

RELATED CORRESPONDENCE  
UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD <sup>DOCKETED</sup> <sub>USNRC</sub>

Before Administrative Judges: <sup>83</sup> APR 15 AIO:35

James P. Gleason, Chairman

Frederick J. Shon

Dr. Oscar H. Paris

OFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

In the Matter of )  
)  
)

CONSOLIDATED EDISON COMPANY OF )  
NEW YORK, INC. )  
(Indian Point, Unit No. 2) )  
)  
)

Docket Nos.  
50-247 SP  
50-286 SP

POWER AUTHORITY OF THE STATE OF )  
NEW YORK )  
(Indian Point, Unit No. 3) )  
)  
)

April 12, 1983

LICENSEES' TESTIMONY  
OF GEORGE C. S. WANG ON COMMISSION QUESTION 6

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TESTIMONY OF  
GEORGE WANG

1 Q. Please state your name and business address.

2 A. George C. S. Wang, 4 Irving Place, New York, New York.

3 Q. Please state your education and experience.

4 A. I received a Bachelor of Arts degree in Economics from  
5 National Taiwan University in 1958. From New York  
6 University, I received an M.B.A. degree in 1965, and a  
7 Ph.D. degree in 1972, majoring in statistics and  
8 economics. I am a member of the American Statistical  
9 Association. Prior to joining Con Edison, I was  
10 employed by CBS, Marketing Division as a statistician,  
11 1968-69. During my employment with CBS, my responsibili-  
12 ties involved market research utilizing statistical  
13 sampling technique, regression analysis and experimental  
14 design. In 1970, I was employed by Con Edison.  
15 Presently, I am Forecast Development Manager in the  
16 Electric Forecast Section of the Forecasting and Economic  
17 Analysis Department. My responsibilities are in the areas  
18 of statistical and economic analysis, econometric modeling  
19 for electric sendout, sales and revenue forecasts,  
20 interdepartmental consultations on statistical matters, and

1 evaluation of computer applications in the forecasting area.

2 Q. What is the purpose of this testimony?

3 A. The report on "The Economics of Closing the Indian Point  
4 Nuclear Power Plants" prepared by the Energy Systems  
5 Research Group, Inc. appears to suggest that a price  
6 elasticity of -0.4 for the Con Edison service area would  
7 not be unreasonable (p. 72). The purpose of this  
8 testimony is to show that -0.4 is a gross overstatement  
9 of the price elasticity of demand for electricity in the  
10 Company's service area.

11 Q. Have you ever testified in legal proceedings on forecasting  
12 models which include estimates of price elasticities?

13 A. Yes, I have. In the Public Service Commission  
14 electric rate case No. 28211, I testified  
15 with respect to Con Edison's econometric model used to  
16 forecast electric sendout. The model includes estimates  
17 of the short-term and long-term price elasticities of  
18 demand for electricity in the Con Edison service area.

19 Q. Would you briefly define "price elasticity"?

20 A. Price elasticity is a measure of change in consumption

1 of a certain good in response to a change in its price.  
2 The measure is simply the ratio of the percentage change in  
3 consumption and the percentage change in price. The value  
4 of price elasticity is usually negative, i.e., when the  
5 price of a good increases, the demand for the good de-  
6 creases. There are generally two time periods for the  
7 price elasticity. The short-term price elasticity  
8 measures the immediate response to a price change, and the  
9 long-term price elasticity reflects consumers' gradual  
10 adjustment to price changes over time. If the short-term  
11 price elasticity equals  $-.10$ , a 10% increase in price will  
12 result in a decrease in consumption by 1%.

13 Q. What are the estimated values of the short-term and  
14 long-term price elasticities included in Con Edison's  
15 sendout forecast model presented in the Public  
16 Service Commission Case No. 28211?

17 A. The estimated short-term price elasticity was  $-.10$  and  
18 the estimated long-term price elasticity was  $-.25$ .

19 Q. Other things being equal, does the magnitude of price  
20 elasticity affect Con Edison's revenue requirement

1 in a rate case proceeding?

2 A. Yes, it does. For example, other things being equal,  
3 had the estimated short-term price elasticity been  $-.40$   
4 instead of  $-.10$ , Con Edison's net revenue forecast  
5 presented in the Public Service Commission Case No.  
6 28211 would have been 11% or \$270 million less, and the  
7 revenue requirement would have been \$270 million more  
8 than the Company's request.

9 Q. Besides the other independent variables in Con Edison's  
10 econometric model, how was the price variable structured  
11 into the model in order to estimate the short-term and  
12 long-term price elasticities?

13 A. By the definitions for price elasticities described  
14 before, the short-term price elasticity and its long-  
15 term "steady state" value can be represented by a  
16 power series which asymptotically approaches to a  
17 constant. Let the short-term price elasticity be  $a_1$   
18 and the initial value of the power series be  $d$ , then  
19 the long-term price elasticity equals  $a_1/(1-d)$ . This  
20 expression is demonstrated in Table 1.

1 Q. Would you describe the historic data used to estimate  
2 the model?

3 A. The model presented in the Public Service Commission  
4 Case No. 28211 used quarterly data from the first quarter  
5 of 1972 through the fourth quarter of 1981 for electric  
6 sendout which is the dependent variable and used quarterly  
7 data from the first quarter of 1973 through the fourth  
8 quarter of 1981 for the price variable which is one of  
9 the independent variables. All other independent  
10 variables included in the model have the same historic  
11 modeling period as the sendout data. These historic  
12 modeling data have been updated through the fourth  
13 quarter of 1982. The estimated price elasticities  
14 using this extended historic period did not change  
15 significantly from the values mentioned before.

16 Q. Were the results of Con Edison's econometric model for  
17 electric sendout forecast used in the decision of  
18 Public Service Commission Case No. 28211?

19 A. Yes.  
20

TABLE 1

Formula for the Estimation of  
Short-Term and Long-Term Price Elasticities

Let the short-term elasticity be  $a_1$  and the long-term adjustment process be represented by the following power series:

$$1+d+d^2+\dots+d^n$$

which asymptotically approaches  $1/(1-d)$ , for  $0 \leq d < 1$ . The long-term price elasticity is, then,

$$a_1(1+d+d^2+\dots+d^n) = a_1/(1-d).$$

The model for estimating  $a_1$  and  $d$  can be structured as follows:

$$Y_t = a_0 + a_1(1+dL+d^2L^2+\dots+d^t L^t)P_t + \sum_{i=2}^K a_i X_{it}$$

$$= a_0 + [a_1/(1-dL)]P_t + \sum_{i=2}^K a_i X_{it}$$

Where  $Y_t$ ,  $P_t$  and  $X_{it}$  are in logarithm, and  $L$  is the backward shift operator.

$Y_t$  = Electric sendout in quarter  $t$ .

$P_t$  = Real electric price in quarter  $t$ .

$X_{it}$  = Other independent variables.

The estimated values for  $a_1$  and  $d$  are  $-.1$  and  $.6$  respectively. The long-term price elasticity is,

$$a_1/(1-d) = -.1/(1 - .6) = -.25.$$