



Steam Long Range Plan

2010-2030

December 2010

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1.0 EXECUTIVE SUMMARY

1.1 OVERVIEW

For over 130 years, Consolidated Edison, Inc. (Con Edison or the Company) has had the privilege of providing steam service to customers in New York City. Foremost, it is the historic quality of Con Edison service that has made it the energy service of choice to many of New York's most prominent and unique properties. The Company's Plan is to continue to provide Steam Service to customers by managing capacity to match a lower projected customer need, maintain the current high reliability and operational excellence on production and distribution, incorporate technological advancements into the system, optimize system efficiency, pursue new opportunities for productivity and performance improvements and cost reductions, and bring additional value to the customer base. The Steam System provides advantages to many customers that on the whole cannot be readily duplicated by onsite services.

The Con Edison Steam System has earned several prestigious awards and recognition in recent years which include:

- The U.S. Environmental Protection Agency (USEPA) Energy Star Combined Heat and Power (CHP) award for East River Stations' Units 1/10 and 2/20, for significant energy savings (2009)
- The only district energy utility to have ever won two International District Energy Association "Best System of the Year" Awards in 2000 and 2007,

The Con Edison Steam System provides tangible and intangible benefits to customers. These include:

- **Reliability**—Continuous service
- **Dependability**—Consistent pressures
- **Simplicity**—No certifications required to operate
- **Flexibility**—Point source demand and usage control
- **Versatility**—One source for high and low pressure applications (heat, cook, cool, etc.)
- **High Energy Content**—Steam delivered at average gauge pressure in excess of 125 psig
- **Responsive**—On/off capability compared to boiler ramping limits
- **Compact Service**—Single steam station at point of entry
- **District Rates**—Capital and O&M savings from aggregated customer profiles
- **Risk Mitigation**—Operational risk managed over a diverse user base
- **Steam Quality**—Industrial grade water treatment and quality controls

- **Green Technology**—Cogeneration, regulated emissions and no local flue exhausts

The Steam System provides significant benefits to Electric Customers, Gas Customers, and the community¹:

Benefits to the Electric System and its Customers

The use of steam air conditioning (A/C) in lieu of electric A/C offsets peak load requirements on the electric supply and delivery infrastructure in critical electric networks, benefitting Electric Customers. There is approximately 580,000 ton of installed steam-driven A/C on the Steam System; if these tons of steam A/C were converted to electric, about 350 MW of additional electric load would be added to Con Edison's Electric System. The Company's analysis shows that steam service provides an annual savings of approximately \$600 million per year to Electric Customers.

Benefits to the Gas System and its Customers

The use of Steam Service for heating eliminates the prospect of additional strains on the natural gas delivery infrastructure. Without the Steam System approximately 250 Mdt/day of additional gas load would be added to the Con Edison Gas System. This equates to \$280 million per year savings to Gas Customers avoiding the increasing need of capital infrastructure investments.

Benefits to the Community

Without the Steam System there would be significant impacts on customers, the environment, and New York City. For existing Steam Customers, the capital costs to install on-site, gas-fired boilers and electric air conditioning equipment would be approximately \$2.4 billion. The lost rental revenue from the space occupied by on-site boilers would range between \$45 million and \$90 million per year. Additional annual costs to Electric and Gas Customers would be approximately \$900 million.

Con Edison's steam production, with approximately half of the supply coming from cogeneration units, is efficient, clean, and better monitored than the use of onsite oil and gas fired boilers. Through the application of cogeneration, the release of approximately 1.5 million tons of CO₂ per year is avoided (equivalent to 274,500 cars)², when compared to individual electric and steam production methods. The Steam System's actual emission rates per thousand pounds of steam produced yield NO_x, SO₂, CO₂, and particulate matter emission rates that are lower than U.S. Environmental Protection Agency published emission rates for commercial boilers.

The Plan Vision and Objectives

¹ An analysis of avoided costs was completed in March 2009 and presented at the PSC Steam Proceeding Technical Conference on April 27, 2009

² According to the EPA's Greenhouse Gas Equivalencies Calculator, 1.5 million metric tons of CO₂ is the equal to the amount of CO₂ produced by 274,500 cars

The first step in this enhanced planning process was to develop forecasts for steam demand. Assumptions were made regarding potential environmental and regulatory requirements, economic trends, and included possible technological advances to develop three forecasts for potential customer demand: a High Case, Plan Case, and Low Case. To develop the production and infrastructure projects and programs in this Steam Long Range Plan (“SLRP” or the “Plan”) the Company used the Plan Case demand forecast and identified uncertainties and signposts that will be monitored to test and adapt the Plan in the future.

Over the next 20 years the Company will seek to integrate energy efficiency, CHP, and demand response to further the goals of deferring new production and infrastructure investments and providing safe, reliable, and competitively priced service that is environmentally responsible. The Company will work with customers to manage their energy consumption, and expenditures.

The Company will implement initiatives to defer or minimize the investment requirements on the system, increase asset utilization, and improve overall performance. The Plan continues to reap the benefit realized from condition based maintenance programs which provide productivity, efficiency, and cost savings. Advances in plant control system upgrades, distribution remote monitoring technologies and customer demand meters, have and will continue to give greater visibility into the status of system components, allowing the Company to increase system automation, improve the accuracy of predictive system models, and direct efforts to those system components or service areas that need the most attention, all with the goal of reducing total costs.

Con Edison’s Steam Operations department regularly conducts focus groups, outreach sessions, and customer seminars. The feedback consistently indicates that customers value the steam service but are concerned with the increase in costs. They are interested in new technology and they want to make sure that the Steam System keeps up with their needs. The Company is committed to provide the appropriate systems and to have programs in place to enhance the overall customer experience, as well as to future mitigate cost increases to steam.

The Steam Long Range Plan provides a plan for the steam supply and distribution for the next two decades. The Company’s vision of the Steam System is:

A long-term viable Steam System that continues to deliver safe, reliable, efficient, competitively priced, and clean energy to customers while providing a fair return to shareholders.

Based on this vision the long term strategic objectives are to:

1. Have reasonable cost allocations and competitive rate structures to retain customers and promote growth which is beneficial to the existing customer base and the business
2. Manage supply capacity to better align it with the customer demand and in the longer term potentially increase the level of cogeneration capacity from Company or customer sources to replace existing supply as it requires replacement.
3. Increase system load factor

4. Be fully recognized through Leadership in Energy and Environmental Design (LEED) for its environmental value
5. Reduce tax and rate base through optimization of the system portfolio and promulgate City and State regulatory changes
6. Maintain a safe and environmentally responsible system for the Company and the community it serves
7. Achieve a fair return on equity

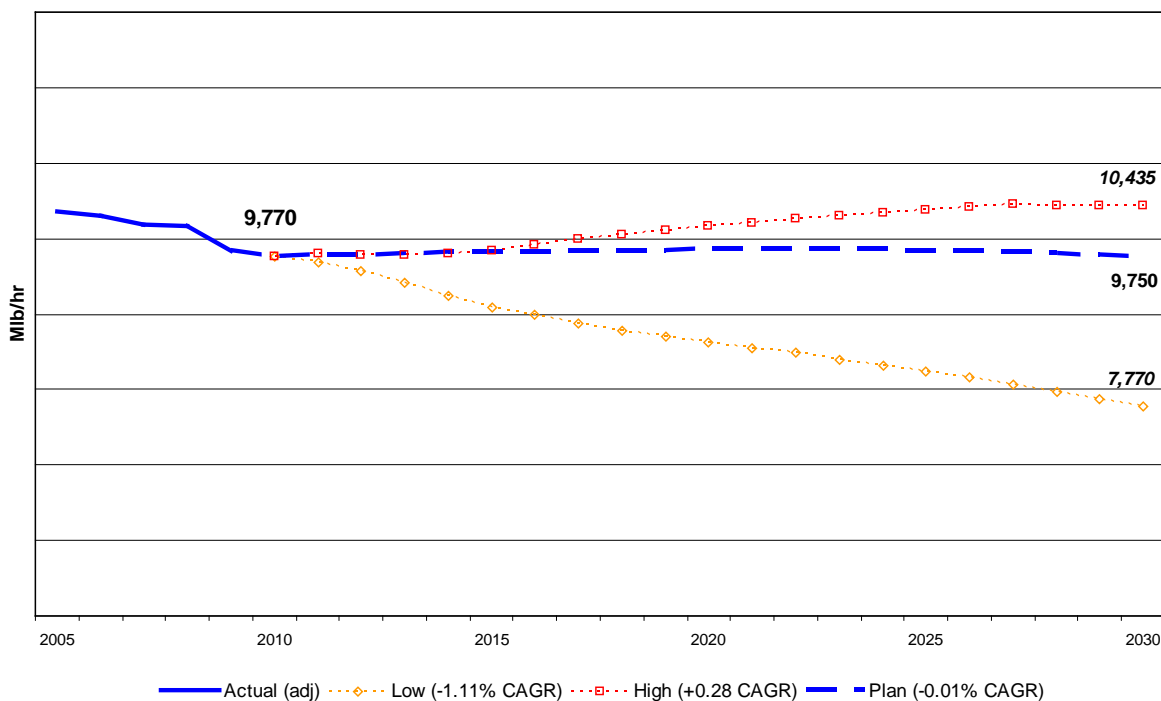
During the period from 2010-2030, the Company expects to invest \$1.2 billion in capital infrastructure in real dollars, or an average of \$57 million a year, including investments to support Steam Customer demand. At this level of expenditure, along with projected increases in the cost of supply including fuel and taxes, we anticipate an average customers' annual bill for steam, in real dollars would increase from \$28.60 today to \$30.90 in 2030, an annual average growth rate of 0.07%

1.2 KEY ELEMENTS OF THE PLAN

To meet the objectives of the Plan, the Company has developed initiatives, some of which are short-term focused, while others are to be implemented over a longer time horizon. These initiatives are broken out into several categories including Demand and Supply, Distribution Infrastructure, and Customer Initiatives.

Under the Plan Case, aggregate customer load is projected to be relatively flat over the 20 year period and incorporates a moderate amount of customer demand management by Con Edison in line with normal load growth projections. Based on the peak demand for the winter of 2009/2010, the forecast starts with a weather adjusted peak demand of 9,770 Mlb/hr in 2010 and slightly increases to 9,860 and then tapers back down to 9,750 Mlb/hr by 2030. This relative flatness is based primarily on the maturity of the Steam market and an expectation that when customers build or renovate they are encouraged to implement the latest efficiency and demand control techniques. The two alternative forecasts for the high and low scenarios project a peak load of 10,435 Mlb/hr and 7,770 Mlb/hr respectively. The differences across the forecasts consider the uncertainties of market conditions including New York City (NYC) employment, new building development, and other factors. They also help to identify the significance of load and capacity management in mitigating customer exposure to significant capital requirements for new incremental load capacity and higher per unit cost risk under a lower aggregate load.

Figure 1-1. Peak Demand Forecasts



Demand and Supply

Con Edison will ensure that it has sufficient capacity to meet customers’ peak steam demand and to continue to provide the reliability and dependability that customers have come to expect from the system. At the same time, capacity must be closely aligned to demand so as to minimize the cost of operating the system. The three potential forecasts incorporate the impact of various economic, legislative, and technological drivers on customer demand for steam.

The Plan Case considers moderate economic growth starting at the end of 2010 resulting in a small increase in new construction. New service requests, including those from the World Trade Center; contribute to positive net growth in the customer base in only a few years. The evolving energy efficiency services market and resulting building codes with higher efficiency thresholds are expected to net out a relatively flat demand for the system between the lost business and new or renovated and returned business projections.

The Plan also projects that demand will actually decline by 0.01% compound annual growth rate (CAGR) per year over twenty years. Therefore, a primary program on the supply side will be to reduce capacity by approximately 12% to align it with this projection resulting in the scheduled removal of capacity at the Hudson Avenue Generating Station. On the demand side, energy measures are needed to protect against customer peak load increases and are suggested in the form of rate structures changes and tariff modifications which would allow Con Edison needed maneuverability in managing load and capacity exposure.

This plan was developed with input received from a wide variety of stakeholders, including customers, the City of New York, and the PSC, among others. This Plan has also been formulated and written in

parallel with the Company's Electric and Gas Long Range plans to ensure consistency with the overall corporate strategy. Key Components of the plan and their relative changes from 2010 to 2030 are listed in Table 1-1

Table 1-1. Summary of the Future State of the Business

	2010	2030 (Plan Case)
Customer base	1,772 with equal distribution across customer classes	Slightly lower number of customers but with a greater proportion of larger SC-2 and SC-3 customers
Customer price per Mlb	\$28.60	\$30.90
Rate structure	3 customer classes, largely usage based billing	Customer classes shifted towards demand based billing tiers and including interruptible rates
Peak capacity (Mlb/hr)	13,256	11,656
Peak demand (Mlb/hr)	9,770	9,750
Annual sales (MMlb)	23,100	22,900
Supply footprint	High base capacity: <ul style="list-style-type: none"> • East River, 59th Street, 60th Street, 74th Street, Ravenswood, Hudson Avenue • Purchased steam from BNY 	Modular, flexible capacity: <ul style="list-style-type: none"> • East River, 59th Street, 60th Street, 74th Street • BNY and potential additional 3rd party steam purchases depending on the competitive nature of any proposed contracts • Removal of select capacity • Possible cogeneration either at Con Edison facilities or customer-sited CHP providing steam back to the system
Oil burn	< 30%	< 10%
Sendout pressure	150-180 psig	140-180 psig
Conservation efforts	Selective conservation efforts for customers with special requirements	Expanded with program cost recovery
Revenue streams	Single Source—steam service	Diversified—electric and gas allocations, steam service, management of customer-sited CHP, district energy systems
Distribution system	105 miles of pipe, some digital meters for larger customers, system event monitoring	Expanded to revitalized neighborhoods and to accommodate customer-sited CHP, digital meters for nearly all SC-2 and SC-3 customers and with demand response capabilities
ROE	5.6%	Competitive with other utilities with similar risk profiles

Capacity Strategies

Capacity resources exceed the current and forecasted peak, and so any new investment here can be curtailed appropriately and potential cost savings pursued. However, there is a need to manage the peak to ensure that future major plant investments are only made when cogeneration is a viable

option, as determined by city and local electrical needs. There will likely need to be tariff and policy changes made to ensure that the peak load is effectively managed, and that there are proper incentives for high load factor customers and cost premiums or disincentives for low load factor customers.

The SLRP tested cogeneration economics in the High Case scenario with reasonable results under assumed cost allocations and tax benefits.

In addition, capacity can be managed through these additional initiatives

- Reduce peak demand by rate policy changes
- Explore customer sited production

Distribution Infrastructure

The distribution system currently has adequate capacity to serve the Company's needs well into the future. No major modifications are anticipated to serve existing customers.

Safe design and operation of the distribution system is a critical component of the SLRP. Con Edison's steam distribution assets are well maintained and continuously monitored. The Company has already undertaken a number of initiatives designed to improve the system safety and design, including a \$200 million program completed in 1999 that enhanced and improved piping components and manhole structures. In addition, Con Edison initiated an effort in 2008 to install remote monitoring within the steam manholes to protect against water infiltration and monitor steam trap operability.

The major distribution investments the Company will undertake to meet the Plan Case are as follows:

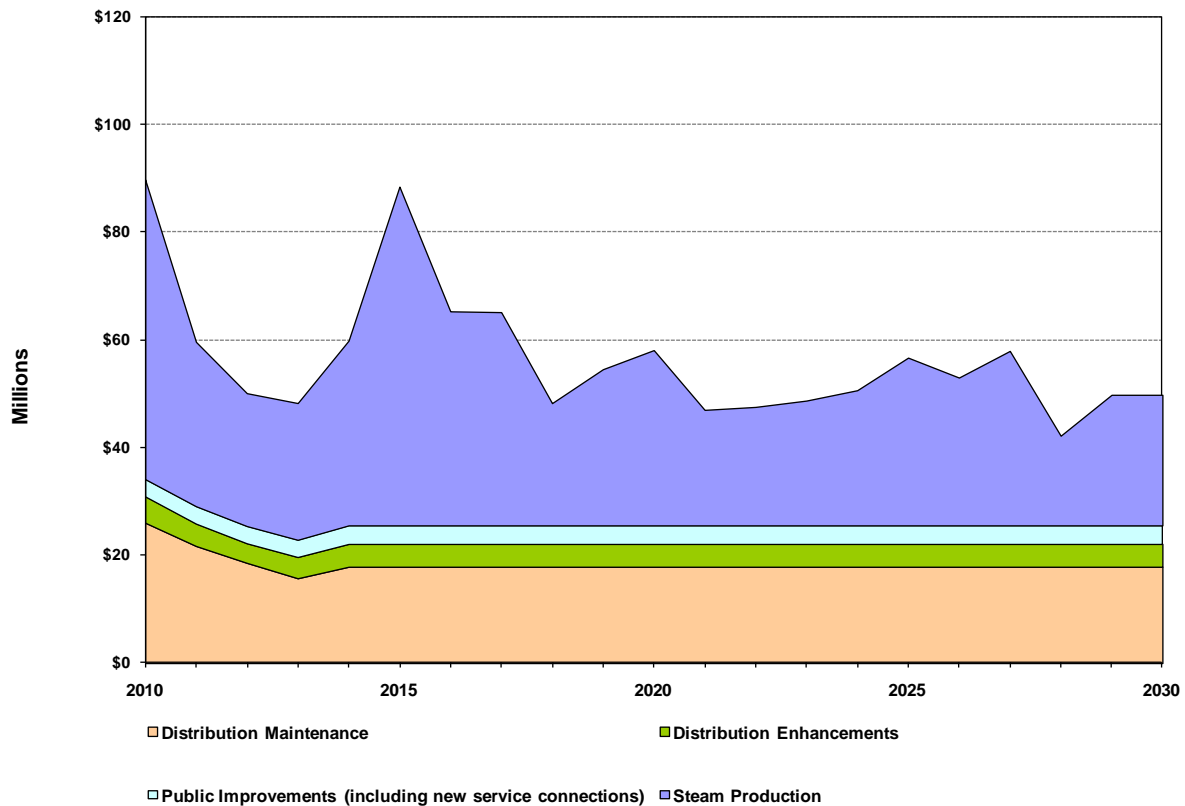
- Continue expansion of existing remote monitoring program in flood prone locations and trap monitoring
- Extend distribution system monitoring and Research and Development (R&D) initiatives on water hammer to continue enhancing employee and public safety.
- Implementation of a smart-grid approach to Steam that includes additional monitoring of the network and the expansion of advanced metering to allow for demand response (DR) programs. This would also provide better customer usage data which may be used to improve conservation program efforts and load shedding capability
- Establish an asset renewal program aimed at replacing anchors, valves, manhole covers and other critical pieces of the distribution system. Continued evaluation of R&D initiatives for monitoring technologies to detect leaks and predict water hammer

Capital Investment

Should the Steam System capacity or distribution infrastructure need to be expanded in order to serve new customers, the SLRP proposes that expansions be evaluated with modified tariff provisions designed to impose more cost responsibility on customers that cause the Company to incur material incremental costs.

Under the Plan the Company will invest \$1.2 billion in real dollars over the course of the next twenty years. For the most part these investments are relatively flat with the exception of cyclical spikes in production projects based on condition based repairs. The distribution system will be evaluated with modified tariff provisions designed to impose more cost responsibility on customers that cause the Company to incur material incremental costs.

Figure 1-2. Steam Capital Investment Expenditures (2010-2030)



Customer Initiatives

Increasing the value of steam service to Con Edison’s customers is an important component of maintaining and growing the customer base. A Steam Business Development group was formed in 2000 to support the customer vision for the future. This vision revolves around a deep understanding of customers and stronger partnerships with them. The system’s small customer base and improved data collection capability means that Con Edison understands each customer better including their load shapes, building attributes, conservation efforts, and operating criteria. Armed with this knowledge, the Company will actively encourage customers to make more efficient use of the Steam System especially as regards load factor which is a critical component in helping to keep capacity aligned with a more stable demand.

Con Edison believes that every customer has the potential to be a beneficial customer to the Steam System. Under the current rate structure, some customers put an undue financial burden on the

system by having low load factors and paying rates that may not reasonably reflect the costs of low load factor usage. A low load factor means that the customer's peak demand is significantly higher than their average demand. By way of example, a low load factor customer might be one that only uses steam for heating and then has a zero load during the non-heating season placing a need to maintain supply capacity only for seasonal needs.

In terms of better controlling the steam peak and allocating costs to customers, the Company has already commenced a Steam Peak Reduction Collaborative (SPRC) process with participants from the Company, the PSC, the Customers, the City and other interested parties.

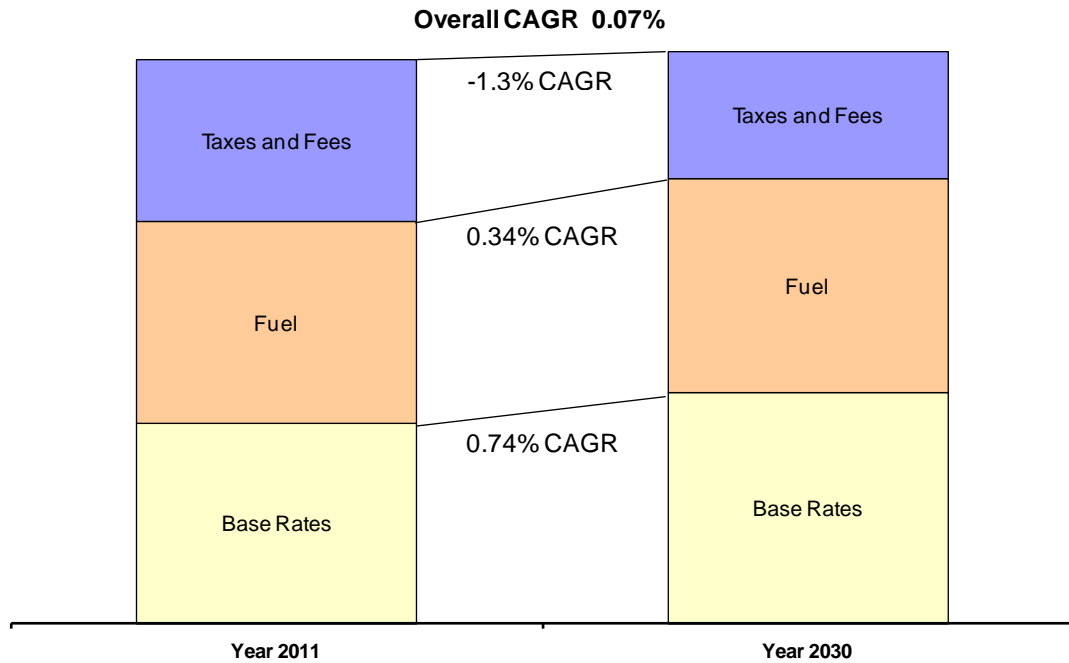
The major program/policy initiatives the Company will address through this SPRC to support the Plan Case are:

- Demand Response
- Obligation to Serve
- Energy Efficiency
- Re-Design Rates to Incent Efficient Customer Behavior
- Steam Air Conditioning
- Customer Supply

Customer Bill Impact

Throughout the development of the SLRP, the Company has evaluated the cost effectiveness of various options for supply and delivery of steam service against the bill impact to the average customer. Figure 1-3 portrays how the composition (delivery, fuel, taxes) and value of an example customer's bill is expected to appear in 2030 as the result of the Plan Case. The example uses a Large Commercial customer that receives bills under a demand rate structure (SC2 Rate II).

Figure 1-3. Averaged Monthly Bill for a Large Commercial (Demand Billed) Customer



1.3 CRITICAL POLICY AND REGULATORY APPROVAL STRATEGIES

Steam’s position in the Manhattan market for energy services is also controlled by legislation and utility specific regulations and is therefore influenced differently than free market competitors.

Taxes

Boiler Fuel Tax

New York City charges a 4.5 percent sales tax on Natural gas and Fuel oil that is burned in the generating stations to produce electricity and steam. Accordingly, when Con Edison buys the fuel to generate energy, it is subject to a 4.5 percent sales tax. Natural gas is subject to a Gross Receipts Tax (GRT) of about 2.4 percent and No. 6 fuel oil is subject to a Spill Tax and a Petroleum Business Tax approximately \$3.10 per barrel. As the price of fuel rises, the tax paid on that fuel increases. These taxes becomes a cost component of the energy, which, when sold to end use customers, are subject to the City’s 2.44 percent GRT, a 4 percent State sales tax for residential customers, and an 8.875 percent sales tax for commercial customers (i.e., State 4 percent sales tax, MTA sales tax of 0.375 percent, and a City sales tax of 4.5 percent). This tax application disadvantages Con Edison Steam in competing against self-generation, because on-site boilers are not subject to this level and compounding effect of taxation.

Sales Taxes

The State of New York currently exempts the delivery portion of the bill for large commercial customers who purchase from ESCOs from sales taxes. This tax (State and City combined) is 8.875 percent. There is no comparable tax exemption for steam, which is particularly disadvantageous in competing for large commercial customers that have natural gas boilers and purchase their natural gas requirements from ESCOs.

Gross Receipts Tax

The Gross Receipts Tax, which is now levied only by the City and not the State, particularly hurts a business like steam that has modest net income. Its taxes remain the same even though its net income is low. Changing to a net income tax would help the steam business vis-à-vis the gas and electric businesses.

Other Tax issues

In addition, at one time, Con Edison Steam had access to tax-exempt financing from the New York State Environmental and Research Development Authority (NYSERDA). Savings from tax-exempt debt are available to lower electric rates. Con Edison has been unable to issue tax-exempt debt since 1994. Among other things, Con Edison's bond rating is not at a level that would make the Company eligible for the NYSERDA program without costly and difficult to get credit support.

Regulatory Issues

The Company will undertake the following initiatives

- Expand joint bidding on interference work (currently applicable only in limited areas of Manhattan) that would make public improvement work more efficient resulting in potential cost savings.
- Preservation of the current cost allocations between the Electric and Steam Systems.
- Decouple rates to compensate for the implementation of approved strategies and the associated lost revenues through reduced sales and demand associated with the implementations of energy efficiency measures, demand response programs and other methods.
- Restore NYSERDA incentives or create new incentive vehicles for steam powered air-conditioning that would put this measure on a par with competing alternatives and mitigate future electric infrastructure investments.

1.4 CHALLENGES

The challenge for Con Edison Steam is to continue to provide steam energy generation, delivery and service to an unregulated and competitive market with ever more sophisticated customers.

Unlike electric and gas service, customer self-supply of steam service is the norm outside of the Manhattan service area. Furthermore, it is a viable and economic alternative for many of Con Edison's existing Steam Customers. While Steam serves a wide variety of purposes, some high load factor buildings choose alternatives when it makes financial sense and when the building configuration can accommodate on site generation equipment. Specific technologies and drivers that challenge the role of steam include:

- On-site boilers
- Floor by floor (packaged) A/C units in lieu of central chiller plants
- Building envelope and system energy efficiency measures
- Thermal Storage Systems
- Fuel Cells
- Combined Heat and Power (CHP)
- Building Developers limited knowledge of steam value in designing the building
- Tax disadvantages with competing technologies
- NYSERDA incentives

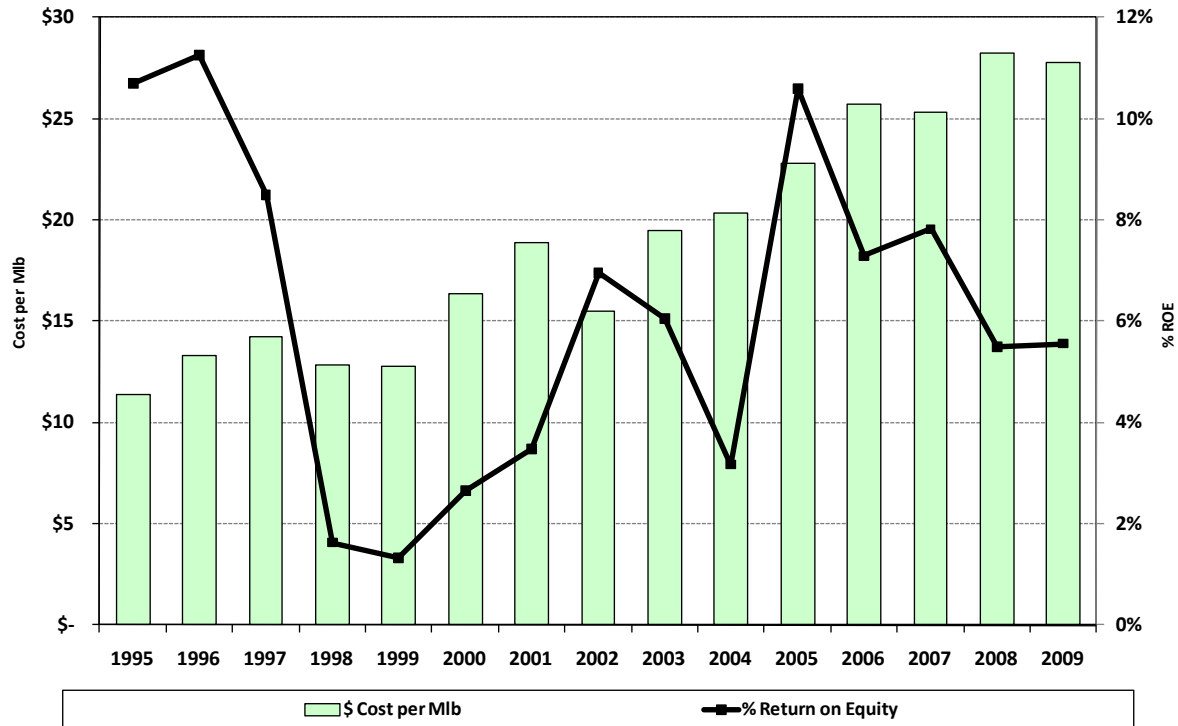
Of the competing technologies listed above, implementation of customer-sited CHP has the most potential to impact the Steam business. The very benefits a large district system like the Steam System provides through diverse customer usage profiles to allow optimal load management and economies of scale to reduce unit costs would be compromised with the widespread adoption of CHP.

Economic conditions and the cost of energy, more specifically fuel, have promoted efficiency and conservation measures with steam customers and is likely to continue. The Company will work more closely with customers to help them better manage their environmental profile and mitigate increases to their bills.

Figure 1-4 shows the historic trend in returns and customer rates on the Steam System. Steam rates have continued to increase and the Company returns have a significant decrease over time. They are affected by the following factors:

1. Lower sales primarily driven by warmer than normal temperatures and conservation
2. Regulatory changes which have contributed to increasing costs on Steam Customers which were previously shared between steam and electric
3. Events – one major event has a significant impact on the small base of customers resulting in significant impact to revenues which results in increase in investment contributing to rate increases

Figure 1-4. Customer Cost and Return on Equity



1.5 UNCERTAINTIES AND SIGNPOSTS

For the purposes of this plan there are four forces that the Company deems to be potential impacts to the SLRP:

- the price of fuel
- the pace of technology innovation
- the nature of regulation and legislation
- the future of the economy

The SLRP was developed under considerable uncertainty around emerging technologies, energy and environmental regulations, customer demand, cost of fuel supplies, economic conditions, availability of financing and utility regulation and ratemaking approaches. Con Edison realizes that with the passage of time, the nature of these uncertainties will change and new uncertainties will emerge. As such, the plan is intended to be a flexible, living document that will be monitored and reshaped as circumstances change. In addition, the uncertainty of the economy will add variability to forecasting

Where signposts reveal significant reductions will occur in steam sales and demand, the Company will apply the capacity reduction and load management options evaluated under the Low case that meet the revised projections.

Natural Gas and Fuel Oil

The price of natural gas has fluctuated significantly in the last ten years and is now twice as high as it was in the late 1990s but a third less than it was two years ago after Hurricane Katrina.³ In the future, natural gas prices are likely to be based on available supply. As part of this Plan, Con Edison is in the process of converting its generation fleet to dual-fuel capability, for both price and environmental reasons. The price of gas is expected to be less than oil on a Btu production basis, but there are no guarantees that this will not change in the future. Also, there are risks around the available supply of gas to NYC on gas peak days since Steam Business Operations will be competing with Gas Customers. Environmental regulations, New York State Department of Environmental Conservation (NYSDEC) Nitrogen Oxide – Reasonably Available Control Technology (NOx RACT), and CAA S185 for instance are also forcing generating stations to switch to cleaner fuels such as gas and rely less on No. 6 fuel oil.

Technological Incentives

Two areas of technological uncertainty that most affect the system's future are customer end-use and distributed generation. Already new packaged air conditioning systems, implemented by developers on each floor of commercial office building, are used to redirect service cost and risk to tenants and are obviating the need for central chiller plants altogether.

Conservation measures for Steam are not as widespread as they are for electricity but advances in energy management systems, will reduce usage. In addition, increases to the efficiency of the building envelopes may reduce the Company's steam sales. New or recently renovated buildings are likely to use less steam per square foot than older buildings. The extent of this future impact is unknown but serves as a signpost for decreasing demand and usage.

Environmental Regulation and Legislation

Energy issues are central to many of the current environmental, economic, and security debates occurring at all levels of government. Energy and environmental policies are under ongoing review and Con Edison cannot know with certainty what specific regulatory proposals will be adopted or what revisions will be made in the near term. Any additional legislation is likely to have a significant impact on the Steam Business, in the form of increased regulation, higher expenses to retrofit existing steam plants with environmental measures, and higher operating costs.

Within NYC, there are a number of proposed environmental regulations under review including a ban on No. 4 and No. 6 fuel oils. This will force customers with onsite oil-fired boilers to switch to alternatives including steam, thereby potentially resulting in an increase in the customer base and sales. Two specific environmental regulations that may have significant impact on the future capital

³ Natural gas prices are City Gate prices from the U.S. Department of Energy

investment on production assets are the NYSDEC revisions to Part 231-New Source Review (NSR) and the NO_x-RACT regulation

1.6 SUMMARY

Con Edison believes that the SLRP contained herein is the first step towards achieving the Company's vision for the Steam System. The SLRP is based on a forecast of customer demand that recognizes that it operates in a mature steam market in which customers seek to use less steam. It acknowledges that there is unlikely to be any catalyst, such as major technological breakthrough, that will significantly increase steam demand, especially during the off-peak period.

Customers continue to see value in receiving steam service, for the many reasons identified. But there has to be control over rate increases, and the Company needs to be able to earn a fair ROE. Although there are many challenges, there are an equal number of opportunities to address these issues and maintain the system as a viable entity for the next 20 years and beyond. The distribution system will not require any major modifications, such that expenses can be limited to a relatively moderate level of new investment. Capacity resources exceed the current and forecasted peak, and so any new investment here can be curtailed appropriately and potential cost savings pursued. However, there is a need to manage the peak to ensure that future major plant investments are only made when cogen is a viable option, as determined by city and local electrical needs. There will likely need to be tariff and policy changes made to ensure that the peak load is effectively managed, and that there are proper incentives for high load factor customers and cost premiums or disincentives for low load factor customers. Fuel changes, from No. 6 oil to natural gas, will require infrastructure investment, but this will improve environmental performance necessary to meet expected future standards, while also reducing fuel costs long term. Combined with other operational and productivity improvement, we believe that there is a healthy future for the Steam System, with customer bill increases kept to within a nominal band around the rate of inflation; the continued provision of superior energy service as customers have noted and expect; and while allowing the shareholders a fair return needed to maintain the business to these standards.

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2.0 INTRODUCTION

2.1 VISION AND PLAN OBJECTIVES

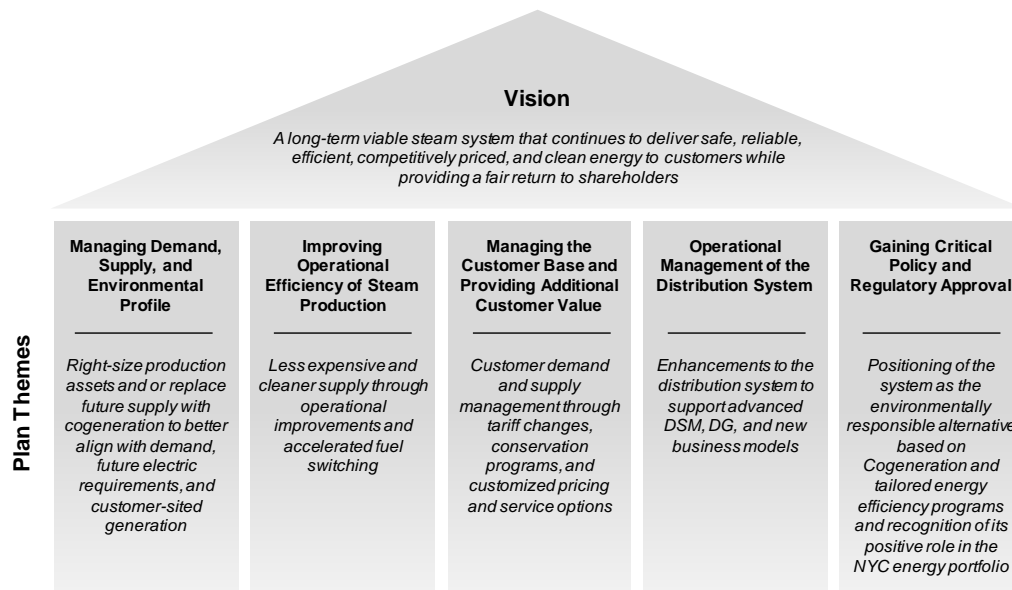
The key objectives of the Steam Long Range Plan are to define the Company's vision, evaluate the challenges and opportunities facing the Steam Business, discuss future growth prospects in the context of the current and projected future business environment, develop a long-term strategy for achieving that vision, and determine the operational steps necessary to carry out the strategy.

A clear vision for Con Edison's future is necessary to guide decisions for investments and programs in the twenty year planning period. The Con Edison Steam System vision statement is as follows:

A long-term viable Steam System that continues to deliver safe, reliable, efficient, competitively priced, and clean energy to customers while providing a fair return to shareholders

Con Edison has developed five objectives to guide the development of the Steam Long Range Plan and provide for integration with the Electric and Gas Plans. These plan themes collectively carry out the mission and individually describe areas of Con Edison strategic intent by which programs and investments are categorized. Figure 2-1 illustrates how the plan themes support the Con Edison vision and mission.

Figure 2-1. Con Edison Steam Vision and Plan Themes



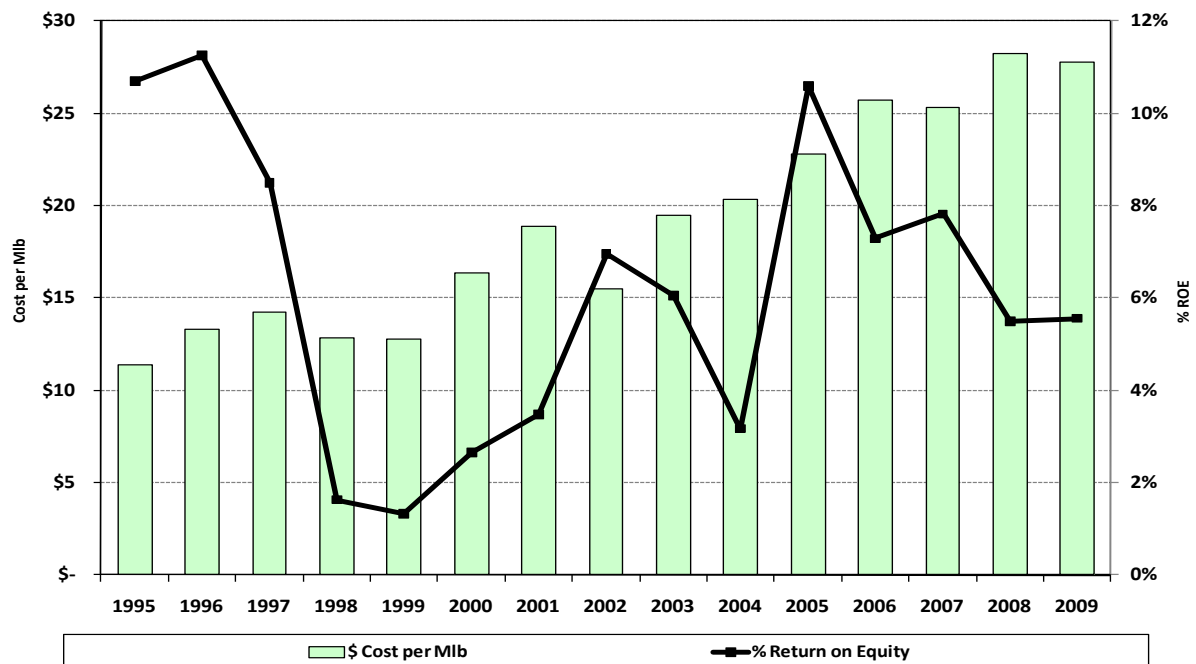
2.2 BUSINESS OVERVIEW

For nearly 130 years the Steam System has provided customers with clean and reliable heating, and with steam-driven air conditioning. The system currently has approximately 1,772 heating customers, including 350 cooling customers, serving many of the most recognizable landmarks in NYC such as Rockefeller Center, the United Nations, the Empire State Building, and the Metropolitan Museum of Art.

In recent years, the cost of steam for customers has increased and has put steam in a less cost-competitive position relative to alternative energy sources. One of the key drivers behind rising costs is fuel, which represented 48% of the total customer bill in 2009. The Company mitigates fuel cost volatility through hedging and storage. The steam generation assets are still reliant, in part, on oil. While assets are well maintained, they are advancing in age and require increased maintenance. In recent years, significant capital investments have been made including monitoring technologies for the distribution system, repowering the East River Generating Station, and new water treatment systems to improve water source chemistry to sustain the integrity of the distribution system.

Customer rates have risen while the Company returns are declining. Figure 2-2 below shows historic steam rates vs. Company returns.

Figure 2-2. Cost and ROE History



The volatility of steam revenues is due in part to continued fuel-cost volatility. The earnings of the Steam System have been affected by a variety of factors, including warm weather, a weak economy and rate determinations based on assumptions that did not provide an accurate picture of the system costs and revenues..

Customers are telling Con Edison that higher prices are a catalyst for them to leave the system. Some customers will be able to accept higher prices but others are likely to leave when their systems reach retirement age. Customer price sensitivity is determined by service costs, physical constraints of the building, system conversion costs and their ability to purchase alternative energy sources at a cost that provides a short payback period for their switching costs. Nevertheless, loss of customers is an important issue to address since a reduction in the customer base generally means that those remaining must incur more of the cost burden of the system.

While customer departures currently remain low, higher bills, and a weak economy have driven customers to reduce their usage and continue to look for ways to conserve energy through energy efficiency measures. In the past year, weather adjusted sales declined by 5%. Five year trends show a five year reduction of 9% in weather adjusted sales. Most of the reduction has come from a decrease in summer sales related to a drop in installed steam cooling equipment and the higher efficiency of new replacement equipment installed by the SC-2 large commercial customer class. Many of these customers have migrated away from central plant chiller designs all together. For business reasons they have installed electric HVAC units where the tenant absorbs the cost of their electric cooling by submetering and maintenance costs are invoiced directly. The interest in steam chillers has also been dampened by the increasing differential cost between steam and electric equipment, higher than expected maintenance costs, and the expiration of valuable financial incentives for steam while incentives for electric have been continually renewed. To this end, the Steam Business remains largely seasonal with winter usage equaling that of the other three seasons combined.

Over the past 5 years, weather adjusted winter peak demand has dropped 6% from 10,365 Mlb/hr to 9,770 Mlb/hr. This is attributed to customer conservation efforts which have accelerated in response to the down economy. Actual summer peak demand has declined by 16% in the last five years partially due to weather but also as a consequence of a change in customer approach towards steam for cooling.

The winter decline in peak demand has resulted in overcapacity in the system. The system has an installed capacity of 13,256 Mlb/hr of which the balance is utilized as a reserve margin to maintain system reliability. During the summer months peak demand drops to a little more than half of the winter demand and the installed steam capacity after electric generation commitments are considered drops to about 9,400 Mlb/hr. Maintaining under-utilized capacity is one of the key cost drivers affecting the direction of the Plan. The Plan provides for the Company to close the gap between capacity and demand. As explained below, this will be achieved through a combination of capacity reduction measures, such as by closing the Hudson Avenue Generating Station, implementation of a tariff structure that incentivizes peak demand reduction, and tailored demand side management initiatives.

2.3 VALUE OF THE STEAM SYSTEM

The Steam System provides advantages to customers that cannot be provided by alternative services. For example, the most competitive alternative to steam heating is gas boilers. Not only do gas boilers consume valuable space within buildings, they require flues that often are impractical to construct without adversely impacting the NYC viewscape, and local environment. Steam heating also provides reliability, ease of use, capital cost avoidance, additional rentable space, and risk mitigation (e.g., avoided fuel and chemical storage and emissions responsibility). Even the supply of an itemized bill

provides some customers a benefit in that it clearly communicates measured costs to their owners or tenants.

As noted previously, the Steam System provides significant benefits to Electric and Gas Customers of approximately \$900 million per year. In addition, Steam Customers currently using steam A/C would incur costs of about \$1 billion to convert to other cooling technologies and about \$1.4 billion to convert to other heating technologies.

The Steam System provides several environmental benefits. Through the use of cogeneration, the release of approximately 1.5 million tons of CO₂ per year is avoided (equivalent to 274,500 cars)⁴, when compared to individual electric and steam production methods. The Steam System's actual emission rates per thousand pounds of steam produced yields NO_x, SO₂, CO₂, and particulate matter emission rates that are lower than U.S. Environmental Protection Agency published emission rates for commercial boilers. This is due to inherently lower seasonal efficiencies of individual building boilers and the efficiency gains that the Con Edison Steam System achieves through cogeneration.

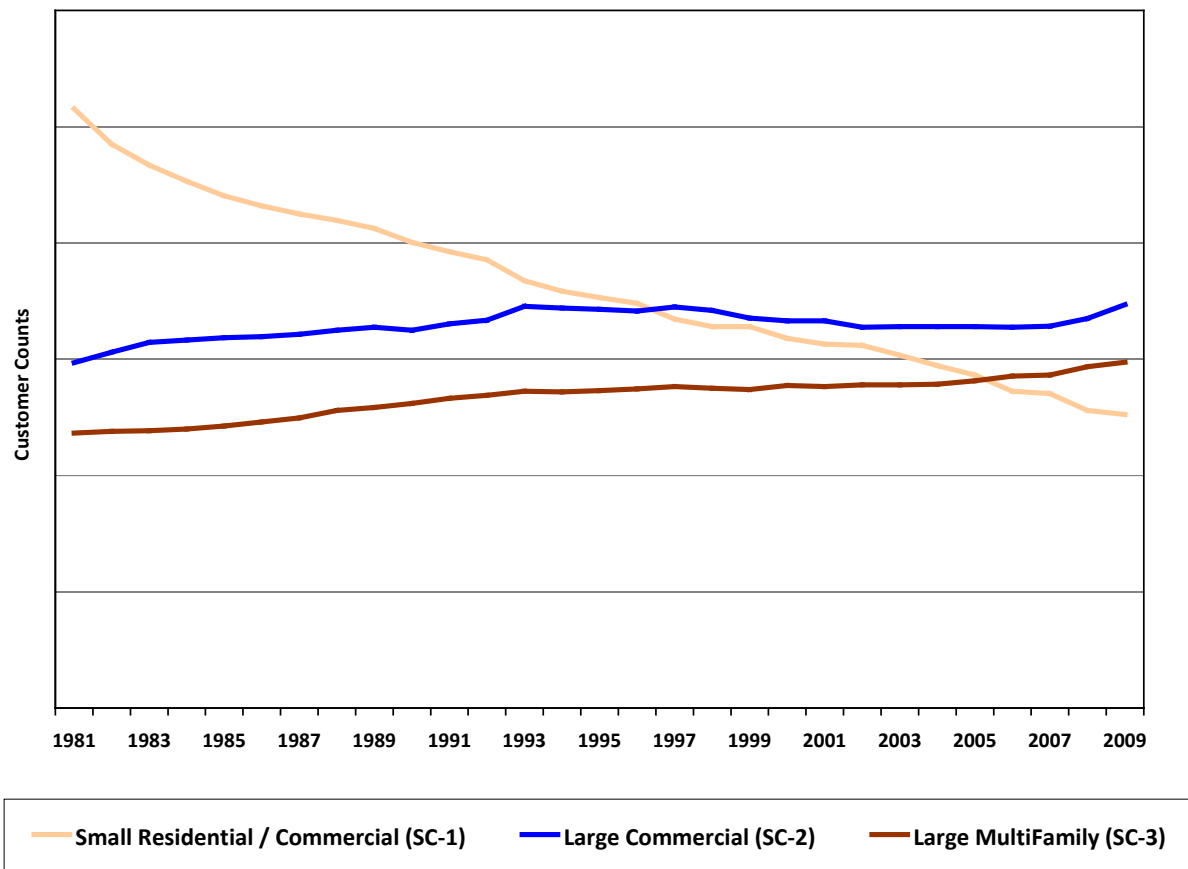
Finally, if the Steam System were no longer available, there would be significant impacts on customers, the environment, New York City, and the Gas and Electric Systems. For existing Steam Customers, the capital costs to install on-site, gas-fired boilers and electric air conditioning equipment would be approximately \$2.4 billion. The lost rental revenue from the space occupied by on-site boilers would range between \$45 million and \$90 million per year. The emission rates for NO_x, SO₂, CO₂, and particulate matter would increase without the Steam System along with substantial amounts of local emissions and the additional annual costs to Electric and Gas Customers

Historical Sales and Key Sales Drivers

The composition of the Con Edison Steam Customer base has changed over time as the result of small building teardowns that were replaced with single larger developments. Having fewer small customers is not necessarily detrimental to system economics, particularly if they can be replaced with higher load factor customers. Figure 2-3 illustrates the significant loss of SC-1 customers replaced by fewer albeit larger commercial and residential accounts.

⁴ According to the EPA's Greenhouse Gas Equivalencies Calculator, 1.5 million metric tons of CO₂ is the equal to the amount of CO₂ produced by 274,500 cars

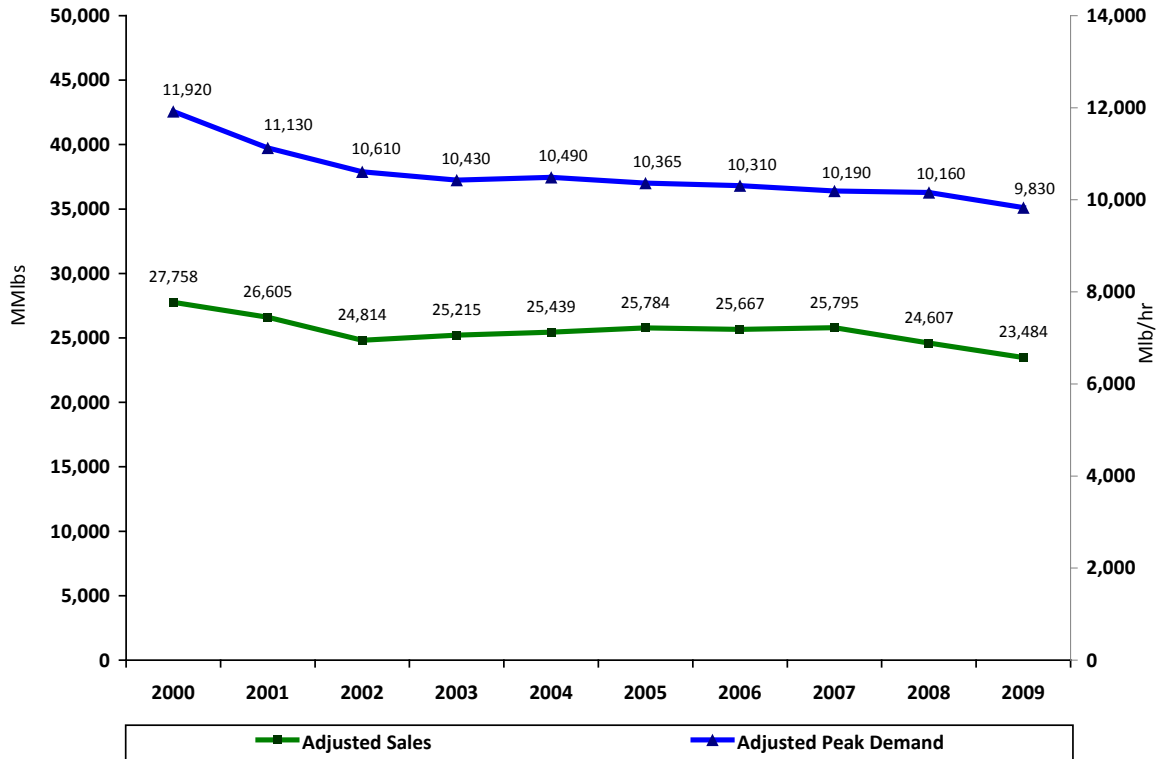
Figure 2-3. Number of Customers by Service Class



The declining usage in steam from 1995 to 2009 as shown in Figure 2-4 below is attributed to:

- Loss of NYSERDA incentives which has resulted in a continued decline in use of steam A/C
- Competing technologies (CHP, On-site Boilers, Gas Heaters)
- Energy conservation

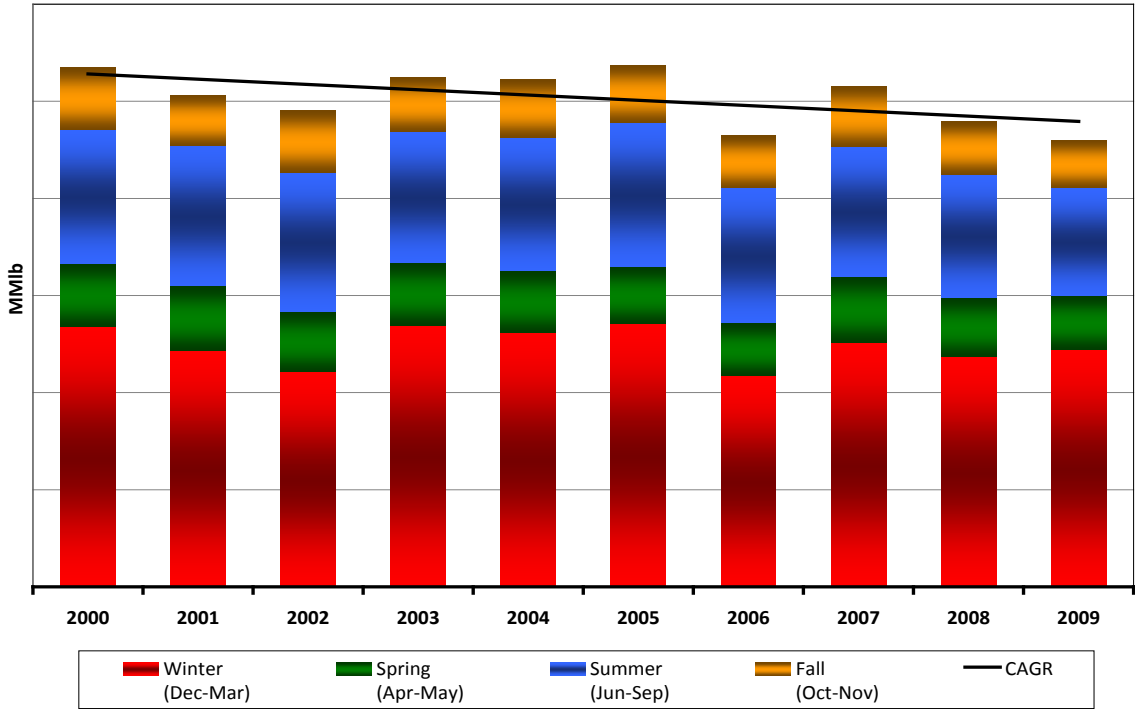
Figure 2-4. Weather Adjusted Sales and Peak Demand



During the past year, actual sales declined 4%. The recent decline in sales is in line with a longer-term trend. Over the past ten years, actual sales have declined by 13.9% or 1.6% per year on average (see Figure 2-5). There are several key reasons for the decline in sales:

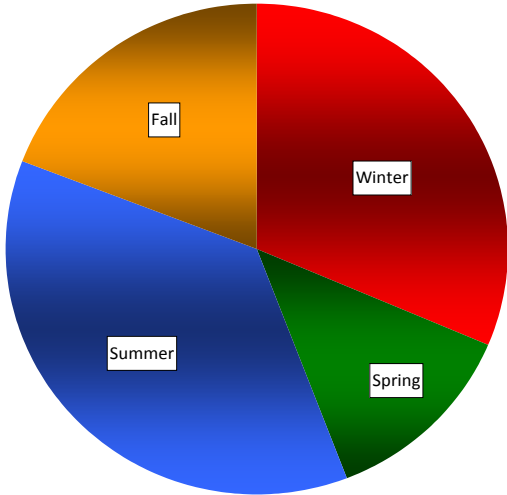
- Less air conditioning required due to cooler summers (during recent years)
- Customers switching from steam A/C to other cooling technologies (either a full switch or hybrid electric and Steam Systems)
- Less heating due to warmer winters
- Increase in customer conservation due to a weakened economy or implementation of energy management systems or other measures

Figure 2-5. Seasonal Sales and Sales Trend (Actual)



In the past ten years, the Steam Business has lost 3,700 Mlb in actual sales. Approximately 50% of this decline came from reduced air conditioning usage during the summer and shoulder seasons.

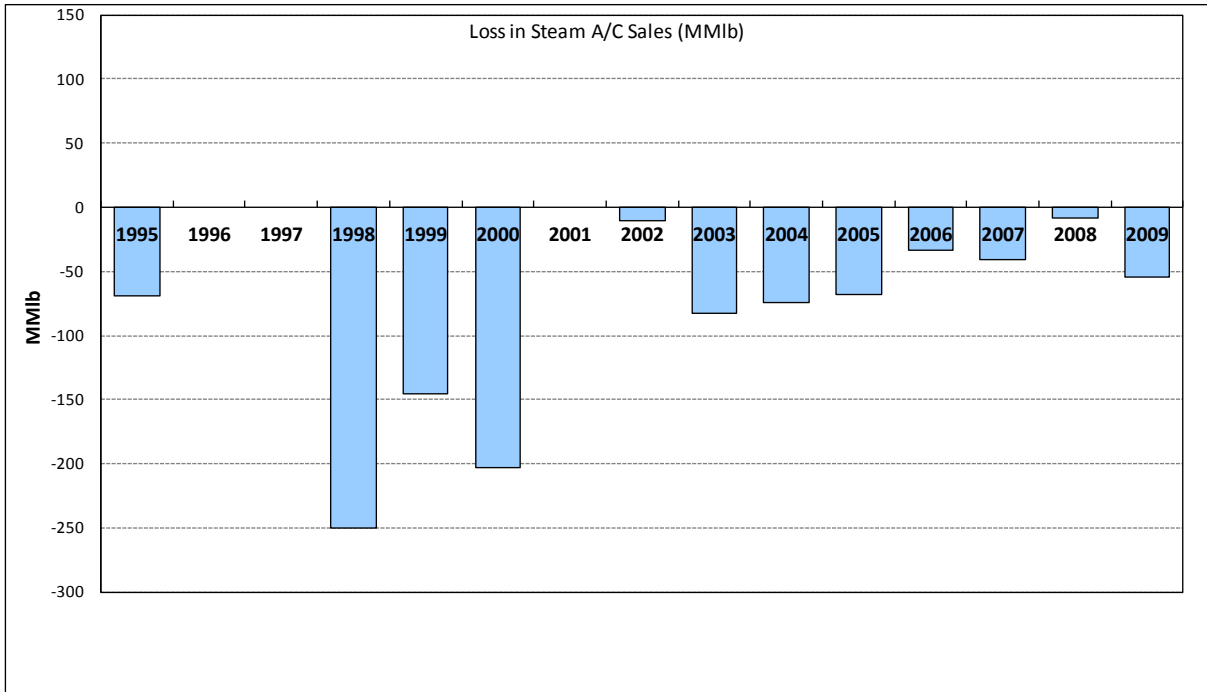
Figure 2-6. Percentage of Sales Losses by Season from 2000 to 2009



Customers are using less steam powered air conditioning. While most continue to be customers of the Steam System and use steam heat, they may have switched their A/C units to competing

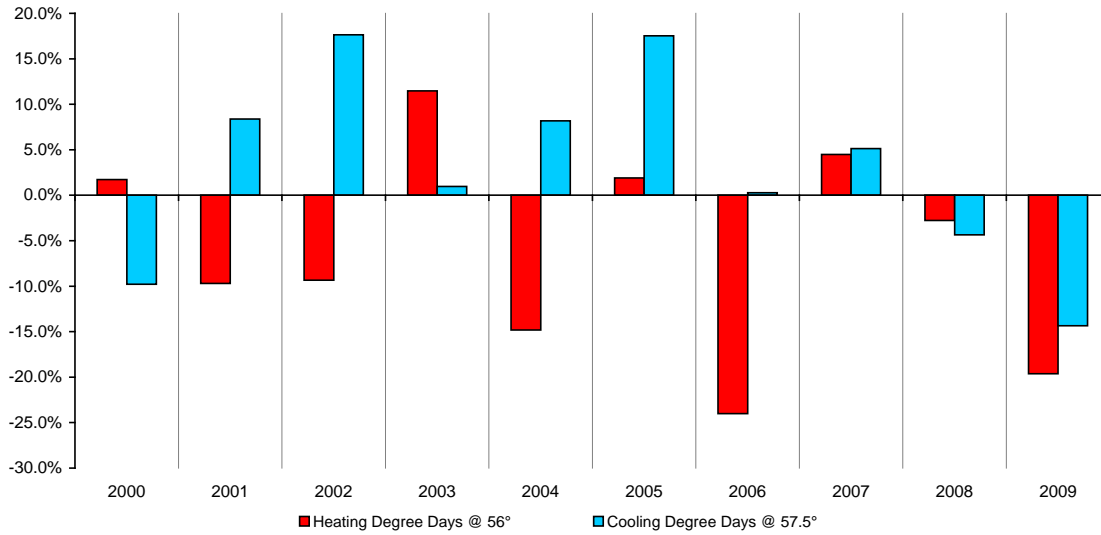
technologies or simply use their systems less often. This can be the result of efficiency measures like “free cooling” where installation of a plate and frame heat exchanger allows A/C to be run off cooling tower water instead of a chiller when conditions are right. According to the Figure 2-7, lost summer A/C sales may be attributed to customers who have left the system since the year 1995. Some of these properties returned to the system at a later time if the building left to be renovated or reconstructed. Note that this graph only represents approximately one third of the total loss in summer sales. The remaining two thirds of lost A/C sales are due to other customers using their steam driven chiller systems less often or not at all.

Figure 2-7. Estimated Impact on Sales from Loss of Steam A/C Customers



Weather has also contributed to the decline in sales over recent years (see Figure 2-8). For example, in 2009 a warmer winter (20% fewer heating degree days) and a cooler summer (14% fewer cooling degree days), reduced the need for heating and air conditioning, respectively.

Figure 2-8. Degree Days Compared to 30-Year Rolling Average



The effects of temporary and permanent conservation efforts are hard to quantify because customer behavior changes or efficiency improvement initiatives are often unknown to Con Edison. Regardless, weather adjusted sales data shows that sales per customer have declined by 7.0% during the past five years and 10.5% in the last ten years. It is evident that customers are addressing their energy usage and, in particular, their steam usage.

2.4 REFERENCES TO OTHER DISTRICT ENERGY UTILITIES

As part of the Steam Long Range Plan process, Con Edison researched and interviewed district energy utilities in the United States to understand how the Steam System compares on financial and operating dimensions. The benchmark consisted of data gathered from the International District Energy Association, publically available data, and interviews with executives from other district energy systems. The data are summarized in an appendix to this Plan. The compiled information suggest the Company’s approach in the SLRP is reasonable and attainable and that the expected outcomes of these efforts are likely to be achieved.

2.5 CUSTOMER BASE

Con Edison has a diverse range of heating and cooling customers, many of who are also customers of the Company’s electric business. Major customers include the United Nations, Rockefeller Center, the Empire State Building, the Metropolitan Museum of Art, and New York University. The Company’s customer base is segmented according to six general service classifications⁵.

⁵ SC-5 Negotiated Agreement Service Classification is a tariff discount that is applied to the Account’s respective Customer Service Classification SC-2 or SC-3

Table 2-2. Steam Service Classifications

Classification	Percentage of Customers
SC-1 General Service	28%
SC-2 Annual Power Service	39%
SC-3 Apartment House Service	32%
SC-4 Back-up/Supplementary Service	1%
SC-6 Transportation Service	0%
Total	100%

Con Edison’s customers are distributed across four geographical locations in Manhattan. Midtown contains many of the large commercial customers that are part of the Annual Power Service classification. The Upper East Side and Upper West Side are home to many of the General Service and Apartment House Service customers.

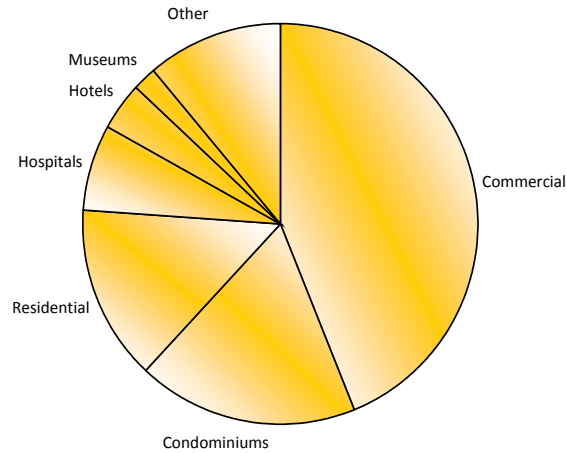
In terms of sales, Midtown consumes sixty-five percent of the annual production. Downtown is second at nineteen percent followed by the Upper East Side at eleven percent. The Upper West Side trails at five percent and is also distinct in that it is the only region without a noticeable summer peak from steam cooling and without a major hospital account.

Table 2-3. Sales by Geography

Geographical Location	Percentage of Sales
Downtown	19%
Midtown	65%
Upper East Side	11%
Upper West Side	5%
Total	100%

Commercial customers comprise over 50% of Steam System revenues, while residential customers contribute nearly 20% of revenues. The remainder is comprised of revenue from hospitals, hotels, museums, and other large buildings.

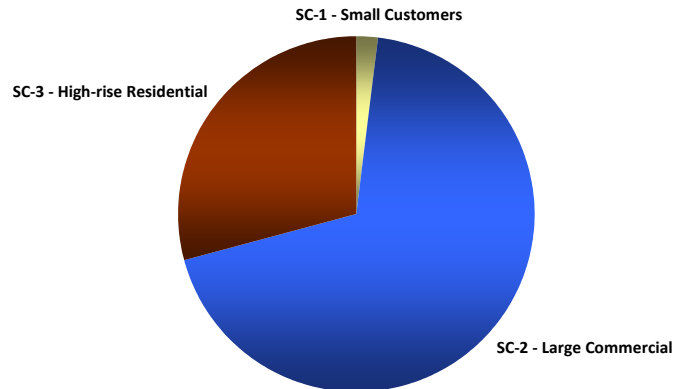
Figure 2-9. Proportion of Revenue by Facility Type



* Other includes government facilities, restaurants, schools, dry cleaners, churches, dormitories, theaters, supermarkets, and other facilities

The SC-2 Annual Power Service customers account for almost 68 percent of both sales volume and revenues, while the SC-3 Apartment Building Service customers account for nearly all of the remaining sales volume and revenue. The SC-1 General Service customers contribute relatively little to either sales or revenues. This proportion has not changed in recent years largely as a result of the Company's efforts to retain the larger customers and the negligible impact of losing SC-1 accounts.

Figure 2-10. Consumption by Tariff Class for 2009



Customer Size and Revenue Distribution

A relatively small number of customers account for most of the Steam System's revenue and sales. The top 6 percent of customers account for 40 percent of revenues. The concentration of commercial and retail building ownership in New York City means that Con Edison Steam works with an even smaller group of owners and decision makers. This concentration of customers can be viewed as both

positive and negative from a business perspective. While it is easier to communicate and educate a small customer population, around topics such as conservation, the Company feels a more immediate impact when adverse decisions are made by the same small number of people.

2.6 COMPONENTS OF THE STEAM BILL

For most Steam Customers, there are three components to their bills:

- o Base rates cover capital and O&M costs and include a usage charge (per Mlb of steam consumed in each monthly period), a customer charge (flat monthly charge), and a base cost of fuel (\$8.049 per Mlb)
- o Fuel adjustment charge (changes from the base cost of fuel)
- o Other Charges and adjustments, primarily fees and taxes

In addition, the rates for approximately 290 SC-2 and SC-3 customers, with consumption in excess of 22,000 Mlb per year, include a demand rate component. These customers are also charged for their peak demand (between 6 a.m. and 11 a.m. on weekdays) and all time peak demand during 4 months of the Winter Peak Period (specifically December through March).on the basis of a per Mlb/hr charge This program will be expanded to approximately 148 customers (consumption in excess of 14,000 Mlb per year) in the winter of 2010/2011. The demand component of a demand-billed customer's total winter peak steam bill ranges between 5% and 15%.

Presently, substantially less than 50% of the total average Steam Customer's bill is for the base rate (net revenue). The balance covers fuel costs, fees, and taxes.

2.7 ALTERNATIVES TO STEAM HEATING AND COOLING

Steam heating's primary competition comes from on-site gas-fired boilers. New package boiler technology can approach 85 percent efficiency at optimal load. On average, on-site boilers could produce steam at a lower overall cost compared to Con Edison steam. Nevertheless, many customers find that the features of the Company's Steam Service, especially the low space requirements, the convenience of the service, and a growing awareness of the environmental value of Con Edison steam more than outweigh a cost differential.

Electric and gas chillers are the main competitors to steam centrifugal chillers. Based on a 2005 study of air conditioning for SC-2 customers, conducted by Con Edison⁶, annual costs to use electric chillers are about one-third less than the steam equivalent. Gas chillers cost about a quarter less than steam equipment. Most of the cost savings come from the lower upfront costs (amortized over the lifetime of the equipment) associated with purchasing gas or electric chillers. In addition, the NYSERDA sponsored financial incentives for steam air conditioning customers have expired, thereby increasing the total cost of ownership. Con Edison has not been successful in adding new steam air conditioning

⁶ Con Edison Steam Business Plan, 2005

customers for several years and the Company does not see strong growth prospects for this product without incentives.

Customer-sited cogeneration offers large customers the capability to self-generate energy for both heating and cooling purposes. Cogenerating steam and power has the potential to allow the system to price steam or electric favorably by, in effect, offsetting steam production costs with electricity margins or vice versa. On-site, dedicated generation facilities may provide a measure of protection from future capacity cost-related increases in utility rates. Cogeneration is also attractive because the technology is eligible for LEED points. LEED certification helps building owners attract premium rents. The Company has been pursuing LEED recognition and expects to be included in the program soon. This is further discussed in Chapter 4.

2.8 TECHNICAL OVERVIEW OF THE SYSTEM

Today, Con Edison owns and operates the largest district Steam System in the United States and one of the ten largest systems in the world. The Steam System currently has a total of 13,256 Mlb/hr of installed net steam generating capacity. Con Edison owns and operates six steam and steam/electric generating stations throughout the City. Generating stations include East River, Hudson Avenue, 59th Street, 74th Street, 60th Street, and Ravenswood Steam. The Brooklyn Navy Yard Cogeneration Partners (BNYCP) supplies steam via an energy sales agreement. About 50% of the steam supplied by Con Edison is produced through cogeneration technology with the remainder produced through gas and oil-fired units.

2.8.1 Generation Overview

There are four generating stations in Manhattan and one each in Brooklyn and Queens generate steam. The East River Generating Station and BNYCP have cogeneration units that provide electricity and steam. The simple cycle gas turbines at Hudson Avenue, 59th Street, and 74th Street are primarily used only during the summer peak demand hours and for black start capability. All of the plants are located in Manhattan except for Ravenswood, which is located in Queens, and BNYCP and Hudson Avenue, which are located in Brooklyn.

The list of station unit groups and capacities, as of March 20, 2010, is shown in Table 2-4 below.

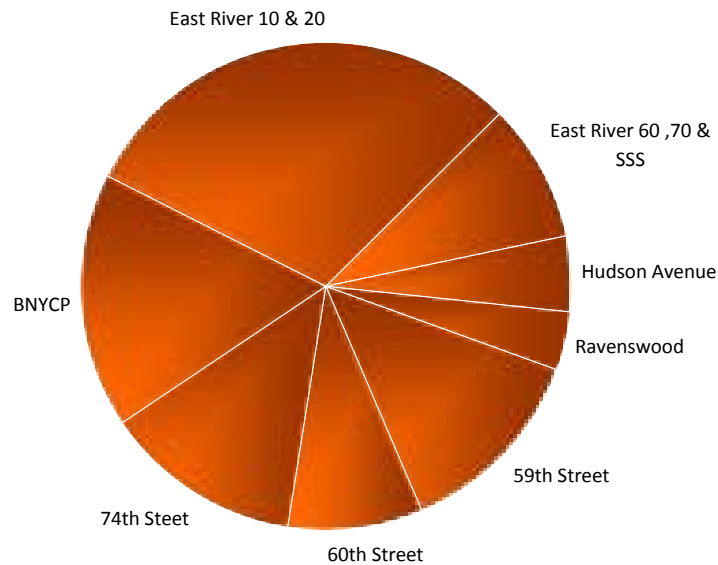
Table 2-4. Steam Generation Current Rated Capacity

Steam Generating Station Unit Groups	Current Winter Net Capacity (Mlb/hr)
East River 1/10 and 2/20	3,185
East River 6/60	830
East River 7/70	1,200
East River South Steam Package Boilers	650
Hudson Avenue Boilers	1,600
74 th Street HP Boilers	1,300
74 th Street Package Boilers	708

60 th Street Package Boilers	696
59 th Street Annex Boilers	985
59 th Street Package Boilers	381
Ravenswood Steam Boilers	750
BNYCP with max steam conversion	971
Total	13,256

Figure 2-11 represents the percentages of total 2009 steam sendout from each station. Units are dispatched to meet demand, subject to considerations such as cost, operational reliability, and emissions regulations. East River Units 1/10, 2/20, 6/60, and BNYCP are cogeneration units and are the principal base-load steam plants. During 2009, the ER 1/10, 2/20 Units and the BCNYP Plant produced approximately one-half of the total sendout.

Figure 2-11. Steam Sendout by Station (2009)

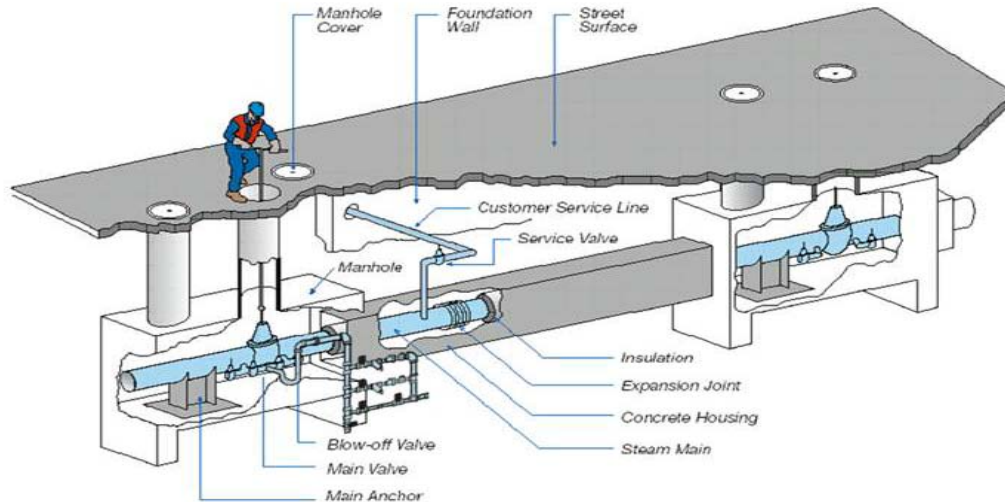


2.8.2 Steam Distribution System

The system contains approximately 105 miles of main and service pipes. It consists of steel piping for the mains and a combination of steel and brass for its service and condensate piping. The system operates as one continuous network and the physical location of the piping is directly correlated to the location of production supply sources and customer demands. The design parameters for the system are 400 psig at 475°F and 200 psig at 413°F.

The entire steam distribution network contains a variety of components that are displayed in the following diagram.

Figure 2-12. Steam Distribution Components



Piping

There are approximately 86 miles of steam mains varying from 2” to 36” pipe diameters and another 19 miles of steam services varying from 1” to 20” pipe diameters. Their age and length are as follows:

Table 2-5. Mains and Service Tunnels

Age	Mains		Services	
	Length	Total Mains	Length	Total Services
(yrs)	(miles)	(%)	(miles)	(%)
>40	62	73%	9	48%
31-40	10	11%	2	11%
21-30	4	5%	2	11%
11-20	6	7%	3	15%
0-10	4	4%	3	15%
Total	86	100%	19	100%

The piping at certain supply outlets (approximately 11 miles) is designed for 400 psig; the majority of the system (approximately 93 miles) is designed for 200 psig. The original Steam System was constructed beginning in 1882, prior to the development of commercial gas or electric arc fusion welding. Flanged pipe and fittings were utilized and can develop gasket leaks over time.

Approximately 101 miles of steam piping and components are buried. Buried steam mains are insulated and routed inside a protective housing. The current standard insulation material is fiberglass. However, most of the buried system is insulated with asbestos insulation. The majority of

the housing is made of concrete, which is the current standard. The remainder of the housing is made of shell housing (pipe within another pipe), cast iron coffin type, brick and/or tile, or combinations of the above. Steam mains are supported by anchors, rollers and guides within the housing.

There is approximately one mile of steam mains running through customer buildings (a/k/a circulating mains). There is also approximately one mile of leased line which Metro North operates and maintains under a lease agreement with the company.

The Steam System also consists of over 2 miles of mains routed inside 10 tunnels and a micro tunnel. Three of the ten tunnels are operated and maintained by the Gas Tunnel Operations, and another seven tunnels and one micro tunnel are operated and maintained by Steam Operations.

2.9 SLRP DEVELOPMENT PROCESS

During the development of the Steam Long Range Plan, Con Edison met with a representative group of stakeholders, the New York Public Service Commission, and the New York Energy Policy Task Force. In the future, the Company expects to continue to have discussions with key stakeholders about Con Edison’s plans.

Con Edison Steam Operations has also conducted various customer surveys and focus groups including one-on-one interviews with large commercial customers. Outreach topics covered affordability, reliability, energy efficiency, infrastructure upgrades, and the pace of adoption of new technologies. Customer feedback was considered and incorporated in the plan.

Table 2-6. Participants in Stakeholder Input Sessions

Year	Focus Groups	Customer Seminars	Steam Seminars
	9 focus sessions (3 per year)	5 public events (1-2 per year)	28 class sessions (10 per year)
2007	25	140	84
2008	11	120	138
2009	23	160	130
2010	Scheduled for April	Scheduled for October	Scheduled monthly

Customer feedback across these various venues has been consistent and can be summarized as follows:

- o Concerned with rising energy costs, including steam, and some recognize fuel volatility is a major factor
- o Steam A/C is cost prohibitive from an upfront capital perspective
- o Excellent reliability of Con Edison Steam Service
- o Excellent customer service levels from meter reading to account managers
- o Product is easy to use and dependable

- o Value environmental benefits and green energy

2.10 KEY BUSINESS DRIVERS AND COMPARATIVE PERFORMANCE TRENDS

Economic Conditions

The economic activity in Con Edison's steam service area is measured by the private non-manufacturing employment for New York City. This indicator is currently projected to continue to decline through 2010 and begin to recover in 2011. However, employment is not anticipated to fully recover to the annual average level for 2008 until 2012. The Company's projections of the impact of employment changes are based on forecasts from Moody's Economy.com. The projected change in employment is considered in determining the steam sales forecast.

Weather

Weather has a major impact on both winter and summer steam sales. There is no "weather normalization" factor in determining revenue requirements and return on equity for the Steam System. Therefore, in determining winter and summer sales forecasts, average weather patterns are used to determine the projected sales, eliminating the impact of warmer or colder than normal weather. Normal weather is defined as the average weather condition over the 30 calendar years ended 2008. A 30-year condition is used by the National Weather Service to define normal conditions and is a widely accepted standard in the energy industry. Actual weather conditions are clearly beyond the control of the Company. A weather normalization clause or a revenue decoupling mechanism (as discussed earlier) in setting Con Edison's steam rates would eliminate the uncertainty of weather conditions from the rate setting process. All of Con Edison's steam heating and air conditioning customers are subject to this weather uncertainty on a continuous basis.

Figure 2-13 plots average hourly steam send out of the total Steam System during the peak period (6 AM – 11 AM) versus the weather variable (F) and compares the regression curves for two comparable winter periods. The 2008-2009 winter had significantly lower steam consumption during peak period at all weather variable temperatures compared to the previous winter, and the difference is more significant at lower weather variable temperature. Figure 2-14 shows a similar correlation for the non-peak demand period. Some of the steam consumption reduction of the 2008-2009 winter period may be attributed to the current recession. The reduction due to the energy conservation measures would tend to be longer lasting or permanent, but the component that is due to the recession would recover with the economy. Going forward, with particular focus on colder days in winter 2009-2010, the Company will be tracking peak and off-peak consumption levels which will be important in forecasting conservation's impact on peak demand.

Figure 2-13. Comparison of Average On-Peak Daily Weekday Steam Sendouts

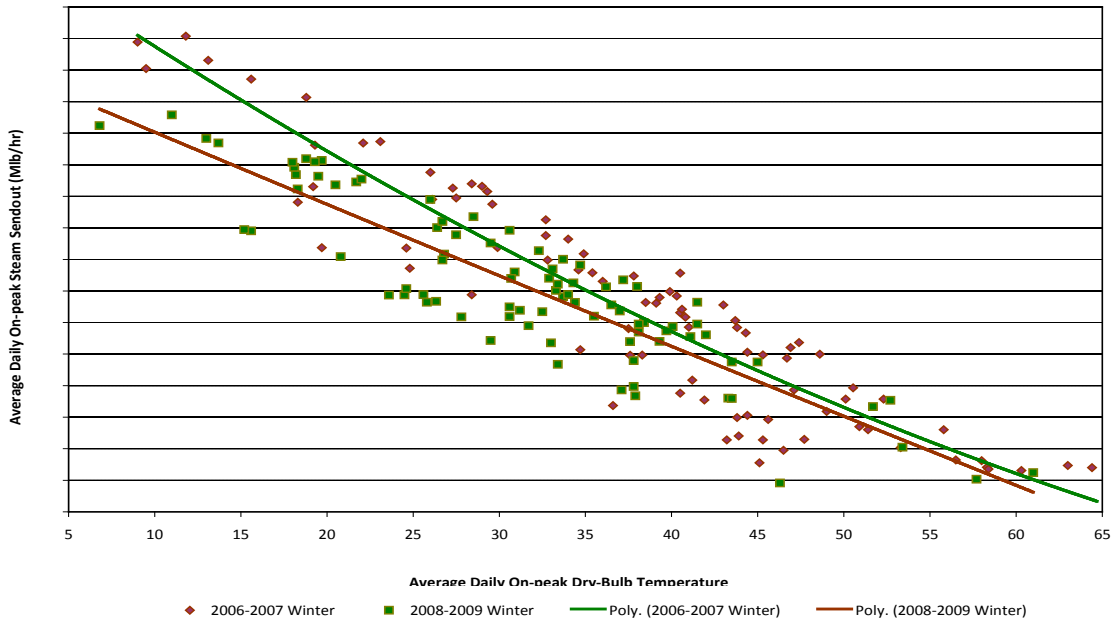
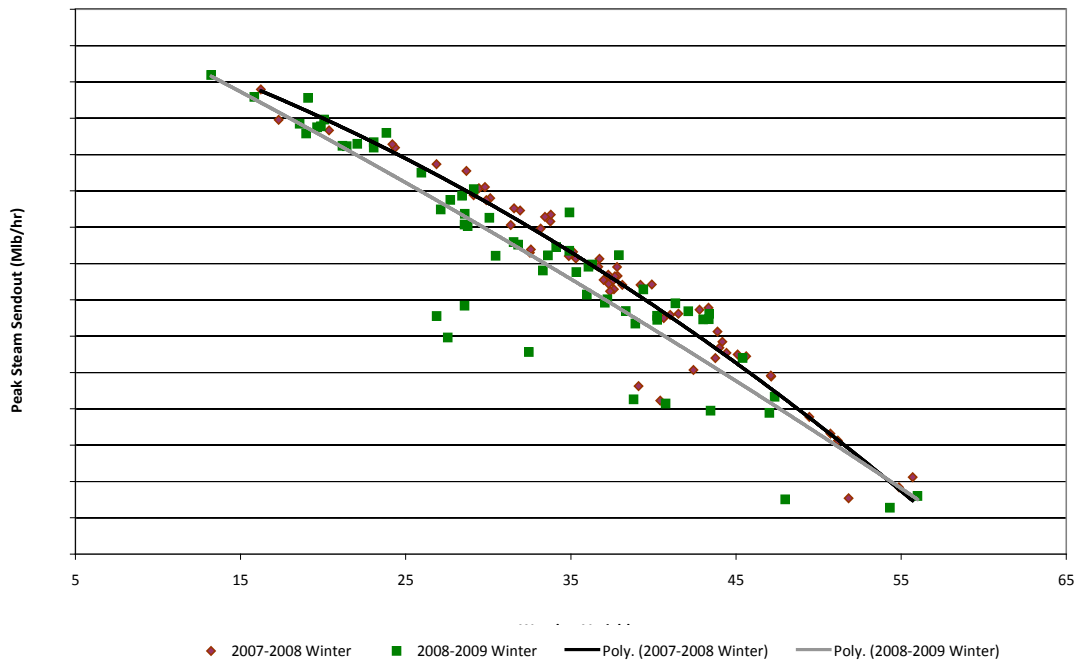


Figure 2-14. Comparison of Daily Weekday Steam Peak Sendouts



3.0 MANAGING DEMAND, SUPPLY, AND ENVIRONMENTAL PROFILE

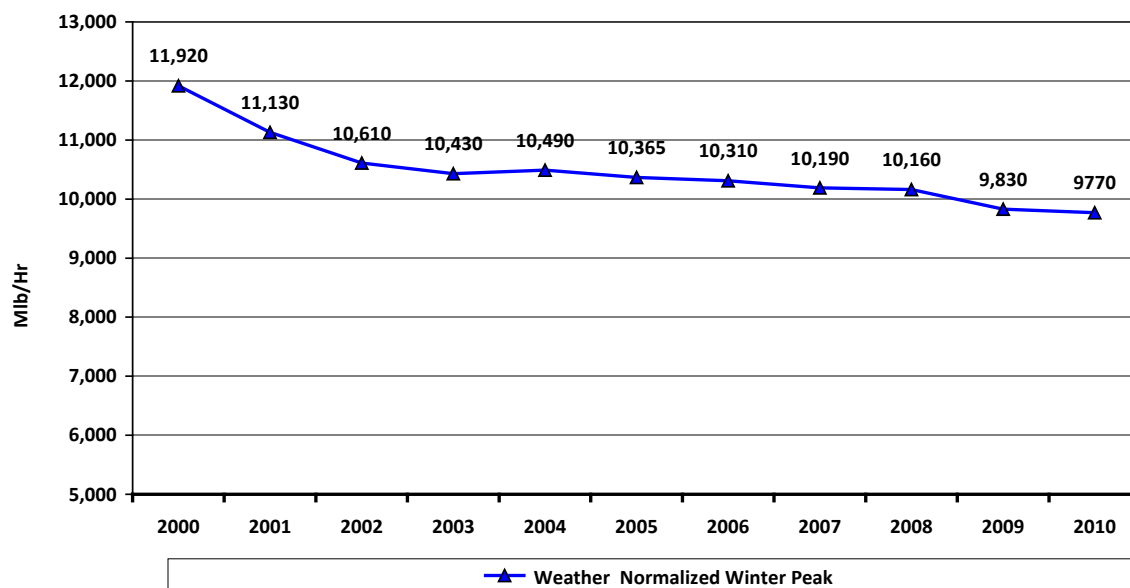
3.1 OVERVIEW

The Plan forecast indicates flat demand over the next five years and throughout the forecast period. To meet this demand, the Company expects to make continued investments to maintain and replace as necessary production and distribution assets while integrating demand management to enable the Company to meet its mission of delivering safe, reliable, and affordable service while minimizing Con Edison's environmental impact. Con Edison will leverage customer-based demand and supply side management (in the forms of time-based pricing, demand response, energy efficiency, and distributed generation) in order to defer or eliminate the need for building replacement infrastructure, while at the same time reducing greenhouse gases.

3.2 DEMAND AND SALES FORECASTS

As shown in Figure 3-1 below, weather-normalized peaks have been very modestly declining over the past decade. The most notable decline coincided with the 2008-09 recession where a 3.3% decline in peak was observed between winter 07-08 and 08-09. That decline moderated back to historic levels this past winter where a 0.6% decline has been calculated with weather-normalized peak of 9,770 Mlb. These modest declines in peak demands are a result of customer conservation, efficiency improvements, and reductions from customer sited generation, net of new business connections.

Figure 3-1. Actual Weather-Normalized Steam Peak Demand



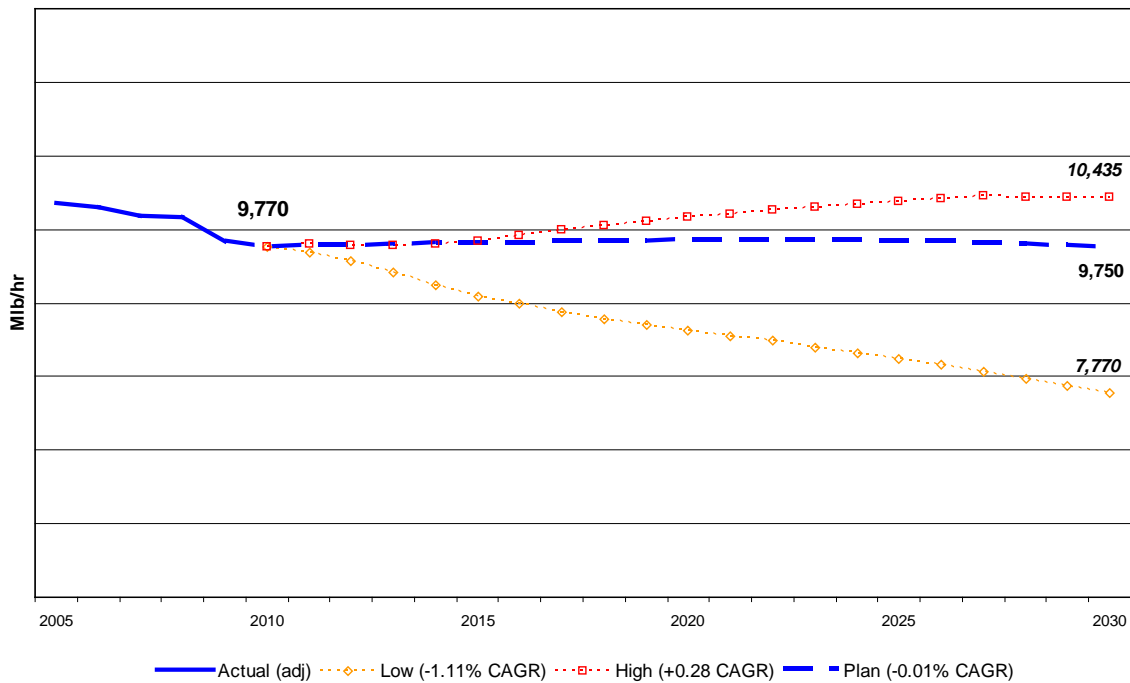
Con Edison's peak demand forecast provides the basis for determining production capacity requirements. Con Edison's peak demand forecasting process and its application to the determination of peak demand for winter 2009-10 is provided in Assessment Document 7.0. A standard forecast

consists of two components: a sales forecast and a peak demand forecast. The sales forecast is a projection of steam consumed throughout the year, measured in terms of millions of pounds (MMlb). The peak demand forecast is a projection of the maximum steam production requirements that Con Edison's customers demand at a single point in time, measured in thousand pounds per hour (Mlb/hr). Peak demand, or the maximum steam that customers require at a single point in time, drives infrastructure investment because Con Edison must build to that demand even if it is a relatively infrequent occurrence. For the Con Edison Steam System, peak demand occurs in winter when heating loads are the highest.

The primary drivers of steam demand and sales growth are overall economic growth in the region, which affects employment, construction and population in the service territory; and specific new business growth including the World Trade Center.

To facilitate the development of the Steam Long Range Plan, the Company developed a Plan Case and two alternate bounding cases. These three forecasts for sales and peak demand are described in brief and depicted in Figure 3-2. The starting point for each of the cases is the weather normalized peak for winter 09-10 of 9,770 Mlb/hr.

Figure 3-2. Steam Demand Forecasts



The Plan Case Scenario

The Plan Case forecasts nearly flat growth through 2030 representing an average annual growth rate of -0.01%. The Plan Case reflects the expectation that the economy will recover slowly through the end of 2010. Consequently, the Company expects moderate net growth in new business from new construction offset by historical levels of lost business. For 2011 through 2013, new business growth

is based on new service requests received by Con Edison. Only service requests deemed “firm” are included in the Plan Case. Beyond 2013, the new residential and commercial business forecast is based on long term economic trends including modest employment growth. These growth trends are offset with the continued extrapolation of historical lost business trends while in later years. Table 3-1 summarizes the key assumptions included in the Plan Case. As indicated, no additional energy efficiency, demand response or conversion are anticipated beyond the historical trends already captured in the forecast. Additional discussion regarding company actions that can be taken to reduce demand are provided later in this chapter.

Table 3-1. Summary of Plan Case Demand Forecast

Driver	Plan Case
New Business	Definite new service requests (2011-2013)
World Trade Center (part of employment growth)	186 Mlb/hr addition
Customer-Driven Energy Efficiency (by 2030)	None
Customer Driven Demand Response (by 2030)	None
Customer Conversion from No. 4/ No. 6 oil to Steam (by 2030)	None
Customer Conversion to Combined Heat and Power	None
Customer Conversion to On-site Boilers (by 2030)	None

The High Demand Scenario

In the High Case, the Company projects peak demand to grow from 9,770 Mlb/hr in 2010 to 10,435 Mlb/hr in 2030, representing a twenty year compound annual growth rate of 0.3%. In the High Case it is assumed that there will be a strong economic recovery in 2010 and 2011, resulting in additional new construction beyond that which has been identified to date.

Also included in the High Case are the expected implications of NYC regulation that is intended to prohibit use of lower grade residual oils for commercial buildings. This could result in displacement of oil heat with steam supply from Con Edison and could account for 500 Mlb/hr in additional peak load by the end of the twenty year time horizon, or approximately 57 new accounts.

To the extent that this growth is coupled with increases in electric load, cogeneration alternatives may become economically attractive compared with boiler-only options. Alternatively, if the Company determines that it is more cost effective to keep demand within current production capacity, the Company may invest in utility-funded programs to encourage demand response and energy efficiency. New control technologies may make it more cost effective to incentivize customers to manage their use than to invest in new generating capacity. Additional details on the DSM strategy are discussed in Chapter 4.3.

Table 3-2. Summary of High Case Demand Forecast

Driver	High Case
New Business	All new service requests (2011-2013)
World Trade Center (part of employment growth)	186 Mlb/hr addition
Customer-Driven Energy Efficiency (by 2030)	2.9% reduction in energy and demand
Customer Driven Demand Response (by 2030)	None
Customer Conversion from No. 4/No. 6 oil to Steam (by 2030)	500 Mlb/hr steam increase (57 accounts)
Customer Conversion to On-site CHP or Boilers	650 Mlb/hr reduction

The Low Demand Scenario

In the Low Case, Con Edison projects peak demand to decline from 9,770 Mlb/hr in 2010 to 7,770 Mlb/hr in 2030, representing a twenty year compound annual growth rate of -1.1%. The Low Case differs from the Plan Case by assuming that peak demand is lower due to a sizable customer base switching to on-site boilers and CHP as well as lower consumption per customer due to more strict building codes, more conservation, and more peak load shifting. This scenario is consistent with recent New York City initiatives that require major commercial buildings to conduct energy efficiency audits. In addition, the peak forecast for the World Trade Center site is reduced to reflect lower usage per square foot.

In summary, variations in demand from new construction of steam-supplied buildings, employment and associated vacancy rates, lost business to onsite generation, energy efficiency measures, and customer-initiated demand side management are the main variables that distinguish the scenarios. Table 3.3 summarizes the input variables for the Low Case.

Table 3-3. Summary of Low Case Demand Forecast

Driver	Low Case
New Business	Definite new service requests (2011-2013)
World Trade Center	146 Mlb/hr addition
Customer-Driven Energy Efficiency (by 2030)	5.0% reduction in energy and demand
Customer Driven Demand Response (by 2030)	200 Mlb/hr reduction
Customer Conversion from No. 4/No. 6 oil to Steam (by 2030)	None
Customer Conversion to On-site CHP or Boilers	1,250 Mlb/hr steam reduction

3.3 STEAM RESOURCE PLAN: MANAGING PRODUCTION CAPACITY

The Steam Resource Plan is designed to meet the Plan Case demand forecast and is consistent with the Company's Long Range Planning Process and has been evaluated in the context of long range plans being developed for the natural gas and electric segments of Con Edison Company of New York, Inc. The Company developed alternative resource plans for the High and Low Demand Cases in order to test the resilience of the assumptions and to develop signposts that can be used to adjust the Company's strategy in a timely manner.

3.3.1 Outlook for 2010 – 2019

Under the Plan Case demand forecast, opportunities to reduce costs by reducing installed capacity may be achievable if demand levels are maintained equal to or less than current levels. For example, the potential cost savings associated with the removal of Hudson Avenue from service were incorporated into the financial analysis in years 2014 and 2015. When the equipment is removed from service and rendered inoperable, the Company would no longer have to pay the equipment portion of the property taxes associated with the site. In 2009, this total was approximately \$8 million. The analysis also assumes a reduction in the O&M budget of approximately \$11 million over the span of 2014 - 2016 with the removal of Hudson Avenue. Rate base associated with Hudson Avenue will continue to include the property still on the Company books. However, in this scenario, the property will still be available for future development by the Company for electric or steam production should the need arise. Some allowance for maintaining the site, buildings and waterfront infrastructure in safe conditions and in conformance with building codes is allotted.

3.3.2 Capital Plan for Ongoing Production Resources

The following is a sample of near-term, major capital projects at each of the generating stations.

East River Generating Station

East River Units 1/10 and 2/20

East River 1/10 and 2/20 cogeneration units each have a gas turbine and heat recovery steam generator (HRSG), with no steam turbines. These units began commercial operation in April 2005 and replaced the Waterside Generating Station, which was retired a few months later. Each unit is currently rated with a net steam sendout capacity of about 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 a HRSG with supplemental duct firing. East River Units 1/10 and 2/20 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 (VOCs). The units have a combined electric capacity of 360 MW.

The capital plan provides for gas turbine overhauls and HRSG repairs, such as economizer and superheater replacements. The water treatment system will be upgraded to reduce the anticipated increase in labor and chemical costs due to the lower quality of water supply. The City of New York switched the water source, which affects the steam equipment. In addition, the upgrades will mitigate flow accelerated corrosion in the economizer section that has previously caused tube leaks. Environmental control equipment (selective catalytic reduction and oxidation catalyst) is scheduled for replacement of the elements every five to seven years depending upon operating hours and performance degradation.

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 capability in 2004, burning either natural gas or No. 6 fuel oil, and are currently rated at 130 Mlb/hr net steam sendout each.

Projects are planned for upgrading the water treatment and chemical monitoring systems, and for improving oxygen removal from deaerators to mitigate corrosion of feed water piping and boiler components. An operator training simulator is scheduled for installation.

East River 6/60

East River Unit 6/60 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 and 980 Mlb/hr in the drag valve mode (live steam when turbine is bypassed).

Some of the projects currently being implemented include a chemical monitoring system upgrade, replacement of the electric generator exciter bus, Feedwater Heater 64N replacement, and Stack 3 inspection and repairs.

East River 7/70

East River Unit 7/70 operates as an electric-only unit in the summer and as a steam-only unit 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 1,200 Mlb/hr net steam sendout

Current projects include automation of the fuel burner system for remote operation from the control room, replacing the turbine lubricating oil cooler tube bundle to protect the turbine bearings from overheating, and Feedwater Heater 77W replacement to ensure unit reliability. The transformers for hotwell pumps and induced draft fans, and the boiler feed pump switchgear need replacement to ensure reliability of the unit.

74th Street Generating Station

There are three High Pressure Boilers (Boilers 120, 121, and 122) and Package Boilers (Boilers 1-6) at the 74th Street Generating Station. The High Pressure Boilers are natural-circulation, balanced-draft, non-reheat boilers, which burn No. 6 oil and currently have a combined total rated capacity of 1,300 Mlb/hr net steam sendout. The Package Boilers are natural-circulation, balanced-draft units that burn No. 6 oil, and currently have a combined total rated net steam sendout capacity of 708 Mlb/hr.

Projects include the gas additions to the boilers, internal and external gas piping reinforcements, and burner modifications with IFGR systems for reduction of nitrogen oxide emissions to meet potential regulations. The SLRP also calls for boiler work and water treatment upgrade from the existing water softened water demineralization water to mitigate the identified corrosion problems. Inspections and repairs will be performed on the stack, roof, and structures.

60th Street Generating Station

There are six package boilers (Boilers 1-6) at the 60th Street Generating Station. These are natural-circulation, balanced-draft units, and presently have a combined total rated net steam sendout capacity of 696 Mlb/hr. These boilers burn natural gas.

Capital improvements targeted for 60th Street include Package Boiler and auxiliary equipment upgrades. The work will include air heater and fan upgrades.

59th Street Generating Station

There are two Annex Boilers (Boilers 114 and 115) and three package boilers (Boilers 116, 117, and 118) at the 59th Street Station. The Annex 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 combined total rated net steam sendout capacity of 985 Mlb/hr. The package boilers are natural-circulation, balanced-draft units that burn natural gas and No. 6 oil. They currently have a combined total rated net steam sendout capacity of 381 Mlb/hr.

A capital project is in progress to install a new demineralized water treatment facility to mitigate identified corrosion problems. A fuel conversion project is scheduled to provided dual fuel burning capability (natural gas and residual oil) for the Annex Boilers, and a NOx reduction project (IFGR) for the Package Boilers is planned.

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 10% natural gas. The total site net capacity is 750 Mlb/hr. This reflects deratings of the units relative to their original total net design capacity of 976 Mlb/hr.

Approximately 550 tubes in Boiler No. 1 will be replaced to address the corrosion detected in a recent inspection. Stack 2 will be inspected and repaired. Mud drum heating coils are to be installed in each unit to help protect the units from out-of-service corrosion.

Hudson Avenue Generating Station

Of the original 32 boilers at Hudson Avenue, only four remain in service. These are natural-circulation, balanced-draft, non-reheat boilers, which burn No. 6 oil and are currently rated at 400 Mlb/hr net steam sendout each.

Roof replacement and building repairs are ongoing to ensure personnel safety and boiler repairs will be performed as needed for safe, reliable operation until plant removal. Boiler inspections will be performed periodically to determine the need for repairs. Beyond 2014, allotments to keep buildings and dock facilities in safe conditions and in conformance with applicable codes are included based on the plant being held in cold shutdown mode or fully removed from service.

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 plant's entire net electric and steam output of the plant 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 is capable of producing maximum steam output of 971 Mlb/hr when its electric output is reduced below 220 MW. The Brooklyn Navy Yard Cogeneration Partners (BNYCP) plant generates about 17% of total steam send out.

3.3.3 Gas Addition Projects⁷

Currently, the primary fuel at both the 59th Street and 74th Street Generating Stations is No. 6 fuel oil. At 59th Street, the two Annex Boilers fire No. 6 fuel oil. Natural gas is used for the three Package Boilers and the Annex Boilers' igniters. At 74th Street, all of the boilers (i.e., three High Pressure and six Package Boilers) fire only No. 6 fuel oil. The gas addition plan includes projects to install gas supply systems at each station with capacity sufficient to fuel all of the boilers. These projects will

⁷ Based on August 2009 fuel forward pricing

convert the stations' primary fuel to natural gas while maintaining the dual-fuel firing capability for all boilers, i.e., each boiler would be capable of using either No.6 fuel oil or natural gas.

Table 3-4 summarizes the savings and planned completion dates for the two conversion projects.

Table 3-4. Summary of Oil to Gas Addition Projects

Station	Description	Projected Annual Savings	Year of Project Completion	Annual Value/Year of Realized Savings
59 th	Gas Conversion	\$8.1M	2011	\$8.1M/2012
74 th	Gas Conversion	\$14.5M	2014	\$14.5M/2015

The use of natural gas rather than No. 6 fuel oil also benefits the environment because emissions such as Nitric oxide ("NOx"), Sulfur Dioxide ("SO₂") Carbon Dioxide ("CO₂") and particulate matter are reduced. The estimated annual emission reductions resulting from firing natural gas as the primary fuel at 59th Street are as follows: 131 Tons NOx, 345 Tons SO₂ and 60,511 Tons CO₂. Similarly, for 74th Street, the annual estimated emissions reductions are 246 Tons NOx, 610 Tons SOx and 116,251 Tons CO₂. In addition, dual fuel capability provides flexibility and significantly enhances reliability in the event that either fuel supply may be disrupted.

As noted previously, it is anticipated that there will be a final PSC Order on the Company's filed Steam Rate Plan by September 2010. The inclusion of the Gas Addition Project is based on the Company's filing. To the extent that these projects are not incorporated into the Final Order, the company would continue to utilize no. 6 oil at these facilities and the company would avoid the capital expenditures and fuel cost savings.

3.3.4 Methodology for Evaluating Production Resource Modifications

The first ten years of this resource plan incorporate recommendations made by the Public Service Commission in prior steam resource planning studies and reflects the Company's ongoing commitment to effective planning and long range strategic decision-making, and has been designed to accomplish the following:

- o Maintain adequate capacity and reserve for reliable system operation.
- o Comply with all applicable environmental requirements, including anticipated new regulations.
- o Minimize the cost of service to ratepayers while providing acceptable return for shareholders, consistent with reliability and environmental requirements.

The 2007 Steam Resource Plan described the Company's reliability criteria for the Steam System and applied this to determine combinations of resources needed to meet the peak load forecast at that time. The 2009 Steam Resource Plan Update applies similar reliability criteria to determine system and site-specific requirements under the plan, low, and High Case scenarios. The criteria are installed

reserve, system Loss-Of-Load Expectation (LOLE), and pressure control. Each reliability criterion is described below.

Installed Reserve

Installed reserve is 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 “single-contingency” design criterion requires installed reserve to be no less than 1,600 Mlb/hr, which is equal to the capacity of East River Unit 1/10 or 2/20. Table 3-5 indicates the amount of winter period installed reserve anticipated will be available. The table indicates that adequate reserve margin in the winter period is maintained throughout the twenty year planning period based on removal of Hudson Avenue in 2014.

Table 3-5. Steam System Capacity: Load and Reserve⁸

Station/Unit	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
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
East River 20	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585
East River 60	830	830	830	830	830	830	830	830	830	830	830
East River 70	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
BNYCP	971	971	971	971	971	971	971	971	971	971	971
East River SSS	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
74th Package	708	708	708	708	708	708	708	708	708	708	708
60th Package	696	696	696	696	696	696	696	696	696	696	696
59th High Pressure	985	985	985	985	985	985	985	985	985	985	985
59th Package	381	381	381	381	381	381	381	381	381	381	381
Ravenswood 'A' House	750	750	750	750	750	750	750	750	750	750	750
Hudson Avenue	1,600	1,600	1,600	1,600	0	0	0	0	0	0	0
Projected Capacity	13,256	13,256	13,256	13,256	11,656	11,656	11,656	11,656	11,656	11,656	11,656
Plan Forecast (*)	9,770	9,775	9,790	9,805	9,810	9,815	9,820	9,830	9,840	9,845	9,855
Reserve Requirement	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
Surplus / Deficiency	1,886	1,881	1,866	1,851	246	241	236	226	216	211	201

Station/Unit	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
East River 10	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
East River 20	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585
East River 60	830	830	830	830	830	830	830	830	830	830
East River 70	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
BNYCP	971	971	971	971	971	971	971	971	971	971
East River SSS	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
74th Package	708	708	708	708	708	708	708	708	708	708
60th Package	696	696	696	696	696	696	696	696	696	696
59th High Pressure	985	985	985	985	985	985	985	985	985	985
59th Package	381	381	381	381	381	381	381	381	381	381
Ravenswood 'A' House	750	750	750	750	750	750	750	750	750	750
Hudson Avenue	0	0	0	0	0	0	0	0	0	0
Projected Capacity	11,656	11,656	11,656	11,656	11,656	11,656	11,656	11,656	11,656	11,656
Plan Forecast (*)	9,860	9,860	9,855	9,850	9,845	9,835	9,820	9,800	9,780	9,750
Reserve Requirement	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
Surplus / Deficiency	196	196	201	206	211	221	236	256	276	306

Probabilistic Reliability Evaluations base on Loss-of-Load Expectation

⁸ Table provides peak load for the winter starting from November 16th of the previous year through March 31st.

Resource portfolios are 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.⁹

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. Numerous resource and load combinations were tested relative to a 1.0 day per year maximum LOLE criterion. MARS results for a peak load of 9,800 Mib/hr is shown below assuming capacity at Hudson Avenue (HA) reduced to zero, existing capacity levels at remaining units and normal planned maintenance schedules. As indicated in Table 3-6, the LOLE reliability criteria of one day in one year are met after Hudson Avenue is assumed to be removed. Table 3-6 indicates that the annual LOLE is 0.943 days per year that steam capacity could not serve load

Table 3-6. Steam System Capacity: Load and Reserve

Reliability Analysis (without Hudson Avenue)							
Capacity with seasonal outages & deratings	Maintenance scheduled mtce at time (week) of peak	Peak 9,800 Mib/hr	Current Reserve less seasonal & mtce & peak	Reserve (less HA)	LOLE		
		Mib/hr				days per year	
				w/o HA & Rav @ 750			
Jan	13,272	0	9,800	3,472	1,872	0.195	
Feb	13,272	0	8,531	4,741	3,141	0.028	
Mar	13,272	0	wk 1	8,658	4,614	3,014	0.062
Apr	13,051	3,798	wk 2	6,979	2,274	674	0.395
May	11,851	2,668	wk 5	3,735	5,448	3,848	0.005
Jun	9,413	0	5,350	4,063	2,463	2,463	0.012
Jul	9,413	0	5,350	4,063	2,463	2,463	0.014
Aug	9,413	0	5,350	4,063	2,463	2,463	0.027
Sep	11,651	2,398	wk 2	5,350	3,903	2,303	0.007
Oct	13,051	5,479	wk 3	5,200	2,372	772	0.146
Nov	13,051	3,712	wk 2	5,967	3,372	1,772	0.048
Dec	13,272	0	8,123	5,149	3,549	3,549	0.004
					Annual LOLE	0.943	
					Annual Alerts (1)	25.543	

(1) An alert in the MARS program is indicated when operating reserve is used to meet the demand for the peak hour of the day.

Hydraulic and Contingency Analyses

⁹ In the Steam System, not meeting the load would result in a decline in pressure. Depending on the severity of the shortfall, interruption of customers could occur.

In order to be in line with Steam's Design Criteria of an LOLE less than 1, a reserve margin equal to loss the of the largest unit, ERRP 1/10 or ERRP 2/20, is necessary. Each of these Units is rated at about 1,600 Mlb/hr, and this amount is Steam's Design Reserve Margin.

Several hydraulic studies were conducted utilizing the STONER Model for analysis of pressure and flow and the Contingency Model was utilized for pressure decay analysis. The STONER Model analyzes steady state pressure and flow conditions on the Steam System. The Contingency Model is used to determine the transient effect between the "before" and "after" cases simulated by STONER.

Several variables were examined to understand the need for capacity at Hudson Avenue and Ravenswood as these two generating stations are the next in line for replacement. Unit capacity, peak demand, derates, outage schedules, and load at the World Trade Center were all varied to help better understand the dynamics of the Steam System under base and contingency scenarios. Table 3-7 summarizes the key conditions and scenarios that were examined.

Three peak demand loads were examined for the winter period, 8,500 Mlb/hr, 9,500 Mlb/hr, and 10,000 Mlb/hr. For a point load of 150 Mlb/hr at the World Trade Center without any capacity at Hudson Avenue, pressures did not go below 125 psig for loads of 9,500 Mlb/hr and the loss of 1 ERRP Unit, which is an N-1 event. If the system did not have any capacity at Hudson Avenue and lost an ERRP Unit at a 10,000 Mlb/hr load and considering about 300 Mlb/hr demand at the World Trade Center, steam pressures would continue to drop until the load dropped to about 9,550 Mlb/hr.

As such, the focus was shifted to the 9,500 Mlb/hr winter peak. This considered a 150 Mlb/hr point load at the World Trade Center with no capacity at Hudson Avenue and a 5% system capacity derate. The highest load that could be served is 9,300 Mlb/hr after the loss of an ERRP Unit.

For the same conditions, however with no capacity at Ravenswood and 990 Mlb/hr capacity at Hudson Avenue, the break point for a loss of an ERRP Unit is 9,500 Mlb/hr without derates and 9,300 Mlb/hr with a 5% system capacity derate and a low system pressure threshold of 125 psig. If 1,200 Mlb/hr is considered at Hudson Avenue, with 5% system derates, a load of 9,500 Mlb/hr for the loss of an ERRP Unit can be supported with pressures greater than 125 psig.

For the non-winter period the following peak demand loads were analyzed:

- 7,050 Mlb/hr – Early Spring
- 6,450 Mlb/hr – Spring
- 5,350 Mlb/hr – Summer
- 6,850 Mlb/hr – Late Fall

Table 3-7. Stoner Results

STEAM RESOURCE PLAN: SLRP UPDATE

	Peak Load Mlb/h	WTC Load Mlb/h	Lowest Contingency Pressure PSIG
WINTER, NO HUDSON AVE STATION			
<i>without derate</i>			
No HA, Lose 1 ERRP	8,500	150	130
No HA, Lose 1 ERRP	9,500	150	127
WINTER, NO HUDSON AVE STATION			
<i>without derate</i>			
No HA, Lose 1 ERRP	10,000	(Failed)	Decay
	9,529	Break Point 300	126
WINTER, NO HUDSON AVE STATION			
<i>with 5.0 percent derate</i>			
No HA, Lose 1 ERRP	9,150	Break Point 250	125
WINTER, NO RAVENSWOOD STATION			
<i>without derate</i>			
No Rav, 990 at HA, Lose 1 ERRP	9,500	150	125
WINTER, NO RAVENSWOOD STATION			
<i>with 5.0 percent derate</i>			
No Rav, 1,200 at HA, Lose 1 ERRP	9,500	150	127
No Rav, 990 at HA, Lose 1 ERRP	9,315	Break Point 150	126
No Rav, 990 at HA, Lose 1 ERRP, with reinforcement	9,500	150	124
NON-WINTER, NO RAVENSWOOD STATION			
<i>with 5.0 percent derate</i>			
No Rav, 1,200 at HA, Lose 1 ERRP, Early Spring	7,050	150	134
No Rav, 1,200 at HA, Lose 1 ERRP, Spring	6,450	150	131
No Rav, 1,200 at HA, Lose 1 ERRP, Late Fall	6,850	150	130
No Rav, 1,200 at HA, Lose 1 ERRP, Summer	5,350	150	128
NON-WINTER, NO HUDSON AVENUE STATION			
<i>with 5.0 percent derate</i>			
No HA, 420 at Rav, Lose 1 ERRP, Early Spring	7,050	250	140
No HA, 420 at Rav, Lose 1 ERRP, Spring	5,980	Break Point 250	128
No HA, 420 at Rav, Lose 1 ERRP, Summer	5,350	250	125
No HA, 420 at Rav, Lose 1 ERRP, Late Fall	6,850	250	130
No HA, 750 at Rav, Lose 1 ERRP, Spring	6,450	250	119

Break Point Definition:

The highest system load with the given restrictions such that the worst case single contingency can be handled and pressures do not fall below 125 PSIG.

All of these peak demands are the highest experienced over the last five years, except for the summer, in which the previous summer's peak demand load was used. These periods provide a challenge as firm up outages, maintenance outages, and major overhauls are performed during the spring and fall periods. During the summer period, steam capacity is lost on ER 6/60, ER 7/70 as they convert to electric only operation, and a portion of the two units at BNYCP as steam sendout capacity is also sacrificed for electric capacity. Over 1,400 Mlb/hr in steam sendout capacity can be lost during the summer period when both gas turbines are in service due to a stack limitation at the 74th Street Generating Station. Typical unit outages, unit conversions to electric operations, and other limitations were considered during these periods.

Without any capacity at Hudson Avenue, all non-winter cases can withstand a 5% system capacity derate and the trip of an ERRP Unit

Again for the same conditions, however with no capacity at Ravenswood and 1,200 Mlb/hr capacity at Hudson Avenue plus a 5% system capacity derate, the load is met with pressures greater than 125 psig for the loss an ERRP Unit.

Analyses were also conducted for a peak load of 9,860 Mlb/hr, the highest peak over the 20 year Plan Forecast, with a point load of 250 Mlb/hr at the World Trade Center. Under an N-1 design condition, Loss of 1 ERRP Unit, with no unit derates (beyond design), Steam System pressures did not go below 125 psig.

A detailed summary of all STONER and Contingency analyses are included in the Appendix.

Based on the foregoing, to meet the Plan Case peak load, under design criteria, the Company would have the option to either remove Hudson Avenue and maintain Ravenswood or remove Ravenswood and repower Hudson Avenue.

3.3.4.1 Design Criteria

- The Steam System Design Criteria is as it pertains to production is as follows: N-1, Loss of the largest Unit (1 ERRP Unit)
- Continuous Service; supplied at an average gage pressure in excess of 125 pounds
- LOLE < 1, Supply cannot meet demand for 1 day in 1 year, which is equated to 24 hours of pressure below 125 psig in a 1 year period
- 1 in 3 chance of Design Weather, 30 year temperature look back with the Design Temperature Variable occurring between the 10th and 11th year.

3.3.5 Long-Term Initiatives

While longer term initiatives (2020-2030) are less definite, the Plan Case includes a capital plan as well the exploration of several new programs.

3.3.5.1 Ongoing Equipment Repair and Replacement

The Company expects it will continue to be cost-effective to operate existing plants relative to the cost of building new capacity. The capital requirement forecast for maintaining the existing plants is based on anticipated major overhauls and recurring equipment repairs and replacements based on historic expenditures.

The electric generating units, ER 1, 2, 6, and 7 require periodic turbine/generator overhauls every 5 to 7 years depending upon their operating hours and number of starts and stops. During these overhauls, the subject equipment will be opened up and inspections and repairs will be performed on all components to ensure reliable performance until the next scheduled major overhaul.

Certain equipment such as boiler components, pumps, deaerators, air heaters, heat exchangers (feedwater heaters, condenser tubing, fuel oil heaters, waste heat recovery systems, lubricating oil coolers, etc), electrical controls and other auxiliary equipment experience service induced degradation and may need replacements during the plan periods. Specific equipment replacements will be determined based on inspections, however the plan provides for forecasted expenditures for such replacements based on historic replacement frequencies.

Corrosion related failures of plant equipment and distribution piping remains a challenge. A recent change in the City water supply to the plants needed additional resources for water treatment in the generation stations. Water treatment and chemical systems upgrades will continue at various units during the plan period.

Con Edison expects long term capital requirements for operating the plants to change in the future based on several factors. These include age of the boilers/equipment, operating conditions, peak load, overall demand/dispatch, material costs, environmental regulations, governmental regulations, and other outside factors. The Company will continue to be cost effective in its operation and maintenance of its existing equipment/plants. But, there is the potential for future replacement of the boilers with cogeneration units and new equipment due to the factors listed above, either within the plan timeframe or beyond.

3.3.5.2 CHP Strategy

New York State and the City of New York have both recognized the need to improve air quality and reduce the economic risk of high energy prices on the City's economy. Development of customer-sited CHP plants in New York City's largest buildings is perceived to be essential to meet the New York State Energy Plan and PlaNYC CHP goals and the New York State goal of reducing electricity consumption 15% by 2015 through energy efficiency. As a result, NYSERDA currently offers significant incentives for customer-sited CHP and has yet to consider Con Edison supplied CHP.

There are some drawbacks to CHP, such as backup fuel source requirements, local emissions, exhaust ducting often creating an adverse impact on the city viewscape, less robust system monitoring capabilities, and impact on the gas infrastructure.

The market potential for CHP in the Steam System footprint is significant. There are numerous sites on the Steam System that have the potential for relatively large CHP installations. These include facilities with large thermal loads and electric loads in excess of 1.5 MW, particularly those adjacent to the Steam and Gas Systems and those in need of renovation or redevelopment. According to a recent

GTI report, there are 22 commercial sites in the City that could potentially add as much as 95 MW of CHP capacity.

There are currently nine Steam Customers that are operating CHP facilities accounting for a total steam and electric load offset of approximately 39 Mlb/hr and 9.7 MW, respectively. In 2010, two additional large facilities will be commissioned accounting for an additional steam and electric load offset of approximately, 62 Mlb/hr and 11 MW, respectively. Steam Business Development actively monitors the status of CHP projects in the steam territory and there are currently 23 additional potential CHP projects that are under study or design by Steam Customers. The total load offset potential is estimated to be 200 Mlb/hr of steam load and 55 MW of electric delivery and supply.

In order to explore the technical and operating feasibility of procuring supply from customer-sited CHP, the Company plans to conduct a pilot project. The pilot will serve to test the reliability, pressure, and steam quality impact of steam feedback into the distribution system. It will serve to help Con Edison develop the control and dispatch technology and protocols to ensure steam is dispatched at the right place at the right time with minimal impact to the system.

In addition to the pilot, the Company will conduct additional research to gain further understanding of the following complexities of relying on distributed resources:

- How reliable are customers and/or equipment manufactures in delivering contracted supply at the right time? How much back-up capacity must Con Edison maintain to ensure no disruption on service?
- What are the implications of relying on non Con Edison personnel for equipment maintenance? Should the Company enter into alternative ownership models or maintenance contracts to ensure CHP plants are operated and maintained appropriately?
- What are the implications to customer-sited suppliers if Con Edison needs to shut down sections of the distribution system to conduct maintenance?
- What are the “ground-level” emissions implications of customer sited CHP?

Ultimately the mix of customer-sited CHP in the supply portfolio will be determined based on what is the lowest cost for customers without compromising reliability or safety. As CHP becomes more widespread, the Company aims to opportunistically integrate distributed supply options into system when it makes sense technically and economically.

3.3.5.3 *District Cooling*

District Cooling is an emerging model to utilize summer capacity. It has been evaluated in the past and deemed infeasible under a regulated business model, particularly because of the expense of adding new pipes to the distribution system. If the right circumstance presents itself the Company would consider evaluating the business model again.

As building envelopes improve and buildings experience greater internal heat generation from computers, lights, and people, cooling capability is now often a 12-month requirement. As a result, the heating market is declining relative to the cooling market in many urban areas, particularly in commercial office buildings. This phenomenon has stimulated many district energy companies to expand into district cooling.

Several district energy systems produce and circulate both hot and chilled water. On the chilled water side, this value proposition eliminates on-site equipment ownership and operating costs and has the ease-of-use advantages of steam heating. District cooling is still a modest factor in the overall energy market. However, it is growing rapidly. The installed cooling capacity in North American cities is 875,000 tons. Campuses, military bases and hospital complexes have 960,000 tons installed and there are known plans to add 110,000 tons in the next 3-5 years. Some notable chilled water systems include Chicago, Toronto, Indianapolis, Denver, Baltimore, and Washington DC. Many of these systems were developed to augment existing Steam Systems, capture summer revenue and margins, and respond to market demands.

Many regulated and unregulated district energy companies have developed district cooling systems to supplement their base heating businesses. The business development and public policy attractions of district cooling include:

- A competitive cooling product that does not require an on-site chiller offered by Steam Systems to offset the cost disadvantage of steam turbine chillers.
- A low first cost, low maintenance option for cooling customers with the plug-and-play features of steam heat.
- Increased steam capacity utilization and, hence, lower average fixed costs for all customers.
- An alternative to high cost new electricity capacity to meet summer cooling loads.
- A new revenue source to offset the declining need for heat in new buildings with high internal heat generation.

It is very expensive to extend steam lines. Most of these line costs reflect the higher construction costs associated with steam lines, which must be insulated, set into channels, and encased in four-foot-by-four-foot concrete jackets to withstand traffic disturbances. In addition, the line extension cost reflects the difficulty of adding new lines to the dense network of pipes and conduit under the streets of New York City, which, has been a factor in utility construction for many years. While New York City does face extraordinary underground congestion, high construction costs, and dense urban markets that make any sort of expansion expensive, these conditions are not unknown in other major cities where cooling systems have been developed.

Based on the foregoing, Con Edison will not purposefully pursue local district cooling systems in the New York City area.

3.3.6 Signposts for Managing Production Capacity

Con Edison plans the production resource investments necessary to meet the Plan Case demand forecast. If demand growth more closely resembles the High Demand Case, growing at approximately

0.3% annually, the Company would expect to continue with capital expenditures to re-power Hudson Avenue, which would account for a sharp increase in the rate base and revenue requirements for those years.

If demand underperforms against forecast and it looks like demand will track closer to the Low Case, or average annual decline of 1.1%, the Company expects that Hudson Avenue and Ravenswood can be permanently removed from service. The cost savings from the removal of Hudson Avenue would be phased in to benefit the Steam Customers. The O&M costs in this scenario are also reduced with the removal of Hudson Avenue from service. Demolition and remediation activities are projected to take 2 years. For the purpose of this analysis, the demolition work is assumed complete in 2015, at which point the structure portion of the property taxes are also removed from the Company's costs. However, the demolition and remediation work is considered capital and increases the overall Rate Base until the asset is sold.

Figure 3-3 illustrates the impact on Rate Base of from the High, Low, and Plan Case. The Rate Base declines after 2015 in the low and plan scenario.

Figure 3-3. Changes in Rate Base for High and Low Demand Cases

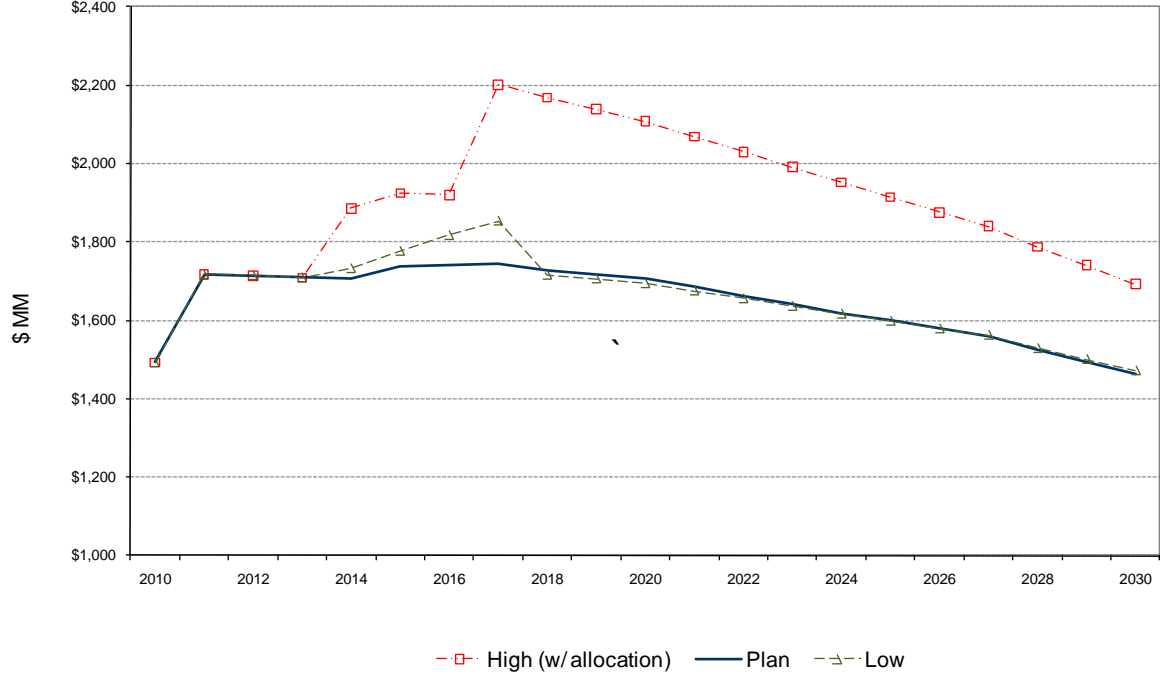
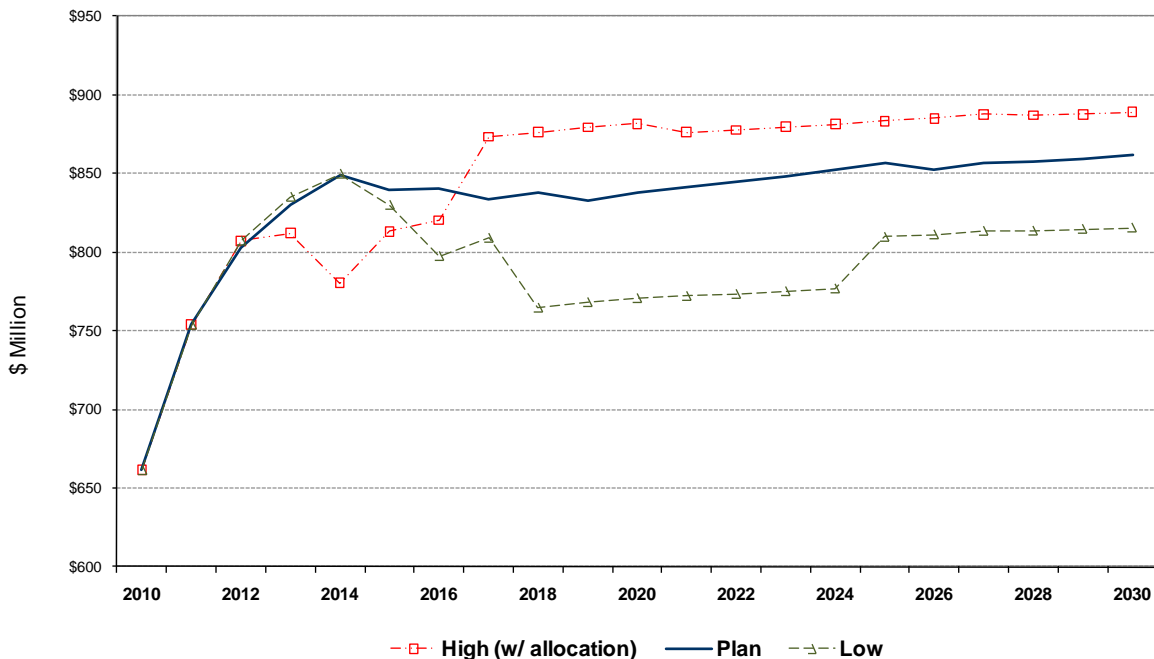


Figure 3-4 highlights the correlating total system revenue requirements for these cases. The figure shows the High Case with capital and operating costs for cogeneration at Hudson Avenue. The Low and Plan Cases show the benefits of the rate base removals noted above.

Figure 3-4. Changes in Revenue Requirement for High and Low Demand Cases



3.4 BILL IMPACT ANALYSIS

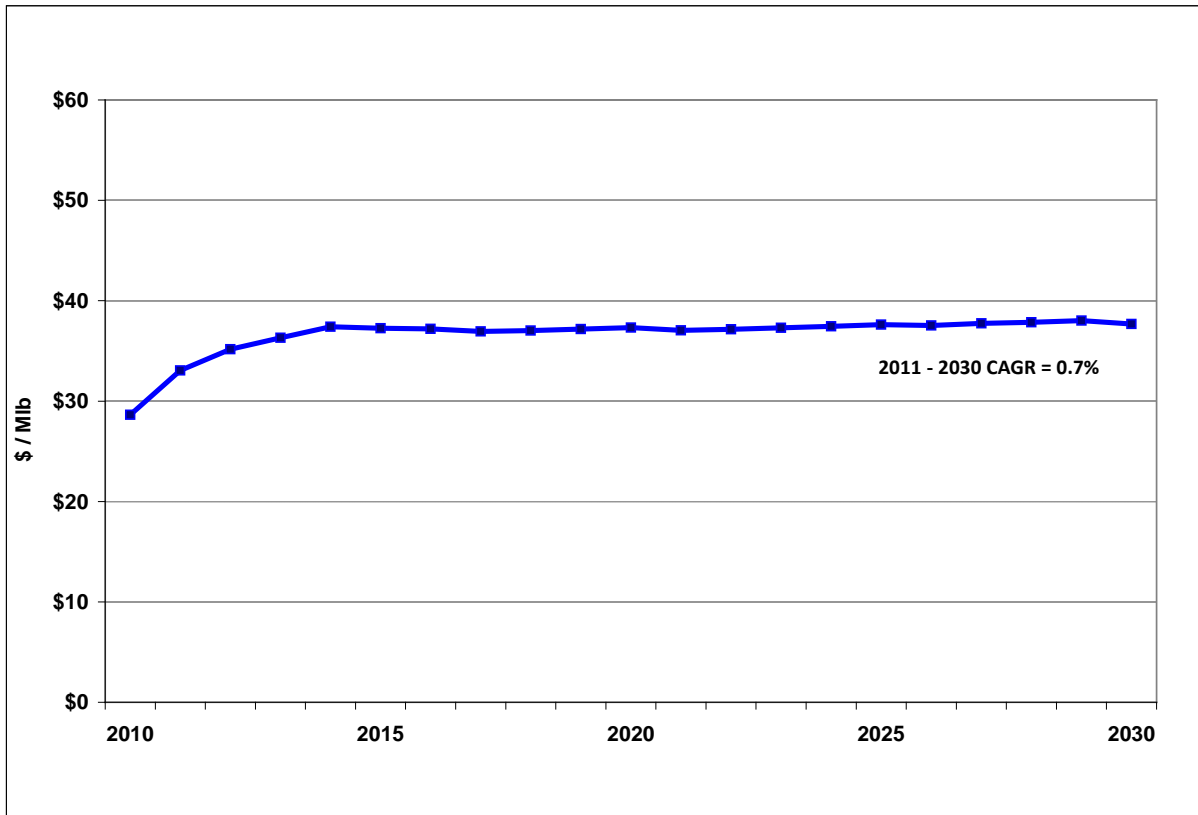
Revenue requirements drive customer bill rates and are consequently a crucial control mechanism for evaluating cost commitments in operating and maintaining the Steam System. Depending upon the costs of projects in each forecast scenario and their associated allocations to expenses or capital and the sources of offsetting revenues, the resulting impact on a customer’s bill will vary. In the early period of the SLRP the bill will increase as historical costs of service and improvements, as presented in the Rate Case, are recovered. Concurrently, the efforts described within the SLRP, as the Plan Case, will provide for rate changes to level off after 2014 and approximately track the inflation rate out to 2030¹⁰. This result meets the Company’s primary objective in the SLRP to balance customer service expectations with service provided at competitive rates.

An additional consideration is the assumed fuel costs. The Company’s rate filing is under review by the Public Service Commission and a Final Order is anticipated by September 2010. The Company’s filing assumed the capital for the gas addition projects will be incorporated into the fuel adjustment clause (FAC) until the capital is paid off by fuel cost savings and the fuel costs would assume costs for higher priced oil. Since the current oil price forecast is significantly higher than the gas price forecast,

¹⁰ Subject to final outcome of the existing rate case

the fuel costs assumed in the Plan Case would be commensurately higher if the gas addition projects are not included in a Final Order in the pending case.

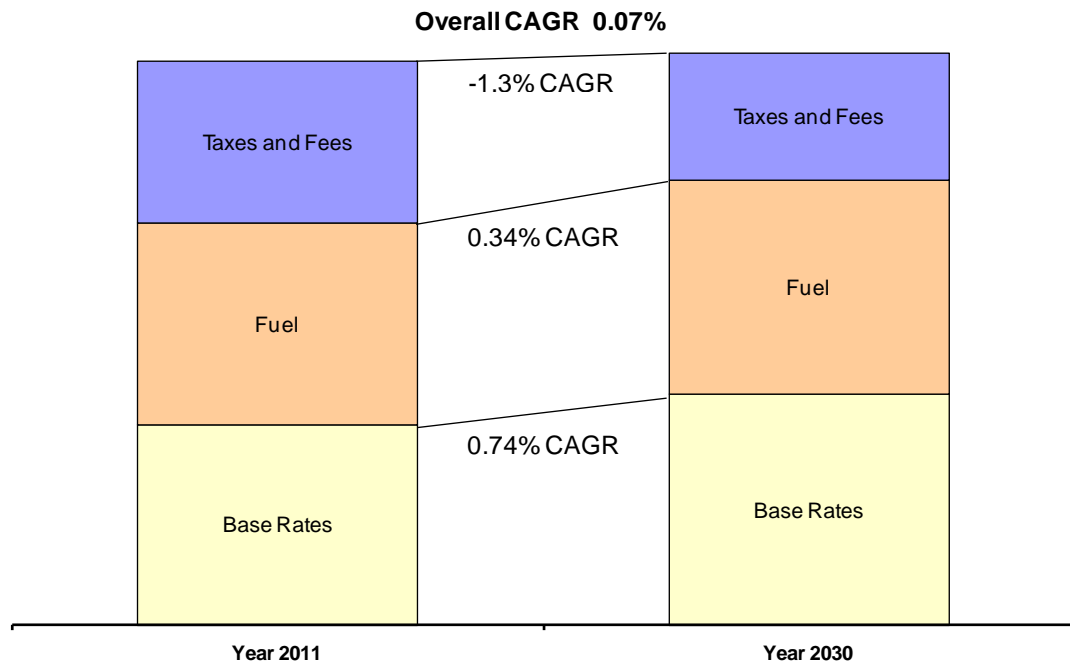
Figure 3-5. Average Revenue per Mlb Forecast for the Plan Case



The Figure 3-6 portrays how the composition (delivery, fuel, taxes) and value of an example customer’s bill is expected to appear in 2030 as the result of the Plan Case. The example uses a Large Commercial customer that receives bills under a demand rate structure (SC2 Rate II).

In total the example customer's bill will increase at a rate of 0.07 % CAGR which is average for the entire customer base. A primary objective of the SLRP is to continue to provide reliable service at a competitive rate and the Plan Case accomplishes this by supplying and delivering steam at near current rates. The components of Base Rates and Fuel change at a CAGR of 0.74% and 0.34% respectively and this reflects the planned efforts to reduce overall installed capacity, add dual-fuel capacity to existing Generating Stations, and the resulting benefits of ongoing modernization and enhancement work.

Figure 3-6. Averaged Monthly Bill for a Large Commercial (Demand Billed) Customer



3.5 ENVIRONMENTAL SUSTAINABILITY INITIATIVES

Con Edison has a long standing commitment to protect the environment. The Company's Environmental Sustainability Strategy is a plan to reduce the Company's environmental impact, encourage and assist customers in managing energy use, build partnerships with stakeholders to support the Company's vision, and develop infrastructure for clean energy alternatives. Long-term objectives of this strategy include: integrating more sustainable choices in the Company's decision making, enhancing the Company's role in policymaking, and improving stakeholder relations. This strategy is constructed of six key principles incorporating environmental, social, and financial considerations:

- Model green behavior internally
- Promote green behavior to external stakeholders
- Innovate to meet customer preferences for a greener lifestyle
- Partner with government to shape policies and standards consistent with sustainability vision
- Develop infrastructure to advance the use and delivery of value-creating clean energy alternatives
- Incorporate environmental and societal value into decision making

The Steam System has specific sustainability initiatives and targets, outlined below, relevant to the first principle.

- Focus on the use of cleaner fuels at steam plants while maintaining system reliability and affordability
 - *Goal:* Achieve 90% natural gas fuel burn at steam generating facilities
 - *Benefits:*
 - Reduction in GHG emissions
 - Emission reductions in NO_x, SO₂, and PM;
 - Operational cost savings through greater use of natural gas

4.0 MANAGING THE CUSTOMER BASE AND PROVIDING ADDITIONAL CUSTOMER VALUE

4.1 OVERVIEW OF THE CUSTOMER STRATEGY

The Con Edison Steam System serves 1,772 customers ranging from single-family brownstones to hospital complexes comprised of multiple buildings. Customer accounts are evenly distributed across three tariff classes; General Service (SC-1) which comprises small commercial and residential properties; Annual Power (SC-2) which primarily consists of large commercial buildings; and Apartment (SC-3) for large multi-family facilities.

Con Edison's customer strategy has two primary components. The first component is to strategically manage the customer base so that each customer is making a positive contribution to the system. This requires changes to the rate structure so that customers with low load factors contribute to their fair share to the system revenue requirements. This also applies to the addition of new customers that should be brought into the system under a structure that ensures positive contribution to the system. To accomplish this, a "Collaborative" has been initiated with participants from the PSC, the counties of New York and Westchester, and representatives for the customer base in an effort to devise the changes and programs that would be most successful.

The second component is to provide additional value to customers. This will come in the form of deeper customer relationships, expanded demand side management initiatives to help customers with their environmental footprint and mitigate bill increases, restoration of financial incentives to make steam competitive with alternatives, and pursuit of LEED certification for Steam. In addition, customer-sited CHP may open up the opportunity for Con Edison to work with customers to provide additional services to the entire customer base.

By promoting stronger customer relationships, Con Edison believes that it can mitigate the risk of losing customers and can capture new strategic customer accounts.

4.2 MANAGING THE CUSTOMER BASE

The Steam Business Development (SBD) team's work during the past five years has helped identify customers that are likely to make a positive contribution to the Steam System. These types of customers generally have the following characteristics:

- High load factors since customers with low load factors require that Con Edison maintain expensive capacity for that customer even if that capacity is only used intermittently.
- Year-round steam needs, such as steam powered cooling systems, to utilize available capacity during off-peak periods.
- Located near existing service lines that have available capacity, such as in Midtown.
- Pay rates that are commensurate with the peak demand they create.
- Likely to remain on the system for a long period of time either because their switching costs are high or they value the service for all of its benefits.

These factors retain their merit when evaluating new customers prior to extending steam service.

The Company's current steam tariff dictates that applications for service will be evaluated for any potential customer within 250 feet of a steam main and steam supplied to those customers, as long as they cover any installation costs in excess of two years worth of steam pure base revenue (PBR). In this Plan, the expectation is this obligation to serve can be eliminated or modified to better serve the existing customer base by permitting greater selectivity of new business opportunities.

4.3 CHANGES TO THE TARIFF STRUCTURE

While not all customers are an ideal match with the Steam System, changes to the tariff structure can help influence the types of customers that decide to join or stay on the system. Adjusting the demand portion of the customer bill is an important tool in encouraging customers to reduce their peak usage, which in turn will avoid investments by the Company in additional supply capacity.

Currently, the rates for those customers who contribute almost 70% of annual pure base revenues consists of a fixed customer charge along with variable usage charges and demand charges. Usage charges are year round but vary by season. Demand charges are in effect from December through March. Only SC-2 and SC-3 customers with annual usage greater than 22,000 Mlb are subject to the demand charge which was first implemented during the winter of 2007/2008. Commencing in the winter of 2010/2011, demand billing will be extended to customers with an annual usage greater than 14,000 Mlb. Currently the demand charge for these customers is 25% of winter PBR, which translates into approximately 10% of the total customer bill.

Table 4-1 and Table 4-2 show that 163 or 54% of SC-2 customers and 62 or 43% of SC-3 customers do not provide revenues sufficient to cover the cost of serving them on an annual basis¹¹ (these customers are highlighted in grey in the tables below). For the remaining customers, Con Edison collects revenue at or above the average revenue for the customer class. These higher margin customers are generally those with load factors higher than the average load factor for the class. For SC-2 customers the average load factor was 30% and for SC-3 customers it was 34%.

¹¹ Cost to serve is based on the revenue requirements for the year spread out over total Mlb/hour sales during the year.

Table 4-1. SC-2 Customer Counts by Profitability vs. Annual Load Factor (30% average)

% of Revenue Over Cost	% Annual Load Factor							Total
	<10%	10% – 15%	15% - 20%	20% - 30%	30% - 40%	40% - 50%	>50%	
<(20%)	10	8	0	0	0	0	0	18
(20%) – (15%)	1	13	6	0	0	0	0	20
(15%) – (10%)	1	15	16	3	0	0	0	35
(10%) – (7.5%)	0	7	13	13	0	0	0	33
(7.5%) – (5.0%)	0	5	4	5	0	0	0	14
(5%) – (3%)	0	4	10	5	0	0	0	19
(3%) – (2%)	0	0	4	6	0	0	0	10
(2%) – 0%	0	1	2	11	0	0	0	14
0% – 1%	0	1	2	4	2	0	0	9
1% – 2%	0	0	3	4	1	0	0	8
2% – 3%	0	0	3	2	2	0	0	7
3% – 5%	0	3	3	11	2	0	0	19
5% – 7.5%	0	0	3	13	3	0	0	19
7.5% – 10%	0	0	1	12	3	0	0	16
10% – 15%	0	0	1	12	11	3	0	27
15% – 20%	0	0	1	4	9	6	3	23
>20%	0	0	0	1	8	2	2	13
Total	12	57	72	106	41	11	5	304
Revenue < Cost	12	53	55	43	0	0	0	163
Revenue > Cost	0	4	17	63	41	11	5	141

Table 4-2. SC-3 Customer Counts by Profitability vs. Annual Load Factor (34% average)

% of Revenue Over Cost	% Annual Load Factor							Total
	<10%	10% – 15%	15% - 20%	20% - 30%	30% - 40%	40% - 50%	>50%	
<(20%)	1	0	0	0	0	0	0	1
(20%) – (15%)	3	0	0	0	0	0	0	3
(15%) – (10%)	9	8	1	0	0	0	0	18
(10%) – (7.5%)	0	2	0	1	0	0	0	3
(7.5%) – (5.0%)	0	3	1	2	0	0	0	6
(5%) – (3%)	0	1	5	1	0	0	0	7
(3%) – (2%)	1	1	1	2	0	1	0	6
(2%) – 0%	0	1	8	7	0	2	0	18
0% – 1%	0	2	1	0	1	1	0	5
1% – 2%	0	0	2	6	1	3	0	12
2% – 3%	0	0	3	7	3	1	0	14
3% – 5%	0	0	1	8	3	3	0	15
5% – 7.5%	0	0	1	2	9	1	1	14
7.5% – 10%	0	0	0	1	1	6	1	9
10% – 15%	0	0	1	1	0	0	0	2
15% – 20%	0	0	0	1	0	0	0	1
>20%	0	0	0	0	0	0	0	0
Total	14	18	25	39	18	18	2	134
Revenue < Cost	14	16	16	13	0	3	0	62
Revenue > Cost	0	2	9	26	18	15	2	72

For customers with low load factors (less than the average load factor for the class), Con Edison must maintain peak capacity even if the customers use it for only a short period of time. Maintaining peak capacity is the single largest cost to the Steam System, outside of fuel and purchased power. Yet, these costs are not adequately translated into costs to the customer. There is little financial incentive for most customers to improve their load factors by reducing their peak demand.

The Company estimates that the current demand charge did have a small effect on changing some customers' load shapes since it was introduced a few years ago. The demand charge represents only a small portion of the bill and so many customers cannot yet justify the investment in new technology, such as energy management systems or thermal storage, or cannot warrant changes to building operations. In some cases, tenants pay the steam bill, rather than building owners and operators, and so dissonance prevents investment in conservation. The muted response to steam demand billing is not unexpected. Discussion with peers at other district energy systems indicates that customers will respond to demand charges only when they are significant enough. Con Edison plans to work with a collaborative group to determine the optimal structure for demand charges in the future.

4.4 FORMING DEEPER CUSTOMER RELATIONSHIPS

Con Edison recognizes that steam is a premium product that has a higher price point than other alternative energy sources. As a component of providing a premium product, the Steam Business places an emphasis on customer service. The creation of the Steam Business Development Group in 2000 was a first step in a plan to counteract market influences on the cost of steam services by actively seeking out new growth opportunities, becoming more proactive with customers, and identifying areas for energy efficiency or demand reduction improvements, amongst other goals. In the past ten years, the primary accomplishment has been a better understanding of customer needs and the strengthening of relationships with customers.

Con Edison SBD staff with assistance of an independent consultant performed energy audits and provided site-specific recommendations for potential improvement in steam usage and peak demand reduction at 30 customer locations over a two year period. These steam audits identified a broad spectrum of steam energy efficiency measures that are applicable at many customer locations. The steam energy saving tips are compiled and summarized as best practices for the benefit of customers and are available on the Company's website. The report remains a staple reference document and handout at all customer events and meetings. The work the SBD staff has done on demand side management serves as the underpinnings of an expanded DSM effort described below.

Table 4-3. Participants in Stakeholder Input Sessions

Year	Focus Groups	Customer Seminars	Steam Seminars
	9 focus sessions (3 per year)	5 public events (1-2 per year)	28 class sessions (10 per year)
2007	25	140	84
2008	11	120	138
2009	23	160	130
2010	Scheduled for April	Scheduled for October	Scheduled monthly

4.5 DEMAND SIDE MANAGEMENT

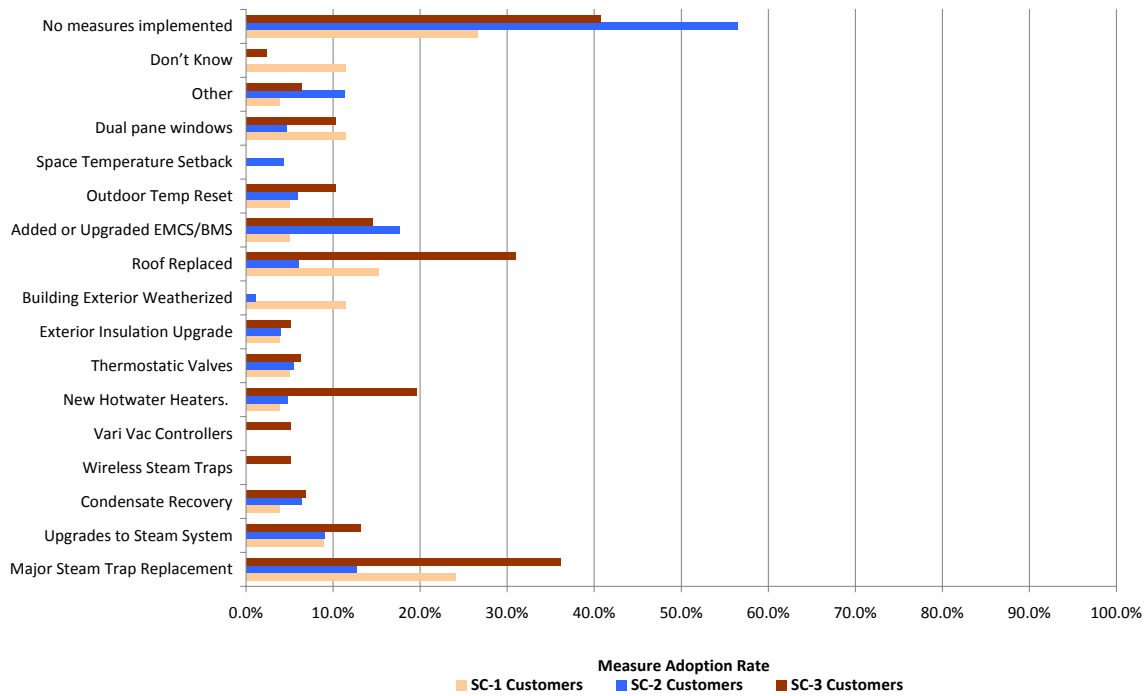
In the steam context, Demand Side Management generally consists of installation of energy efficiency (EE) measures, adoption of conservation strategies, peak demand shifting, and demand response events initiated by the utility. The primary EE measures include improvements to the building envelope, such as the installation of better insulated windows, frequent cleaning of traps, or roof replacements. Conservation strategies may be as simple as turning down the heat or not heating unused floors. Energy Management Control Systems (EMCS) can facilitate conservation efforts by automatically managing the building's steam use through strategies such as monitoring the temperature on each floor or timing the building's use of heat to the occupancy levels at various times of the day.

Based on a study that Con Edison completed in June of 2009, customers have already started implementing efficiency measures. However, a relatively small percentage of the customer base is responsible for the majority of existing measure installations. SC-3 customers were far more active in installing new technologies and this is likely due to the financial resources of these customers, their

higher load factors which results in better payback periods, and the availability of onsite technical staff that can focus on conservation.

Based on the data presented in Figure 4-1, there is no single conservation measure that is universally adopted. This is partially due to the fact that steam service requires less equipment on the customer site. Steam trap replacements and roof replacements are the most popular measures but simple measures such as temperature setbacks and outdoor temperature resets were not popular.

Figure 4-1. Measures Installed by Customers in the Past 5 Years¹²



The study also looked at uptake potential for conservation measures. For the SC-2 customer class, biannual steam trap replacement, condensate heat recovery, and exterior wall insulation have the highest potential for implementation at SC-2 sites with 63%, 57%, and 50% uptake potential, respectively. Energy Management Control Systems already have a high level of implementation, yet only 12% of sites do not have one. Even when these systems are installed, they are often not programmed to shift peak demand to off-peak times.

SC-3 customers have the highest average load factors but there is also significant room to help them improve their efficiency. Within this customer class, only 30% use EMCSs so it has a high level of potential uptake. Biannual steam trap inspections, outdoor temperature reset and condensate heat recovery have uptake potentials of 54%, 52%, and 40% respectively.

¹² The market potential study consisted of a statistical sampling of the Con Edison Steam Customer base, including face to face surveys of large customers, mailings and phone interviews.

Conservation Efforts

As mentioned, there is no efficiency measure that would single handedly allow Con Edison to reduce demand across the customer base. Furthermore, the diverse nature of the customer base means that they have varying building footprints, use a wide variety of technologies, and have different levels of capability in identifying and managing conservation efforts. A prescriptive conservation program is unlikely to meet the needs of Con Edison's customers. Instead, the Company envisions a DSM effort that is targeted to very specific customers and tailored to individual customers needs. Initial DSM efforts will likely to focus on the SC-2 and SC-3 customer classes where Con Edison is able to achieve demand reduction at the lowest cost.

Other district energy systems have had a high level of success with customized DSM efforts. As identified during peer interviews, many of these efforts have been similar to Con Edison's. In the past, the Company has held workshops to teach customers about steam and to share best practices. These have been successful and well attended. For example, approximately 160 customers and consultants attended a recent seminar on demand billing topics.

A program focused around the use of Energy Advisors serves some additional benefits. Most notably, it allows Con Edison to form stronger ties with its customers through more frequent contact. Steam service is considered by some to be a premium service with a premium price point so forming and maintaining relationships is essential. Also, customers are actively seeking Con Edison's guidance in helping them keep their bills from increasing. Steam is a product that may not be as familiar to many building operators and as such, the Company will continue to educate customers on steam best practices as part of its good customer service.

4.6 NEW REVENUE MODELS EXPLORING MANAGEMENT OF CUSTOMER CHP

It is expected that some large customers and prospective Steam Customers will pursue customer-sited CHP options. Con Edison has extensive experience operating large CHP facilities and there is an opportunity to provide service contracts to customers. Customer-sited CHP could potentially allow the Company to provide district energy services in areas not currently served with much less financial risk than could be achieved extending the existing supply and distribution footprint. Some of these topics were discussed earlier.

As part of the Steam Planning Proceeding in Case 09-S-0029, the Company has indicated its willingness to develop a pilot program to gauge the interest in and the ability of customers to install CHP facilities that sell steam back to the Company. While the specifics of the pilot program have not yet been developed, Con Edison plans to evaluate current and future CHP options to determine the optimal timing and scope of the pilot.

4.7 PROVIDING ADDITIONAL CUSTOMER VALUE

Conservation programs are part of the strategy for positioning the Steam System as a green alternative to other energy sources. Approximately 30% of the System's installed capacity and 50% of the annual steam generated comes from clean cogeneration. Also, centralized generation is more efficiently maintained and monitored than vast numbers of customer-sited boilers. Customers indicate

that environmentally friendly supply is becoming an important part of their purchase criteria, although interest varies by customer type and industry.

Environmentally conscious customers are likely to pay a premium for steam service. For example, developers can gain a competitive advantage by obtaining LEED certification which commands higher rental prices. In the future, a continued emphasis will be placed on the environmental benefits of the system through marketing efforts and interactions with customers, engineers, architects, and other stakeholders.

Renewal of City and State Financial Incentives

Incentive programs are generally used to eliminate entrance barriers to new technologies and conservation methods so that a foothold is established until eventual market inclusion carries the measures forward. Incentives for steam cooling, that helped eliminate or reduce electric load and provided cost avoidance, were available and effective until NYSERDA discontinued them in March of 2008. At that point steam cooling technologies lost a significant cost leveler in competing with electric chillers and packaged A/C units that are still obtaining cost incentives and rebates. As part of the SLRP, Con Edison intends to ask for the reinstatement of these financial incentives.

LEED Certification

Con Edison along with the International District Energy Association have worked for the last two years with the U.S. Environmental Protection Agency (USEPA) and the U.S. Green Building Council (USGBC) to ensure that district energy systems are accurately represented throughout the various internationally recognized "Green Building" certification standards known as LEED (Leadership in Energy and Environmental Design Standards). Currently, co-generation and CHP, which are commonly considered "green technologies" and are used to produce approximately 50% of annual steam sales, is unrecognized by these two organizations.

As a result of the Company's continued efforts to engage these organizations, USGBC has issued a new guidance document applicable to new green building projects that are connected to district energy systems. This guidance document details the methodology that buildings connected to CHP-based district systems could use to obtain up to 8 out of 19 available Energy Performance LEED points. To put it in perspective, a building must obtain at least 40 total points out of 100 available to obtain the minimum level of green building certification. Therefore, 8 points represents a significant contribution to a customer's LEED certification project and would provide significant value to customers.

Additionally, the Company and IDEA have worked with the USEPA to obtain a similar recognition of district steam CHP utilization in its Energy Star Portfolio Manager Energy benchmarking tool which is commonly known as Portfolio Manager. This on-line tool compares a building's energy consumption to that of similar buildings throughout the country and provides a performance score. A score of 75 and above is required to obtain the Energy Star certification, which is required for existing buildings that want to become LEED certified.

The Portfolio Manager tool does not currently recognize the efficiency benefits of Steam Systems that employ CHP and assumes that all Steam Systems in the country utilize boilers only. However, Con Edison has compiled and presented production data from all major district systems in the country

indicating that up to 30% of all steam produced annually by these systems is produced through co-generation. Therefore, the EPA currently overestimates the energy losses by district Steam Systems in their on-line tool. As a result of numerous discussions with the USEPA, they have agreed in principal to revise their calculations and to publish an update to the Portfolio Manager tool in April, 2010.

The charts below show the emission comparison of Con Edison CHP against onsite generation alternatives:

Figure 4-2. NOx Comparisons

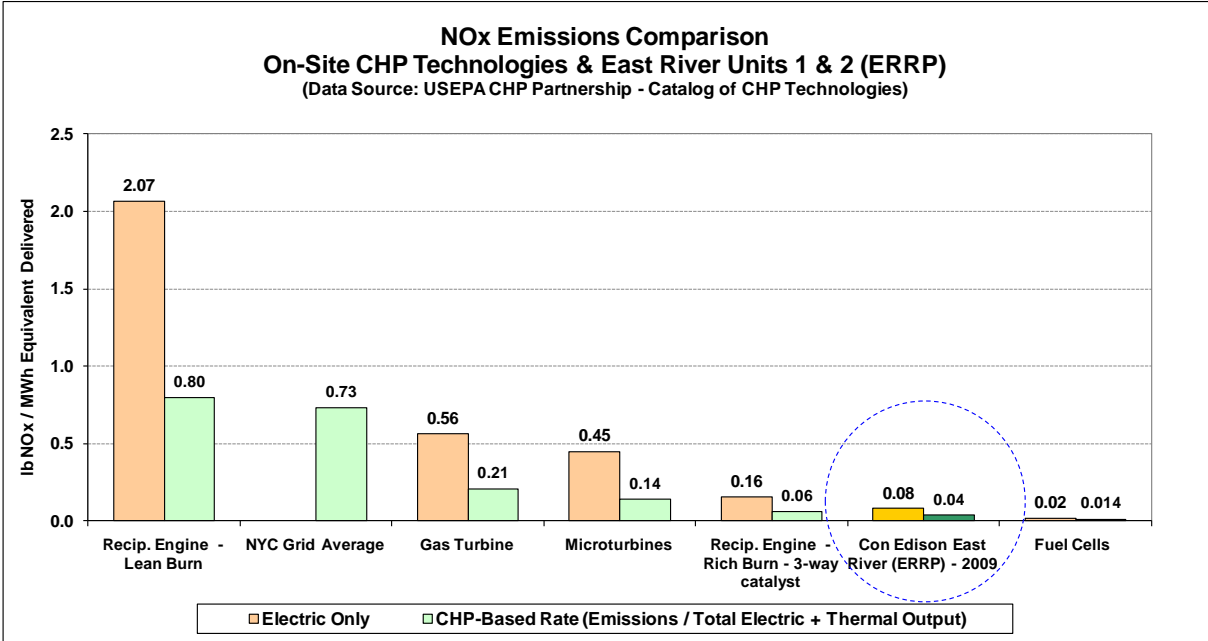
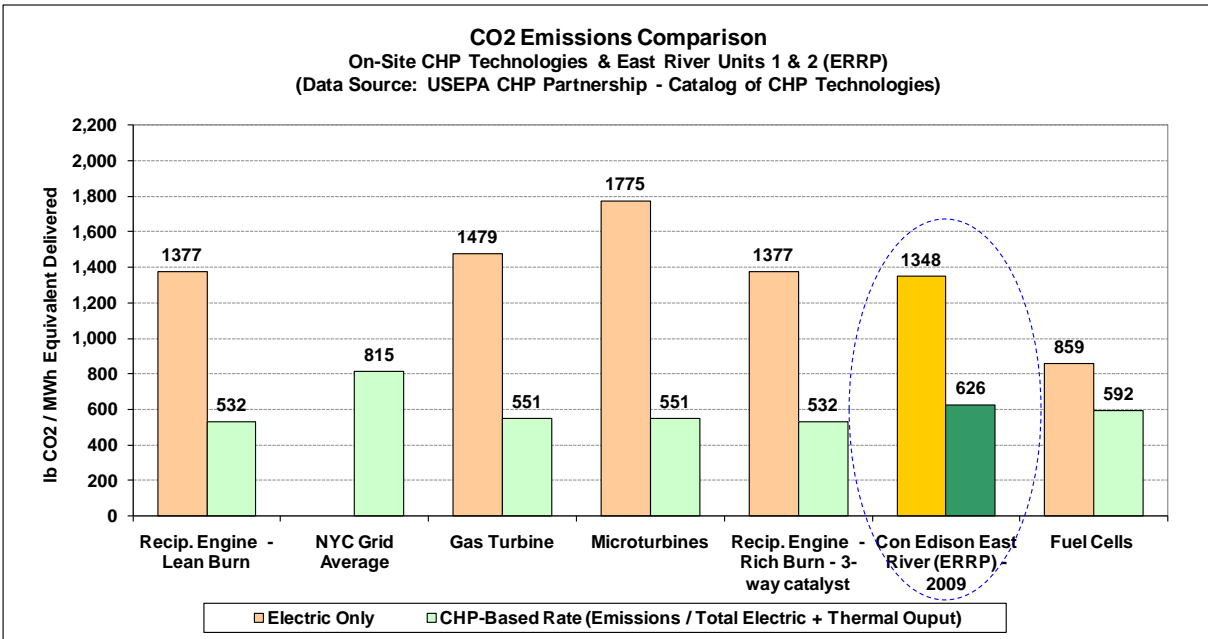


Figure 4-3. CO₂ Comparisons



4.8 SIGNPOSTS

The change in the size of the customer base is the primary signpost that will help Con Edison determine if the customer strategy discussed above is progressing as planned and if it should be adjusted.

Net Loss or Net Gain in Customers

A significant increase in the number of customers investigating or switching to alternative energy sources would indicate that the Company has been unsuccessful in providing additional value to customers and in keeping rates competitive with alternatives. Regular surveys of customers would provide advance notice of the number of customers seeking to leave the system, especially those using steam A/C. In this scenario, Con Edison would need to reevaluate the tariff structure and rates to ensure that the costs of operating and maintaining the system are being charged fairly to customers. Under this scenario, the Company may need to increase the scope and magnitude of its customer outreach efforts help customers keep their bills from rising.

An increase in the number of higher-margin customers joining the system may indicate that Con Edison's customer strategy is working as planned. Successful adaptation of LEED certification for steam-served facilities would likely result increase in service applications from customers seeking LEED certification as part of new construction activities. In addition, new No. 4 and No. 6 fuel oil regulations would likely cause an increase in the number of new customers. Under this scenario, the Company may need to increase the scope and magnitude of its DSM efforts to ensure that demand does not go above the level prescribed by the Plan Case.

5.0 OPERATIONAL EXCELLENCE, PRODUCTIVITY IMPROVEMENT, AND ENVIRONMENTAL CONSIDERATIONS OF STEAM PRODUCTION

5.1 OVERVIEW

This chapter will discuss ongoing efforts and opportunities to improve the cost effectiveness of steam operations while maintaining reliability.

5.2 OPERATIONAL IMPROVEMENTS AND O&M EFFICIENCY

Con Edison works to continually improve our operational processes by closely managing our plant workforce and proactively identifying workforce productivity enhancements.

5.2.1 Workforce Management

The Company conducted workforce benchmarking which identified 20 peer steam production plants of comparable size, type, fuel, and operational characteristics. The benchmarking revealed that Con Edison plants, on average, employ more full time equivalents (FTEs) than peer plants. This is consistent with the Company's operation of older steam boiler plants that require more labor than newer units or cogeneration facilities.¹³

To manage labor costs, the Company will adopt best practice principles of developing detailed 5 and 10 year work force strategies. The key input elements of workforce strategic plan include the following:

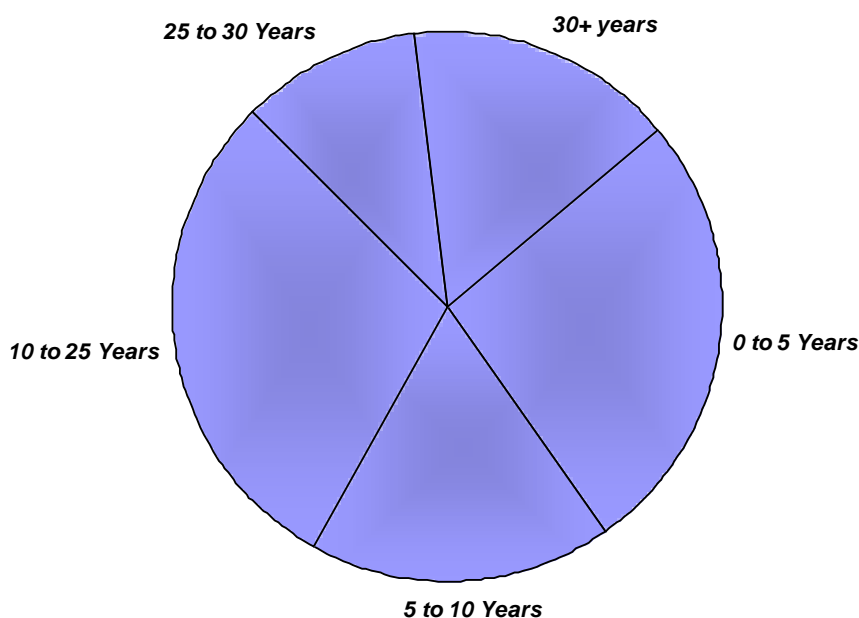
- Workforce age and service profiles
- Projected retirements
- Expected workforce turnover and attrition
- FTE re-deployment and reduction plans
- Future plant requirements given plant retirements
- Impact of technology improvements and plant modifications on workforce requirements
- Process and productivity improvements
- Implications of regulations and operational requirements

Plant staffing plans include overall staffing levels and specific training and development plans for each employee.

¹³ 40% of Con Ed capacity is supplied by units that are over 50 years old; average weighted age of production units is 38 years. This is older than most peer systems.

Specific challenges Con Edison faces in terms of workforce management include the high percentage of employees likely to retire in the next five years (the current estimate is 37%). At the same time, 31% of plant employees have less than six years of service, potentially limiting their productivity. Figure 5-1 illustrates these two challenges.

Figure 5-1. Years of Service



To address these challenges Con Edison has and will continue to conduct rigorous organizational reviews and invest in extensive training. A comprehensive training program will be required to qualify employees in existing and new job positions.

5.2.2 Productivity Improvements

To continually improve workforce productivity the Company will focus on:

- Extensive cross training and on-the-job training
- Control room integration
- Workforce communication strategies
- Cost Management training at all levels
- Centralization or outsourcing of non-core activities

In line with best practices, Con Edison continues to develop cross-training initiatives such that operating teams are multi-disciplined and trained for all aspects of plant operations and maintenance. Part of this effort may include sharing employee resources between various plants as the need arises.

In the past, Con Edison has cross trained operating personnel into maintenance positions and will continue to explore opportunities for further cross training.

The Company will explore opportunities of further combining control rooms to eliminate the need for fixed posts which may require some capital investment. This concept has been proven extensively at peer plants with the adoption of currently available control and monitoring technology. .

As part of this Plan, Con Edison will seek to build employee support and interest in the Companies' vision for the future. In line with best practice companies, Con Edison will develop formal plans for communicating the vision to all employees via regular town-hall meetings, face-to-face meetings, and Q&A sessions. Steam leadership will involve managers, supervisors, bargaining units, and senior executive participation in the communication process.

Con Edison, in line with peer companies, continues to analyze opportunities to outsource noncore needs and activities where it is cost beneficial.

5.2.3 Cost Management and Control

Forced Outages

Forced Outages are the removal from service of boilers via an automatic operation or when the equipment is taken out of service on an emergency basis. The number of forced outages is a barometer of equipment reliability and the effectiveness the Company's maintenance program. Reducing the number and duration of unit outages lowers overall O&M costs as well as fuel costs.

Turbine forced outage rates and boiler forced outage rates are closely monitored and are calculated monthly to allow for the trending and examination of equipment that is out of service and the root cause identified. The industry standard according to NERC is 5.6. The performance of Con Edison's steam generating units has consistently outperformed NERC industry standards over the past five consecutive years. This performance is partly attributable to efforts over the last several years to reduce forced outages. The Company holds monthly meeting attended by operations, maintenance, technical managers and engineering staff to ensure root cause analysis is conducted and corrective actions taken. This process also ensures that other plants are made aware of similar susceptibility for themselves. Action items are tracked to ensure that they are completed.

5.2.4 Maintenance Processes

Con Edison tracks and monitors maintenance schedules and work progress on a daily basis. Work planning is done on a work order, crew, daily and weekly basis. The Company targets best practice statistics of plant emergent work of 10-20%, depending on the plant operation loading. Planned work makes up the balance.

The Company utilizes MAXIMO software to improve maintenance productivity, minimize equipment losses and lower maintenance costs. To improve success, the Company is utilizing additional MAXIMO functionality such as analysis to determine if repeat maintenance is occurring and how to eliminate it. Efforts underway on Work Control Performance and Productivity improvements include the following items.

Economic

Initiate and provide more specific / granular Performance Indicators for Productivity, Unit Cost and Program Cost as the Maximo CMMS data matures into year's five to ten.

Provide enterprise integration of Maximo to emerging / planned corporate financial systems to allow complete Work Order cost be reflected in Maximo at the Work Order level for all Own Labor, Other Department Labor, Accounts payable and MMS, essentially all costs to execute the Work Orders completion rolled up to corporate financial system through Maximo portal.

Implement a structure that provides for Units of Work reporting and trending at Station – Unit – Asset and Maximo Work type level. Implement Key Performance Indicators that capture the granular reporting to allow development of targeted action plans to reduce cost and support Corporate Cost Management Goals.

Plan Capital funding requirements for Maximo - CMMS software version upgrade every three to four years to ensure CMMS version remains functionally current and on a vendor supported platform. This will also ensure that Work Control Groups can leverage CMMS software functionality defined by industry experience that emerges in new software versions and improve work flow efficiency, reporting and processing.

Operations

Further develop the current Steam Operations Hand Held solution for use with a new Maximo Integrated - Operation Order (OO) and Work Permit (WP) software selected to replace the existing legacy mainframe based OO/WP system. This enhanced Maximo CMMS integrated software will leverage use of our Bar-Coded asset tags to minimize Operating Errors and improve plant safety and availability by ensuring hold off's / tag outs are performed in the correct sequence and on the targeted assets.

Provide a modern Graphic Interface for P&ID's and One-Line drawings assessable for use by all station personnel.

Environmental

Provide a Maximo CMMS solution to allow asset / station Work Orders to be further categorized according to Regulatory commitment. This initiative will provide the ability to query and sort Work Order and PM database information to ensure compliance is tracked by agency or discipline – i.e. SPDES, EPA, DEC, TITLE V, etc.

Reliability

Continue on-going initiative to maximize the migration of station assets PM basis toward Predictive Technologies (PDM). Develop Core Peer Teams that own the individual technologies (Vibration, Thermography, Valve Diagnostics etc.) to ensure uniform PM application across the plants varied asset categories. Enhance Predictive Maintenance failure trend tools and provide a web-based Steam Production Dashboard that provides automated failure trigger of Maximo - CMMS Corrective Maintenance Work Orders, based on automated or manually gathered asset performance information

vs. predefined set-points and other available analytical tools and failure modeling. The dashboard would also provide tools for risk assessment modeling.

Develop an asset specific Failure Class / Problem Code Hierarchy embedded in Maximo – CMMS to enhance craft failure reporting at the Work Order level – This data could then be uploaded automatically to an analytical failure analysis dashboard to determine correctness of asset PM basis, MTBF etc.

Identify and select a Corporate – Enterprise wide, IT supported Document Management System that is functionally capable of storing the wide array of Work Control – Work Order documents and the individual stations Procedure / Instruction documents in a structured hierarchy assessable at all locations.

5.2.5 System Dispatch and Loading

Con Edison maintains several programs focused on optimizing dispatch. Notably, in the near future, the Company will implement both a predictive cost tool (Dispatch Optimizer) and a real time cost tracker. In addition the PROMOD software application is used as a simulation tool of steam/electric production and fuel forecasts used for budgets, cash flows, Rate Proceedings and studies. The Inputs are fuel type, fuel costs, heat rates, forced outages, outage schedule, ramp rates, DMNC Rates, minimum loads, emissions rates, and limitations. The primary outputs are steam sendout, electric generation, production costs, monthly dispatch by boiler, and unit costs. Steam Operations Planning provides West End Avenue dispatchers with an economic rating of each unit at least once a week.

5.2.6 Optimizing Plant Fuel Efficiency

Con Edison is continually focused on implementing and improving enhanced boiler efficiency programs. The Company currently has a program that tests each large boiler at a high steady load each month to determine losses due to boiler air in-leakage and ash fouling. A report and recommendations are given by the supervisor to the plant staff.

The Company also focuses on optimizing and minimizing boiler feed pump power since it is the major auxiliary consumer due to high heat requirements. In the fourth quarter of 2009, PI data was used to create intelligent graphs that display the running of excess boiler feed pumps and the recommended pumps to be running. This data is incorporated is a cumulative cost for excess pump power.

Minimizing boiler excess air and air leakage can for a small expenditure and effort generate a large payback in efficiency savings because it accumulates 24 hours a day every day the unit is on line. Air leakage detection has to be completed while the boiler is on line because you need the negative draft of the boiler to detect the leaks. The savings also include the reduced auxiliary power needed for the fans by not having to move the additional air introduced by leakage. Also repairing air leakage can lead to increased boiler capacity as the boilers will be able to produce more steam before they “run out of fan”. Air leakage fixing has to be methodical and detailed as the holes are often numerous small holes which have a large cumulative effect as well as the easy target larger holes, unwelded casing, and leaking doors. In the fourth quarter of 2009 PI data was used to create intelligent graphs that display O₂ versus load so the plant staff can see how operators have/have not maintained good control as well as associated fuel losses

5.3 ASSET MANAGEMENT AND CAPITAL EFFICIENCY

To more effectively manage plant assets, the Company engages in plant and equipment lifecycle management. This allows management to remain proactive in knowing when to remove assets, invest in new equipment, or enter power purchasing contracts. We utilize a suite of integrated software, online / portable technology solutions and training to develop an on-going predictive diagnostic foundation of asset health - The available technologies include valve diagnostic, vibration analysis, laser alignment, infrared thermography and on-site oil / lubricant analysis. The data gathered from these predictive technologies are integrated with our CMMS (MAXIMO) to establish overall asset health and drives plant asset / overhaul decisions, as well as dynamic PM basis decisions which allow continuing plant mechanical and electrical asset optimization. The Maximo CMMS software tracks system / asset failure reporting through Failure Class / Problem Code methodology which allows performance trending at the system / asset level. Additionally, the CMMS Work Order cost data is rolled up to "Units of Work" cost metrics that further support capital investment decisions.

To obtain best practice levels of asset management and capital efficiency, the Company utilizes various metrics to track conditions of the system and plants such as forced outage rates and unit heat rates to develop a life cycle plan for each unit in the system.

5.4 ENVIRONMENTAL COMPLIANCE MANAGEMENT AND SAFETY

5.4.1 Environmental Air Regulations

This section summarizes the environmental regulations that have the potential to affect the operation of the Steam System's generating stations. The Company's options for future equipment upgrades and its plans to operate existing generating stations, as a result of new regulations, were considered. In terms of the removal of a unit or installation of new generation, environmental considerations, air emissions regulations, and permitting issues were also evaluated. (Previous reports had presented detailed environmental evaluations of repowering options). Some of the regulations considered with regards to existing generating units, and potential removal of such units or the installation of new units, include the following:

- Proposed revisions to New York State Department of Environmental Conservation's ("NYSDEC") regulations pertaining to Nitrogen Oxide - Reasonably Available Control Technology ("NOx-RACT") limits.
- Compliance strategy for NYSDEC revisions to Part 231 - New Source Review ("NSR") regulations.
- Current NYC and NYS policies and regulations regarding greenhouse gases (Greenhouse Gas - GHG in NYC and Regional Greenhouse Gas Initiative – RGGI in NYS) to limit power plant carbon dioxide emissions.
- EPA Clean Air Act Section 185.
- EPA Clean Air Interstate Rule (CAIR) Replacement Rule.

NOx - RACT Regulations

Existing Rules

Current NOx RACT rules provide specific NOx emission rate (lb/MMbtu) limits for various emissions sources based on the type and size of the unit. The rules permit the use of system-wide averaging (24-hour average during the ozone season, and 30-day average during the non-ozone season) as a compliance option. The allowable limit and actual measured emissions (total NOx lb / total MMBtu fuel burn) from each unit are calculated together for an overall emissions average that is weighted by the heat input. This determines the single system-wide allowable NOx limit and actual NOx emissions. All of the Company's steam and electric generating units except East River Units 1/10 and 2/20 are included in the system-wide average. East River Units 1/10 and 2/20 are BACT / LAER units and are considered separate, stand-alone units for NOx RACT compliance. The BNYCP combined cycle plant continues to be excluded from the Company's NOx system-wide average.

The current emission rate limits for the Company's generating units are 0.25 lb/MMbtu for very large utility boilers, 0.30 lb/MMbtu for large package boilers, and 0.40 lb/MMbtu for simple cycle combustion turbines. This results in a system-wide permissible emission rate limit (weighted average) for the Company's units of approximately 0.26 to 0.27 lb/MMbtu (excluding East River Units 1/10 and 2/20 and BNYCP).

A number of different compliance plan options/configurations are being evaluated in order to meet the new NOx RACT regulation. A much more detailed analysis and engineering study will be performed on the most promising compliance plans options. The final evaluation would determine which plan gives the Company the best mix of the three factors: allowable oil firing, lowest cost, and compliance with the new NOx RACT emissions limits.

NYSDEC Part 231 Revision - New Source Review (NSR)

NYSDEC revised the 6 NYCRR Part 231 New Source Review (NSR) regulations effective March 5, 2009, and has required some additional analysis and recordkeeping for all power plant capital and O&M projects that may directly or indirectly impact emissions. This new rule compares the future predicted emissions (from PROMOD dispatch models) against past actual emissions (baseline) looking for projected increases in emissions (after correction for unused, but available, emissions during the baseline period). Prior to implementation of its new Part 231 regulations, a Part 231 analysis was directed at increases in the potential to emit from a specific unit. The new regulations basically ratchet down future emissions of older boilers/equipment/technology as they age and effectively force their replacement with new, cleaner technology rather than be rebuilt like-in-kind when they reach their end of useful life.

In accordance with the new NSR regulations, the Company has reviewed its 2009, 2010 and other near-term planned capital and O&M projects for potential modifications which would trigger the regulations and potentially require additional emissions reduction measures to be taken. At present, these reviews have not resulted in or predict any significant modifications or increased costs for

specific projects. However, over time, the potential for increased permitting requirements and triggering the need for BACT/LAER compliance in terms of any significant capital and O&M project expenditures relevant to the 20 year plan cannot be predicted.

NYC Policy for Carbon Dioxide Emissions Reductions

The City of New York's PlaNYC sets an ambitious goal for reducing the City's greenhouse gas (GHG) emissions 30% by 2030, and has a short-term goal of reducing carbon dioxide (CO₂) emissions by seven million tons per year ("tpy"). These goals would be achieved using several initiatives, including improvements in energy efficiency, reduced demand, encouraging clean distributed generation, and facilitating repowering and construction of new cleaner power plants and dedicated transmission lines. The City of New York has indicated that it views the cogeneration option at Hudson Avenue as a potential means for contributing to its GHG reduction targets. The Company continues to evaluate cogeneration for the Hudson Avenue site, taking into consideration the currently forecasted need for electric and steam capacity, the affordability of the resource choice for steam ratepayers, and the environmental tradeoffs of the options being considered. The City has also indicated that it would encourage new Combined Heat and Power installations at some of the City-owned and customer-owned buildings. This initiative would potentially result in a reduction in steam demand for the system.

NYS Regulations for Carbon Dioxide Emissions

The Company is in the process of procuring CO₂ allowances to comply with recent NYSDEC regulations governing CO₂ emissions. This CO₂ cap-and-trade regulatory framework implements in New York State the Regional Greenhouse Gas Initiative ("RGGI") covering the northeast region (10 states including New York). It applies to electric generators greater than 25 MW, including Con Edison's East River Units 1, 2, 6, and 7. Unlike other cap-and-trade programs, NYSDEC has not allocated emission allowances to generators, choosing instead to auction close to 100 percent of the allowances. The number of allowances available for the auctions was budgeted per the established caps, with one allowance giving the right to emit one ton of CO₂. The number of allowances to be auctioned would be reduced each year, beginning in 2015, to achieve net reductions in CO₂ emissions. As the number of available allowances diminishes, the expected cost per allowance is anticipated to increase. The Company's operating budget now includes estimated allowance costs for the Con Edison electric units (ER 1, 2, 6, and 7) that are affected by these regulations, and the economic evaluations incorporate forecasted costs for procuring carbon allowances for options that include electric power generation.

There are uncertainties in the longer term implementation of CO₂ cap-and-trade programs regionally and nationally. A federal cap-and-trade program may be established, probably with higher allowance prices than are likely in the current RGGI program. It is not known if the current RGGI program would merge with the federal program or if its applicability would extend beyond currently affected units.

EPA Clean Air Act Section 185

A series of recent court decisions require EPA to impose Clean Air Act Section 185 fees on major sources; EPA will require State Implementation Plan (SIP) updates by states to implement this program. Section 185 requires major sources of NO_x and VOCs in severe ozone non-attainment areas to pay fees (\$8,000/ton) for emissions greater than 80% of specific baseline emissions. The actual fees will be determined based on actual annual emissions and final resolution as to what is an

acceptable baseline. Clearly, the fees will be lower if emissions are reduced by increasing the amount of natural gas in the fuel mix. There are several related EPA actions underway, and it is not clear as to when New York will file SIP revisions to implement the Section 185 fee program.

EPA Clean Air Interstate Rule (CAIR): SO₂ and NO_x Allowance Trading Programs

Clean Air Interstate Rule (CAIR)

The Clean Air Interstate Rule (CAIR) was finalized in March 2005. It established a long term NO_x and SO_x reduction goal for most of the States in the eastern part of the United States, and created an emission allowance trading program modeled after the highly-successful Acid Rain Control Program. CAIR was overturned by court action in 2008. The courts agreed to postpone the implementation of its vacature of the CAIR, pending the development of a replacement rule by EPA. Accordingly, the SO₂ and NO_x allowances allocated by NYSDEC and the cap and trade rules per CAIR are currently in force. EPA has indicated that the CAIR Replacement Rule will be issued in April 2010. EPA representatives have indicated that the new rule will be fairly complex, and will significantly limit the amount of emission allowance trading available to air permit compliance managers. New emission limits on NO_x and SO_x are likely to be promulgated as part of the CAIR Replacement Rule, and EPA has also indicated that it intends that the CAIR Replacement Rule will help to address the changes under development in the ozone and PM_{2.5} National Ambient Air Quality Standards (NAAQS). Overall, it is expected that the CAIR replacement will press major sources like the Company's electric and steam plants to find additional emission reductions for a variety of pollutants.

Following is a status of the cap and trade programs that are required by the current NYSDEC regulations.

SO₂ Cap and Trade Programs (CAIR)

The number of SO₂ allowances allocated to each electric generating unit under the EPA's Acid Rain Program remains unchanged, and no additional allowances are allocated to meet the new CAIR program requirements. Starting 2010, the generating units would be required to surrender the allowances for both the Acid Rain and CAIR programs. Allowance surrender ratio for each ton of SO₂ emission would be as follows:

- 1:1 ratio for allocations before 2010
 - One allowance for Acid Rain Program, no allowance for CAIR
- 2:1 ratio for allocations 2010-2014
 - One allowance for Acid Rain and one allowance for CAIR
 - Each allocated allowance permits 0.5 tpy.
- 2.86:1 ratio for allocations 2015 and after
 - One allowance for Acid Rain and 1.86 allowances for CAIR.
 - Each allocated allowance permits 0.35 tpy

Therefore, the generating units need to curtail their emissions 50% by 2010 and 65% by 2015 or purchase additional allowances on the market. In previous years the Company achieved more SO₂ reductions than the regulations called for, so the Company has banked excess allowance savings. Currently The Company has no need for purchasing additional allowances, but will continue to monitor and manage its allowance portfolio.

NO_x Cap and Trade Programs (CAIR)

In accordance with CAIR, the NYSDEC has allocated NO_x allowances to affected generating units (electric and/or steam generating; but not package boilers) for the years 2009, 2010 and 2011. Two types of NO_x allowances were allocated: (1) Seasonal allowances (for emissions during the ozone season, May – September), and (2) Annual allowances (instead of the non-ozone season allowances allocated in the previous years). Allowance allocations for each generating unit were based on its historic heat input data (actual fuel burn), but prorated with a statewide cap for the total number of budgeted allowances. The annual caps for both types of allowances would decrease in each subsequent year thereby allocating fewer allowances each year.

In order to comply with this program, the generators are forced to either achieve NO_x emission reductions in a timely manner or purchase additional allowances on the market. Until now the Company is able to comply with this program without having to purchase allowances because of the successful NO_x reductions already achieved from the Company's environmental projects. However, there are uncertainties regarding possible drastic reductions in the caps and allowance allocations in future years 2012 and beyond.

Interstate Transport of Fine Particles (PM2.5)

There is a concern that the air emissions dispersed from the stacks of power plants in one state would travel across state boundaries, and secondary fine particles are formed due to the chemical reactions occurring in the atmosphere during this transport. This may cause fine particle non-attainment in down-wind states. Currently NYSDEC is addressing this issue with the promulgation of stricter NO_x-RACT rules (discussed above) that curtail the NO_x emissions, which are precursors to the fine particle formation. With this approach, NYSDEC is currently not intending to issue new regulations for the interstate transport of fine particles. However, there is a possibility that this may change when the EPA develops the new CAIR rules.

Regulatory Considerations for Repowering Options

Permitting Requirements

The SLRP assumes that replacement of boilers with new boilers or cogeneration units would be subject to federal, state and 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 or major modification of an existing facility. An EJ assessment determines if a

project would result in a disproportionate adverse environmental impact on a potential EJ area comprised of minority or low-income communities.

NYSDEC's EJ policy requires the Company to consult with the NYSDEC Staff to determine whether a potential EJ community is affected by a project, and if the potential for a disproportionate adverse environmental effects is identified, an environmental impact statement will have to be prepared. At a minimum, where an EJ community is identified, an enhanced public participation plan has to be developed to facilitate public participation in the application process.

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 ("PM2.5"). This designation requires more stringent limits for the ozone precursors (NOx and VOCs) and PM2.5. This Plan assumes that any repowering or replacement project would be equipped with low NOx burners, selective catalytic reduction (NOx reduction), oxidation catalyst (CO reduction), and would burn natural gas as the primary fuel, with ultra low sulfur distillate oil (0.0015% sulfur) as back-up for 30 days maximum per year.

Netting Analysis

New York City is considered a non-attainment area for PM2.5. There is presently no cap and trade program or emissions offset databank for PM2.5. The US Environmental Protection Agency ("USEPA") and NYS Department of Environmental Conservation is expected to issue new regulations in the future. Considering these uncertainties, PM2.5 emissions needs to be further evaluated during the engineering phase of any new plant project option to mitigate possible permitting risks. Other emissions constituents would also have to be netted out, for any new plant that was replacing an existing one, with a fully developed analysis showing that the overall future emissions are less than the baseline or current emissions.

Dispersion Modeling

Another significant emissions risk pertains to results of required air dispersion modeling that determines how pollutants from an exiting stack would disperse and impact the areas around a new plant site. Tall residential buildings (existing and planned) near the plant site meet the definition of "ambient air" receptors near a new plant location. The modeled impacts at these elevated receptor locations must meet the significant impact level for the specified emissions. There is a permitting risk if the USEPA adopts the most stringent acceptable limits among those under consideration.

Other Environmental and Permitting Issues

Environmental studies for a new facility provide discussions of permitting concerns beyond emissions issues. For example; a new stack would need to be built for a new facility which could be approximately 400-600 feet in height per a good engineering practice (GEP) analysis performed for the site. This could become a distinctive element of the view/landscape and may require FAA approval considering the flight path of aircraft from local airports.

Natural gas firing increases the release of water vapor and may result in visible condensed water plumes. In addition, there is a potential for noise transmission through the atmosphere to off-site

residential receptors above acceptable levels at night from fans associated with the air-cooled condensers or other new plant equipment.

Environmental Considerations for Plant Closures

Since plant closures may be a cost-effective option under the Low Demand and Plan Demand Scenarios discussed in this SLRP, environmental and policy considerations when retiring an existing generating plant are considered briefly in this subsection.

The local community surrounding an existing generating facility would likely view the closure and demolition of a facility favorably in light of the expected reduced local emissions and improved views. However, the Company and New York City would need to consider other regional factors pertaining to emissions and energy supply reliability. For example, the Company and the City have limited sites available that are suitable for generating plants. A site released for other uses, would, of course, not likely remain available to accommodate any generating facility that may subsequently be needed.

Closure of a facility would not preclude the application of emission reduction credits earned from the facility removal, which can be banked for future use. However, their value may be diminished in an NSR/PSD review when applied for a new plant permit at a different site.

Water SPDES Management and Control

Compliance with State Pollutant Discharge Elimination (SPDES) permits at our stations is integral to the way Steam Operations does business. Performance metrics are established each year that are aimed at driving performance in regard to minimizing the number of exceedances that could occur from our facilities. For nine consecutive years Steam Operations has either met or outperformed its established SPDES goals. A preventive maintenance program consisting of station oil water separators, softening and demineralization equipment, and SPDES sampling assessments assists in ensuring continued compliance.

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6.0 OPERATIONAL MANAGEMENT OF THE DISTRIBUTION SYSTEM

6.1 DISTRIBUTION STRATEGY

The Company is focusing its efforts toward a number of future initiatives which the Company feels will be beneficial to all stakeholders.

- Promote programs that allow the company to optimize the use of its assets in order to reduce cost and minimize outages.
- Implement remote monitoring where possible and utilize the technology as a more efficient monitoring process to identify potential problems before they are an issue.
- Install digital meters at customer locations in order to collect real-time system data for monitoring, allow more cost-effective meter reading, and to facilitate potential new time of use pricing and demand response models for the future.
- Pursue R&D projects to identify conditions that lead to “water hammer”¹⁴ in order to enhance employee and public safety.

With these initiatives as the foundation for the steam distribution strategy, the Company feels these initiatives will allow the system to continue to serve the people of Manhattan for years to come.

6.2 MANAGEMENT OF THE CURRENT ASSET BASE

6.2.1 Asset Management and Replacement

The steam distribution grid is a complex system requiring the interconnection of a number of different components. Successful operation requires that the Company ensure that each component is functioning correctly and doing its job to transport steam or remove condensate from the system. The Company uses an internally developed Steam Operations Mapping and Information System (SOMIS) which contains a database of all steam distribution assets. SOMIS is capable of providing information about any individual asset, as well as providing aggregate results of the system.

¹⁴ Water hammer occurs when a bubble of steam gets trapped in subcooled condensate and the steam rapidly collapses causing the condensate to impact with a resulting high pressure pulse that could break or rupture an adjacent component on the system. Also, if condensate is collecting in the system it can be transported as a slug by the steam at the system pressure and velocity. When the slug reaches an obstruction such as an elbow or tee it collides with the fitting and the momentum of the slug results in a huge impulse force that could break or rupture the fitting.

Information available from the SOMIS system includes, but is not limited to:

- o Location of components
- o Service dates
- o Operational statistics
- o Current status
- o Customer information (if applicable)

In addition, the Company has a very detail mapping system of its piping system that shows the location of pipes, services, components and structures, and also their date of installation, and construction details.

In order to maintain the assets in the system, the Company has initiated a number of programs to effectively optimize the usefulness of assets, including effectively replacing those assets that have reached the end of their useful lives, in most cases operating until failure. Refer to Table 6-1.

Table 6-1. System Component Management Programs

<i>Program</i>	<i>Description</i>
<i>Anchor Replacement Program</i>	Program designed to replace 5 deteriorated anchors per year between 2010 and 2014.
<i>Cooling Chamber Replacement Program</i>	Program to replace cooling chambers in approximately 40 locations in 2010, and approximately 25 additional locations per year between 2011 and 2014. Condensate collected in the cooling chambers has the negative effect of corroding the chamber over time, causing leakage and requiring replacement. A new design, involving the replacement of the solid end connection piping into and out of the cooling chamber, with a braided flexible pipe is expected to lengthen the life of the cooling chamber. In addition, utilizing cathodic protection is also being evaluated.
<i>Expansion Joint Replacement Program</i>	Program forecasted to extend for 12 more years, through 2021, in order to complete the change-out of Inconel internally pressurized joints due to the inherent design risk for an uncontrolled release upon failure. This program has a scheduled replacement rate of 20 joints per year.
<i>Flange Removal Program</i>	Program targeting the replacement of 30 pairs of flanges per year. Flanges are typically replaced when leaking and also replaced in conjunction with other work that may occur on a section of the system.
<i>Infrastructure Condition Projects</i>	Program designed to make improvements to the Steam System infrastructure to prevent water infiltration into subsurface steam structures. In areas of high ground water or tidal areas this program will reduce water infiltration into steam structures to minimize accumulation in the structures and potential contact with the steam main. In addition, steam mains of certain configurations of mains are

	relocated under this program.
<i>Leaks Upgrade Program (pipes)</i>	Program to address leaking pipe, performing approximately 105 leak repairs per year.
<i>Main Valve Replacement Program</i>	Program designed to replace defective and inoperable main valves. The program is to replace 2 main valves per year, increasing to an estimated 7 in 2011 and to 10 per year in 2012. The Company's ability to replace valves is limited by the complexity of the work and the customer outage impact The Company is actively working with the valve suppliers to improve the service life.
<i>Manhole Cover Replacement Program</i>	Program to replace all cast iron manhole covers. As of today, there are approximately 110 cast iron manhole covers left in the system. Most of these covers are non-standard size. The plan is to re-design the manhole roof slabs to accommodate the use of standard size hybrid manhole covers or composite 8" Valve Box Covers. This is targeted to be complete by end of 2010. The Company continues to pursue a fully composite cover for future use.
<i>Pump Manhole Electrical Upgrade Program</i>	Program to install new high temperature pumps plus various electrical components inside the pump manholes will bring them up to current electrical standards and codes. This program is forecasted to upgrade approximately 25 pump locations in 2010 and 12 pump locations per year afterward until completion.
<i>Trap Combination Replacement Program</i>	Program designed to address future trap station improvements on an as needed basis, including a new design that has improved debris removal capability. These programs will reduce the amount of debris that gets into the trap by capturing this debris in the drip leg or the strainer that is upstream of the trap. The company is expected to replace approximately 250 trap stations in 2010 and 160 trap stations in 2011. On an ongoing basis, the company expects to replace approximately 30 trap stations per year.
<i>Service Valve Replacement Program</i>	Program to replace street service valves on an as needed basis between 2010 and 2011. From 2012 to 2014, the Company anticipates replacing approximately 14 street service valves per year. This program will be re-evaluated in 2014. The company is actively working with the valve suppliers to improve the service life.

6.2.2 Managing Company Assets Inside Customer Buildings

Meters

In addition to underground components within the system, the Company has made an effort to replace components on the system that reside on the customer's premises. The Company primarily utilizes three different types of meters within customer premises: EDP, Shuntflo and the new Vortex meters. Currently the Company replaces both the Shuntflo and Vortex meters on a 5 year schedule; however, the Company has instituted a program, the Shuntflo Meter Conversion project, with the intent of upgrading many mechanical Shuntflo meters to the digital Vortex meters.

With the move to Vortex meters, the Company's studies have shown that meter replacement can be moved back from 5 to 10 years as these meters are accurately able to perform within a tolerance level of 2% over that 5 year cycle. To date, the Company has already upgraded all customers who use 1,400 Milb of steam per year, with plans to convert up to 70 additional customers in 2010 and 50 more

each year through 2014. These new Vortex meters allow the Company to receive information in 15 minute intervals regarding customer usage and pressure.

The Company does not currently plan to upgrade all customers, as this might be a cost prohibitive effort. The Company has been studying cost effective ways to install devices on the steam pipe which will convert steam to electricity to power the meter. The Company currently has a prototype of this scenario, but it has not yet proven robust enough to be deployed at customer sites. The Company will continue to pursue new methods of reducing the cost of Vortex meters as Shuntflo meters are obsolete and replacement parts utilized today will become cost prohibitive in the long-term.

The company has also initiated a Meter Downsizing program designed to replace oversized steam meters at various customer locations due to operational changes and efficiency improvements by customers. Oversized meters will lose registration at lower flow rates. Downsizing the meters enables more accurate capturing of the lower customer demands. This program addresses Company-initiated meter station changes and is done on an as-needed basis.

Meter Regulating Valves

In conjunction with the replacement of Shuntflo meters with Vortex meters, the company also wants to replace the problematic mechanical meter regulating valves, both the M and Spence valves, with the motor operated ball valves under the M Valve Conversion program. It is anticipated to convert approximately 35 locations per year until completion. These ball valves provide a tighter seal than the previous design, thus virtually eliminating this as a source of losses in the system.

The company has instituted the Limatorque Angle Valve Replacement program designed to replace defective Limatorque actuator operated angle globe meter regulating valves with new valve assemblies which will be enabled with remote monitoring and control capability when the new generation of flow computers is installed in the future. This will allow remote determination of valve positions and remote isolation of meter lines in the event of an emergency. The program is anticipated to replace 2 locations per year and on an as-needed basis.

Meter Station Trap Assemblies

The Meter Station Trap Remote Monitoring program is designed to remotely monitor company traps at customer premises to speed up detection of blowing or clogged traps. Late detection or non-detection of non-working company traps is a source of steam loss or a potential for condensate build-up which can result in water hammer. The program is to enhance the company-owned traps located before each meter station to be monitored around the clock by an automated system that will alert the 24-hour troubleshooting dispatcher when a problem is detected. Installations are done at the same time with the Shuntflo Meter Conversions. Currently, the Company has initiated a pilot program which will equip approximately 30 customer buildings with remote meter station trap monitoring. This program is estimated to convert approximately 60 locations in 2011, and approximately 70 locations per year until completion.

6.2.3 Asset Management Challenges

Managing a system as large as the steam distribution system, in a geographic region as complex as Manhattan, is not without its challenges. Since the majority of the system is underground, with only part of the system accessible through structures such as manholes, it is often necessary to dig under the streets to repair or upgrade parts of the system. This is difficult when working in the city that never

sleeps, and it is necessary for the Company to undertake an arduous permitting process with the city to ensure that the customer's, the Company's, the city's and the public's needs are addressed. This includes excavating to connect new business to the existing system. New customers can be in excess of 200 ft from the nearest main, and depending on the location within the city, connecting them to the system can be an expensive endeavor for the Company.

The Company realizes that these challenges are not expected to improve over the next 20 years, and in fact may become more challenging as the city continues to expand Green Streets and Summer Street closures that inhibit the company's ability to access its assets. It will be up to the Company to continue to manage around them.

Condensate Buildup

The steam distribution system is a "once through" network, which means that there is no recovery of the condensate. Due to its size and New York City subsurface congestion, the design of condensate recovery for the entire system is not feasible. Many customers collect the condensate within their buildings in collection tanks to be used for pre-heating domestic hot water. For customers who do not re-use the condensate, it is discharged into heat exchangers or tanks and eventually discharges into the sewer system. .

Condensate generated from the distribution system is discharged into cooling chambers, collected in the chambers and allowed to cool before being discharged into the sewer. .

Construction in Manhattan

Construction in New York City streets is unlike any other construction. The subsurface infrastructure is congested with various utilities and structures, both in use and those abandoned in place. Facilities belonging to city and state agencies include sewers, water mains, the Transit Authority's electric system, and signal systems for the Department of Transportation (DOT), and the Fire and Police Departments. In addition, there are electric, gas, steam, cable, telephone conduits, mail tubes, fiber optic cables and their associated structures. In some areas, old foundations and footings from long-retired elevated train structures and trolley tracks remain in place. Also, beneath the city streets are subways, train, and vehicular traffic tunnels. Due to these conditions, significant excavation by hand is required on most jobs. All of these make excavating to maintain or install new facilities challenging, time consuming and costly.

The company must design its facilities around New York City owned facilities. If a proposed City facility is designed with routing into steam assets, the Company must relocate, support, or protect the Company's facilities and bear the resulting cost. On the other hand, if a Steam project runs into City owned facilities, even if inaccurate City drawings are the cause, it is the Company's responsibility to incur the added cost to support, protect or replace the interfering City facility. The Company also has to pay to relocate other facilities such as gas, electric and telephone cables for the Company's own work. Therefore, to minimize unknowns, Steam Distribution Engineering conducts an extensive subsurface investigation before any design begins. In all cases, New York City has the right to eminent domain.

Permitting

Street construction permits for excavation work are usually issued with traffic stipulations. Traffic stipulations restrict construction activities based on the volume of traffic and the size of the roadway in

the area of the work. The restrictions vary for mid-block excavations, as opposed to those that take place at intersections. Also, extraordinary noise restrictions in hospital zones and similar sensitive areas, average noise restriction in residential areas, facility access, and holiday embargoes are also considered in traffic stipulations. The stipulations dictate what hours the company can work at a particular location, how much space can be used to perform the work, and how site conditions must be maintained. Restricted permits add to the duration of construction and also escalate the cost of performing work.

Interconnecting New Business

The Company currently has a commitment to connect any customer requesting steam service to the Steam System as long as that customer resides less than 250 feet from a main. If the customer is beyond 250 feet, they can still be connected, but Con Edison is not obligated to supply a connection. As described herein, the Company plans to modify its tariff to lessen its obligation to serve low load factor customers, including modifying the 250 foot rule.

Due to the combination of the variability in real estate prices, differing levels of congestion, and complexity of subsurface structures throughout Manhattan, the cost of adding customers to the Steam System varies considerably between different neighborhoods within Manhattan. The Company recently started trending the actual costs of adding new customers in different parts of Manhattan and created neighborhood boundaries for zones with similar costs. Therefore, location of customers has an impact on cost of providing service.

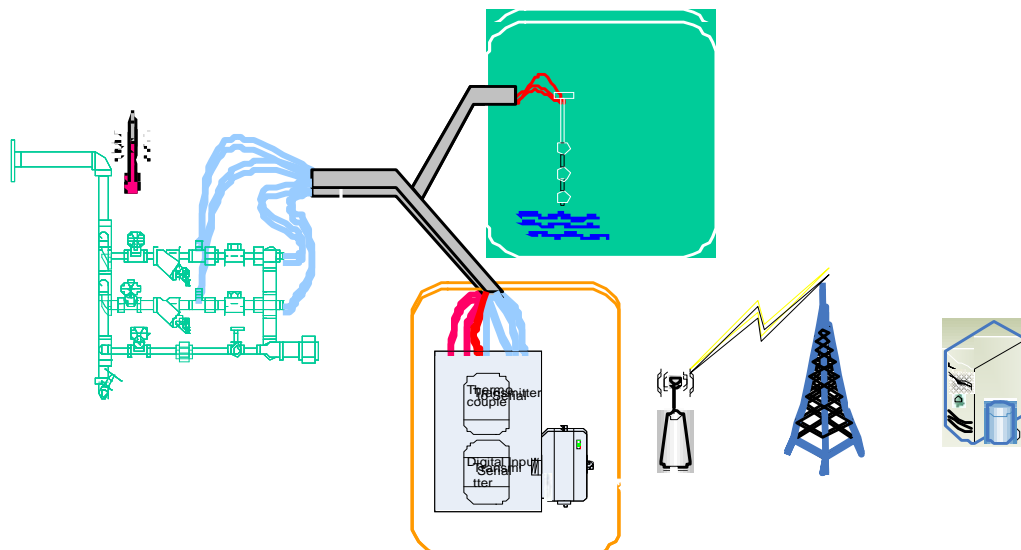
6.3 PLANNED SYSTEM IMPROVEMENTS

6.3.1 Remote Monitoring To Enhance Safety

As a result of the 41st Street Steam Incident that occurred in 2007, the Company instituted changes to its operation and maintenance programs. Specifically the Company established procedures for response during rain events. In addition, the PSC now requires all traps in the system to be replaced annually to ensure safe operation of the system. The company also performs an onsite visual inspection (cap inspection) within four months of installation of a trap.

The Remote Manhole Monitoring System is a multi-year project in which the Company is installing instrumentation to measure trap temperatures and steam manhole water levels (see Figure 6-1). This information shall be retrieved by remote telemetry units (RTU's) installed at each field location. The data is then transmitted to a Company server where it shall be stored and then ultimately distributed to operator workstations for "real-time" monitoring of steam trap status and manhole conditions. To date, more than 200 locations are being monitored with the eventual goal of monitoring over 800 locations.

Figure 6-1. Remote Trap Monitoring



Presently, Phase I of the program plans to install an additional 250 locations in 2010 and the remaining locations in 2011. Then the Phase II of the program will install upgrades between 2012 and 2014. The goal of this program is to eventually be able to read and analyze data at a rate sufficient to identify issues before they occur. Eventually this system should be able to eliminate the need to manually check manholes after heavy rains and eliminate or reduce trap replacements and inspections.

6.3.2 Thermal Efficiency Improvement Program to Reduce Line Losses

A review of Steam Variance, the difference between metered steam sendout at the generating stations and metered steam sales at the customer locations, was conducted by an independent consultant in May 2009. Resulting recommendations included investigating the increase of superheat in steam sendout and the examination of the economics associated with the use of pumpable insulation. The Company determined there was no margin for increasing superheat by raising steam temperature and that from an economic standpoint, insulating with pumped insulation is not cost effective. The Company is currently considering the impact on Steam Variance if steam pressures are lowered and results in an increase in superheat.

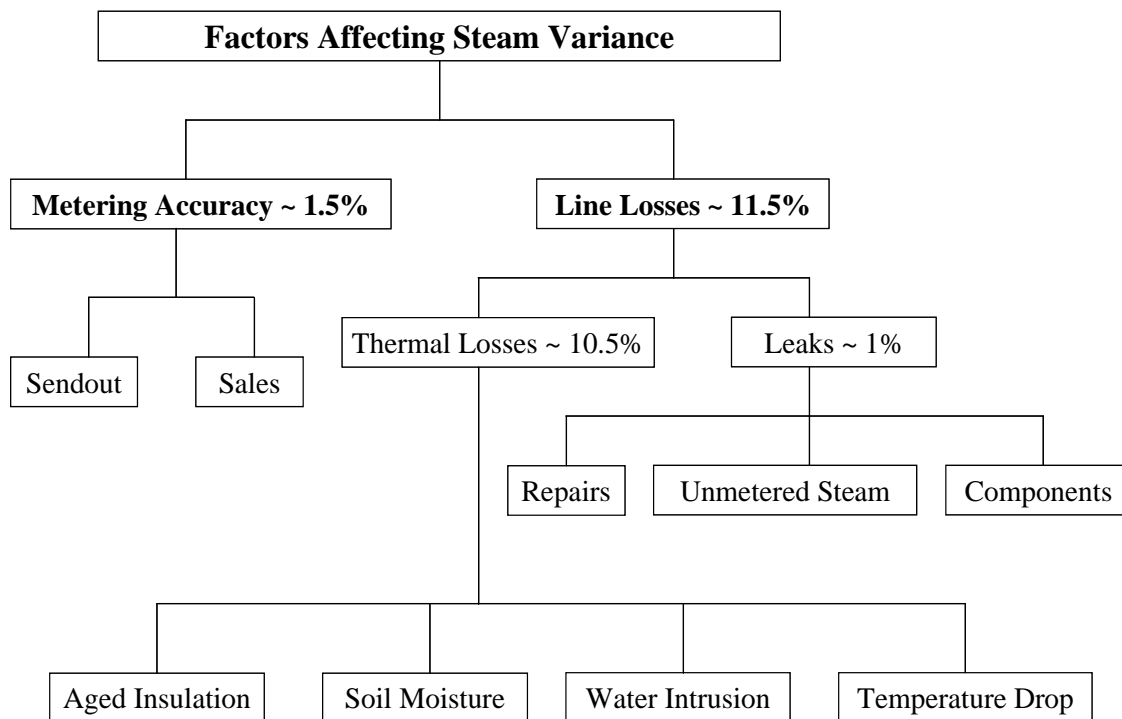
The Company has been analyzing the impact of operating at various pressures which may provide a benefit on the variance loss with little impact to customer service. Presently, the Steam System is operated year round between 150 and 180 psig with a slight superheated temperature. There are customers who use steam turbines for cooling, requiring a minimum of 125 psig to drive their compressors for cooling. From a distribution perspective this can prove beneficial to reducing thermal losses in the system as high temperature at lower pressures produce less condensate. This “dry steam” provides the operational benefit of reducing the risk of water hammer discussed previously in this chapter. Additionally, lowering operating pressure should provide less stress on the piping system, lengthening the useful life of those assets

Steam Variance results in economic inefficiencies as the Company is forced to burn more fuel to create more steam than is needed by the customer. Based on historic studies, the aggregate Steam Variance was close to 16% per year due to metering inaccuracy, inherent thermal losses, and leaks. Recent Steam Variances are closer to 13% as meter modifications, steam main housing structure waterproofing, and remote monitoring projects were completed.

The Con Edison Steam System has some mains installed at elevations that are below the water table. When a steam main is installed, it is surrounded by insulation and encased in a housing, which is meant to reduce thermal losses. Thermal losses increase in areas where there is a breach in the housing or breakdown of the original insulation, or when the insulation comes in contact with groundwater. Tidal conditions and rainfall affect the amount of water concentrated in the soil around buried steam mains. The Company will be addressing this through its waterproofing project.

Figure 6-2 shows the components of Steam Variance.

Figure 6-2. Historic Studies of Steam Variance



6.3.3 Various Enhancement Reinforcement Program

Design of a Steam System results in some inherent inefficiencies. For example, if the system has surplus generation capacity in one area, there may not be a way to get that surplus to another part of the system where it might be needed. In addition, steam that is least expensive to generate cannot always flow into the “pocketed” areas of the system where generation may be more expensive to produce. This is discussed in detail in Chapter 6.4.6, Options for the Future.

6.3.4 Connect Distributed CHP

The Company feels distributed generation, and specifically CHP, is going to continue to be adopted at a greater rate in the service territory. Distributed generation involves the use of small-scale power generation technologies located close to the load being served. Distributed generation is designed to serve some or all of the electricity needs of a customer using fuel sources that may include natural gas, renewable fuel sources such as solar or wind or steam. CHP involves capturing the heat byproduct of producing electricity to heat the premises.

From a Steam perspective, CHP involves the customer producing electricity and using the heat byproduct to produce steam which it can then sell back to the Company. This is an extremely efficient process and is similar to the process occurring at the East River Generating Station. From a distribution perspective, the system is capable of handling two-way steam flows (both to and from the customer), and the Company has been able to purchase steam in the past from its customers. The only restriction from a distribution perspective is that the steam must not contain any impurities that could lead to leaks in the system. This should not be an issue for a customer using clean water in concert with a high quality CHP boiler.

In a second configuration, a customer could use steam as its fuel source for the traditional heat and hot water of the building as well as to operate a turbine to produce electricity for the building. Currently no customers are doing this, but it is a possible configuration for the future.

From a Company perspective, although the Company disputes the identification of CHP as a renewable source¹⁵, it does view CHP as a clean source of power.

6.3.5 Improve Transport Flexibility

Although peak load has been trending downward over the last few years, the Company has been actively studying the Steam Transmission and Distribution System to identify specific locations with congestion and restrictions that could use upgrades and enhancements to improve steam pressure, flow, and dispatch operations. With the goal of maintaining an acceptable pressure distribution across the system, several locations were identified that could be upgraded to result a system improvement. At this time the peak demand does not require these locations be addressed, nor would it be economically feasible at this time; however, the Company will keep them on the radar for the future.

Main Upgrade—this project un-bottles steam flow in the downtown steam district and facilitates steam flow from the east side to the west side, which normally operates at pressures lower than the rest of the System. This is expected to improve the transport flexibility up to 300 Mlb/hr across the downtown area.

¹⁵ “The Companies oppose the designation of CHP as a renewable resource; the State should continue to prefer repowering at existing sites over installing new DG, especially in non-attainment areas. Especially for non-attainment areas, power plants with higher stacks and greater emission velocities are generally better for the environment than customer-sited DG that is fossil-fueled.” See Comments of Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc. on the Draft 2009 New York State Energy Plan

Main Upgrade—this project makes for greater use of the steam capacity at the East River Generating Station by un-bottling the steam flowing from the East River Generating Station outlets to provide greater transport flexibility to both the uptown and downtown districts.

The benefits of this upgrade can improve the transport flexibility up to 600 Mlb/hr from the East River's Sendout Main and provide for greater steam flow uptown. The extra flexibility can be used to help improve steam pressures on the west side.

Main Upgrade—This project makes for greater use of the steam capacity from the Ravenswood Steam Plant by un-bottling steam flow at the Tunnel outlet and providing up to 226 Mlb/hr more steam from the Ravenswood Station to the Upper East Side and Midtown areas.

The benefits of this project are ability to send out the full 976 Mlb/hr capacity from the Ravenswood Steam Plant to the Upper East Side and midtown areas.

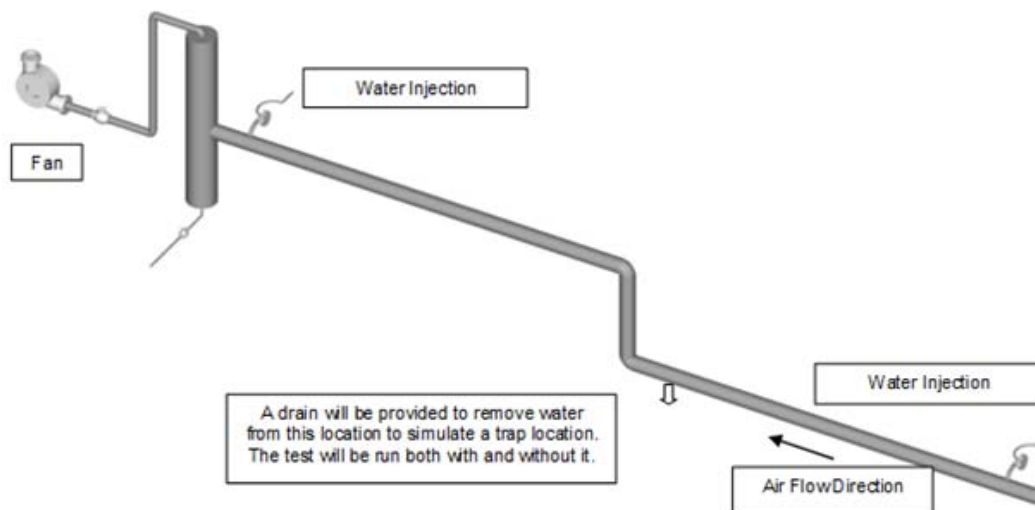
Main Tie—this project t would connect Mains in lower Manhattan and helps to balance the steam flow on these Mains.

6.3.6 Study the Behavior of Condensate in the System

The Company is actively pursuing an R&D effort to better understand the causes of water hammer and the behavior of condensate. The Company has initiated an effort to study, in a lab environment using air and water, the behavior of condensate combined with moving steam in sloped pipes and fittings. These results will be used to determine the expected behavior of traps and to enhance the condensate removal capability based upon test data

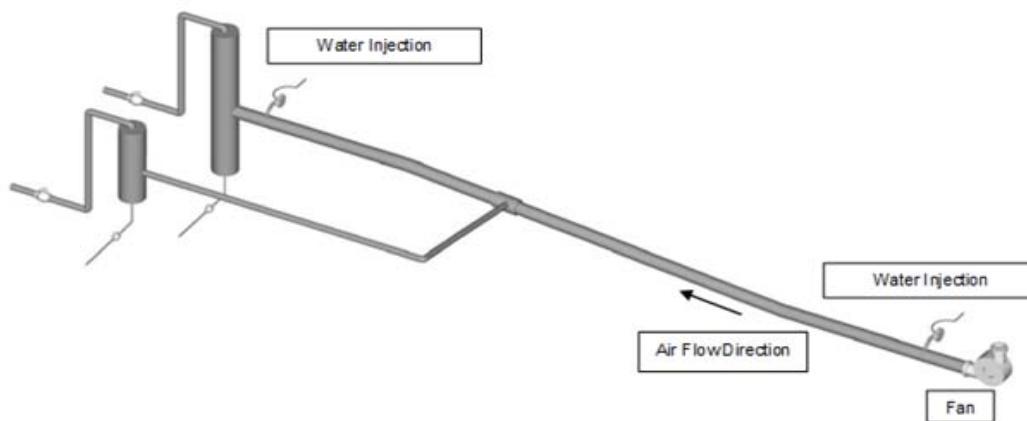
Figure 6-3 shows the layout of the test apparatus of one of the behavior tests. In this setup water is injected into either end of the test fixture at variable rates. Air flows are then introduced which simulate both normal condensation and accelerated flow rates with the resulting condensate behavior being measured and analyzed.

Figure 6-3. Unidirectional Flow Test



A second series of tests will be performed to simulate closing a service from the system, a common occurrence in the distribution system when workers need to make modifications or repairs to the system. It is expected that the fan will be modified so that the air will blow into a straight piece of pipe with a moderate slope downward. The precise slope will be selected based on the results of the unidirectional tests. Flow adjustment control valves will be placed in the six inch and the two inch pipe so that the flow can be split into the two pipes and controlled. The test configuration appears in Figure 6-4.

Figure 6-4. Service Take Off Test



In addition to these two tests, The Company, along with its partners, has developed a battery of tests to validate the test results using steam and condensate and to fully study other conditions in the system that can result in water hammer. Success of the project will help the Company improve its operation of the system.

6.3.7 Operational Risk Mitigation

In order to keep the steam distribution system running effectively and in a safe and reliable manner, the PSC has developed a few operational and maintenance metrics which the company is subject to penalties if these metrics are not met (see Table 6-2).

Table 6-2. Distribution O&M Metrics

<i>Metrics</i>	<i>Description</i>
<i>Emergency Response Performance Metrics</i>	Steam operations must respond to 95% of the steam leak and vapor condition calls within 60 minutes and 85% of the calls within 45 minutes per the current Rate Case Performance Metrics.
<i>Leak management performance metrics</i>	Emergency leaks require immediate response and are worked continuously until repaired or the condition is no longer hazardous. Non-emergency leaks include any leak which is not immediately hazardous at the time of discovery and can be reasonably expected to remain that way. Non-emergency leaks shall be repaired within six months from the date of discovery. There is a current Rate Case Performance Metric target for a mid-year and year-end leak backlog to be less than or equal to 24 leaks based on 12 month average.

Table 6-3 shows the Company's operational and maintenance programs as agreed to by the PSC.

Table 6-3. Distribution O&M Programs

<i>Programs</i>	<i>Description</i>
<i>Manhole flood inspection</i>	Flood prone manholes must be physically inspected after heavy rain
<i>Identify and evaluate manholes requiring automatic pumping</i>	The source of the water infiltration in flood prone manholes must be identified, and proper drainage or automatic pumping must be installed where necessary to keep the water level below the steam main if necessary.
<i>Failure analysis</i>	Failure analysis must be conducted to identify areas of system damage and/or degraded components. Permanent repairs should be made within 6 months for any temporary repairs made in the field.
<i>Installation of remote monitoring for trap operation and water infiltration, and the installation of high capacity traps</i>	Existing traps must be replaced with high capacity traps at low points in the system where large amounts of condensate are expected to accumulate. Approximately 9 locations have been selected for the installation. The installation of two locations has been completed and is currently under testing. The performance of the traps at these locations will be monitored and evaluated for the next 6 months. The Company plans to install up to approximately 55 locations per year in 2010 and 2011.
<i>Inspect street traps every 10 weeks</i>	Steam traps and trap piping assemblies are to be inspected for general condition and proper operation at least six times each calendar year at intervals not exceeding ten weeks.
<i>Inspect slip joints twice annually</i>	Accessible expansion slip joints are inspected at least twice each calendar year at intervals not exceeding 30 weeks. The inspection includes checks for leakage, proper alignment, and traverse measurement.

<i>Manhole inspection</i>	Steam manholes are inspected for general conditions and adequacy of insulation at least once each calendar year at intervals not exceeding 15 months and must also be inspected for structural integrity at least once each ten calendar years. The structural inspections are included as part of the annual manhole inspection program.
<i>Blow off valve and by-pass valve inspections</i>	Blow-off valves and by-pass valves are checked for operability immediately prior to closing each associated main valve during a scheduled shut down of a section of the steam distribution pipeline system. Removal of condensate from a shut down section of pipeline must be done prior to re-opening main valves.
<i>Inside service valve inspection</i>	Inside service line valves are inspected at the time of periodic meter reading. Presently, the meter reading has been scheduled monthly. Valve seals, and warning tags stating that the opening of the service valve must be made only by authorized steam corporation personnel, are physically verified in field. Missing or illegible tags and broken seals must be replaced no later than one week, after the condition was discovered. Broken seals, indicating possible unauthorized operation of the valve, are investigated to determine cause
<i>Inspect traps inside buildings once every month</i>	Company owned steam traps and trap piping assemblies are to be inspected for general condition and proper operation at the time of periodic meter reading.
<i>System telemetry</i>	System pressure telemeter recording devices are inspected and tested for accuracy at least twice each calendar year at intervals not exceeding 30 weeks. At a minimum, pressure recording gauges are installed at the interface between portions of the system which are designed for different operating pressures

6.3.8 Proposed Changes to O&M Processes

Based on the Company's operational experience, the Company is investigating proposing the following regulatory changes on some O&M programs. These changes do not affect the safety and reliability of the system. However, the changes will alleviate some of the manpower requirements in order to comply. In return, saving resources will enable the company to reduce costs and thereby reduce customer cost impacts.

- **Emergency response performance metrics**—Response to steam/leak/vapor calls in excess of 45 minutes has not resulted in any known instances of personnel injury or property damage in connection with any of these complaints. Therefore the Company supports maintaining the current 60 minute requirement instead of reducing it to 45 minutes.
- **Leak management performance metrics**—The Company has demonstrated that it is able to safely manage leaks on its system without regulatory performance metrics and is proposing the leak performance metrics be eliminated.
- **Mandated inspections**—with the implementation of a remote monitoring system, the Company proposes to eliminate manual inspections of manholes where monitoring of water infiltration exists. It also proposes to eliminate the requirement for annual trap replacement with the ability to monitor trap operability with trap monitoring and based on analysis of visual inspections for debris. In addition, the Company proposes reducing the code required 10 week inspections of traps when trap monitoring is fully implemented.

6.4 SIGNPOSTS

By definition uncertainties are difficult to predict; however, The Company has identified a list of signposts that will trigger the review and adjustment of its plan at any point during implementation. This list is a reminder that the world is constantly changing, and the Company needs to change with it, which also means this list is never final and will continue to grow and change as The Company and its stakeholders grow and change.

- **Interference projects identified by the City**—can have a significant impact on the cost of operations and maintenance for the Steam System. Currently, the City has eminent domain of the streets of New York and whenever existing steam facilities will cause an interference issue with proposed City facilities, the Company would have to relocate its facilities or pay for accommodations to avoid the interference. Allowing the company to include accommodations, relocation and support and protection for its facilities in City projects based on competitive pricing would reduce costs impact to Steam Customers.
- **Results of the Condensate Behavior Tests**—May identify additional opportunities for programs, processes or system changes which can be implemented to improve the safety and operational efficiency of the system.
- **Distributed Generation, specifically CHP, adoption**—May drive load in certain pockets of the system which may need to be modified to allow for bidirectional steam flow in order to provide standby service to the customer during a customer outage as well as purchase steam from the customer should that be necessary.
- **Leak detection model development**—will allow the Company the ability to model operations of the distribution system to identify and locate underground leaks in order to reduce distribution losses. Leaks develop over time on piping, flanges, and valves, slip joints, trap discharge lines and cooling chambers, and can come from a variety of sources including corrosion, welds, gaskets, and packing. In addition, steam leaks affect the overall efficiency of the Steam System. Discovered steam leaks are currently required to be repaired within six months of discovery; however, non-visible leaks occurring in the middle of underground pipe, not near a structure, will remain undetected until that section of pipe needs future maintenance or the leak worsens.
- **Regulatory changes**—can reduce the amount of mandated replacement of assets required in the distribution system. By lengthening asset lives, while maintaining the current level of safety and service, the Company can reduce costs for both new assets and the labor expenditure to replace those assets.

7.0 ASSESSMENT DOCUMENTS

A. Assessment Document: Steam Variance

B. Assessment Document: Peak Forecast Methodology for 2009/2010

C. Assessment Document: Stoner Hydraulic Studies

D. Assessment Document: Multi-Area Reliability Simulation (MARS)