	1.853	2,621.888	106.482	3,080.8	21.697	7.271	9.506	16.404	1,197.96	1,197.96	3.56
1998Q4	0.9955	1	1	1	1	1	0	298.757	459.900	418.400	2,682.300	5,654.000	297.769	1.850	2,630.406	107.145	3,161.2	20.228	6.281	9.007	13.703	152.50	0.00	805.15
1999Q1	1.0072	1	1	1	1	1	0	300.361	501.100	419.800	2,785.300	5,547.100	299.352	1.851	2,636.617	107.349	3,126.6	19.482	5.740	8.798	12.542	0.00	0.00	2,312.97
1999Q2	0.9847	1	1	1	1	1	0	301.957	450.200	396.400	2,534.200	5,485.100	299.319	1.851	2,639.889	107.501	3,172.6	19.466	6.287	8.846	13.412	246.28	0.00	526.81
1999Q3	1.0001	1	1	1	1	1	0	304.677	548.500	620.600	4,163.800	7,041.600	297.885	1.853	2,641.845	108.972	3,172.9	21.370	7.159	8.982	16.042	1,291.90	1,291.90	2.93
1999Q4	0.9942	1	1	1	1	1	0	308.586	459.900	422.100	2,709.700	5,875.300	298.388	1.855	2,650.062	109.672	3,270.2	20.746	6.565	9.211	14.601	159.05	0.00	848.22
2000Q1	1.0088	1	1	1	1	1	0	312.474	509.082	422.324	2,880.410	5,813.268	299.743	1.859	2,655.791	109.897	3,225.3	20.917	6.596	9.453	14.504	0.00	0.00	2,360.65
2000Q2	1.0002	1	1	1	1	1	0	316.341	458.808	412.254	2,673.988	5,822.588	300.119	1.857	2,660.570	110.482	3,294.5	21.560	7.535	9.676	15.637	243.36	0.00	637.71
2000Q3	1.0006	1	1	1	1	1	0	317.788	521.948	550.137	3,602.806	7,028.977	299.441	1.853	2,661.853	111.810	3,292.8	25.227	9.049	10.807	20.153	1,009.59	1,009.59	6.10
2000Q4	0.9941	1	1	1	1	1	0	316.709	470.648	431.713	2,803.198	6,059.293	300.990	1.858	2,669.292	112.570	3,390.3	23.096	7.898	10.326	17.280	122.91	0.00	1,142.30
2001Q1	1.0090	1	1	1	1	1	0	315.641	517.458	429.681	2,957.276	6,023.095	303.316	1.859	2,674.699	112.842	3,320.7	22.796	8.168	10.497	17.710	0.00	0.00	2,564.89
2001Q2	0.9990	1	1	1	1	1	0	314.579	462.908	418.462	2,690.585	5,984.850	304.349	1.861	2,676.799	113.214	3,336.5	21.220	7.594	9.581	16.339	273.94	0.00	668.38
2001Q3	1.0011	1	1	1	1	1	0	315.018	549.581	607.909	4,002.618	7,274.365	304.861	1.865	2,676.984	114.440	3,287.9	23.695	8.467	9.951	19.099	1,193.33	1,193.33	4.00
2001Q4	0.9948	1	1	1	1	1	0	317.067	465.407	435.248	2,850.419	6,019.029	306.028	1.866	2,677.799	114.965	3,263.0	18.762	6.249	8.462	13.974	192.99	0.00	685.19
2002Q1	1.0078	1	1	1	1	1	0	319.093	503.851	423.948	2,933.179	5,792.537	309.430	1.863	2,679.796	115.058	3,170.4	18.154	5.982	8.234	13.670	0.00	0.00	1,993.53
2002Q2	1.0001	1	1	1	1	1	0	321.108	472.256	421.834	2,784.748	6,005.816	312.523	1.859	2,682.576	115.432	3,212.5	19.283	6.627	8.705	14.613	297.15	0.00	638.55
2002Q3	1.0017	1	1	1	1	1	0	322.412	576.421	639.518	4,468.108	7,439.860	312.974	1.857	2,682.502	116.816	3,183.4	21.757	7.378	9.309	16.911	1,281.02	1,281.02	4.44
2002Q4	0.9934	1	1	1	1	1	0	322.944	496.002	453.967	3,047.167	6,314.419	314.609	1.858	2,688.544	117.652	3,244.9	19.726	6.457	8.910	14.730	213.68	0.00	1,166.25
2003Q1	1.0076	1	1	1	1	1	0	323.469	538.883	445.079	3,152.229	6,096.379	318.483	1.850	2,690.509	118.086	3,147.1	20.285	6.837	9.319	15.285	0.09	0.00	2,764.47
2003Q2	1.0000	1	1	1	1	1	0	323.992	467.191	405.283	2,719.959	5,857.503	321.105	1.862	2,691.269	118.273	3,176.7	22.971	7.900	10.442	17.638	133.99	0.00	755.82
2003Q3	1.0033	1	1	1	1	1	0	326.153	560.484	616.179	4,187.030	7,297.267	321.779	1.864	2,690.286	118.936	3,155.3	23.582	8.121	10.024	18.460	1,224.93	1,224.93	3.94
2003Q4	0.9921	1	1	1	1	1	0	330.056	495.559	438.976	2,991.658	6,169.360	323.025	1.868	2,695.583	119.654	3,226.2	21.099	6.937	9.364	15.909	171.73	0.00	1,023.72
2004Q1	1.0074	1	1	1	1	1	0	333.939	546.472	448.765	3,160.154	6,135.509	326.141	1.869	2,696.723	119.891	3,146.3	20.237	6.936	9.191	15.338	0.00	0.00	2,593.20
2004Q2	1.0000	1	1	1	1	1	0	337.800	488.788	434.314	2,899.609	6,201.736	328.827	1.869	2,693.416	120.186	3,203.5	20.351	6.676	9.007	15.225	316.89	0.00	610.47
2004Q3	1.0001	1	1	1	1	1	0	340.594	560.018	593.851	4,037.310	7,402.385	330.221	1.866	2,694.273	121.293	3,204.2	23.263	7.619	9.544	17.821	1,171.10	1,171.10	3.00
2004Q4	0.9955	1	1	1	1	1	0	342.271	501.632	455.368	3,071.533	6,321.394	332.768	1.859	2,700.403	121.749	3,272.9	21.135	6.779	9.116	15.645	161.84	0.00	933.72
2005Q1	1.0072	1	1	1	1	1	0	343.930	560.484	449.858	3,202.032	6,286.324	336.751	1.856	2,703.436	121.938	3,204.4	19.995	6.711	8.837	15.143	0.00	0.00	2,518.62
2005Q2	1.0002	1	1	1	1	1	0	345.580	493.523	424.436	2,928.591	6,154.665	338.121	1.854	2,707.779	122.161	3,263.5	22.535	7.509	9.530	16.750	219.27	0.00	672.28
2005Q3	1.0004	1	1	1	1	1	0	349.362	613.430	679.784	4,839.721	7,868.751	338.046	1.854	2,710.458	123.270	3,262.9	24.724	8.329	9.885	19.060	1,344.09	1,344.09	0.16
2005Q4	0.9941	1	1	1	1	1	0	355.409	523.864	476.148	3,297.747	6,587.539	339.518	1.847	2,717.728	123.858	3,336.5	26.220	9.403	11.247	21.045	229.15	0.00	993.92
2006Q1	1.0090	1	1	1	1	1	0	361.390	546.252	450.250	3,156.037	6,295.398	341.736	1.856	2,721.550	123.861	3,273.3	21.957	7.639	9.745	17.004	0.01	0.00	2,169.83
2006Q2	0.9836	1	1	1	1	1	0	367.338	480.805	415.730	2,819.685	6,212.489	343.103	1.855	2,726.235	123.853	3,336.8	21.691	7.134	9.079	15.803	202.63	0.00	526.42
2006Q3	1.0006	1	1	1	1	1	0	372.192	593.921	653.793	4,582.244	7,839.053	344.837	1.858	2,729.957	124.767	3,333.4	24.725	8.373	9.765	18.905	1,188.30	1,188.30	3.23
2006Q4	0.9941	1	1	1	1	1	0	375.841	505.369	435.152	3,076.701	6,545.228	348.548	1.859	2,738.081	125.243	3,420.3	22.216	7.197	9.042	16.283	145.19	0.00	788.35
2007Q1	1.0090	1	1	1	1	1	0	379.450	567.264	461.642	3,247.246	6,514.463	354.193	1.855	2,742.026	125.392	3,364.1	20.928	7.183	9.054	16.014	3.72	0.00	2,400.49
2007Q2	0.9990	1	1	1	1	1	0	383,039	519.191	442.123	3,050.165	6,544.580	355.904	1.855	2,745.742	125.782	3,420.5	23.787	8.012	9.998	17.917	275.78	0.00	681.32
2007Q3	1.0011	1	1	1	1	1	0	385.989	591.368	618.787	4,443.350	7,806.085	355.036	1.862	2,748.268	126.638	3,415.0	24.992	8.094	9.632	18.521	1,056.80	1,056.80	10.25
2007Q4	0.9948	1	1	1	1	1	1	388.235	531.832	487.742	3,367.715	6,886.196	355.952	1.924	2,757.022	127.021	3,503.5	22.930	7.659	9.312	17.016	287.03	0.00	986.32
2008Q1	1.0078	1	1	1	1	1	1	390.468	565.619	453.348	3,251.606	6,513.676	358.683	1.927	2,761.507	127.161	3,442.0	22.860	7.704	9.834	17.854	0.00	0.00	2,262.06
2008Q2	1.0001	1	1	1	1	1	1	392.690	504.112	435.510	3,021.931	6,476.277	358.893	1.931	2,767.572	127.091	3,488.3	24.094	8.080	10.181	18.455	214.62	0.00	665.15
2008Q3	1.0015	1	1	1	1	1	1	391.154	601.578	656.199	4,598.567	7,973.973	357.022	1.935	2,770.482	127.791	3,470.4	28.525	9.901	11.442	22.809	1,132.75	1,132.75	1.93
2008Q4	1.0010	1	1	1	1	1	1	385.696	517.974	464.177	3,187.838	6,688.237	359.257	1.946	2,777.581	127.892	3,504.5	21.200	6.875	8.892	15.516	134.04	0.00	1,081.55
2009Q1	1.0149	1	1	1	1	1	1	380.297	592.469	472.781	3,330.594	6,585.038	362.457	1.952	2,777.568	127.742	3,375.1	21.535	7.164	9.472	16.328	0.00	0.00	2,564.65
2009Q2	1.0001	1	1	1	1	1	1	374,928	496.117	432.430	2,900.997	6,370.262	362.771	1.944	2,776.085	127.713	3,374.5	23.165	7.309	9.822	16.578	222.89	0.00	613.34
2009Q3	1.0000	1	1	1	1	1	1	374.191	566.093	601.965	4,112.089	7,570.733	361.676	1.941	2,780.197	128.223	3,338.9	26.021	8.080	10.228	18.541	1,008.65	1,008.65	5.80
2009Q4	0.9955	1	1	1	1	1	1	378.429	510.103	462.441	3,104.944	6,497.829	364.450	1.941	2,788.914	128.457	3,375.5	24.155	7.538	10.205	17.029	100.75	0.00	950.64
2010Q1	1.0072	1	1	1	1	1	1	382.622	567.607	471.601	3,309.603	6,478.646	368.228	1.946	2,794.200	128.434	3,335.4	22.137	7.132	9.900	15.918	0.00	0.00	2,457.00
2010Q2	0.9847	1	1	1	1	1	1	386.792	512.482	454.678	3,091.295	6,463.461	366.251	1.947	2,803.304	128.520	3,398.8	26.583	8.688	11.342	19.705	362.58	0.00	409.80
2010Q3	1.0001	1	1	1	1	1	1	388.931	627.124	702.244	5,087.333	8,085.288	363.400	1.946	2,810.784	129.606	3,397.1	26.196	8.180	10.277	18.302	1,314.82	1,314.82	0.34
2010Q4	0.9955	1	1	1	1	1	1	388.879	522.087	472.819	3,224.739	6,546.235	362.472	1.946	2,821.685	129.971	3,467.5	25.021	7.551	10.293	17.704	181.36	0.00	1,000.53
2011Q1	1.0072	1	1	1	1	1	1	388.827	580.048	463.606	3,331.868	6,500.169	362.512	1.942	2,825.331	129.751	3,434.3	22.938	7.159	9.968	16.581	0.00	0.00	2,570.64
2011Q2	1.0002	1	1	1	1	1	1	388,775	521.803	448.968	3,105.303	6,517.729	361.120	1.938	2,829.040	129.889	3,505.6	25.686	7.627	10.686	17.741	319.15	0.00	615.33
2011Q3	1.0004	1	1	1	1	1	1	390,099	603.669	671.373	4,822.761	7,931.090	357.803	1.936	2,833.365	130.952	3,500.4	27.249	7.880	10.499	18.394	1,264.87	1,264.87	5.44
2011Q4	0.9941	1	1	1	1	1	1	392.890	512.845	461.309	3,188.908	6,597.443	357.700	1.934	2,843.350	131.071	3,551.9	24.181	6.667	10.060	15.703	201.33	0.00	761.58
2012Q1	1.0090	1	1	1	1	1	1	395.667	553.482	444.415	3,171.161	6,353.062	358.752	1.930	2,844.898	130.849	3,509.8	22.441	6.524	9.739	14.928	7.74	0.00	1,932.99
2012Q2	0.9990	1	1	1	1	1	1	398.429	494.008	433.201	2,991.107	6,484.702	358.019	1.928	2,850.052	130.683	3,587.9	25.848	7.340	10.566	16.686	295.06	0.00	446.41
2012Q3	1.0011	1	1	1	1	1	1	399.363	613.407	677.015	5,001.639	7,924.709	357.560	1.925	2,849.179	130.866	3,596.3	26.948	7.313	10.143	16.761	1,241.57	1,241.57	1.74
2012Q4	0.9948	1	1	1	1	1	1	398,391	513.489	448.441	3,170.970	6,394.819	357.249	1.922	2,854.230	131.015	3,643.3	25.312	6.767	10.190	15.243	140.15	0.00	981.87
2013Q1	1.0078	1	1	1	1	1	1	397.428									3,599.7	22.441	6.524	9.739	14.928	0.00	0.00	2,405.35
2013Q2	1.0001	1	1	1	1	1	1	396.471									3,684.2	25.848	7.340	10.566	16.686	255.20	0.00	622.92
2013Q3	1.0017	1	1	1	1	1	1	397.644									3,691.4	26.948	7.313	10.143	16.761	1,172.27	1,172.27	1.19
2013Q4	0.9934	1	1	1	1	1	1	401.095									3,732.1	25.312	6.767	10.190	15.243	154.61	0.00	977.53
2014Q1	1.0076	1	1	1	1	1	1	404.509									3,678.1	22.441	6.524	9.739	14.928	0.00	0.00	2,402.52
2014Q2	1.0000	1	1	1	1	1	1	407.904									3,757.6	25.848	7.340	10.566	16.686	259.21	0.00	615.87
2014Q3	1.0033	1	1	1	1	1	1	411,888									3,764.4	26.948	7.313	10.143	16.761	1,172.60	1,172.60	1.49
2014Q4	0.9921	1	1	1	1	1	1	416,478									3,812.1	25.312	6.767	10.190	15.243	150.23	0.00	987.07
2015Q1	1.0074	1	1	1	1	1	1	421.018									3,752.4	22.441	6.524	9.739	14.928	0.00	0.00	2,399.95
2015Q2	1.0001	1	1	1	1	1	1	425.533									3,843.2	25.848	7.340	10.566	16.686	263.17	0.00	608.69
2015Q3	1.0000	1	1	1	1	1	1	429.952									3,853.9	26.948	7.313	10.143	16.761	1,168.53	1,168.53	1.77
2015Q4	0.9955	1	1	1	1	1	1	434.238									3,900.3	25.312	6.767	10.190	15.243	150.34	0.00	996.38
2016Q1	1.0072	1	1	1	1	1	1	438.500									3,855.4	22.441	6.524	9.739	14.928	0.00	0.00	2,406.71
2016Q2	1.0002	1	1	1	1	1	1	442.740									3,947.0	25.848	7.340	10.566	16.686	256.78	0.00	619.97
2016Q3	1.0004	1	1	1	1	1	1	446.012									3,950.6	26.948	7.313	10.143	16.761	1,170.68	1,170.68	1.43
2016Q4	0.9941	1	1	1	1	1	1	448,275									3,985.1	25.312	6.767	10.190	15.243	154.58	0.00	979.45

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR MONTHLY CON EDISON VOLUME FORECASTING AND CUSTOMERS FORECASTING MODELS
-- ACTUAL DATA ENDING 2012M12

Observation	GWH12	CDD0	HDD0	D200309	NC12
1986M01	71.800	0.0	869.6	0	546
1986M02	80.300	0.0	847.7	0	556
1986M03	69.100	9.0	547.2	0	575
1986M04	44.000	9.4	274.8	0	575
1986M05	33.900	175.8	69.0	0	578
1986M06	26.400	288.5	4.1	0	574
1986M07	27.900	428.9	0.0	0	567
1986M08	30.000	349.3	5.7	0	569
1986M09	25.800	194.4	10.5	0	571
1986M10	25.300	63.1	180.3	0	572
1986M11	37.300	4.6	496.3	0	570
1986M12	56.500	0.0	716.1	0	574
1987M01	66.900	0.0	925.3	0	574
1987M02	72.000	0.0	820.0	0	578
1987M03	64.200	0.0	542.2	0	581
1987M04	44.100	15.3	292.0	0	585
1987M05	32.800	135.0	108.9	0	584
1987M06	28.000	320.0	0.7	0	583
1987M07	30.500	487.5	0.0	0	582
1987M08	31.400	367.1	0.0	0	581
1987M09	26.800	206.8	12.6	0	580
1987M10	28.000	0.7	267.5	0	580
1987M11	37.700	4.0	431.2	0	582
1987M12	57.100	0.0	700.6	0	587
1988M01	70.500	0.0	1,005.8	0	586
1988M02	72.000	0.0	789.4	0	583
1988M03	63.000	0.0	593.8	0	568
1988M04	45.600	0.9	364.2	0	562
1988M05	35.500	95.1	101.3	0	552
1988M06	27.600	267.6	23.3	0	543
1988M07	30.100	505.0	0.0	0	538
1988M08	33.300	495.8	0.0	0	536
1988M09	30.300	172.4	12.3	0	540
1988M10	26.900	24.2	324.0	0	541
1988M11	39.200	1.5	394.0	0	543
1988M12	54.200	0.0	815.6	0	543
1989M01	68.900	0.0	766.1	0	544
1989M02	69.400	0.0	778.2	0	547
1989M03	68.400	14.4	635.7	0	548
1989M04	46.600	2.0	328.3	0	550
1989M05	33.100	102.0	112.8	0	549
1989M06	28.400	315.0	5.2	0	552
1989M07	29.900	408.0	0.0	0	552
1989M08	30.600	383.0	0.0	0	553
1989M09	29.200	239.8	33.3	0	554
1989M10	28.900	51.1	162.8	0	562
1989M11	35.000	7.9	499.3	0	561
1989M12	66.500	0.0	1,134.5	0	561
1990M01	76.800	0.0	658.2	0	600
1990M02	60.500	0.9	632.8	0	602
1990M03	59.800	14.2	549.8	0	599
1990M04	46.800	24.2	315.0	0	589
1990M05	32.500	28.2	96.1	0	590
1990M06	28.000	295.3	0.4	0	581
1990M07	29.100	442.4	0.0	0	577
1990M08	32.000	415.1	0.0	0	571
1990M09	30.400	209.4	33.0	0	557
1990M10	27.100	139.5	130.0	0	555
1990M11	34.100	12.7	379.4	0	531
1990M12	52.600	5.4	613.6	0	528
1991M01	63.800	0.0	845.9	0	529
1991M02	68.500	0.0	625.3	0	530
1991M03	58.700	0.0	554.2	0	531
1991M04	47.000	44.6	270.7	0	530
1991M05	32.500	226.3	42.1	0	532
1991M06	30.600	322.6	2.3	0	527
1991M07	31.300	448.2	0.0	0	534
1991M08	32.500	451.6	0.0	0	532
1991M09	31.400	207.7	44.0	0	533
1991M10	28.000	59.3	174.2	0	538
1991M11	36.000	8.3	428.1	0	537
1991M12	56.100	0.0	692.8	0	537
1992M01	66.900	0.0	822.7	0	536
1992M02	73.300	0.0	754.0	0	534
1992M03	64.100	0.0	695.3	0	533
1992M04	55.300	7.9	401.2	0	528
1992M05	36.000	57.7	119.9	0	530
1992M06	28.400	242.6	5.4	0	487
1992M07	24.500	384.1	0.0	0	487
1992M08	25.100	332.0	0.0	0	489
1992M09	24.200	216.2	35.0	0	484
1992M10	25.000	22.5	272.3	0	487
1992M11	35.600	4.1	483.1	0	487
1992M12	53.300	0.0	750.2	0	487
1993M01	62.900	0.0	797.8	0	493
1993M02	64.100	0.0	894.8	0	490
1993M03	64.200	0.0	709.4	0	489
1993M04	46.500	1.8	294.0	0	488
1993M05	27.100	110.0	33.1	0	483
1993M06	22.900	306.2	4.9	0	483

Observatior	GWH12	CDD0	HDD0	D200309	NC12
1993M07	27.400	493.9	0.0	0	482
1993M08	27.300	447.2	0.0	0	480
1993M09	27.800	212.0	35.2	0	482
1993M10	24.900	21.2	221.6	0	480
1993M11	32.200	10.7	412.7	0	481
1993M12	49.000	0.0	771.4	0	487
1994M01	67.700	0.0	1,129.3	0	487
1994M02	72.400	0.0	890.4	0	485
1994M03	63.600	0.0	665.2	0	486
1994M04	41.300	15.7	223.1	0	485
1994M05	25.500	64.9	103.8	0	485
1994M06	27.100	370.1	0.0	0	491
1994M07	29.100	534.7	0.0	0	491
1994M08	28.200	382.3	0.0	0	493
1994M09	23.500	179.4	6.8	0	496
1994M10	23.700	17.6	166.5	0	495
1994M11	28.900	12.1	320.1	0	504
1994M12	47.000	0.0	622.8	0	509
1995M01	55.800	0.0	767.3	0	516
1995M02	63.400	0.0	857.2	0	525
1995M03	57.000	0.0	550.7	0	540
1995M04	40.300	0.4	340.1	0	542
1995M05	28.700	72.2	93.9	0	541
1995M06	24.600	292.1	0.0	0	542
1995M07	26.100	526.5	0.0	0	541
1995M08	30.800	471.0	0.0	0	541
1995M09	26.700	194.9	20.8	0	540
1995M10	23.500	103.1	98.1	0	537
1995M11	31.000	12.0	560.8	0	540
1995M12	58.900	0.0	926.4	0	540
1996M01	69.600	0.0	971.3	0	537
1996M02	66.200	0.0	815.4	0	538
1996M03	58.600	0.0	725.0	0	537
1996M04	40.200	19.7	327.2	0	536
1996M05	29.300	85.8	140.1	0	535
1996M06	25.500	313.5	3.0	0	533
1996M07	25.300	390.7	0.0	0	530
1996M08	24.100	414.3	0.0	0	530
1996M09	26.500	229.3	17.6	0	531
1996M10	23.900	19.6	181.3	0	530
1996M11	30.700	8.1	580.6	0	532
1996M12	52.700	0.0	644.8	0	529
1997M01	61.600	0.0	935.7	0	513
1997M02	62.700	1.5	614.4	0	512
1997M03	49.300	0.0	630.1	0	515
1997M04	39.200	2.0	326.3	0	518
1997M05	30.600	25.7	115.2	0	518
1997M06	24.100	272.3	25.0	0	518
1997M07	27.400	424.1	0.7	0	519
1997M08	24.900	364.3	0.0	0	518
1997M09	23.000	199.8	25.7	0	516
1997M10	22.700	59.0	216.3	0	517
1997M11	33.900	2.5	526.5	0	518
1997M12	51.100	0.0	736.3	0	519
1998M01	53.100	0.0	685.0	0	517
1998M02	52.900	0.0	602.8	0	516
1998M03	47.500	0.0	576.6	0	515
1998M04	35.200	6.4	260.6	0	516
1998M05	25.900	135.4	75.4	0	513
1998M06	23.200	268.4	7.9	0	513
1998M07	25.100	443.4	0.0	0	511
1998M08	27.700	440.6	0.0	0	512
1998M09	25.800	269.1	7.5	0	511
1998M10	23.700	23.7	161.1	0	511
1998M11	30.300	0.0	418.7	0	511
1998M12	38.800	4.7	590.2	0	510
1999M01	60.400	0.0	863.1	0	510
1999M02	54.800	0.0	652.1	0	509
1999M03	52.700	0.0	624.3	0	507
1999M04	36.600	4.0	276.9	0	506
1999M05	25.600	79.5	53.1	0	507
1999M06	24.000	341.7	0.2	0	506
1999M07	28.200	557.6	0.0	0	509
1999M08	29.200	409.7	0.5	0	505
1999M09	25.200	258.9	10.5	0	505
1999M10	23.200	35.7	200.0	0	505
1999M11	26.700	10.1	355.4	0	504
1999M12	43.300	0.0	684.9	0	502
2000M01	57.372	0.0	957.0	0	503
2000M02	65.690	0.0	727.2	0	509
2000M03	49.300	0.0	474.9	0	504
2000M04	37.338	4.4	346.2	0	503
2000M05	29.925	110.5	79.0	0	503
2000M06	23.555	311.5	17.3	0	502
2000M07	27.715	337.8	0.0	0	504
2000M08	29.935	368.7	0.0	0	503
2000M09	25.444	203.6	47.5	0	504
2000M10	25.093	39.3	190.0	0	504
2000M11	32.184	0.0	502.0	0	504
2000M12	52.204	0.0	952.4	0	504
2001M01	63.434	0.0	886.1	0	503
2001M02	61.442	0.0	726.4	0	499
2001M03	57.019	0.0	705.6	0	498
2001M04	42.169	24.7	285.5	0	497
2001M05	26.942	113.9	83.0	0	494

Observati	GWH12	CDD0	HDD0	D200309	NC12
2001M06	23.296	352.4	3.2	0	494
2001M07	26.960	358.5	0.0	0	492
2001M08	26.550	503.3	0.0	0	494
2001M09	28.134	212.7	34.1	0	496
2001M10	23.234	78.5	166.0	0	495
2001M11	28.185	14.3	292.3	0	494
2001M12	37.329	2.0	567.9	0	499
2002M01	53.587	0.0	681.6	0	499
2002M02	53.423	0.0	610.5	0	497
2002M03	45.588	0.0	556.5	0	497
2002M04	36.852	88.9	280.5	0	498
2002M05	27.191	84.0	125.5	0	497
2002M06	25.741	301.5	10.5	0	497
2002M07	29.602	491.7	0.0	0	496
2002M08	29.267	465.1	0.1	0	493
2002M09	28.236	285.0	2.4	0	492
2002M10	24.904	67.1	253.2	0	494
2002M11	34.648	8.5	483.2	0	495
2002M12	55.087	0.0	811.7	0	495
2003M01	62.082	0.0	1,072.6	0	496
2003M02	71.321	0.0	894.7	0	497
2003M03	58.174	0.5	603.5	0	495
2003M04	41.902	20.1	407.1	0	498
2003M05	29.977	30.6	144.7	0	496
2003M06	25.470	238.0	16.9	0	490
2003M07	28.348	452.6	0.0	0	490
2003M08	31.179	492.5	0.0	0	490
2003M09	23.537	249.0	9.2	1	490
2003M10	25.224	29.8	220.9	0	493
2003M11	28.189	17.6	376.1	0	493
2003M12	49.266	0.0	753.0	0	494
2004M01	61.983	0.0	1,150.8	0	493
2004M02	67.690	0.0	785.9	0	495
2004M03	52.333	0.0	587.4	0	495
2004M04	44.034	15.9	289.2	0	493
2004M05	24.932	168.1	49.7	0	490
2004M06	22.725	302.1	6.1	0	490
2004M07	25.688	428.3	0.0	0	487
2004M08	25.734	435.2	0.0	0	491
2004M09	25.473	272.3	6.7	0	489
2004M10	23.116	27.7	201.2	0	484
2004M11	31.253	0.0	408.8	0	489
2004M12	46.471	0.0	720.2	0	486
2005M01	59.916	0.0	948.5	0	487
2005M02	62.120	0.0	714.6	0	488
2005M03	58.988	0.0	720.5	0	490
2005M04	41.511	14.9	252.1	0	489
2005M05	26.413	30.5	148.7	0	486
2005M06	26.346	362.7	5.3	0	483
2005M07	28.604	479.6	0.0	0	485
2005M08	32.082	514.5	0.0	0	487
2005M09	29.294	313.9	4.3	0	487
2005M10	25.773	72.3	187.4	0	487
2005M11	31.137	4.0	363.8	0	485
2005M12	50.057	0.0	830.5	0	485
2006M01	59.016	0.0	652.5	0	486
2006M02	56.239	0.0	738.4	0	486
2006M03	56.668	0.0	597.7	0	484
2006M04	37.262	6.5	228.4	0	481
2006M05	26.470	86.9	83.0	0	485
2006M06	22.720	292.8	5.6	0	487
2006M07	29.052	506.5	0.0	0	486
2006M08	31.088	413.2	0.0	0	485
2006M09	25.999	174.4	10.7	0	488
2006M10	23.267	40.8	211.5	0	488
2006M11	30.818	11.0	306.8	0	490
2006M12	41.943	4.2	554.7	0	491
2007M01	51.908	3.3	756.1	0	491
2007M02	64.405	0.0	953.3	0	491
2007M03	60.623	1.1	619.2	0	490
2007M04	45.326	11.5	397.1	0	489
2007M05	29.830	134.1	61.2	0	486
2007M06	25.875	278.5	2.0	0	486
2007M07	24.305	399.0	0.0	0	487
2007M08	30.198	385.9	5.6	0	487
2007M09	27.366	251.6	8.3	0	486
2007M10	24.466	158.1	84.2	0	486
2007M11	31.320	0.0	496.1	0	489
2007M12	49.224	0.0	781.6	0	488
2008M01	59.221	0.0	790.1	0	487
2008M02	61.518	0.0	758.6	0	487
2008M03	56.360	0.0	618.8	0	486
2008M04	41.445	9.8	248.3	0	483
2008M05	27.262	45.1	131.1	0	482
2008M06	26.840	350.4	0.0	0	482
2008M07	27.991	479.6	0.0	0	483
2008M08	28.836	332.7	0.0	0	482
2008M09	25.999	229.9	8.4	0	483
2008M10	24.034	26.2	235.0	0	484
2008M11	30.436	7.9	490.9	0	480
2008M12	52.755	0.0	745.9	0	489

Observati	GWH12	CDD0	HDD0	D200309	NC12
2009M01	68.883	0.0	1,053.4	0	491
2009M02	63.376	0.0	713.2	0	487
2009M03	53.744	0.0	624.9	0	484
2009M04	42.400	40.9	297.9	0	482
2009M05	26.083	89.7	81.9	0	482
2009M06	22.226	207.3	12.5	0	483
2009M07	24.517	347.8	0.0	0	482
2009M08	30.207	448.1	0.0	0	482
2009M09	27.592	168.9	17.3	0	483
2009M10	23.356	25.5	230.9	0	483
2009M11	30.754	0.1	331.7	0	482
2009M12	42.506	0.0	808.3	0	481
2010M01	65.063	0.0	922.9	0	480
2010M02	64.541	0.0	812.8	0	481
2010M03	50.665	0.0	441.9	0	480
2010M04	33.072	27.3	179.0	0	480
2010M05	21.691	168.2	74.8	0	480
2010M06	24.512	366.2	1.2	0	480
2010M07	30.226	539.7	0.0	0	479
2010M08	30.849	448.6	0.0	0	479
2010M09	25.905	269.0	0.0	0	479
2010M10	24.645	39.7	152.1	0	478
2010M11	27.768	0.0	427.8	0	479
2010M12	46.549	0.0	907.7	0	478
2011M01	67.265	0.0	998.6	0	480
2011M02	64.904	0.0	733.9	0	480
2011M03	52.790	0.0	627.3	0	479
2011M04	37.487	34.9	278.1	0	480
2011M05	30.559	131.7	60.9	0	480
2011M06	23.686	318.7	0.0	0	480
2011M07	25.326	535.6	0.0	0	479
2011M08	29.842	420.2	0.0	0	478
2011M09	25.083	296.1	13.0	0	478
2011M10	23.347	42.5	185.6	0	480
2011M11	26.932	4.5	301.4	0	479
2011M12	38.204	1.3	567.5	0	479
2012M01	51.465	0.0	772.9	0	479
2012M02	53.077	0.0	622.1	0	479
2012M03	43.806	18.5	375.2	0	478
2012M04	29.131	26.5	253.4	0	478
2012M05	23.993	157.2	48.7	0	478
2012M06	22.618	273.0	7.4	0	477
2012M07	27.237	487.1	0.0	0	477
2012M08	30.477	449.1	0.0	0	477
2012M09	26.931	219.6	7.2	0	477
2012M10	22.320	53.3	153.4	0	478
2012M11	29.497	0.0	557.8	0	478
2012M12	43.052	0.0	642.9	0	478
2013M01		0.0	886.0	0	
2013M02		0.0	741.0	0	
2013M03		0.0	602.0	0	
2013M04		18.0	299.0	0	
2013M05		101.0	89.0	0	
2013M06		302.0	0.0	0	
2013M07		456.0	0.0	0	
2013M08		425.0	0.0	0	
2013M09		229.0	18.0	0	
2013M10		51.0	188.0	0	
2013M11		0.0	429.0	0	
2013M12		0.0	745.0	0	
2014M01		0.0	886.0	0	
2014M02		0.0	741.0	0	
2014M03		0.0	602.0	0	
2014M04		18.0	299.0	0	
2014M05		101.0	89.0	0	
2014M06		302.0	0.0	0	
2014M07		456.0	0.0	0	
2014M08		425.0	0.0	0	
2014M09		229.0	18.0	0	
2014M10		51.0	188.0	0	
2014M11		0.0	429.0	0	
2014M12		0.0	745.0	0	
2015M01		0.0	886.0	0	
2015M02		0.0	741.0	0	
2015M03		0.0	602.0	0	
2015M04		18.0	299.0	0	
2015M05		101.0	89.0	0	
2015M06		302.0	0.0	0	
2015M07		456.0	0.0	0	
2015M08		425.0	0.0	0	
2015M09		229.0	18.0	0	
2015M10		51.0	188.0	0	
2015M11		0.0	429.0	0	
2015M12		0.0	745.0	0	
2016M01		0.0	886.0	0	
2016M02		0.0	765.0	0	
2016M03		0.0	602.0	0	
2016M04		18.0	299.0	0	
2016M05		101.0	89.0	0	
2016M06		302.0	0.0	0	
2016M07		456.0	0.0	0	
2016M08		425.0	0.0	0	
2016M09		229.0	18.0	0	
2016M10		51.0	188.0	0	
2016M11		0.0	429.0	0	
2016M12		0.0	745.0	0	

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR QUARTERLY SENDOUT FORECASTING MODEL - ACTUAL DATA ENDING 2012Q4

Observation	GWHSO	EMP_N	HDD	CDD	PRICE_S	NCINDEX	LEAPY
1983Q1	9,192	3,238.9	2,159.7	0.0	13.317	0.739	90
1983Q2	9,255	3,291.5	442.5	397.5	13.597	0.737	91
1983Q3	11,295	3,319.5	18.7	1,250.0	15.282	0.730	92
1983Q4	9,310	3,370.7	1,452.9	68.0	14.203	0.735	92
1984Q1	9,644	3,341.4	2,390.4	0.0	12.801	0.749	91
1984Q2	9,642	3,393.9	426.1	433.0	13.280	0.750	91
1984Q3	10,948	3,410.8	45.1	1,025.0	15.297	0.755	92
1984Q4	9,409	3,462.9	1,129.0	74.0	13.750	0.755	92
1985Q1	9,688	3,431.6	2,290.0	11.2	12.282	0.771	90
1985Q2	9,546	3,481.0	310.8	415.9	12.490	0.772	91
1985Q3	11,315	3,498.9	9.3	1,145.7	13.718	0.774	92
1985Q4	9,816	3,556.3	1,381.7	75.3	12.137	0.775	92
1986Q1	9,983	3,512.6	2,264.5	9.0	11.361	0.790	90
1986Q2	10,166	3,567.0	347.9	473.7	11.670	0.791	91
1986Q3	11,660	3,583.0	16.2	972.6	12.118	0.794	92
1986Q4	10,229	3,630.1	1,392.7	67.7	10.483	0.795	92
1987Q1	10,295	3,586.4	2,287.5	0.0	9.833	0.812	90
1987Q2	10,727	3,643.8	401.6	470.3	9.971	0.812	91
1987Q3	12,458	3,643.5	12.6	1,061.4	11.138	0.816	92
1987Q4	10,558	3,701.9	1,399.3	4.7	9.947	0.817	92
1988Q1	10,926	3,638.6	2,389.0	0.0	9.350	0.835	91
1988Q2	10,939	3,676.6	488.8	363.6	9.070	0.835	91
1988Q3	13,289	3,654.7	12.3	1,173.2	9.920	0.839	92
1988Q4	10,902	3,717.3	1,533.2	25.7	9.063	0.839	92
1989Q1	11,008	3,661.2	2,180.0	14.4	8.373	0.856	90
1989Q2	11,362	3,704.3	446.3	419.0	8.972	0.856	91
1989Q3	13,200	3,671.2	33.3	1,030.8	10.046	0.857	92
1989Q4	11,483	3,717.3	1,796.6	59.0	8.690	0.855	92
1990Q1	11,124	3,665.3	1,840.8	15.1	8.581	0.873	90
1990Q2	11,281	3,696.1	411.5	347.7	9.081	0.872	91
1990Q3	13,465	3,656.8	33.0	1,066.9	9.359	0.871	92
1990Q4	11,439	3,657.8	1,123.0	157.6	8.574	0.868	92
1991Q1	11,163	3,508.9	2,025.4	0.0	8.350	0.882	90
1991Q2	12,095	3,516.6	315.1	593.5	8.740	0.880	91
1991Q3	13,759	3,453.5	44.0	1,107.5	9.477	0.880	92
1991Q4	11,325	3,482.9	1,295.1	67.6	8.304	0.878	92
1992Q1	11,464	3,383.4	2,272.0	0.0	7.695	0.894	91
1992Q2	11,202	3,412.1	526.5	308.2	8.071	0.891	91
1992Q3	13,055	3,385.6	35.0	932.3	9.619	0.888	92
1992Q4	11,352	3,421.0	1,505.6	26.6	8.492	0.883	92
1993Q1	11,514	3,364.4	2,402.0	0.0	7.699	0.897	90
1993Q2	11,639	3,408.7	332.0	418.0	8.856	0.895	91
1993Q3	14,096	3,415.3	35.2	1,153.1	9.676	0.894	92
1993Q4	11,482	3,466.7	1,405.7	31.9	8.555	0.891	92
1994Q1	11,894	3,406.3	2,684.9	0.0	7.803	0.909	90
1994Q2	11,923	3,458.7	326.9	450.7	8.197	0.906	91
1994Q3	14,058	3,445.2	6.8	1,096.4	9.196	0.905	92
1994Q4	11,536	3,510.7	1,109.4	29.7	7.958	0.902	92
1995Q1	11,703	3,440.7	2,175.2	0.0	7.690	0.918	90
1995Q2	11,818	3,482.1	434.0	364.7	8.351	0.922	91
1995Q3	14,543	3,471.6	20.8	1,192.4	9.152	0.919	92
1995Q4	12,098	3,530.1	1,585.3	115.1	7.988	0.922	92
1996Q1	12,176	3,464.0	2,511.7	0.0	7.938	0.940	91
1996Q2	12,128	3,524.4	470.3	419.0	8.278	0.939	91
1996Q3	14,054	3,514.1	17.6	1,034.3	8.979	0.938	92
1996Q4	11,933	3,591.8	1,406.7	27.7	7.922	0.937	92
1997Q1	11,932	3,532.1	2,180.2	1.5	7.865	0.954	90
1997Q2	12,138	3,584.9	466.5	300.0	7.843	0.953	91
1997Q3	14,379	3,607.3	26.4	988.2	8.894	0.953	92
1997Q4	12,166	3,684.8	1,479.1	61.5	7.923	0.953	92
1998Q1	11,964	3,628.7	1,864.4	48.2	7.619	0.970	90
1998Q2	12,543	3,688.4	343.9	410.2	7.822	0.966	91
1998Q3	15,386	3,704.7	7.5	1,153.1	8.588	0.966	92
1998Q4	12,286	3,785.3	1,170.0	28.4	7.592	0.966	92
1999Q1	12,485	3,746.8	2,139.5	0.0	7.167	0.983	90
1999Q2	13,083	3,796.7	330.2	425.2	7.534	0.981	91
1999Q3	16,279	3,816.0	11.0	1,226.2	8.433	0.982	92
1999Q4	12,760	3,900.0	1,240.3	45.8	8.063	0.982	92
2000Q1	13,088	3,852.0	2,159.1	0.0	8.089	1.000	91
2000Q2	13,656	3,936.6	442.5	426.4	8.483	1.000	91
2000Q3	15,445	3,929.5	47.5	910.1	10.266	1.000	92
2000Q4	13,450	4,019.8	1,644.4	39.3	9.211	1.000	92
2001Q1	13,353	3,939.2	2,318.1	0.0	9.419	1.019	90
2001Q2	13,958	3,959.1	371.7	491.0	8.622	1.018	91
2001Q3	16,214	3,927.2	34.1	1,074.5	9.613	1.017	92
2001Q4	13,129	3,891.4	1,026.2	94.8	7.523	1.015	92
2002Q1	13,080	3,800.2	1,848.6	0.0	7.322	1.033	90
2002Q2	14,034	3,845.7	416.5	474.4	7.741	1.032	91
2002Q3	17,309	3,819.7	2.5	1,241.8	8.761	1.032	92
2002Q4	13,745	3,879.4	1,548.1	75.6	8.002	1.032	92
2003Q1	13,806	3,772.0	2,570.8	0.5	8.233	1.052	90
2003Q2	13,599	3,803.2	568.7	288.7	9.324	1.050	91
2003Q3	16,900	3,777.6	9.2	1,194.1	9.425	1.046	92
2003Q4	13,597	3,851.0	1,350.0	47.4	8.420	1.045	92
2004Q1	14,105	3,766.8	2,524.1	0.0	8.212	1.065	91
2004Q2	14,342	3,829.2	345.0	486.1	8.041	1.062	91
2004Q3	16,836	3,826.9	6.7	1,135.8	9.035	1.061	92
2004Q4	13,850	3,893.3	1,330.2	27.7	8.270	1.058	92
2005Q1	14,124	3,822.6	2,383.6	0.0	8.014	1.078	90
2005Q2	14,512	3,889.6	406.1	408.1	8.764	1.076	91
2005Q3	18,689	3,889.3	4.3	1,308.0	9.547	1.074	92
2005Q4	14,278	3,958.2	1,381.7	76.3	10.661	1.073	92
2006Q1	14,038	3,893.1	1,988.6	0.0	8.955	1.092	90
2006Q2	14,614	3,960.6	317.0	386.2	8.303	1.088	91
2006Q3	17,819	3,956.1	10.7	1,094.1	9.440	1.086	92
2006Q4	14,157	4,044.7	1,073.0	56.0	8.504	1.084	92
2007Q1	14,495	3,989.0	2,328.6	4.4	8.431	1.104	90
2007Q2	15,178	4,047.9	460.3	424.1	9.310	1.103	91
2007Q3	18,025	4,043.8	13.9	1,036.5	9.313	1.100	92
2007Q4	14,892	4,133.2	1,361.9	158.1	8.767	1.099	92
2008Q1	14,500	4,072.1	2,167.5	0.0	9.168	1.119	91
2008Q2	15,135	4,123.2	379.4	405.3	9.420	1.115	91
2008Q3	17,997	4,104.9	8.4	1,042.2	11.016	1.111	92
2008Q4	14,429	4,138.2	1,471.8	34.1	8.179	1.107	92
2009Q1	14,531	4,007.0	2,391.5	0.0	8.626	1.125	90
2009Q2	14,285	4,006.9	392.3	337.9	8.821	1.120	91
2009Q3	17,216	3,990.0	17.3	964.8	9.543	1.115	92
2009Q4	14,252	3,995.7	1,370.9	25.6	9.153	1.112	92
2010Q1	14,353	3,960.0	2,177.6	0.0	8.749	1.132	90
2010Q2	15,439	4,041.4	255.0	561.7	10.339	1.129	91
2010Q3	18,671	4,014.8	0.0	1,257.3	9.622	1.126	92
2010Q4	14,261	4,083.3	1,487.6	39.7	9.428	1.123	92
2011Q1	14,425	4,044.6	2,359.8	0.0	8.967	1.141	90
2011Q2	14,987	4,118.6	339.0	485.3	9.606	1.138	91
2011Q3	18,329	4,117.7	13.0	1,251.9	9.777	1.135	92
2011Q4	13,943	4,162.7	1,054.5	48.3	8.878	1.131	92
2012Q1	14,029	4,117.0	1,770.2	18.5	8.560	1.149	91
2012Q2	14,809	4,197.4	309.5	456.7	9.384	1.144	91
2012Q3	18,439	4,206.2	7.2	1,155.8	9.343	1.136	92
2012Q4	13,730	4,254.7	1,354.1	53.3	8.931	1.131	92
2013Q1		4,207.0	2,229.0	0.0	8.560		90
2013Q2		4,294.4	388.0	421.0	9.384		91
2013Q3		4,301.5	18.0	1,110.0	9.343		92
2013Q4		4,342.4	1,362.0	51.0	8.931		92
2014Q1		4,283.3	2,229.0	0.0	8.560		90
2014Q2		4,365.4	388.0	421.0	9.384		91
2014Q3		4,374.0	18.0	1,110.0	9.343		92
2014Q4		4,425.5	1,362.0	51.0	8.931		92
2015Q1		4,366.0	2,229.0	0.0	8.560		90
2015Q2		4,462.3	388.0	421.0	9.384		91
2015Q3		4,475.7	18.0	1,110.0	9.343		92
2015Q4		4,524.0	1,362.0	51.0	8.931		92
2016Q1		4,480.0	2,253.0	0.0	8.560		91
2016Q2		4,575.5	388.0	421.0	9.384		91
2016Q3		4,580.5	18.0	1,110.0	9.343		92
2016Q4		4,615.9	1,362.0	51.0	8.931		92

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR MONTHLY NYPA VOLUME FORECASTING MODELS - ACTUAL DATA ENDING 2012M12

Observation	SC62GWHR	SC91GWHR	KIACMWHR	HDDCYCA	HDDCALA	CDDCALA	BURNHRSNYC	TRIP18	TRIP02	LITERAIL	WEATHER2005
1996M01	2.330	658.230	N/A	1,044.71	971.3	0.0	443	30.85	N/A	N/A	0
1996M02	2.300	680.870	N/A	937.62	815.4	0.0	384	32.00	N/A	N/A	0
1996M03	2.140	629.140	N/A	751.33	725.0	0.0	371	29.00	N/A	N/A	0
1996M04	1.850	575.710	N/A	512.74	327.2	19.7	319	29.00	N/A	N/A	0
1996M05	1.730	562.980	N/A	199.14	140.1	85.8	294	29.00	N/A	N/A	0
1996M06	1.510	630.630	N/A	60.83	3.0	313.5	266	32.00	N/A	N/A	0
1996M07	1.940	654.510	N/A	0.29	0.0	390.7	283	30.00	N/A	N/A	0
1996M08	1.690	621.030	N/A	0.00	0.0	414.3	314	29.00	N/A	N/A	0
1996M09	1.670	665.990	N/A	2.84	17.6	229.3	342	32.00	N/A	N/A	0
1996M10	1.570	575.960	N/A	93.20	181.3	19.6	396	29.15	N/A	N/A	0
1996M11	1.770	573.880	N/A	298.58	580.6	8.1	418	29.85	N/A	N/A	0
1996M12	2.300	642.570	N/A	671.48	644.8	0.0	452	34.00	N/A	N/A	0
1997M01	2.260	686.660	N/A	821.40	935.7	0.0	443	33.00	N/A	N/A	0
1997M02	2.260	635.080	N/A	829.72	614.4	1.5	372	29.15	N/A	N/A	0
1997M03	3.220	571.760	N/A	624.23	630.1	0.0	371	28.85	N/A	N/A	0
1997M04	3.470	572.450	N/A	446.03	326.3	2.0	319	29.00	N/A	N/A	0
1997M05	3.390	564.910	N/A	209.86	115.2	25.7	294	32.00	N/A	N/A	0
1997M06	2.930	594.160	N/A	69.99	25.0	272.3	266	29.00	N/A	N/A	0
1997M07	3.070	665.230	N/A	4.41	0.7	424.1	283	30.00	N/A	N/A	0
1997M08	3.140	657.340	N/A	0.57	0.0	364.3	314	31.00	N/A	N/A	0
1997M09	2.940	661.110	N/A	5.19	25.7	199.8	342	30.00	N/A	N/A	0
1997M10	3.010	594.590	N/A	80.61	216.3	59.0	396	30.00	N/A	N/A	0
1997M11	3.380	624.090	N/A	367.90	526.5	2.5	418	32.00	N/A	N/A	0
1997M12	3.750	659.910	N/A	679.07	736.3	0.0	452	31.45	N/A	N/A	0
1998M01	3.880	630.430	N/A	708.06	685.0	0.0	443	32.55	N/A	N/A	0
1998M02	3.700	620.020	N/A	715.70	602.8	0.0	372	30.00	N/A	N/A	0
1998M03	3.510	628.660	N/A	617.97	576.6	48.2	371	31.00	N/A	N/A	0
1998M04	3.120	577.020	N/A	355.36	260.6	6.4	319	29.00	N/A	N/A	0
1998M05	2.890	603.170	N/A	156.02	75.4	135.4	294	30.00	N/A	N/A	0
1998M06	2.860	596.050	N/A	26.01	7.9	268.4	266	29.00	N/A	N/A	0
1998M07	2.900	710.300	N/A	1.21	0.0	443.4	283	32.00	N/A	N/A	0
1998M08	2.860	687.460	N/A	0.00	0.0	440.6	314	29.00	N/A	N/A	0
1998M09	2.900	678.420	N/A	2.35	7.5	269.1	342	30.00	N/A	N/A	0
1998M10	2.750	635.890	N/A	65.10	161.1	23.7	396	31.15	N/A	N/A	0
1998M11	2.980	578.960	N/A	307.98	418.7	0.0	418	29.85	N/A	N/A	0
1998M12	3.240	704.880	N/A	432.07	590.2	4.7	452	33.15	N/A	N/A	0
1999M01	3.700	686.070	30.840	881.03	863.1	0.0	443	30.85	32.05	0.00	0
1999M02	3.490	645.610	31.280	720.27	652.1	0.0	372	32.00	30.00	0.00	0
1999M03	4.030	627.010	31.760	711.67	624.3	0.0	371	29.00	32.00	0.00	0
1999M04	3.030	579.050	28.860	353.04	276.9	4.0	319	28.15	28.95	0.00	0
1999M05	2.710	576.210	24.660	160.36	53.1	79.5	294	28.85	28.05	0.00	0
1999M06	2.820	640.100	28.950	13.41	0.2	341.7	266	30.00	30.00	0.00	0
1999M07	2.700	769.170	29.140	0.11	0.0	557.6	283	32.00	29.00	0.00	0
1999M08	2.760	744.180	35.950	0.00	0.5	409.7	314	29.00	32.00	0.00	0
1999M09	2.520	728.430	30.000	2.82	10.5	258.9	342	30.00	29.00	0.00	0
1999M10	2.310	648.590	29.170	78.97	200.0	35.7	396	31.15	29.95	0.00	0
1999M11	2.750	603.220	28.270	278.01	355.4	10.1	418	29.85	31.05	0.00	0
1999M12	3.080	713.760	29.990	491.24	684.9	0.0	452	33.00	31.94	0.00	0
2000M01	3.230	688.780	32.410	817.02	957.0	0.0	443	31.00	32.06	0.00	0
2000M02	3.260	705.270	31.750	972.20	727.2	0.0	384	32.00	30.00	0.00	0
2000M03	3.620	652.950	34.130	571.43	474.9	0.0	371	29.00	32.00	0.00	0
2000M04	2.750	641.060	28.810	368.37	346.2	4.4	319	29.00	29.00	0.00	0
2000M05	2.500	619.520	28.130	211.57	79.0	110.5	294	29.00	29.00	0.00	0
2000M06	2.470	691.360	28.580	57.77	17.3	311.5	266	32.00	30.00	0.00	0
2000M07	2.430	732.510	31.060	0.00	0.0	337.8	283	30.00	31.00	0.00	0
2000M08	2.380	692.350	31.160	0.00	0.0	368.7	314	29.00	30.00	0.00	0
2000M09	2.430	761.660	29.600	6.10	47.5	203.6	342	32.00	29.00	0.00	0
2000M10	3.010	635.460	32.330	103.67	190.0	39.3	396	29.15	31.85	0.00	0
2000M11	2.690	692.320	27.780	300.55	502.0	0.0	418	33.85	29.15	0.00	0
2000M12	2.790	683.750	33.370	738.08	952.4	0.0	452	29.15	33.85	0.00	0
2001M01	2.990	730.400	33.364	1,003.91	886.1	0.0	443	30.85	30.15	0.00	0
2001M02	3.140	710.640	33.369	808.77	726.4	0.0	372	32.00	30.00	0.00	0
2001M03	2.760	672.490	34.449	752.21	705.6	0.0	371	29.00	32.00	0.00	0
2001M04	2.670	637.300	30.819	482.28	285.5	24.7	319	29.00	29.00	0.00	0
2001M05	2.370	686.550	28.583	135.81	83.0	113.9	294	29.00	29.00	0.00	0
2001M06	2.160	687.330	30.851	50.29	3.2	352.4	266	32.00	32.00	0.00	0
2001M07	2.430	767.530	29.001	0.00	0.0	358.5	283	30.00	29.00	0.00	0
2001M08	2.250	789.410	30.694	0.00	0.0	503.3	314	29.00	30.00	0.00	0
2001M09	2.200	750.100	30.892	4.00	34.1	212.7	342	32.00	29.00	0.00	0
2001M10	2.260	659.390	31.639	85.19	166.0	78.5	396	29.15	31.95	0.00	0
2001M11	2.290	667.590	25.948	237.77	292.3	14.3	418	33.85	29.05	0.00	0
2001M12	2.520	675.860	31.683	362.23	567.9	2.0	452	29.15	33.95	0.00	0
2002M01	2.910	684.767	29.467	760.10	681.6	0.0	443	32.85	30.05	0.00	0
2002M02	2.490	687.607	31.756	644.73	610.5	0.0	372	30.00	32.00	0.00	0
2002M03	2.430	667.942	29.554	588.70	556.5	0.0	371	29.00	30.00	0.20	0
2002M04	1.990	693.224	27.716	384.73	280.5	88.9	319	29.00	29.00	0.20	0
2002M05	2.150	690.756	26.196	196.14	125.5	84.0	294	32.00	29.00	0.20	0
2002M06	2.180	673.251	28.759	57.68	10.5	301.5	266	29.00	32.00	0.25	0
2002M07	2.100	782.200	27.486	4.25	0.0	491.7	283	30.00	29.00	0.25	0
2002M08	2.030	879.173	29.826	0.00	0.1	465.1	314	31.00	30.00	0.30	0
2002M09	2.390	738.454	31.536	0.19	2.4	285.0	342	30.00	32.00	0.30	0
2002M10	1.960	710.748	27.520	61.98	253.2	67.1	396	29.15	28.95	0.30	0
2002M11	2.060	659.815	26.202	385.13	483.2	8.5	418	31.85	29.05	0.20	0
2002M12	2.840	727.628	32.664	719.14	811.7	0.0	452	31.15	33.95	0.30	0
2003M01	2.330	758.487	31.954	894.98	1,072.6	0.0	443	32.85	30.05	0.50	0
2003M02	2.540	765.822	35.387	1,059.54	894.7	0.0	372	30.00	32.00	0.50	0
2003M03	2.470	689.232	33.000	809.95	603.5	0.5	371	29.00	30.00	0.50	0
2003M04	2.210	674.275	29.442	465.90	407.1	20.1	319	31.00	29.00	0.50	0
2003M05	2.420	679.224	29.783	210.29	144.7	30.6	294	30.00	31.00	0.50	0
2003M06	2.260	661.055	27.451	79.63	16.9	238.0	266	29.00	30.00	0.50	0
2003M07	1.840	804.963	28.283	3.42	0.0	452.6	283	32.00	29.00	0.50	0
2003M08	1.700	811.751	33.074	0.00	0.0	492.5	314	29.00	32.00	0.50	0
2003M09	2.010	813.291	29.567	0.52	9.2	249.0	342	30.00	30.00	0.50	0
2003M10	1.760	699.667	28.662	100.22	220.9	29.8	396	29.45	28.95	0.50	0
2003M11	1.910	687.192	27.236	279.03	376.1	17.6	418	31.55	29.05	0.50	0
2003M12	2.370	773.638	34.621	644.47	753.0	0.0	452	31.45	33.95	0.50	0
2004M01	2.378	813.645	35.940	889.66	1,150.8	0.0	443	32.55	32.05	1.00	0
2004M02	2.509	805.390	36.462	1,055.94	785.9	0.0	384	30.00	30.00	1.00	0
2004M03	2.255	710.488	33.812	647.60	587.4	0.0	371	31.00	30.00	1.00	0
2004M04	2.339	697.972	33.983	462.36	289.2	15.9	319	29.00	31.00	1.00	0
2004M05	1.643	701.820	30.911	129.99	49.7	168.1	294	29.00	29.00	1.00	0
2004M06	1.810	726.765	27.648	18.12	6.1	302.1	266	30.00	30.00	1.00	0
2004M07	1.808	795.645	30.004	1.00	0.0	428.3	283	32.00	29.00	1.00	0
2004M08	2.314	808.280	34.247	0.00	0.0	435.2	314	29.00	32.00	1.00	0
2004M09	1.672	777.742	31.363	2.00	6.7	272.3	342	30.00	29.00	1.00	0
2004M10	1.878	768.897	31.304	70.02	201.2	27.7	396	31.15	29.95	1.00	0
2004M11	1.768	708.060	30.836	314.54	408.8	0.0	418	29.85	31.05	1.00	0
2004M12	2.090	746.197	33.828	549.16	720.2	0.0	452	33.15	31.95	1.00	0
2005M01	2.243	859.531	36.724	811.86	948.5	0.0	443	30.85	32.05	1.00	0
2005M02	2.201	768.215	35.803	908.76	714.6	0.0	372	32.00	30.00	1.00	0
2005M03	2.120	782.778	37.494	798.00	720.5	0.0	371	29.00	32.00	1.00	0
2005M04	2.024	686.403	32.935	413.40	252.1	14.9	306	29.00	29.00	1.00	0
2005M05	1.723	672.405	29.753	195.48	148.7	30.5	282	29.00	29.00	1.00	0
2005M06	1.889	759.553	30.184	63.40	5.3	362.7	256	32.00	30.00	1.00	0
2005M07	1.855	843.546	34.868	0.16	0.0	479.6	272	30.00	32.00	1.00	0
2005M08	1.699	849.251	32.867	0.00	0.0	514.5	302	29.00	29.00	1.00	0
2005M09	1.636	939.435	33.314	0.00	4.3	313.9	330	32.00	29.00	1.00	1
2005M10	1.689	806.228	35.755	43.31	187.4	72.3	380	29.15	31.85	1.00	1
2005M11	1.807	711.290	30.515	276.51	363.8	4.0	402	33.85	29.15	1.00	0
2005M12	2.015	777.845	37.261	674.10	830.5	0.0	434	29.15	33.85	1.00	0
2006M01	2.047	828.068	35.852	746.63	652.5	0.0	425	30.85	30.15	1.00	0
2006M02	1.954	791.813	34.841	692.91	738.4	0.0	356	32.00	30.00	1.00	0
2006M03	1.974	739.341	37.922	730.29	597.7	0.0	355	29.00	32.00	1.00	0
2006M04	1.752	712.186	32.222	344.70	228.4	6.5	306	28.15	28.95	1.00	0
2006M05	1.550	679.195	29.069	141.85	83.0	86.9	282	28.85	28.05	1.00	0
2006M06	1.690	764.743	30.914	39.87	5.6	292.8	256	32.00	30.00	1.00	0
2006M07	1.697	909.180	33.800	1.60	0.0	506.5	272	30.00	31.00	1.00	0
2006M08	1.730	819.092	34.560	0.00	0.0	413.2	302	29.00	30.00	1.00	0
2006M09	1.676	842.623	33.756	1.63	10.7	174.4	330	32.00	29.00	1.00	0
2006M10	1.761	778.211	30.529	64.46	211.5	40.8	380	29.15	31.85	1.00	0
2006M11	1.465	743.985	36.022	285.03	306.8	11.0	402	33.85	29.15	1.00	0
2006M12	1.892	712.384	34.628	438.86	554.7	4.2	434	29.15	33.85	1.00	0
2007M01	2.107	833.597	34.340	596.90	756.1	3.3	425	30.85	30.15	1.00	0
2007M02	2.048	899.927	35.351	990.12	953.3	0.0	356	32.00	30.00	1.00	0
2007M03	2.017	757.849	39.636	813.47	619.2	1.1	355	29.00	32.00	1.00	0
2007M04	1.793	749.917	33.744	487.40	397.1	11.5	306	29.00	29.00	1.00	0
2007M05	1.462	683.214	31.895	171.06	61.2	134.1	282	29.00	29.00	1.00	0
2007M06	1.530	810.821	34.577	22.86	2.0	278.5	256	32.00	32.00	1.00	0
2007M07	1.680	864.328	32.944	0.95	0.0	399.0	272	30.00	29.00	1.00	0
2007M08	1.703	801.745	35.496	1.56	5.6	385.9	302	29.00	30.00	1.00	0
2007M09	1.617	974.408	33.918	7.74	8.3	251.6	330	32.00	29.00	1.00	0
2007M10	1.933	847.330	36.366	20.97	84.2	158.1	380	29.15	31.95	1.00	0
2007M11	1.640	772.925	32.045	270.60	496.1	0.0	402	33.85	29.05	1.00	0
2007M12	1.900	749.239	38.240	694.75	781.6	0.0	434	29.15	33.95	1.00	0
2008M01	1.994	786.296	36.061	752.15	790.1	0.0	425	32.85	30.05	1.00	0
2008M02	2.701	813.047	38.077	795.19	758.6	0.0	369	30.00	32.00	1.00	0
2008M03	1.745	810.075	36.000	714.72	618.8	0.0	355	29.00	30.00	1.00	0
2008M04	1.584	716.892	34.313	432.03	248.3	9.8	306	29.00	29.00	1.00	0
2008M05	1.626	687.157	33.031	180.32	131.1	45.1	282	32.00	29.00	1.00	0
2008M06	1.454	869.762	34.606	52.80	0.0	350.4	256	29.00	32.00	1.00	0
2008M07	1.922	877.537	33.882	0.00	0.0	479.6	272	30.00	29.00	1.00	0
2008M08	1.622	889.687	36.496	0.00	0.0	332.7	302	31.00	30.00	1.00	0
2008M09	1.427	891.596	37.283	1.93	8.4	229.9	330	30.00	32.00	1.00	0
2008M10	1.563	774.031	33.067	67.78	235.0	26.2	380	29.15	28.95	1.00	0
2008M11	1.538	763.404	31.874	318.21	490.9	7.9	402	31.85	29.05	1.00	0
2008M12	1.825	874.609	38.528	695.56	745.9	0.0	434	32.00	34.00	1.00	0
2009M01	2.102	909.099	37.973	942.35	1,053.4	0.0	425	33.00	33.00	1.00	0
2009M02	1.849	808.094	38.241	933.00	713.2	0.0	356	30.00	30.00	1.00	0
2009M03	1.717	777.456	35.755	689.30	624.9	0.0	355	31.00	30.00	1.00	0
2009M04	1.526	699.901	35.309	422.10	297.9	40.9	306	29.00	31.00	1.00	0
2009M05	1.591	756.309	31.237	153.38	81.9	89.7	282	30.00	29.00	1.00	0
2009M06	1.537	755.893	31.548	2.58	12.5	207.3	256	29.00	30.00	1.00	0
2009M07	1.435	924.032	35.018	2.58	0.0	347.8	272	32.00	32.00	1.00	0
2009M08	2.069	974.236	33.321	0.00	0.0	448.1	302	29.00	29.00	1.00	0
2009M09	1.448	876.708	31.902	3.20	17.3	168.9	330	30.00	29.00	1.00	0
2009M10	1.419	789.301	32.859	115.19	230.9	25.5	380	31.15	29.95	1.00	0
2009M11	2.748	729.953	31.402	283.72	331.7	0.1	402	29.85	31.05	1.00	0
2009M12	1.965	818.406	37.154	551.73	808.3	0.0	434	33.15	31.95	1.00	0
2010M01	2.306	837.362	38.426	957.17	922.9	0.0	425	30.85	32.05	1.00	0
2010M02	1.389	864.272	36.144	901.20	812.8	0.0	356	32.00	30.00	1.00	0
2010M03	2.324	767.363	38.771	598.63	441.9	0.0	355	29.00	32.00	1.00	0
2010M04	1.647	699.833	31.950	239.67	179.0	27.3	306	28.15	28.95	1.00	0
2010M05	0.630	790.205	29.482	141.39	74.8	168.2	282	28.85	28.05	1.00	0
2010M06	2.852	786.188	32.002	28.74	1.2	366.2	256	30.00	30.00	1.00	0
2010M07	0.457	953.669	32.587	0.34	0.0	539.7	272	32.00	29.00	1.00	0
2010M08	1.515	905.448	37.334	0.00	0.0	448.6	302	29.00	32.00	1.00	0
2010M09	1.524	858.437	33.050	0.00	0.0	269.0	330	30.00	29.00	1.00	0
2010M10	1.484	848.774	31.672	55.46	152.1	39.7	380	31.15	29.95	1.00	0
2010M11	1.918	770.925	32.139	284.77	427.8	0.0	402	29.85	31.05	1.00	0
2010M12	1.608	840.029	32.839	660.30	907.7	0.0	434	33.15	31.95	1.00	0
2011M01	3.113	846.595	34.787	978.36	998.6	0.0	425	30.85	32.05	1.00	0
2011M02	0.677	813.265	31.122	936.13	733.9	0.0	356	32.00	30.00	1.00	0
2011M03	1.924	763.918	33.182	656.15	627.3	0.0	355	29.00	32.00	1.00	0
2011M04	1.476	704.417	29.055	463.96	278.1	34.9	306	29.00	29.00	1.00	0
2011M05	1.389	680.710	26.805	131.84	60.9	131.7	282	29.00	29.00	1.00	0
2011M06	1.534	839.914	31.242	19.53	0.0	318.7	256	32.00	30.00	1.00	0
2011M07	0.825	971.223	35.028	0.00	0.0	535.6	272	30.00	32.00	1.00	0
2011M08	1.777	887.328	31.955	0.00	0.0	420.2	302	29.00	29.00	1.00	0
2011M09	1.292	868.623	31.524	5.44	13.0	296.1	330	32.00	29.00	1.00	0
2011M10	1.388	772.679	34.061	53.68	185.6	42.5	380	29.15	31.85	1.00	0
2011M11	1.510	713.126	28.650	281.13	301.4	4.5	402	33.85	29.15	1.00	0
2011M12	1.626	768.606	36.432	426.77	567.5	1.3	434	29.15	33.85	1.00	0
2012M01	1.763	795.199	32.343	719.69	772.9	0.0	425	30.85	30.15	1.00	0
2012M02	1.771	794.765	32.940	701.02	622.1	0.0	369	32.00	30.00	1.00	0
2012M03	1.586	698.387	35.072	512.28	375.2	18.5	355	29.00	32.00	1.00	0
2012M04	1.366	734.739	29.929	272.92	253.4	26.5	306	29.00	29.00	1.00	0
2012M05	1.336	717.118	28.758	158.68	48.7	157.2	282	29.00	29.00	1.00	0
2012M06	1.447	827.810	32.220	14.81	7.4	273.0	256	32.00	32.00	1.00	0
2012M07	1.523	954.413	30.386	0.89	0.0	487.1	272	30.00	29.00	1.00	0
2012M08	1.329	866.634	33.093	0.00	0.0	449.1	302	29.00	30.00	1.00	0
2012M09	1.631	908.574	31.759	0.85	7.2	219.6	330	32.00	29.00	1.00	0
2012M10	1.480	685.855	33.306	67.29	153.4	53.3	380	29.15	31.95	1.00	0
2012M11	1.623	756.734	27.849	326.76	557.8	0.0	402	33.85	29.05	1.00	0
2012M12	1.854	757.715	35.268	587.82	642.9	0.0	434	29.15	33.95	1.00	0
2013M01				850.26	886.0	0.0	425	32.85	30.05	1.00	0
2013M02				864.84	741.0	0.0	356	30.00	32.00	1.00	0
2013M03				690.25	602.0	0.0	355	29.00	30.00	1.00	0
2013M04				416.79	299.0	18.0	306	29.00	29.00	1.00	0
2013M05				183.14	89.0	101.0	282	32.00	29.00	1.00	0
2013M06				22.99	0.0	302.0	256	29.00	32.00	1.00	0
2013M07				0.00	0.0	456.0	272	30.00	29.00	1.00	0
2013M08				0.00	0.0	425.0	302	31.00	30.00	1.00	0
2013M09				1.19	18.0	229.0	330	30.00	32.00	1.00	0
2013M10				79.42	188.0	51.0	380	29.15	28.95	1.00	0
2013M11				290.81	429.0	0.0	402	31.85	29.05	1.00	0
2013M12				607.30	745.0	0.0	434	31.15	33.95	1.00	0
2014M01				852.68	886.0	0.0	425	32.85	30.05	1.00	0
2014M02				866.30	741.0	0.0	356	30.00	32.00	1.00	0
2014M03				683.54	602.0	0.0	355	29.00	30.00	1.00	0
2014M04				413.47	299.0	18.0	306	31.00	29.00	1.00	0
2014M05				180.68	89.0	101.0	282	30.00	31.00	1.00	0
2014M06				21.72	0.0	302.0	256	29.00	30.00	1.00	0
2014M07				0.00	0.0	456.0	272	32.00	29.00	1.00	0
2014M08				0.00	0.0	425.0	302	29.00	32.00	1.00	0
2014M09				1.49	18.0	229.0	330	30.00	30.00	1.00	0
2014M10				81.69	188.0	51.0	380	29.45	28.95	1.00	0
2014M11				296.80	429.0	0.0	402	31.55	29.05	1.00	0
2014M12				608.58	745.0	0.0	434	31.45	33.95	1.00	0
2015M01				857.92	886.0	0.0	425	32.55	32.05	1.00	0
2015M02				862.51	741.0	0.0	356	30.00	30.00	1.00	0
2015M03				679.52	602.0	0.0	355	31.00	30.00	1.00	0
2015M04				410.16	299.0	18.0	306	29.00	31.00	1.00	0
2015M05				178.17	89.0	101.0	282	30.00	29.00	1.00	0
2015M06				20.36	0.0	302.0	256	29.00	30.00	1.00	0
2015M07				0.00	0.0	456.0	272	32.00	32.00	1.00	0
2015M08				0.00	0.0	425.0	302	29.00	29.00	1.00	0
2015M09				1.77	18.0	229.0	330	30.00	29.00	1.00	0
2015M10				83.89	188.0	51.0	380	31.15	29.95	1.00	0
2015M11				302.62	429.0	0.0	402	29.85	31.05	1.00	0
2015M12				609.87	745.0	0.0	434	33.15	31.95	1.00	0
2016M01				866.88	886.0	0.0	425	30.85	32.05	1.00	0
2016M02				858.84	741.0	0.0	356	32.00	30.00	1.00	0
2016M03				680.99	602.0	0.0	355	29.00	32.00	1.00	0
2016M04				416.47	299.0	18.0	306	29.00	29.00	1.00	0
2016M05				181.19	89.0	101.0	282	29.00	29.00	1.00	0
2016M06				22.31	0.0	302.0	256	32.00	30.00	1.00	0
2016M07				0.00	0.0	456.0	272	30.00	32.00	1.00	0
2016M08				0.00	0.0	425.0	302	29.00	29.00	1.00	0
2016M09				1.43	18.0	229.0	330	32.00	29.00	1.00	0
2016M10				80.85	188.0	51.0	380	29.15	31.85	1.00	0
2016M11				299.60	429.0	0.0	402	33.85	29.15	1.00	0
2016M12				599.00	745.0	0.0	434	29.15	33.85	1.00	0

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR QUARTERLY CON EDISON VOLUME FORECASTING MODELS
NORMAL WEATHER BASED ON 10-YEARS ENDING DECEMBER 31, 2012

Observation	WCDD0	WCDD3	WHDD0
2013Q1	0.00	0.00	2,431.54
2013Q2	260.19	0.00	596.87
2013Q3	1,195.58	1,195.58	0.73
2013Q4	164.27	0.00	943.65
2014Q1	0.00	0.00	2,428.65
2014Q2	264.17	0.00	590.11
2014Q3	1,196.22	1,196.22	0.83
2014Q4	159.65	0.00	953.16
2015Q1	0.00	0.00	2,425.97
2015Q2	268.07	0.00	583.25
2015Q3	1,192.24	1,192.24	0.91
2015Q4	159.73	0.00	962.49
2016Q1	0.00	0.00	2,447.54
2016Q2	261.77	0.00	594.13
2016Q3	1,193.97	1,193.97	0.71
2016Q4	164.30	0.00	945.87

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR MONTHLY CON EDISON VOLUME FORECASTING MODEL
NORMAL WEATHER BASED ON 10-YEARS ENDING DECEMBER 31, 2012

Observation	CDD0	HDD0
2013M01	0.0	912.0
2013M02	0.0	766.0
2013M03	0.0	582.0
2013M04	21.0	283.0
2013M05	104.0	88.0
2013M06	299.0	0.0
2013M07	466.0	0.0
2013M08	434.0	0.0
2013M09	244.0	9.0
2013M10	52.0	186.0
2013M11	0.0	406.0
2013M12	0.0	731.0
2014M01	0.0	912.0
2014M02	0.0	766.0
2014M03	0.0	582.0
2014M04	21.0	283.0
2014M05	104.0	88.0
2014M06	299.0	0.0
2014M07	466.0	0.0
2014M08	434.0	0.0
2014M09	244.0	9.0
2014M10	52.0	186.0
2014M11	0.0	406.0
2014M12	0.0	731.0
2015M01	0.0	912.0
2015M02	0.0	766.0
2015M03	0.0	582.0
2015M04	21.0	283.0
2015M05	104.0	88.0
2015M06	299.0	0.0
2015M07	466.0	0.0
2015M08	434.0	0.0
2015M09	244.0	9.0
2015M10	52.0	186.0
2015M11	0.0	406.0
2015M12	0.0	731.0
2016M01	0.0	912.0
2016M02	0.0	791.0
2016M03	0.0	582.0
2016M04	21.0	283.0
2016M05	104.0	88.0
2016M06	299.0	0.0
2016M07	466.0	0.0
2016M08	434.0	0.0
2016M09	244.0	9.0
2016M10	52.0	186.0
2016M11	0.0	406.0
2016M12	0.0	731.0

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR QUARTERLY SENDOUT FORECASTING MODEL
NORMAL WEATHER BASED ON 10-YEARS ENDING DECEMBER 31, 2012

Observation	HDD	CDD
2013Q1	2,260.0	0.0
2013Q2	371.0	424.0
2013Q3	9.0	1,144.0
2013Q4	1,323.0	52.0
2014Q1	2,260.0	0.0
2014Q2	371.0	424.0
2014Q3	9.0	1,144.0
2014Q4	1,323.0	52.0
2015Q1	2,260.0	0.0
2015Q2	371.0	424.0
2015Q3	9.0	1,144.0
2015Q4	1,323.0	52.0
2016Q1	2,285.0	0.0
2016Q2	371.0	424.0
2016Q3	9.0	1,144.0
2016Q4	1,323.0	52.0

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
CASE 13-E-0030
FORECASTING PANEL WORKPAPERS

DATA FOR MONTHLY NYPA VOLUME FORECASTING MODELS
NORMAL WEATHER BASED ON 10-YEARS ENDING DECEMBER 31, 2012

Observation	HDDCYCA10Y	HDDCALA10Y	CDDCALA10Y
2013M01	841.15	912.0	0.0
2013M02	899.56	766.0	0.0
2013M03	690.83	582.0	0.0
2013M04	400.57	283.0	21.0
2013M05	172.56	88.0	104.0
2013M06	23.74	0.0	299.0
2013M07	0.00	0.0	466.0
2013M08	0.00	0.0	434.0
2013M09	0.73	9.0	244.0
2013M10	67.93	186.0	52.0
2013M11	282.08	406.0	0.0
2013M12	593.64	731.0	0.0
2014M01	844.19	912.0	0.0
2014M02	901.04	766.0	0.0
2014M03	683.42	582.0	0.0
2014M04	397.30	283.0	21.0
2014M05	170.35	88.0	104.0
2014M06	22.46	0.0	299.0
2014M07	0.00	0.0	466.0
2014M08	0.00	0.0	434.0
2014M09	0.83	9.0	244.0
2014M10	70.40	186.0	52.0
2014M11	287.78	406.0	0.0
2014M12	594.98	731.0	0.0
2015M01	850.10	912.0	0.0
2015M02	897.12	766.0	0.0
2015M03	678.75	582.0	0.0
2015M04	394.10	283.0	21.0
2015M05	168.05	88.0	104.0
2015M06	21.10	0.0	299.0
2015M07	0.00	0.0	466.0
2015M08	0.00	0.0	434.0
2015M09	0.91	9.0	244.0
2015M10	72.72	186.0	52.0
2015M11	293.35	406.0	0.0
2015M12	596.42	731.0	0.0
2016M01	872.99	912.0	0.0
2016M02	893.39	791.0	0.0
2016M03	681.16	582.0	0.0
2016M04	400.35	283.0	21.0
2016M05	170.73	88.0	104.0
2016M06	23.05	0.0	299.0
2016M07	0.00	0.0	466.0
2016M08	0.00	0.0	434.0
2016M09	0.71	9.0	244.0
2016M10	69.44	186.0	52.0
2016M11	290.63	406.0	0.0
2016M12	585.80	731.0	0.0

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-29
Date of Response: 04/02/2013
Responding Witness: Electric Forecasting Panel

Question No. :E0398
Subject: Forecast for Weather Normal - Follow up your response to IR DPS-043, part 3. Explain why the Panel will not use a 10-year average based normal weather in the forecast update, even though the 10-year average approach is preferred by the NYPSC (Page 14 of the June 17, 2011 NYPSC Order in Case 10-E-0362).

Response:

The Company does not believe that the Commission's June 17, 2011 order in Case 10-E-0362, or the June 22, 2009 order in Case 08-E-0887, precludes a party from arguing for a 30-year average based normal weather variable rather than a 10-year average based normal weather variable. This is evidenced by Staff's position in the Company's last gas and steam rate filings (Cases 09-S-0794 and 09-G-0795) favoring use of a 30-year average despite the Commission's June 22, 2009 order in Case 08-E-0887. The Company believes its use of a rolling 30-year average includes any trends in temperature patterns without being overly impacted by any one year as might occur with a shorter time period. A shorter time period (i.e., a 10-year period) on an annual rolling basis could reflect temporary increases or decreases in the level of degree days rather than any long term trend. The weighting of any one year in a 10-year average would be three times that in a 30-year average. This increases the variability of the normal weather measure significantly.

Company Name: Con Edison
Case Description: Con Edison Electric, Gas & Steam Rate Cases
Case: 13-E-0030, 13-G-0031, 13-S-0032

Response to DPS Interrogatories – Set DPS-31
Date of Response: 04/02/2013
Responding Witness: Gas Forecasting Panel

Question No. :399R
Subject: Forecast for Weather Normal. With respect to 10-year vs. 30-year weather normal, is the Company’s position for gas sales forecast the same as for steam, as stated in the Steam Forecasting Panel’s response to IR DPS-030, question 6? Explain why or why not.

Response:
Yes. Please see the Company's response to DPS7-0030.

Company Name: Con Edison
Case Description: Con Edison Electric Rate Case
Case: 13-E-0030

Response to DPS Interrogatories – Set DPS-47
Date of Response: 05/02/2013
Responding Witness: Electric Forecasting Panel

Question No. :E0592
Subject: Out of Model Adjustment Update - Provide the updated monthly data corresponding to the out of model adjustment summarized on pages 2 through 4 of the Exhibit ___ (FP-6), including the impacts of standby service, of Recharge New York, and of World Trade Center and Gain from Steam AC, that will have reflected the actual data through December 2012.

Response:

Please see the attached file, DPS-47-E0592 Delivery Volume Adjustments.xlsx.

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
DELIVERY VOLUME ADJUSTMENTS

Total Impact of Standby Service

	Con Ed Sales Standby Service Impact								Total Con Ed	NYPA Standby Sales Impact		Total NYPA	TOTAL
	SC 1	SC 2	SC 5	SC 8	SC 9	SC 12	SC 13	Standby Service	Sales impact	NYPA	NYPA Standby Service	Sales Impact	Sales Impact
Jan-13	0	0	0	0	(16)	0	(1)	16	(1)	0	0	0	(1)
Feb-13	0	0	0	0	(15)	0	(1)	14	(2)	0	0	0	(2)
Mar-13	0	0	0	0	(16)	0	(1)	15	(2)	0	0	0	(2)
Apr-13	0	0	0	0	(17)	0	(1)	16	(2)	0	0	0	(2)
May-13	0	0	0	0	(18)	0	0	16	(2)	0	0	0	(2)
Jun-13	0	0	0	0	(21)	0	0	19	(2)	0	0	0	(2)
Jul-13	0	0	0	(1)	(22)	0	0	21	(2)	0	0	0	(2)
Aug-13	0	0	0	0	(23)	0	0	21	(2)	0	0	0	(2)
Sep-13	0	0	0	0	(21)	0	(1)	21	(1)	0	0	0	(1)
Oct-13	0	0	0	0	(18)	0	(2)	19	(1)	0	0	0	(1)
Nov-13	0	0	0	0	(15)	0	(1)	15	(1)	0	0	0	(1)
Dec-13	0	0	0	0	(20)	0	(2)	21	(1)	0	0	0	(1)
Jan-14	0	0	0	0	(18)	0	(1)	16	(3)	0	0	0	(3)
Feb-14	0	0	0	0	(15)	0	(1)	14	(2)	0	0	0	(2)
Mar-14	0	0	0	0	(16)	0	(1)	15	(2)	0	0	0	(2)
Apr-14	0	0	0	0	(17)	0	(1)	17	(1)	0	0	0	(1)
May-14	0	0	0	0	(18)	0	0	16	(2)	0	0	0	(2)
Jun-14	0	0	0	0	(21)	0	0	19	(2)	0	0	0	(2)
Jul-14	0	0	0	(1)	(24)	0	0	21	(4)	0	0	0	(4)
Aug-14	0	0	0	0	(25)	0	0	21	(4)	0	0	0	(4)
Sep-14	0	0	0	0	(23)	0	(1)	21	(3)	0	0	0	(3)
Oct-14	0	0	0	0	(20)	0	(2)	19	(3)	(8)	1	(7)	(10)
Nov-14	0	0	0	0	(17)	0	(1)	15	(3)	(11)	3	(8)	(11)
Dec-14	0	0	0	0	(22)	0	(2)	21	(3)	(11)	3	(8)	(11)
Jan-15	0	0	0	0	(24)	0	(1)	16	(9)	(13)	5	(8)	(17)
Feb-15	0	0	0	0	(22)	0	(1)	14	(9)	(13)	5	(8)	(17)
Mar-15	0	0	0	0	(23)	0	(1)	16	(8)	(11)	4	(7)	(15)
Apr-15	0	0	0	0	(42)	0	(1)	30	(13)	(10)	3	(7)	(20)
May-15	0	0	0	0	(43)	0	0	30	(13)	(8)	1	(7)	(20)
Jun-15	0	0	0	0	(48)	0	0	35	(13)	(11)	3	(8)	(21)
Jul-15	0	0	0	(1)	(49)	0	0	37	(13)	(10)	3	(7)	(20)
Aug-15	0	0	0	0	(50)	0	0	36	(14)	(10)	3	(7)	(21)
Sep-15	0	0	0	0	(49)	0	(1)	37	(13)	(10)	2	(8)	(21)
Oct-15	0	0	0	0	(44)	0	(2)	33	(13)	(16)	7	(9)	(22)
Nov-15	0	0	0	0	(38)	0	(1)	28	(11)	(20)	10	(10)	(21)
Dec-15	0	0	0	0	(45)	0	(2)	33	(14)	(19)	10	(9)	(23)
Jan-16	0	0	0	0	(43)	0	(1)	29	(15)	(20)	11	(9)	(24)
Feb-16	0	0	0	0	(42)	0	(1)	27	(16)	(22)	12	(10)	(26)
Mar-16	0	0	0	0	(41)	0	(1)	28	(14)	(18)	10	(8)	(22)
Apr-16	0	0	0	0	(42)	0	(1)	30	(13)	(17)	9	(8)	(21)
May-16	0	0	0	0	(44)	0	0	30	(14)	(15)	7	(8)	(22)
Jun-16	0	0	0	0	(49)	0	0	35	(14)	(18)	9	(9)	(23)
Jul-16	0	0	0	(1)	(50)	0	0	37	(14)	(19)	10	(9)	(23)
Aug-16	0	0	0	0	(51)	0	0	36	(15)	(18)	9	(9)	(24)
Sep-16	0	0	0	0	(51)	0	(1)	37	(15)	(18)	9	(9)	(24)
Oct-16	0	0	0	0	(53)	0	(2)	33	(22)	(16)	7	(9)	(31)
Nov-16	0	0	0	0	(47)	0	(1)	28	(20)	(20)	10	(10)	(30)
Dec-16	0	0	0	0	(52)	0	(2)	33	(21)	(19)	10	(9)	(30)
2014	0	0	0	(1)	(236)	0	(10)	215	(32)	(30)	7	(23)	(55)
2015	0	0	0	(1)	(477)	0	(10)	345	(143)	(151)	56	(95)	(238)
2016	0	0	0	(1)	(565)	0	(10)	383	(193)	(220)	113	(107)	(300)

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
DELIVERY VOLUME ADJUSTMENTS

Total Impact of Recharge New York

	Commencement of RNY		Elimination of EDDS		Net Impact			TOTAL
	SC 9	RNY	EDDS	SC 9	SC 9	RNY	EDDS	Sales Impact
Jan-13	(65)	65	(63)	63	(2)	65	(63)	0
Feb-13	(63)	63	(61)	61	(2)	63	(61)	0
Mar-13	(63)	63	(63)	63	0	63	(63)	0
Apr-13	(59)	59	(57)	57	(2)	59	(57)	0
May-13	(58)	58	(58)	58	0	58	(58)	0
Jun-13	(59)	59	(60)	60	1	59	(60)	0
Jul-13	(61)	61	(63)	63	2	61	(63)	0
Aug-13	(64)	64	(66)	66	2	64	(66)	0
Sep-13	(61)	61	(64)	64	3	61	(64)	0
Oct-13	(63)	63	(64)	64	1	63	(64)	0
Nov-13	(62)	62	(61)	61	(1)	62	(61)	0
Dec-13	(67)	67	(64)	64	(3)	67	(64)	0
Jan-14	(65)	65	(63)	63	(2)	65	(63)	0
Feb-14	(63)	63	(61)	61	(2)	63	(61)	0
Mar-14	(63)	63	(63)	63	0	63	(63)	0
Apr-14	(59)	59	(57)	57	(2)	59	(57)	0
May-14	(58)	58	(58)	58	0	58	(58)	0
Jun-14	(59)	59	(60)	60	1	59	(60)	0
Jul-14	(61)	61	(63)	63	2	61	(63)	0
Aug-14	(64)	64	(66)	66	2	64	(66)	0
Sep-14	(61)	61	(64)	64	3	61	(64)	0
Oct-14	(63)	63	(64)	64	1	63	(64)	0
Nov-14	(62)	62	(61)	61	(1)	62	(61)	0
Dec-14	(67)	67	(64)	64	(3)	67	(64)	0
Jan-15	(65)	65	(63)	63	(2)	65	(63)	0
Feb-15	(63)	63	(61)	61	(2)	63	(61)	0
Mar-15	(63)	63	(63)	63	0	63	(63)	0
Apr-15	(59)	59	(57)	57	(2)	59	(57)	0
May-15	(58)	58	(58)	58	0	58	(58)	0
Jun-15	(59)	59	(60)	60	1	59	(60)	0
Jul-15	(61)	61	(63)	63	2	61	(63)	0
Aug-15	(64)	64	(66)	66	2	64	(66)	0
Sep-15	(61)	61	(64)	64	3	61	(64)	0
Oct-15	(63)	63	(64)	64	1	63	(64)	0
Nov-15	(62)	62	(61)	61	(1)	62	(61)	0
Dec-15	(67)	67	(64)	64	(3)	67	(64)	0
Jan-16	(65)	65	(63)	63	(2)	65	(63)	0
Feb-16	(63)	63	(61)	61	(2)	63	(61)	0
Mar-16	(63)	63	(63)	63	0	63	(63)	0
Apr-16	(59)	59	(57)	57	(2)	59	(57)	0
May-16	(58)	58	(58)	58	0	58	(58)	0
Jun-16	(59)	59	(60)	60	1	59	(60)	0
Jul-16	(61)	61	(63)	63	2	61	(63)	0
Aug-16	(64)	64	(66)	66	2	64	(66)	0
Sep-16	(61)	61	(64)	64	3	61	(64)	0
Oct-16	(63)	63	(64)	64	1	63	(64)	0
Nov-16	(62)	62	(61)	61	(1)	62	(61)	0
Dec-16	(67)	67	(64)	64	(3)	67	(64)	0
2014	(745)	745	(744)	744	(1)	745	(744)	0
2015	(745)	745	(744)	744	(1)	745	(744)	0
2016	(745)	745	(744)	744	(1)	745	(744)	0

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
DELIVERY VOLUME ADJUSTMENTS

Total Impact of World Trade Center and Gain from Steam AC

	WTC		Steam AC		Total			TOTAL
	SC 9	NYPA	SC 8	SC 9	SC 8	SC 9	NYPA	Sales Impact
Jan-13	(3)	4	0	0	0	(3)	4	1
Feb-13	(4)	4	0	0	0	(4)	4	0
Mar-13	(4)	4	0	0	0	(4)	4	0
Apr-13	(3)	5	0	0	0	(3)	5	2
May-13	(2)	5	0	0	0	(2)	5	3
Jun-13	(3)	6	0	1	0	(2)	6	4
Jul-13	(3)	6	0	1	0	(2)	6	4
Aug-13	(2)	7	0	1	0	(1)	7	6
Sep-13	(3)	6	0	1	0	(2)	6	4
Oct-13	(3)	6	0	1	0	(2)	6	4
Nov-13	(2)	6	0	0	0	(2)	6	4
Dec-13	(3)	7	0	0	0	(3)	7	4
Jan-14	(3)	6	0	0	0	(3)	6	3
Feb-14	(4)	7	0	0	0	(4)	7	3
Mar-14	(4)	7	0	0	0	(4)	7	3
Apr-14	(3)	7	0	0	0	(3)	7	4
May-14	(2)	7	0	0	0	(2)	7	5
Jun-14	(3)	8	0	1	0	(2)	8	6
Jul-14	(3)	7	1	2	1	(1)	7	7
Aug-14	(2)	8	1	2	1	0	8	9
Sep-14	(3)	8	0	2	0	(1)	8	7
Oct-14	(3)	7	0	1	0	(2)	7	5
Nov-14	(2)	7	0	0	0	(2)	7	5
Dec-14	(3)	8	0	0	0	(3)	8	5
Jan-15	(3)	7	0	0	0	(3)	7	4
Feb-15	(4)	8	0	0	0	(4)	8	4
Mar-15	(4)	8	0	0	0	(4)	8	4
Apr-15	(3)	8	0	0	0	(3)	8	5
May-15	(2)	9	0	1	0	(1)	9	8
Jun-15	(3)	9	0	2	0	(1)	9	8
Jul-15	(3)	11	1	3	1	0	11	12
Aug-15	(2)	12	1	3	1	1	12	14
Sep-15	(3)	11	1	2	1	(1)	11	11
Oct-15	(3)	10	0	2	0	(1)	10	9
Nov-15	(2)	10	0	0	0	(2)	10	8
Dec-15	(3)	12	0	0	0	(3)	12	9
Jan-16	(3)	11	0	0	0	(3)	11	8
Feb-16	(4)	11	0	0	0	(4)	11	7
Mar-16	(4)	11	0	0	0	(4)	11	7
Apr-16	(3)	11	0	0	0	(3)	11	8
May-16	(2)	11	0	1	0	(1)	11	10
Jun-16	(3)	13	1	2	1	(1)	13	13
Jul-16	(3)	15	1	4	1	1	15	17
Aug-16	(2)	17	1	5	1	3	17	21
Sep-16	(3)	15	1	3	1	0	15	16
Oct-16	(3)	15	0	2	0	(1)	15	14
Nov-16	(2)	15	0	0	0	(2)	15	13
Dec-16	(3)	16	0	0	0	(3)	16	13
2014	(35)	87	2	8	2	(27)	87	62
2015	(35)	115	3	13	3	(22)	115	96
2016	(35)	161	4	17	4	(18)	161	147

Actual Cooling and Heating Degree Days, 1974-2012

New york City Central Park Station

Year	CDD	10-Year Average	30-Year Average	HDD	10-Year Average	30-Year Average
1974	1373			4174		
1975	1420			4037		
1976	1359			4613		
1977	1580			4468		
1978	1375			4708		
1979	1593			3943		
1980	1658			4408		
1981	1591			4150		
1982	1456			4068		
1983	1716	1512		4074	4264	
1984	1532	1528		3991	4246	
1985	1648	1551		3992	4241	
1986	1523	1567		4021	4182	
1987	1536	1563		4101	4146	
1988	1563	1582		4424	4117	
1989	1523	1575		4456	4168	
1990	1587	1568		3408	4068	
1991	1769	1585		3680	4021	
1992	1267	1566		4339	4049	
1993	1603	1555		4175	4059	
1994	1577	1560		4128	4072	
1995	1672	1562		4215	4095	
1996	1481	1558		4406	4133	
1997	1351	1539		4152	4138	
1998	1592	1542		3386	4035	
1999	1697	1560		3721	3961	
2000	1376	1538		4294	4050	
2001	1660	1528		3750	4057	
2002	1792	1580		3816	4004	
2003	1531	1573	1547	4499	4037	4120
2004	1650	1580	1556	4206	4044	4121
2005	1792	1592	1568	4176	4041	4126
2006	1536	1598	1574	3389	3939	4085
2007	1623	1625	1576	4165	3940	4075
2008	1482	1614	1579	4027	4004	4052
2009	1328	1577	1570	4172	4049	4060
2010	1859	1625	1577	3920	4012	4043
2011	1786	1638	1584	3766	4014	4031
2012	1684	1627	1591	3441	3976	4010

Note:
CDD is based on 57.5 Average Dry & Wet Bulb.
HDD is based on 24 Hour Average Dry Bulb Temperature - 62° F.

Forecasting Weather Normal, 10-Year Average vs. 30-Year Average

Cooling Degree Days, NYC Central Park, 57.5 Degree Fahrenheit of Average Dry & Wet Bulb

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Rolling Averages			Forecast Error (Absolute%)		10-Year	10-Year Better
Year	Actual	Year Ending	30-Year	10-Year	30-Year	10-Year	Better?	W/ Extreme Weather?
2004	1650	2003	1547	1573	6.2%	4.7%	Y	
2005	1792	2004	1556	1580	13.2%	11.8%	Y	Y
2006	1536	2005	1568	1592	2.1%	3.6%	N	
2007	1623	2006	1574	1598	3.0%	1.6%	Y	
2008	1482	2007	1576	1625	6.3%	9.7%	N	
2009	1328	2008	1579	1614	18.9%	21.5%	N	N
2010	1859	2009	1570	1577	15.5%	15.2%	Y	Y
2011	1786	2010	1577	1625	11.7%	9.0%	Y	Y
2012	1684	2011	1584	1638	6.0%	2.8%	Y	
2005	1792	2003	1547	1573	13.7%	12.2%	Y	Y
2006	1536	2004	1556	1580	1.3%	2.9%	N	
2007	1623	2005	1568	1592	3.4%	1.9%	Y	
2008	1482	2006	1574	1598	6.3%	7.8%	N	
2009	1328	2007	1576	1625	18.6%	22.3%	N	N
2010	1859	2008	1579	1614	15.0%	13.2%	Y	Y
2011	1786	2009	1570	1577	12.0%	11.7%	Y	Y
2012	1684	2010	1577	1625	6.4%	3.5%	Y	

Statistics Measuring Forecast Accuracy

	30-Year	10-Year
Average Forecast Error (BIAS)	-67.8	-36.7
Mean Average Percent Error (MAPE)	9.4	9.1
Standard Root Mean Square Error (SRMSE)	11.0	10.7

Note:

1. Data sources: Con Edison sales forecasting model data in Cases 04-E-0572, 07-E-428, 08-E-539, 09-E-523, and response to IR DPS-325 of this rate case.
2. Extreme weather is defined as when actual degree days exceed one of the weather normal forecasts by more than 10%.

Forecasting Weather Normal, 10-Year Average vs. 30-Year Average

Heating Degree Days, NYC Central Park, 62 Degree Fahrenheit of 24-Hour Average Dry Bulb

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Rolling Averages			Forecast Error (Absolute%)		10-Year	10-Year Better
Year	Actual	Year Ending	30-Year	10-Year	30-Year	10-Year	Better?	W/ Extreme Weather?
2004	4206	2003	4120	4037	2.0%	4.0%	N	
2005	4176	2004	4121	4044	1.3%	3.1%	N	
2006	3389	2005	4126	4041	21.7%	19.2%	Y	Y
2007	4165	2006	4085	3939	1.9%	5.4%	N	
2008	4027	2007	4075	3940	1.2%	2.2%	N	
2009	4172	2008	4052	4004	2.9%	4.0%	N	
2010	3920	2009	4060	4049	3.6%	3.3%	Y	
2011	3766	2010	4043	4012	7.4%	6.5%	Y	
2012	3441	2011	4031	4014	17.1%	16.6%	Y	Y
2005	4176	2003	4120	4037	1.3%	3.3%	N	
2006	3389	2004	4121	4044	21.6%	19.3%	Y	Y
2007	4165	2005	4126	4041	0.9%	3.0%	N	
2008	4027	2006	4085	3939	1.4%	2.2%	N	
2009	4172	2007	4075	3940	2.3%	5.6%	N	
2010	3920	2008	4052	4004	3.4%	2.1%	Y	
2011	3766	2009	4060	4049	7.8%	7.5%	Y	
2012	3441	2010	4043	4012	17.5%	16.6%	Y	Y

Statistics Measuring Forecast Accuracy

	30-Year	10-Year
Average Forecast Error (BIAS)	180.8	107.5
Mean Average Percent Error (MAPE)	6.8	7.3
Standard Root Mean Square Error (SRMSE)	8.9	8.6

Note:

1. Data sources: Con Edison sales forecasting model data in Cases 04-E-0572, 07-E-428, 08-E-539, 09-E-523, and response to IR DPS-325 of this rate case.
2. Extreme weather is defined as when actual degree days exceed one of the weather normal forecasts by more than 10%.

Summary of Forecasts and Adjustments for Con Edison Electric Sales Volume

Rate Year Ending December 31, 2014, Unit in GWh

	Con Edison Forecast 30-Year Weather Normal (1)	Staff Forecast 10-Year Weather Normal (2)	Difference from Con Edison (3)	Staff Forecast 30-Year Weather Normal (4)	Difference from Staff 10-Year (5)	Difference from Con Edison (6)
Model Forecast	47,249	47,760	511	47,616	-144	367
Adjustment						
DSM Savings	(810)	(542)	268	(542)	0	268
Standby	(309)	(237)	72	(237)	0	72
RNY	(641)	(745)	(104)	(745)	0	(104)
EDDS	744	744	0	744	0	0
WTC	(34)	(35)	(1)	(35)	0	(1)
Steam AC	16	10	(6)	10	0	(6)
Total Adjustment	(1,034)	(805)	229	(805)	0	229
Net Forecast	46,215	46,955	740	46,811	-144	596

Total sales volume for SCs 1, 2, 8, 9, and 12.

SC 1 (RESIDENTIAL AND RELIGIOUS)

Volume Forecasting Model

Dependent Variable: LOG(GWH17/BDA0)
Method: Least Squares
Sample: 1988Q1 2012Q4
Included observations: 100
Convergence achieved after 23 iterations
MA Backcast: 1987Q1 1987Q4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.221112	1.502170	2.810009	0.0061
LOG(PRICE17S(-1))	-0.060524	0.037912	-1.596445	0.1139
LOG(DPYR(-1))	0.322919	0.108030	2.989147	0.0036
WCDD0	0.000355	4.14E-05	8.579319	0.0000
WCDD3	0.000246	5.01E-05	4.906898	0.0000
WHDD0	7.14E-05	1.21E-05	5.891785	0.0000
AR(1)	0.341677	0.104179	3.279712	0.0015
SAR(4)	0.979313	0.007788	125.7411	0.0000
MA(4)	-0.580528	0.099306	-5.845845	0.0000

R-squared	0.991818	Mean dependent var	7.997018
Adjusted R-squared	0.991098	S.D. dependent var	0.209133
S.E. of regression	0.019731	Akaike info criter	-4.927530
Sum squared resid	0.035429	Schwarz criterion	-4.693065
Log likelihood	255.3765	Hannan-Quinn crite	-4.832638
F-statistic	1378.827	Durbin-Watson stat	2.027827
Prob(F-statistic)	0.000000		

Inverted AR Roots	.99	.	.00+.99i-.00-.99i
-0.99			
Inverted MA Roots	.87		

Customer Forecasting Model

Dependent Variable: LOG(NC17)
Method: Least Squares
Sample: 1988Q1 2012Q4
Included observations: 100
Convergence achieved after 15 iterations
MA Backcast: 1986Q4 1987Q4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.051760	0.039967	1.295057	0.1984
LOG(NC17(-1))	0.982044	0.008253	118.9864	0.0000
LOG(PNEMP_N)	0.011320	0.004094	2.764877	0.0068
MA(1)	0.266912	0.105493	2.530152	0.0130
SMA(4)	0.416790	0.099272	4.198481	0.0001

R-squared	0.999475	Mean dependent var	7.884175
Adjusted R-squared	0.999453	S.D. dependent var	0.038885
S.E. of regression	0.000910	Akaike info criter	-11.11804
Sum squared resid	7.86E-05	Schwarz criterion	-10.98778
Log likelihood	560.9018	Hannan-Quinn crite	-11.06532
F-statistic	45188.89	Durbin-Watson stat	1.911752
Prob(F-statistic)	0.000000		

Inverted MA Roots	.57+.57i	.57+.5	-.27-.57-.57i
	-.57-.57i		

SC 2 (GENERAL - SMALL)

Volume Forecasting Model

Dependent Variable: LOG(GWH02/BDA0)
Method: Least Squares
Sample: 1988Q1 2012Q4
Included observations: 100
Convergence achieved after 14 iterations
MA Backcast: 1987Q1 1987Q4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.699102	0.419661	4.048748	0.0001
LOG(PRICE02S(-3))	-0.088655	0.025402	-3.490092	0.0007
LOG(PNEMP_N)	0.150139	0.074165	2.024399	0.0459
LOG(NC02F)	0.595421	0.083516	7.129422	0.0000
WCDD0	0.000176	2.69E-05	6.543424	0.0000
WCDD3	3.51E-05	2.04E-05	1.725007	0.0879
WHDD0	7.94E-05	4.00E-06	19.85470	0.0000
AR(1)	0.564154	0.090082	6.262652	0.0000
MA(4)	0.273841	0.112107	2.442684	0.0165

R-squared	0.973806	Mean dependent var	6.230346
Adjusted R-squared	0.971503	S.D. dependent var	0.085930
S.E. of regression	0.014506	Akaike info criter	-5.542838
Sum squared resid	0.019148	Schwarz criterion	-5.308373
Log likelihood	286.1419	Hannan-Quinn crite	-5.447946
F-statistic	422.8835	Durbin-Watson stat	2.211379
Prob(F-statistic)	0.000000		

Inverted AR Roots	.56			
Inverted MA Roots	.51-.51i	.51+.5	-.51+.51i	-.51+.51i

Customer Forecasting Model

Dependent Variable: LOG(NC02)
Method: Least Squares
Sample: 1988Q1 2012Q4
Included observations: 100
Convergence achieved after 18 iterations
MA Backcast: 1986Q4 1987Q4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.056896	0.144034	-0.395017	0.6937
LOG(NC02(-1))	0.972810	0.021059	46.19459	0.0000
LOG(PNEMP_N(-1))	0.026502	0.015020	1.764455	0.0809
AR(4)	0.882880	0.036339	24.29567	0.0000
MA(1)	0.823713	0.063788	12.91320	0.0000
SMA(4)	-0.489677	0.117942	-4.151852	0.0001

R-squared	0.998475	Mean dependent var	5.774043
Adjusted R-squared	0.998394	S.D. dependent var	0.073424
S.E. of regression	0.002943	Akaike info criter	-8.760767
Sum squared resid	0.000814	Schwarz criterion	-8.604457
Log likelihood	444.0384	Hannan-Quinn crite	-8.697506
F-statistic	12306.89	Durbin-Watson stat	1.966581
Prob(F-statistic)	0.000000		

Inverted AR Roots	.97	.00+.9	-.00-.97i	-.97
Inverted MA Roots	.84	.00-.8	-.00+.84i	-.82
-0.84				

SC 8 (MULTIPLE DWELLINGS - REDISTRIBUTION)

Volume Forecasting Model

Dependent Variable: LOG(GWH08/BDA0)
Method: Least Squares
Sample: 1988Q1 2012Q4
Included observations: 100
Convergence achieved after 13 iterations
MA Backcast: 1987Q1 1987Q4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.314121	0.474230	11.20580	0.0000
LOG(PRICE08S(-4))	-0.026817	0.019773	-1.356247	0.1783
LOG(PNEMP_N(-4))	0.095983	0.056243	1.706579	0.0912
WCDD0	0.000444	1.84E-05	24.17492	0.0000
WHDD0	6.15E-05	8.97E-06	6.852356	0.0000
AR(4)	0.941456	0.013696	68.74091	0.0000
MA(4)	-0.465881	0.116822	-3.987942	0.0001

R-squared	0.992327	Mean dependent var	6.118979
Adjusted R-squared	0.991831	S.D. dependent var	0.173143
S.E. of regression	0.015649	Akaike info criter	-5.409434
Sum squared resid	0.022774	Schwarz criterion	-5.227072
Log likelihood	277.4717	Hannan-Quinn crite	-5.335629
F-statistic	2004.450	Durbin-Watson stat	1.586782
Prob(F-statistic)	0.000000		

Inverted AR Roots	.99			
Inverted MA Roots	.83	.00-.8	.00+.83i	-.83

Customer Forecasting Model

Dependent Variable: LOG(NC08)
Method: Least Squares
Sample: 1988Q1 2012Q4
Included observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.063293	0.048284	-1.310860	0.1930
LOG(NC08(-1))	0.949466	0.022541	42.12136	0.0000
LOG(PNEMP_N)	0.011851	0.007142	1.659266	0.1003

R-squared	0.976418	Mean dependent var	0.620664
Adjusted R-squared	0.975932	S.D. dependent var	0.024311
S.E. of regression	0.003772	Akaike info criter	-8.293117
Sum squared resid	0.001380	Schwarz criterion	-8.214962
Log likelihood	417.6558	Hannan-Quinn crite	-8.261486
F-statistic	2008.161	Durbin-Watson stat	1.708624
Prob(F-statistic)	0.000000		

SC 9 (GENERAL - LARGE)

Volume Forecasting Model

Dependent Variable: LOG(GWH49A/BDA0)
Method: Least Squares
Sample: 1988Q1 2012Q4
Included observations: 100
Convergence achieved after 159 iterations
MA Backcast: 1986Q4 1987Q4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.420361	0.559676	7.898068	0.0000
LOG(PRICE49S(-3))	-0.046136	0.016711	-2.760785	0.0070
LOG(PNEMP_N(-1))	0.190723	0.083919	2.272710	0.0254
LOG(NC49F)	0.591335	0.051891	11.39572	0.0000
WCDD0	0.000189	4.01E-06	47.17838	0.0000
WHDD0	1.06E-05	2.74E-06	3.875860	0.0002
D1999Q4	0.023724	0.011220	2.114492	0.0372
MA(1)	0.623872	0.089797	6.947606	0.0000
SMA(4)	0.472292	0.102954	4.587391	0.0000

R-squared	0.990236	Mean dependent var	8.702742
Adjusted R-squared	0.989378	S.D. dependent var	0.137191
S.E. of regression	0.014139	Akaike info criter	-5.594030
Sum squared resid	0.018193	Schwarz criterion	-5.359565
Log likelihood	288.7015	Hannan-Quinn crite	-5.499138
F-statistic	1153.661	Durbin-Watson stat	2.062945
Prob(F-statistic)	0.000000		

Inverted MA Roots	.59+.59i	.59+.5	-.59-.59i	-.59-.59i
-0.62				

Customer Forecasting Model

Dependent Variable: LOG(NC49)
Method: Least Squares
Sample: 1988Q1 2012Q4
Included observations: 100
Convergence achieved after 12 iterations
MA Backcast: 1987Q1 1987Q4

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.047203	0.071856	0.656920	0.5128
LOG(NC49(-1))	0.959797	0.008019	119.6840	0.0000
LOG(PNEMP_N)	0.017438	0.011716	1.488361	0.1400
D1995Q2	0.007616	0.001651	4.611593	0.0000
MA(4)	0.491849	0.090946	5.408130	0.0000

R-squared	0.999465	Mean dependent var	4.693415
Adjusted R-squared	0.999442	S.D. dependent var	0.138860
S.E. of regression	0.003279	Akaike info criter	-8.553664
Sum squared resid	0.001022	Schwarz criterion	-8.423405
Log likelihood	432.6832	Hannan-Quinn crite	-8.500946
F-statistic	44354.37	Durbin-Watson stat	2.108457
Prob(F-statistic)	0.000000		

Inverted MA Roots	.59+.59i	.59+.5	-.59-.59i	-.59-.59i

SC 12 (MULTIPLE DWELLING SPACE HEATING)

Volume Forecasting Model

Dependent Variable: LOG(GWH12)
Method: Least Squares
Sample: 1988M01 2012M12
Included observations: 300
Convergence achieved after 11 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.639679	0.958389	-0.667452	0.5050
LOG(NC12F)	0.591307	0.154151	3.835888	0.0002
CDD0	0.000318	6.14E-05	5.175727	0.0000
HDD0	0.000618	3.24E-05	19.08646	0.0000
CDD0(-1)	0.000419	6.13E-05	6.832034	0.0000
HDD0(-1)	0.000730	3.25E-05	22.44533	0.0000
D200309	-0.184324	0.060687	-3.037292	0.0026
AR(1)	0.327716	0.055875	5.865216	0.0000
SAR(12)	0.399369	0.056372	7.084530	0.0000

R-squared	0.966226	Mean dependent var	3.589569
Adjusted R-squared	0.965298	S.D. dependent var	0.365313
S.E. of regression	0.068052	Akaike info criter	-2.507542
Sum squared resid	1.347651	Schwarz criterion	-2.396429
Log likelihood	385.1313	Hannan-Quinn crite	-2.463074
F-statistic	1040.652	Durbin-Watson stat	2.016008
Prob(F-statistic)	0.000000		

Inverted AR Roots	.93	.80+.4	.80-.46i	.46+.80i
	.46-.80i	.	.00+.93i	.00-.93i
	-.46+.80i	-.46-.8	-.80-.46i	-.80+.46i
-0.93				

Customer Forecasting Model

Dependent Variable: LOG(NC12)
Method: Least Squares
Sample: 1997M07 2012M12
Included observations: 186
Convergence achieved after 4 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.864175	0.043915	156.3042	0.0000
LOG(TIME)	-0.117013	0.007687	-15.22232	0.0000
AR(1)	0.801711	0.043712	18.34076	0.0000

R-squared	0.973969	Mean dependent var	6.197815
Adjusted R-squared	0.973685	S.D. dependent var	0.022776
S.E. of regression	0.003695	Akaike info criter	-8.347865
Sum squared resid	0.002498	Schwarz criterion	-8.295837
Log likelihood	779.3514	Hannan-Quinn crite	-8.326781
F-statistic	3423.550	Durbin-Watson stat	2.073348
Prob(F-statistic)	0.000000		

Inverted AR Roots .80

Economic Assumptions to Forecast

		Number of Customers (1,000)					Private Non-Manufacturing Employment (1,000)	Real Personal Disposable Income (Million 2005$)	Real Electric Price (c/KWhr)			
		SC1	SC2	SC8	SC9	SC12			SC1	SC2	SC8	SC9
2013	Q1	2,858.080	357.486	1.923	131.128	0.477	3,599.7	397,428	22.441	6.524	9.739	14.928
	Q2	2,864.216	357.201	1.925	131.205	0.476	3,684.2	396,471	25.848	7.340	10.566	16.686
	Q3	2,867.344	356.493	1.927	131.332	0.475	3,691.4	397,644	26.948	7.313	10.143	16.761
	Q4	2,872.260	356.946	1.929	131.594	0.474	3,732.1	401,095	25.312	6.767	10.190	15.243
2014	Q1	2,877.231	358.015	1.931	131.832	0.474	3,678.1	404,509	22.441	6.524	9.739	14.928
	Q2	2,882.807	357.964	1.933	132.110	0.473	3,757.6	407,904	25.848	7.340	10.566	16.686
	Q3	2,888.353	357.541	1.935	132.382	0.473	3,764.4	411,888	26.948	7.313	10.143	16.761
	Q4	2,894.221	358.142	1.937	132.672	0.472	3,812.1	416,478	25.312	6.767	10.190	15.243

Con Edison Forecast Compared with Actual Volume Weather Normalized

Six Months Ending December 31, 2012, Unit in GWh

Actual Sales	24,817
10-Year Weather Normalization	
Con Edison Model Forecast	24,726
30-Year Weather Normal	
Adjustment	
DSM Savings	(163)
Standby	(97)
RNY	(323)
EDDS	382
WTC	(15)
Steam AC	4
Total Adjustment	(212)
Net Forecast	24,514
Under-Forecast	(303)

Note: Total sales volume for SCs 1, 2, 8, 9, and 12.

Sales and Economic Growth Rates: History and Forecasts in Con Edison Service Area

Average Annual Rates

	Before Recession		Recession	Post Recession	Forecast
	1997-2007	1998-2008	2008-2009	2009-2012	2012-2014
Total Employment	1.2%	1.1%	-2.7%	1.6%	2.0%
Private Employment	1.4%	1.2%	-3.2%	2.1%	2.3%
Personal Income	3.0%	2.8%	-3.3%	1.8%	1.5%
Sales Volume Growth	2.0%	1.9%	-1.8%	0.1%	
Con Edison Forecast					0.1%
Staff Forecast					0.9%

Total sales volume for SCs 1, 2, 8, 9, 12.
Historical data for sales volume 1997-2012 are normalized for weather.

Recent Load Factors in Con Edison's Service Area

1. Load Factors Based on Delivery Volume and System Peak

Year	Delivery Volume (GWH)	System Peak (MW)	Load Factor (%)
2008	58,524	13,700	48.6%
2009	57,498	13,575	48.4%
2010	57,461	13,150	49.9%
2011	57,030	13,100	49.7%
2012	57,188	13,100	49.7%
Average 2010-2012			49.8%

2. Load Factors Based on System Sendout and System Peak Plus Loss

Year	System Sendout (GWH)	System Peak + Loss (MW)	Load Factor (%)
2008	62,428	13,851	51.3%
2009	61,154	13,731	50.8%
2010	61,343	13,317	52.6%
2011	60,900	13,311	52.2%
2012	61,136	13,265	52.5%
Average 2010-2012			52.4%

Sources: Con Edison Response to DPS-078, Exhibit FP-7, NYISO Load Forecast Task Force.

Pitfalls in the Estimation of a Differenced Model
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Pitfalls in the Estimation of a Differenced Model

Asatoshi Maeshiro and Shapoor Vali
Department of Economics, University of Pittsburgh, Pittsburgh, PA 15260

This article assesses the potential magnitude of the loss of estimation efficiency caused by the adoption of a differenced model when the disturbances of the original (levels) linear regression model follow either a stable (autoregressive) AR(1) process or a fixed start-up random-walk process (hence no filtering is necessary from the standpoint of estimation). The magnitude of the loss, which can be quite large, is found to be affected by both the form of the original model (homogeneous or nonhomogeneous) and the sign and magnitude of the autocorrelation coefficient of the AR(1) disturbance, as well as by the nature of the exogenous variable (smoothly trended or not).

KEY WORDS: Loss of efficiency; Trended variables.

1. INTRODUCTION

In every subfield of applied econometrics, both a linear regression model in first differences and one in levels are concurrently adopted to explain the same or a similar variable. Yet the ramifications of estimating one form of a model when the other form is "correct" do not seem to be well known among the applied econometricians—or they may be known but their potential magnitudes may not have been appropriately assessed. [Within a limited context, this question was studied by Plosser and Schwert (1977, 1978) and Harvey (1980), with somewhat different conclusions. Plosser and Schwert (1978) concluded that differencing—with any number of differences—makes little difference from the standpoint of estimation "as long as the autocorrelation properties of the regression disturbances are taken into account" (p. 638). On the other hand, Harvey (1980) concluded that "attempting to discriminate between models on statistical grounds is clearly preferable to taking first differences automatically, since the loss in precision in doing so may be considerable" (p. 718). For yet a different interpretation of differencing in modeling methodology, see Davidson, Hendry, Srba, and Yeo (1978, p. 673).]

The main purpose of this article is to demonstrate the potential magnitude of the loss of efficiency in estimation when applied econometricians use a differenced (first differences) model under inappropriate and yet commonly observed conditions. In our demonstration, we assume that the disturbances of the original (levels) model follow either a stationary (autoregressive) AR(1) process or a fixed start-up random-walk process with zero mean. In other words, we assume that the levels model is "correctly" specified in the sense that the mean of the disturbance is 0 and the variance–covariance matrix of the disturbances is finite and positive definite; hence, differencing is unnecessary from the standpoint of estimation. [Estimation is not the sole reason for the adoption of a differenced model, however. Various reasons have been advanced for its adoption, some pertaining to estimation and others relating to hypothesis testing, the purpose of the model, and the availability of data (Chow and Moore 1972; Granger and Newbold 1974; Suits 1962).]

Referring to the practice of prefiltering economic time series in economic modeling, a practice that has gained momentum recently, Zellner (1979) cautioned that "the effects of filtering, whether by differencing or by use of more general prefilters, can be drastic enough in some circumstances to justify Friedman's phrase 'throwing the baby out with the bath' " (p. 41). This article illustrates such circumstances and thereby warns applied econometricians not to adopt a prefiltered (differenced) model mechanically and carelessly. The opportunity cost of a careless adoption can be astronomical, as we shall reveal.

2. EFFECTS OF DIFFERENCING WITH OR WITHOUT MISSPECIFICATION

We assume that the original (levels) model is correctly specified as follows:

$$Y = X\beta + U, \qquad (1)$$

where Y is a $T \times 1$ random vector of observations on the regressand, X is a $T \times K$ matrix of observations on the K exogenous regressors, β is a $K \times 1$ vector of coefficients, and U is a $T \times 1$ vector of disturbances with mean 0 and variance–covariance matrix Ω. The disturbances are assumed to be generated by either a stable AR(1) process or a fixed start-up random-walk process. The former is specified as

$$u_t = \rho u_{t-1} + \varepsilon_t, \qquad t = 1, \ldots, T, \qquad (2)$$

where $-1.0 < \rho < 1.0$, the ε's are iid with zero mean and constant variance σ_ε^2, and the initial disturbance, u_0, is independent of the ε's and has a mean of 0 and a variance equal to $\sigma_\varepsilon^2/(1.0 - \rho^2)$. The fixed start-up random-walk process is given by

$$u_1 = \varepsilon_1, \quad u_t = u_{t-1} + \varepsilon_t, \quad t = 2, 3, \ldots, T, \tag{3}$$

where the ε's are iid with mean 0 and variance σ_ε^2.

The fixed start-up random-walk process is included to examine a case in which differencing may be viewed as desirable or almost "correct," although not necessary from the standpoint of estimation because the original disturbances possess a finite variance–covariance matrix of known structure and generalized least squares (GLS) can be applied directly. In practice, the assumption of a fixed start-up random-walk process is more realistic than that of an indefinitely operating random-walk process, because every economic process, aggregate or disaggregate, is disrupted by catastrophes, natural or man-made. In other words, structural shifts are the rule. If so, to assume that a new process starts after each catastrophe is natural.

Given the model described previously, we examine four cases, each of which has direct relevance in applied econometrics.

Case 1. The original model is a nonhomogeneous one, given by

$$Y = i\beta_0 + X_1\beta_1 + U, \tag{4}$$

where Y is a $T \times 1$ random vector of observations on the regressand, i is a $T \times 1$ vector of ones, X_1 is a $T \times (K - 1)$ matrix of observations on the exogenous regressors, β_0 is an intercept, β_1 is a $(K - 1) \times 1$ vector of slope coefficients, and U is a $T \times 1$ vector of disturbances. The rank of the matrix $(i\ X_1)$ is K. The differenced model of (4) can be represented as

$$DY = Di\beta_0 + DX_1\beta_1 + DU = DX_1\beta_1 + DU, \tag{5}$$

where D is a $(T - 1) \times T$ differencing matrix—that is, the matrix with $d_{tt} = -1$ and $d_{t,t+1} = 1$ for $t = 1, \ldots, T - 1$, and all other elements equal to 0.

In this case, it can be shown that the GLS of the vector of slope coefficients β_1 in (4) and in the differenced model (5) are identical whether the disturbances are generated by a stable AR(1) process, a fixed start-up random-walk process, or by any other process so long as their variance–covariance matrix is finite and positive definite (for proof, see Maeshiro, Vali, and Wichers 1979). In other words, given the variance–covariance matrix Ω of the disturbances, the last $K - 1$ elements of $(X'\Omega^{-1}X)^{-1}X'\Omega^{-1}Y$ are identical to $[X_1'D'(D\Omega D')^{-1}DX_1]^{-1}X_1'D'(D\Omega D')^{-1}DY$, where $X = (i\ X_1)$. Note that the quality holds even when Ω is replaced by its estimator $\hat{\Omega}$; that is, the two feasible estimators are identical so long as they use the same estimator of Ω. Thus no information is lost by differencing as far as the estimation of slope coefficients is concerned. Similar results were obtained for iid disturbances (i.e., the case of $\rho = 0$) by Plosser and Schwert (1977), using a Monte Carlo experiment; they were also proved by Harvey (1980, pp. 718–719).

If the original model (4) contains p polynomial time trends $t, t^2, \ldots, t^p$ as separate regressors and if mth differencing $(m \leq p + 1)$ is done properly so that an intercept that is the coefficient of a linear time trend in the immediately preceding model is dropped at each stage, the GLS of the mth differenced model will be identical to the GLS of the corresponding parameters in the original model (4). In this context, Plosser and Schwert (1978) were right to assert that differencing (not just first differencing) "makes little difference" so long as "the autocorrelation properties of the regression disturbances are taken into account" (p. 638).

Case 2. The original model is homogeneous; that is,

$$Y = X_1\beta_1 + U. \tag{6}$$

The differenced model is the same as (5). The variance–covariance matrix of the GLS for β_1 in the original model, $(X_1'\Omega^{-1}X_1)^{-1}$, and that in the differenced model, $[X_1'D'(D\Omega D')^{-1}DX_1]^{-1}$, are generally not the same; hence, differencing induces a loss of efficiency in estimation. Of course, this is a well-known result. What may not be known among applied econometricians is that the size of this loss can be unbearably large in practice.

Case 3. The original model is nonhomogeneous as in Case 1, but an applied econometrician inadvertently includes an intercept in the differenced model when the linear time trend t would not have been included among the regressors in the original model. In other words, a misspecification is committed by including an irrelevant constant term in the differenced model. Applied econometricians tend to include an intercept in a differenced regression model as a matter of course. They include an intercept in a differenced regression model more cursorily than a linear time trend in a levels regression model, although one implies the other. The inclusion of a linear time trend might be viewed as a confession of ignorance, but the inclusion of an intercept in the differenced model does not seem to be viewed in the same vein. Perhaps an applied econometrician includes an intercept because he wants to obtain an R^2 in the standard format. He may not be aware, however, that this can induce a huge loss in efficiency. The misspecified differenced model is given by

$$DY = j\beta_0^* + DX_1\beta_1 + DU, \tag{7}$$

where j is a $(T - 1) \times 1$ vector of ones. The variance–covariance matrix of the GLS of this model is given by

$$[(j\ DX_1)'(D\Omega D')^{-1}(j\ DX_1)]^{-1}. \tag{8}$$

Case 4. The original model is homogeneous as in Case 2 with no linear time trend as a regressor, but an applied econometrician includes an irrelevant intercept in the differenced model for the same reasons given previously—namely, the original model is (6) but the model (7) is estimated. The variance–covariance matrix of the GLS for the misspecified differenced model is the same as given by (8) in Case 3. Naturally, the induced loss in efficiency should be larger than in Case 3.

We shall illustrate the potential magnitude of the loss of efficiency in the estimation of slope coefficients for Cases 2–4 by using a simple linear regression model. As a regressor, we adopt three series of U.S. real gross national product (GNP) of size $T = 20$, 50, and 100, respectively. Periods covered in the three GNP series (in 1964 dollars) are 1950–1969 (annual), 1960:1–1972:2 (quarterly), and 1947:1–1971:4 (quarterly). These series are chosen because they have been used to represent typical mean-nonstationary economic time series in various studies of the small sample econometrics of AR(1) disturbances (Maeshiro 1976; Park and Mitchell 1980). The loss of efficiency is measured by computing the ratio of the variance of the GLS of the differenced model to that of the original model. In this computation, the value of ρ is assumed to be known so that the variance–covariance matrix Ω of the AR(1) disturbances is available. A known variance–covariance matrix enables us to focus our analysis on the effect of differencing and obviates its being obscured by the sampling variation of an estimator of the variance–covariance matrix.

To find the variance–covariance matrices of the GLS's of the original and the differenced models, we need to find Ω^{-1} and $(D\Omega D')^{-1}$. Given σ_ε^2 and ρ of the AR(1) disturbances, Ω^{-1} and its decomposition are known in closed form [i.e., $\Omega^{-1} = (1/\sigma_\varepsilon^2)\Omega_*^{-1} = (1/\sigma_\varepsilon^2)P'P$, where P is a well-known matrix]. The variance–covariance matrix of the fixed start-up random-walk disturbances, $\Omega = \sigma_\varepsilon^2\Omega*$, has as its elements $\omega_{ij} = \sigma_\varepsilon^2 i$ for $j \geq i$ and $\omega_{ji} = \omega_{ij}$ $(i, j = 1, 2, \ldots, T)$. Its inverse can be decomposed as $\Omega^{-1} = (1/\sigma_\varepsilon^2)H'H$, where H is a square matrix with ones on the diagonal elements, -1 on the $(i + 1, i)$th element for $i = 1, 2, \ldots, T - 1$, and zeros on the rest. The inverse of the matrix $D\Omega D'$ associated with AR(1) disturbances can also be obtained in a closed form [derived in Maeshiro, Vali, and Wichers (1979)]. For the fixed start-up random-walk disturbances, we have $D\Omega D' = \sigma_\varepsilon^2 I$; hence, no computational problem exists. Since σ_ε^2 does not affect the *relative* magnitude of the loss of efficiency, it is set at 1.0 in the computation of the variance–covariance matrices of all the estimators. For the AR(1) disturbances, the value of ρ is varied as $\rho = -.9(.1).9$.

The results are summarized in Table 1, where the number associated with each ρ–case combination for a given sample size is the ratio of the variance of the GLS of the differenced model to that of the original model. The fixed start-up random-walk disturbance is identified by $\rho = 1.0$. The table speaks for itself. All of the entries can serve to illustrate the case of "throwing the baby out with the bath" by differencing economic time series. Even for the high positive value of $\rho = .9$ or the fixed start-up random-walk process ($\rho = 1.00$), the variance can increase by many folds. This is so even for sample size 100. No applied econometrician would accept such huge losses.

Table 1. Relative Efficiency of Various Estimators

	T = 20			T = 50 and 100		
ρ	Case 2	Case 3	Case 4	Case 2	Case 3	Case 4
−.90	24.82	18.16	450.62	48.56 (15.34)	45.14 (29.31)	2,191.83 (449.72)
−.50	24.09	18.47	444.91	48.12 (15.27)	45.46 (29.42)	2,187.39 (449.24)
−.30	23.57	18.59	438.24	47.80 (15.22)	45.53 (29.47)	2,176.13 (448.35)
−.10	22.88	18.63	426.29	47.36 (15.14)	45.40 (29.48)	2,150.45 (446.41)
.10	21.94	18.44	404.56	46.73 (15.03)	44.81 (29.41)	2,094.38 (442.19)
.30	20.56	17.72	364.40	45.75 (14.87)	43.07 (29.09)	1,970.30 (432.47)
.50	18.38	15.83	290.94	43.98 (14.56)	38.37 (27.98)	1,687.50 (407.24)
.70	14.52	11.78	170.95	40.03 (13.84)	26.79 (23.82)	1,072.46 (329.51)
.90	6.80	5.81	39.50	25.52 (10.58)	8.17 (7.34)	208.51 (98.87)
1.00	13.09	3.24	42.35	76.82 (19.45)	2.28 (1.69)	175.33 (32.79)

NOTE: Figures in parentheses are for sample size 100.

The following additional observations may be made.

1. The entries under Case 2 show that if the original model is homogeneous, differencing can induce a great loss even if the autocorrelation properties of the regression disturbances are taken into account. This reveals that the form of the original model (homogeneous or nonhomogeneous) critically affects the efficiency of estimation of a differenced model. For example, in the estimation of a linear production function or a consumption function based on the permanent-income hypothesis, which should have no intercept in the original model, one should expect a great loss in efficiency if a differenced form is adopted. This is not the case if the original model is nonhomogeneous and the autocorrelation properties of the differenced disturbances are properly taken into account—that is, our Case 1.

2. The pairwise comparisons of Case 1 (no effect) with Case 3, and Case 2 with Case 4 disclose a severe penalty against the inclusion of an irrelevant intercept in the differenced model. Applied econometricians cannot afford to be too cursory about the inclusion or the exclusion of an intercept in a differenced model.

3. The huge losses associated with the *negative* values of ρ should not be lightly dismissed as irrelevant in applied econometrics. A negative autocorrelation in the disturbances is not uncommon when one estimates a disaggregated model; for example, see Fromm and Klein (1975, pp. 66–67, 122–131), where we find many Dur-

bin–Watson statistics greater than 2. Of course, if an applied econometrician estimates the original (levels) model first and finds a negative autocorrelation in the residuals, he may not adopt a differenced model. On the other hand, he may not estimate the levels model at all if he has some reason for not adopting a levels model—for example, if he accepts the modeling principle that an econometric model be estimated with prefiltered variables.

4. A comparison of the results obtained from the three different sample sizes reveals a higher detrimental effect for sample size 50 than for 20 but a lower detrimental effect for sample size 100 than for 50. This is misleading. The sample size effect may be inferred by comparing the results obtained for $T = 50$ and 100 but not for $T = 20$, since the sample of size 20 is an annual series and the other two are quarterly series. (We have chosen an annual series for sample size 20 and quarterly series for 50 and 100 to illustrate typical cases in applied econometric research.) Clearly, the detrimental effect of differencing decreases as the sample size increases from 50 to 100. Such is not always the case, however. It all depends on the nature of a series. For our purpose it suffices to show, by using a typical economic time series, that the detrimental effect can be large even for sample size 100.

5. The values under Case 4 are the products of the corresponding two values under Cases 2 and 3 except for rounding errors. Since Case 4 pertains to the differencing of the homogeneous model coupled with an irrelevant intercept (misspecification) whereas Case 2 pertains to the differencing of the homogeneous model with no misspecification and Case 3 to the differencing of the nonhomogeneous model with an irrelevant intercept, we may regard the values under Case 2 as "differencing effects" and those under Case 3 as "misspecification effects." The values under Case 4 then represent the "combined effects." Both effects are large; hence the combined effects are much larger.

6. Finally, readers may notice a discontinuity between the results obtained for the stable AR(1) disturbances and those for the random-walk disturbance for Cases 2 and 4. This is not surprising since a fixed start-up random-walk process is not the limiting process of the stable AR(1) process as ρ approaches 1.0. In particular, the implied transformation of GLS in the case of fixed start-up random-walk disturbances retains the first observation with weight 1.0; the corresponding weight $(1 - \rho^2)^{1/2}$ used for stable AR(1) disturbances approaches 0 as ρ approaches 1.0. The discontinuity between the relative efficiency obtained for $\rho = .9$ and that obtained for $\rho = 1.0$ in the table does not imply any abrupt change as ρ approaches 1.0 from below.

Before concluding, it is useful to explain why the differencing of the regressor—the GNP series in this study—can induce a great loss of estimation efficiency. The main reason lies in the reduction of the variation in the values of a regressor. When a regressor is as mean-nonstationary and smoothly trended as our GNP series, differencing necessarily induces a great reduction in the variation of the values of the differenced series. Unless something is gained to offset this reduction (e.g., the intercept is properly dropped from the original nonhomogeneous model as in Case 1, which reduces the number of coefficients to be estimated by one), differencing is bound to induce a loss of estimation efficiency.

The reduction of variation in our differenced GNP series of size 20 should serve to illustrate our contention: the range of the original series is 370.3, but that of the differenced series is 46.1 (reduced to 12% of that of the original series); the sum of squares (relevant for a homogeneous model) for the original series is 5,491,025.94, but it is 10,444.05 for the differenced series (reduced to a mere .2% of that of the original series); the sum of squared deviations from the mean (relevant for a nonhomogeneous model) is 244,561.44 for the original series, but that for the differenced series is 3,227.10 (reduced to 1.3% of that of the original series). For the samples of size 50 and 100, a much larger reduction in variation is induced. No wonder we are "throwing the baby out with the bath!"

If the reduction in the variability due to differencing is the cause of a great loss in estimation efficiency, the converse must be true if the original regressor is not smoothly trended, and differencing does not greatly reduce the variation in the values of the regressor—that is, the loss of estimation efficiency due to differencing should be small. To confirm this conjecture, we repeated the same experiment for three series that were obtained by randomly reordering the time sequence of the three GNP series so as to eliminate the smooth trend. The results obtained are totally different from those reported in Table 1. For example, even for Case 4 and $T = 50$, we obtained a relatively small detrimental effect of differencing: 38.69(.1), 22.92(.3), 11.15(.5), 4.23(.7), and 1.35(.9), where numbers in parentheses are the associated values of ρ. To further contrast the effect of a nonsmoothly trending regressor and to comply with a suggestion to include an example in which differencing would increase the variability of a regressor, we created three new series out of the three GNP series by making negative every other observation of the respective GNP series. The differencing of these series enormously increases the variability. The detrimental effect of differencing for these series is nil, that is, the relative efficiency is almost 1.0 for every case and every ρ. (All the results of these additional experiments are available on request.)

3. CONCLUSIONS AND SUGGESTIONS

The article assesses, for four cases, the effect of differencing a mean-nonstationary, smoothly trended regressor (U.S. real GNP series) on the efficiency of estimation when the disturbances of the original linear regression model follow either a stable AR(1) process or a fixed start-up random-walk process (hence no filtering is necessary from the standpoint of estimation). The four cases are as follows: Case 1, in which the original model is nonhomogeneous (i.e., with an intercept), the intercept is dropped in the differenced model, and the autocorrelation properties of the differenced disturbances are taken into account; Case 2, in which the original model is homogeneous and the autocorrelation properties of the differenced disturbances are taken into account; Case 3, as in Case 1 except that an intercept is added to the differenced model when no linear time trend exists as a regressor in the original model; and Case 4, as in Case 2 except that an intercept is added to the differenced model as in Case 3. The major finding is that except for Case 1 the efficiency loss caused by differencing can be quite substantial. More specifically, the magnitude of the loss is in general found to be critically affected by both the form of the original model (homogeneous or nonhomogeneous) and the sign and magnitude of ρ [the first-order autocorrelation coefficient of the AR(1) disturbances] as well as the nature of the exogenous variable (smoothly trended or not).

An applied econometrician adopting a differenced linear regression model should ask the following questions: if a levels model were to be estimated, would I include a *linear time trend* as one of the regressors? Would I include an *intercept*? Are levels regressors smoothly trended? If his answer is "no" to the first question, the econometrician must make sure that no intercept is included in the differenced model. If his answer is "no" to the second question, he should be aware of a potentially large loss in estimation efficiency incurred by adopting the differenced model. But if his answer is "no" to the last question, there may be little detrimental effect caused by differencing, either combined with an irrelevant intercept or alone.

In conclusion, we note that in assessing the relative losses in Cases 2–4, the variance–covariance structure of the differenced disturbances is assumed to be known; hence, GLS is applied to the differenced model. In practice, an applied econometrician would not know the exact autocorrelation properties of the differenced disturbances and, therefore, the relative loss of efficiency would generally be larger than is revealed in this article.

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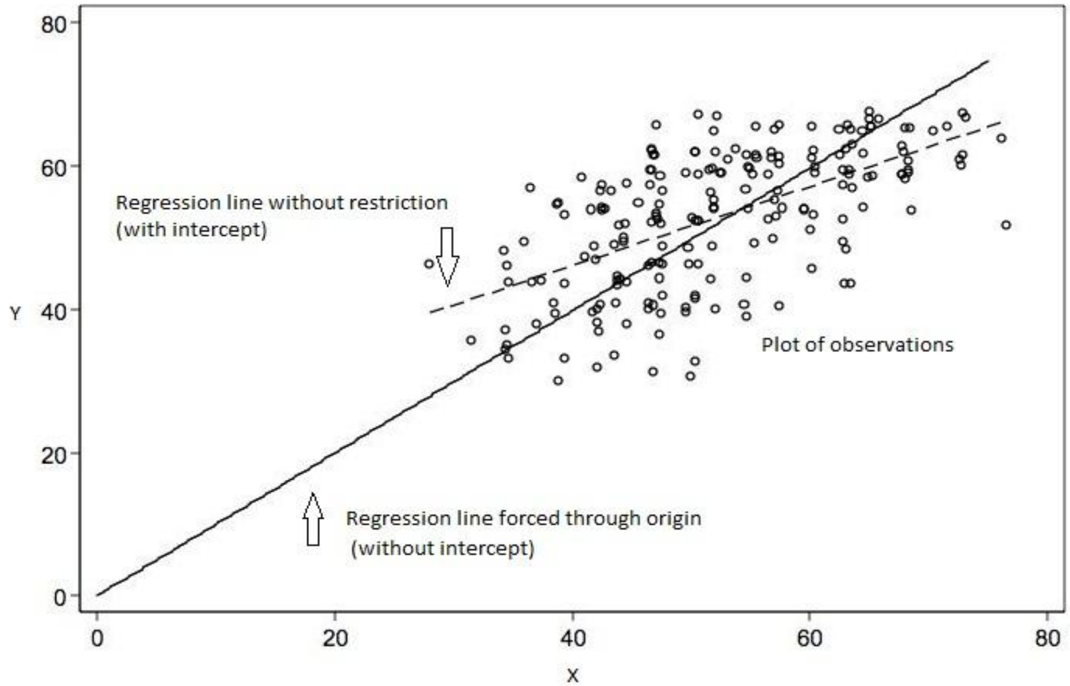
Illustration of Linear Regression With and Without Intercept



Annual Energy Savings (MWh)
Performance versus Targets

	Performance	Target	Percent
CECONY EEPS 1	306,910	378,693	81%
CECONY EEPS 2	138,470	230,615	60%
Total	445,381	609,308	73%

	Performance	Target	Percent
NYSERDA EEPS 1	1,555,305	2,546,225	61%
NYSERDA EEPS 2	151,928	1,517,483	10%
Total	1,707,233	4,063,708	42%

Note:
Figures for NYSERDA is State-wide.
EEPS 1 thru March 2013 from 1st Quarter 2013 Commitment & Encumbrance Reports.
EEPS 2 thru March 2013 from March 2013 Monthly Scorecard Reports.