A Report to Mayor Michael R. Bloomberg

New York City Energy Policy:
An Electricity Resource Roadmap

Prepared by the New York City Energy Policy Task Force

January 2004

The New York City Energy Policy Task Force

New York City Economic Development Corporation

conEdison, inc.

ISO NEW YORK INDEPENDENT SYSTEM OPERATOR

NYBC NEW YORK BUILDING CONGRESS

REBNY REAL ESTATE BOARD OF NEW YORK

abny

BUILDING AND CONSTRUCTION TRADES COUNCIL OF GREATER NEW YORK · CRAFTSMEN

CITY OF NEW YORK DCAS DEPARTMENT OF CITYWIDE ADMINISTRATIVE SERVICES

NRDC THE EARTH'S BEST DEFENSE

ASSOCIATION FOR ENERGY AFFORDABILITY, INC.

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I. Executive Summary

To maintain its position as the financial, corporate and communications capital of the world, New York City must have a dependable source of electricity. Electricity makes much of the City's daily functioning possible—from the vast underground transit system and the commuter rail network to the elevators that serve our high-rise buildings. Assuring reliable, affordable, and clean electricity is essential to the continued attraction and retention of City businesses and residents.

New York City has been recognized as having the most reliable electricity distribution system in the country.[1] However, as the regional blackout of 2003 pointedly reminded us, electricity systems can also be subject to unplanned interruptions. The City has adequate energy resources for its electricity needs today, but the margins necessary for reliability are extremely thin. And the growth of demand for electricity in the City continues to be strong, even in the face of a weakened economy.

To ensure reliability, to promote economic growth, and to address environmental issues, the Task Force concludes that the City needs 2,600 megawatts of new electricity resources by 2008.[2] The best way to meet this goal will be through a combination of generation plants (both new and repowered), transmission lines, and distributed resources—including clean on-site generation and

[1]Consolidated Edison Company of New York, Inc. (Con Edison) has been named the most reliable electric utility in North America for the second year in a row by PA Consulting Group, an international consultant, which presented the company with its National Achievement Award for "sustained leadership and achievement in the area of electric reliability."

[2]A megawatt (MW) is equal to 1,000 kilowatts or 1 million watts, and is a standard measure of electric power plant generating capacity measured as the energy produced per unit of time.

various methods of energy efficiency and demand reduction. Natural gas pipelines and local electric, gas, and steam distribution systems, which are critical to energy delivery, must also be enhanced. Finally, City government should serve as a model by managing its own electricity use wisely.

A. Summary of Recommendations

The Task Force arrived at a comprehensive program of action consisting of 28 specific recommendations in four principal areas: energy supply, distributed resources, energy delivery, and initiatives of New York City agencies. A summary of these recommendations follows. A complete discussion of each topic including full recommendations may be found in Sections IV through VII of this report.

Energy Supply

- Support innovative means to finance appropriate electricity projects
- Advocate in Albany for the immediate passage of the Article X power plant siting law
- Facilitate appropriate siting of power plants and other energy facilities
- Support the development of appropriate transmission lines
- Support diversity of fuel supply

Distributed Resources

- Support increased investment in energy efficiency
- Support legislation and regulatory rule-making to set and/or enhance appliance standards and targeted incentives at the state and federal levels
- Determine the types and necessary levels of direct incentives to overcome the initial cost barrier of installing steam and gas chillers and thermal energy storage systems
- Support Con Edison in obtaining full cost recovery from the Public Service Commission for investments needed to mitigate high levels of fault current in the electric distribution system
- Support the use of clean on-site generation systems
- Adopt a standardized and streamlined grid interconnection review and approval process for clean on-site generation systems

- Expand the use of limited exceptions to air emission limits during wholesale market capacity and local grid emergency conditions
- Collaborate with the Partnership for New York City and the Real Estate Board of New York to expand the Summer Energy Program
- Support incentives for peak load management enabling technologies

Energy Delivery Infrastructure

- Establish a collaborative capital infrastructure planning process between relevant City and State agencies and local utilities
- Support the expansion of targeted demand-side management and clean distributed generation for grid support
- Support the passage of joint bidding legislation to facilitate infrastructure projects
- Create a special zoning or permit designation to allow utility facilities in targeted development areas
- Ensure that utilities and other energy project developers have access to public and private New York City docks

New York City—Leading by Example

- Enhance and augment the City's menu of energy efficiency programs
- Create a City energy efficiency plan
- Develop pilot energy educational programs
- Tie economic development assistance to energy efficiency
- Expand the use of steam and gas chillers and thermal energy storage systems where cost effective
- Include clean on-site generation strategies as part of a least-cost resource plan to supply the electricity needs of City agencies
- Seek direct incentives and low-cost financing for peak load management enabling technologies
- Incorporate high-performance design strategies into City-led capital projects for long-term value
- Partner with private sector New York City developers, and the building community at large, to promote the benefits of high-performance building design

II. Introduction

A. Background and Context

Deregulation of Electricity Markets

In the mid-1990s, New York State, along with a number of other jurisdictions, began restructuring the electric utility system by substituting competition for some activity that was previously regulated. Most of the large New York State utilities were directed to divest themselves of their power plants. Customers were offered the choice of purchasing their own power or letting the utility serving them purchase power on their behalf. The Federal Energy Regulatory Commission (FERC) asserted its authority over electricity transmission rates and oversaw the creation of the New York Independent System Operator (NYISO), which was charged with operating the transmission grid and the wholesale energy markets in the State.

At the direction of the New York Public Service Commission (PSC), the agency charged with overseeing and regulating utility service in the State, Con Edison divested almost all of its in-City generation plants. Con Edison retained ownership of certain generation assets to supply its Manhattan steam system, but today is largely out of the generation business and is principally an electricity, gas, and steam transmission and distribution company. The primary in-City generation owners are now KeySpan Energy, Reliant Resources, NRG Energy, and the New York Power Authority (NYPA).

Other aspects of the electricity markets have also changed under deregulation. Transmission lines, for example, can now be built by merchant developers, as in the case of TransEnergie's Cross Sound Cable connecting Connecticut and Long Island. However, the placement of new generation and transmission affects the reliability and performance of the electric grid. Unlike in the past,

when utilities were responsible for integrated generation and transmission, NYISO will now play the integrator role in assuring adequate transmission planning. In short, there are now more moving parts—and more complexity—than was the case under traditional electricity regulation.

The City's Role in Energy Matters

While the City is not directly involved in electric generation, the siting or regulation of transmission facilities, or the construction and regulation of distribution facilities, it still plays an important role in relation to all these activities. The City intervenes in state and federal energy regulatory proceedings and energy related negotiations, and serves on the governance committees of the New York Independent System Operator, expressing its views on diverse energy issues. These include rate design, the structure of electricity markets, limitation of market power, siting concerns, and the design and operation of various demand-side energy programs.

The City also has an overarching obligation to protect the health and welfare of all its citizens fairly and equitably. Through its zoning and permitting authority, and control of assets such as shorelines and streets, the City wields influence on the siting of major generation, transmission, and distributed generation projects. Finally, because City government is a major user of electricity—using some 10% of the entire load used in New York City—it is in a position to serve as a model for energy efficiency, load management, fuel switching, thermal energy storage, and clean on-site generation programs.

B. About the Task Force

The New York City Energy Task Force was established by Mayor Michael R. Bloomberg following a City energy issues meeting in July, 2003. The New York City Economic Development Corporation was selected to lead the Task Force, which consists of leading energy experts in the private, public and non-profit sectors. Members were assigned to working groups to address four key concerns: energy supply, distributed resources, energy delivery infrastructure, and the role of City agencies in achieving the recommended goals.

The Task Force members and their affiliations are shown on the following page.

Name & Title	Organization	Representing
***Gil C. Quiniones**,* *Task Force Chair* *Senior Vice President of Energy*	New York City Economic Development Corporation	City of New York
Terry Agriss *Vice President* *Energy Management*	Con Edison Company of New York, Inc.	Con Edison, Inc.
Garry Brown *Vice President,* *Strategic Development*	New York Independent System Operator	New York Independent System Operator
Scott Butler *Vice President*	New York City Economic Development Corporation	New York City Agencies
Michael Delaney *Assistant Vice President*	New York City Economic Development Corporation	New York City Economic Development Corporation
John Gilbert *Executive Vice President and Chief Operating Officer*	Rudin Management	New York Building Congress; Real Estate Board of New York; Association for a Better New York; Building Construction & Trades Council
David Greenberg *Deputy Commissioner for Fiscal Management and Operations*	New York City Department of Citywide Administrative Services	New York City Agencies
Ashok Gupta *Director, Air & Energy Program*	Natural Resources Defense Council	Natural Resources Defense Council
William Harkins	Energy Consultant	New York Building Congress
David Hepinstall *Executive Director*	Association For Energy Affordability	Association For Energy Affordability; Association of Energy Engineers—NYC
Catherine Luthin *Principal*	Luthin Associates	Consumer Power Advocates
David Manning *Senior Vice President* *Corporate Affairs*	KeySpan Energy	KeySpan Energy
Patricia Noonan *Vice President* *Research and Policy*	Partnership for New York City	Partnership for New York City
Jay Raphaelson *President*	Energy Watch	New York Energy Buyers Forum; Building Owners and Managers Association; Owners Committee on Electric Rates
Peter Smith *Acting President*	New York State Energy Research & Development Authority	State of New York
Gail Suchman *Senior Environmental Counsel*	New York Lawyers for the Public Interest	New York Lawyers for the Public Interest; Communities United for Responsible Energy

The mission of the Task Force was threefold:

- To assess the current state of the City's energy resources, with a primary focus on electricity;
- To project the energy needs of the City through 2008;
- To develop specific and achievable recommendations for the policies, practices, and actions needed to secure the City's energy future.

C. Report Scope and Approach

This report represents a compilation of the Task Force's findings. Section III of this report offers an overall summary of the City's current energy picture and its expected needs over the next five years. Sections IV through VII discuss the four central topic areas that correspond to the working group subjects: energy supply, distributed resources, energy delivery infrastructure, and the role of City Agencies. Each of these sections contains a specific action plan.

A series of earlier reports, including the 2002 New York State Energy Plan and Final Environmental Impact Statement, The New York State Independent System Operator's Power Alert III and the New York Building Congress' Electricity Outlook 2002: A Call To Action, informed the work of the Task Force.

By design, the scope of the report does not include such energy-related issues as motor vehicle fuels, energy in transportation, energy security, sustainable energy, clean air, climate change policy, or the role of energy in waste management and disposal. Similarly, the issue of general heating fuels is beyond the scope of this report, except to the extent that it relates to issues of electricity generation, such as the use of natural gas or fuel oil in power plants.

III. Electricity Resources and Needs: 2003–2008

In 2003, New York City's forecasted peak electricity demand was 11,020 megawatts. By regulation and for reliability purposes, 8,816 MW, or 80% of that forecasted peak load, had to be supplied by capacity available in-City.[3] The available electricity supply capacity in the City exceeded the 80% requirement by only 71 MW.

In other words, New York City has adequate electricity resources today, but only by a slim margin. A projected increase of approximately 1.5% annually in electricity demand in the next five years will necessitate new generation and transmission facilities and expanded distributed resources measures. Additional resources will be required to assure market price stability, and old power plants will need to be retired and/or replaced with cleaner, more efficient facilities by 2008. This report stresses near-term decisions in the context of a long-term energy strategy for the City.

A. Electricity Requirements

In total, the Task Force estimates that New York City will need about 3,780 MW of new electricity resources by 2008, for the following purposes:

- 665 MW to accommodate load growth;
- 1,000 MW to reduce energy and capacity prices;

[3]Reliability concerns require that 80% of the City's peak load be met with in-City resources under a mandate from the New York State Reliability Council and the New York Independent System Operator.

- 2,115 MW to replace potential power plant retirements, including NYPA's existing Poletti plant.

665 MW Needed to Meet Demand Growth

The City's economy has followed the national economy in a gradual recovery from the past two years' recession, and electricity demand has followed this upward trend. In the summer of 2003, the peak load demand reached 10,960 MW on a weather-adjusted basis. Over the period through 2008, demand is expected to rise another 830 megawatts, or an increase of approximately 7.6%. To match the increase in demand, New York City will need approximately 665 MW of new resources to meet the current in-City capacity requirement of 80%.

1,000 MW Needed to Assure Market Stability

To establish a competitive market for electricity and reduce the costs of electric energy and capacity, the New York State Public Service Commission began restructuring New York State's electric energy markets in 1996. The electricity market continues to be dominated by the few firms that purchased power plants from the utilities as part of the restructuring process, and energy prices are more volatile today than they were before restructuring, particularly in the City.

The Task Force believes that approximately 1,000 MW of additional resources above what is required to meet the growth in demand are needed to create a workably competitive market, avoid excessive volatility in the price of electricity in the newly deregulated power generation market, and assure market stability.[4]

2,115 MW Needed to Replace Aging Power Plants

Currently, there is no regulatory requirement or physical limit that dictates power plants must be retired at a certain age; however, the costs of refurbishing and operating older plants and meeting increasingly stringent environmental requirements are likely to encourage plant owners to retire older facilities. New, cleaner burning natural gas fired plants using efficient technology are as much as 30% more efficient in converting fuel energy into electric power than older plants.[5] As cleaner, more efficient generating capacity replaces older, inefficient

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[4]For further detail on this issue, see the analysis contained in "Energy Plan for the City of New York" (2003). While the precise number of megawatts needed for market stability is uncertain, a target of 1,000 megawatts is prudent for planning purposes.

[5]For example, new combined-cycle plants burn natural gas and have heat rates of lower than 7,500 BTU/kWh as compared to existing plants whose heat rates may be in excess of 10,000 BTU/kWh. Heat rates measure the amount of fuel needed to generate a given electricity output. On average, natural gas power plants produce approximately 97% less nitrogen oxide, 90% less sulfur dioxide and 50% less carbon dioxide respectively as compared to older NYC plants.

plants, the City will enjoy the concurrent environmental benefits of reduced air emissions.

Unless new electric generation is constructed or investment in energy efficiency is undertaken to replace some of the City's aging units, the amount of generation that is more than 45 years old will total 3,730 MW, or approximately 42% of existing total capacity, by 2010. For purposes of this report, the Task Force assumes that one third of the 45-year old plants will be retired in the next five years. This gives rise to an additional need of 1,240 megawatts.

In addition to the above, an agreement announced by Governor Pataki in 2002 to allow construction by NYPA of a new 500 MW plant at the Poletti site in Queens requires that the existing 875 MW Poletti plant be retired no later than January 1, 2010, and as early as 2008 if there is sufficient capacity in-City to permit it. Accordingly, this 875 MW must be included in the retirement and replacement need for the period through 2008, bringing the total to 2,115 MW of additional resources needed to replace aging energy capacity.

B. Addressing the Need

At present, there are two principal means to address the needs described above.

Power Plants Currently Under Construction —875 MW

Three power plants are now under construction in the City: KeySpan's Ravenswood addition (250 MW), Con Edison's East River Project (125 MW net addition for peak periods after the retirement of the company's Waterside plant), and NYPA's new Poletti combined-cycle plant (500 MW), for a total of 875 MW. All of these plants are expected to be completed and serving load in the period 2004–2005.

In addition, two projects with a total of 1,563 MW (Reliant Resources and Astoria Energy–SCS) have been certified by the state under Article X and are currently seeking financing commitments.

Distributed Resources —300 MW

It is difficult to estimate the amount of peak load management, energy efficiency, and clean on-site generation resources that will be in place in the City by 2008. For planning purposes, the Task Force estimates a business as usual case of 300 MW, or on average some 60 megawatts annually over the next five years. Policy changes and new commitments of resources would make additional distributed resources possible. (See the extended discussion of Distributed Resources in Section V of this Report).

C. Net Need for New Electric Resources through 2008

The need for new resources calculated in the foregoing discussion is 3,780 megawatts. Netting out the supplies expected from plants under construction and from expected energy efficiency measures yields 2,605 megawatts. This amount, approximately 2,600 MW, represents the estimated net need for new electric resources in New York City between now and 2008. Options to meet this need include new distributed resource measures, and construction of new power plants, repowering or expansion of existing plants, and transmission projects.

Electric Resource Net Need (2003–2008)

Category	Capacity (MW)
Projected Demand	
1. Need To Meet Demand Growth	665
2. Need To Assure Market Stability	1,000
3. Need To Replace Aging Power Plants	2,115[a]
Total Capacity Need	3,780
Less	
Projected Supply and Distributed Resources	
4. Power Plants Under Construction	(875)
5. Distributed Resources	(300)
Net Capacity Need Through 2008	2,605

[a]Assumes that NYPA's existing Poletti power plant is retired by 2008

IV. Energy Supply

A. Overview of Energy Supply Infrastructure

The following sections describe four aspects of the energy supply infrastructure serving New York City: electricity transmission, generation, natural gas pipelines, and the Manhattan district steam system.

Electricity Transmission into New York City

In electrical terms, New York City is a *load pocket.*[6] This means that transmission lines cannot carry enough energy into the City to meet its *peak load,* defined as the year's highest point of electricity demand. To meet the City's peak load, 80% of the forecasted demand must be supplied by capacity located inside the load pocket.[7] For the balance, including reserve requirements imported over transmission lines, New York City is connected to upstate New York, to the electrical grid system in northern New Jersey, and to Long Island.

- In the north, Con Edison's overhead transmission lines connect substations in Westchester and run south to the City, connecting to the underground

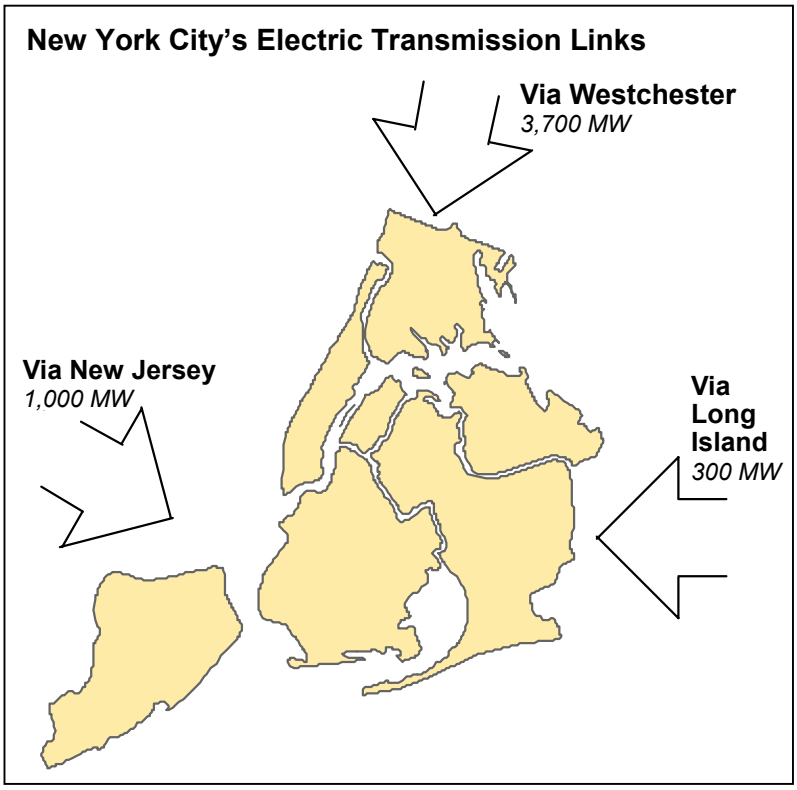
[6]The only exception is the Rockaway peninsula, which is in the City but in the Long Island Power Authority's service territory, and hence part of the Long Island load pocket.

[7]The fact that an area is a load pocket is not necessarily a problem; even areas with much generation capacity that are usually power exporters may be load pockets. Technically, New York State itself is a load pocket, since in-state load is greater than the transmission import capacity and in-state generation plants must run to meet load.

Several areas within New York City are also load sub-pockets, which require local generation plants to meet their own peak loads. (Those sub-pockets are defined as much by transmission voltage as by geography. They include the entire 138-kilovolt (kV) transmission system and the 69kV system around the East River plant.) This report deals primarily with the capabilities of the transmission system connecting New York City to other geographic areas.

transmission system there. The effective import capability from the north is approximately 3,700 MW.

- In the west, three lines run from Public Service Electric & Gas Company (PSEG) substations in New Jersey under the harbor and Hudson River to Con Edison substations in Staten Island and Brooklyn. These cables could carry 1,500 MW; however, restrictions on PSEG's system limit deliveries over the lines to 600–1,000 MW.[8] Over the last several years, there has been a steady decline in the deliveries from New Jersey into the City due to the limits placed on the PSEG lines.
- To the east, the in-City Load Pocket is interconnected to the Long Island Power Authority (LIPA) service territory through two cables. Again, the capacity of the feeders (510 MW) exceeds the ability of LIPA's transmission system to support transfers to New York City, and imports are actually limited to about 300 MW. In addition, since LIPA is also a load pocket and has high marginal energy costs, these lines are of less value to the in-City loads than are the lines from New Jersey and upstate New York.



[8]Another dedicated transmission line connects New York City to the Cogen Tech plant in New Jersey, but not to the New Jersey area transmission system. In electrical terms, the Cogen Tech plant is therefore viewed as being located in New York City.

The maximum power that can be imported into the in-City load pocket from the three transmission corridors is approximately 5,000 MW. However, the actual amount that is imported during peak load conditions is generally lower due to conditions such as transmission constraints and local reliability rules. A simplified map of the bulk power transmission system appears on the opposite page.

Transmission capacity to the City has not been increased since the 1980s. The last significant upgrade to the system in New York State was the Marcy-South project running from the Utica area into downstate that was completed in 1988. Marcy-South allowed importation of more power into the City.

Currently, NYISO is considering transmission plans and expansions in conjunction with FERC and the PSC. Meanwhile, merchant developers are proposing two transmission projects connecting New York City to New Jersey and upstate New York. If built, these lines might allow access to power at prices lower than those now available in the City.

Electricity Generation Sources

The City load pocket currently has approximately 8,760 MW of generation. The following five parties own or control almost all of the in-City generation:

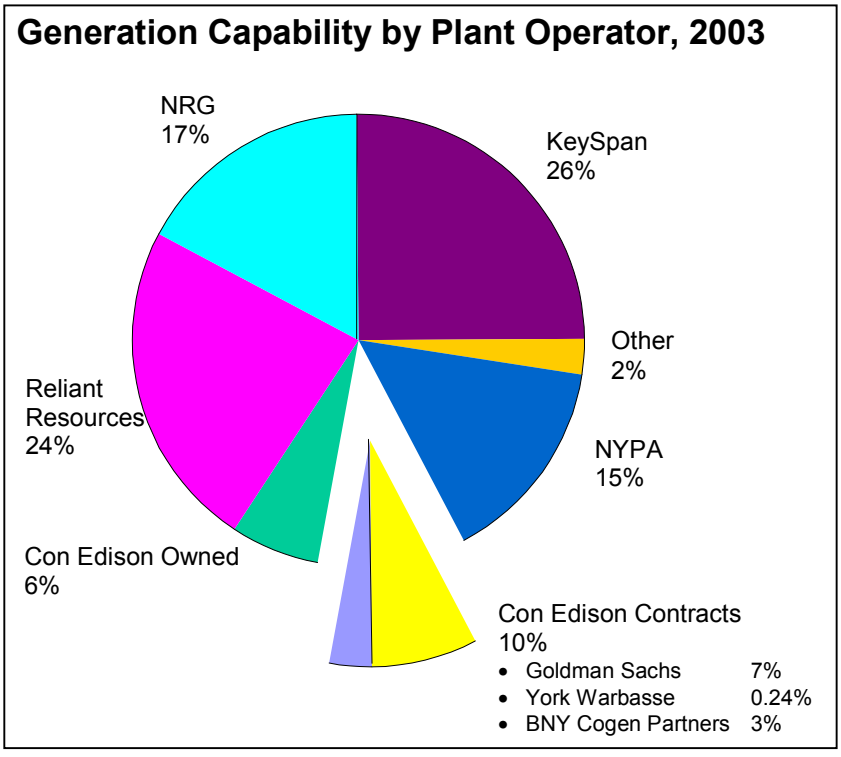
- Reliant Resources, NRG Energy, and KeySpan Energy own the electric plants and gas turbines divested by Con Edison.
- NYPA owns the Poletti plant and a fleet of new gas-fired combustion turbines at six locations throughout the City, and holds a long-term contract for the output of the cogenerator at the Kennedy International Airport.[9]
- Con Edison owns a few generators for steam production and a few small combustion turbines, and has long-term power contracts from Cogen Technologies (currently owned by Goldman Sachs), York Warbasse, and BNY Cogen Partners.

Most generation in the City can utilize either natural gas or residual fuel oil, but some plants are limited to one fuel type. Natural gas is the cleanest fuel available for fuel-burning power plants, producing almost no sulfur and generally low emissions of nitrogen oxides. While particulate emissions from the combustion of natural gas are significantly less than for distillate oils, there is still concern with respect to the emission of fine particulate matter, especially in neighborhoods that have been shown to be at or above federal ambient standards.

[9]In addition, NYPA installed ten gas turbine generators in the City in early 2001. These plants added a total of 408 MW of in-City generation.

Natural gas and distillate oils are the only fuels burned in combustion turbines and combined-cycle plants—the types of plants that have comprised most generation additions since the 1980s. Looking forward, most new in-City generation is proposed to utilize natural gas as the primary fuel, as environmental requirements limit the use of alternative fuel to 720 hours (30 days) per year. In some situations, generators have also agreed to limit their overall level of operations and to increase their use of natural gas at existing units by establishing seasonal and annual fuel mix targets.

Given increased reliance on natural gas, there could be reliability and cost impacts from inadequate gas pipeline capacity. Existing pipeline is currently used to capacity during peak periods, and additional pipeline space is needed to meet future growth in both consumer gas use and gas-fired generation. Until this situation is addressed, a balanced energy strategy for the City should maintain the ability of existing and new units to burn the cleanest possible liquid fuels, especially during emergencies; increase the efficiency of gas use in power plants; diversify gas supplies; and expand pipeline delivery capacity to the New York City area.[10]



[10]In addition to minor improvements at existing units, the efficiency goal may be pursued by repowering gas-fired steam plants with higher efficiency combined-cycle technology, and by replacing inefficient old combustion turbines with new turbines.

Natural Gas Supply

The gas supplies delivered to New York City originate in the gas fields of Texas, Louisiana, the Gulf of Mexico and Western Canada, and are transported by interstate pipelines to the region. New York City is served directly by three interstate pipeline companies and five interconnections. One other pipeline and three interconnections can supply gas at points outside the City limits.

New York City and the three New York counties in the region (Westchester, Nassau and Suffolk) are served through gas facilities operated by Con Edison, KeySpan Delivery of New York, and KeySpan Delivery of Long Island. The three local distribution companies (LDCs) receive gas from five interstate pipeline companies through numerous interconnections. Con Edison and KeySpan each has its own internal distribution system which carries gas from delivery points in the City and to interconnections between the local distribution companies.

As reported in the 2003 New York Gas Report prepared by the Northeast Gas Association, the three local utilities experienced peak day delivered volumes totaling 3,132,000 dekatherms[11] and annual delivered volumes of 698,715,000 dekatherms to all customers including power generators.

The interstate pipelines that serve this area are as follows:

- Transcontinental Gas Pipe Line, Texas Eastern Transmission (and its Algonquin Pipeline affiliate), and Tennessee Gas Pipeline carry gas from the Gulf Coast region to in-City delivery points of one of the gas LDCs.[12]
- Iroquois Gas Transmission brings western Canadian gas from the Trans-Canada pipeline in Ontario through upstate New York and Connecticut, across the Sound to Long Island, and into an out of City delivery point. By early 2004, Iroquois will be delivering directly into a new in-City delivery point of one of the gas LDCs.

The same pipelines connect New York City to underground gas storage facilities in Pennsylvania and western New York State. Gas from the supply areas is injected into those storage facilities in the summer, when customer demand is relatively low, and delivered to the distribution companies in the

[11]A dekatherm is equivalent to 1,000,000 BTUs. A BTU, or British thermal unit, is a unit of heat—the quantity required to raise one pound of water one degree Fahrenheit.

[12]Since these pipelines connect to Midwestern pipelines that carry gas from the Southwest and from western Canada, the actual gas delivered to New York City may have come from almost anywhere in North America. In addition, these pipelines interconnect with other pipelines in the region that deliver gas from remote sources of gas supply and storage facilities.

winter. During off-peak periods when interstate pipeline capacity is not needed to serve gas customers, capacity can be made available to serve generation requirements and other markets. This practice has benefited both gas and electric consumers by allowing for a very high utilization of existing pipeline capacity on a year-round basis.

Steam Resource Requirements

Demand for steam in Con Edison's service area peaks during the winter heating season. The one-hour peak load during the winter of 2002–2003 (through January 31, 2003) occurred on January 24, 2003, when the load reached 9.7 million pounds per hour. The company's estimate for the winter of 2003–2004 peak demand of its steam customers is approximately 10.8 million pounds per hour under design criteria that assume severe weather.

As of December 31, 2002, the steam system had the capability of delivering about 12.8 million pounds of steam per hour. Con Edison estimates that the system will have the capability to deliver the same volume of steam per hour in the 2003–2004 winter.

It is in the City's best interest to have a steam system that is financially healthy and sustainable. Production of steam in central plants avoids the need for individual boilers in buildings and their associated concentration of emissions, increased traffic congestion due to fuel truck deliveries, and loss of rentable space in buildings. The steam system also provides an alternative to electric air conditioning through the use of steam-powered chillers. Existing steam air conditioning systems reduce the critical summer electrical peak load by approximately 400 MW. Without this benefit, the electric supply need in-City would be much greater, as would the need for local distribution reinforcements.

Steam system loads have been stable or falling due to increasing efficiency in steam use and conversion of some steam-powered chilling to electricity. The replacement of the Waterside power plant (at 40th Street and 1st Avenue) with the expanded East River power plant (at 15th Street and the FDR Drive) will increase the efficiency of the steam system. Even with a successful effort to promote steam-powered chilling to relieve loads on the electric system, existing and committed steam capacity is likely to remain sufficient throughout the planning period.

B. Energy Supply Resource Options

Over the past year, the pace of construction of new electric resources has lagged. Financing of new electric resource projects has been highly uncertain, particularly in the aftermath of September 11 and the collapse of several energy firms, but there are signs the tide may be turning. Beyond the power plants now being built, there are a number of options for New York City to achieve its electricity needs by 2008.

Power Plants

Power Plants Certified for Construction—1,562 MW

Article X projects that have been certified by the State but are not yet in construction are tracked by the Public Service Commission.[13] Astoria Energy LLC (SCS) was recently awarded a 500 MW contract by Con Edison for a 10-year period commencing in 2006, and is expected to construct a large power plant in Queens. Article X plants currently certified in New York City are as follows:

- Astoria Energy LLC (SCS)..... 1,000 MW
- Reliant Energy Astoria Repowering..... 562 MW (net)

Power Plants in the Certification Process—1,620 MW

Two additional in-City power plants are still in various stages of the Article X approval process. The following plant proposals are currently under review by the New York State Siting Board:

- Sunset Energy Fleet, LLC .....520 MW
- TransGas Energy .....1,100 MW [14]

There are also a number of projects proposed for New York City that have a capacity lower than the 80 MW threshold for Article X, and therefore will be subject only to approval under the State Environmental Quality Review Act.

[13]Article X of the New York State Public Service Law addresses the siting of power plant projects, and grants authority to a State Siting Board to certify applications for approval. The current law expired on January 1, 2003 (see discussion on page 24).

[14]As a matter of public record, the City of New York opposes the proposed location of the TransGas power plant in Brooklyn on the grounds that it conflicts with the City's Greenpoint-Williamsburg rezoning and redevelopment plan. The City has offered an alternate site. For further details, please refer to PSC Case 01-F-1276–TransGas Energy Systems, LLC.

Repowering Generation Plants

Repowering at existing generation facilities can help supply the power needs of the City. While repowering is for the most part similar to new site construction in terms of its financing requirements, it has a substantially lesser impact on adjoining neighborhoods because it avoids the need for a new plant site. In addition, repowering can dramatically reduce air emissions and increase efficiency. For these reasons, repowering can and should be expedited in the permitting process under Article X.

Existing base load power plant sites such as KeySpan (Ravenswood), NYPA, Reliant, and NRG Energy (Arthur Kill) facilities are repowering possibilities, as are the Con Edison steam electric plants. However, repowering could raise market power concerns if it leads to a significant net gain of any owner's market share.[15]

Transmission Lines

Two merchant transmission projects have the potential to make significant contributions to the electricity resource requirements of New York City. The Public Service Commission has already certified one, and the other application is pending.

Transmission Lines Certified for Construction—550 MW

PSEG Power has proposed the Cross Hudson project, which now has Article VII approval from the New York State Public Service Commission.[16] The project would construct an isolated alternating current (AC) transmission cable to Manhattan that would allow up to 550 MW from PSEG's Bergen Plant to be considered in-City generation. Cross Hudson received its Article VII–approval certificate in April of 2003.

Transmission Lines in the Certification Process—2,000 MW

Conjunction LLC has proposed the Empire Connection project to carry approximately 2,000 MW of power from upstate New York to New York City. The project is comprised of two high-voltage direct current (HVDC) lines along railroad and highway rights-of-way into Manhattan. Conjunction filed an Article VII siting application with the New York Public Service Commission in November of 2003. That application is under review, with a certification decision likely

[15]The NYISO, under the oversight of the FERC, monitors and mitigates the exercise of market power. Market power is generally defined to mean the ability of a party to set market prices or to control output.

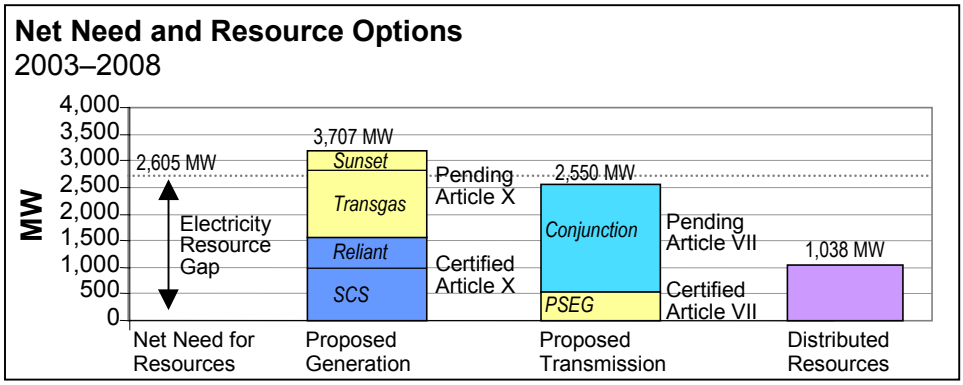
[16]Article VII of the New York State Public Service Law addresses the siting of transmission projects, and grants authority to the Public Service Commission to oversee the approval process.

in 2004. Conjunction has obtained initial equity financing and estimates that the transmission line could be operational as early as 2006.

Electricity Resource Options

In summary, New York City's electricity needs can be met through several options, including 2,550 MW of proposed transmission lines and approximately 3,700 MW of new and repowered generation projects. In addition, distributed resources can reduce or reshape electric system load and thereby mitigate the need for increased generation and/or transmission resources. Distributed resources are discussed in Section V.

The chart below compares the net need for resources, calculated in Section III, to the resource options outlined in this section. Any combination of generation, transmission, or distributed resources can be used to meet the net need of 2,605 MW in 2008.



Natural Gas Pipelines

Pipelines Approved by FERC and New York State and Under Construction

Iroquois Eastchester Extension, owned by Iroquois Gas Transmission System, will connect a Canada–New England pipeline with the Con Edison system in the Bronx, bringing 230,000 dekatherms of natural gas per day to the City by early 2004.

Pipelines Approved Only by FERC

Millennium Pipeline, co-owned by Columbia Gas Corporation, TransCanada Gas Pipeline, Duke Pipeline and DTE Energy, would bring 350,000 dekatherms per day of natural gas supplies from Canada and the Midwest and increase market area storage access to a new interconnection to the Con Edison gas system at the Bronx–Westchester border for direct deliveries into the City market. The State of New York is currently reviewing this project.

Islander East, co-owned by Islander East Pipeline Company and Algonquin Gas Transmission Company, would connect Long Island to Connecticut and bring 275,000 dekatherms into the New York metropolitan area. State permitting issues in Connecticut have delayed this project.

C. Challenges and Opportunities

Energy Market Uncertainties

Before deregulation, owners of energy supply—of gas pipelines, electric generation and transmission, and demand-side resources—were assured a predictable rate of return. The economics of projects were generally evaluated and compared to alternatives on a *cost-plus* basis. Customers typically assumed construction and market risks through regulated rates or tariffs.

Since the 1980s for natural gas pipelines, and the latter part of the 1990s for electricity resources, investment has become largely a market-driven merchant function; investors bear both the construction risks and market risks, although the latter can be mitigated by long-term contracts with customers. The economics of projects are evaluated and compared to alternatives under competitive market conditions.

Pipeline developers and their lenders have adjusted to the competitive market by insisting on long-term contracts for the capacity of new facilities before construction starts. The customers for pipeline capacity include existing and new power plants, gas distributors, large industrial customers, and gas marketers serving wholesale and retail consumers. Several market capacity expansions and new pipelines have been built under this system in the U.S.; however, the natural gas industry now faces many challenges similar to those confronted in the electricity market.

Challenges in Electricity Project Financing

In the less mature electricity markets, financing and constructing projects has been even more problematic. Long-term contracts for new plants are rare, subjecting developers to price risks. The following issues have arisen in deregulated electricity markets.

- The energy service companies (ESCos) that market directly to consumers have not been able to lock in long-term relationships and cannot commit to long-term purchase contracts.
- Distribution utilities, which purchase power for customers who do not select an ESCo for supply services, are similarly reluctant to commit to long-term contracts to serve an uncertain customer base. The general approach to

restructuring in New York has required that the utilities reduce their role in energy supply to consumers and transfer generation risks to developers. Unless consumers are required to purchase through the utility, long-term purchase contracts can shift risks to the utility or its remaining customers.

Market prices for generation services, which determine the value of power plants, have been very volatile. The structure of the electric markets—including energy, capacity, operating reserves, and ancillary services, plus market power mitigation rules—is much more complex than that for natural gas sales. Regulation of the wholesale electric markets is more complicated and less predictable than for gas, further increasing developers' risks. The NYISO and FERC have continued to adjust certain aspects of the markets' operation, as illustrated by the recent imposition of the demand curve for capacity prices in New York State.[17]

Cost recovery for merchant transmission is particularly problematic. The capacity increase due to addition of normal alternating current (AC) facilities to existing systems depends on complex electrical interactions of the existing and new equipment; no jurisdiction has yet worked out a fully satisfactory mechanism for assigning AC capacity to merchant facilities. High Voltage Direct Current (HVDC) lines require expensive conversion facilities at both ends, but allow control and measurement of power flow due to individual lines. Even so, the investment return on a HVDC line depends on the price differentials between the ends of the line, which are exposed to the usual price risks, as well as the effect of the line itself on those differences. In addition, the ability of such large HVDC terminals to work effectively in parallel with an underground cable system is still unproven.

Financial markets have also created problems for developers of electric generation facilities since the bankruptcies of Enron, Mirant, PG&E's National Energy Group, and NRG, as well as the financial distress of still more merchant developers and marketers. While a number of developers remain active and financially sound (including subsidiaries of PSEG and KeySpan) and creditworthy affiliates of such financial firms as Goldman Sachs and Kohlberg Kravitz Roberts & Co. are taking equity positions in new projects, it may be some time before the confidence of lenders returns to the sector.

[17]The New York ISO uses a "demand curve" that is an administrative estimate of the incremental value of generation capacity in the market; as less capacity is made available, its relative price rises.

Challenges in Siting Facilities

Siting power plants, transmission lines, and gas pipelines is often difficult—particularly in New York City due to its high population density and land use constraints.

Even when the public recognizes the benefits of particular types of energy infrastructure, neighborhoods have concerns about the effect of energy development on land use, aesthetics, noise and air quality. This is especially true in low-income communities and communities of color that may already bear a disproportionate share of such burdens.

Power plants tend to be concentrated near the City's waterfronts, which are coveted for a range of economic and recreational activities. To a large extent, current plant locations are a legacy of the original siting of old plants to allow deliveries by water of coal and oil, and to provide cooling water for power-plant condensers.

These rationales no longer apply. Coal is no longer used for electric generation in the City, combustion turbines need no cooling water, and the state Department of Environmental Conservation (DEC) will not allow the use of river water for cooling of new plants. Even so, waterfront locations remain attractive for power plants due to the presence of industrial zoned sites, gas pipelines and transmission facilities from earlier power plants, as well as the relative ease of running new transmission and pipelines underwater.

Article X of the Public Service Law, which established a single streamlined process for reviewing all permitting and siting issues for proposed generation above 80 MW, lapsed at the end of 2002, and has not been reinstated by the New York State legislature. In the absence of Article X, obtaining state and local approvals for generating facilities remains possible but is far more cumbersome than with the Article X process in place. The City regularly intervenes in Article X siting proceedings, and is an active party in the State's Siting Board cases that are related to proposed power plants in the City.

Challenges in Electric and Gas Transmission Planning

While the PSC's Article VII process facilitates comprehensive state and local siting review for electric and gas transmission facilities, FERC's transmission rate recovery policies continue to evolve. The new competitive market has also shifted risks between the transmission owner and power plant developer in ways that the market has not yet fully addressed. Some generation developers have tried to have the transmission owners spread the generator's interconnection and mandatory system upgrade costs to all customers. The NYISO is now developing a comprehensive transmission planning process with its market

participants. "Power Alert III: New York's Energy Future" (NYISO, May 2003) recommended addressing this issue.

All interstate gas transmission facilities require FERC approval, although FERC's standards for gas pipelines are more clearly defined than for electric transmission. In-City development of gas supplies and power plants are closely interrelated. Power plants cannot be developed without adequate supplies of natural gas, and gas pipelines cannot be developed without adequate demand from power plants. Maintaining some dual fuel capability in existing and new units may be necessary for both gas and electric system reliability.

D. Energy Supply Recommendations

Support innovative means to finance appropriate electricity projects

- Support the targeted use of long-term power purchase agreements or other financial commitments from creditworthy entities, including the City of New York, as a vehicle for reducing project and financial risk.
- Facilitate financing for power plants and transmission lines. The City, Task Force members, and others should convene a series of meetings with developers and financial institutions involved in recent financing of energy projects.
- Encourage the targeted use of tax-exempt financing vehicles for energy supply infrastructure projects in New York City.
- Pursue long-term policies to establish a competitive energy market that will encourage developers to invest in energy projects in the City.

Advocate in Albany for the immediate passage of the Article X Power Plant Siting Law

Article X of the New York Public Service Law should be reenacted with the following measures:

- Increase coordination between the Siting Board and Department of Environmental Conservation (DEC) reviews to reduce lead time and uncertainty of developers' planning processes.
- Include analysis of the cumulative effect on the immediate community of air emissions from a proposed facility, in addition to emissions from other existing or planned sources in the area. Consideration should be given to a

preference and expedited handling for the repowering of existing facilities, as under the former statute.

- Consider environmental justice concerns, to avoid disproportionate environmental burdens on low-income and minority communities.

Facilitate appropriate siting of power plants and other energy facilities

- Encourage the repowering of existing power plants in New York City.
- Review pending proposals for changes in zoning to ensure that suitable existing industrial zones remain available for generation plants.
- Work with local communities and environmental agencies to facilitate the development of energy facilities while addressing community concerns with health, environmental justice, and community-based planning.
- Maintain standardized community impact fees that vary with the capital cost of new projects, as has been done recently for the Iroquois Eastchester Pipeline and FPL's Bayswater power plant in Far Rockaway.

Support the development of appropriate transmission lines

- Support the efforts of the transmission owners and NYISO to implement a transmission expansion planning process. The process should identify projects justified to meet reliability requirements or to reduce congestion and generation costs.
- Support transmission projects to increase the City's import capability as needed for system reliability.
- Use existing transportation corridors and rights-of-way where appropriate, including underground and underwater cables where technically possible and judged necessary to minimize concerns over the environmental effects of transmission projects.
- Encourage diversification of transmission from New Jersey–Pennsylvania, New England, and western New York.
- Support mandatory reliability standards for transmission system operation.

Support diversity of fuel supply

- Support development of additional interstate pipeline and gas supply projects (and natural gas efficiency programs) in the metropolitan area, consistent with other environmental and land-use considerations. The City should particularly encourage gas projects that increase the number of inter-

state pipeline interconnections into the City and independent supply sources to enhance reliability, increase diversity, and reduce price volatility.

- Foster close coordination between the regulatory review processes for new generation and the gas transmission facilities required to support it.
- Encourage fuel flexibility in power plants in New York City, consistent with environmental and local community impact considerations, and support a properly designed statewide renewable portfolio standard to improve reliability and reduce price volatility.
- Coordinate with federal, state, and local environmental officials to promote appropriate fuel diversity for in-City generation, and to include limited utilization of low-sulfur oil as a dual-fuel alternative to natural gas.

V. Distributed Resources

A. Overview of Distributed Resources in New York City

The term *"Distributed Resources"* refers to:

- *Energy Efficiency*—targets *permanent* demand and energy usage reductions by the design, application and installation of energy efficient building materials and equipment such as high-efficiency building envelopes (including green roofs), lighting, appliances, office equipment, electric motors, building controls and air conditioning systems. Energy efficiency also includes better practices such as "commissioning," a process that ensures building systems operate efficiently and in accordance with their original design intent.
- *Fuel Switching Applications*—refers to the use of steam and gas chillers in lieu of electrically driven chillers for air conditioning systems in large buildings. The primary goal is to reduce on-peak electric demand *permanently* by using non-electric cooling equipment.
- *Thermal Energy Storage*—encourages off-peak production and integration of chilled water storage, low temperature fluid storage, and ice storage into air conditioning distribution systems. Shifting this cooling energy usage to off-peak hours can considerably reduce on-peak electricity demand.
- *Clean On-Site Generation*—includes cogeneration (also known as combined heat and power or "CHP") and clean distributed generation ("clean DG"), such as microturbines and fuel cells. Both are defined as electric generation connected to the distribution level of the grid usually located at or near the intended place of use. Cogeneration or CHP systems generate

electricity *and* useful thermal energy in the form of direct heat, steam, or hot water simultaneously in a clean, efficient, integrated manner. CHP can result in system efficiencies of 70% to 95%, compared with the national average of 30% efficiency in conventional large generation plants and roughly 50% in conventional thermal applications.

- *Peak Load Management*—aims to encourage *temporary* electricity demand and consumption adjustments according to prevailing wholesale capacity and local grid conditions. In times of peak load demand, customers are asked to curtail their energy consumption and/or generate on-site power.[18]
- *Renewable Energy*—in New York City, it applies to the production of energy via the following applications and technologies: landfill gas, anaerobic digesters, solar photovoltaics, solar thermal, and wind power. Renewable energy promises environmental benefits, increased diversity of energy sources, and reduced reliance on fossil fuels for electricity generation.

B. Background and Context

The shaping of demand and overall usage of electricity, natural gas, and steam must be an important part of a comprehensive energy policy for New York City. With appropriate policies and incentives, distributed resources are often the most readily available, cost-effective, and underutilized clean energy resources that can potentially reduce or defer the amount of required new electric supply from generation and transmission systems. While it can take many years to plan, design and build electric generation plants, most distributed resources can be deployed within a year.

As a practical matter, saving a megawatt is at least as good as building or generating one and can be the cheaper, cleaner, and more reliable way to meet the demand for energy services. However, by their very nature, distributed resources are difficult to measure and include in the supply-oriented planning tools developed in the past 30 years.

[18]Peak load management is also known as demand response or price responsive load program.

C. Distributed Resources Potential in New York City through 2008

Unlike central station generation and transmission, a distributed resource will generally provide benefits directly to the end customer (i.e., reduced energy consumption) in addition to its benefits to the rest of New York City (i.e., reduced requirements for distribution investments, reduced market prices for energy and capacity). The discussion in this section recognizes both groups of benefits to New York City and treats as cost-effective any resource that provides total benefits to *anyone* in New York City that are greater than the total costs to *everyone* in New York City.

Energy Efficiency

In a recent study of energy efficiency, the New York State Energy Research and Development Authority (NYSERDA) estimated the economic potential for reducing New York City summer peak demand by 2008 to be approximately 1,250 MW.[19] For 2012, the report estimates an economic potential of about 2,710 MW in peak demand reduction, of which 1,826 MW, or 67%, would be economically achievable. Applying the same ratio for 2008, 868 MW in summer peak reduction would be economically achievable. However, this entire economic potential is unlikely to be achieved, since it has not taken into account other factors such as future market acceptance rate, technology adoption cycle, design and operational constraints and the full administrative costs of implementing energy efficiency programs. Therefore, for planning and policy development purposes, the Task Force estimates the actual potential for energy efficiency in the next five years to be within a base case of 300 megawatts and a high case of 868 megawatts in peak electric demand reductions.[20]

Clean On-Site Generation

Another recent NYSERDA study found that 3,276 MW of combined heat and power (CHP) technical potential exists in the Con Edison service area over the next ten years.[21] Most of this CHP will comprise units smaller than 5 MW in size and will be in commercial and institutional facilities: hospitals, hotels, commercial office buildings, and large residential complexes. While this

[19]Energy Efficiency and Renewable Energy Resource Development Potential in New York State—Final Report, August 2003. The 2008 value is interpolated from the report's estimates for 2007 and 2012.

[20]The base case is derived as follows: 125 MW from NYSERDA's energy-efficiency and clean on-site generation programs plus 125 MW from Con Edison's DSM RFP plus 50 MW from NYPA's efficiency programs. This equals 300 total MW in peak demand reductions.

[21]Combined Heat and Power Market Potential for New York State Final Report 02-12. October 2002

technical potential exists, there is somewhat smaller potential for CHP systems that are financially viable, in that they provide an economic return that would make them attractive investment opportunities for building owners and developers. The study's market penetration scenarios estimate a base case of 142 MW and an accelerated case of 343 MW in New York City by 2008—provided that all of the major challenges and barriers discussed in the next section are fully addressed and resolved in 2004.[22]

Peak Load Management

There are at least 1,320 MW of diesel backup emergency generators in New York City, based on the recent NESCAUM survey.[23] Less than 20% of this capacity participates in the New York State Independent System Operator (NYISO) programs. In New York City, only 3.7% of the total summer peak demand is registered in NYISO's price-responsive load programs. It would appear that peak load management programs could be expanded considerably, but this potential is very difficult to quantify due the challenges and barriers discussed in the next section.

For planning and policy development purposes, the Task Force assumes that 127 MW of peak load management, which reflects the 2003 NYISO special case resource participation rate in New York City, will continue until 2008.[24]

Summary of Distributed Resources Potential in New York City
2003–2008

Category	Base Case (MW)	High Case (MW)
Peak Load Management	127	127
Energy Efficiency	300	868
Clean On-Site Generation	142	343
Total	**569**	**1,338**

[22]*Base case*—business as usual based on current CHP technology and current stand-by rates. *Accelerated case*—based on gradual evolution from current to advanced technology, immediate reduction of stand-by charges to one half of the base case level.

[23]Northeast States for Coordinated Air Use Management, Stationary Diesel Engines in the Northeast: An Initial Assessment, June 2003.

[24]Special case resource utilizes peak load management capabilities to augment the supply of generation used by the NYISO as standing reserves, which is especially important in areas of the State that are capacity limited such as New York City.

D. Challenges & Opportunities

Energy Efficiency Programs

Energy efficient mechanical and electrical equipment and other building systems are typically more expensive than standard equipment on an initial-cost basis. Even though these systems can be more financially advantageous from a life-cycle cost perspective, split incentives, budget constraints, and/or an inability to compete effectively with alternative capital investments have meant that energy efficient investments remain far below their technical and economic potential. The rebates and other forms of assistance available today from entities like NYSERDA sometimes do not provide sufficient economic incentive to achieve the efficiency potential in the City.

Fuel Switching Applications and Thermal Energy Storage

The principal alternatives to the use of electricity for such critical purposes as summer cooling are steam and gas-fired chillers, both of which have higher upfront costs. The higher initial cost of purchasing and installing such systems stands as a serious impediment to their wider application. Also, steam chillers, gas chillers, and thermal energy storage systems generally have larger space requirements relative to standard electric chillers.

Clean On-Site Generation

Fault current limitations at several points on the distribution level of the grid directly affect the ability of synchronous generation devices such as natural gas engine-generator sets (which currently constitute the vast majority of such resources) to connect to the City's local electrical distribution system.[25] A number of Con Edison's distribution system circuits are currently operating at or near full capacity and large capital investments will be required just to maintain and support reliability. Additional investments will be required to allow interconnection of synchronous clean on-site generation systems. While more technologically advanced and cleaner devices such as fuel cells and solar cells are not subject to the same limitations, their current market share and penetration relative to engine-based systems still remains relatively small.

Moreover, a complicated and lengthy interconnection review and approval process adds significant upfront cost and uncertainty to potential projects. This is often further compounded by the customer's desire to ensure that the utility grid backs up their on-site generation. The interconnection of clean on-site generation facilities to the electric distribution system requires a series of

[25]Fault current is the momentary power that flows throughout an electrical system during a short-circuit disturbance.

detailed and complicated engineering studies. Hence, a substantial commitment of time and resources, both by Con Edison and the developer, is necessary even before a potential project can be deemed feasible.

Also, in a dense and vertical building stock environment like New York City, locating on-site generation systems is a real challenge. An on-site generation system requires space for the engine-generator assembly, its auxiliary devices, and a stack to exhaust the products of combustion. Other factors to consider are noise level, vibration, and the structural requirement to support these systems.

Finally, clean on-site generation systems frequently require an investment horizon of ten to fifteen years. It is very challenging to create an economic model to assess project costs, benefits, and risks when forward prices of natural gas (i.e., input fuel) and electricity (i.e., output energy) are uncertain and volatile on a monthly basis.

Peak Load Management

Proposed air emissions requirements from the New York State Department of Environmental Conservation would reduce the use of diesel emergency generators by customers as a way to curtail peak electrical demand. Over the next five years, air quality regulations are likely to result in the replacement of a large amount of the existing high-emission diesel generation with cleaner modern diesels and natural gas powered units.

However, curtailing or shifting energy use in the City poses a serious challenge. In a 24-hour, digital economy, the ability of financial institutions, law firms, and other service-oriented concerns such as hospitals and universities to shift or curtail load may be limited. While manufacturing plants can shift production times and capacities, the same flexibility is not available to commercial office buildings.

E. Distributed Resources Recommendations

Energy Efficiency

Support increased investment in energy efficiency

- Support the extension of the statewide System Benefits Charge (SBC) program.[26]

[26]The New York State Public Service Commission (PSC) established the System Benefits Charge (SBC) for New York State in its Opinion No. 96-12, issued on May 20, 1996. New York's SBC is designed to fund, during the transition to full electric retail competition and possibly thereafter, certain public policy initiatives not expected to be adequately addressed by competitive electric markets.

- Support policies that promote investment in energy efficiency to enhance overall electric system reliability, lower consumer costs, and enhance the protection of the environment.
- Support the increased use of cost-effective energy efficiency, fuel switching, and clean distributed generation as a least-cost strategy for providing distribution load relief services.
- Assist Con Edison in obtaining cost recovery from the Public Service Commission for reasonable expenses necessary to defer distribution reinforcement projects.
- Determine the optimal target level of distributed resources for New York City in the next five years.
- Recommend appropriate levels and allocations of SBC program investments for distributed resources in New York City.
- Work with NYSERDA to prioritize and align existing and upcoming incentive programs according to New York City's distributed resources needs.
- Collaborate with NYSERDA to optimize the marketing and delivery of their incentive programs and associated technical support services in New York City.
- Encourage the targeted use of tax-exempt financing vehicles for distributed resources projects in New York City.

Support legislation and regulatory rule-making to set and/or enhance appliance standards and targeted incentives at the state and federal levels

- Support regular reviews and strengthening of the New York State Energy Code.
- Form coalitions and participate in regulatory and legislative proceedings at the federal and state levels to support stricter energy efficiency appliance standards.

Fuel Switching and Thermal Energy Storage

Determine the necessary types and levels of direct incentives required to overcome the initial cost barrier of installing steam and gas chiller and thermal storage systems

- Support regulatory policies that will provide Con Edison and KeySpan Delivery the ability and flexibility to offer individually negotiated rates for non-electric chillers and thermal energy storage systems.

- Seek appropriate levels of incentives from NYSERDA to spur the application and installation of steam and natural gas chillers and thermal energy storage systems in New York City.
- Explore and assess the feasibility of district heating and/or cooling systems in major New York City rezoning and redevelopment projects without creating barriers to economic development.

Clean On-Site Generation

Support Con Edison in obtaining full cost recovery from the Public Service Commission for investments needed to mitigate high levels of fault current in the electric distribution system

- Identify specific distribution network areas without serious fault current limitations and where development of clean on-site generation can be made possible on a cost-effective basis.

Support the use of clean on-site generation systems

- Collaborate with Con Edison, KeySpan Delivery, and consumer groups to continue to enhance the new electric stand-by rates and proposed natural gas tariffs for clean on-site generation.

Adopt a standardized and streamlined grid interconnection review and approval process for clean on-site generation systems

- Exchange best practices with the Institute of Electrical and Electronic Engineers and with other states, such as Massachusetts and California, in the design and implementation of a standardized interconnection review and approval process.
- Work with the Public Service Commission, Con Edison, and other parties to develop a standardized interconnection review and approval process.

Peak Load Management

Expand the use of limited exceptions to air emission limits during wholesale market capacity and local grid emergency conditions

- Engage the New York State Department of Environmental Conservation and New York City Department of Environmental Protection to exempt from air emissions limits emergency generators that operate only in response to a request from NYISO and/or Con Edison during reserve capacity shortages and local grid constraints.

Collaborate with the Partnership For New York City and the Real Estate Board of New York to expand the Summer Energy Program

- Share best practices and expand the Summer Energy Program to other large customer groups in New York City including, but not limited to, the Building Owners and Managers Association of New York, New York Energy Buyers Forum, Consumer Power Advocates, International Facilities Managers Association (NYC Chapter) and Greater New York Hospital Association.
- Seek technical and financial support from NYSERDA, NYISO, local utilities and other private sector sources to streamline and automate the existing Summer Energy Program implementation and to create a workable measurement and verification protocol.

Support incentives for peak load management enabling technologies

- Support the expansion of targeted incentives from NYSERDA for smart metering, sub-metering and building control systems.
- Continue to implement targeted and pilot real time pricing programs to transform the market and to spur technology development in energy information and building controls.

VI. Energy Delivery Infrastructure

A. Overview of the Energy Distribution System

The City energy supply addressed in Section IV of this report is of little value if electricity cannot reach those who need it on a reliable basis. The ultimate availability of electricity depends on an effective transmission and distribution system.

Electric demand was up this past summer, in large part due to burgeoning residential requirements, and the August 2003 blackout vividly reminded New Yorkers of the critical role energy transmission plays in their lives. In order for the City to remain an international center of commerce and culture, public and private decision makers must be sure that New York has a reliable and resilient energy delivery infrastructure.

Con Edison Electric Distribution System

The Con Edison distribution system covers 604 square miles and contains an approximate population of 8,786,300, which includes the Bronx-Westchester region, Brooklyn-Queens region, Manhattan region, and Staten Island region. The electric distribution system consists of 54 area substations supplying 75 secondary networks and non-network load.[27] As of January 1, 2003, Con Edison served 3,126,174 electric customers: 2,291,421 network and 834,753 non-network. Approximately 86% of its 23,945-MVA[28] distribution transformer capacity is underground and 14% is overhead.

[27]A secondary network has the ability to supply load via multiple paths, whereas a non-network secondary system does not have this ability.

[28]MVA—Megavolt Ampere, a transformer capacity rating

In 2003, Con Edison Company invested $660 million in upgrades to its electric delivery system. These upgrades and improvements reflect Con Edison's commitment to provide the most reliable electric delivery service in the country. Industry analysts have consistently rated Con Edison as the leading electric utility for reliability in North America.

Con Edison Steam Distribution System

The Con Edison steam distribution system supplies steam to about 1,800 commercial and residential customers in Manhattan, extending from the southern tip of Manhattan to 96th street on the west side of Central Park and 86th street on the east side—the world's largest district steam system. Its customers use steam for space heating, water heating, central air conditioning, and manufacturing processes.

The Con Edison steam system has 105 miles of pipe under the streets of Manhattan. It has the largest number of district energy steam customers in the nation and an annual steam send-out of nearly 30 billion pounds, more than twice that of the largest European steam system. With 400 accounts having installed capacity of about 700,000 tons of air conditioning equipment, it is the country's largest steam-based cooling system.

Natural Gas Distribution System

New Yorkers use gas for cooking, domestic hot water and space heating, and other commercial and industrial purposes including gas utilized for steam and electric generation. Within New York City, there are two major providers of natural gas.

Con Edison is the largest distributor of natural gas in New York City in terms of volume of gas delivered and supplies of natural gas. The Con Edison natural gas distribution system in New York City consists of approximately 4,200 miles of mains, primarily located beneath City streets, and 372,083 services feeding individual buildings. The system serves approximately 1,054,312 customers in its service territory.

KeySpan is the largest distributor of natural gas in New York City in terms of number of customers. Serving a territory of 187 square miles, KeySpan delivers gas to 1,128,000 customers in Brooklyn, Queens, and Staten Island over 3,843 total miles of gas mains.

B. Economic Development and the Energy Distribution System

Each year, the City's projected rate of economic growth is factored into each utility's demand forecast. A current trend of increasing demand, despite the economic downturn, has contributed to the need for some 2,600 megawatts of additional resources by 2008. New York City has a highly reliable distribution system, with numerous separate and distinct power grids, but constant investments must be made to ensure its continued resilience.

One of the Bloomberg Administration's hallmark initiatives is to expand the City's economy by capitalizing on the strengths of the outer boroughs. Numerous areas are being rezoned, and comprehensive plans are under review for the development of commercial and residential projects throughout the City. To make Hudson Yards, Long Island City, and Downtown Brooklyn attractive alternative business districts, companies locating there must be assured a reliable power supply. Similarly, educational facilities on Governor's Island (which has its own distribution network), and new development projects in Lower Manhattan, Morrisania, and East Harlem will all need a strong distribution network to serve new customers.

In many cases, the new commercial or residential development will occur on land that is currently underutilized. For example, the City's plans for the far west side of Midtown Manhattan (Hudson Yards) involve rezoning land from its current manufacturing designation to one that would allow the development of large commercial and residential buildings. Examining the distribution network in these areas is critically important. In the case of Hudson Yards, the distribution network might include district steam service for heating and cooling, provided that the extension of Con Edison's steam distribution system would be economically attractive.

The current situation in Chelsea illustrates the importance of comprehensive economic development planning. In 1995, the City rezoned large portions of Sixth Avenue in Chelsea to allow for the development of large residential complexes on land that had been previously reserved for manufacturing use. In the period since the rezoning, nearly 1,500 residential units have been built on Sixth Avenue between 24th and 31st Streets alone. As galleries, restaurants, and other businesses have opened, real estate values throughout Chelsea have increased and additional residential development has occurred. Chelsea's electricity demand has recently grown at an annual rate of 3.3%, and Con

Edison is rapidly expanding the local infrastructure to serve the considerable increase in load—now one of the most constrained areas of the grid.

The Chelsea example illustrates the need to consider the strengths of the network when planning for future economic development growth. For example, the Mayor has made the provision of affordable housing a priority of his administration and has plans for the development or preservation of 65,000 homes and apartments over the next five years. Since residential development has largely been driving New York City's increasing peak load, it is important to look at how this increased power usage may stress the system.

Because development and construction can only occur where land exists to support it, it is not feasible to target development based solely on where excess capacity exists in the grid. Instead, the City must coordinate its targeted rezoning and other economic development initiatives with local utilities to enhance facility infrastructure.

C. Challenges and Opportunities

Electricity Load Growth

The greatest single challenge for the City's energy infrastructure is keeping up with load growth, particularly as it appears to be accelerating in some areas. This is largely a product of increased residential construction, and of sharply lower prices for home air conditioning units. These growth factors, combined with an economic recovery in the commercial and industrial sectors, will place great strain on a system that is already overburdened, despite Con Edison's efforts to expand and enhance its infrastructure.

Siting Distribution Facilities

As with power plants, the siting of electric substations is difficult in the City.[29] There are competing uses for the property needed for substations and public concern over their location. However, reliability depends to a great degree on the proximity of substations to the consumer load they serve. In addition, there is often inadequate recognition of the need to allocate property for utility workout facilities that house personnel and equipment.

The siting of these critical utility facilities is becoming more difficult as more neighborhoods are rezoned from manufacturing to residential and commercial

[29]The parallel is not exact, as substations are far smaller facilities, do not involve such issues as air emissions and large-scale visual impacts, and are already located throughout the City. Distribution substations reduce the voltage of electricity to lower levels so that it can be carried on smaller cables or distribution lines. Smaller transformers underground or on poles further reduce the voltage so that it can be used by customers.

districts. These critical utility facilities can be developed "as-of-right" in manufacturing zones, but not in residential and commercial zones. While the rezoning is intended to spur economic growth, it also restricts the energy infrastructure needed to support that growth. For example, the Hudson Yards Development Plan proposes rezoning that would change much of a manufacturing area to commercial and residential. As a result, Con Edison may not have an opportunity to build new substations as-of-right, and may face significant obstacles and substantial costs in securing the required variances or other approvals required to serve the economic growth. Ultimately, such costs are passed on to consumers.

Difficulties of Managing an Underground Infrastructure

While New York City's underground infrastructure facilities greatly enhance delivery reliability, maintenance and repair work on these facilities is difficult and expensive. Inaccessibility is an issue, not only because of the subterranean location, but also due to traffic disruption concerns and the sheer complexity of the underground network that includes telephone and cable lines, storm and sanitary sewer lines, subways, and water mains.

In a highly concentrated urban environment, a certain amount of disruption is inevitable in any substantial building or repair project. In the case of infrastructure work that almost inevitably involves opening streets for extended periods of time, it is particularly important to avoid unnecessary, costly, and inefficient projects on the same or overlapping sites.

D. Energy Delivery Infrastructure Recommendations

The primary responsibility for the City's energy infrastructure rests with the utilities that have the obligation to maintain and improve it. As noted above, they spend very large sums each year on infrastructure improvements and, to the extent that they are regulated, remain subject to Public Service Commission oversight in doing so. However, the City needs to play a role in facilitating necessary maintenance and upgrades of its energy infrastructure to the maximum extent possible.

Establish a collaborative capital infrastructure planning process between relevant city and state agencies and local utilities

- Establish a formal planning process to coordinate the major infrastructure projects for the City and State with local utilities.

- Include the local utilities at the earliest stages of any City rezoning and redevelopment plans. For example, the City and Con Edison are currently working together to develop unified infrastructure development plans for the Hudson Yards Redevelopment project.

Support the expansion of targeted demand-side management (DSM) and clean distributed generation (clean DG) for grid support

- Encourage the expansion of cost-effective and targeted DSM and pilot grid-level clean DG programs. Targeting distribution networks that are expected to require reinforcement due to increased area loads could defer capital investment for transmission and distribution load relief.
- Advocate increased investment and incentives for cost-effective energy efficiency, fuel switching and clean on-site DG as a least-cost strategy for providing distribution load relief services.
- Support technological innovations to interconnect clean on-site generation safely and reliably to the local electric distribution system.

Support the passage of joint bidding legislation to facilitate infrastructure projects[30]

- Seek the passage of joint bidding as a legislative priority in Albany. In the case of infrastructure work that almost inevitably involves opening streets for extended periods of time, it is particularly important to avoid successive projects on the same or overlapping sites.

Create a special zoning or permit designation to allow utility facilities in targeted development areas

- Create a more flexible zoning and/or permit designation for utility sub-station and workout locations to serve the growing loads in commercial, residential and mixed-use areas. Allowances in zoning should facilitate utility service infrastructure and avoid the need to obtain zoning variances in non-industrial areas.

Ensure that utilities and other energy project developers have access to public and private New York City docks

- Ensure that utilities and merchant energy developers have access to public and private New York City docks to minimize traffic congestion associated

[30]Joint bidding refers to shared bids between the City and the local distribution utilities affected by a particular construction project.

with the movement of large trucks and equipment. Access is also integral to the supply of building materials, utility components, and for the development activities associated with maintaining the energy infrastructure.

VII. New York City—Leading By Example

A. Overview of City Buildings and Facilities

The City of New York owns more than 2,500 major building assets, containing over 200 million square feet, and leases an additional 22 million square feet of space.[31] These facilities are utilized by twenty different City agencies and range from brand new schools to the landmarked City Hall, courts, police precincts, correctional facilities, homeless shelters, hospitals, and recreation centers in parks. The New York City Housing Authority (NYCHA) is managed independently of the City and is the largest public housing agency in the nation. Its 181,000 dwelling units in 346 developments are located in 2,724 residential buildings. In all, New York City, excluding NYCHA, holds more than 5,000 electricity accounts. A summary of the annual electricity use at City facilities appears in the table on the following page.

Together, the City of New York and NYCHA use more than 10% of the total energy consumed in the entire City. By expanding and improving their efforts to deploy distributed resources, City agencies can

- significantly reduce electric demand and energy usage in the City;
- reduce the burden on taxpayers;
- have a distinct, if indirect, influence over practices in the private community in such areas as design, construction, operation, and energy policy choices.

[31] "Major building assets" are defined as buildings with replacement cost of more than $10 million and at least ten years remaining life.

The City of New York has pursued opportunities to reduce its electric load for many years. Some efforts are spearheaded by the Department of Citywide Administrative Services' Office of Energy Conservation (OEC), working with individual City agencies; others are directly initiated by individual agencies.

Utility purchases for City agencies and cultural institutions, the Health and Hospitals Corporation, and CUNY, are made through OEC. Each agency and organization designates an energy liaison officer (ELO) to whom extensive monthly energy cost and usage information is provided for each account and location.

Annual Electricity Use by City Offices and Public Buildings
Megawatts (MW) and Megawatt Hours (MWh)

Consumer	MW	MWh	MWh %
Education	280	887,000	17%
City Offices	245	1,040,000	20%
Department of Environmental Protection, including Sewage Treatment Plants	109	640,900	12%
Transportation, including Street and Traffic Lighting	8	390,100	8%
Health and Hospitals Corporation	80	378,600	7%
City Universities, Libraries, and Cultural Institutions	148	645,800	12%
NYC Housing Authority	240	1,200,000	23%
TOTAL	1,110	5,182,400	100%

B. Current State of the City's Distributed Resources Activities

Energy Efficiency

Energy efficiency achieved through improved operations or capital retrofits is fundamentally important in reducing baseline demand for electricity and energy costs over the long term. Since 1997, New York City agencies have been able to undertake energy efficiency capital projects through the Energy Cost Reduction (ENCORE) Program, a collaborative effort between the City and NYPA. Projects are principally directed at improved lighting, motors, chillers, energy management systems, and process improvements in Department of Environmental Protection (DEP) plants.

The ENCORE program is, in effect, an energy performance contracting program in which the energy savings that result from the efficiency project are used to

pay for the cost of the project. Through ENCORE, NYPA offers turn-key services and low-cost financing to the City. Between January 1997 and September 2003, ENCORE completed 164 projects at a cost of $153 million, generating annual energy savings of $14 million, annual electrical energy savings of 55,000 MWh, and 8.7 MW in baseline energy demand reduction. Examples of major ENCORE projects demonstrate impressive savings:

- New high-efficiency lighting systems in more than 150 City public schools, installed at a cost of $42 million, save $7,000,000 annually in electricity expenses;
- Energy efficient chillers installed at the Brooklyn Municipal Building save $153,000 per year;

Similarly, City agencies have undertaken major energy efficiency initiatives of their own. The Department of Transportation has an initiative underway that will reduce energy use by nearly 20% per year by installing street lights and pedestrian crossing indicators that use significantly less wattage. At the Wards Island treatment plant, DEP has established an energy exchange with the New York State Department of Health. DEP sends digester gas to the Manhattan State Psychiatric Hospital; boilers at the hospital then use the digester gas to produce steam, which is then shared by the hospital and the treatment plant. Most of the steam is used for plant heating, but some is used by DEP to power chillers for air conditioning, thus reducing peak load on the electrical grid.

Clean On-Site Generation

Fuel cells generate "clean and green" electricity on-site at various City facilities including DEP water pollution control plants. In some cases, the fuel cells generate electricity from anaerobic digester gas, a by-product of the wastewater treatment process that would otherwise be flared to the atmosphere. The City now has eleven fuel cell installations; six are operational and five more are expected to be operational in April 2004.

In addition, certain New York City government buildings, including NYCHA, may be able to house equipment that can produce clean on-site electricity and heat using natural gas through the application of clean distributed generation (DG) or combined heat and power (CHP) systems. As discussed in Section VI, DG and CHP represent the potential to use current forms of energy more efficiently, and to thereby make a substantial net contribution to existing capacity. [32]

[32]See NYSERDA Final Report 02-12, Combined Heat and Power Market Potential for New York State (2002).

Peak Load Management Program

New York City agencies participate in NYPA's Peak Load Management Program to help reduce the electric system's load on peak summer days. As the City's centralized energy billing agency, OEC promotes participation in the program through extensive outreach to City agencies.

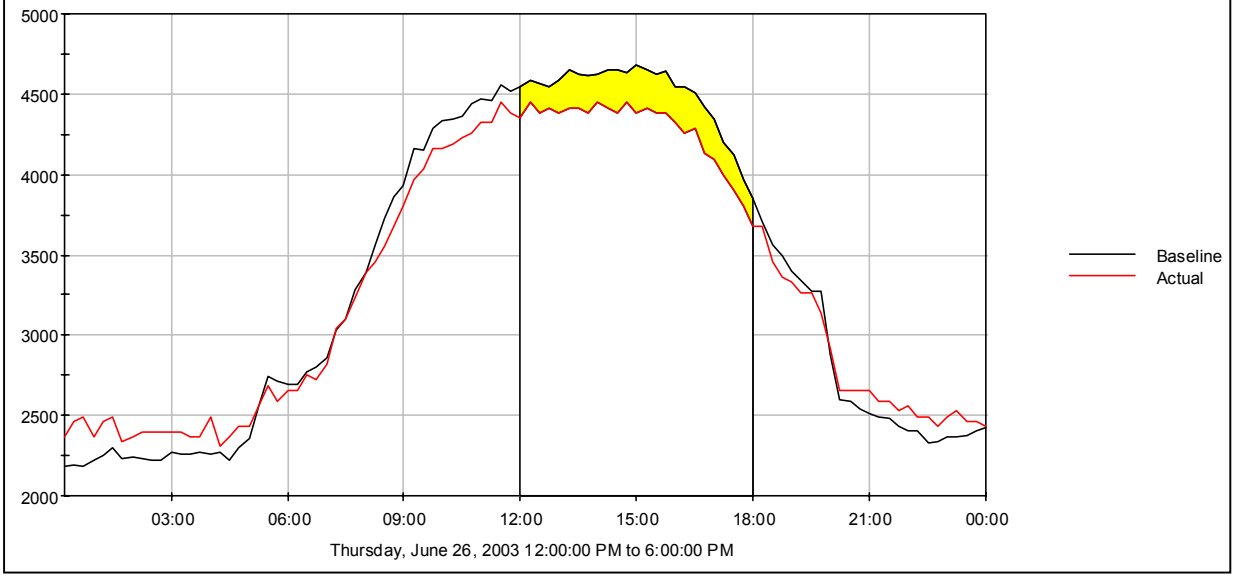
As reflected in the table below, participation in this program has grown steadily since its inception in 2001. In summer 2002, facilities for which the City purchases electricity contributed 28 MW of peak reduction; for summer 2003, the commitment was 36 MW. DEP is the largest participant. In 2003, DEP exceeded its contracted reduction of 17 MW in demand by an additional 7 MW.

City Accounts Participating in NYPA Peak Load Reduction Program

	Number of sites	Contracted reduction (MW)
Summer 2001	3	18.0
Summer 2002	22	26.9
Summer 2003	43	35.9

Most sites reduce system load by using generators. At One Centre Street, the Manhattan Municipal Building, peak load is shed by raising air conditioning set points, reducing lighting levels, and selectively shutting off elevators. For facilities that are too small to participate formally in the Peak Load Reduction Program, the City nonetheless notifies its agency representatives to reduce usage on days designated as peak load periods. The chart below shows the load

Peak Load Curtailment at One Centre Street, June 26 2003



that was reduced at One Centre Street on a peak day during the summer of 2003.

High-Performance Building Design

High-performance buildings are generally those that are highly energy efficient, have low life-cycle costs, and minimize adverse environmental effects for their occupants and the community at large. The added initial cost for some of these high-performance features must be justified by the reduction in future costs and an improved working environment over the term of the building's operation.[33]

The City's Department of Design and Construction's (DDC) Office of Sustainable Design has incorporated high-performance building design elements in two completed pilot projects—the new South Jamaica Branch Library in Queens, and the new Children's Center in Manhattan, a central intake and training facility for the Administration for Children's Services. Four more pilots are under construction and ten are in design, including three projects being designed to achieve LEED certification from the U.S. Green Buildings Council.[34] These latter projects will be analyzed to assess the costs, benefits, and limitations of using LEED as a design tool in the ongoing effort to improve the performance of City buildings. Two of the projects incorporate photovoltaics into roof and exterior wall materials. Based on technical projections of energy performance, average savings on all the pilot projects should be approximately 20% above those mandated in the current New York State Energy Conservation Code. Actual savings on the completed projects are being monitored to ensure that such projected savings are in fact realized.

In order to further support these guidelines, the City recently joined with the federal Environmental Protection Agency and others in sponsoring a design competition for green buildings design in New York City. The competition will seek ideas on how to utilize clean on-site power generation, solar and wind energy, brownfield developments, and water and energy efficiency in new building designs. Winning designs will be displayed in all of the five boroughs. They will contribute to the City's understanding of green buildings and will benefit all City agencies and the public at large.

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[33]See High Performance Building Guidelines, New York City Department of Design and Construction, April 1999. This report was developed with the Design Trust for Public Space.

[34]Leadership in Energy and Environmental Design (LEED) is a consensus-based national design standard for developing highly efficient and sustainable buildings.

C. Challenges and Opportunities

Energy Efficiency

Funding limitations for energy efficiency in City agencies and cultural institutions are likely to become more pronounced in the face of current budget deficits, creating competition for scarce resources. While retrofit projects are financed and paid for from projected energy savings over a period of time via the ENCORE program, they still incur overhead costs. In addition, there are still incremental investments required, especially in new construction and operation and maintenance programs when incorporating energy efficiency measures.

Further, there is currently no direct incentive mechanism in place to encourage agencies to increase energy efficiency. Client agencies do not receive any share in the energy and operating cost savings derived from energy efficiency projects in their facilities—or, alternatively, for reaching energy efficiency targets. All of the savings and avoided costs accrue back to the City's general funds.

Clean On-Site Generation

Clean on-site generation is currently not part of a least-cost resource plan to supply the City's electricity needs. In 1995, the City extended its existing energy supplier relationship with NYPA by executing a contract with a term of ten years. Prices paid by the City to NYPA are generally lower than those available in the competitive market. However, the current electric supply contract does not specifically include clean on-site generation as part of the least-cost resource mix to supply the electricity needs of the City.

The City has limited experience with packaged on-site natural gas generation systems. The most common clean on-site generation technology employed today is the natural gas engine-generator set. While the City has installed a number of fuel cells on a pilot basis, it has not widely deployed gas engine-generator sets in distributed generation modes or cogeneration applications. Gas engine-generators have different economic, technical, operational, and environmental requirements, especially with regard to their application and connectivity to the Con Edison electric grid.

Peak Load Management

Only a limited number of City facilities have large enough on-site generation equipment or have large enough loads to qualify for the Peak Load Management Program, and the best candidates are already enrolled. Of the remaining generators that could be enrolled, most will probably not qualify under new air emission requirements by NYS DEC. The new requirements have sharply reduced the option of using diesel emergency generators as a way to curtail peak electrical demand.

In addition, facilities that might have sufficient load-shedding capabilities are not currently equipped with the right meter type, building controls system, and rate structure, or have very limited functional flexibility to curtail load.

High-Performance Building Design

Initial costs of projects often overshadow life-cycle costs. High-performance building design and green buildings use materials and equipment with reduced impacts on global, local, and internal environments during their design, construction, operation, demolition, and reuse. While there are numerous life-cycle benefits from green buildings, many decisions made in the public and private sectors are still based on, or constrained by, the real or perceived additional cost of designing and constructing green buildings. Also, at this early stage in the technology adoption cycle, the benefits of high-performance building design are still challenging to quantify and justify to most decision makers.

D. New York City—Leading by Example Recommendations

Energy Efficiency

Enhance and augment the City's menu of energy efficiency programs

- Increase the use of energy performance contracting such as the City's Energy Cost Reduction (ENCORE) Program. Research thoroughly and consider alternative ways and methods of project delivery and financing.
- Develop a pilot web-based energy information management system to track and report on energy usage and the cost to operate select City facilities.
- Organize formal energy efficiency training programs for agency representatives, including facility managers and building engineers.
- Introduce a pilot commissioning program for new and existing facilities.[35]
- Consider incentives to encourage agencies and City employees to reduce energy and operating costs. For example: (1) assign dedicated resources to fund cost-effective incremental energy efficiency components in capital projects; (2) develop a high-profile awards program to recognize City employees for exemplary energy efficiency achievements.

[35] Commissioning is a process that ensures that building systems operate efficiently and according to their original design intent.

- Support the use of Energy Star and New York State Energy Code efficiency standards for the procurement of appliances, building materials, and equipment for City facilities.

Strategic Energy Planning

Create a City energy efficiency plan

- Conduct an energy efficiency potential assessment of the City's portfolio of facilities over the next six to twelve months.
- Set realistic energy efficiency targets along with practical and flexible measurement and verification protocols. These should include necessary adjustments and allowances for facility functional changes and for beneficial energy growth.
- Exchange energy efficiency program best practices with other jurisdictions at the federal, state, and local levels.
- Identify and address the resource needs to successfully implement the City's energy efficiency plan.

Develop pilot energy educational programs

- Develop energy-related educational pilot programs that can potentially be integrated into the curriculum of the New York City school system.
- Collaborate with NYPA, NYSERDA, and Con Edison to create and promote energy education materials for the general public, for elementary and secondary schools, and for public libraries.

Tie economic development assistance to energy efficiency

- Require businesses that receive energy rate discounts and tax abatements through City economic development programs to evaluate and implement cost-effective energy efficiency measures where cost effective.

Fuel Switching and Thermal Energy Storage

Expand the use of steam and gas chillers and thermal energy storage systems where cost effective

- Assess the use of non-electric or hybrid (i.e., a mix of electric and non-electric) chiller plant designs for air conditioning systems in new or retrofit projects in City facilities.
- Explore the integration of chilled water or ice storage systems to shift peak electric demand for cooling permanently from on-peak to off-peak hours.

Clean On-Site Generation

Include clean on-site generation strategies as part of a least-cost resource plan to supply the electricity needs of City agencies

- Conduct a survey of City facilities to screen for potential application of clean on-site generation projects over the next six to twelve months.
- Forge partnerships with NYPA, NYSERDA, KeySpan, and Con Edison to develop and facilitate projects for various clean on-site generation applications including natural gas packaged co-generation, micro-turbines, fuel cells and solar photovoltaic systems.

Peak Load Management

Seek direct incentives and low-cost financing for peak load management enabling technologies

- Collaborate with NYPA, Con Edison, KeySpan, NYSERDA and NYISO. Request assistance for peak load management enabling technologies such as smart metering, sub-metering, and the upgrading or re-commissioning of building control systems.

High-Performance Building Design

Incorporate cost-effective high-performance design strategies into City-led projects for long-term value

- Review high-performance building strategies with client agencies and consider them in the context of an overall project plan prior to commencement of design and construction.
- Explore making LEED a requirement for all New York City new construction building projects.
- Seek public and private resources to support technical design assistance. Review energy-related building materials and equipment to determine their appropriateness for New York City capital projects.

Partner with private sector New York City developers and the building community at large to promote the benefits of high-performance building design

- Highlight innovative green and sustainable development projects, both in the public and private sectors, to illustrate the ability to incorporate extremely high standards even in very large buildings in New York City.
- Use the City's building code (currently under revision) and permitting process to foster innovative design and construction strategies. Work with the Department of City Planning to see if the same can be done with regards to zoning.

- Collaborate with local and national chapters of the U.S. Green Building Council to develop a standard urban-NYC LEED rating system. Incorporate these guidelines and standards in the City's various major rezoning and redevelopment plans and related transportation projects.

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The specific recommendations of this report reflect a consensus position of the organizations involved. In some instances, certain organizations may be precluded from actively endorsing specific recommendations if such recommendations are outside of the direct charter or mission of the organization.

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