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IN THE MATTER OF :

Proceeding on Motion of the Commission as to the Rates, Charges, Rules, and Regulations of the Long Island Lighting Company for Electric Service. : CASES NOS. 27774 & 27563 (Phase I)

- X

TESTIMONY OF:

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COUNCIL ON ECONOMIC PRIORITIES
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LEIGHTON K. CHONG, ESQ.,
OF COUNSEL

Q. Please state your name and address.

A. My name is Steven Buchsbaum. My address is 32 Irving Street, #21, Cambridge, Massachusetts 02138.

Q. Please describe your occupation and employment history.

A. I am currently a Master's Degree candidate in City and Regional Planning at Harvard University. Since 1979 I have been employed as a research associate at Energy Systems Research Group, Boston, Massachusetts. Prior to that I was co-director of the Long Island Jobs and Energy project, which was a three-year study sponsored by the Council on Economic Priorities to assess the employment and economic impacts of nuclear plant construction compared to implementation of energy conservation measures.

Q. Would you describe briefly your other experience in employment and economic analysis as related to energy policy?

A. I was a co-author of a study undertaken by Energy Systems Research Group (ESRG) for the U.S. General Accounting Office on the employment impact of an energy conservation strategy in the New England region. I am a member of the National Panel on Energy and Employment sponsored by the U.S. Department of Energy in 1980. I have served as a consultant and advisor on energy and employment policy for the Congressional Research Office, the California State Energy Commission, and other

organizations, and to the Economic Division of the Senate Committee on Banking on the draft of the Energy Security Act.

Q. Have you ever testified previously on energy conservation policy and employment/economic impacts?

A. Yes. I have testified before the Joint Legislative Committee of the New York State Legislature on amendments to the Home Insulation and Energy Conservation Act, which is a state law requiring utility companies to provide energy audits and arrange for financing and installation of conservation measures in homes. I also testified before the New York State Siting Board in 1979 on the comparative employment impact of the Jamesport nuclear plants proposed by the Long Island Lighting Company versus an alternative investment in energy conservation, and before the Michigan Public Utilities Commission on the conclusions of the Jobs and Energy study which I mentioned previously.

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

A. The purpose of my testimony is to compare the regional employment and economic impacts of the two proposed energy scenarios, completion and operation of Shoreham versus implementation of conservation measures, in the Long Island Lighting Company's service area, comprising mainly the Counties of Nassau and Suffolk.

Q. Would you please summarize the conclusions of your comparison.

A. My analysis of LILCO's estimates for completing construction of and operating the Shoreham plant and the ESRG alternative scenario for investment in comprehensive conservation measures on Long Island concludes that the residential part of the ESRG conservation scenario alone would generate on the average up to 8 times as many jobs as LILCO's Shoreham project, and would save LILCO's customers billions of dollars in energy savings over the next twenty years. Specifically, I estimate that an alternative investment in residential energy conservation measures such as proposed by ESRG would generate an average of about 1030 jobs per year in direct on-site construction and installation work and 1470 jobs per year in indirect employment for supporting sales, material supply and other services. In addition, LILCO's customers would save about $3.5 billion (cumulative 1980 dollars to the year 2000) in home heating fuel savings that ESRG estimates would be realized through the conservation measures. These savings reflect increased disposable income which, in a "ripple effect" through the local economy, would generate an additional 4720 jobs per year average. A similar investment for commercial and industrial conservation measures could have an analogous impact, although these figures are not quantified in my analysis.

In comparison, completing construction of Shoreham would generate an

average of about 475 full-time jobs on-site per year over the next two or three years, and about 2956 jobs per year in indirect employment. During operation of the Shoreham plant, direct employment on-site would total about 90 personnel, and indirect employment would average about 436 jobs per year.

The largest single factor affecting employment is the substantial net dollar savings on fuel costs created by the conservation strategy over and above the oil for electricity generation that either Shoreham or the conservation scenario could displace. These savings would result in consumer spending that generates substantially more local employment than spending for oil, electricity, and/or gas. Although spending for energy supply creates jobs in the industries related to energy production, such spending is not as job productive and relatively few of such jobs would be located in the Nassau/Suffolk region.

Q. Please explain the methodology of your analysis?

A. The basic analytical framework used in my analysis was developed in the Jobs and Energy study undertaken by the Council on Economic Priorities (CEP) in 1977. The CEP study calculated the total number of jobs created by two regional energy scenarios, nuclear power generation versus conservation/solar measures, taking into account: (a) on-site employment in construction or installing plant or equipment;

(b) multiplier employment created indirectly in the manufacture and supply of materials, equipment, and services required on-site, and employment induced by the spending of income earned by the workforce on-site and the local workforce involved in supplying the materials required on-site; and (c) employment from increased discretionary income spending, for example, such as that incurred as a result of lower fuel oil and utility bills.

In the CEP study, the national and regional employment impacts of building and operating the nuclear power plant (the two proposed Jamesport units) were compared to installing 32 conservation measures and 2 solar measures in homes in the LILCO service area. The measures were selected on the basis of their availability "off-the-shelf", cost effectiveness, and capability to reduce energy waste and improve efficiency without reductions in the quality of life. The on-site labor requirements for the conservation/solar scenario were quantified from detailed labor and cost estimates prepared by an engineering consultant, Dubin-Bloome Associates, and modified by CEP. Using detailed economic and costing data for each conservation and solar measure under consideration, a Scenario Generator program computed the total cost of the scenario and the amount and type of on-site labor required. On-site labor requirements for the nuclear scenario were developed from detailed data obtained from the Long Island Lighting Company (LILCO).

To quantify the multiplier and consumer spending employment effects, the CEP study utilized two different input-output (I-O) models. For national multiplier analyses, CEP used the Economic Growth Model developed by the Bureau of Labor Statistics (BLS). The Regional Industrial Multiplier System (RIMS) was used for the regional analysis. It was developed by the Regional Economic Analysis Division of BEA to estimate industry specific input-output relationships between 478 industry classifications included in the national I-O tables for any county or regional group of counties. Further description and detailed examples of the development and application of these CEP programs are contained in the appendices to the CEP Jobs and Energy study.

The measures that were included in CEP's Long Island conservation strategy are closely analogous to those included in the present ESRG conservation scenario, and I have used the employment factors derived in the CEP study as a model for estimating the employment impacts of ESRG's scenario. The use of the CEP Nassau/Suffolk I/O model to measure the local employment effects of energy conservation investment would be only minimally affected by any difference between the two strategies. A more detailed description of the application of employment factors from this model to the present analysis is presented in the appendix to this testimony.

The on-site labor requirements for completing the construction of

Shoreham were developed from the labor and budget estimates provided by LILCO in its Revised Estimate #5 (July 1980) as summarized in the Kaiser Engineers Power Corporation, Direct Cost Interim Report (August 1980), and Indirect Cost & Yearly Expenditures Interim Report (September 1980), which are included in the record and exhibits of this proceeding. Workforce requirements for operation and maintenance (O&M) of Shoreham were estimated from generic data developed in the CEP study based upon industry average. Multiplier employment effects were computed using the RIMS program developed for the nuclear scenario of the CEP study. As Shoreham is the comparison case in this analysis, consumer spending effects for the ESRG conservation scenario are taken net of any consumer savings attributable to Shoreham. Construction and O&M expenditures and multiplier effects outside of LILCO's bi-county service area, as in the conservation case, were not considered in this analysis.

Q. Please explain your projections for the employment and economic impacts of ESRG proposed energy conservation scenario.

A. My estimates are quantified for the residential conservation measures of the ESRG scenario. I have summarized these estimates on Table No. I. Column 1 shows the years of the scenario beginning in 1982 to the year 2000. Column 2 shows the yearly investment for home conservation measures in 1980 dollars; this is to be distinguished from yearly

TABLE I

EMPLOYMENT AND ECONOMIC IMPACT OF ESRG CONSERVATION SCENARIO (RESIDENTIAL SECTOR)

Year	Expenditures ($ Million 1980 Dollars)	Oil Savings (Millions of Barrels)	On-Site Employment	Employment from Multiplier Effect	Employment From Increased Discretionary Income	Total Employment
1980	--	--	--	--	--	--
1981	--	--	--	--	--	--
1982	47.0	.06	554	790	68	1412
1983	106.8	.35	1165	1663	404	3232
1984	112.7	.65	1139	1626	773	3538
1985	118.2	.94	1105	1578	1178	3861
1986	119.7	1.24	1036	1479	1617	4132
1987	128.4	1.58	1030	1471	2090	4591
1988	136.1	1.82	1010	1442	2606	5058
1989	146.1	2.12	1004	1434	3164	5602
1990	155.6	2.35	991	1415	3674	6080
1991	165.7	2.59	976	1394	4220	6590
1992	182.8	2.82	999	1427	4804	7231
1993	224.3	3.05	1133	1618	5431	8182
1994	234.7	3.28	1098	1568	6101	8767
1995	247.6	3.51	1073	1532	6820	9425
1996	259.4	3.73	1042	1488	7586	10,116
1997	289.0	3.96	1073	1532	8408	11,013
1998	308.5	4.18	1060	1514	9283	11,857
1999	328.2	4.41	1045	1492	10,214	12,751
2000	345.9	4.67	1019	1455	11,210	13,614
TOTALS	3656.7	47.2	19,553	27,918	89,651	137,122
AVERAGE NUMBER OF JOBS/YEAR			1,030	1,470	4,720	7,220

costs which would reflect financing of the investment. Column 3 shows the on-site employment for contractors and installers that would be generated by the investment in home conservation measures. The result of my analysis is that an average of 1,030 on-site jobs per year would be created.

In Column 4 I show the multiplier effect of indirect and induced employment produced by the investment in conservation: an average of 1,470 jobs per year would be created throughout the local economy. These include jobs in the manufacture and sale of energy conservation equipment and jobs induced by the wage spending of the on-site workers.

Column 5 shows the effect of increased consumer spending of dollars saved through the conservation measures. The ESRG scenario projects a total net saving of 47 million barrels of home heating oil due to conservation, equivalent to approximately $3.5 billion in 1980 dollars (assuming an annual 4.5% real escalation in oil prices). The spending of the available dollars from energy savings creates an average of 4,720 additional jobs per year.

Thus, investment in home conservation measures under the ESRG scenario would generate a total average of 7,220 jobs per year. Investment in commercial and industrial conservation measures could generate additional jobs and energy savings of similar magnitude. The latter would include

retrofitting of malls, office buildings, hospitals, and institutional buildings with insulation, efficient lighting and HVAC systems, and high-efficiency motors and cogeneration systems. This would create employment for skilled construction craft workers such as electricians, carpenters, sheet metal workers, insulation workers, and machinists.

Q. What are your projections for the employment and economic impacts of LILCO's proposed Shoreham project.

A. According to estimates provided by LILCO in Exhibit 105 in the proceeding, the Shoreham construction workforce requirements are projected at a total 950 labor years over the two years to completion of the plant at the postulated January 1983 in-service date. This is an average of 475 full-time on-site jobs per year. The choice of the January 1983 date here is for purposes of this analysis and should not be viewed as an estimate of the likely in-service date for the Shoreham plant. Operation and maintenance personnel would average 90 on-site jobs per year from the in-service date of 1983 to the year 2000.

Using the RIMS I-O model developed in the CEP study, I estimate that a multiplier effect of 6,650 labor years, or an average of 2,956 jobs per year, would be generated in indirect and induced employment during the construction period. This includes employment in engineering services and construction management, in local companies supplying

materials and equipment used on-site, and from effects of wage spending by on-site and indirect workers. Operation of the plant will create an additional 7,855 labor years of multiplier employment, or an average of 436 jobs per year, during the period from 1983 to 2000. The employment impacts for the Shoreham project are summarized on Table II.

No employment effect of increased discretionary spending from energy savings is attributed to Shoreham. As projected by ESRG, the conservation scenario will displace almost as much electricity use as Shoreham would generate, and the total of capital and fuel costs for electricity or its displacement to be borne by consumers in the LILCO service area is approximately equal under either scenario.

Q. Are there any factors that are not included in your employment estimate?

A. Yes. Spending for LILCO's financing, stockholder dividends, taxes and insurance costs attributable to Shoreham are not included in my analysis because they are difficult to quantify in terms of regional impact and would probably be offset, if not exceeded, by other effects in the conservation scenario. For example, spending for administration of the conservation program and for commercial and industrial conservation measures can be expected to generate significantly larger employment effects in the local economy.

TABLE II

EMPLOYMENT IMPACT OF LILCO SHOREHAM PROJECT

Year	LILCO RE #5 Capital Expenditure $ Million 1980 Dollars	O&M Expenditures (1980 Dollars, $ Million)	Construction Employment		O&M Employment		Total Employment
			Direct On-Site (Labor Years)	Multiplier (Labor Years)	On-Site (Labor Years)	Multiplier (Labor Years)	
1980	--	--	--	--	--	--	--
1981	197.8	--	650	3,050	--	--	3,700
1982	149.9	--	300	2,800	--	--	3,100
1983	38.1	13.5	--	800	90	255	1,145
1984	--	25.0	--	--	90	560	650
1985	--	20.4	--	--	90	440	530
1986	--	20.4	--	--	90	440	530
1987	--	20.4	--	--	90	440	530
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.	.	.	.	.	.	.	.
2000	--	20.4	--	--	90	440	530
TOTAL	$385.8	$364.9	950	6,650	1,620	7,855	17,075
AVERAGE NUMBER OF JOBS/YEAR			475	2,956	90	436	854

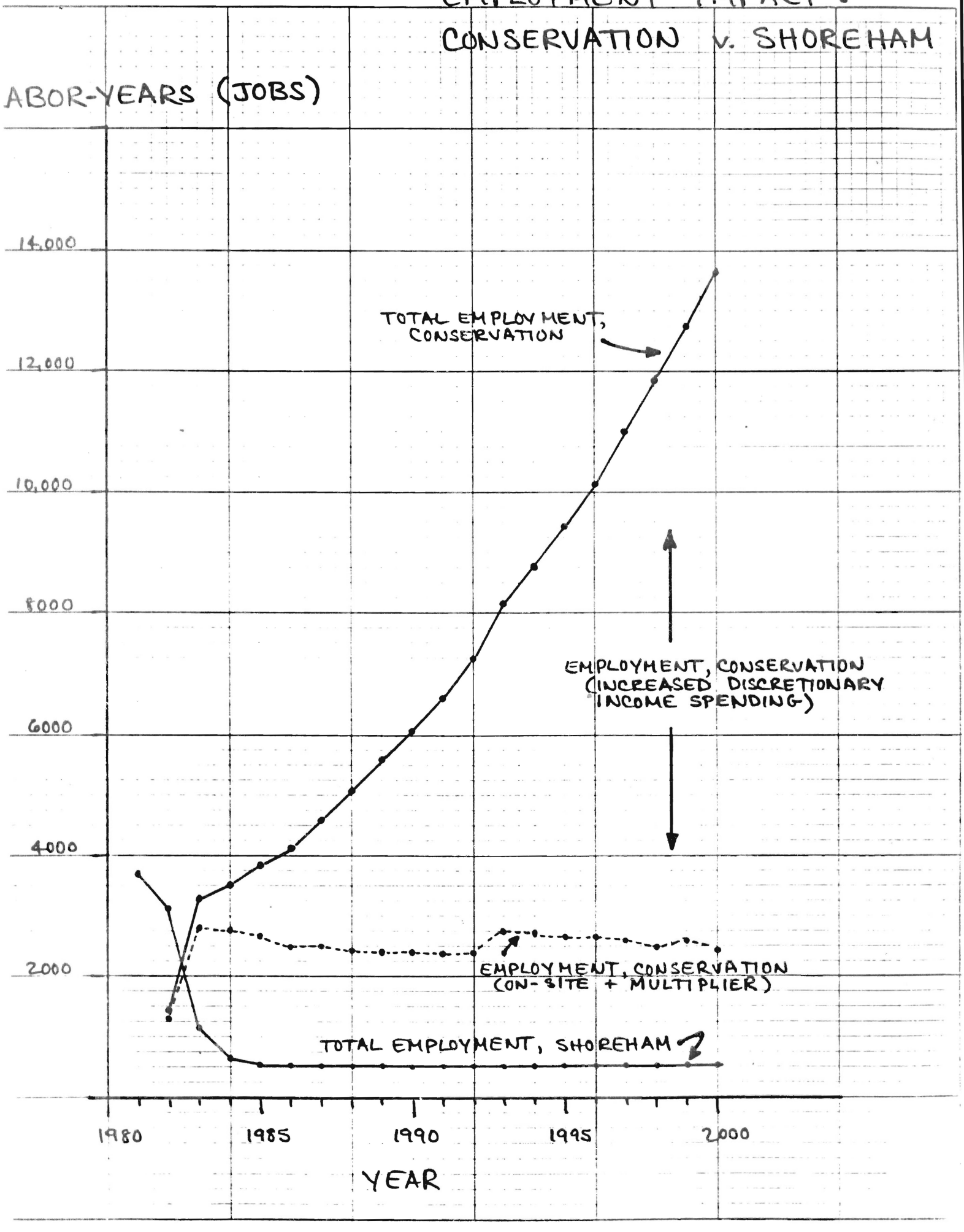
Q. Have you prepared a summary of your comparison of employment generated under the Shoreham and the conservation scenario (residential sector)?

A. Yes. On the following graph I compare my estimates for the employment generated by the two energy alternatives under consideration.

Q. Does this conclude your testimony?

A. Yes, it does.

EMPLOYMENT IMPACT: CONSERVATION v. SHOREHAM



APPENDIX

APPLICATION OF CEP I/O MODEL TO ESTIMATING EMPLOYMENT IMPACT

Conservation Employment

Regional on-site and multiplier effect employment were calculated using the following formula:

$$\text{Annual Employment} = \left[E_I \,/\, (1+R)^I \right] \times J_K$$

I = Year

E_I = Current expenditures

R = Inflation rate, 8%

J_K = Employment factor; K = 1, 2

J_1 = On-site labor years per million dollars expenditure

J_2 = Multiplier labor years per million dollars expenditure

Employment generated by increased discretionary income spending of dollars saved through conservation measures were calculated as follows:

$$\text{Annual Employment} = \left[S_I \times (1+R)^I \times J_s \right] - \left[S_I \times (1+R)^I \times J_o \right] \text{, where:}$$

I = Year

S_I = Oil savings in gallons

R = Real escalation of oil prices, 4.5% annually

J_s = Employment factor (labor years) per million dollars (consumer spending)

J_o = Employment factor (labor years) per million dollars (oil purchase)

Thus, employment from increased discretionary income was calculated net as the employment from consumer spending of energy dollars saved less employment that would have been generated by purchases of fuel oil. Using the CEP I-O model, it was found that average consumer spending in the Nassau/Suffolk region generates an employment factor of 26 labor years per million dollars, while purchases of fuel oil generate only 1 labor year of employment per million dollars. In the latter case, most of the effect of oil purchases flows out of the regional economy to the oil supply and production industries elsewhere and abroad. The net effect on regional employment of increased discretionary income spending is, therefore, 25 labor years per million dollars of expenditure.

Nuclear Employment

Direct on-site labor requirements were obtained from estimates provided by LILCO in the budget scenarios of Exhibit 105. Direct O&M labor requirements were estimated based upon the CEP modelling of industry average figures for O&M personnel at nuclear plants.

Regional multiplier effect employment from construction expenditures and from O&M expenditures were calculated as follows:

$$\text{Annual Employment} = A_{I,N} - P_{I,N}$$

$$A_{I,N} = \left[E_{I,N} / (1+R)^{I} \right] \times J_{N} \text{ , where:}$$

I = Year

$A_{I,N}$ = Total annual employment, on-site and multiplier; N=1, construction; N=2, O&M.

$P_{I,N}$ = On-site employment estimates; N=1, construction; N=2, O&M.

$E_{I,N}$ = Inflation rate, 8%.

J_{N} = Employment factor in labor years; N=1, construction; N=2, O&M

Employment Factors

Regional employment factors were developed in the CEP Nassau/Suffolk I/O model based upon the RIMS multiplier analysis developed by the Bureau of Economic Analysis. A detailed explanation of methodology is contained in Appendices A and E to the CEP Jobs and Energy study. The resulting employment factors from the CEP regional models are summarized as follows:

Activity	Labor Years/$ Million (1980 Dollars)
Conservation expenditures;	33
on-site (J_1):	(14)
multiplier (J_2):	(19)
Nuclear construction (J_1):	21
Nuclear O&M (J_2):	26
Nuclear fuel purchases:	0
Heating oil purchases:	1
Consumer spending:	26