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October 25, 2007

VIA OVERNIGHT MAIL

Honorable Jaclyn A. Brilling
Secretary
State of New York
Public Service Commission
Three Empire State Plaza
Albany, New York 12223-1350

Re: Case 05-S-1376 – Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Consolidated Edison Company of New York, Inc. for Steam Service.

Dear Secretary Brilling:

The Commission's Order Determining Revenue Requirement and Rate Design, issued on September 22, 2006 in the above-referenced proceeding, provides that Consolidated Edison Company of New York, Inc. will file a steam resource plan.

Enclosed please find an original and five copies of the steam resource plan, approved by the Company's Chief Executive Officer, as required by the Order. Confidential trade secret information has been redacted from this filed version of the plan. Con Edison is also submitting today, under separate cover letter, the unredacted plan with the Commission's Record Access Officer.

Please contact me if you have any questions regarding this matter.

Very truly yours,

Richard B. Miller

Enc
cc (w/encl.): Active Parties (via e-mail)

2007 Steam Resource Plan

conEdison

Prepared by

Consolidated Edison Company of New York, Inc.

October 26, 2007

Table of Contents

Appendices

1 EXECUTIVE SUMMARY

The Con Edison steam system is an important component of the overall New York City energy portfolio, providing both environmental and economic development benefits for the New York City metropolitan area. Con Edison is committed to assuring the long-term viability of its steam system by continuing to provide reliable steam service at a reasonable price. This Steam Resource Plan (Plan) describes the Company's steam production plans for the next 20 years to achieve these objectives. Con Edison submits the Plan in accordance with the current Steam Rate Plan (Rate Plan).[1] The Plan's principal findings and recommendations are:

1. The Company forecasts that winter peak load will grow from 10,510 thousand pounds per hour (Mlb/hr) in 2008 to 10,910 Mlb/hr by 2027, inclusive of projected peak load reductions.[2]

2. The boilers at the Hudson Avenue station are expected to be replaced by November 2013 and the boilers at the Ravenswood Steam Station by November 2016 in accordance with the findings of the 2006 Steam Production Options Study (SPOS) that these plants need to be replaced during the twenty year time frame for that study.[3] [4]

3. Replacement capacity of up to 1,600 Mlb/hr will be required at the Hudson Avenue station. Replacement capacity needs at the Ravenswood Steam station will likely range from 488 to 976 Mlb/hr, depending on uncertainties in the pace and location of new customer hookups, impacts of demand

[1] Case 05-S-1376, Order Determining Revenue Requirement and Rate Design (issued September 22, 2006), Appendix A, p. 34.
[2] References to years cover the winter period beginning November of the previous calendar year.
[3] The Ravenswood Steam Station (sometimes referred to as the "A-House") refers to the boilers, building and related facilities owned by Con Edison and located on the National Grid/KeySpan Ravenswood Generating station site.
[4] Long Term Con Edison Steam Production Options Study – Phase I Final Report, October 2006

reduction, energy efficiency actions, attrition of existing customers, and operational considerations. The Company plans to seek permits for the full range of potential capacity needed at both sites to maximize long-term planning flexibility.

4. The studies conducted for the Hudson Avenue station show that the need for replacement capacity will be best met by installing new package boilers. This option is preferred because it provides cost and reliability advantages as well as significant environmental benefits.[5]

5. The studies conducted for the Ravenswood Steam station show that the need for replacement capacity will be best met by installing two to four new boilers, each capable of providing 244 Mlb/hr. The operating condition of the Ravenswood Steam boilers allows for a later replacement date. Therefore, additional time has been allotted for further study of replacement options.

6. The Company decided not to issue a request for proposals for a merchant supplier of steam to replace Hudson Avenue capacity because: (1) a merchant supplier would have the ability to control the price of steam (i.e., the supplier would have market power) for a replacement plant for the Hudson Avenue site; (2) even if a long-term contract with a merchant provider could reduce market power concerns, there would be significant financial and accounting concerns because of the recent rule changes adopted by the Financial Accounting Standards Board; (3) information about the cost of merchant steam supplies indicates that a merchant alternative would not be cost competitive with the Company's boiler-only option.

[5] Prior to procuring equipment, the Company will select a specific boiler size for each site, considering equipment availability, cost, reliability, and opportunity for standardization.

7. The Company will continue operating the East River, 59th Street, 74th Street, and 60th Street plants over the 20-year planning period. This determination is consistent with the conclusions of the SPOS.

8. The Plan also provides for continued environmental improvements through equipment upgrades in the existing plants and increased use of natural gas at both existing and planned new facilities to reduce residual oil consumption.

2 INTRODUCTION

Con Edison's steam system service area extends from Battery Park north to 96th Street on the West Side and 89th Street on the East Side of Manhattan. It serves approximately 1,800 customers with steam for space heating and hot water and provides about 370 of those customers with steam for building cooling. Steam air conditioning displaces more than 600,000 tons of electric chillers and avoids an estimated 375 MW of peak electric load with concomitant savings in electric generation, transmission, and distribution resources.[6] Steam customer accounts include numerous commercial, residential and government buildings, including many of the City's most famous landmarks.

The steam system provides significant benefits to the air quality in New York City by reducing the need for hundreds of space-heating boilers, as well as trucks delivering fuel oil at customer facilities. In addition, steam production in centralized plants improves dispersion of air emissions. The steam plant boilers use clean-burning natural gas and low-sulfur oil, and the emissions from the centralized plants are continuously monitored and controlled to meet or exceed federal and state regulations. Moreover, nearly half of the steam produced is obtained from modern cogeneration plants that operate with much greater efficiency than older steam and electric generating facilities, which further reduces air emissions.[7]

On September 22, 2006, the Public Service Commission (Commission) approved a two-year Rate Plan for Con Edison's steam business. The Rate Plan provides that Con Edison will file a Steam Resource Plan with the Commission "by the later of

[6] Depending on the efficiency of new electric chillers selected by customers, the avoided load might be even greater.

[7] One recent example of the Company's success with emission reductions is its top ranking for Climate Governance as determined by the Carbon Disclosure Project, based on the Company's approach to addressing climate change and its transparent disclosure practices on the issue.

August 1, 2007 or 12 months after completion of the Steam Production Cost Study".[8] That Study was completed on October 27, 2006. Accordingly, the applicable filing deadline for the Plan is October 27, 2007.

The Rate Plan provides that the scope of the Steam Resource Plan would be as follows:

> *The Resource Plan will examine and discuss various resource options (e.g., maintain and/or rebuild existing boilers, construct a new boiler(s), construct cogeneration, or seek competitively procured capacity). The Plan will identify the option(s) selected by Con Edison and fully support and justify that selection.*[9]

The Plan builds on the following documents that were filed with the Commission within the past year:

- Steam Production Options Study (SPOS) – conducted by Worley Parsons under the guidance of the Steam Business Development Task Force and filed in October 2006. This study included a detailed assessment of the existing condition of the 59th Street, 74th Street, Ravenswood Steam and Hudson Avenue stations and recommendations for their ongoing operation, repair, and/or replacement. The Plan builds on the SPOS recommendation that the boiler units at the Hudson Avenue and Ravenswood Steam stations should be replaced.
- Steam Strategic Plan - filed in January 2007. This report provides information on Con Edison's business development and customer support programs. It

[8] Case 05-S-1376, Order Determining Revenue Requirement and Rate Design (issued September 22, 2006) Appendix A, p. 34.
[9] In approving the Rate Plan the Commission stated the "e.g." should be treated as "i.e." See Order Determining Revenue Requirement and Rate Design (issued September 22, 2006), p.17, Appendix A, p.34.

emphasizes steps the Company has taken and will continue to take to maintain and grow the steam business.

- Investment Grade Cost Study (IGCS) – conducted by Parsons Brinkerhoff and filed in August 2007. The Company obtained detailed investment grade cost estimates for two Hudson Avenue replacement options. The cost estimates in the IGCS are based on an engineering study that provided plant layouts, equipment selection, and cost inputs from equipment manufacturers. The IGCS also evaluated environmental permitting requirements.

The Plan describes investments needed to maintain or replace the steam supply resources to meet the following objectives:

- Maintain adequate capacity and reserve for reliable system operation;
- Comply with all applicable environmental requirements, including anticipated new regulations; and
- Minimize the cost of service and financial risks to ratepayers and shareholders alike, consistent with reliability and environmental requirements.

In accordance with the confidentiality provision of the Rate Plan, confidential cost information has been redacted from this report.[10] To demonstrate the Plan's analytical findings, non-confidential information has been used to the extent possible. All redacted information is set forth in Appendices B - E, which have been filed with the Commission's Records Access Officer.

[10] Case 05-S-1376, Order Determining Revenue Requirement and Rate Design (issued September 22, 2006) Appendix A, p. 33.

3 DESCRIPTION OF THE STEAM SYSTEM

3.1 Steam Generation

The steam system currently has a total of 13,060 Mlb/hr of net steam generating capacity. A list of stations is shown in Figure 3.1 below.

Figure 3.1
Steam Generation Current Rated Capacity

Steam Generating Station	2007–2008 Winter Net Capacity (Mlb/hr)
East River 10 & 20	3,200
East River 60	830
East River 70	1,186
East River South	650
Hudson Avenue LP Boilers	1,600
74th Street HP Boilers	1,300
74th Street Package Boilers	708
60th Street	762
59th Street HP Annex Boilers	950
59th Street Package Boilers	381
Ravenswood Steam	575
BNYCP Contract	918
Total	**13,060**

East River 10 & 20

East River has two cogeneration units (10 & 20) and each unit has a gas turbine and heat recovery steam generator (HRSGs), with no steam turbines. These units were placed in commercial service in April 2005 and replaced the Waterside Station, which was retired a few months later. Each unit is currently rated with a net steam sendout capacity of 1,600 Mlb/hr (with duct firing). Each unit consists of a General Electric Model 7FA Combustion Turbine capable of burning natural gas or distillate oil and an HRSG with supplemental duct firing. The East River Units 10 & 20 use selective catalytic reduction (SCR) technology to reduce nitrogen oxides (NO_x), and oxidation catalyst to reduce emissions of carbon monoxide (CO) and volatile organic compounds (VOC).

East River 60 & 70

East River Unit 60 generates both electricity and steam. This is a natural circulation, balanced draft non-reheat unit that burns natural gas and No. 6 fuel oil. The unit is currently rated at 830 Mlb/hr net steam sendout in extraction mode.

East River Unit 70 is being operated as an electric-only unit in the summer and as a steam-only boiler in the winter. This is a natural circulation, balanced draft reheat unit. It was converted to steam sendout in 1995. The unit burns natural gas and No. 6 fuel oil and is currently rated at 1,186 Mlb/hr net steam sendout.

East River South Steam Station (ERSSS)

There are five operational package boilers at the East River South Steam Station (ERSSS). These are natural circulation, balanced draft units. These boilers (Units

115-119) were converted to dual fuel in 2004, burning either natural gas or No. 6 fuel oil and are currently rated at 130 Mlb/hr each.

Hudson Avenue Station

Of the original 32 low pressure (LP) boilers, only four remain in service at the Hudson Avenue Station.[11] These are natural circulation, balanced draft, non-reheat boilers, which burn No. 6 oil and are currently rated at 400 Mlb/hr each.

74th Street Station

There are three high pressure boilers (Boilers 120, 121, and 122) and six package boilers (Boilers 1-6) at the 74th Street Station.

The high pressure boilers are natural circulation, balanced draft, non-reheat boilers, which burn No. 6 oil and currently have a total rated net steam sendout capacity of 1,300 Mlb/hr.

The package boilers are natural circulation, balanced draft units that burn No. 6 oil, and currently have a total rated net steam sendout capacity of 708 Mlb/hr.

60th Street Station

There are six package boilers (Boilers 1-6) at the 60th Street Station. These are natural circulation, balanced draft units, and presently have a total rated net steam sendout capacity of 762 Mlb/hr. These units burn natural gas or distillate oil.

59th Street Station

[11] High and low pressure nomenclature for plant descriptions in this section are relative to other existing or retired boiler categories within each station.

There are two high pressure annex boilers (Boilers 114 and 115) and three package boilers (Boilers 116, 117, and 118) at the 59th Street Station.

The high pressure boilers are natural circulation, balanced draft, non-reheat boilers, which burn No. 6 oil and a limited amount of natural gas. They currently have a total rated net steam sendout capacity of 950 Mlb/hr.

The package boilers are natural circulation, balanced draft units that burn natural gas and No. 6 oil. They are currently rated at a net total capacity of 381 Mlb/hr.

Ravenswood Steam Station

There are four boilers (Boilers 1-4) at Ravenswood Steam Station. These are natural circulation, balanced draft units that fire No. 6 oil and a limited amount of natural gas. The total site net capacity is 575 Mlb/hr. This reflects deratings of the units relative to their original net design capacity of 244 Mlb/hr each.

Brooklyn Navy Yard Cogeneration Partners

This plant is located within the Brooklyn Navy Yard and is owned by Brooklyn Navy Yard Cogeneration Partners (BNYCP). Con Edison purchases the plants entire net electric and steam output under a 40 year Energy Service Agreement (ESA) that began on November 1, 1996. This plant is comprised of two Siemens V84.2 combustion turbines, each nominally rated at approximately 100 MW, two associated HRSGs, and two Siemens steam turbines each nominally rated at approximately 40 MW. This plant utilizes natural gas as a primary fuel, with distillate oil as a back up. The ESA requires that BNYCP deliver 220 MW to Con Edison, with an associated seasonal steam output of 800 Mlb/hr in the winter (December through March), 750 Mlb/hr in the spring (April to May) and fall (October to November), and 550 Mlb/hr in

the summer (June through September). This cogeneration facility produces maximum steam output when its electric output is reduced below 220 MW.

3.2 Steam Distribution

The steam distribution system is comprised of approximately 105 miles of integrated distribution and service mains of varying diameters and design operating pressures. Higher-pressure steam lines are operated at up to 400 pounds per square inch gauge (psig) to enable certain generating plants to deliver steam to lower-pressure distribution mains. Other generating plants provide steam directly to the distribution system at pressures below 200 psig. Service mains deliver steam directly to customer premises. Steam distribution main diameters vary from 8 to 36 inches and service main diameters vary from 2 to 16 inches.

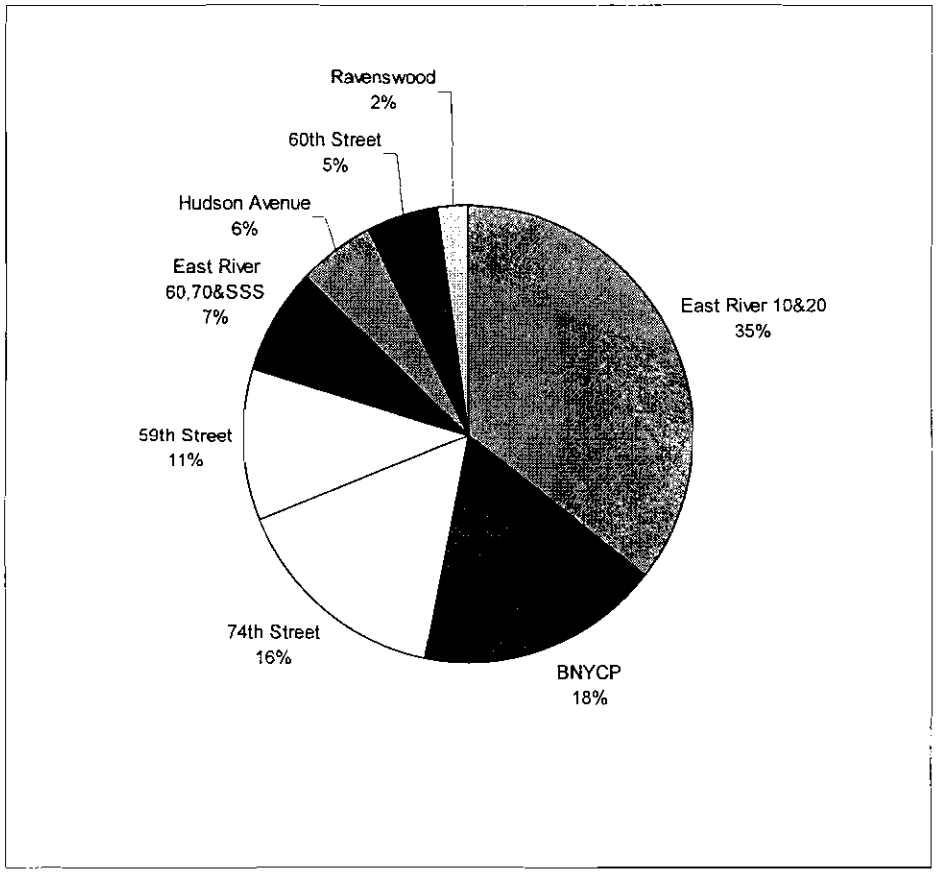
The new First Avenue tunnel has a 36-inch diameter main that enables Units 10 and 20 at the East River station to serve the uptown district at the same location where Waterside steam was previously supplied. A new piping connection was also provided from the East River station to the First Avenue main. Steam can be directed to uptown and downtown via remotely operated control valves.

The Company continuously evaluates improvements to the steam distribution system to meet operational needs and as supply and load distribution change.

3.3 Steam Sendout Statistics

Figure 3.2 shows the percentages of total 2006 steam sendout from each station. Units are dispatched to meet demand, subject to considerations such as cost, reliability (including local needs), fuel diversity, and emissions regulations. East River Units 10 and 20 and BNYCP are the two principal base-load plants. During 2006, Units 10 and 20 produced approximately one-third of the total sendout requirement. The Company dispatches as much steam as possible from this facility to minimize customer cost.

Figure 3.2
Steam Sendout by Station
(Total Sendout = 27,267,763 Mlb)



4 PEAK DEMAND FORECAST

Con Edison's peak load forecast provides the basis for determining production capacity amounts and timing. The forecast is updated annually. Appendix A discusses the forecasting methodology in more detail. A discussion of the major factors affecting the forecast follows.

Con Edison focuses on the following categories of information to project new business for its steam system. The categories are:

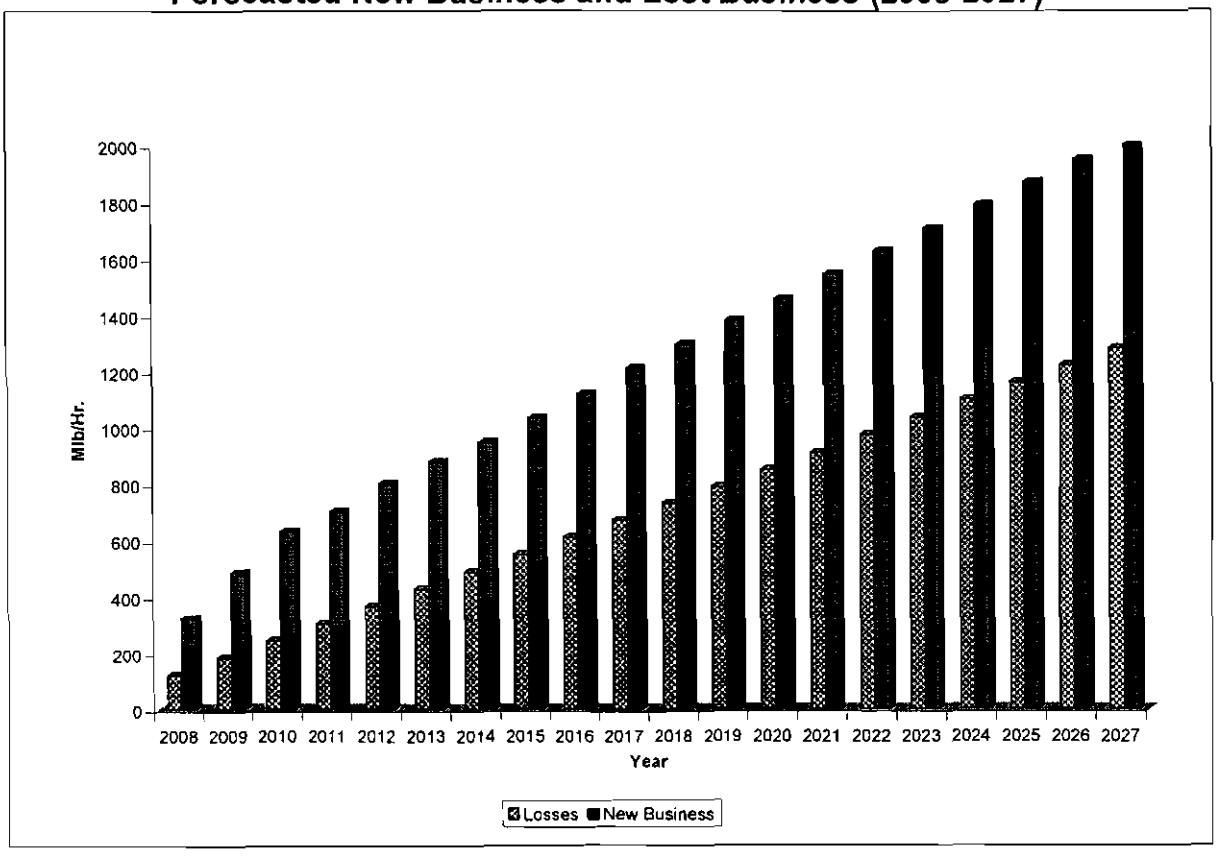
- New construction for which the Company has received Service Interconnection Requests;
- Economic factors that affect new commercial construction;
- Economic factors that affect new residential construction; and
- Vacancy rates.

The Company's forecast also takes into account anticipated lost business due to building demolitions and conversions to onsite generation.[12] Based on analysis of customer price elasticity and switching behavior, the Plan assumes that the overall competitiveness of steam service (including non-economic factors) will not change substantially over the long-term. Thus, conversions to on-site boilers are projected based on historical experience.

As indicated in Figure 4.1 below, between 2008 and 2027 new business resulting from economic activity will result in substantial increases in steam load that will be partially offset by lost business.

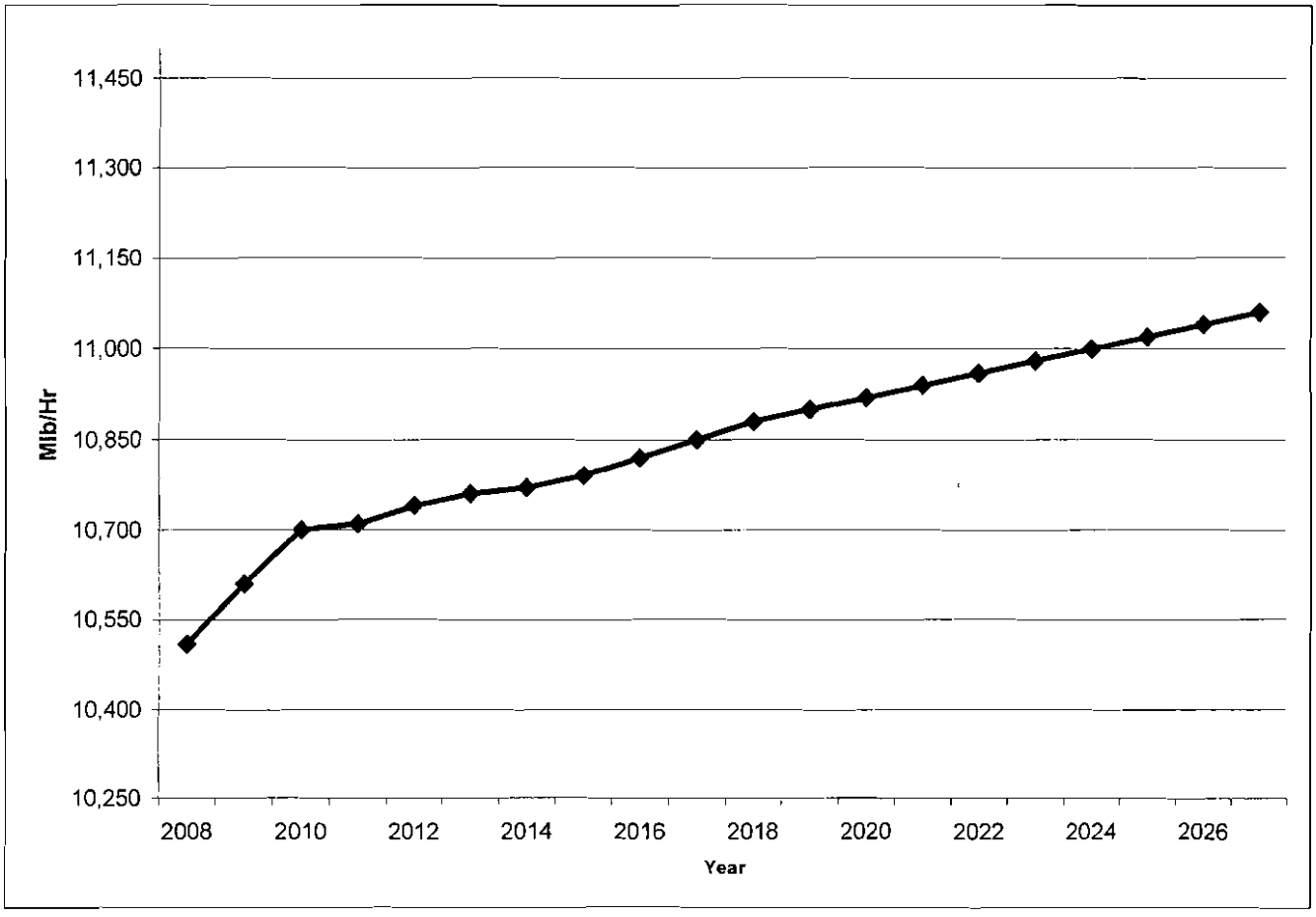
[12] This forecast does not take into account the impact of demand side management. Demand side management programs are discussed in Section 5 of this Plan.

Figure 4.1
Forecasted New Business and Lost Business (2008-2027)



The overall peak load forecast from 2008 to 2027 is shown in Figure 4.2. In 2008, the winter peak load is projected to be 10,510 Mlb/hr.[13] This is expected to increase to 11,060 Mlb/hr in 2027, the last year of the 20 year forecast period, before demand-side management is taken into account.

Figure 4.2
Peak Load Forecast (2008-2027)
Prior to Demand-Side Management



[13] The design condition used in the winter peak load forecasts is a 6° F temperature variable that is based on a one in three probability of being exceeded over 30 years (For more detail see Appendix A, Figure A.3 and Figure A.4).

The assumptions underlying the winter peak load forecast are subject to many variations and uncertainties. For example, economic conditions will almost certainly vary from the forecast over a 20-year period. Moreover, the steam system's cost competitiveness with onsite heating options can affect the rate of business gain and losses. Offsetting this possibility are other factors that affect customer preferences, such as convenience, space efficiency, and the desire for green power. Finally, changes in customer demand profiles could also affect the peak load forecast.

The Plan needs to be flexible enough to respond to ongoing load forecast variations. This is discussed further in Sections 8 and 11.

5 PEAK DEMAND REDUCTION PROGRAMS

In 2005, Con Edison retained Goldman Copeland Associates to identify demand-reduction measures that would reduce demand in the on-peak period — specifically, 6:00 to 11:00 a.m. on winter weekdays. A description of the options considered in the Plan follows.

Storage of Thermal Energy in Existing Mechanical Systems

Con Edison and Goldman Copeland developed a demand-reduction technique known as Storage of Thermal Energy in Existing Mechanical Systems (STEEMs). In winter 2006-2007, Con Edison successfully tested this technique at two customer locations. The testing showed that implementing the technique would be cost effective for demand billed customers under the demand charge billing structure that will be in effect this winter. Specifically, the only additional equipment cost required was for interconnection of the Company's meters with each customer's Building Management System (BMS) and the programming of that system. The cost is estimated at $10,000 per building.

With the STEEMs technique, the BMS is programmed to store thermal energy in the existing circulating hot water loops. At 6:00 a.m., the BMS modulates the water temperature control valves to prevent the steam demand from exceeding a preset value. High and low water temperature limits pre-programmed into the BMS ensure that comfort and safety are not compromised.

STEEMs is appropriate for demand-billed customer buildings that meet the following criteria:

- For heating, use circulating hot-water systems that can handle high water temperatures;

- Have induction units, fan coils, fan powered boxes, or any other terminal units that have a local thermostat; and
- Have a programmable BMS.

Con Edison estimates that approximately 100 demand-billed customers would meet these criteria and have an economic incentive to install STEEMs to reduce their demand charges. The estimated cumulative demand reduction potential is 150 Mlb/hr.

Voluntary Demand-Response Program

Voluntary demand-reduction programs — programs that pay customers to voluntarily reduce the amount of energy used during peak times — are another option the Company analyzed. In winter 2006-2007, Con Edison, working with four customers, conducted a successful pilot program that identified effective voluntary demand-reduction measures customers could implement. These measures are now posted on the Con Edison Steam Web site.

This test program indicated that peak demand could potentially be reduced through voluntary demand-reduction measures at a cost that is lower than the marginal cost for additional capacity. The Company is investigating continuation or expansion of this type of demand-reduction program.

Electric Heating in Lieu of Steam

With this option, a customer would use available electric service to offset steam use on high-demand days. To accomplish this, supplemental electric water heaters would be installed in space-heating systems that use hot-water circulation loops that are primarily heated by steam. This approach, however, would not work in buildings with heating systems that use steam circulating loops. This option also requires that the building have space to accommodate heaters, pumps, and other equipment

associated with electric water heating. It also requires the building to have spare electric capacity. The cost of this option was found to exceed the marginal cost of capacity and it is not recommended.

Thermal Storage

With this option, a building would use the steam generated by Con Edison during non-peak hours to heat and store water in large, insulated storage tanks. The stored energy would then be used during peak hours. The quantity of hot water is equivalent in thermal capacity to compensate for the reduced steam demand. Heated water would be circulated into the various hot water loops during peak demand periods. To use thermal storage, a customer's building must have extra space for the additional equipment and be strong enough to handle its weight. The cost of this option was found to exceed the marginal cost of capacity and it is not recommended.

Preheating

This option would apply if a customer's building could be preheated before the on-peak period begins. While this option would reduce overall demand, analysis of demand data from a number of customers shows that preheating has limited applicability. In many buildings, the heating system is started before the 6:00 a.m. on-peak period and/or is operated all night when it is very cold.

Summary

Based on the favorable economics of STEEMs and the voluntary demand-response program and the uncertainty as to customer participation rates, the Plan assumes a total demand reduction of 150 Mlb/hr will be achieved by 2013.

6 ENVIRONMENTAL CONSIDERATIONS

The following is a discussion of the ongoing environmental programs for the existing plants and the environmental considerations for the repowering options considered in the Plan. The SPOS and the IGCS have also presented detailed analyses of potential emissions and discussed permitting issues for repair / replace / repower options. More detailed evaluations to support permitting will be performed at the time of permit application.

6.1 Air Pollutant Reductions Achieved in Recent Years

The Company is committed to striving for excellence in its environmental performance while complying with all applicable laws and regulations. Accordingly, the Company has implemented various projects that have resulted in reductions in air emissions from the steam system. Environmentally, the most significant projects in recent years have been the following:

- Replacement of Waterside Station with East River 10 & 20 gas turbine cogeneration plant;
- Implementation of nitrogen oxides (NO_x) reduction projects at various boilers in the system; and
- Fuel management to reduce sulfur dioxide (SO_2) emissions.

As a result of retiring the Waterside Station and installing gas turbine cogeneration facilities at East River 10 & 20 units, the Company achieved a net annual reduction in NO_x emissions. The East River 10 & 20 units are equipped with emission controls for NO_x.

The steam system complies with NO_x-RACT (Reasonably Available Control Technology) regulations, which currently limits the Company system-wide average NO_x emissions to approximately 0.26 lbs/MMBtu. The New York State Department of Environmental Conservation (NYSDEC) is likely to lower this limit, as discussed

below. During the ozone season (May – September), all steam system unit NO_x emissions are tracked and reported on a 24-hour average basis (Ravenswood Steam and BNYCP plants are monitored by KeySpan and BNYCP, respectively). Outside the ozone season, NO_x emissions are tracked and reported on a 30-day average basis. Individual boilers that cannot comply with their respective allowable limits are allowed by the regulations to be averaged with other boilers with compliance margins.

To achieve NO_x reductions, the Company implemented various boiler projects, such as installing low NO_x burners, modification of burner systems, new burner management systems, flue gas recirculation, and overfire air. The Company also achieved net annual reductions in SO_2 and PM_{10} emissions. These reductions were achieved by procuring fuel oil with reduced sulfur content (<0.30% for No. 6 oil, <0.20% for distillate oil) and burning additional natural gas at the East River station. These efforts have contributed to system-wide emission rate reductions as shown in Figures 6.1a and 6.1b.

Figure 6.1a

Recent Emission Rate Data for NO_x and SO_2 – Total for All Company Boilers

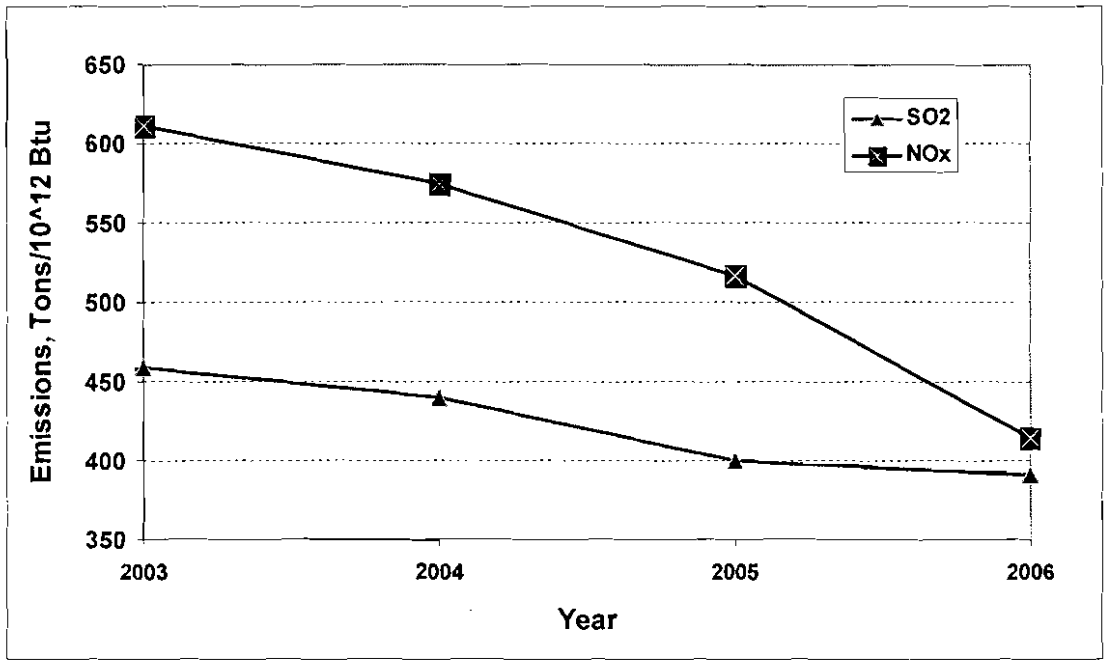
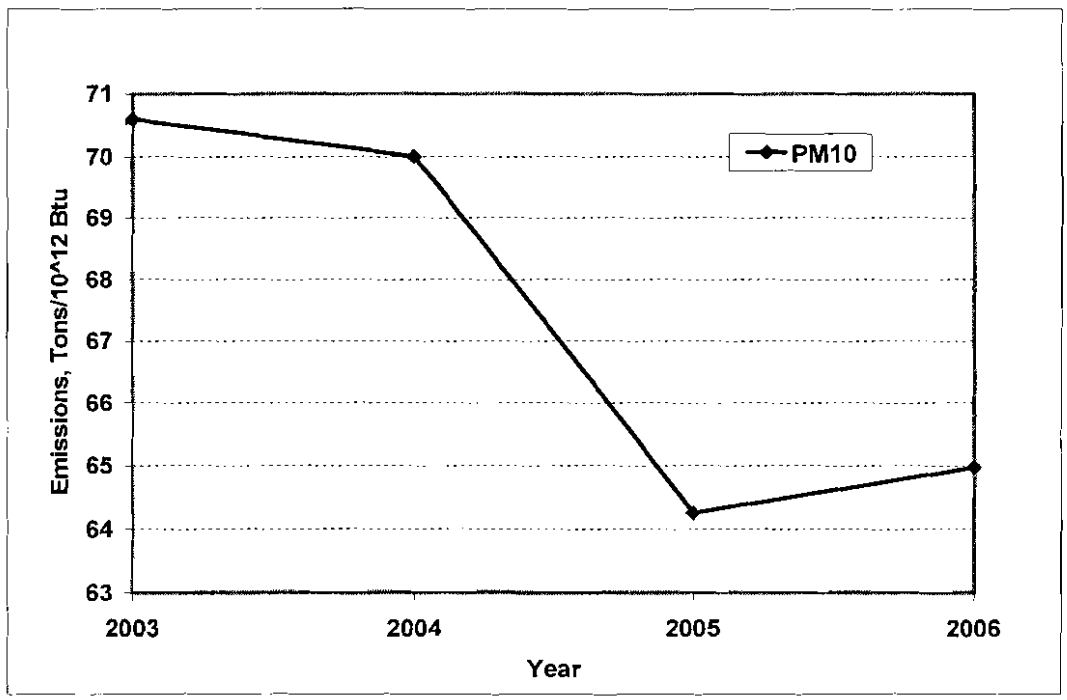


Figure 6.1b

Recent Emission Rate Data for PM_{10} – Total for All Company Boilers



6.2 Recent and Anticipated New Regulations

New Regulations for NO_x and SO_2 Emissions

The NYSDEC recently adopted regulations that would provide for annual tonnage allocations for NO_x and SO_2 emissions in addition to the existing ozone season NO_x allocations. In addition, the NYSDEC is currently evaluating new regulations that would further restrict NO_x emissions, primarily because New York State continues to be designated as a non-attainment area for ozone by the U.S. Environmental Protection Agency (EPA). NO_x emissions are considered to be precursors of ozone. The NYSDEC is considering the following proposals:

- Lowering the permissible average emission rate for NO_X-RACT from 0.26 lb/MMBtu to 0.15 lb/MMBtu during ozone season; and
- Requiring NO_x emission reductions on a daily basis during High Energy Demand Days (HEDD), prompted by the finding that the monitored ozone exceedances in the Northeastern states occur mostly on days when electric demand is at its peak.

The recently adopted regulations will result in new allowance trading programs and enhancements of existing trading programs. While the exact implication of these programs is not yet known, the Plan includes $6 million in potential expenditures at the 59th Street and 74th Street Stations for additional NO_x reductions that may be required and/or economic under future allowance trading regimes. Additionally, the Plan provides for $16 million for other environmental projects at the existing steam generating stations.

The Plan also includes $55 million in estimated costs for conversion of the existing boilers at 59th Street and 74th Street to have the capability to burn 100% natural gas to facilitate reductions in NO_x, SO_2 and PM, as well as CO_2. While the exact timing

of these conversions has not yet been established, the Plan assumes the need for these projects during the Plan period to meet potential new regulations and/or more restrictive interpretations of existing regulations.

New Regulations for Carbon Dioxide Emissions

The Regional Greenhouse Gas Initiative (RGGI) is an agreement among 10 states, including New York, to stabilize, beginning in 2009, and then reduce, CO_2 emissions using a cap and trade program. Allowances will be auctioned, with one allowance giving the right to emit one ton of CO_2 during a calendar year. The number of allowances to be auctioned would be reduced each year, beginning in 2015, to achieve net reductions in CO_2 emissions. Consequently, the Plan has included an estimate of the allowance costs for cogeneration units that are expected to be affected by these new rules.

6.3 Regulatory Considerations for Repowering Options

Permitting Requirements

The Plan assumes that replacement of boilers with new boilers or cogeneration units will be subject to federal, state and New York City environmental reviews and permitting. This process is expected to take about 24 months if the review is undertaken pursuant to the State Environmental Quality Review Act (SEQRA).

Environmental Justice

The permit process may require addressing environmental justice (EJ) issues in the vicinity of a proposed new plant. This is done by an assessment that would determine if there is a disproportionately high and adverse impact on minority or low-income communities due to a proposed project. Actions that could trigger an EJ assessment are relocating steam capacity from one station to another or building a new plant at an existing facility that could raise the potential to emit.

NYSDEC has an EJ procedure that will require the Company to consult with the NYSDEC Staff to determine whether a potential EJ community is affected by the project, and if the potential for disproportionate adverse environmental effects is identified, an environmental impact statement will have to be prepared. If an EJ community is identified, a public participation plan would need to be developed to facilitate enhanced public participation in the environmental review. In accordance with the finding of the IGCS, the Company will need to address EJ in any permit filing for Hudson Avenue.

Air Emission Requirements for New Plants

New York City has been designated a non-attainment area for ozone and particulate matter with particle size <2.5 microns ($PM_{2.5}$). This designation requires more stringent limits for the ozone precursors (NO_x, and VOCs) and $PM_{2.5}$. As provided in the IGCS, this Plan assumes that any repowering or replacement project will be equipped with low NO_x burners, SCR, oxidation catalyst, and should burn natural gas as primary fuel, with low sulfur oil as back up for 30 days maximum per year.

7 EVALUATION METHODOLOGY

7.1 Resource Evaluation Process

The starting point for the Plan's economic evaluation was the October 2006 Steam Production Options Study (SPOS). The SPOS assessed the condition, operation, and maintenance requirements of the Hudson Avenue, 74th Street, 59th Street and Ravenswood Steam stations. The SPOS also evaluated various repowering options and estimated the steam production cost over the 20-year period, 2006 - 2025 for all the options considered for repowering and continuing maintenance. The SPOS concluded that the existing boilers at the 59th Street and 74th Street stations could be maintained and that no replacement or repowering of these boilers was necessary over the 20 year plan period. The SPOS, however, also concluded that the boilers at the Hudson Avenue and Ravenswood Steam stations need to be replaced or repowered in order to continue operation over the 20 year period.

The Company's Plan was developed in two phases. The first phase examined the existing capacity at the 59th Street, 74th Street, 60th Street, and East River South stations. The Company concurs with the SPOS that continued maintenance of these plants would be cost-effective.

The second phase of the Company's evaluation considered various options for steam supply at the Hudson Avenue and Ravenswood Steam stations. After screening 14 repowering options for the Hudson Avenue station, the SPOS recommended several for more detailed study. The Rate Plan required the Company to study two of those options in more detail. The Company selected the following two options for more detailed examination in the IGCS:

- Install four new package boilers in a new building; and
- Retrofit the retired Unit10/100 with an air cooled condenser for operational flexibility and new environmental controls.[14]

The Company considered but did not advance a recommendation for a large cogeneration plant because the New York Independent System Operator (NYISO) has determined that there is no need for a regulated utility backstop solution to satisfy electric reliability needs through 2016.[15] This conclusion could be reevaluated if conditions change, for example, as a result of electric generating plant retirements due to plaNYC 2030 initiatives.

For the Ravenswood Steam station, the SPOS recommended new boilers. No other repowering options were found to be feasible at that site. The Plan also considered competitively-procured (i.e., merchant) capacity options at both sites.

The Company's evaluation considered these replacement capacity options relative to overall system needs, including the life-cycle cost and conformance with reliability criteria. (See Sections 7.2 and 7.3) Where two or more options had comparable costs and/or reliability, the evaluation also took into account various risk factors.

7.2 Revenue Requirement Analysis

The cost of each resource option was evaluated in terms of the revenues needed to recover capital investments and support plant operation with acceptable returns for 20 years. Where applicable, electric revenue offsets were allocated to the steam system. The items considered in the revenue requirement analysis included:

[14] As required by the Rate Plan, the Company presented those two options at a November 6, 2006 meeting of the Steam Business Development Task Force. No members of the Task Force objected.
[15] See the NYISO Comprehensive Reliability Plan 2007, Final Report, at 50 (Sept. 18, 2007)

Carrying Charges - consisting of depreciation, federal and state income taxes, and overall return. The analysis assumed a 30-year book life for depreciation of capital investments with an annual depreciation rate of 3%. Federal Income Taxes/State Income Taxes are estimated at approximately 40% of taxable income and calculated based on the desired after-tax equity return. The overall return consists of interest expense and equity return. Based on the Rate Plan, the assumed return on equity is 9.8% and the average interest rate of long-term debt is approximately 6%. The analysis used the Rate Plan capital structure for common equity (48%) and debt (52%) to calculate the required rate of return, which is approximately 8%.

Operations and Maintenance Expenses — were assumed to escalate at slightly less than the rate of inflation, recognizing ongoing productivity gains.

Additional Property Tax on new capital — was calculated based on the most recent forecasted tax rates. In addition, for new plants, Industrial and Commercial Incentive Program (ICIP) property tax credits were calculated on those parts of the station costs attributable to new equipment. The ICIP tax abatements are structured as follows: 100% abatement for the first 11 years; 80%, 60%, 40%, 20% abatements in years 12 through 15; and zero thereafter.

Fuel Cost — fuel consumption, fuel costs, and steam production for all options were determined using PROMOD, a production cost program, which estimated fuel use and total fuel cost for each option. Inputs to the program were each unit's heat rate, capacity rating, forced outage rate, and scheduled maintenance. The fuel price projections used in the analysis are shown in Appendix B.

Capacity and Energy Revenue — for cogeneration cases, capacity and energy revenues offset fuel costs and carrying charges. Forecasts for capacity and energy

prices used in the analysis are shown in Appendix B. Under the incremental cost method (used most recently at East River 10 & 20), a regulated steam-electric plant could have a majority of its costs allocated to electric generation.[16]

The revenue requirements calculated in this report were based on financial parameters reflected in the Rate Plan. Although the next steam rate filing may propose changes in some of these parameters and such changes could affect the absolute value of forecasted revenue requirements, they are not expected to alter the conclusions of the Plan's screening analyses or its resource recommendations.

[16] However, the economics of a steam-electric resource option are evaluated on the basis of the total cost of steam and electric generation.

7.3 Reliability Criteria

Steam reliability evaluations were performed to verify that planned resources would be adequate for overall system reliability. The criteria considered in this evaluation included installed reserve, system Loss-Of-Load Expectation (LOLE), and pressure control. The Company evaluated various combinations of supply at the Hudson Avenue and Ravenswood Steam stations that would meet system-wide requirements and site-specific flow and pressure limits. A discussion of the tools used to evaluate these criteria follows.

Installed Reserve

Installed reserve is measured against a deterministic criterion that requires total supply to exceed forecast load by a reserve margin at least equal to the loss of the single largest unit. This so-called "single–contingency" design criterion requires installed reserve to be no less than 1,600 Mlb/hr, the capacity of East River Units 10 or 20. However, another consideration is the system's ability to employ its reserve following a contingency. Operationally, this is done by establishing an on-line reserve requirement that can be met by capacity which is available for dispatch within minutes. Such a requirement allows the system to respond to contingencies rapidly to prevent system pressures from decaying below 125 psig. Currently, the steam system's operating reserve requirement is nominally 1,400 Mlb/hr, but 600 Mlb/hr of system capacity is not applicable to this requirement because it would not ordinarily be available for quick dispatch.[17] [18] Additional reserve is currently maintained to accommodate unexpected variations in weather and load, among other things.

[17] These distinctions are analogous to the 10-minute and 30-minute reserve on the electric system.
[18] Consequently to maintain 1,400 Mlb/hr operating reserve on the peak day, the system would need at least 2,000 Mlb/hr of installed capacity.

Loss-of-Load Expectation

Potential resource portfolios were also evaluated for their conformance with the probabilistic reliability criterion using General Electric Company's Multi-area Reliability Simulation Program (MARS). MARS was used to quantify the probability that the available resources would not be able to meet forecasted load, as measured by LOLE.[19]

A sequential Monte Carlo simulation forms the basis for MARS, and allows for the calculation of time-correlated measures, such as frequency (outages/year) and duration (hours/outage). To determine the reliability of the steam system, MARS took into consideration the randomly occurring events associated with forced outages. All recommended options were tested relative to a 1.0 day per year maximum LOLE criterion.

Pressure Control

The Company verified that proposed resource portfolios that met the above reliability criteria could also maintain steam pressure within the design range throughout the distribution system on a steady-state basis.[20] The model used for this verification simulated system operation under pre- and post-contingency conditions, which meant the steam pressures and required valve positions had to be acceptable under peak demand conditions before and after the most severe, single contingency (or common mode failure) related to the resource option in question.

[19] In the steam system, not meeting the load would result in a decline in pressure. Depending on the severity of the shortfall, disconnection of customers could be required.
[20] The design range of post-contingency steady-state pressures is 125-200 psig, except that high pressure mains may not exceed 400 psig,

8 STEAM RESOURCE REQUIREMENTS

8.1 Existing Plants

The Company's capital plan provides for the continued operation of the existing steam plants. With the exception of the Hudson Avenue and Ravenswood Steam stations, the existing plants are to be maintained through the 20 year planning horizon. The Hudson Avenue station's low-pressure boilers will be maintained until their planned replacement in 2014. This date is premised on receipt of necessary regulatory approvals for a replacement plant by 2011 (see section 11.3). To the extent that permits can be obtained sooner, the Hudson Avenue low-pressure boilers could be replaced before 2014. The boilers at the Ravenswood Steam stations will be maintained until their planned replacement in 2017.

The Company carries out an ongoing program of periodic inspections and preventive maintenance of existing equipment to provide for the safe and reliable operation of the steam plants. This preventive maintenance program calls for on site inspections, condition assessments, non-destructive inspections, root cause evaluations, and forced outage investigations. This program, in turn, forms the basis for the 20-year capital plan. This capital plan also incorporates various upgrades to boilers, auxiliaries, electrical, structural and balance of plant items at each of the steam generation sites. Selected projects in the 20 year capital plan for each station are discussed below.

East River Complex

The Company has determined that the East River 10 and 20 control systems and the ERSSS package boilers will need to be upgraded over the next twenty years.

ERSSS is also budgeted for a backup control room that will improve overall operation of the plant.

74th Street Station

Capital projects at this station include the following air emission reduction programs for complying with environmental regulations: gas conversion of the boilers, internal and external gas piping reinforcements and burner modifications for reduction of nitrogen oxide emissions. The Plan also calls for boiler overhauls and replacing the existing water softening treatment facility with a demineralization water treatment facility.

60th Street Station

Capital improvements targeted for 60th Street include package boiler and auxiliary equipment upgrades. The work will include tube replacement, air heater and fan upgrades. The water softening system for the package boilers will be upgraded for corrosion protection.

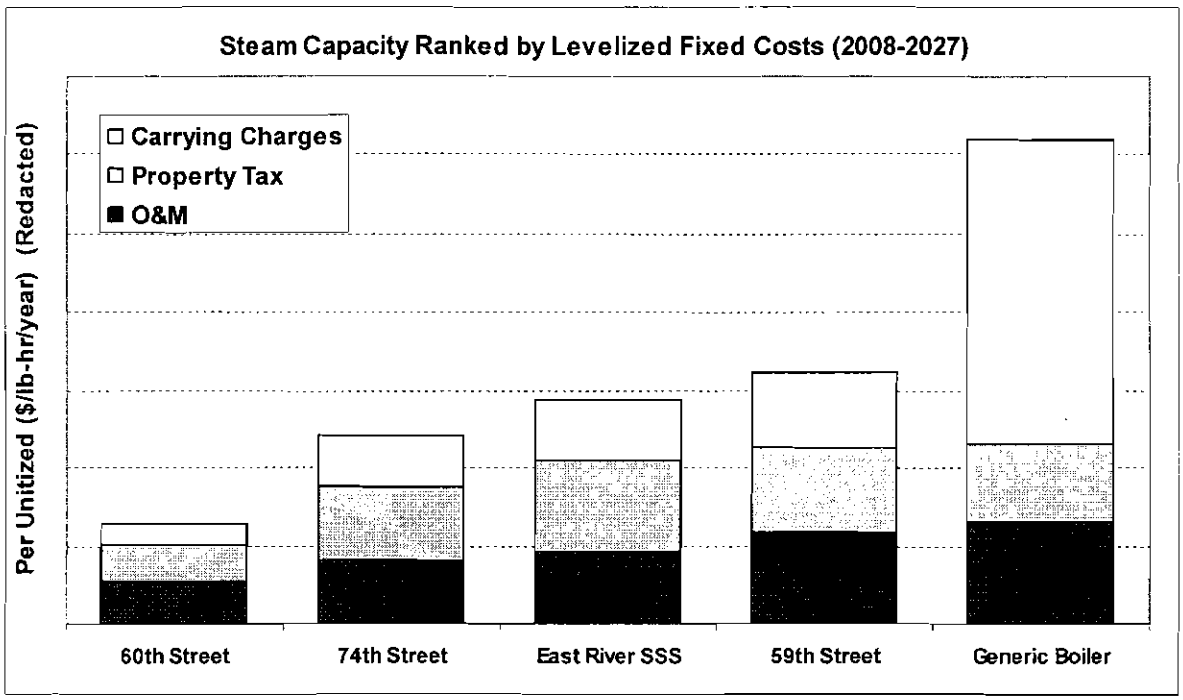
59th Street Station

Capital improvements identified in the Plan include boiler overhauls and the addition of a demineralized water treatment facility. A gas conversion project for the boilers is also planned. The boiler system work entails repairs and tubing replacements that will keep the boilers at their rated capacity for the next 20 years. The water treatment project is similar to that planned at the 74th Street station.

Resource Ranking

For each of the existing steam plants, carrying charges for the forecasted capital costs were evaluated along with projections for fixed operations and maintenance (O&M) and property taxes to determine the total levelized annual cost of steam capacity ($/lb/hr/yr). These costs were then ranked and compared to the cost of new boilers (using the Hudson Avenue investment grade estimate for 1,200 Mlb/hr as a proxy). Fuel costs were not considered because all the plants are expected to burn natural gas as primary fuel in the future. As shown in Figure 8.1, this analysis confirmed that maintaining the existing plants is more cost-effective than constructing new boilers.

Figure 8.1



8.2 Need for Replacement Capacity

An installed reserve projection was used to identify the need for replacement capacity at the Hudson Avenue and Ravenswood Steam stations following the retirement of the existing boilers (see Figure 8.2). Examination of Figure 8.2 indicates that the installed reserve would fall below 1,600 Mlb/hr in 2014 if the Hudson Avenue boilers were not replaced. Moreover, the level of replacement capacity that will be needed at both stations should be determined on the basis of the criteria discussed in section 7.3

By 2027, 2,175 Mlb/hr of existing capacity will be retired and the peak load is expected to grow by about 400 Mlb/hr. To maintain the current level of reliability over the 20-year planning period, a total of 2,575 Mlb/hr of replacement capacity would be required.[21]

The need to operate securely within steam main design pressures limits the portion of this capacity that could be installed at each site without major distribution reinforcements. Modeling was done to determine these limitations as well as to identify the need for any modest distribution system enhancements.

The nature of steam transmission requires that steam be generated in close proximity to the load. Thus, the uptown district is predominately served by the 59th Street, 60th Street, 74th Street, and Ravenswood Steam plants, while the downtown district is predominately served by the Hudson Avenue and BNYCP plants. The East River Complex (Units 10, 20, 60, 70, and South Steam Station) is able to supply both districts. Steam flows and system pressures were analyzed under the most severe contingency applicable to each scenario studied.

[21] MARS analysis confirmed the range of installed reserve discussed in section 7.3 would satisfy the system's LOLE criterion.

The results of the analysis are summarized in Figure 8.3. The findings are as follows:

- In order to fully utilize the capacity at Hudson Avenue to serve a load of 10,700 Mlb/hr or greater, the East 15th Street main should be upgraded to permit higher pressure (300 psig) operation and greater transfers to uptown. The estimated cost of this upgrade is $5 million (2007$). Generally, the East 15th Street main upgrade would permit a greater proportion of long-term capacity requirements to be met by Hudson Avenue.

- A minimum of 488 Mlb/hr is required at Ravenswood Steam to keep pressures within design limits at the East 10th and 11th Street mains emanating from East River Station.

- The maximum capacity at Ravenswood Steam (976 Mlb/hr) cannot be delivered simultaneously with the maximum capacity at 74th Street without causing high pressure (above 200 psig) at East 71st Street. To fully utilize the maximum capacity at Ravenswood Steam, the East 71st Street main should be upgraded to permit higher pressure (300 psig) operation. The estimated cost of that upgrade is $5 million (2007$).

Based on the foregoing analyses, replacement capacity would be required over the twenty year planning period as follows:

- A nominal 1,600 Mlb/hr at Hudson Avenue, and 488 Mlb/hr at Ravenswood Steam respectively; although the initial installation at Hudson Avenue might be 1,200 Mlb/hr depending on the load forecast and operational requirements at the time new capacity is installed;
- An additional 488 Mlb/hr at Ravenswood Steam, as needed to meet load growth.

Sections 9 and 10 of this report address the selection of specific resource options to meet these capacity requirements.

Con Edison will continue to re-examine resource requirements periodically to confirm that all reliability and operational criteria are satisfied.

Figure 8.2
Steam System Capacity, Load, and Reserve

(Mlb/hr)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Winter	*'07/'08*	*'08/'09*	*'09/'10*	*'10/'11*	*'11/'12*	*'12/'13*	*'13/'14*	*'14/'15*	*'15/'16*	*'16/'17*	*'17/'18*	*'18/'19*	*'19/'20*	*'20/'21*	*'21/'22*	*'22/'23*	*'23/'24*	*'24/'25*	*'25/'26*	*'26/'27*
Station/Unit																				
East River 10	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
East River 20	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
East River 60	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830	830
East River 70	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186	1,186
BNYCP	918	918	918	918	918	918	918	918	918	918	918	918	918	918	918	918	918	918	918	918
East River SSS	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650	650
74th High Pressure	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
74th Package	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708	708
60th Package	762	762	762	762	762	762	762	762	762	762	762	762	762	762	762	762	762	762	762	762
59th High Pressure	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950
59th Package	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381	381
Ravenswood 'A' House	575	575	575	575	575	575	575	575	**575**	**0**	0	0	0	0	0	0	0	0	0	0
Hudson Ave	1,600	1,600	1,600	1,600	1,600	1,600	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Projected Capacity	**13,060**	**13,060**	**13,060**	**13,060**	**13,060**	**13,060**	**11,460**	**11,460**	**11,460**	**10,885**	**10,885**	**10,885**	**10,885**	**10,885**	**10,885**	**10,885**	**10,885**	**10,885**	**10,885**	**10,885**
Peak Load Forecast	**10,510**	**10,610**	**10,700**	**10,710**	**10,740**	**10,760**	**10,770**	**10,790**	**10,820**	**10,850**	**10,880**	**10,900**	**10,920**	**10,940**	**10,960**	**10,980**	**11,000**	**11,020**	**11,040**	**11,060**
DSM		**30**	**60**	**90**	**120**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**	**150**
Net Peak Load	**10,510**	**10,580**	**10,640**	**10,620**	**10,620**	**10,610**	**10,620**	**10,640**	**10,670**	**10,700**	**10,730**	**10,750**	**10,770**	**10,790**	**10,810**	**10,830**	**10,850**	**10,870**	**10,890**	**10,910**
Installed Reserve	**2,550**	**2,480**	**2,420**	**2,440**	**2,440**	**2,450**	**840**	**820**	**790**	**185**	**155**	**135**	**115**	**95**	**75**	**55**	**35**	**15**	**(5)**	**(25)**

Figure 8.3
Pressure and Flow Studies

Scenario							
Hudson Avenue (Mlb/hr)		1200	1200	1600	1600	1200	1200
Ravenswood (Mlb/hr)		575	488	488	244	976	976
Distribution		As-Is	Upgrade East 15th Street	Upgrade East 15th Street	Upgrade East 15th Street	Upgrade East 15th Street	Upgrade 15th & 71st St. Mains
Load Served (Mlb/hr)		10,720	10,910	10,910	10,910	10,910	10,910
Contingency ("Loss of")		74th Street HP Boilers	74th Street HP Boilers	74th Street HP Boilers	74th Street HP Boilers	East River 10 or 20	East River 10 or 20
Generation (Mlb/hr)							
	Ravenswood	575	488	488	244	976	976
	74th Street (*)	720	720	720	720	1,960	1,960
	60th Street	762	762	762	762	427	427
	59th Street	1,331	1,331	1,331	1,331	1,331	1,331
	East River Complex	5,566	5,491	5,202	5,566	4,098	4,098
	BNYCP	918	918	918	918	918	918
	Hudson Avenue	848	1,200	1,489	1,369	1,200	1,200
	Total	10,720	10,910	10,910	10,910	10,910	10,910
Transfers (Mlb/hr)							
	East River-to-Uptown	4,027	4,415	4,448	4,192	3,014	3,014
	East River-to-Downtown	1,539	1,076	754	1,374	1,084	1,084
	7th Avenue (to Uptown)	254	119	208	238	245	245
Facility Pressures (% of Limit)							
	York Ave. & 71st St.	78%	80%	82%	76%	**104%**	69%
	East River-15th St.	**100%**	91%	92%	83%	67%	67%
	East River-11th St.	99%	99%	98%	**105%**	75%	75%
Distribution Pressures (psig)							
	Highest	189	188	190	**196**	190	190
	Lowest	134	144	149	150	146	146

*Based on a preliminary rating for the package boilers that was subsequently revised to 708 Mlb/hr.

9 HUDSON AVENUE STATION

The Company's analysis of replacement options for the Hudson Avenue station was based on the results of the IGCS.

- Installing four new package boilers in a new building (1,600 Mlb/hr capacity); and
- Retrofitting the retired Annex unit with environmental upgrades plus an air cooled condenser and supplemental package boilers in an adjacent building (1,600 Mlb/hr total capacity).

The IGCS contained a comprehensive design scope, capital cost estimate, and O&M cost assessment at a level of detail that supports an investment decision by Con Edison. In addition, the IGCS included an assessment of the environmental and permit requirements for each option. The two Hudson Avenue options are discussed below.

9.1 Retrofit of Annex Unit

The Con Edison technical criteria for the IGCS called for steam sendout capacity of 1,600 Mlb/hr, the existing capacity at the site. Therefore, Parsons Brinckerhoff developed a cost estimate for the Annex retrofit plus two new additional package boilers. The proposed retrofit of Annex Unit would require the conversion of the existing Unit 100 high pressure boiler to natural gas as primary fuel and low sulfur distillate oil as backup.[22] The existing boiler would also need to be substantially retrofitted with emission control equipment (SCR for NO_x reduction and oxidation catalyst for CO reduction) to meet current environmental regulations. The existing steam turbine would be refurbished and upgraded with the addition of a full flow

[22] Specific backup fuel to be determined, subject to permitting requirements, reduction targets and availability. The IGCS assumed low sulfur diesel fuel in its emissions analyses.

turbine bypass and an air cooled condenser to allow the facility to generate maximum electric power regardless of steam demand. Maximum net steam capacity from the Annex alone would be approximately 1,200 Mlb/hr. The new air cooled condenser and the supplemental boilers would need a new building adjacent to the Annex building. The need for a separate building resulted in a relatively high incremental cost for the supplemental boilers.[23] Another large component of the Annex retrofit cost is the environmental upgrades, particularly the cost of retrofitting the SCR. While the IGCS estimate included a routine allowance for contingencies, the IGCS did not investigate in detail the condition of existing major equipment, which is in many cases over 50 years old. Thus, there is uncertainty as to the potential for additional upgrade costs.

The new supplemental boiler exhaust would be combined with the existing Unit 10/100 stack. The exhaust system of each package boiler would be channeled into a common flue gas breech and connected through individual control dampers for flue gas control. Any necessary repairs and modifications to the existing Annex Unit stack would be performed to accommodate the connection of new package boilers.

Since system-wide resource requirements could be met with less than 1,600 Mlb/hr sendout capacity at Hudson Avenue with adequate capacity at Ravenswood Steam, an alternative case was developed that eliminated the package boilers and relied solely on the capacity from the refurbished Annex unit as described above. Capital cost assumptions are shown in Appendix C.

The revenue requirement analysis for the Annex retrofit cases applied capacity and energy revenues as offsets to costs. The Annex would provide a net 62 MW of installed capacity. Fuel and electricity price assumptions are shown in Appendix B.

[23] According to the IGCS, the structural supports for the air-cooled condenser would be located on the site of the new building, but most of the building costs would be incurred upon construction of the supplemental boilers.

9.2 Installation of New Boilers

The IGCS estimated capital costs for installation of four new 400 Mlb/hr (net) package boilers at Hudson Avenue, equal to the existing capacity. The new boilers and accessories would be installed in a new boiler building in the Maintenance and Storage building area and adjacent area. The proposed boiler plant would consist of package dual fuel (natural gas and low sulfur distillate oil) water tube type steam generators.[24] Each package boiler would be equipped with a low NO_x burner system and selective catalytic reduction (SCR) and oxidation catalyst for CO and VOC emission control. The Company scaled down the direct costs within the IGCS to consider a three boiler installation. The three boiler option was used to compare against the Annex retrofit where no additional package boilers are used.

[24]Specific backup fuel to be determined, subject to permitting requirements, reduction targets and availability. The IGCS assumed low sulfur diesel fuel in its emissions analyses

9.3 The Company's Evaluation of the Hudson Avenue Investment Grade Alternatives

The Company's technical and economic evaluation of the Hudson Avenue investment grade alternatives is shown in Figure 9.1 through Figure 9.3.

Figure 9.1

Hudson Avenue Repowering Options
Projected Annual Operating Results

	Gas	Oil	Total	Steam	Electric	NOx	PM 2.5	CO2
	10^{12} BTU	10^{12} BTU	10^{12} BTU	MMlb	GWh	tons	tons	tons
Boilers	3.8	0.8	4.6	3,150	0	18.8	21.1	284,703
Annex	4.1	0.8	4.9	3,150	40	39.6	35.2	308,134

Figure 9.1 shows the results of an operational analysis that was used to estimate fuel costs, emissions, and electricity generation (Annex only) for the two options at 1,200 Mlb/hr capacity. Each option's fuel consumption was based on meeting the same forecasted annual steam loads in accordance with Hudson Avenue's share of steam system generation and sendout levels. The Annex shows slightly higher fuel consumption because of electricity production. In addition, Figure 9.1 shows the Annex has substantially higher total emissions, primarily as a result of higher NO_x and PM emission rates. NO_x emission rates on gas are .007 lb/MMBtu for the boiler and .011 lb/MMBtu for the Annex. On oil, the Annex emission rate is .04 lb/MMBtu or nearly 3 times the boiler emission rate of .014 lb/MMBtu.[25] The Annex's higher NO_x rates are driven by higher firing temperatures in the Annex boiler and the design capabilities of its SCR system relative to the packaged boiler SCR system.

[25] Emission factors based on IGCS for each option.

Operationally, the need for low off peak steam sendout from Hudson Avenue needs to be considered in the comparison of these options. Figure 9.2 illustrates this point. It shows that historic Hudson Avenue steam sendout levels fall below 350 Mlb/hr approximately 5,000 hours per year. This sendout level corresponds to the current minimum operating point for the Annex turbine. To avoid cycling the turbine off during these hours, the unit would need to dump excess steam to the condenser. Another operational option would be to bypass the turbine during any period when low sendout may be required. Then, the boiler's sendout could be reduced to the levels required during off peak periods. This latter assumption was employed in the analysis with the result that electricity generation was limited to high load periods.

Figure 9.2

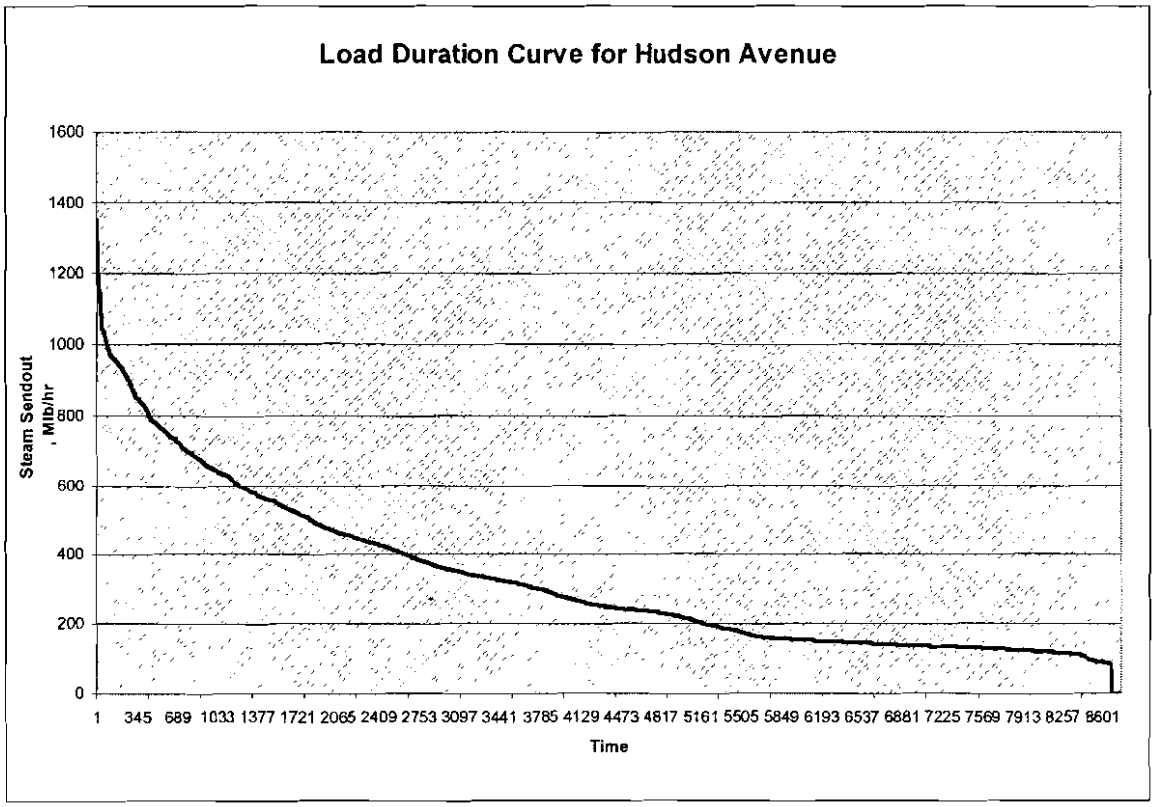
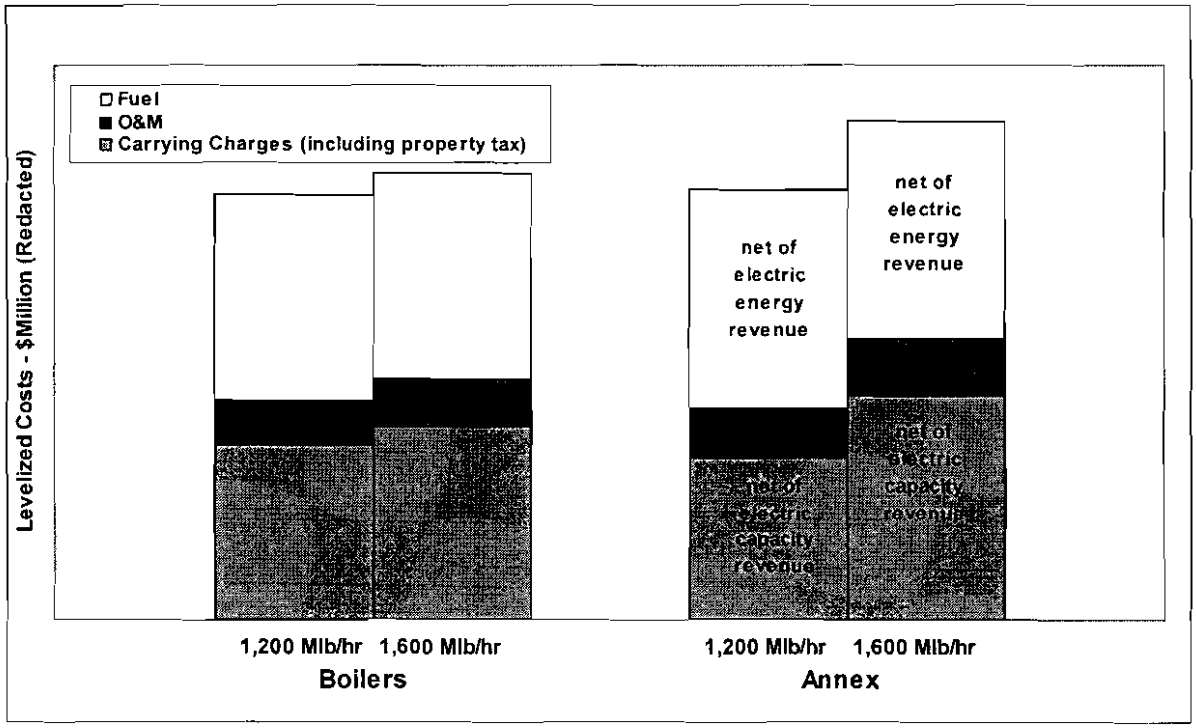


Figure 9.3 shows that the levelized cost for the Annex option is slightly higher than the three boiler scenario.[26] However, the Annex option is significantly more expensive where 1,600 Mlb/hr is needed. For this latter scenario, a distinct, stand-alone boiler plant would be needed, including a separate building, and this drives up the incremental cost. The importance of retaining planning flexibility as load forecasts change over time makes the increased incremental costs a major consideration.

Figure 9.3
Economic Comparison of Hudson Avenue Alternatives



In addition to the life-cycle cost comparison shown in Figure 9.3 and the higher costs of phasing-in an additional 400 Mlb/hr for the Annex retrofit case, the Company

[26] Appendix D provides levelized cost calculations for Hudson Avenue.

considered other risk factors for the two options for the Hudson Avenue site. A discussion of the additional factors follows.

Capital Cost Risk:

The Annex retrofit is a riskier construction project compared to the option of installing new package boilers. Extensive internal inspection of major equipment was not performed as part of the IGCS. Therefore, the Annex retrofit cost estimate is uncertain and subsequent findings could change the current estimate significantly. The package boilers, however, are modular in design so cost overruns are less likely.

Electric Market Risk:

Customers would be exposed to capacity and electric market pricing relative to fuel costs in the Annex option. This risk does not exist with the boilers-only option. When steam is needed in winter, electric prices might be at low levels relative to production costs, causing negative margins on electric sales that cannot be avoided.

Permitting Risk:

Due to installation of state-of-the-art environmental control equipment and use of natural gas as the primary fuel, both options would reduce emission of criteria pollutants relative to current levels. According to the IGCS, however, there is greater uncertainty in the air quality modeling for the Annex because of the shorter stack and higher local pollutant concentrations. The boilers-only option involves installation of entirely new equipment, while the Annex option would involve the re-use of 1950's boiler technology and could raise additional licensing issues. For example, the Annex has higher emission rates, as previously discussed in this section.

Taking into consideration all of these factors, the Company recommends installation of three to four new boilers at the Hudson Avenue site to meet needed steam sendout capacity. The incremental revenue requirement associated with installation of three Hudson Avenue boilers in 2014 is shown in Appendix D. The impact of the new project would be an order of magnitude 5-10% increase in revenue requirements (including fuel) for the first year the project enters rate base.

9.4 Consideration of Competitively Procured Capacity – Hudson Avenue

The levelized cost rankings and other criteria discussed above led to the Company's recommendation that new boilers are the preferred technology option at the Hudson Avenue site. Given that finding, the Company then considered competitively procured supplies as an alternative to Company-constructed resources. This analysis considered the following alternatives:

- Purchasing steam from a merchant steam plant; and
- Purchasing steam from a merchant cogeneration plant.

Regulatory Background

The Commission's Order in Case 05-S-1376 established the criteria upon which merchant steam supplies should be evaluated. As with any resource option, price and reliability are fundamental considerations.[27] However, in the case of procured steam supply, another important consideration is market power.

In evaluating competitively procured steam supplies, the Company has been guided by the principles articulated by the Commission in a 1999 steam order ("Phase II Order") that "Con Edison should be willing to enter into negotiations with any producer that can offer pricing under terms that are competitive with Con Edison's own avoided steam costs, so long as doing so does not result in the new owner having excessive market power." The Commission noted in the order that, unlike the electric market, the steam system cannot function as a competitive market because steam production and load are very well balanced, there is no opportunity for

[27] Case 05-S-1376, Order Determining Revenue Requirement and Rate Design (issued September 22, 2006), pp. 15, 18.

expanding the steam transmission and distribution grid, and there is no import/export market.[28]

These principles have recently been reaffirmed by both the New York State Board on Electric Generation Siting and the Environment (Siting Board) and the Commission. In the TransGas Energy (TGE) siting proceeding, the Siting Board rejected TGE's claim that the PSC favored "cost-effective merchant steam plants" and explained:

> *The relevant considerations are Con Edison's public service obligations as a steam utility, the PSC's determination that a competitive steam market is not feasible in New York City, and the PSC's determination that Con Edison should not purchase steam from other providers in a manner that would afford market power to the latter.*[29]

In approving the National Grid/KeySpan merger with conditions, the Commission noted that there was a provision requiring National Grid "to enter into good faith negotiations" with Con Edison to sell steam from the Ravenswood combined-cycle plant. The Commission stated that it would adopt this provision "subject to the condition that our action does not diminish Consolidated Edison's statutory obligation to provide steam service reliably and at the lowest reasonable cost. This includes its obligation to ensure that it does not procure steam externally under an arrangement where the provider could exercise market power". [30]

Evaluation

Con Edison's evaluation of competitively-procured capacity considered the characteristics of merchant steam supplies with respect to market power, financial

[28] Cases 96-S-1065, 96-S-1121, Order Concerning Phase II Steam Plan Report, (issued December 2, 1999), pp. 4, 7.
[29] Case 01-F-1276, Order Concerning Further Proceedings, (issued June 25, 2007), p. 44.
[30] Case 06-M-0878, Abbreviated Order Authorizing Acquisition Subject to Conditions, (issued August 23, 2007), p. 19.

concerns, reliability, and cost. As a result of this evaluation, the Company has drawn the following conclusions:

- Market power issues are substantial for a merchant replacement plant for the Hudson Avenue station;
- Even if a long-term contract with a merchant provider could mitigate market power, it would raise significant financial and accounting concerns because of the recent rule changes adopted by the Financial Accounting Standards Board; and
- Available information on the cost of merchant steam supplies indicates that a merchant alternative would not be cost competitive with the Company's boiler-only option.[31]

Accordingly, the Company does not plan to request merchant proposals for Hudson Avenue steam supply. The above points are discussed in detail below.

Market Power

The market power issues associated with the purchase of steam from a merchant supplier would be substantial. As the term was used in the 1999 consultant study on steam market power that was the subject of the Phase II Order, market power refers to the supplier's unrestricted ability to set a price for steam capacity (or energy at times) because no alternative supplies are available. Due to the closed nature of the steam system with its limited distribution pathways, significant pressure constraints would tend to confer market power on most suppliers. If the Hudson Avenue station were to be controlled by a merchant owner, the Company would have few, if any, viable alternatives for downtown steam supply. Indeed, the 1999 study concluded that in a hypothetical competitive steam market, the Hudson Avenue station and other downtown plants would require energy bid mitigation in all hours – i.e., the

[31] Merchant steam supplies are assumed to provide the same level of dispatchability as a boiler plant would.

plant owners would have energy market power in addition to the capacity market power that all steam plant owners would have.[32]

In the Phase II Order, the Commission discussed the risk of post-contract price hikes, but here the consequences of market power could occur at almost any time following contract signing. The first instance would be during plant licensing and construction. In the 1980s, Public Utility Regulatory Policies Act (PURPA) contracts (which in the aggregate provided more capacity than was needed at the time), included milestone provisions that served to penalize developers who failed to construct on schedule. The ultimate penalty was contract termination. In the case of the steam system, the ratepayers would be punished if a merchant developer failed to achieve construction milestones. The Company would be faced with a choice of investing significant additional capital in the existing Hudson Avenue boilers or possibly renegotiating for a higher steam price.[33]

The next instance of market power would be after initial operation. Since resource needs may point to a plant of 1,200 Mlb/hr capacity with potential for expansion, the Company could be in a situation where it is negotiating with a merchant supplier with market power to expand the capacity of the Hudson Avenue station due to the need for more capacity.

Finally, market power would be an issue during plant operation. A supplier's operating decisions with respect to electric sales, fuel management, and plant maintenance all present opportunities to exercise market power, especially on high-load days.[34] As discussed in more detail in Appendix E, such risks are difficult to mitigate through contractual provisions.

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[32]Feasibility of a Wholesale Steam Market for the New York City Steam System, pp. 20-28, attached as Appendix A to the Con Edison Steam System Plan Phase II Report, July 22, 1999.

[33] It should be noted that the BNYCP steam contract was negotiated on the eve of construction completion and the plant it replaced, the Hudson Avenue Annex (Unit 10/100), had been in good operating condition at the time.

[34] Moreover, the utility's last resort in the event a supplier fails to perform is the "step-in" right. While it enables the utility to continue to supply steam, it burdens the utility and ratepayers with the supplier's obligations to its creditors. If the plant needed repairs, Con Edison would still be unable to supply steam.

Financial and Accounting Concerns

There are significant financial ramifications associated with procured supplies, especially because it would require a long-term contract to mitigate market power concerns. New long-term utility contracts would likely be treated as utility debt. That could raise costs for both investors and ratepayers. In addition, in 2003 the FASB issued Interpretation No. 46 Revised (FIN 46R), Consolidation of Variable Interest Entities, which requires existing, unconsolidated variable interest entities to be consolidated by their primary beneficiaries if the entities do not effectively disperse risks among the parties involved. Under FIN 46R, a utility with a long-term contract may often be considered the primary beneficiary (the one who receives the majority of the rewards and/or absorbs the majority of the risks per the terms of the contract) and, therefore, that utility (in most cases) would have to consolidate that power plant, and its associated debt/liabilities, into its financial statements even though it does not have an ownership interest in the power plant.

Reliability and Cost

It is axiomatic that there is a continuum of tradeoffs between reliability and cost. Indeed, New York State's experience with PURPA contracts in the 1980s highlighted how ample financial incentives would facilitate resource procurement, but at the cost of contracts that contained significantly above market prices. In assessing the reliability-cost tradeoffs, a fundamental assumption is that the Company and all potential merchant suppliers would have equal access to technology, equipment suppliers, and Engineering, Procurement, and Construction (EPC) contractors. Thus, any differences in steam production cost would have to result from differences in financing, electric market expectations (in the case of cogeneration), or subcontract arrangements. Similarly, any difference in reliability would necessarily stem from a misalignment between supplier costs and contract prices. Each of these areas was examined.

In regard to a steam-only option, the Company's assessment finds no basis for a lower-cost merchant supply, assuming equal reliability and performance. Merchant financing is likely to result in a higher carrying cost (higher interest rates and equity return tend to outweigh the higher debt ratio) than utility financing.[35] Moreover, a merchant supplier would be compelled to seek full recovery of its investment during the term of the steam contract since its investment could become stranded upon contract termination.[36] In the event that the contract term would be shorter than the typical 30-year depreciation schedule used in utility accounting, merchant carrying charges could be even more "front-loaded" than those used to set utility rates. In addition, merchant plants are often operated by subcontractors, thus adding a profit margin to operation and maintenance costs.

In regards to a cogeneration option, in the event that a merchant supplier might ascribe sufficient value to future electric sales to offer a lower price for steam than the Company estimates for new boilers, the Company would bear the risk that steam sales would not provide sufficient revenues to assure reliable service. Ironically, this result could happen if electric market conditions are more — or less — compensatory than assumed in the merchant's bid for steam. If electricity sales are more attractive, there would be a disincentive to provide steam. If electricity is less valuable than low-priced steam, there would be a disincentive to operate at all. Although these risks can be mitigated through contractual pass-through provisions, the Company's steam customers would bear the risk of volatility in the electric market.[37]

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[35] In this context, "merchant" financing refers to a non-utility entity that relies on revenues under a long-term contract to facilitate financing. Such an arrangement would be expected to be more highly leveraged than a "pure merchant" plant.

[36] Analogous issues are being raised in the study conducted for the NYISO regarding how to compute the cost of new entry for the demand curve. In that study, the NYISO's consultant recommended that the cost of new entry reflect shorter amortization periods (resulting in higher carrying charges) on account of market risks during the life of the plant. For new units in New York City, the study recommended an amortization period of 13.5 years (see Independent Study to Establish Parameters of the ICAP Demand Curve for the New York Independent System Operator, August 15, 2007, p. 13).

[37] A merchant supplier may also seek to maximize steam revenues in order to assure competitive electric sales. During its Article X proceeding, TGE took full credit for avoided steam production costs in estimating its cost of electricity production. TGE response to DPS interrogatory (SFK-6), March 23, 2005.

Specific Information on Merchant Alternatives

The Commission stated that a merchant alternative cannot be evaluated in the same manner as utility construction and that the elements of the investment grade analysis of Hudson Avenue repowering options are not relevant to a merchant alternative.[38] Consequently, the analysis of merchant alternatives is based largely on information obtained during the SPOS. As directed by the Steam Business Development Task Force, the SPOS consultant, Worley Parsons, sought indicative proposals from three prospective merchant steam suppliers to facilitate a comparative analysis.

KeySpan-Ravenswood (KSR) was the only prospective supplier substantially responsive to the solicitation. BNYCP chose not to make a proposal due to insufficient analytical resources. TGE, which specifically sought to replace Hudson Avenue, did not provide a conforming proposal.[39]

The Company evaluated the information submitted by TGE and KSR during the SPOS as well as information provided by TGE in the course of its Article X proceeding.[40] In the SPOS, TGE submitted indicative pricing for annual quantities of steam between four and six times as great as that forecasted to be required from the Hudson Avenue station. The assumed quantities were nearly half of the total annual production required from the entire steam system. Since TGE did not provide information as to how its steam production could be adjusted to match system dispatch needs, the SPOS could not compare TGE's pricing to that of the other Hudson Avenue options, all of which would be fully dispatchable. TGE did provide such information in its Article X proceeding. According to TGE, it would reduce the electrical output of its proposed topping turbines in response to reduced steam

[38] Case 05-S-1376, Order Determining Revenue Requirement and Rate Design, (issued September 22, 2006), pp. 14-15.
[39] SPOS, Redacted Version, pp. 159-160.
[40] TGE proposed a steam-electric plant configuration in 2004 that relied on topping turbines and had no condenser or cooling system. The Company's evaluation of the KSR proposals is contained in Appendix E.

demand.[41] While not evaluated in the SPOS, this information suggested that reduced output would be uneconomical. The Company analyzed the TGE information to determine how the cost of steam from TGE's plant would be affected by steam dispatch requirements. The results of that analysis are shown in Appendix D.

On June 25, 2007, the Siting Board decided to hold the TGE Article X proceeding in abeyance pending the City's decision on revocable consents related to construction of steam and water lines beneath city property. In a letter dated July 6, 2007, TGE informed the Siting Board that it would not seek consents that the City would likely refuse to provide and that it no longer intended to produce steam. However, on July 25, TGE sought rehearing of the June 25 Order. In an October 3 motion to the Siting Board, TGE explained that it would proceed with its steam-electric plant proposal should the Siting Board grant its petition and override the City's objections.

In light of the significant uncertainty concerning TGE's ability to construct steam facilities, as well as the analysis of TGE's cost information, Con Edison has concluded that TGE's plant is currently not a viable potential alternative to the Hudson Avenue options considered here.

Conclusion

For all of the above reasons, the Company has concluded that a merchant alternative would not be an appropriate steam resource selection to replace Hudson Avenue. In view of this finding, the Company does not plan to request merchant proposals for Hudson Avenue steam supply. As discussed above, the Company believes that it is not practical to establish contract terms that could effectively mitigate the supplier's market power. To the extent such terms could be conceived, they would likely be so onerous as to prevent financing. A failed auction would serve no interests and would reduce the time available to develop a well-conceived permit

[41] Case 01-F-1276, Recommendation Concerning Further Proceedings, (issued April 12, 2006), pp. 22-23.

application. It should be noted here that many of the benefits of the competitive marketplace will be obtained by bidding out the engineering, procurement, and construction work for a new steam plant.

10 RAVENSWOOD STEAM STATION

The SPOS concluded that the least cost alternative for in-kind replacement of boiler capacity at the Ravenswood Steam site was four new boilers with a total net capacity of 976 Mlb/hr and that cogeneration was not viable due to site constraints. This was less costly than retrofitting the existing boilers. Since there are no other practical options for steam supply from the Ravenswood Steam station, new boilers are the only Company-supplied option to be considered. As described in Section 8, the Company also analyzed the option of installing two boilers for a total capacity of 488 Mlb/hr. It should be noted that most of the fixed costs of the plant are inherent in the initial boiler installation and, therefore, the incremental cost of increasing capacity is lower. The four-boiler option involves incremental steam distribution reinforcement costs, which partially offset these economies of scale.

The Plan also considered steam supply purchased from the Ravenswood combined-cycle plant as an alternative to installing new boilers. In light of the Commission's requirement that National Grid must divest the Ravenswood electric generating station, the future owner of the Ravenswood combined-cycle plant and the effect of divestiture on potential terms of steam supply cannot be known at this time. However, the analysis was conducted based on information provided by KSR. For reasons and details discussed more fully in Appendix E, the Company has determined that new boilers are a preferred option at this time. However, given that replacement is not required until 2017, the Company will re-evaluate its Plan for the Ravenswood Steam station at a later time, prior to commencing a licensing proceeding for the new boilers.

11 RECOMMENDED PLAN

11.1 Replacement Capacity

The analyses described in Sections 8-10 forecasted a need for replacement boiler capacity at Hudson Avenue and Ravenswood Steam stations ranging from about 2,000 to 2,600 Mlb/hr by 2027. The Plan anticipates boiler installations of 1,600 Mlb/hr at Hudson Avenue and between 488 Mlb/hr and 976 Mlb/hr at Ravenswood Steam.

In summary, the recommended Plan is:

1. Initiate permitting of new boilers with a capacity up to 1,600 Mlb/hr at the Hudson Avenue station, and set 2014 as the in-service date;
2. Reevaluate options for the Ravenswood Steam station before initiating the permitting process for new boilers with capacity up to 976 Mlb/hr;
3. Upon receipt of permits, construct the initial amount of capacity desired at each site; and
4. Complete construction at both sites when needed.

The specific amount and timing of the capacity to be installed at each site will be based on further evaluation of peak load, operational requirements, reliability/cost trade-offs, and environmental considerations. Such evaluations will be conducted upon receipt of permits for each site.

11.2 Environmental Benefits of the Recommended Plan

In addition to meeting planning criteria for cost and reliability, the Plan's recommendations will also reduce emissions significantly over the next 20 years. Figure 11.2 shows the projected emission reductions for certain criteria pollutants from the implementation of the projects recommended in the Plan, i.e., installing new boilers at the Hudson Avenue and Ravenswood Steam stations, and gas conversions at the 74th Street and 59th Street stations. [42]

Figure 11.2
Projected Emission Reductions during the Plan Period

Total Annual Emisssion (Tons/Year)			
	2008	2027	% Reduction
NOx	2,491	1,917	23
SO2	2,144	629	71
CO2	2,550,774	2,423,832	5
PM2.5	319	193	40

[42] It should be noted that in addition to the 5% reduction in CO_2 that results from implementation of the Plan, the steam system produces CO_2 reductions on an ongoing basis because the use of Con Edison district steam is generally more efficient that onsite boilers.

11.3 Implementation Plan

The Plan calls for installation of new boilers at the Hudson Avenue and Ravenswood Steam stations. The Company's implementation plan for Hudson Avenue is shown in Figure 11.3. It calls for new boiler installation to be permitted, constructed, commissioned, and ready for operation by the fourth quarter of 2013. Demolition activities are not shown in the schedule and add a degree of scheduling uncertainty to the milestone targets. In the case of the Ravenswood Steam site, there is more flexibility in the date for planned replacement and so no specific milestones are included.

Figure 11.3
2007 Steam Resource Plan
Implementation Plan

Activity	Target Month, Quarter, Year
File Plan	October 2007
Hudson Avenue	
• Permitting	1Q 2009 - 1Q 2011
• Engineering and Procurement	1Q 2009 - 4Q 2011
• Construction	2Q 2011 – 2Q 2013
• Commissioning	3Q 2013
• Ready for Winter Operations	4Q2013

The Company will continue to update and refine the Plan. For example, capital cost estimates, resource requirements and environmental regulations will be monitored. In addition, the Company will consider comments and suggestions from interested parties. The Company is committed to meeting Plan objectives and the City's future energy needs in cooperation with customers and other stakeholders.

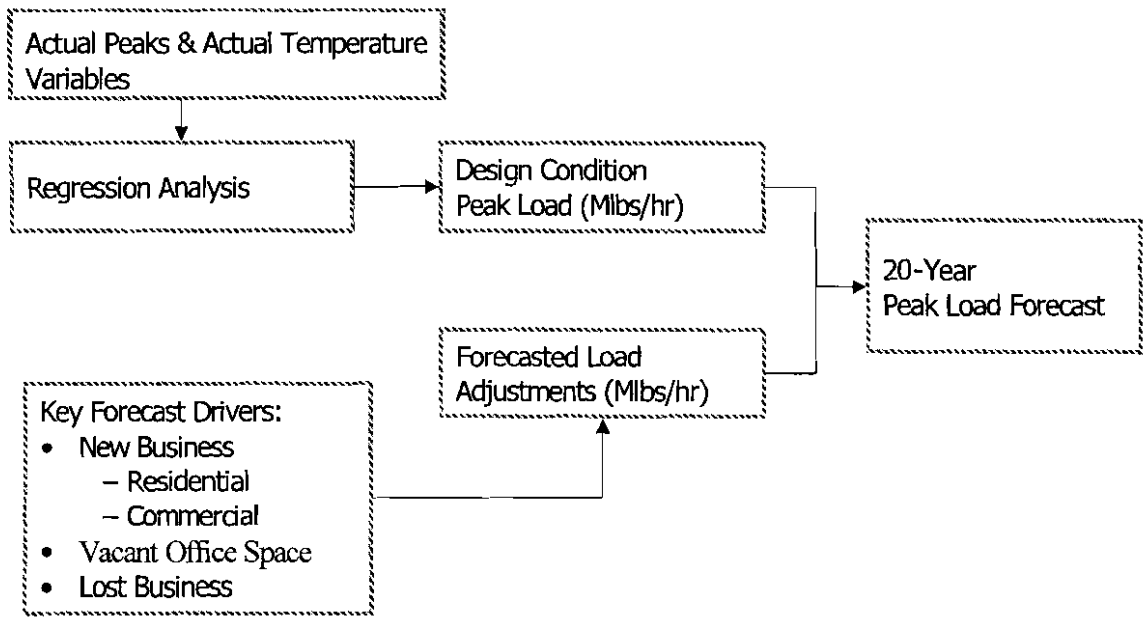
Appendix A

Load Forecasting Methodology

Appendix A – Load Forecasting Methodology

This section discusses the steam demand forecast used for the 2008-2027 time horizon covered in the Plan. The forecast methodology starts with a determination of a design-day, winter-peak load. Steam usage peaks in winter because its largest service component is space heating. Projected new business hook-ups, for which the Company has received Service Information Requests (SIRs), and projected economic activity for residential and commercial customer segments are used to determine load growth. Offsetting this load growth is a forecast of lost business. Figure A.1 illustrates the overall load forecasting methodology.

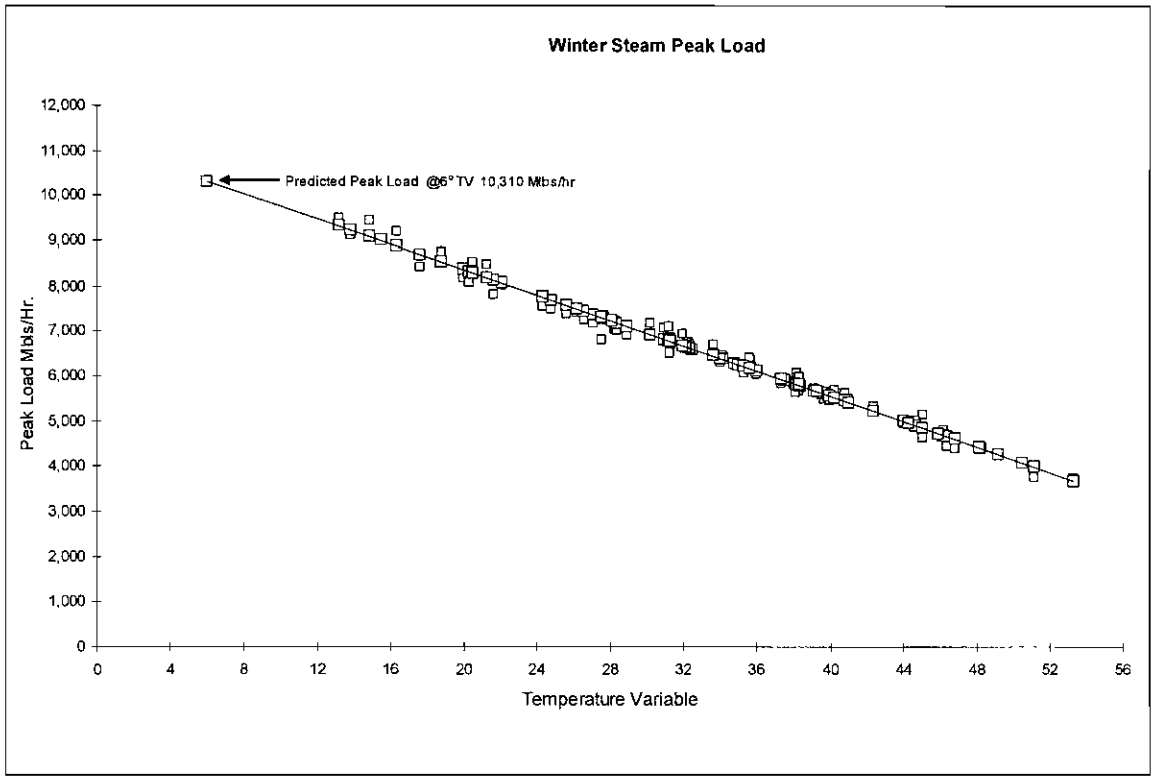
Figure A.1
Flow Chart of Load Forecast Methodology



Winter Peak Design Condition

The winter peak forecasting process starts by correlating prior winter actual daily peak loads with actual weather. This regression analysis extrapolates the forecasted peak based on a design temperature as shown in Figure A.2.

Figure A.2
Winter Steam Peak Load versus Temperature Variable



The design condition used in the winter peak load forecasts is a 6° F temperature variable that is based on a one-in-three probability of being exceeded over 30 years (Figure A.3 and Figure A.4). Temperature variable is defined as 60% of the current hour's dry bulb temperature and 40% of the previous 24-hour average dry bulb temperature.

Figure A.3

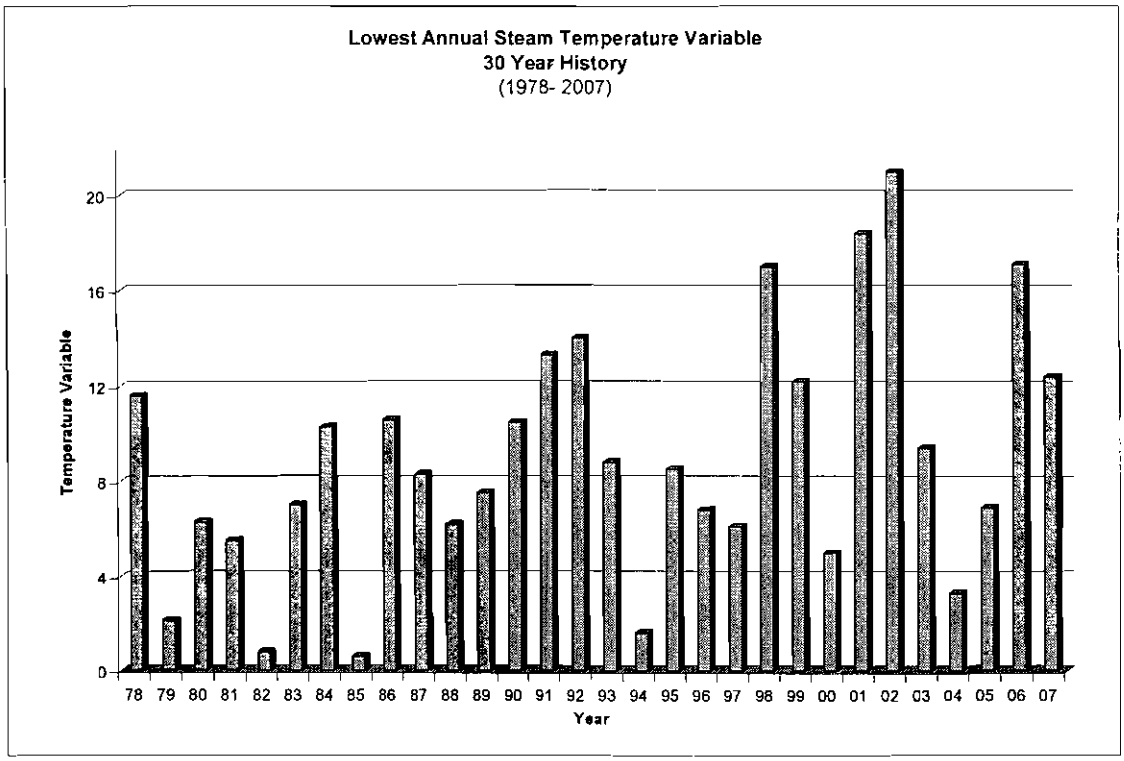
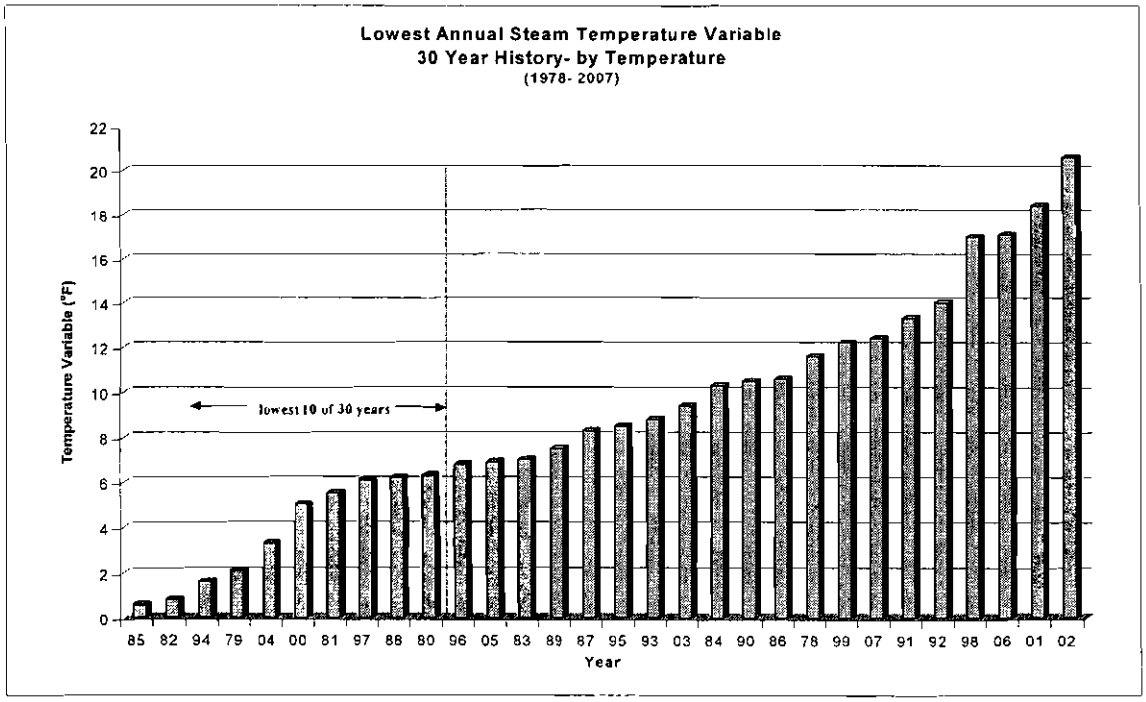


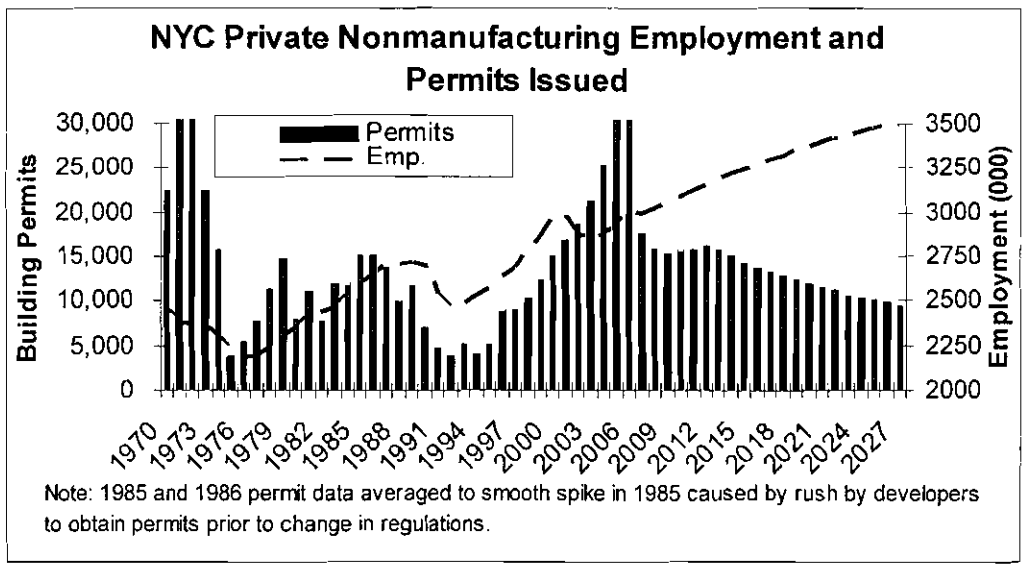
Figure A.4



Economic Activity Considered in the Forecast

New York City employment is the primary factor influencing the construction of new office space in Manhattan. Historically, office employment accounts for about 75% of private non-manufacturing (PNM) employment. PNM employment is cyclical but has trended upward since the mid-1970s (see Figure A.5). Long-term growth averaged 1.0% per year over the 25 year period ending in 2006. Growth within that period has been significantly higher, particularly between 1994 and 2000 and in 2005 and 2006. Between 1996 and 2006, PNM employment grew by an average of 1.4% per year, the equivalent of an annual average of 380,000 jobs. This upward trend reflects the growth of the service sector in the economy of the city and the nation, and has occurred despite the downturn caused by the 2001 recession and the loss of jobs associated with 9/11. The forecasted compound annual rate of employment growth over the next 20 years is 0.8%.

Figure A.5



The level of new housing construction in New York City fluctuates with business cycles in the city's economy. Figure A.5 shows forecasted construction of new

housing in terms of housing permits issued and NYC employment, including historic data from 1970 and forecast projections until 2027. Also shown in Figure A.5 is the surge in employment that took place in the late 1990s and from 2004 to 2006, which produced record high levels of permits for new construction. In 2005, the number of residential building permits issued in New York City reached a 32-year high. The data for the forecast in housing permits and PNM employment for New York City is from Moody's Economy.com (www.economy.com).

New Business - Residential

The Company forecasts the completion of new dwelling units based on a two-year lag of the housing-permits forecast. Relative to the historic highs reflected in the permit data, the rate of dwelling unit additions is expected to steadily decline over the forecast period 2008 - 2027. These statistics apply to all five boroughs of New York City. The load forecast adjusts this based on data that shows that Manhattan accounts for about 26% of total New York City permits issued and the Con Edison steam service area is estimated at 80% of the Manhattan market. The average number of new dwelling units added in the steam service area over the 2008 - 2027 periods is forecasted at 3,300 per year. Market share for the Company's steam business is assumed to be 10% of the service area's new-dwelling-unit forecast. [43]

New Business – Commercial

The Manhattan Office Market

New office construction is generally driven by employment levels. Historically, new construction occurs in waves (Figure A.6). However, the forecasted year on year changes are based on long-term trends which level out the lumpiness in

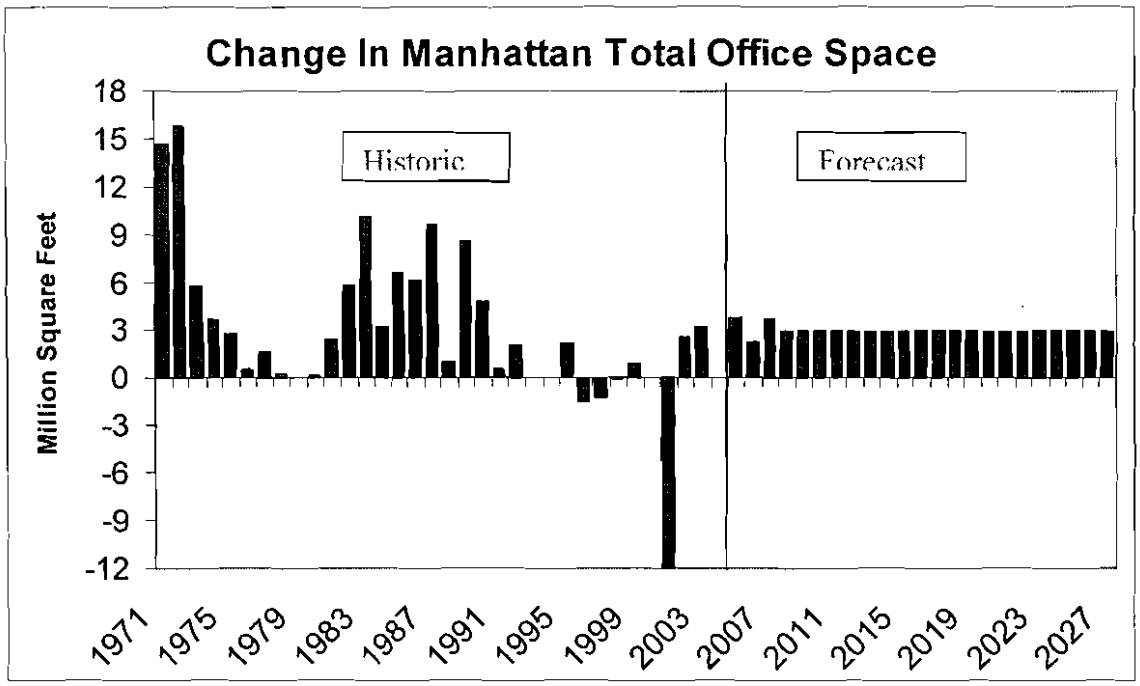
[43] The market share for targeted segments is higher. For example, the January 2007 Steam Strategic Plan cited an average capture rate of approximately 20% for residential buildings larger than 250,000 square feet near the steam system, over the last five years.

construction activity. And, the forecast assumes that the long-term trend in total office space is upward, consistent with the forecasted trend in employment.

The Company's office-construction forecast is also shown in Figure A.6. It assumes that New York City PNM employment will grow by an average of 0.8% per year between 2008 and 2027. This equates to a net new construction increase of 56.6 million square feet by 2027 in the steam service area, which includes 11.1 million square feet for World Trade Center (WTC) reconstruction, 3.6 million square feet for First Avenue properties (former site of the Waterside station), and 1.6 million square feet for major projects on the west side of Manhattan. For the years 2010 and beyond, the WTC is currently the only large-scale project requesting steam service. For most other future development, including the First Avenue properties, market share for the Company's steam business is assumed at 90%, which is based on the historical average share of new commercial business.[44]

[44] In the case of Hudson Yards, there are no active requests for steam service at this time and the forecast does not assume any new steam load in the area on account of the economic and technical barriers to expanding service to the area. See Steam Business Development Plan, August 26, 2005, p 19.

Figure A.6

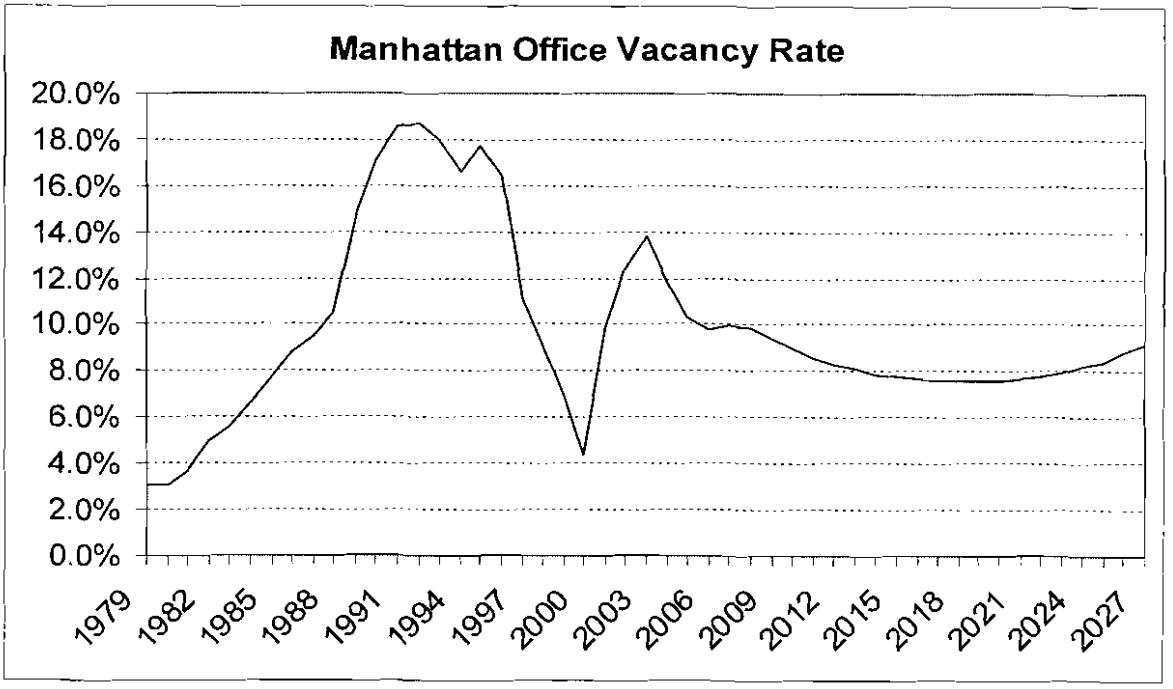


Vacant Office Space

Vacancy rates are forecasted to decline slowly over the 2008-2017 periods, dropping to a low of 7.6%, and rising gradually during 2021-2027 to 9.2% (Figure A.7). Changes in vacancy rates are reflected in the steam forecast as increases or decreases in peak load, as the occupancy of existing and new buildings increases or decreases.

As noted in Section 4 of this document, the peak load forecast is subject to many uncertainties. The recent mortgage crisis is one example of an event that has the potential to change forecasted load. Annual updates to the load forecast will be considered as implementation of the Plan advances. At this time, the Company is evaluating the impact on new office and residential construction and vacant Manhattan office space as a result of the mortgage crisis.

Figure A.7
Actual and Forecasted Manhattan Office Vacancy Rate



Appendix B

Commodity Pricing

Redacted

Appendix C

Capital Cost Estimates

Redacted

Appendix D

Levelized Cost Calculations

Redacted

Appendix E

Ravenswood Steam Station Options

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