

BEFORE THE
STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

In the Matter of
Consolidated Edison Company of New York, Inc.
Case 07-E-0523
September 2007

Prepared Testimony of:

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1 Q. Please state your name, employer, and business
2 address.

3 A. My name is Anping Liu. I am employed by the New
4 York State Department of Public Service
5 (Department). My business address is Three
6 Empire State Plaza, Albany, New York.

7 Q. What is your position at the Department?

8 A. I am employed as a Principal Econometrician in
9 the Office of Accounting, Finance, and
10 Economics.

11 Q. Please describe your educational background and
12 professional experience.

13 A. I received a Bachelor of Science in Mathematics
14 from Shaanxi Normal University in 1982, a Master
15 of Science from Huazhong University of Science
16 and Technology in 1985, and a Ph.D. in Economics
17 with specialties in Industrial Organization and
18 Public Economics from Wayne State University in
19 1991. I joined the Department in 1992.

20 Q. Please briefly describe your current
21 responsibilities with the Department.

22 A. My current responsibilities include developing
23 electric sales forecasts and monitoring the
24 wholesale electric market.

1 Q. Have you previously testified before the New
2 York State Public Service Commission
3 (Commission)?

4 A. Yes. I have testified on sales forecasts,
5 wholesale electricity supply costs, and the
6 economic impact of the increase in the price of
7 electricity.

8 Q. In what previous rate cases have you testified
9 on sales forecasts for electric utility?

10 A. I testified in Case 05-E-1222, New York Electric
11 and Gas Corporation; Case 04-E0572, Consolidated
12 Edison Company of New York, Inc.; Cases 03-E-
13 0765, 02-E-0198, and 95-E-0673, Rochester Gas
14 and Electric Corporation; Case 02-E-1055,
15 Central Hudson Gas and Electric Corporation.

16 Q. What is the purpose of your testimony in this
17 proceeding?

18 A. I will explain Staff's recommendation regarding
19 the electric sales volume and the number of
20 customer forecasts for Consolidated Edison
21 Company of New York, Inc. (Con Edison).

22 Q. Please summarize your recommendation.

23 A. I recommend that the sales volume forecasted by
24 Con Edison be increased by about 220

1 gigawatthours (GWHs) for the rate year ending
2 March 2009. I also recommend that the number of
3 customers forecasted be revised for four of the
4 service classifications (SC).

5 Q. In your testimony, will you refer to, or
6 otherwise rely upon, any information produced
7 during the discovery phase of this proceeding?

8 A. Yes. I will refer to, and have relied upon,
9 several responses to Staff Information Requests.
10 They are attached as Exhibit ___(AL-1).

11 Q. Please summarize Con Edison's sales forecast and
12 methodology.

13 A. Con Edison forecasts sales volume for the rate
14 year ending March 2009 to be 58,541 GWHs. For
15 SCs 1, 2, 4, 7, 8, and 9, Con Edison developed
16 econometric models to forecast sales volume.
17 Sales volumes for these six classifications
18 comprise about 98 percent of the Company's total
19 sales volume.

20 Q. What is your evaluation of Con Edison's
21 econometric models?

22 A. Con Edison's econometric models and the
23 forecasts for these classifications are
24 generally acceptable under the econometric

1 standards. However, there are a few areas in
2 which I found that adjustments need to be made,
3 especially for SC 1.

4 Forecast for SC 1

5 Q. What is the problem with Con Edison's forecast
6 for SC 1?

7 A. Con Edison's SC 1 model misses a key economic
8 variable. In addition, it includes a dummy
9 variable that cannot be justified.

10 Q. How was Con Edison's SC 1 model developed?

11 A. Con Edison modeled sales volume for SC 1 on a
12 per customer basis, as a function of the real
13 price of electricity, weather variables, dummy
14 variables, and other ARIMA terms.

15 Q. What is the missing key economic variable?

16 A. The key economic variable that Con Edison fails
17 to include in the model is personal income. SC
18 1 comprises residential non-space heat
19 customers. By economic principles, the energy
20 consumption of residential households is
21 dependent on electricity price and personal
22 income. Residential customers use electricity
23 indirectly from their installed appliances, such
24 as refrigerators, air conditioners, and

1 computers, etc. The ownership of larger homes
2 or apartments and more appliances is largely
3 dependent of personal income.

4 Q. What is the problem with the dummy variable for
5 the SC 1 model?

6 A. The dummy variable was created for the third
7 quarters of 2005 and 2006. The inclusion of
8 this dummy variable in the model cannot be
9 justified based the documents provided by Con
10 Edison and my statistical tests.

11 Q. Please explain what a dummy variable is.

12 A. A dummy variable is created to take a value of 1
13 for specified periods and 0 otherwise. It may
14 be added to a model to capture the impact of
15 special events that no other included
16 independent variables can explain. Events such
17 as September 11, 2001 or a blackout are
18 examples. Such events could give a shock to the
19 demand for a good or service that cannot be
20 explained by the regularly included income,
21 prices, or weather variables. However, to
22 include such a dummy variable requires both
23 strong evidence and a few tests.

1 Q. For what reason did Con Edison include this
2 dummy variable?

3 A. Con Edison includes it to "capture the effects
4 on SC 1 sales of the unusually warm summer in
5 2005 and the unusually hot days in August 2006"
6 (response to Staff Information Request (IR) DPS-
7 11(1)).

8 Q. Does the Company provide strong supporting
9 evidence for this dummy variable?

10 A. No. Con Edison did not show any analysis for SC
11 1. Rather, in responding to Staff IRs DPS-11(2)
12 and DPS-167, Con Edison provided an analysis on
13 the franchise area total sendout for the third
14 quarters of 2004-2006, showing an increase in
15 the slope of the relationship between the total
16 sendout and the number of cooling degree days
17 (CDD) from 2004 to 2005 and to 2006.

18 Q. Does this analysis support the inclusion of the
19 dummy variable for SC 1?

20 A. No. The analysis is for the total sendout, not
21 for SC 1. The sales volume for SC 1 is only a
22 small portion of the total sendout. It was
23 about 26 percent of the sendout for the third
24 quarters in 2005 and 2006.

1 Q. Do the Company's models for other major service
2 classifications have this dummy variable?

3 A. No, they do not.

4 Q. What is your view of the Company's sendout-CDD
5 relationship analysis?

6 A. The analysis does not support the inclusion of
7 this dummy for SC 1. The absence of the dummy
8 from other major SC models suggests that the
9 impact of the hot weather in 2005 and hot days
10 in 2006 can be explained by the weather
11 variables included in the model.

12 Q. What is your view of Con Edison's analysis on
13 the sendout-CDD relationship as related to
14 appliance saturation?

15 A. Con Edison's analysis merely shows that the
16 total sales volume for Con Edison area in 2005
17 summer months was more responsive to the weather
18 and continued to be so in 2006. In my view, it
19 confirms that the increase in the responsiveness
20 of CDD was a result from a surge in the
21 saturation of cooling appliances like air
22 conditioners (IR DPS-13(2)). With more cooling
23 appliances in place, the demand for electricity
24 was more responsive to weather. More

1 importantly, the level of the responsiveness
2 will not go down when weather returns to normal.

3 Q. How does the appliance saturation support your
4 rejection of the dummy variable?

5 A. The weather impact captured by the dummy
6 variable was assumed to be temporary and removed
7 from the forecast. It contradicts to the facts
8 that the addition of cooling appliance will stay
9 on. The hot weather in 2005 was temporary, but
10 the appliance additions triggered by the hot
11 weather will be permanent. The dummy variable
12 should be removed.

13 Q. Did you do a statistical analysis to support the
14 removal of this dummy variable?

15 A. Yes, I did. My analysis evaluates Con Edison's
16 SC 1 model for predictive power. I re-estimate
17 the model on a shortened sample through 2005 and
18 forecast "ex post" the sales volume for 2006. I
19 did this for three scenarios. For the first
20 scenario, I re-estimated the model including the
21 dummy variable and assumed that the dummy
22 captured impact will not continue (D2005603=0
23 for the 3rd quarter). This is the Con Edison
24 approach. For the second scenario, I re-

1 estimated the model including the dummy variable
2 but assumed that the dummy captured impact will
3 continue (D2005603=1). Finally, for the third
4 scenario, I re-estimated the model not including
5 the dummy variable. The ex post forecasts from
6 all three scenarios, compared with the actual
7 sales volume, are depicted in the page 1 of
8 Exhibit ___ (AL-2). Clearly, the Con Edison
9 approach produces the lowest forecast when
10 compared to the actual sales volume.

11 Q. Your test shows that the scenario assuming the
12 continuation of the dummy captured impact
13 produces an ex forecast closest to the actual.
14 Should this approach be used for the forecast?

15 A. No. This approach would assume all the impact
16 captured by the dummy variable will continue to
17 exist for the following years. I do not
18 recommend such an approach. Based on what I
19 discussed earlier in my testimony, the dummy
20 variable may assume some value between 0 and 1
21 for the third quarter to account for the hot
22 weather triggered appliance additions, which would
23 lead to a forecast closer to my recommendation.
24 However, my non-dummy variable approach is

1 preferred as it does not require a subjective
2 judgment.

3 Q. What would be the Con Edison forecast for SC 1
4 if the full impact of the dummy variable were
5 assumed to exist for the forecast?

6 A. It would be 14,196 GWHs for the rate year 2009
7 (response to IR DPS-169), or 241 GWHs is above
8 Con Edison filed forecast for SC 1.

9 Q. Did you develop an alternative forecast for SC
10 1?

11 A. Yes.

12 Q. Does your model correct these problems you just
13 discussed?

14 A. Yes. I added a personal income variable to the
15 SC 1 model and removed the dummy variable. The
16 independent variables for my SC 1 model include
17 the number of customers, real electricity price,
18 real personal income, weather variables, and
19 other ARIMA terms.

20 Q. What is the implication of the change in
21 appliance saturation to the sales forecast when
22 you add the personal income variable to the SC 1
23 model?

1 A. As I stated earlier, the sales impact of the
2 warmer weather in 2005 and the hot days in 2006
3 was partially related to a surge in the
4 appliance saturation. By including a personal
5 income variable, my model has better captured
6 the impact of the appliance additions.

7 Q. Is there any other Con Edison model that should
8 include the personal income variable?

9 A. Yes, the SC 7 model should contain an income
10 variable. SC 7 is for residential all electric
11 customers.

12 Q. Have you developed alternatives to correct the
13 problem?

14 A. Yes, I have. I added the same personal income
15 variable to the SC 7 model and provide the Staff
16 forecast.

17 Weather Forecast

18 Q. Please explain your adjustment as a result of a
19 change in the weather forecast.

20 A. This adjustment is derived from using my
21 forecast for the normal number of CDD.

22 Q. Why should your weather forecast be used for the
23 sales forecast?

1 A. The Company's forecast for CDD is incorrect and
2 does not match its 30-year historical average.
3 The adjustment to these weather variables leads
4 to an upward revision to the forecasts for all
5 SCs that have CDD as an input.

6 Q. Why is Company's forecast for normal weather
7 incorrect?

8 A. The Company's weather forecast for CDD for the
9 rate year is understated, below the 30-year
10 average based normal number of CDD. The
11 discrepancy results from Con Edison's use of
12 manually adjusted data only for May through
13 October to compute the 30-year average,
14 resulting in a number of CDD below the total for
15 the year by 23 to 27 (Exhibit ___ (AL-2), page
16 2).

17 Q. How did you develop the 30-year based forecast
18 for the number of CDD?

19 A. I used the actual CDD data to obtain a 30-year
20 average for each calendar month. I then add the
21 discrepancies for the corresponding months or
22 quarters to the Con Edison forecasted cycle CDD
23 so that the annual total of the revised cycle

1 CDD is equal to the annual total of the 30-year
2 average.

3 Customer Forecast

4 Q. Please move to the customer forecast. Does the
5 number of customers forecasted affect the
6 revenue forecast?

7 A. Yes, it does. For SC 1, the number of customers
8 affects the revenue forecast in two ways. The
9 customer revenue was directly calculated by
10 multiplying the customer charge by the number of
11 customer forecasted. The number of customers
12 forecasted was also an input to the sales volume
13 forecast. For SCs 2, 7, and 9, the number of
14 customers forecasted was also an input to the
15 sales volume forecast.

16 Q. How did the Company develop the forecast for the
17 number of customers?

18 A. For SCs 1 and 9, the Company used the time
19 series or Box-Jenkins models to forecast the
20 number of customers. For SCs 2 and 7, the
21 Company used the average growth rates of the
22 latest three years to develop the forecasts.

23 Q. What is your assessment to the Company's
24 forecast?

1 A. For SC 1, both goodness-to-fit and forecast
2 evaluation can be improved by developing an
3 alternative. For SC 2 and SC 7, I used the Box-
4 Jenkins method to forecast the number of
5 customers. The method is superior to the three-
6 year average approach as it reflects the long
7 term trend. I also found that my forecast is
8 more accurate than the Company's when compared
9 with the recent actual data (Exhibit ____ (AL-2),
10 page 3).

11 Price Deflators

12 Q. What price deflator did Con Edison use to obtain
13 real price of electricity?

14 A. Con Edison used Consumer Price Index (CPI) for
15 Urban Wage Earners and Clerical Workers for New
16 York Metropolitan Statistical Areas for all
17 service classes.

18 Q. What is your assessment to Con Edison's use of
19 CPI?

20 A. In the context of forecasting sales volume, the
21 use of this price index is inappropriate for the
22 following two reasons. First, the CPI should
23 not be used for commercial or industrial
24 customers to deflate their costs of electricity.

1 Second, the CPI for Urban Wager Earners and
2 Clerical Workers represents a much smaller
3 percentage of the total population than the more
4 popular CPI for All Urban Consumers.

5 Q. Please explain why the CPI should not be used
6 for commercial or industrial customers.

7 A. The CPI, frequently called a cost-of-living
8 index, measures overall price increases of goods
9 and services that the residential consumers
10 purchase. The CPI market basket is developed on
11 expenditure information by families and
12 individuals. In this case, it is an appropriate
13 price index to deflate price of electricity for
14 the purpose of modeling residential demand for
15 electricity.

16 Q. What's the appropriate price index for the
17 commercial and industrial customers?

18 A. The expenditure pattern for the commercial and
19 industrial customers is quite different from the
20 residential customers. The costs of the
21 commercial and industrial customers are more
22 appropriately deflated by the GDP Price Index
23 (GDP-PI), as GDP-PI measures the price increases
24 of all goods and services.

1 Q. Can you now explain why the CPI for All Urban
2 Consumers should be used for residential
3 customers?

4 A. Yes. The U.S. Department of Labor developed CPI
5 for two population groups: all urban consumers
6 and urban wage earners and clerical workers.
7 The all urban consumers group includes almost
8 all residents of urban metropolitan areas,
9 representing about 87 percent of the total U.S.
10 population. On the other hand, the wage earners
11 and clerical workers group is a subset of all
12 urban consumers, representing only about 32
13 percent of the population (Exhibit ___ (AL-4),
14 page 2).

15 Q. Does the Staff forecast reflect the use of the
16 two price indices you just proposed?

17 A. Yes, it does.

18 Q. Does this conclude your testimony at this time?

19 A. Yes, it does.