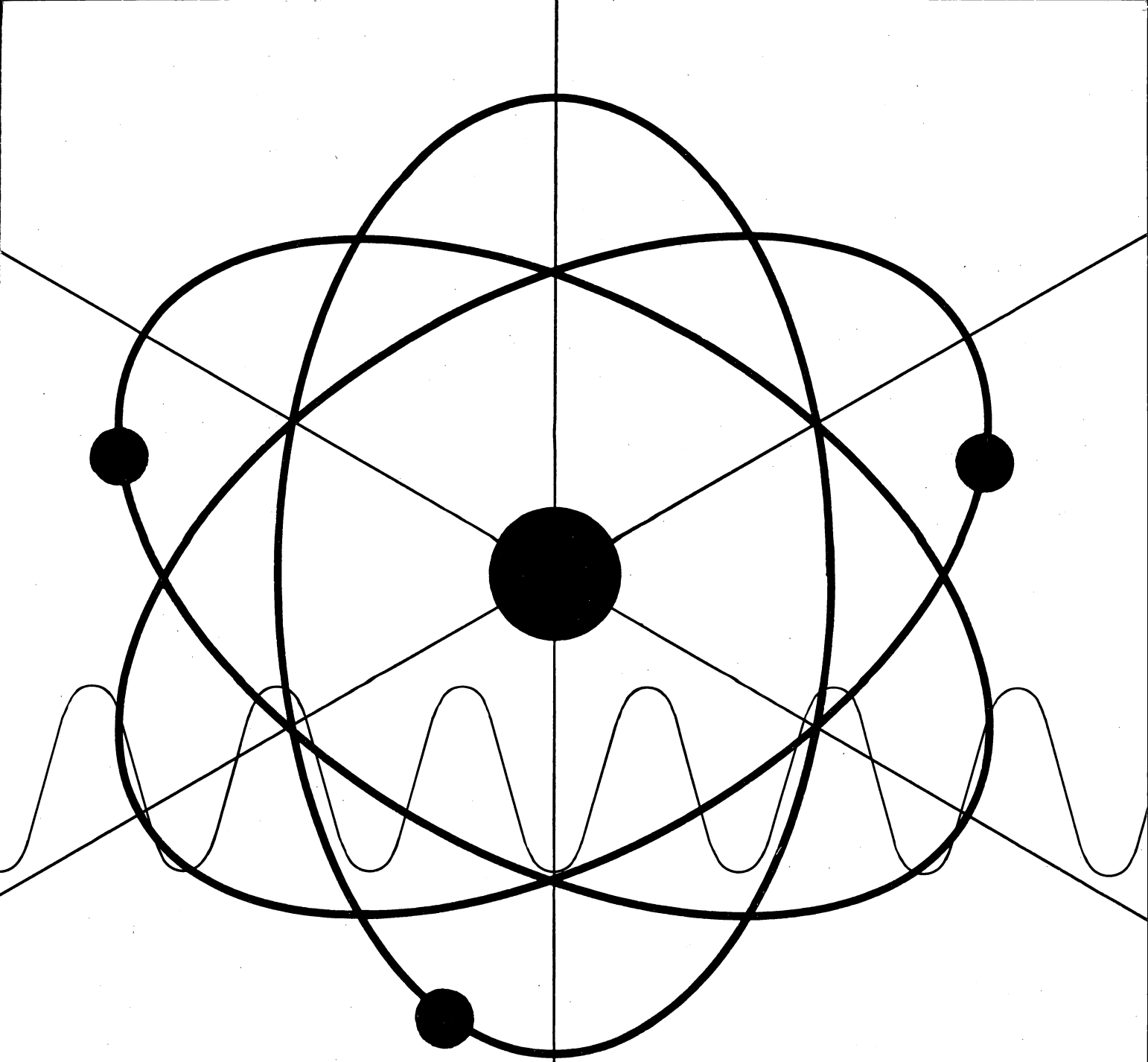

ATOMIC POWER

POWER AUTHORITY OF THE STATE OF NEW YORK

POWER AUTHORITY OF THE STATE OF NEW YORK

THE COLISEUM TOWER—10 COLUMBUS CIRCLE

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DIRECTOR OF
POWER UTILIZATION

Memorandum to
Honorable NELSON A. ROCKEFELLER
Governor of the State of New York

On February 1, 1961, Oliver Townsend submitted to you the annual report of the State Office of Atomic Development which he heads. The report rejects our recommendation for legislation to permit the Power Authority, with the governor's approval, to accept assistance which may be made available by the federal government for the construction of a large nuclear power plant. The report counsels procrastination and delay, avoids all issues which might be deemed controversial and fails to answer or present fairly the arguments in favor of the legislation we recommend.

The report starts by stating that the first objective of the State's atomic development program is:

> *"Expansion of the state's atomic power capacity, including particularly the construction at the earliest practicable date of either an economically competitive full-scale atomic power plant or a prototype leading directly toward the construction of an economically competitive full-scale plant"*

and continues:

> *"We propose this because we believe that there is no single event that would do more to establish the peaceful atomic industry on a permanent, flourishing basis in the State of New York than the achievement of economically competitive atomic power in the area."*

To achieve the desired end one and only one affirmative recommendation is made. This is that the Governor appoint another committee. The committee would study the question of whether state legislation should be adopted to allow the Authority with approval of the Governor to use its resources and skills to build an atomic energy plant with the aid of federal funds for the purpose of speeding the development of atomic energy in New York.

In negative fashion, the report recommends that no such legislation be adopted now because it says:

(i) it would be "premature to consider a change . . . prior to completion of a study of the *Authority's need* for an atomic power plant";

(ii) Townsend believes enough federal aid will not be available to assist organizations such as the Authority to construct a large plant without a change in federal law;

(iii) plans for an Authority project have not been "clearly defined";

(iv) the Authority might carry out some studies without a change in the law; and

(v) the whole problem might arouse controversy.

The balance of the report as it relates to atomic power consists of (i) a long discussion of the fact that seven private utility companies in the State together with General Electric Company and General Dynamics Corporation are engaged in an atomic research program which it is hoped will result three years from now in a small superheat development reactor and ultimately in a 300,000 to 500,000 kilowatt plant; (ii) a detailed description of negotiations between the City of Jamestown and the Atomic Energy Commission with respect to the building of a little (16,500 kw) plant and the difficulties involved which seem to have been insurmountable

so far as Jamestown is concerned; (iii) mention of the fact that the Consolidated Edison Indian Point plant, the only atomic energy plant being built in New York State, is expected to be finished in 1961; and (iv) a statement of the fact that it has been suggested that a mobile atomic unit be exhibited at the 1964-1965 World's Fair.

We believe the report is wrong in recommending against the legislation proposed by the Authority for the following reasons:

1. Contrary to the report's suggestion, it is not the Authority but the citizens and industry of New York which need the earliest possible development of low-cost atomic power to overcome the competitive advantage of other states which have an abundant supply of cheap power and are using it to lure industry away from New York and it is absurd to put off action designed to fulfill this need pending report of a committee to be appointed by the Governor to study it. Mr. Townsend already has one committee. It includes officers of the two largest utilities in the State, Consolidated Edison Company and Niagara Mohawk Power Corporation and of the General Electric Company. His report presumably had the approval of that committee. The one representative of the Authority, Major General Thomas F. Farrell, former Deputy Chief of the Manhattan Project and Assistant General Manager of the Atomic Energy Commission, dissented.

On the basis of past experience with two power projects costing over $1,000,000,000 this Authority can be expected to accomplish something if it is given an opportunity. If New York's need for atomic power is to be met soon enough to do it any good in its competition with other states to hold and attract industry, action by the Authority — the only public agency in the state capable of financing or building a large nuclear plant — is essential. As the report indicates the Authority as well as private companies needs federal assistance to develop a large-scale plant but the Authority needs much less assistance to produce power competitive with present steam costs and with the same amount of assistance can produce much cheaper power and do so sooner.

2. As a second reason for delay the report states that it is the opinion of Mr. Townsend that a basic change in federal law would be necessary to make enough aid for the building of a large plant available to the Authority and organizations like it. This is wrong.

Present federal law puts organizations such as the Authority in a favored position. All atomic power facilities must be licensed by the Atomic Energy Commission; and where the Commission receives conflicting applications for a license it is required by the Atomic Energy Act to give preferred consideration to those submitted by public agencies. New York State should be in a position where in competing with other parts of the country for federal help it has at least one agency such as the Authority in a favored position to obtain it. No rural electric cooperative or municipal system in the state is big enough to take advantage of federal help to build a large atomic power plant.

The 1958 Atomic Energy Commission Authorization Act set up an authorization procedure for the cooperative construction of atomic energy plants by the Commission and public bodies such as the Authority. Federal money to finance such projects has been appropriated. The only proposed atomic power project for which the Atomic Energy Commission has considered giving aid in New York was the small Jamestown project referred to in Mr. Townsend's report and negotiations with respect to it were carried on pursuant to this provision of federal law.

Other provisions of federal law authorize the Commission to cooperate with both public and private power-producing agencies to foster the development of power from atomic energy. Thus the Authority as well as private companies is eligible for monies appropriated to carry out these authorizations but only organizations such as the Authority are

eligible under the 1958 cooperative authorization referred to above.

Under any of the last four federal authorization acts the Commission could have made money available to the Authority if it had been in a position to accept it.

No basic change in federal law is necessary to make possible the building of a large atomic energy plant of the type Mr. Townsend recognizes is needed. All that is necessary is federal authorization and appropriation sufficient to meet the situation. This can come about at any time and is very likely to happen between sessions of the state legislature. As we show below the Authority needs much less federal help to build a large atomic plant capable of producing power at rates competitive with coal produced steam than private companies would need and with the same amount of help can produce power much cheaper.

3. The third excuse in the Townsend report for delay is that plans for an Authority project have not been "clearly defined." Quite obviously the Authority cannot prepare plans and specifications for a particular project without first getting authorization to accept federal aid to build such a project. Once such authorization is received you can be sure, based upon past performance, that the Authority will soon come up with a definite proposal for submission to both the Governor and the Atomic Energy Commission.

4. Another reason for counseling delay is that Mr. Townsend thinks the Authority may be able to make some studies even if the legislature does not take action now. This is of course true, but the studies the Authority can make now are insignificant compared to what it should be enabled to do. Existing federal law in addition to authorizing assistance to builders of atomic power plants in the form of outright grants and waiver of charges for nuclear fuel provides for assistance in the form of research without full reimbursement. Since under present state law the Authority cannot apply for federal aid for the building of a plant it is not in a position to ask for assistance in the form of research.

5. The greatest absurdity in the Townsend report is that it counsels delay on the part of the legislature in order to avoid controversy. It takes the position that legislative consideration of authorizing the Authority to build an atomic plant at this time would "constitute an abortive attempt to resolve solely in an atomic energy context a public policy question with many other aspects and ramifications." If Mr. Townsend and his advisers have any hope of realizing their stated objective with respect to atomic energy development in this State they must take a far more courageous stand.

We commend the action of the private companies in the State in carrying out research and development and are willing to cooperate with them as we have on the St. Lawrence and at Niagara. We have no thought of competing with them in basic development but the production of cheap power from atomic energy is vitally important to New York State and the method of doing it raises problems which must be met without preliminary debate on ideological differences.

We urge careful consideration of the facts set forth below showing the State's need for a new unlimited source of low cost power and the essential role the Authority can play. New York must elect either to drag its feet as the Townsend report recommends or take affirmative action to meet the needs of its people and its industry as we recommend.

ROBERT MOSES
Chairman

March 16, 1961.

NEW YORK NEEDS NEW UNLIMITED SOURCES OF LOW-COST POWER

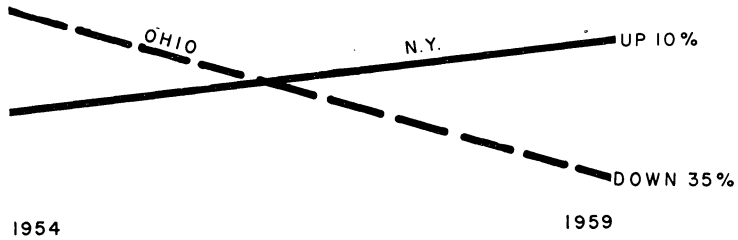
When the Niagara Project is completed the power potential of New York's undeveloped hydroelectric resources will have been almost entirely realized. The State's future power requirements must be met by thermal plants — either conventional or atomic. When Niagara is finished steam plants will still supply 70% of the power capacity in the State — about ten million kilowatts in active service against four million kilowatts of hydro. From then on the demand for power will increase at a rate of a million kilowatts a year, and the percentage supplied by steam will increase accordingly.

For many years power costs in New York were lower than in other industrial areas. On the Niagara frontier plentiful cheap hydroelectric power was the primary incentive to industrial growth and should continue to attract industry until the output of the new Niagara development is fully allocated. In the State as a whole as recently as 1954 power for industry was cheaper than in Ohio. Since then power sales to industrial users have increased over 100% in Ohio and about 10% in New York, while average power costs to these customers declined 35% in Ohio and increased 10% in New York.*

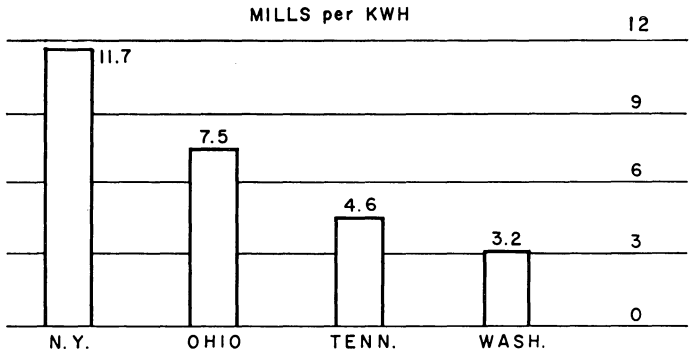
Industrial users in New York paid an average of 11.7 mills a kilowatt-hour for power in 1959. In the same year, the average cost was 7.5 mills in Ohio, 4.6 mills in Tennessee and 3.2 mills in Washington, a state which can still supply its requirements with hydro.†

The reason for these low industrial power costs in Ohio and Tennessee is obvious. In Ohio and Tennessee coal is cheap — $5.36 and $4.67 a ton against an average of $9.58 in New York.† As a result very large plants can be built which produce power at a cost low enough to attract industry and industry has the assurance that the potential supply of cheap power is virtually unlimited.

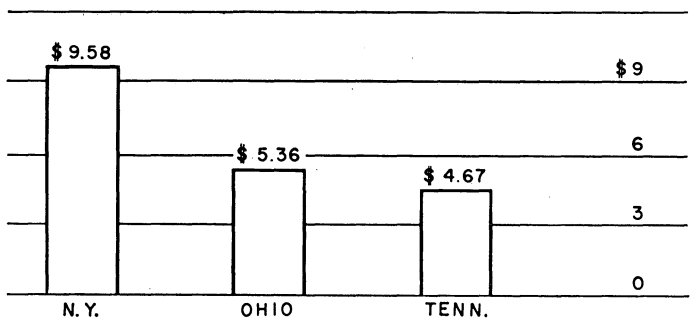
The Tennessee Valley, the Pacific Northwest and many other parts of the country have the further competitive advantage of government-owned or other publicly financed power



POWER COST TO INDUSTRY*



1959 COST OF POWER TO INDUSTRIAL USERS†



COST OF COAL PER TON (1959)†

Edison Electric Institute Statistical Bulletins, 1954, 1959.

†*Edison Electric Institute Statistical Bulletin, 1959. (Published Sept. 1960.)*

plants. There large plants are built by agencies such as TVA or the Public Utility Districts in Washington which pay no federal taxes, borrow money at low interest rates, and operate without profit. Naturally they can produce power at extremely low rates.

Modern steam plants in the Ohio Valley, in western Pennsylvania and in the Southeast can produce power for about 4 or 5 mills when privately built and operated and for about 3½ mills when publicly built and operated. To produce power from the newest coal plants in the New York City area costs 8 mills or more and in modern plants upstate about 7 mills. Transmission and distribution bring the total cost to industry up to a state-wide average of 11.7 mills.*

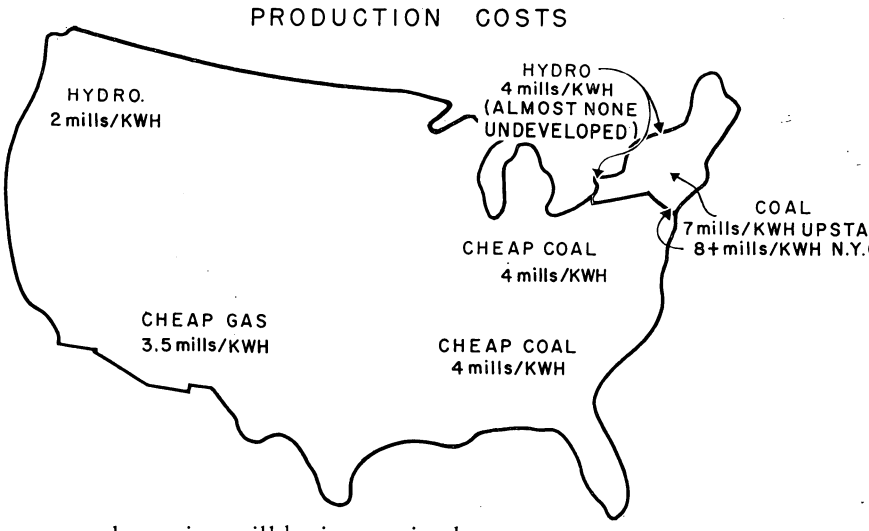
With power produced from coal, gas or oil New York cannot hope to overcome this disadvantage. Other sections of the country will continue to have cheap power because they have large deposits of coal or natural gas or great sources of hydroelectric energy still undeveloped. New York has none of these advantages. It will always cost more either to bring coal to New York and produce power from it here — or to produce power from coal elsewhere and transmit the power here — than it does to produce power for use near the coal fields.

But eventually power from nuclear fuels should be cheaper than from coal. When atomic research has progressed to that point New York will again be able to compete with other areas in power costs — if we get started soon enough. We cannot expect other areas to stand still either in the development of the resources they have or in looking for new ones.

LITTLE PLANTS CANNOT DO THE JOB

The cost of atomic power will not be brought down to the level of coal-burning steam units by tiny plants such as the 16,500 kw plant which the City of Jamestown has been struggling so hard to build. Even Consolidated Edison's 275,000 kilowatt plant (only 163,000 kw of which is supplied by nuclear energy) is nowhere near the most economical size, and of course could supply only a small fraction of one year's growth in the power requirements of New York State.

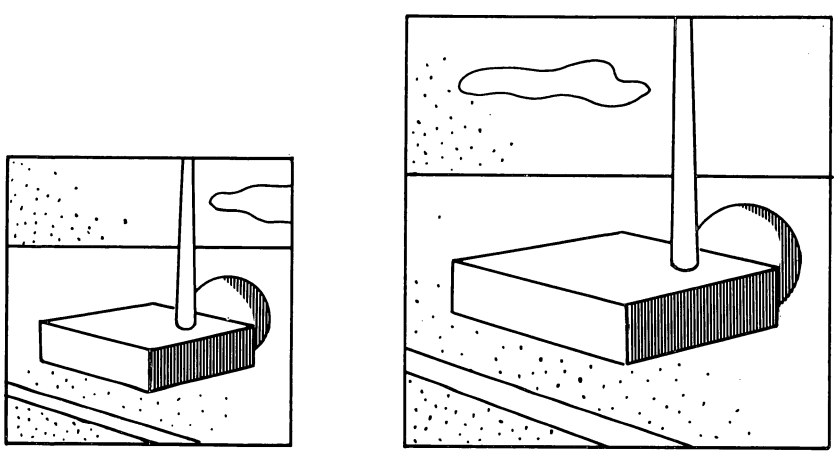
Experience in the construction of all types of power plants — whether the fuel is coal, gas, oil or uranium — shows that larger plants are more efficient and produce power at less cost. How great the saving will be in atomic plants cannot be determined until big plants are built. Undoubtedly large-scale experimentation will be carried on somewhere in the United States within the next decade. We think it should begin in New York.



NEW YORK WILL GET LARGE LOW-COST ATOMIC PLANTS MUCH SOONER IF THE POWER AUTHORITY IS AUTHORIZED TO ACCEPT FEDERAL AID AND ASSIST IN THE DEVELOPMENT OF NUCLEAR POWER.

Without substantial federal grants or other assistance neither the Authority nor any private company or combination of companies can proceed now with large scale atomic development.

Atomic Energy Commission estimates predict that with presently planned federal assistance privately produced nuclear power will be only slightly more expensive than present privately produced steam power in high-cost fuel areas by 1970. While it may well be that greater assistance than that now contemplated will be necessary to make the AEC's predictions come true there is no reason to assume that it will not be available.



WITH LARGER PLANTS...NUCLEAR COSTS WILL BE LOWER

* *See table pages 5, 9.*
and Edison Electric Institute Statistical Bulletin, 1959

In any event the Authority would need less aid and could afford to start development sooner than private companies.

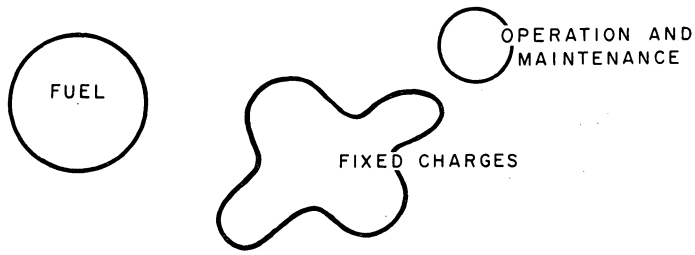
The cost of steam-produced electric power, either conventional or atomic, is made up of three components: fixed charges, fuel and operation-maintenance. With respect to the largest element of cost — fixed charges — the Authority has a great advantage in the development of atomic power, and with respect to the other two elements the Authority is at least in an equally good position.

According to AEC estimates fixed charges related to cost of construction represent at least half the cost of nuclear power in any private plant. In types of plants where construction costs are high and fuel costs relatively low, more than 70% of the total cost of power may be in fixed charges.*

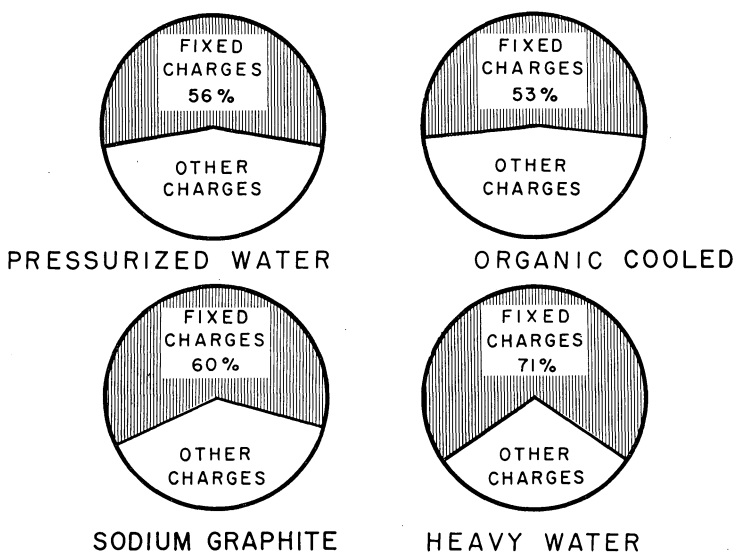
In a privately financed plant annual fixed charges, excluding operation and maintenance, equal about 14% of the total cost of construction. A private company in order to get a 6% return on its investment must earn much more than 6% because federal income taxes alone take 52% of the profit. If the Power Authority built a nuclear plant the fixed charges would be only about half those for a private plant. At Niagara and St. Lawrence the Authority's fixed charges are about 7% in the initial years and less thereafter.

According to figures published by Consolidated Edison Company, fixed charges at its Indian Point plant represent 51% of the cost of power, or 7.3 mills per kilowatt hour.† If the Power Authority had built a plant similar to Indian Point the fixed charges would be 3.7 mills against 7.3 which Consolidated Edison must pay. As a result the total cost of power would be 10.7 mills instead of 14.3.

The second element of cost is fuel. In modern coal, gas and oil burning steam plants fuel now costs less than 2 mills in the cheapest fuel areas and about 3½ mills in New York. In the plant constructed by Consolidated Edison at Indian Point nuclear fuel now costs 8 mills, but the overall average cost of fuel (including oil for superheaters) is 6 mills, about 45% of the total cost. The Atomic Energy Commission estimates that nuclear fuel will be available by about 1970 at approximately the present cost of coal, gas and oil in cheap fuel areas.*



THREE MAJOR ELEMENTS IN THE COST OF PRODUCTION OF STEAM PRODUCED ELECTRIC POWER



A E C ESTIMATES OF FIXED CHARGES IN PRIVATELY FINANCED NUCLEAR POWER PLANTS OF VARIOUS TYPES IN 1970-1972*

SAVING FROM LOWER FIXED CHARGES IF POWER AUTHORITY BUILDS ATOMIC PLANTS

Type of Plant and Date	*Private Company Total Cost*	*Power Authority Total Cost*	*Saving*
Pressurized Water (1970)*	7.8 mills	5.6 mills	28%
Organic Cooled (1970)*	6.7	4.9	26%
Sodium Graphite (1971)*	7.4	5.2	30%
Heavy Water Reactor (1972)*	8.2	5.3	35%

* Based on AEC estimates, "Civilian Power Reactor Program, Part II, TID-8517." See note 5 to table on page 9.

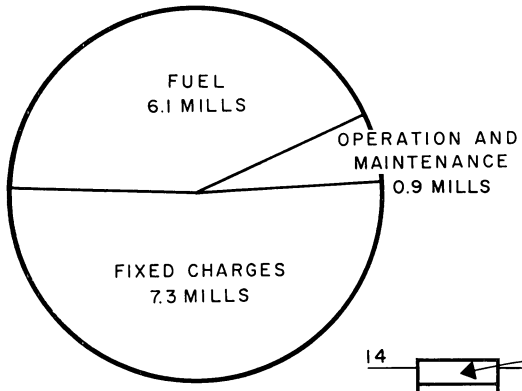
* *Civilian Power Reactor Program, Part II, TID-8517.*

† *See Note 4 to table on page 8.*

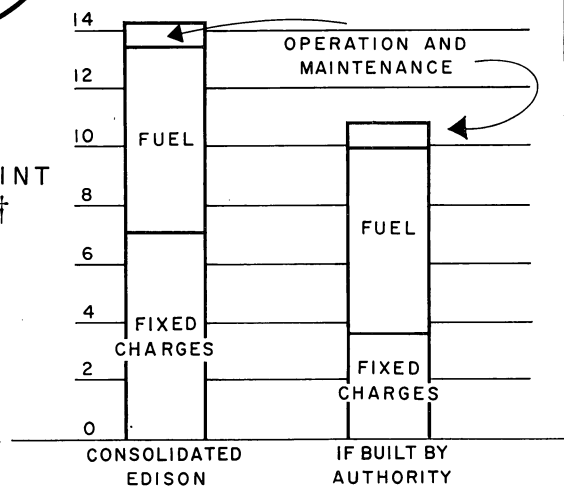
For our purposes it is assumed that fuel costs to a private company and to the Power Authority or any other public body would be the same.

In either a conventional plant or an atomic plant the third element of cost, operation and maintenance, is a comparatively small expense. In a modern conventional plant it is usually about half a mill. At Consolidated Edison's Indian Point nuclear power plant it will amount to 9/10th mill per kilowatt hour. This cost would be about the same whoever built or owned an atomic plant.†

The charts in this brochure, based on information published by Consolidated Edison Company and AEC estimates, show that solely on the basis of lower fixed charges and without taking into account other advantages the Power Authority would almost certainly have, the Authority could produce atomic power 25% cheaper than private companies.



INDIAN POINT PLANT†



† *Consolidated Edison Company. "Nuclear Electric Generating Station" prepared for Geneva Conference on Atomic Energy, September 1-14, 1958 as supplemented by "Fact Sheet, Indian Point Nuclear Generating Station", May 20, 1960.*

NON-ATOMIC STEAM PLANTS

OWNER PLANT	Consolidated Edison Co. Astoria[2]	Niagara Mohawk Power Corporation Dunkirk[2][3]	Ohio Power Co. Muskingum River[2]
TYPE OF REACTOR	—	—	—
DATE	1953	1950	1953
INSTALLED CAPACITY	695 MW	360 MW	876 MW
ORIGINAL COST PER KW	$193	$164	$117
FIXED CHARGES PER KWH[1]	3.8 mills	3.3 mills	2.3 mills
FUEL AND OPERATING COST PER KWH	4.2 mills	3.7 mills	1.9 mills
TOTAL PRODUCTION COST PER KWH	8.0 mills	7.0 mills	4.2 mills

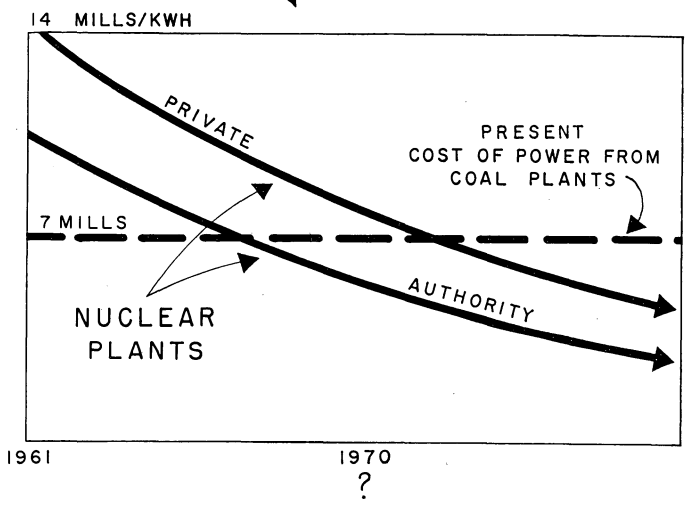
[1] Plant factor of 80% for all plants. Fixed charges 14% except Colbert (6.4%), and Power Authority plants (7%).

[2] Data from "Steam-Electric Plant Construction Cost and Annual Production Expenses, 1959" Federal Power Commission.

[3] Data for addition to Dunkirk plant not available.

[4] Consolidated Edison Company. "Nuclear Electric Generating Station" prepared for Geneva Conference on Atomic Energy, September 1-14, 1958 as supplemented by "Fact Sheet, Indian Point Nuclear Generating Station", May 20, 1960.

SINCE FIXED CHARGES TO THE POWER AUTHORITY ARE ONLY HALF THOSE TO PRIVATE COMPANIES THE OVERALL COST OF NUCLEAR POWER TO THE AUTHORITY SHOULD BE AT LEAST 25% LOWER



Whenever enough federal assistance is available to bring the total cost of power at a privately financed atomic plant down to 7 or 8 mills the Authority — with precisely the same assistance — could produce power for about 5 mills. By the same token the Authority could produce 7-mill power with substantially less federal aid than private companies would need.

We ask only that if federal assistance is offered the Authority be authorized — with the approval of the Governor — to accept it and utilize it.

The private companies' ESADA program which the Townsend report features so prominently is far from an answer to the State's need for an energetic and imaginative effort to build a large-scale project as soon as it is feasible in New York State so that New York can beat other parts of the country to the punch, pioneer in bringing down power costs and regain a competitive advantage for its industry. The Authority has demonstrated by its construction of the St. Lawrence and Niagara projects in record time and within the cost estimates that it can do such a job.

NUCLEAR PLANTS

Tennessee Valley Authority Colbert[2]	Consolidated Edison Co. Indian Point[4]	Private[5] Company	Private[5] Company	Power[5] Authority	Power[5] Authority
—	Pressurized Water	Pressurized Water	Heavy Water	Pressurized Water	Heavy Water
1955	1961	1970	1972	1970	1972
720 MW	275 MW	300 MW	300 MW	300 MW	300 MW
$131	$365	$220	$290	$220	$290
1.2 mills	7.3 mills	4.4 mills	5.8 mills	2.2 mills	2.9 mills
2.2 mills	7.0 mills	3.4 mills	2.4 mills	3.4 mills	2.4 mills
3.4 mills	14.3 mills	7.8 mills	8.2 mills	5.6 mills	5.3 mills

[5] These figures are based on estimates of the AEC. Other estimates published by the AEC and other agencies show slightly different estimated costs—some lower. These differences do not affect materially the proportion of total cost represented by fixed charges and therefore do not affect materially the amount of savings to be derived from Authority construction. All these estimates assume that prior to 1970 large sums will be spent for research and development by the government and others.

The purpose of this table is not to attempt to show what atomic power will cost. It is to show that the Authority could produce such power more cheaply than private companies and therefore it will become competitive with conventional power sooner if the Authority produces it.

The reason that atomic plants of 300 megawatts capacity are assumed is that there are AEC estimates available for plants of such size. If plants larger than 300 megawatts were built power would be cheaper. The Authority would hope to build a larger plant and produce power at lower cost and sooner.

AN ATOMIC PLANT WOULD COMPLEMENT THE AUTHORITY'S HYDROELECTRIC PLANTS.

The basic reason the Authority should take part in the development of nuclear power is that otherwise, as we have shown, the State's need will be met too late, too expensively or not at all. An additional reason is an Authority-owned atomic plant would benefit customers of the Niagara and St. Lawrence hydroelectric plants by equalizing seasonal variations and supplementing output.

NEW YORK CANNOT AFFORD DELAY

It takes years to plan and construct any large power development. New York cannot afford to wait for the ultimate design in reactors or nuclear fuels which may come many years from now. Construction should start as soon as enough federal aid is available to make it economically feasible. Definitive studies and planning should start now. While the cost of nuclear fuel can be expected to decrease, construction costs will continue to rise.

While we debate, other areas of the country are growing faster not only in power production but in manufacturing. Southern and Western states actively seek to lure industry away from New York and boast of their success. Ten Southeastern states which together in 1947 manufactured 15% less than New York now produce 10% more than we do.*

In the long run the major advantage which other parts of the country can offer to industry is cheap power. As the South and Far West become more industrialized, wages, social benefits (of which New York is justly proud) and other costs will undoubtedly increase and approach New York levels. But the competitive disadvantage of high power costs will not be overcome without affirmative action.

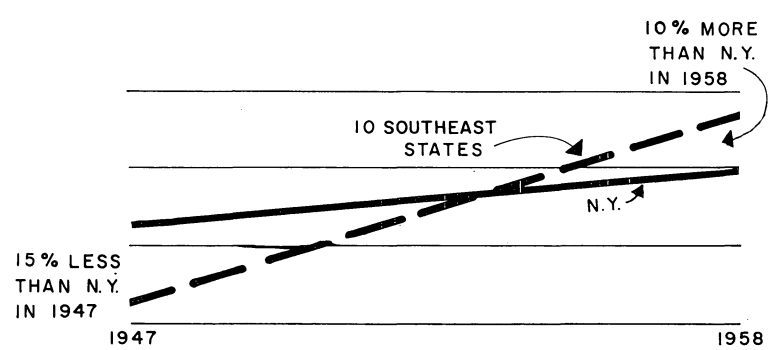
* *Bureau of the Census. "Census of Manufacturing", 1947, 1958.*

WHOEVER CONTROLS ATOMIC POWER WILL CONTROL CIVILIZATION

As we said in the Authority's 1960 Annual Report:

"Let there be no mistake about it. The control of atomic energy will, before long, be the greatest domestic policy question before the American people, because those who control fission and fusion will be the masters of population growth and location, industry, trade, commerce and life itself. This is too great a control to be exercised otherwise than on the theory that it is affected with a major public purpose not to be left exclusively to private profit enterprise."

We urge you therefore to reject the do-nothing recommendations of the Townsend report, and to support legislation which will permit the Power Authority to contribute to the development of nuclear power in New York.



INDUSTRIAL OUTPUT *