The Power To Grow

An Analysis of the Impact Of Additional Generating Capacity On New York State's Economic Health

Prepared for the

New York State Board on Electric Generation Siting and the Environment

The Public Policy Institute of New York State, Inc.

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Table of Contents

Tables and figures

1: Executive Summary

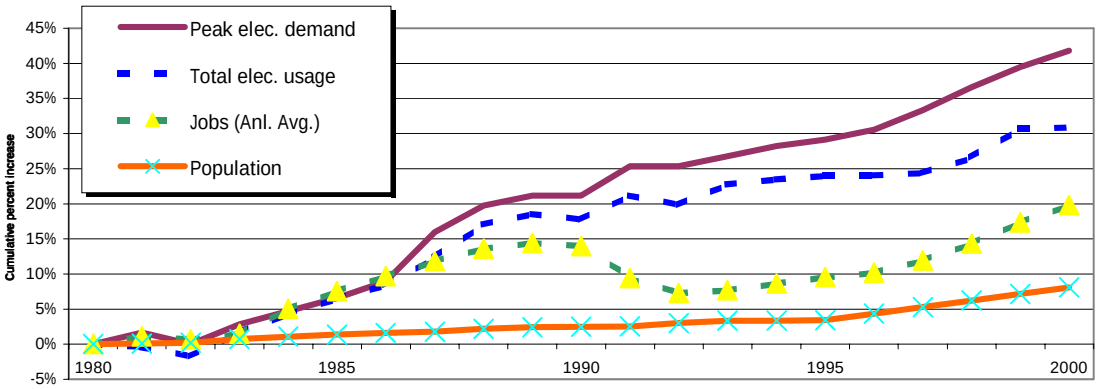
The Public Policy Institute, research affiliate of The Business Council of New York State, Inc., New York's statewide business organization, has reviewed the potential economic impact of building — or, of not building — the proposed new generating facilities now being considered by, or likely to come before, the New York State Board on Electric Generation Siting and the Environment.

We have concluded that New York State urgently needs to site as many as a dozen new generating facilities over the next few years to lay a secure foundation for continued growth, and to avoid the risk of doing serious damage to our state's economic health. New York must match its electric supply with rising demand, and with the realities of the competitive energy marketplace.

In each power siting case, the applicant typically presents projections on the direct economic benefits that the construction and operation of the proposed facility will bring to its particular region of the state. In this presentation the Public Policy Institute focuses, instead, on the *statewide* importance of bringing new capacity on-line.

New generating capacity is needed in New York to avert serious *dangers* — significant electricity price increases, power interruptions, and damage to the state's ability to attract new businesses and jobs, all of which could harm the citizens, businesses and public institutions of each specific region of the state, as well as of the state as a whole. On the positive side, the Institute has also concluded that new generating capacity offers the state of New York important *opportunities* —for there will be considerable public benefit in each region, and in the state as a whole, if we move with dispatch to site and operate additional generating plants.

Figure 1: Growth in New York's Electric Usage, 1980-2000
Compared to Jobs and Population



Source: Public Policy Institute compilation from NYISO, NYSDOL data

The additional capacity afforded by these proposed generating projects will enable New York to realize a competitive marketplace for electrical supply, in which suppliers will have to bid against each other to provide electricity destined for residential, commercial and industrial customers. New York simply will not get real competition if there is anything less than a reliable surplus of generating capacity. And competition is the only certain, long-term way of ensuring that our energy needs are met at the lowest possible price. Competitive electrical prices, in turn, will make it more attractive to live, to do business and to provide jobs in New York. Competitive prices will also benefit schools, governments, hospitals and other institutions that serve public needs.

Action is urgently required, however, because New York's current generating capacity is already below what is needed to ensure reliable supplies and to stimulate competition. This gap seems certain to grow considerably wider in just the next few years, unless more generating capacity comes on-line.

As illustrated in Figure 1,[1] above, New York's demand for electricity, measured in terms of both peak demand and total annual usage, has been growing steadily. From 1980 through 2000, peak demand in New York grew 5.2 times as fast as our State's population, and 2.1 times as fast as employment. Our information-driven economy, with its heavy use of computing and communications equipment, becomes more dependent on electricity year by year.

As Figure 1 illustrates, the growth in our State's need for electricity supply has continued during times of robust economic growth, as well as during times of recession. Growth in demand has continued despite major advances in the efficiency of electricity-consuming appliances, ranging from home refrigerators to commercial cooling systems to desktop computers.

This growth in demand has now pushed New York's requirement for reliable supply up against the ceiling of what is available from existing generating facilities. New York entered the summer of 2001, for example, with installed generating capacity that was 285 megawatts *below* the minimum considered necessary to meet what was then projected as the summer's projected peak demand of 30,620 megawatts.[2] The actual 2001 peak demand was reached on August 9 at 30,983 megawatts — and a major power outage was avoided only through the assistance of users who voluntarily curtailed operations.[3]

If no new power generation comes on-line and growth in demand continues even at the reduced pace projected by the New York Independent System Operator

[1] For the actual numbers from which this graph is derived, see Table 2, page 14.

[2] With the 18 percent reserve margin that the New York State Reliability Council considers to be needed for system reliability, the state should have had capacity of at least 36,132 megawatts to meet that projected peak demand. Instead we had 35,847MW.

[3] "New York's Electric System Survived Unprecedented Week of Record Demand Thanks to Everyone Doing Their Part, Says NYISO," NYISO news release dated August 10, 2001.

(NYISO), the gap between projected demand and capacity will rise to 2,350 megawatts in the summer of 2005.

There is no basis for believing that demand for electricity will not continue to grow in New York. And thus, there is no reasonable basis for believing that New York does not need to obtain additional sources of electricity supply — unless we are willing to risk damage to our economy and to our quality of life.

Exactly how much additional capacity will New York State need in coming years? Estimates vary. NYISO forecasts a need for 8,600 megawatts of new capacity over five years, to ensure reliability and enhance competition. The Public Policy Institute's own estimate, as we will detail below, is that the need could well be higher — at least 9,200 megawatts by 2007. Others have suggested that enhanced conservation efforts could reduce the growth needs forecast by NYISO — but all conservation-oriented perspectives with which we are familiar nonetheless project a substantial need for new generating capacity, as well.

For purposes of the Siting Board's review of the plants coming before it this year, perhaps the simplest answer to the question of how much more capacity New York needs is: *The state will unquestionably need each proposed new plant, and more.* We know of no credible estimate of future demand that suggests otherwise. A 750-megawatt plant here, a 250-megawatt plant there, an 1,100-megawatt plant elsewhere — each will make an essential contribution to the State's effort to meet its near-term generating needs.

New York State's economy needs power — reliable electric power, at competitive prices — to grow. We need economic growth to provide jobs, to secure a prosperous future for our young people, to provide a sound tax base, and to support the institutions and organizations that meet human needs. These are the fundamental, underlying realities that we believe should inform the Siting Board's decision in these cases.

Section 2: New York State's dependence upon electricity

It is axiomatic that a reliable and affordable supply of electricity is essential to our economy, to our lifestyle and to public safety as we begin the 21st Century. The government of the State of New York assigns a very high priority to the necessity of ensuring adequate electrical supplies — as evidenced by, among other things, the Article X legislation that created the Siting Board, with its extraordinary powers to override local zoning and other restrictions that might prevent the siting of needed facilities.

Yet because electricity is so ubiquitous, so integral a part of modern life, we tend to take it for granted. The radio alarm awakens us in the morning, the subway gets us to work, the machinery at the factory does its job, the instruments in the emergency room work as they should, we listen to music as we head for home, and the lights come on in the evening. Electricity is there when we need it. Life is good.

Our dependence upon electricity is a given, but it must not become an afterthought.

In the normal public debate over siting a specific new power plant, much of the attention is focused on concerns about the impact of the plant on the community and the environment. Those concerns are important. But so, too, is our society's need for the power to grow.

A growing dependence

In calendar year 2000, per-capita electric consumption in New York State was 8,253 kilowatt-hours.[4] That's as much as if every man, woman and child in the state had four or five desktop computer systems running flat out, 24 hours a day, 365 days a year.

We don't all have four computers running all the time, of course. But we have their equivalent in the lights and computers in our offices, in the machine tools at the factory, in the mass transit system, in the financial data centers, in the dishwasher in the school cafeteria, in the refrigerators that keep our food healthy at home and at the grocery store — and in all the thousands of other ways that each of us enjoys the advantages of electricity every day.

New York's energy market is more "electrified" than that of the nation as a whole; that is, we are somewhat more dependent upon electricity than average. The portion of total U.S. primary energy consumption devoted to electrical generation was 40 percent in 1999, compared to New York's 43 percent.[5]

And our state's annual per-capita consumption of electricity has grown 5.3 percent since 1990, when it was 7,833 kilowatt-hours.

It is only reasonable to forecast continued growth, given our growing prosperity, our growing preference for electricity as an energy source, and our increasing dependence on information-intensive industries that are heavy users of data processing and communications equipment.

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[4] NYISO, the New York Independent System Operator, reports total electric generation of 156,618 gigawatt hours in 2000. The 2000 Census found New York's population to be 18,976,457.

[5] *Ibid.*, p. 3, Figure 1-1.

Manufacturing, commerce and knowledge industries alike depend upon electricity

The availability, reliability and cost of electricity are critical to all sectors of New York's economy. Consider, for example, one of this state's traditional sources of economic strength, its manufacturing sector.

Far from being a thing of the past, manufacturing is the economic mainstay of much of upstate New York, and will remain so. As illustrated in Table 1, below, manufacturing directly accounts for 10.5 percent of all jobs in New York State, and that proportion almost doubles in some upstate regions.

Table 1: Manufacturing's Role in the Upstate Economy
Selected Metropolitan Areas, 2000

	Total Jobs	*Manufacturing Jobs*	*Manufacturing jobs as a % of total*
Albany-Schenectady	457,000	37,900	8.3%
Binghamton	120,200	24,700	20.5%
Buffalo-Niagara	557,800	86,200	15.5%
Rochester	555,100	113,700	20.5%
Syracuse	352,300	49,700	14.1%
Utica	136,500	19,600	14.4%
New York State (total)	8,455,400	890,400	10.5%

Source: NYSDOL, establishment survey, annual averages

Given that economists generally believe that each manufacturing job supports additional jobs in other sectors — the "multipliers" usually cited range from 2 to 3.5 — it is clear that the manufacturing sector is still vital to the well-being of upstate New York, in particular.

How dependent upon electricity is manufacturing? Very. Although manufacturing currently accounts for only 10.5 percent of total employment in

New York State, it accounts for *30.4 percent* of electricity consumed by all places of employment — that is, by the entire commercial-industrial sector.[6]

Manufacturing has not been doing as well in New York as we would like. In 1985 manufacturing accounted for 16.7 percent of all jobs in New York State, compared to 19.8 percent nationally. But by 2000 New York had lost 32 percent of its manufacturing jobs, compared to only a 4 percent loss nationally.[7]

Across upstate there are many signs of the impact of those job losses, but perhaps one stands out above all others. And that is the fact that between the 1990 Census and the 2000 Census, the number of upstate New York residents in the crucial 20-34 age group dropped by 377,000 — more than 22 percent.[8] When we lose jobs, we lose people.

Manufacturers have repeatedly cited the cost of electricity as one of the reasons New York has lost so much of its competitive edge in their sector. In 1985 and 1986, average industrial electric rates in New York State were close to the national average. But in succeeding years these rates steadily moved ahead of the national average, peaking in 1994 at 6.8 cents per kilowatt hour, 41.7 percent above the national average at the time.

Tax cuts and other major policy changes by New York since then have reduced this cost gap significantly; but as of 1999, industrial rates in New York were still

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[6] NYSERDA, *Patterns and Trends*, p. 19, Table 2-7a. Commercial and industrial sales of electricity in 1999 totalled 83,097 gigawatt hours in New York State in 1999, of which 25,2232 gigawatt hours were sold to manufacturers.

[7] U.S. Bureau of Labor Statistics and New York State Department of Labor. The 1985 annual average number of manufacturing jobs was 19.25 million in the nation, with 1.29 million in New York State. In 2000 there were 18.47 million nationally, of which 874,200 were in New York State.

[8] Age-group data from the U.S. Census Bureau and the New York State Data Center.

8.8 percent above the national average.[9] The cost gap remains a significant competitive disadvantage, given manufacturers' huge demand for power, and given the ever-more-competitive nature of the global marketplace.

The *average* industrial rate in New York, moreover, masks the fact that for many manufacturers, rates are considerably above the average. The average rate is pulled down by state programs that reduce rates for participating firms, such as the Power Authority's sale of low-cost hydropower, and the subsidized "Power for Jobs" program. These programs are vital in the competition for jobs. But for manufacturers not able to participate in such programs, electric rates in New York are, obviously, higher than the state average and hence even farther above the average rate in competing states. For such manufacturers, the best hope of electric prices that would help them compete and provide jobs in New York is a robust, competitive electric market in New York — for which, as we shall document below, ample supplies are a necessary precursor.

The fact that our economy is changing structurally, and that our state's job base is not as concentrated in manufacturing as in the past, does not mean we can expect electricity consumption to decline. Manufacturing output (which is more closely related to manufacturers' energy demand than is their employment) is continuing to grow. And "new economy" companies are, if anything, even more dependent upon electricity than are manufacturers.

We see the impact every day in our offices, in the rising use of the Internet, in the data needs associated with the 24-hour global financial networks centered on Wall Street. The phenomenon is seen most dramatically, however, in the growth

[9] NYSERDA, *Patterns and Trends*, p. 5, Tables 1-3a and 1-3b. In 1985, average industrial rates in New York were 5.2 cents per kilowatt hour, compared to a national average of 5 cents per kWh, and in 1986 both the state and national averages were 4.9 cents/kWh. In 1994 New York's average was 6.8 cents/kWh, versus a national average of 4.8 cents. In 1999 the national average was 4.4 cents/kWh; New York's was 4.8 cents.

of so-called "server farms," large data centers with rows of computers servicing network needs.

A single, modest 10,000-square-foot "server farm" needs as much as 1 million watts of power to run. Consolidated Edison reported in early 2001 that it was receiving a flurry of inquiries about power available for many such centers — including one that would consume as much as 180 megawatts.[10] In December 2000, IBM announced that it will build 50 new data centers, at locations to be determined, to meet the growing demand.[11]

Yet for businesses and other employers outside the manufacturing sector — those charged "commercial" rather than "industrial" rates — New York's competitive cost disadvantage is even greater than it is for manufacturing. Average commercial electrical rates were in fact 36.3 percent higher than the national average in 1999, the latest year for which complete statistics are available.[12] Rates downstate were, generally, even further above average.

If New York wants the jobs, investment and connections all these "new economy" employers will provide, reliable, affordable electricity supplies are essential.

A statewide issue with a local impact

Although the Public Policy Institute's primary focus here is on the statewide business climate and its requirements for electrical power, the Institute believes

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[10] Neal Templin, "Power Hungry Web 'Server Farms' Find Cooler Reception in California," *The Wall Street Journal*, Feb. 28, 2001.

[11] "Power Struggle," www.zdnet.com.au/bitgech/enterprise/story/00,2000010343,20107748,00.htm, Dec. 18, 2000.

[12] NYSERDA, *Patterns and Trends*, p. 5, Tables 1-3a and 1-3b. Commercial electric rates in New York averaged 11.3 cents per kilowatt hour, compared to 7.2 cents as a national average.

that each specific region of the state has a strong, significant stake in ensuring that New York has adequate electric generating capacity.

Applicants for siting generally note that the development of their plant will produce construction jobs, and that ongoing operation of the plant will provide additional jobs. It is also noted that as those employees spend their wages, additional jobs in the region will be supported. Each facility will also purchase building materials, supplies and services from local companies, and contribute to the local tax base.

Those benefits are real, and are to be welcomed. But we would point out, at the same time, that the economic importance of each project to the state and to the region involved goes beyond the direct investment in, activity at, and spending on and by, the proposed new facility.

As argued above, we believe that the primary economic benefit of new generating facilities will be the role they will play in ensuring that the electric power system has enough capacity to maintain reliability and to sustain the competition needed to hold down and reduce prices.

Each new plant will have its strongest impact in that regard within its own region, because regional constraints in the state's electric distribution grid and bidding system will tend to favor using the power as close as possible to where it is generated. But the capacity afforded by each new plant will have a statewide economic benefit as well. And that *statewide* benefit will deliver a *local* benefit, in turn, to the host region.

The health of the statewide economy is important to each region of the state, of course, because of the interconnectedness of New York State's economic and tax base.

Cost-competitive, reliable power will strengthen the economy of New York City, for example, and that is very important to Long Island — many of whose residents work in the city, or for businesses that are connected to the city's economy. Similarly, a healthy Long Island economy is important to the city, because, among other reasons, Long Island constitutes a large portion of the state government tax base that helps support services in the city.

In the Capital Region, the state's tax base is an even more important factor, because a significant portion of local economic activity is fueled by taxes collected from the state as a whole. As of October 2001, State government employment in the Albany-Schenectady-Troy area was 55,400. This constitutes 11.9 percent of all non-agricultural employment in the region — making the region's job base far more dependent upon state government than is the statewide average (state government jobs accounting for only 3 percent of total non-agricultural employment in New York State as a whole).[13] To the extent that a shortage of electric generating capacity could harm the statewide economy and thus undermine New York's state government tax base, the economic security of the Capital Region is threatened.

Similarly, businesses dependent upon traffic at Stewart Airport have an acute interest in the health of the economy of the entire downstate region — not just of Orange County. A power plant that helps ensure the cost-competitiveness and reliability of electric power in the downstate region would be a key asset for Orange County.

[13] See regional employment statistics at www.labor.state.ny.us/html/metro.htm

Section 3: Projecting future growth in New York's need for electric generating capacity

As reported above and as documented in Table 2, New York's demand for electricity has grown steadily in recent years. Total annual electric consumption grew almost four times as fast as the state's population between 1980 and 2000 — and peak demand (which the state generally hits when the hottest weather of each summer causes the usage of air conditioning to soar) grew more than five times as fast as population. This growth has occurred despite steady technological advances that have made almost every electricity-consuming device and appliance, from air conditioners to computers, more efficient. Why?

One reason for the growing consumption of electricity is that our state's energy consumption is steadily becoming more "electrified" — that is, a larger share of our overall energy budget is being met through electricity. In 1985, for example, 35.8 percent of New York State's primary energy consumption (of 3,681.5 trillion Btu) was consumed in electric generation; in 1999 the portion had risen to 43 percent (of 4,207.4 TBtu).[14] Electricity is such a widely distributed, highly flexible and precise way of applying energy to a task that over time an advanced society inevitably depends upon it more and more to meet its energy needs.

A second reason is that with the state's economy growing — and personal income growing even faster than employment — there is growing demand for the good things that electricity can power, whether it be computer networks in the schools, diagnostic equipment in the hospitals, or entertainment systems in the home.

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[14] New York State Energy Research and Development Authority, *Patterns and Trends: New York State Energy Profiles: 1985-1999*, Albany, December 2000, p. 13 Table 2-1b.

Table 2: Growth in New York's Electric Usage, 1980-2000
Compared to Jobs and Population

	Total Electric Consumption, GWH	*Peak Electric Demand, MW*	*Employment in 1,000s (Anl. Avg.)*	*Population in 1,000s*
1980	119,659	21,300	7,207.1	17,558
1981	119,206	21,650	7,287.3	17,567
1982	117,576	21,300	7,254.6	17,589
1983	121,738	21,900	7,313.3	17,687
1984	124,814	22,300	7,570.4	17,745
1985	127,401	22,700	7,751.3	17,792
1986	129,717	23,200	7,907.9	17,833
1987	134,432	24,700	8,059.4	17,869
1988	140,050	25,500	8,186.9	17,941
1989	141,883	25,800	8,246.8	17,983
1990	140,917	25,800	8,212.4	17,990
1991	145,020	26,700	7,886.7	18,003
1992	143,432	26,700	7,730.3	18,082
1993	146,911	27,000	7,759.8	18,141
1994	147,760	27,300	7,831.4	18,141
1995	148,391	27,500	7,892.2	18,151
1996	148,470	27,800	7,938.7	18,144
1997	148,882	28,400	8,067.1	18,143
1998	151,421	29,100	8,236.7	18,159
1999	156,453	29,700	8,455.4	18,197
2000	156,618	30,200	8,632.3	18,976
# Change	+ 36,959	+ 8,900	+ 1,425	+ 1,418
% Change	**+ 30.9%**	**+ 41.8%**	**+ 19.8%**	**+ 8.1%**

Sources: NYISO; Census Bureau; New York State Dept. of Labor

And as technology advances, structural changes in our economy are making this state more and more dependent upon information-intensive industries that, as noted above, rely on data processing and communications equipment powered by electricity. Employment in the business services sector in New York, for example, rose by more than 42 percent from 1980 to 2000, to 622,800 jobs; employment in the finance, insurance and real estate sector rose by nearly 20 percent, to 747,600 jobs. These two sectors, alone, accounted for nearly 300,000 new jobs in New York over the past two decades.[15]

The capacity required to meet our needs

We project that demand for electricity will continue to grow, and will grow as strongly as it has in the past. Peak demand for electricity grew by 9.8 percent over the five years from 1995 to 2000. Over the five years from 1996 to 2001, it grew 11.45 percent. And as can be seen in Figure 1, the growth in peak demand has held relatively steady even in times of economic slowdown.

A reasonable projection for New York's growth in demand over the next five years, therefore, seems to us to be that it will be in the same range as in recent years — that is, about 10 percent. How much generating capacity, therefore, will we need? The answer is that New York will need a substantial margin of capacity *above* peak demand, for two basic purposes:

- To ensure system reliability.

- And to ensure price competition that will hold down costs to consumers and businesses.

[15] New York State Department of Labor.

Traditionally only the first of those two concerns, reliability, was a consideration in meeting the state's power supply needs. It was, and still is, a very serious consideration indeed. The power system in New York, as elsewhere, must have enough excess capacity to ensure that generating plants can come "off-line" for scheduled maintenance; to guard against the consequences of unscheduled plant shutdowns, due to mechanical failures or other causes; to offset any failures in the distribution system; and to reduce the danger that unusual weather will put unanticipated strain on the supply system. The near-blackout downstate in August of 2001 illustrates the point.

The New York State Reliability Council, which recommends to the Public Service Commission the reserve margin target for New York State on the basis of these and other factors, has set an overall statewide target of an 18 percent reserve margin for generating capacity, over and above peak demand. In other words, for reliability purposes, alone, New York must have generating capacity at least 18 percent above its anticipated peak demand at any given time.

There is no comparable, accepted target for the amount of extra capacity needed to meet the second consideration — the need for competition — because this consideration is new, tracing to the deregulation of New York's electric utility industry.

As the 1998 State Energy Plan articulated, New York deregulated its marketplace for electricity in order to bring down this state's longstanding high cost of electricity, and make our state more competitive. Deregulation is intended to restrain prices by forcing suppliers of generation to compete against each other. As we have argued above, this was a highly desirable — and urgently needed — policy goal.

Yet electricity industry deregulation will not work — indeed, it will turn against us — if we do not enable new suppliers to enter the market. If available supplies do not exceed demand, prices will be bid progressively higher, not lower.

How much surplus capacity do we need to ensure competition and lower prices? No specific target was identified during the course of deregulation. But a useful calculation has been formulated by the NYISO, which operates the electric market in the state. The NYISO has developed a detailed database of information about how prices respond to specific supply and demand situations. Working from that experiential basis, the NYISO calculates that the state needs about 15 percent excess capacity, *above what is needed for system reliability*, to ensure competition. With such a level of surplus, the NYISO has concluded, average wholesale electric rates in the state should be about 20 to 25 percent below what they would be if only the reliability margin were met.[16]

Projecting that peak demand over the next five years will grow about 7.2 percent, and then adding an 18 percent reliability factor and the margin of about 15 percent to ensure price competition, the NYISO calculates that New York needs to bring an additional 8,600 megawatts of capacity on-line by 2005.

NYISO's projection of annual growth was admittedly conservative, and The Public Policy Institute believes that it could well turn out to be too low. We have projected peak demand as growing 10 percent over the next five years (less than the 11.45 percent experienced in the last five years), and have then added to it the 18 percent margin for reliability, and the 15 percent margin for price

[16] See New York Independent System Operator, *Power Alert: New York's Energy Crossroads*, Albany, March 2001. A detailed explanation of the database and mathematics behind this calculation is provided in Appendix D, pp. 16-27. The figure of 15 percent does not appear in *Power Alert*, but its projections of need work out to that.

competition. By this calculation, as illustrated in Table 3 below, we believe New York will need at least an additional 9,200 megawatts of capacity by 2007.

To us this is the heart of the case with respect to the need for each proposed new power plant. New York needs almost 10,000 megawatts of new capacity; each proposed new plant will supply some vital portion of that. Others may argue that our future capacity need is less — but even if it is *far* less, it still seems clear this state will need a substantial number of new power plants.

Furthermore, we believe that if New York is to err in balancing capacity with demand, it would be best to "err on the high side." Before deregulation, the risk of excess capacity was borne by ratepayers; but now it is borne by suppliers. More capacity will not necessarily mean more generation — but it will mean more competition.

Table 3:
Projection of New Generating Capacity Needed by 2007

2002 peak demand (assuming it drops to the level of 2000)	30,200 MW
Add 5-year growth of 10% (compared to 1996-2001 growth of 11.45%)	+ 3,020 MW
Projected peak demand, 2007	= 33,220 MW
+ 18% margin for reliability	+ 5,980 MW
+ 15% margin for competition	+ 5,880 MW
Total capacity needed, 2005	= 45,080 MW
LESS: Capacity on-line, 2000	- 35,797 MW
New capacity needed, 2002-2007	**9,282 MW**

We would stress that the figures in Table 3 are highly conservative, in two key ways.

First, we assume that the current recession, and the aftermath of the World Trade Center attack, will have some negative impact on demand for electricity — and that therefore, instead of increasing this summer, peak demand will drop back to what it was in 2000. (It should be noted that in the recession that began in 1990 and held its grip on New York until early 1993, peak demand still increased every year.)

Second, we assume that once peak demand resumes growing, it will grow somewhat more slowly than it has in the recent past. As noted above, peak demand in New York grew by 11.45 percent in the five-year period from 1996 through 2001, compared to the growth rate of 10 percent for 2002 through 2007 used in our projection.

Our calculations may be a bit high, or a bit low — but either way, it is clear that New York needs to add *significant* amounts of new generating capacity, and soon.

Section 4: Why New York must be sure to meet the capacity needs projected

The two considerations that weigh in our calculations as to the total generating capacity needed to meet New York's electric needs in the near-term future also weigh in the consideration of this specific project. It is important to remember how much our state's economy and citizens have at stake both in achieving lower costs, and in ensuring system reliability.

The economic impact of high electric costs

Consumers will obviously benefit directly from policy decisions that reduce, or hold down the rate of increase in, the cost of electricity.

There is also a strong public interest, however, in bringing about the same benefit for employers. People operating businesses in New York have said for years — in communications with The Business Council, other organizations, and their elected representatives — that the high cost of electricity in New York undermines their ability to compete with businesses in other states paying lower rates, and is an impediment to their ability to grow and provide jobs in New York.

In July of 2001, The Public Policy Institute conducted an on-line survey of Business Council and chamber of commerce members across the state, to gauge employers' concerns with respect to energy supply and costs. Some 1,531 responses were compiled. Of these surveyed:

- More than 80 percent strongly agreed (46.7 percent) or agreed somewhat (33.4 percent) that energy costs are critical to their own company's competitiveness and profitability.

- An even stronger majority of respondents strongly agreed (73.2 percent) or agreed somewhat (22.6 percent) that energy costs are critical to New York State's overall competitiveness.

- Virtually all respondents strongly agreed (70.7 percent) or agreed somewhat (25.9 percent) that New York's above-average energy costs are hurting its competitiveness.

The economic impact of New York's energy cost burden is difficult to quantify with precision, in part because the impact varies so much from business to business. Electricity costs are a key part of the costs facing any business, but they are more important to, say, a grocery store with enormous needs for refrigeration, than they are to a retail clothing store. Similarly, some manufacturers rely mostly on natural gas in their production processes, while others rely more on electricity. Electricity may be a higher percentage of the cost of doing business for a chemical plant or a machine shop than it is for an assembly plant where labor costs are a large share of the operation's costs.

However, from a macroeconomic point of view there are clear indications that states with lower electrical costs tend to have stronger growth in manufacturing, in particular. This suggests that New York's economy would gain new strength if enough generating capacity were added to meet the 20 to 25 percent rate reduction (relative to what costs would otherwise be) forecast by the NYISO.

The Public Policy Institute has reviewed the interrelationship between industrial electric rates, total manufacturing output and total manufacturing employment in each of the 50 states for the period 1992 to 1997 — the most recent five-year period for which final numbers on all these points are available.

Table 4: Exploring the Relationship Between Industrial Electric Rates and the Health of a State's Manufacturing Sector
Top 10 Manufacturing States, 1992-97

State (ranked by average 1992 industrial electric rate)		1992 rate, $/M Btus	Rate's % above (or below) national average	% growth in State's manufacturing output, 1992-97	% growth (or loss) in State's manufacturing jobs, 1992-97
# 1	New Jersey	$22.59	+ 59%	+ 8%	(9%)
# 2	California	22.24	+ 57%	+ 27%	+ 1%
# 3	New York	19.05	+ 34%	+ 5%	(9%)
# 4	Pennsylvania	18.21	+ 28%	+ 26%	(2%)
# 5	Michigan	17.29	+ 22%	+ 34%	+ 7%
# 6	Illinois	16.04	+ 13%	+ 29%	+ 6%
# 7	North Carolina	14.44	+ 2%	+ 22%	N.C.
# 8	Texas	12.31	(13%)	+ 53%	+ 12%
# 9	Ohio	12.14	(14%)	+ 25%	+ 4%
#10	Indiana	11.73	(17%)	+ 32%	+ 8%

Sources: Bureau of Economic Analysis for output, BLS for jobs data, Energy Information Administration for cost data

In 1992, the national average industrial electric rate, measured in constant (1997) dollars per million Btus, was $14.18. New York's rate was 11th highest in the nation, at $19.05, or 34 percent above the national average.

In the following five years, the 16 states with industrial electric rates above the national average lost an average of 2 percent of their manufacturing jobs, while their manufacturing output grew by an average of 21 percent. But the 34 states with rates below the national average *grew* manufacturing jobs an average of 10 percent — and grew their manufacturing output by 39 percent.

A similar pattern is apparent from reviewing only the 10 largest manufacturing states, including New York.

The three of those 10 largest states with industrial electric rates below the national average added an average of 8 percent to their manufacturing employment, and an average of 36 percent to their manufacturing output. But

the seven states (including New York) with higher-than-average rates lost an average of 1 percent of their manufacturing employment, and grew output by an average of only 22 percent. (And had New York matched the national average growth rate in manufacturing employment during that period, it would have gained 125,500 manufacturing jobs — instead of losing 93,600.)[17]

The danger to our economy should we run short of power

So the cost of energy is an important factor in our economy, and new generating capacity is needed if we are to bring that cost down.

But the other, equally vital half of the case for new capacity is built around the importance of reliable and affordable electricity to New York State overall and to each of its regions specifically — that is, the benefits that will flow if New York acts to meet its power capacity needs. We illustrated above how important electricity is to our economy, and how demand for it is growing in New York State. What happens if we fail to expand capacity to meet rising demand?

To get an informative, if painful, lesson in the dangers of not acting, we need only to look at the recent experience of California.

For more than a decade, California has seen rapid increases in its consumption of electricity, while it did little or nothing to add in-state generating capacity. With its high-tech economy booming, total electrical consumption increased by 4 percent in 2000, twice the historical average. Peak consumption in the May-

[17] Sources: Manufacturing output numbers by state from the federal Bureau of Economic Analysis; cost data from the federal Energy Information Administration; jobs data from the federal Bureau of Labor Statistics.

September 2000 period increased by 8 percent over the same period in 1999. This reduced California's reserve margin to 3.5 percent.[18]

The shortage in capacity triggered a run-up in wholesale prices; "effectively, every generator could sell every kilowatt at any price since there were no alternatives,"[19] as one analysis explained it. But with retail prices capped by state law, the electric distribution utilities were unable to pay in full. When payments fell far enough behind, some generators stopped selling to California utilities, which triggered yet more shortages, causing rolling blackouts and yet more "spikes" in prices. Then the state government stepped in, using surplus funds — and, when those ran out, borrowed money — to buy power for the utilities.

By the end of the summer of 2001, California's state government had managed to stabilize the situation (in part, however, by writing long-term power contracts at prices considerably higher than had prevailed in recent years, with consequences to the state's economy not yet known). But in the meantime the California crisis had shed light on how damaging a shortage of electricity can be to a modern economy — and hence had provided lessons New York would do well to heed.

A particularly chilling example came in January of 2000 with an announcement by Intel Corp., California's second-largest employer and a microprocessor maker symbolic of the kind of high-tech manufacturer every state would like to attract. CEO Craig Barrett was quoted as saying there's "not a chance" he would approve

[18] McKinsey & Company for the Bay Area Economic Forum, *A Knowledge Economy Needs Power*, San Francisco, April 2001, p. 4. California's reserve margin target is 15 percent, and once the capacity margin fell below 10 percent some blackouts were considered inevitable. As noted above, New York's standard is an 18 percent margin; this higher margin was set in part because of concerns about transmission capacity into the New York City metropolitan area.

[19] Ibid.

any expansion in Silicon Valley until the company was assured that the reliability crisis was over.[20] The lesson for New York and other states was clear: employers dependent upon electrical power *can and will* shun locations where they consider that power unreliable.

Initial studies by business groups in California suggested that power shortages would also have a significant impact not just on attracting new plants, but also on already established businesses — an impact far greater than would at first seem to be the case, if it were assumed that the economic losses would merely be proportional to the extent and duration of specific power outages.

"The primary costs are direct and roughly proportional to the duration of the outage and the amount of undelivered power, including lost production and idled labor," wrote McKinsey & Company in a report for the Bay Area Economic Forum. "Frequently, however, actual losses are much greater than this," the report said.

> "For example, when production systems are shut down, it can take hours or days to restart them and return to full productivity. Often, information technology equipment and even basic manufacturing equipment is damaged when power is suddenly lost; and industries dependent on climate control (from bioscience labs to supermarkets) are threatened with damaged research or spoiled goods. Finally, power interruptions frequently result in lost data, which can be costly and sometimes impossible to reproduce.
>
> "Loss of power can also impose longer-term costs by damaging external relationships and customer interactions. For example, a power interruption for an Internet-based business can compromise security and harm its reputation, leading to lower sales in the future."[21]

[20] http://sanjose.bcentral.com/canjose/stories/2001/01/08/daily14.html

[21] McKinsey & Company, op. cit., pp. 25-26.

McKinsey & Company surveyed employers in the San Francisco area and found that the "most threatened" sectors were those that were "both rate-sensitive and highly sensitive to blackouts."

> "In biosciences, an outage not only poses the threat of spoilage, but can also derail laboratory experiments that are in a critical phase, losing weeks and sometimes months of work. Another form of spoilage, inventory damage, can take place in manufacturing as well. Composite Structures LLC, an aircraft parts manufacturer, observes that even a brief power failure can ruin $500,000 worth of spoilers and rotor blades…
>
> "During the January blackouts Solectron Corp. reportedly idled 2,000 workers, losing millions of dollars in labor and production costs. According to the Silicon Valley Manufacturing Group, an industry association of 190 high-tech companies, the January blackouts left 100,000 employees idle, costing tens of millions of dollars."[22]

When summer 2001 blackouts seemed an imminent threat in California, a number of studies were commissioned to try to project the economic impact.

One particularly interesting study,[23] by AUS Consultants of Moorsetown, N.J., was based on what it characterized as the "best case" scenario offered by the power distribution entity in California, the California Independent System Operator (CAISO) — a scenario that called for each customer to experience approximately 20 hours of outage over the course of the summer.

AUS calculated that even outages at that level — **amounting to little more than two-tenths of one percent of the hours in a year** — would have these impacts on the California economy:

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[22] Ibid., pp. 36-37. The Solectron Corp. figure was taken from the *San Jose Mercury News,* Dec. 9, 2000.

- A reduction in the gross state product of 1.7 percent, or $21.8 billion, for the year as a whole.

- A resulting drop in household income of $4.6 billion for the year — not counting the impact of higher electricity prices on household budgets.

- And a loss of 135,755 jobs.

The perspective of New York businesses

The Public Policy Institute has not conducted comparable econometric studies of the potential impact of power shortages on New York's economy. As of the summer of 2001, there had been so much public discussion about the possibility of California-type problems in New York that we did not want to contribute to alarmist concerns about that happening here in the near-term future.

We did, however, include in our July 2001 survey of employers across New York State a series of questions intended to gauge their views on the importance of reliable electrical supplies. Of the 1,531 responses compiled:

- Virtually all respondents strongly agreed (84.2 percent) or agreed somewhat (13.6 percent) that blackouts, power shortages, and uncertainty about future energy supplies would hurt New York's ability to attract jobs and employers.

- More than 80 percent strongly agreed (47.1 percent) or agreed somewhat (35.6 percent) that New York must site more power plants to ensure long-term supply.

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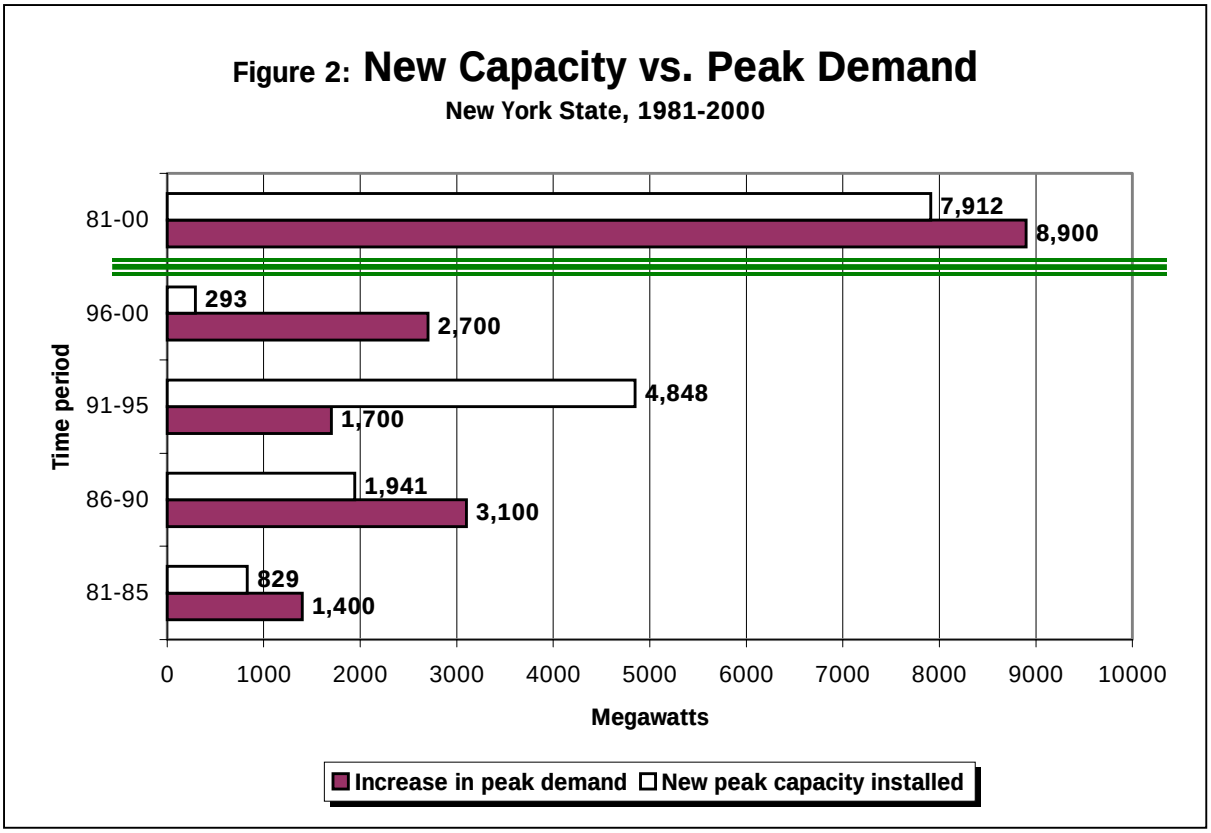
[23] AUS Consultants, "Impact of a Continuing Electricity Crisis on the California Economy." Moorsetown, N.J., May 3, 2001.



- A similar majority strongly agreed (47.1 percent) or agreed somewhat (33 percent) that the state must accelerate the process by which it sites power plants.

Could it happen here?

New Yorkers watching and worrying about the power situation in California last year were told that the situation in this state is very different. And in many ways, it is.

New York's deregulation process did not include two features of California's plan that have been at the root of that state's financial troubles: the cap on retail prices, and a ban on long-term power contracts. Also, New York's economy, and

hence its demand for electricity, have not been growing quite as fast as California's.

In the one essential detail, however, New York's situation is identical to California's: This state has not added new generating capacity commensurate with demand.

As illustrated by Figure 2 on the previous page, between 1980 and 2000, New York's peak demand grew by 8,900 megawatts. But only 7,911 megawatts of new capacity were installed. Between 1996 and 2000, peak demand grew by 2,700 megawatts, yet we installed only 293 megawatts of new capacity.[24]

If demand keeps growing, as is inevitable, and if New York fails to site new sources of generation, it seems only a matter of time until this state will have supply problems at least as serious as California's. As of this writing, the state has not seen a major new electrical generating facility actually go on line since 1995.[25]

[24] Figures on total consumption, peak demand and new capacity brought on-line were supplied, upon our request, by the New York Independent System Operator, in the form of electronic spreadsheet files.

[25] Brooklyn Navy Yard. Two other major facilities, at Athens and Scriba, have been approved but not yet built, and some smaller generating facilities were opened last summer in and around New York City. Two expansion projects, at East River and Ravenswood, have also been approved.

Section 5: Conservation cannot entirely replace the need for additional generating capacity

Finally, it is necessary to consider the question of whether the need for new generation could be obviated by a change in the way our society consumes electricity. Opponents of a proposed new generating plant will often argue that even though demand for electricity may have been growing, we can reduce or eliminate *future* growth in demand by conserving energy — and thus eliminate the need for the particular plant in question.

The short answer to this is that our economy has become more energy efficient year after year; that this is going to continue; that this progress has not (however) eliminated growth in demand; that demand is going to continue to grow; that therefore we still need to expand generating capacity.

Energy efficiency, like all forms of efficiency, is a key tool for economic progress. New York businesses have saved billions of dollars through energy efficiencies just over the last decade.[26] But energy consumption has grown and will continue to do so. Energy efficiency will not eliminate the need for new capacity.

Energy efficiency and energy demand

We noted above that annual peak electric consumption in New York has grown five times as fast as our population in the last 20 years, even as the energy efficiency of every kind of electrical appliance has steadily improved.

[26] Total commercial and industrial expenditures for energy in New York in 1999 were $10.6 billion, up from $10.3 billion in 1990. (NYSERDA, *Patterns and Trends,* Table 4-1, p. 33) Since energy efficiency has been improving an average of 1 percent a year [see below], these 1999 expenditures appear to have been about $1.05 billion less than they would have been but for the efficiencies achieved during the decade.

This observation mirrors what economists have documented for many years, even centuries — that as humans have steadily become more and more efficient in our use of energy (and other resources), our consumption of energy (and other resources) has continued to rise. Indeed, in the last half century, the overall energy efficiency of the U.S. economy has improved by 47 percent, yet our per-capita energy consumption has increased 65 percent.[27]

This is a reflection of a basic tenet of economics, which holds that greater efficiency in inputs tends to be converted into greater *outputs*, rather than fewer *inputs*. We see this most clearly in fundamental production activities. As economies around the world have industrialized over the past two centuries and have become ever more efficient at producing goods, humankind has devoted those efficiencies to producing more goods, rather than to using fewer resources.

It is the same with energy, including electricity. Energy is a vital input, and as we get more efficient in its use we do more, rather than less, with it. There is no reasonable basis not to expect this pattern to continue. Thus it seems certain that energy consumption will continue to grow, even as we become more efficient in our use of energy.

Indeed, some economists argue that increasing energy efficiency may actually *increase* a society's use of energy. The argument goes like this: Energy efficiency, like any other kind of efficiency, lowers the cost of producing goods and services so much that it expands the economy, hence expands the demand for goods and services; and the increase in demand is sufficient to increase the demand for energy. Other economists calculate that this so-called "rebound" effect is not

[27] Per capita energy consumption was 354 million Btus in 1999, compared to 215 million Btus in 1949. But it took only 10,900 Btus to produce one constant dollar of GDP in 1999, compared to 20,600 Btus in 1949. U.S. Energy Information Administration, *Energy in the United States: A Brief History and Current Trends*, Washington, D.C., 1999. Available at www.eia.doe.gov/emeu/aer/eh1999/eh1999.html.

enough to wipe out all the gains from increased efficiency — but none that we are aware of argue that there is no rebound effect.

We are not in a position to settle this debate among economists.[28] But we have found no economic support for any suggestion that efficiency gains will be so significant as to eliminate growth in demand for electricity and, hence, to eliminate the need for new generating capacity in New York State.

Projections for growth in demand already assume gains in energy efficiency

But will we not be using energy more efficiently tomorrow than we are today — and does that not indicate that demand will grow less than in the past?

The answer is *yes* we will be, and *no* it does not. In terms of the Siting Board's review of the need for new capacity, we would emphasize that our projections of future growth in demand for electricity in New York State *already* assume improvements in energy efficiency. Here's why.

Our projections of future growth in demand, like all other such projections of which we are aware, are derived from actual growth in demand in the past. We found that peak demand in New York grew by 11.45 percent over the last five years; we project a 10 percent rate of growth into the next five years.

But as documented by the U.S. Energy Information Administration, on average, and across all forms of energy, energy efficiency in the U.S. economy has been improving steadily by about one percentage point each year for the past 50 years.

[28] The debate was thoroughly aired in a recent special issue of the British journal *Energy Policy*, Vol. 28 Numbers 6-7, June 2000.

If we assume this rate of improvement holds true for the efficiency of our use of electricity in New York State over the past five years, then the growth in demand for electricity in this state during that period was about five percentage points less than it would have been, absent improvements in energy efficiency.[29] In other words, if actual peak electric consumption grew by 11.45 percent, then the baseline growth in demand for electricity was actually 15 percent or 16 percent during the period. It was improvements in energy efficiency that held the actual growth rate to 11.45 percent.

Therefore, projecting our past consumption trend forward assumes that *both* the growth in the need for electricity, *and* our improvements in the efficiency of its use, will continue at their previous pace.

If we fail to make further improvements in energy efficiency, demand over the next five years could well grow by 15 or 16 percent. Therefore it is indeed important that we continue to improve our energy efficiency — but doing so will in no way obviate the need for new capacity.

Energy efficiency is an important goal, but it will not be a substitute for reliable electricity supplies. New York needs the power to grow — and new generating capacity will provide it.

[29] We use the overall rate of efficiency improvement in the U.S. here, because over time it has held steady year-to-year and for all forms of energy use. We are aware of no statistics that have been published specifically on the change in the efficiency of the use of electricity, in New York or any other single state, in a single year, and we believe that it would be extremely difficult, if not impossible, to produce such statistics accurately. The overall U.S. annual rate of energy efficiency improvement seems to us to be the best available proxy for it.

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