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CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

TWENTY YEAR ADVANCE PROGRAM

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1971 - 1990

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This summarizes Con Edison's new 20-Year Advance Program as transmitted to appropriate Federal, State, City and County governmental agencies.

The new Advance Program modifies and extends the Ten-Year Power Generation Plan promulgated in 1966 and revised in 1969. It has three principal objectives:

1. To meet estimated load growth of about 450,00 KW per year, allow for retirement in this decade of about 2 million KW of obsolete in-city generating capacity, and provide adequate reserves.
2. To do so with minimum adverse impact on the environment. For example, in the next five years we expect to increase power sendout by 28 percent and reduce by more than 50 percent our remaining emissions in New York City. We expect to meet water, air and noise criteria adopted by appropriate governmental agencies, and hopefully to better them.
3. To do the foregoing as economically as possible.

The new program recognizes the very serious delays that are besetting the licensing of nuclear plants by postponing until the next decade the construction of Nuclear unit 4 which in our 1969 plan had been scheduled for this decade. It contemplates that the capacity proposed in our 1969 plan as Astoria 7, and denied by the City of New York, will be incorporated in a somewhat larger unit to be built on the Lower Hudson, possibly at Ossining. And it reflects the improvement since 1969 in prospects for the purchase of power from the Power Authority of the State of New York (PASNY) and the Province of Quebec.

We practice open planning. We put forward our new 20-Year Advance Program at this time to share our plans with government officials and with the public as far in advance as we can plan. We put it forward with conviction that it is a sound program, but without stubborn pride of authorship. We welcome comment and ask only what we have asked for previous plans, that individuals or groups opposing a specific project be prepared to suggest a realistic alternative that will be environmentally acceptable and will provide the power that people need at costs they can afford to pay.

We, ourselves, will search continually for opportunities to improve on this Advance Program, taking into account changing conditions and technology.

Three tables attached as Exhibits A, B and C show for the 20-year period anticipated peak loads, capacity additions and planned retirements.

Load Projections

Load growth can be predicted with reasonable accuracy by utilizing four basic factors: the historical trend of power use, the market saturation of electric appliances, and the trend in building activity, and population changes.

Using these factors, our engineers predict that peak electric demand will grow from the 7,950,000 KW peak in 1971 to more than 17 million KW by 1990. They estimate a 5.7 percent growth in peak demand next year, declining to an average 4.2 percent in the 1975-80 period and 3.9 percent in the 1980-85 period. The annual consumption of electricity ("sendout") is expected to increase somewhat faster than peak demand, around 5.0 percent between now and 1975, and declining to about 4.9 percent for the 1975-80 period and about 4.3 percent for 1980-85.

In forecasting the growth in electric loads, our engineers used the Regional Plan Association's projection for population growth averaging 0.55% per year. Much of the predicted load growth will result from raising the income levels of people who now cannot afford many electric appliances. For

example, today in New York City only 50 percent of households have any air-conditioning, 24 percent have a frost-free refrigerator, 9 percent a dishwasher, and 4 percent a self-cleaning oven.

The above estimates of growth rate for our service territory are substantially lower than national projections for peak demand and total sendout, as reported by the Edison Electric Institute last October. National projections are for peak demand to grow by 11.2 percent in 1972, declining gradually to 8.1 percent by 1975, the end year in EEI projections. Total sendout on a nationwide basis is expected to grow by 8.3 percent in 1972, declining to about 7.6 percent in 1975.

On the Con Edison system, the summer of 1971 peak load, after adjustment for weather conditions, was 7,950,000 KW. This was 200,000 KW lower than forecast and is attributable in large part to the Save a Watt campaign which we undertook to encourage efficient use of electric energy. Over the long term, we expect the Save a Watt program to continue to influence the peak loads. However, for purposes of capacity planning we have been conservative by assuming a peak reduction of only 150,000 KW in 1972 and 100,000 KW thereafter -- assumptions we sincerely hope are wrong but think prudent for planning purposes (if Save a Watt proves more effective we can always slow down construction; but with lead-times of 6-10 years on new facilities,

speed-up is another story). Our forecast of the peak load for 1990, the horizon year in the program, is now 17,350,000 KW.

This projection of the rapidly growing electrical energy needs of New York City and Westchester County, and the many new facilities required to meet these needs, dramatizes again the great need for energy conservation. Con Edison is attempting to do what it can to encourage its customers to conserve all forms of energy -- by discontinuing our sales program, by proposing revisions in our rate structures to reduce quantity discounts, and by an educational campaign using radio, TV, newspapers, bill enclosures and other media.

We need the support of all levels of government in this conservation endeavor through government power to improve public transportation, to regulate the use of property, to prescribe building codes, to require labeling for the protection of the public, and in various other ways. The federal, state and local authorities, we believe, should use their legislative power to encourage the conservation of all forms of energy, including electricity. We urge that they do so, and we applaud efforts already begun in these directions.

Scheduling Assumptions

In planning new facilities, one important goal has been to establish a level of reserves which will assure reliability each year, even though there is a delay in completing a new power plant scheduled for that year.

This is, of course, a costly and sometimes ineffectual way of trying to meet the problems of delay in construction schedules. Costly, because it means that in any given year we must have invested in construction in progress hundreds of millions of dollars of additional capital -- which translates eventually into higher electric rates. Sometimes ineffectual, because delays of particular projects may exceed one or even two years. But until better ways are found to resolve environmental disputes, assure timely delivery of high quality plant components, recruit an adequate supply of skilled craftsmen, and avoid frequent work stoppages, accelerated scheduling seems necessary.

It must be recognized, however, that no amount of alternative planning, or acceleration of schedules, or other planners' devices, will assure an adequate supply of electric energy if Con Edison cannot obtain the many Federal, State and local approvals necessary to build new facilities. If the license for the 2 million KW Cornwall project is not upheld, we will be short 2 million KW -- unless licenses for 2 million KW at other

sites are promptly granted. If a license is not granted at Ossining (or some other site on the Lower Hudson) for a 1.2 million KW oil-fired plant, we will be short another 1.2 million KW. If we cannot get rights of way for additional up-state high voltage transmission lines, we will lose any chance to purchase large blocks of power from Canada, And so it goes.

It is a sobering fact that 2½ years have passed since we asked New York City for permission to build the 800,000 KW Astoria 7 unit, and 1½ years since we were turned down. And we still have not found a site for the capacity denied us at Astoria -- and the many opponents of that unit have not been of assistance in finding a realistic alternative site.

All of this points up what we believe to be the absolute necessity for legislation that will authorize a single state agency to settle these siting questions, and promptly. It points up, too, the need for constructive support from all segments of society for the licensing of new facilities that will provide society with the electric energy and the environmental protection it needs. Reform of the law is important -- but reform of attitudes on all sides of the energy question will be even more important. If we remain a divided body politic on energy questions, the probabilities are high that energy shortages will become worse.

The Program

Based on the above-described load projections and scheduling assumptions, our 20-Year Advance Program can be summarized as follows:

Facilities Under Construction

New generating facilities under construction with related transmission and distribution, will cost about \$3 billion over the next five years. New generating units under construction, and when we expect them to be ready for commercial operation if there are no further licensing delays, are as follows:

- 350,000 KW of peaking turbines mounted on two barges on the Brooklyn waterfront ("The Narrows"), July 1972
- 800,000 KW representing our share in two units at Bowline Point near Haverstraw, July 1972 and May 1975.
- 1,340,000 KW in Indian Point nuclear units 2 and 3 near Buchanan, July 1972 and November 1974.
- 480,000 KW representing our initial share in two units at Roseton near Newburgh, November 1972 and May 1973.
- 800,000 KW from an addition to our Astoria Plant, Astoria No. 6, June 1974.

In addition, we are building three high voltage transmission interconnections with other utilities that, subject

to timely issuance of permits, will double our power import capability by 1974. They are:

- a tie with the 500,000-volt Pennsylvania-Jersey-Maryland (PJM) System, February 1972.
- a 345,000-volt tie with Public Service Electric and Gas (New Jersey) in two sections, a cable under the Hudson River to be completed in spring 1972, and an overhead section on the west side of the Hudson dependent upon final approval by the state regulatory commissions of New Jersey and New York, to be completed 7-8 months after certification.
- a 345,000-volt tie with upstate utilities (the "Southern Tier" line), approximately 12 months after we receive the necessary license from the New York PSC.

We also are rebuilding to 345,000 volts two 138,000-volt lines on the Catskill Aqueduct from Millwood to Dunwoodie substations in Westchester County, scheduled for completion in spring 1974. This increase in capacity is essential to deliver electricity from Indian Point Nuclear Unit No. 3 to New York City, and will improve reliability and increase internal capacity for receiving imported power.

Facilities To Be Built

For the second half of the 1970s and early 1980s, we hope to construct the 2 million KW pumped storage hydroelectric Cornwall Project (Storm King); a 1.2 million KW oil-fired station on the Lower Hudson, perhaps at Ossining; and at least 700,000 KW of additional peaking gas turbines. The Cornwall Project would require four 345,000-volt transmission cables under the Hudson River and underground about 2 miles, then overhead to a switching point at Kent, together with the rebuilding at 345,000 volts of two 138,000-volt lines from Pleasant Valley to Millwood. Electricity from a plant at Ossining would be delivered via two 345,000-volt cables possibly laid inside the Croton Aqueduct which no longer is in use, to connect with our existing transmission system. Transmission plans for additional peaking gas turbines will depend on their location.

For the latter part of the 1980s we presently foresee as new sources of electric energy a series of base-load plants, probably nuclear, possibly island-based or barge-mounted, together with advanced design gas turbines, and perhaps a beginning on fuel cells, magnetohydrodynamic generators (MHD), and breeder reactors. Associated transmission lines will be planned as part of the site selection process.

Purchased Power

Long-term purchases contemplated from PASNY, include as much as 500,000 KW during the summer and as much as 200,000 KW during the winter from the FitzPatrick Nuclear Unit starting in 1973, and 500,000 KW from the Breakabeen Pumped Storage Plant starting 1977. However, PASNY has not yet received an FPC license to construct Breakabeen, so purchase from this plant must remain tentative at best.

We are participating in studies that could lead to the import of 500,000 KW from Hydro Quebec in 1977, either by straight purchase or through seasonal exchange. Further, there has been some indication that Quebec might have additional power for sale from new projects such as James Bay. But this source of supply, too, must be considered tentative. No contracts have been signed. Substantial transmission line construction would be required in Quebec and New York State. Con Edison would pay rental on lines built by others, or possibly be a joint owner. An export license from the National Energy Board of Canada would be required, and the license may be available only if the power to be exported is declared to be in excess of requirements in Canada.

For the shorter term, we have made arrangements for the firm purchase of 395,000 KW from various other utilities for the summer of 1972, and we are in various stages of negotiation for additional purchases in subsequent years.

Among such planned purchases is 40,000 KW from the Maine Yankee Atomic Plant for four years, starting in 1973. Purchases also have been proposed in 1973 and 1974 from Rochester Gas and Electric Corporation, and in 1973, 1974 and 1975 from Niagara-Mohawk Corporation. The latter would be part of a diversity exchange, by which Niagara-Mohawk would make power from its system available to Con Edison in the summer and Con Edison would make the same amount of power available to Niagara-Mohawk in the winter.

Retirements

Completion of construction now underway will permit the shutdown, in steps through 1975, of approximately 1,450,000 KW of older, less reliable and less efficient generation equipment. This consists of units installed at various times dating back to 1915. They have already outlived their practical service lives and have been kept in service only because we couldn't get along without them in view of delays in construction of the nuclear and Cornwall pumped storage projects.

Some 600,000 KW would be retired between 1978 and 1981 with another 1.5 million KW between 1982 and 1990.

Inability to obtain permits and licenses to construct and operate scheduled new capacity, or unusual construction delays, could force changes in the present schedule for shutting down old generating capacity.

Research & Development

As an integral part of long-range planning, we also have increased our direct participation in research and development five-fold in the past five years. In 1972, Con Edison will spend \$7 million on R&D compared to about \$2.2 million in 1971.

Because the national need for accelerated R&D transcends the capabilities of even the largest electric companies, the utility industry as a whole is undertaking an ambitious cooperative R&D effort.

A Con Edison representative served on the 17-member R&D Goals Task Force of the Electric Research Council (ERC), representing all segments of the industry, which in 1971 analyzed the types of R&D projects needed over the next 30 years, and their cost. We subscribe to the Task Force conclusions that top priority should be given to the development of processes for controlling stack gas emissions; coal gasification; more economical underground transmission; breeder and fusion reactors, and new concepts to increase power plant efficiency, lessen the waste heat problem and, in some cases, to permit scattered small generators, a concept called "distributed generation."

The Task Force recommended that about \$1.2 billion per year, on average, should be committed by utilities, manufacturers and the government for electric R&D. This is about double the present rate of expenditures.

The ERC is working on plans for a central research corporation to administer research programs to be financed by contributions from the public and private sectors of the industry, such contributions to be made possible by R&D add-ons to utility bills or through a tax. Add-ons would require approval of the various state regulatory commissions, and a federal tax would require congressional action.

EXHIBIT A
UNCONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
LONG RANGE ELECTRIC GENERATION PROGRAM
PLANNED CAPACITY, LOAD AND RESERVE - SUMMER PROGRAM

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
<u>Existing Installed Capacity</u>	8469	8909	10205	10488	11150	11985	12720	12633	12508	13108	13542	14104	15059	15810	16060	17010	17410	18510	19510	19210
<u>New Capacity and Retirements</u>	624																			
Gowanus Gas Turbines																				
Indian Point No. 2		273	92	35	33															
Bowline Point No. 1		400																		
Narrows Gas Turbines		348																		
Roseton Nos. 1 & 2			490				120				170									
Indian Point No. 3					965 ⁽¹⁾	35	33													
Bowline Point No. 2					400															
Astoria No. 6						800														
GT Peaking Plant - JFK Airport			44	44																
Gas Turbine Plants							700							400		400		400		400
Ossining Fossil									600	600										
Cornwall Pumped Storage											1000	1000								
Nuclear Nos. 4 & 5													1100		1100					
Base Load Plants																	1100		1100	
Retirements	-184	-325	-333	-217	-563			-125		-166	-318	-45	-349	-150	-150			-400	-400	
<u>Total Installed Capacity</u>	8909	10205	10488	11150	11985	12720	12633	12508	13108	13542	14104	15059	15810	16060	17010	17410	18510	19510	19210	19610
<u>Firm Purchases</u>	920	395	40	40	40	40														
<u>Proposed Purchases (2)</u>			1000	900	700	400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
<u>Total Capacity Resources</u>	9829	10600	11528	12090	12725	13160	14033	13908	14508	14942	15504	16459	17210	17460	18410	18810	19910	19910	20610	21010
<u>Steam Deratings</u>	-200	-95	-40	-39	-27	-67	-46	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>Net Capacity Resources</u>	9629	10505	11488	12051	12698	13093	13987	13908	14508	14942	15504	16459	17210	17460	18410	18810	19910	19910	20610	21010
<u>Estimated Peak Load</u>	7950	8400	8850	9300	9750	10200	10650	11100	11550	12000	12475	12950	13450	13950	14500	15050	15600	16150	16750	17350
<u>Reserve - MW</u>	1679	2105	2638	2751	2948	2893	3337	2808	2958	2942	3029	3509	3760	3510	3910	3760	4310	3760	3860	3660
%	21.1	25.1	29.8	29.6	30.2	28.3	31.3	25.3	25.6	24.5	24.2	27.1	27.9	25.2	27.0	25.0	27.6	23.3	23.0	21.1
<u>Reserve with Latest Unit</u>																				
<u>Delayed One Year - MW</u>		1232	2398	1951	2465 (3)	2543	2837 (4)	2808	2358	2342	2529 (5)	3009 (5)	2660	3110	2810	3360	3210	3360	2760	3260
%		14.7	27.1	21.0	25.3	24.9	26.6	25.3	20.4	19.5	20.2	23.2	19.8	22.3	19.4	22.3	20.6	20.8	16.5	18.8

- Notes:
- (1) Indian Point No. 3 operation at full power shown delayed beyond summer 1974 scheduled construction completion date to allow for potential AEC licensing delays.
 - (2) Proposed purchases include capacity which may be available from Rochester Gas and Electric (1973 and 1974), Niagara Mohawk (1973-75), Power Authority of the State of New York FitzPatrick Nuclear Unit (beginning in 1973) and Breakabeen Pumped Storage Plant (beginning in 1977), and Hydro Quebec (beginning in 1977). Purchase arrangements are in various stages of negotiation and no contracts have yet been signed.
 - (3) Assumes Indian Point No. 3 in operation at one-half of full power.
 - (4) Considers delay of 500 Mw of proposed purchases.
 - (5) Assumes two Cornwall pump-turbines (500 Mw) delayed.

EXHIBIT B

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
LONG RANGE ELECTRIC GENERATION PROGRAM
1971 - 1990

PLANNED NEW CAPACITY

<u>YEAR</u>	<u>UNIT</u>	<u>CAPACITY</u>
1971	Gowanus Gas Turbines	624 MW
1972	Indian Point No. 2	873
	Bowline Point No. 1	400
	Narrows Gas Turbines	348
		<u>1,621</u>
1973	Roseton Nos. 1 & 2	480
	Uprate Indian Point No. 2	92
	Gas Turbine Peaking Plant - JFK Airport	44
		<u>616</u>
1974	Uprate Indian Point No. 2	35
	Astoria No. 6	800
	Gas Turbine Peaking Plant - JFK Airport	44
		<u>879</u>
1975	Uprate Indian Point No. 2	33
	Indian Point No. 3	965
	Bowline Point No. 2	400
		<u>1,398</u>
1976	Uprate Indian Point No. 3	35
	Gas Turbine Plant	700
		<u>735</u>
1977	Uprate Indian Point No. 3	33
1978	-	-
1979	Ossining Base Load Fossil Plant	600
1980	Ossining Base Load Fossil Plant	600
1981	Cornwall Pumped Storage Plant	1,000
1982	Cornwall Pumped Storage Plant	1,000
1983	Nuclear No. 4	1,100
1984	Gas Turbine Plant	400
1985	Nuclear No. 5	1,100
1986	Gas Turbine Plant	400
1987	Base Load Plant	1,100
1988	Gas Turbine Plant	400
1989	Base Load Plant	1,100
1990	Gas Turbine Plant	400
	Total Planned New Capacity	<u>15,106</u>

Note: Firm and proposed purchases have not been included.

EXHIBIT C
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
LONG RANGE ELECTRIC GENERATION PROGRAM
1971 - 1990

RETIREMENT SCHEDULE (1)

<u>YEAR</u>	<u>STATION</u>	<u>EFFECT OF RETIREMENT ON SYSTEM INSTALLED CAPACITY</u>
1971	Hudson Avenue Turbine No. 4 Hell Gate Turbine Nos. 6 & 7	80 104 <hr/> 184
1972	East River Turbine No. 2 Hudson Avenue Turbine Nos. 1, 2 & 3 74th Street Turbine No. 4 59th Street Turbine No. 7 Waterside Turbine No. 1 Hell Gate Turbine Nos. 2, 3 & 4	42 131 -1 14 33 106 <hr/> 325
1973	Hell Gate Turbine Nos. 1, 8 & 9 East River L.P. Boilers	209 124 <hr/> 333
1974	Kent Avenue Generating Station Sherman Creek Generating Station	82 135 <hr/> 217
1975	East River Turbine Nos. 1, 4 & "S" Hudson Avenue Turbine Nos. 5, 6, 7, & 8	93 470 <hr/> 563
1978	74th Street Turbine No. 3 59th Street Turbine No. 8 Waterside Turbine Nos. 10, 11, 12 & 13	0 25 100 <hr/> 125
1980	Waterside Station No. 2 Turbine Nos. 4, 5, 6 & 7	166
1981	Hudson Avenue Turbine No. 10 (2) East River Turbine Nos. 5 & 6 (2)	44 274 <hr/> 318
1982	59th Street Turbine No. 13 (2)	45
1983	Waterside Station No. 1 Turbine Nos. 8, 9, 14 & 15 Provision for Retirement (2)	199 150 <hr/> 349
1984	Provision for Retirement (2)	150
1985	Provision for Retirement (2)	150
1988	Provision for Retirement (2)	400
1989	Provision for Retirement (2)	400 <hr/> 3725 (3)

- NOTES:
- (1) Schedule for retirement or removal from operation of generating units is in large part subject to timely completion of new electric and steam production facilities and local area load requirements.
 - (2) Provision has been made for retirement of capacity equivalent to the capacity of units which achieve their 30th year of service.
 - (3) Does not include repurchase of 120 Mw from Roseton Generating Station by Central Hudson in 1977 and 1981.