CONSOLIDATED EDISON COMPANY OF NEW YORK

Electric System Long Range Plan: Assessment Documents

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1.0 **OBJECTIVES**

1.1 OVERVIEW

As part of Con Edison's long-term strategy of managing its supply, demand, and environmental profile, we have developed a plan that provides customers in all segments the tools and incentives to permanently lower energy consumption and to reduce use of electricity during times of peak demand. This assessment document explains how Con Edison plans to directly and indirectly promote two demand side management resources, energy efficiency and demand response.

Growing demand for electricity can be met by building generation and transmission and delivery (T&D) capacity and/or by leveraging demand side management resources. Permanent energy efficiency as well as conservation reduces overall demand for electricity by installing more efficient equipment, whereas demand response resources reduce demand for electricity at a point in time, usually in response to pricing signals or system peaks.

Both energy efficiency and demand response resources effectively reduce stress on the electric grid, allow the utility to avoid purchasing expensive peak time power, and can defer T&D investments. This ultimately may result in lower customer bills for all customers and a reduced environmental footprint.

Energy efficiency and demand response, as part of an integrated demand and supply management strategy, are highly cost-effective compared to the cost of supply resources.

Demand Side Management includes any programs to drive changes in energy consumption including permanent reductions in consumption through **energy efficiency**, temporary reduction in energy usage from **demand response**, shifts in time of use through peak load shifting programs such as ice storage, and shifts in electric production resources from the utility side of the meter to the customer side of the meter with **distributed generation** (covered in detail in Assessment Document 4).

Energy Efficiency Programs are programs sponsored by the utility or other entities that promote energy efficiency by providing financial incentives, direct assistance, financing, or otherwise facilitating the adoption of efficient end-use equipment.

Demand Response Programs are programs sponsored by the utility or other entities that create incentives for customers to temporarily reduce their demand on the electric system by either curtailing their loads or increasing the use of distributed generation.

In New York State the cost of a supply resource is estimated to be 8.2 cents per kWh, whereas energy efficiency typically costs between 2 and 4 cents per kWh.[1] While still cost effective, energy efficiency programs cost more in New York City[2], where energy usage patterns bring about unique challenges and opportunities for demand side management. Table 2-1 illustrates the Electric Power Research Institute's (EPRI) estimated levelized costs associated with the implementation, promotion and delivery of energy efficiency programs. Energy Efficiency resources are also 100% clean, producing zero green house gases. Consequently, Con Edison views the promotion of energy efficiency as an effective use of rate payer dollars as long as such programs continue to be the most cost-effective method for achieving energy efficiency goals.

Table 1-1. National Unit Cost of Energy Efficiency[3]

Year	National Levelized Cost of Energy Efficiency Measures ($/kWh)
2010	$0.0217
2020	$0.0264
2030	$0.0322

Similarly, a demand response resource which is estimated by the New York Public Service Commission (PSC) cost from $120.00 $/KW-year in 2010 to $139.00 $/KW-year in 2030[4] is comparable to the cost of an equivalent kW purchased at market price. The capacity avoided from demand response programs also provides other long term benefits to our service territory, including the deferral of additional generating capacity (and associated financial and environmental costs), and the deferral of investments to our transmission and distribution infrastructure.

Our position to leverage demand side management is consistent with the New York State Energy Plan which particularly has identified energy efficiency as a priority resource for meeting its objective of creating an innovative Clean Energy Economy that will stimulate investment, create jobs, and meet the energy needs of its residents and businesses.[5] Our main objectives are to reduce consumption and demand thus reducing our dependence on fossil fuels and their associated green house gas emissions, while improving air quality.

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[1] New York State Energy Planning Board. "Energy Efficiency Assessment: New York State Energy Plan 2009." August 2009.

[2] Due to the higher cost of doing business in New York City, we project our energy efficiency programs to have a levelized cost of energy of $0.06 per kWh between 2010 and 2030.

[3] Electric Power Research Institute (EPRI). "Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. 2010-2030." January 2009.

[4] New York State Public Service Commission. "Order Approving Fast Track Utility Administered Electric Energy Efficiency Programs with Modifications." January 2009

[5] New York State Energy Planning Board. "2009 State Energy Plan." December 2009.

1.2 OBJECTIVES

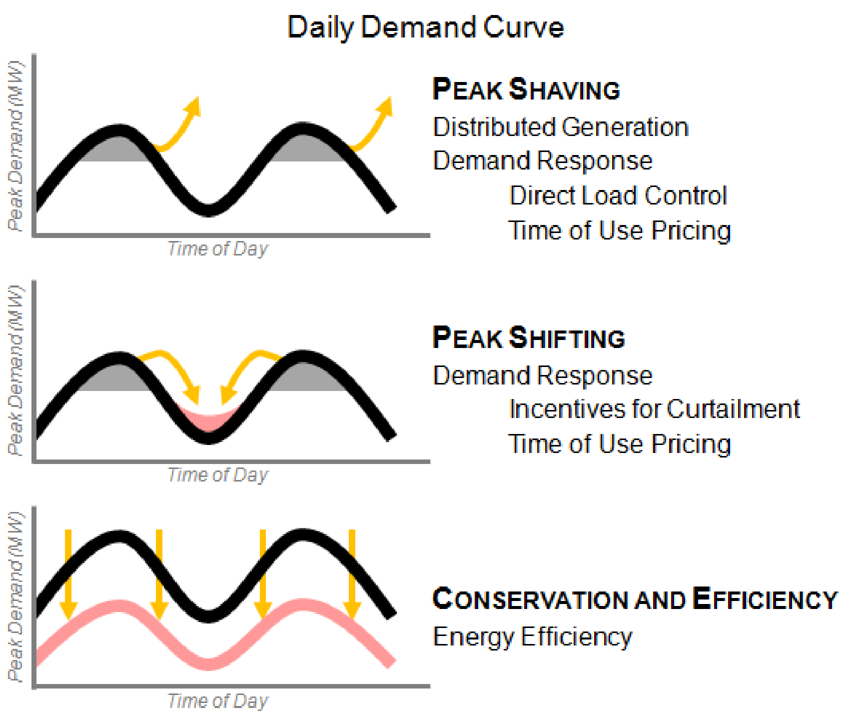
Con Edison believes there are several benefits to proactively managing demand, supply, and our environmental profile. Energy efficiency, demand response, and other demand side management effors each serve these same objectives, outlined below and described in detail in this section.

- Reduce T&D Infrastructure Investments and Power Purchase Costs
- Lower Customer Bills
- Improve Environmental Profile and Meet Federal, New York State, and New York City Targets
- Enhance Reliability
- Diversify Supply Portfolio

1.2.1 Reduce T&D Infrastructure Investments and Power Purchase Costs

Active demand and supply side management will position us to better manage customer demand through peak shaving, peak shifting, and reducing overall energy usage. Lowering peak demand and energy use should allow the Company to defer or avoid infrastructure investments as well as reduce capacity and power purchases that would have been needed to meet higher peak demand. Figure 1-1 illustrates how a full portfolio of demand and supply side initiatives help achieve our load shape objectives. Demand response is effective in load shaving and load shifting, where energy efficiency is (and conservation) is most effective in permanent reduction in use.

Figure 1-1. Con Edison Load Objectives



Cost effective deployment of these customer-centric resources may postpone and potentially permanently reduce the need for additional transmission and delivery infrastructure, particularly when demand and supply side management programs are targeted to constrained load areas.

These resources may also substitute for generation thus displacing fossil-fueled resources and the associated emissions, such as CO_2, which contributes to global warming, and nitrous oxides, which contribute to smog, and have been associated with adverse health effects. In addition, reducing demand may result in lower capacity prices, lower peak period energy, or both.

1.2.2 Help Customers Manage Energy Costs

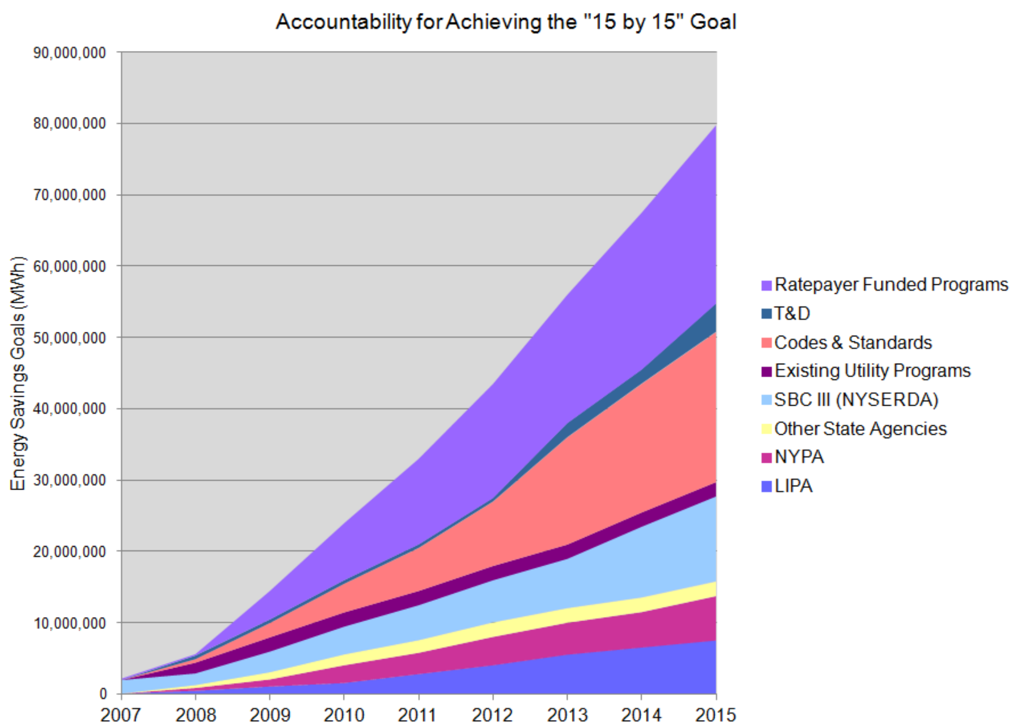
Energy efficiency programs provide customers the tools to better control their energy consumption. From rebates on the purchase of efficient lighting, to free removal and green disposal of inefficient refrigerators, to financial incentives to reduce the cost of highly efficient industrial equipment, these programs are designed to give Con Edison customers the power to reduce their energy usage and consequently their bills.

Similarly, demand response helps customers manage their energy consumption and lower the supply portion of their electric bill by reducing peak demand charges, and possibly avoiding capacity purchase costs if there is an impact on the system coincident peak.

1.2.3 Improve Environmental Profile and Meet Federal, New York State, and New York City Targets

Our demand side management program portfolio was designed to ensure that we do our part to support policy targets set at the local, state, and Federal levels. Specifically, our energy efficiency portfolio is intended to meet our portion of New York State's goal of 15% energy reduction of forecasted levels by 2015[6] and PlaNYC objectives to achieve 2005 consumption levels in 2030. The structure of New York State's Goal is illustrated in Figure 1-2, whereby numerous entities including electric utilities are responsible for reducing energy consumption.

Figure 1-2. Achieving New York State's "15 by 15" Goal[7]



Achievement of the New York State goals will require the cooperative effort of many entities, including state agencies and authorities, municipalities, and third party program administrators. Specific targets for utilities, including Con Edison, have been established as part of the New York State Public Service Commission's (PSC) Energy Efficiency Portfolio Standards (EEPS) proceedings. The Company intends to meet all energy savings targets set forth by the PSC; however, we are aware of the quickly evolving nature of policy targets, and we expect to adjust our programs based on changing market and regulatory conditions.

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[6] June 23rd 2008 EEPS order establishes baseline as energy sendout projects based on 2007 forecasts for 2015

[7] New York State Energy Planning Board. "2009 State Energy Plan." December 2009.

Pending green house gas (GHG) legislation at the Federal level would require a reduction of CO_2 emissions by 80% by 2050[8]. Pending renewable portfolio standards (RPS) would require an increased portion of energy supplied to our customers to be from renewables[9]. As discussed in the Signposts section of this document, we will closely monitor these developments, and will work with stakeholders to adjust our current plans as necessary.

It is also our intention to take actions that support stated goals at the local level, where applicable. Legislative activity in New York City could significantly reshape our business environment by enhancing clean supply options[10] (including some distributed generation), accelerating improvements to the electric grid, electrifying the City's fleet of vehicles, and expanding load management through the promotion of smart meters and dynamic pricing.

While we discussed the role of energy efficiency in achieving carbon reduction targets, it is worth noting that demand response programs, such as time-based pricing, while primarily impacting peak demand have shown to have some ability to reduce carbon emissions, potentially reducing the run time of certain generating units during system peaks which can result in reducing peaking generator emissions. Timely, dispatchable demand response also may be able to be used as a tool to allow the integration of intermittent renewables into the grid by smoothing consumption peaks. Thus, demand response may be critical to help New York state achieve its renewables goals.

1.2.4 Enhance Reliability

Demand response deployed as a load relief mechanism may increase reliability and stability of the distribution network during system contingencies by reducing peak loading of system equipment including distribution transformers and feeders.

1.2.5 Diversify the Supply Portfolio

Timely, dispatchable demand response may be critical to reduce reliance on fossil fueled generation by assisting in the integration of intermittent renewables into the grid and by smoothing consumption peaks by integrating curtailment resources.

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[8] Applies to Con Edison generation assets, not discussed in the ESLRP.

[9] Enacted H.R. 2454, American Clean Energy and Security Act of 2009. Also known as the "Waxman-Markey" bill, H.R. 2454 calls for up to 20% renewable and energy efficiency by 2020, with a 15% minimum to be met by qualified renewables, leading to renewable making up 12% of forecasted energy.

[10] PlaNYC calls for facilitation of construction of 2,000 to 3,000 MW of supply capacity by repowering old plants, constructing new ones, and building dedicated transmission lines. Plan supports the building of power plants outside city limits that are dedicated to providing electricity to New York City and connecting those plants directly via new transmission lines to ensure we do not import energy from dirtier sources such as conventional coal plants.

2.0 PROJECT COMPONENTS AND FUNCTIONALITY

2.1 INTEGRATED DEMAND SIDE MANAGEMENT

Details of programs both those that we currently offer, and those planned for future deployment, are outlined below. While we discuss the energy efficiency and demand response portfolio, in turn, it is worth noting that Con Edison intends to manage all demand side resources, including distributed generation discussed in Assessment Document 4, in a highly integrated fashion. We will work with individual customers and customer segments to ascertain which programs can be most effective in meeting their energy management goals. At the same time we will monitor where on the electric grid we need load relief and evaluate if demand side management may be a more cost effective solution than traditional infrastructure expansion. Con Edison will continually monitor program costs and effectiveness and will only continue to fund cost effective programs.

2.2 ENERGY EFFICIENCY PLAN

Con Edison's energy efficiency plan is to work with customers proactively to reduce energy needs, cooperating with regulatory and other agencies to develop, offer, and continually refine a suite of programs that drive efficient end-use technologies to provide permanent energy reduction.

Con Edison will continue to work collaboratively with the New York State Energy Research and Development Authority (NYSERDA) on statewide efficiency objectives. Currently, NYSERDA is funded by rate payers through the System Benefits Charge (SBC), which was established on May 20, 1996, and was specified funding from July 1, 1998 to June 30, 2001. The SBC was extended through June 30, 2006, and most recently until June 2011. These SBC funds are allocated towards energy-efficiency programs, research and development initiatives, low-income energy programs, and environmental disclosure activities across New York State. Part of this funding created New York Energy Smart^{SM} which helps to maintain momentum for the state's efforts to develop competitive markets for energy efficiency, demand management, outreach and education, research, development, low-income services, and to provide direct economic and environmental benefits to New Yorkers.

Because of our direct relationship with our customers, we believe we are well positioned to directly partner with customers to reduce energy usage. Therefore, we plan to expand our efficiency efforts to help achieve energy savings and emissions reduction.

New York City and Westchester County are diverse communities comprised of customer segments that have distinct needs. Meeting their needs requires a tailored portfolio of energy efficiency programs that allows all customer segments to control their energy usage. We are currently delivering or preparing to deliver nine approved efficiency programs, and are in dialog with the PSC for approval of additional programs.

The Company's existing Targeted DSM program offered since 2004 and employed in 30 networks runs through 2012. Under this program, the Company contracted with competitively selected demand side management contractors to reduce load through the installation of permanent energy efficiency measures in customer facilities. This targeted program is unique as it was designed to directly reduce network peak demand via firm load reduction within specific load areas. The program is targeted to areas where transmission and distribution upgrades are proposed and can be deferred through firm load reductions. The targeted load reductions are set to defer near-term capacity investments. Candidate deferrals include:

- Transmission lines
- New or upgraded substations
- Network load transfers
- Distribution feeders

Continuation of this program is subject to ongoing evaluation, measurement and verification (EM&V) and will be adjusted to provide ongoing cost effectiveness.

New programs currently being rolled out or being considered are described in Tables 2-1 and 2-2.

Table 2-1. Residential Programs

Program	Description
Direct Install	Provides low cost on-site energy surveys, direct installation of efficiency measures and recommendations for more extensive upgrades.
HVAC Rebates	Promotes the purchase and installation of new high-efficiency HVAC (central and room) equipment by providing customers with financial incentives to offset the higher purchase cost of energy efficient equipment and information on the features and benefits of energy efficient equipment. This program also includes a dealer incentive program for retailers who up-sell room air conditioners to a higher efficiency level.
Appliance Recycling	Provides rebates to participants and also provides free pick up and disposal of old appliances.
Multifamily (Refrigerator Replacement)	Promotes energy efficiency for gas and electric customers in the 5-50 unit multi-family buildings. This program will focus on energy surveys for common areas and replacing lighting and other common equipment and building systems and also on recycling and replacement of inefficient refrigerators, and rebates for high efficiency AC's.
New Targeted DSM	Encourages energy efficiency for residential customers in selected neighborhoods where transmission and delivery investment upgrades may be required.
Residential Room AC	Encourages the purchase of energy efficient room air conditioners for residential customers.

Table 2-2. Commercial and Industrial Programs

Program	Description
Small Business Direct Install	Provides low-cost on-site energy surveys, direct installation of free efficiency measures and recommendations for more extensive energy efficiency upgrades.
Prescriptive Rebate Program	Offers rebates to install common, high-efficiency technologies to offset the higher purchase and installation cost.
Custom Rebate Program	Offers rebates to install complex systems and/or process improvements that are shown to be cost effective.
Steam Cooling	Encourages large buildings to use steam instead of electric air conditioning.[11]
New Targeted DSM	Encourages energy efficiency for commercial customers in selected neighborhoods where transmission and delivery investment upgrades may be required

[11] Only available to customers in the Manhattan steam distribution area.

2.3 DEMAND RESPONSE PLAN

Con Edison has successfully implemented a number of emergency based demand response programs in its service territory. The Company plans to expand these, introduce four new system and network peak reduction programs, as well as expand and improve existing time-based pricing programs. As part of Con Edison's targeted approach to system investments, some of these programs will be focused on the load areas that have the most critical capacity and reliability needs. The targeted deployment of verifiable and measurable demand response ensures the strongest return on investment.

2.3.1 Portfolio of Demand Response Programs

Con Edison currently (as of February 2010) runs four existing demand response programs and has begun implementation of four additional programs, approved in the fourth quarter of 2009 for deployment in May of 2010.

Existing Programs

The Distribution Load Relief Program (DLRP) pays customers to curtail their power use during emergency situations. The program offers reservation and energy payments to participants in the mandatory option and energy payments to all participants. The Direct Load Control program targets residential and small business customers with a peak demand of less than 100 kW who have central air conditioning. Upon enrollment, Con Edison installs a free programmable thermostat that allows the customer to adjust temperature manually or remotely via the Internet. Con Edison can communicate with the thermostat to cycle the compressor on and off to reduce demand on our electric system when needed. The Mandatory Hourly Pricing Program (MHP) encourages large customers who take their supply from Con Edison to reduce electricity use during peak hours. Customers' supply charges are based on the NYISO day-ahead hourly market prices. Currently customers participating in this program have demand in excess of 1000 kWs. In May 20011 this program will be expanded to customers with demand in excess of 500 kWs. Finally, the Voluntary Time of Use Pricing Program is designed to encourage customers to reduce electricity use during peak hours.

Building on the experience acquired through the implementation of our current programs, we will introduce the next generation of demand response tools and incentives to our customers designed to reduce network peaks, system peaks, and peaking generator emissions. In addition, the eligibility criteria of current programs will be adjusted in order to increase the number of customers and load areas that can participate. New programs currently being rolled out are described in Table 2-3.

Table 2-3. Planned Demand Response Programs

Program	Description
Commercial System Relief Program (CSRP)	Will include participants that can curtail load or bring on emergency generation[12] to reduce their demand by a minimum of 50 kWs individually, or 100kWs through aggregation, with a minimum of 24 hours notice before a "forecasted event" (a day ahead forecasted load level that is at least 92.5% of the forecasted summer system peak). Participants will receive capacity and energy payments. Penalties apply for non-performers.
Critical Peak Rebate Program (CPRP) – Pilot 2010 and 2011	Will include participants from virtually all customer classes that can curtail load or bring on emergency generation[13] to reduce their demand by a minimum of 1 kW. 24 hours notice will be provided before a "forecasted event" (a day ahead forecasted load level that is at least 92.5% of the forecasted summer system peak). Participants will receive payments based on the kW reductions they achieve during events. Penalties do not apply for non-performers.
Network Relief Program (NRP) (Pilot) 2010 - 2011[14]	Target specific networks that are in need of system relief. Request for proposals will be issued and open enrollment will be permitted for load relief in certain hours and over a specific number of years to defer the need to build T&D infrastructure.
Residential Smart Appliance Program (RSAP) (Pilot) 2010 - 2011	Will initially target residential customers and allow utility control of the customers' curtailable electric devices, such as Home Area Networks and individual appliances with customer override capability. Participants will be given notification based on forecasted and emergency events. Participants will receive an initial rebate for each smart appliance or home area network purchased as well as a year-end bonus for verified participation.

[12] Emission, location and vintage restrictions apply.

[13] Emission, location and vintage restrictions apply.

[14] The NRP has been approved and will be rolled out upon determination of specific network needs.

2.3.2 Enabling Technological Infrastructure

We believe that the best way to deploy demand response in New York City and Westchester County is by coupling it with the right technology enablers. Integrating the right automation, monitoring, and verification infrastructure and processes will unleash the full value of demand response for our customers. An Advanced Metering Infrastructure (AMI), end-use devices that are designed to communicate with the utility, and a robust meter data management system (MDMS) will expand the pool of eligible customers, provide valuable information on customer behavior, and will facilitate accurate measurement and verification of program results. Time-based usage data or interval data – which is required for time of use pricing and other demand response programs – cannot be obtained from the traditional meters that are currently in service at small and medium size commercial and residential locations in our service territory. We are experimenting with certain home area network (HAN) and in home device (IHD) set ups to address this gap; however, AMI, supported by a two-way telecommunication infrastructure, may be necessary to allow these customer segments to more readily participate in these types of programs.

To optimize the potential of measurable and verifiable DR resources, Con Edison will encourage with cash incentives the purchase and installation of innovative utility-controllable technologies. More specifically, we will incen HANs, auto DR-enabled building management systems, room A/Cs, rooftop A/Cs, and other controllable equipment. HANs, room A/Cs, and other appliances, will allow penetration of New York City residential customers that have been unable to participate in DR. Rooftop A/Cs and auto DR-enabled building management systems will allow Con Edison to increase the breadth and confidence in its DR resources. The combination of these technologies will provide DR resources that are extremely reliable and verifiable.

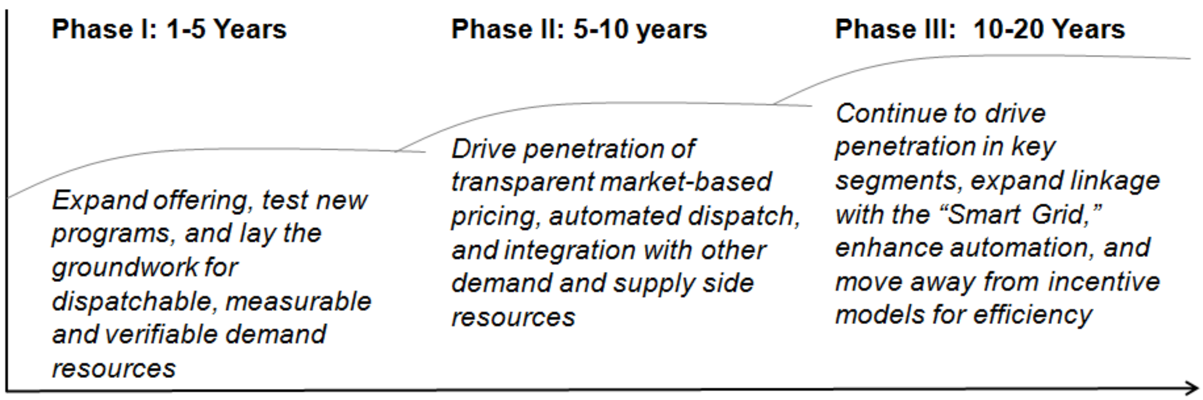
The installation of advanced meters will significantly expand the amount of system data that will be collected by Con Edison. An expanded MDMS solution will be required to aggregate this information. Electric system operators, demand response program managers, and energy services providers, as well as end-use customers will be able to perform advanced analytics on customer use data across the territory, enhancing the use and enrollment of demand response as a truly dispatchable resource.

3.0 IMPLEMENTATION PLAN

3.1 IMPLEMENTATION PLAN

The implementation of Con Edison's energy efficiency and demand response plans will continuously evolve and improve over the next twenty years and can generally be described in three phases, as described in Figure 3-1. During Phase I, Con Edison will expand program offerings, test new programs, and lay the groundwork for dispatchable, measurable, and verifiable demand resources. In Phase II we will drive penetration of market-based pricing, automated dispatch, and integration of demand response and energy efficiency with other demand and supply side resources. In Phase III we will continue to drive penetration in key segments, expand linkages with the "Smart Grid," enhance automation, and move away from incentive models for efficiency

Figure 3-1. Energy Efficiency and Demand Response Implementation Plan



Phase I will involve refining and expanding Con Edison's program portfolio. The Company will continue to coordinate with NYSERDA on their programs. On a regular basis, Con Edison will identify the most load-constrained networks in the territory, and will expand the current targeted program to those networks. This will ensure programs continue to deliver the most valuable cost-benefit proposition even as investments and demographic changes alter a network's profile. Early on a robust portfolio of programs will be launched (Tables 2-1, 2-2, 2-3). The most successful programs will then be aggressively expanded across the service territory.

Another potentially critical element of Phase I will be the investment in a targeted rollout of AMI supported by competitively-provided HANs and home energy displays. These initiatives will facilitate mass-market, dispatchable and verifiable demand response in our service territory, among other benefits described in Assessment Document 5.

In Phase II Con Edison will continue to drive the penetration of demand side resources in segments that represent either high usage segments or have a high potential for reduced consumption with new practices or technologies. For example we expect there to be significant opportunity to work with developers, governments, municipalities, and other agencies to influence the efficiency of new construction. There also may be specialized efficiency solutions for data centers, financial services, building managers, government, or education facilities. Programs will be tailored to drive maximum changes in consumption without compromising quality of service. In addition, we believe there will be increasing opportunities to tie programs focused on permanent conservation to other demand-side solutions such as demand response and distributed generation to drive optimal improvements.

Con Edison also plans to continue to increase integration of energy efficiency with building automation and controls throughout its system. Automation will increase the certainty of demand reduction from energy efficiency resources. For example, we may promote the installation of devices such as thermostats and appliances that respond to price-based signals and voltage sags.

Phase III will occur at a time during which technologies that are now considered to be emerging may become widespread in New York City and Westchester County. The Company will expand programs aimed at new end-use technologies such as electric vehicles and will leverage the ubiquity of home area networks, smart appliances, and customer-sited storage solutions to drive optimal end-use efficiency improvements.

New solutions and business models for managing load growth may be available during Phase III. Con Edison is committed to evaluating and integrating them as a cost-effective alternative to minimizing transmission, distribution, and generation investments. We expect to further expand eligibility for the Mandatory Hourly Pricing Program or provide a broader array of dynamic rates, as well as offer automatic dispatch of both demand and supply resources to intelligently respond to market pricing and reliability-based signals

Longer term customer awareness and acceptance should evolve to the point where financial incentives for efficiency may no longer be needed as customers will move voluntarily toward these techniques or will be required to do so based on Federal and State mandates for building codes and appliance and equipment efficiency standards. We expect that by this time, incentive-based programs will be limited and enhanced, or in some cases, replaced by competitively provided energy efficiency services and continually improving building codes and appliance standards. We believe the role for the utility will still be significant in terms of working with developers, governments, manufacturers, and local stakeholders in developing effective codes and standards and potentially providing financing to facilitate their widespread adoption. Our focus will likely be more upstream, dealing with manufactures, as opposed to customer-level adoption incentives. Demand response initiatives will similarly focus on permanent behavioral changes driven primarily by developing tailored rate structures.

3.2 IMPLICATIONS FOR LONG RANGE PLANNING

Corresponding with the adoption of its targeted energy efficiency programs launched in 2004, energy efficiency has been integrated into the Company's planning process and is considered a viable alternative to traditional capacity investments for meeting the capacity deficit on individual circuits. Permanent efficiency can be targeted to select circuits by focusing marketing in those areas and also designing programs specific to the characteristics of customers in that segment e.g. commercial lighting controls for areas with a high concentration of office buildings.

As we move forward we will continue to plan for demand and energy savings from Con Edison administered energy efficiency programs. Our forecasts also include estimates of what we expect other state agencies such as NYSERDA will achieve in terms of demand reduction in our service territory.

Critical to the ongoing incorporation of energy efficiency resources in our planning process is the effective measurement and verification of our programs, those offered by NYSERDA and other agencies, and independent measurement and forecasting of the impact of improved codes and standards. In order to plan our system investments and power purchase needs it is imperative that we have accurate estimates of what energy efficiency will be realized in our service territory.

In the short-term Con Edison does not intend to include demand response resources in our system forecasts. Current programs include both voluntary and special case resources (SCR) which cannot be counted on as a consistent resource as they are only called based on adverse system conditions. New programs will automatically call on participants when the day ahead forecast reaches 92.5% of the forecasted annual peak demand and should be more reliable. However, these are only pilot programs and until we can ascertain program performance and resource reliability we will not include these resources in demand forecasts.

4.0 KEY DEPENDENCIES

4.1 DEPENDENCIES

A service territory as dynamic as ours is not expected to look the same in twenty years. As New Yorkers welcome new residents, and the profile of the service territory's economy evolves, so may the regulatory framework as well as the cost and functionality of our T&D infrastructure. It is Con Edison's intention to unleash the potential of energy efficiency and demand response to meet the distinct needs of specific customer segments in New York City and Westchester County, and consequently, achieve our demand management objectives.

Nevertheless, the Company realizes the uncertainty that is inherent to initiatives that are highly dependent on a number of regulatory and economic factors. This plan is designed to balance a long-term vision for demand side management, with the flexibility required to meet changing demand. As such, the Company has identified the market, regulatory, and legislative conditions that need to be monitored on an ongoing basis to continually refine its plan. Customers may not respond as expected and planned results may not be achievable at the expected cost levels. Codes and standards may emerge as expected or may far under- or over-achieve targeted levels of efficiency. From a regulatory and legislative standpoint, there may be a change in targets, in the role of NYSERDA, or in pending Federal legislation.

Additional dependencies include technology platforms such as AMI which may be required so that Con Edison can effectively run demand side management programs that are dependent on interval data and two-way communication with meters (outside large commercial and industrial segments). These tools will also be required to provide reliable large-scale reliable dispatch, measurement, and verification.

4.2 LEGISLATIVE AND REGULATORY ENABLERS

While we are committed to deploying demand side management initiatives in our service territory as an alternative to expensive infrastructure investments, we are cognizant of the changes they represent for our traditional business model. To that end we advocate a legislative and regulatory environment that drives the cost-effectiveness and innovation to meet our community's demand reduction targets. The Company believes that an open and competitive energy efficiency and demand response market is the most cost-effective way to meet New York City and Westchester County's future needs and we would encourage that the energy efficiency bill surcharges should be re-evaluated on an ongoing basis to ensure cost effectiveness. We also advocate the continued increased role of the utility in energy efficiency due to our direct relationship with customers.

The residential and small commercial segments hold good potential for demand reductions. Expanding price-based programs will depend on whether New York State allows time-based pricing in these segments.

We hold that utilities should receive fair regulatory treatment for energy efficiency in line with the sales and demand those programs offset. Cost recovery commensurate with costs incurred should be guaranteed in order to encourage optimal spending levels to achieve demand side management targets and so as not to penalize innovation.

In order to accurately measure and adjust its programs and conduct effective planning, Con Edison strongly supports increased visibility into the measurement and verification results of all energy efficiency initiatives impacting its service territory. Finally, the Company advocates transparency and alignment of all programs sponsored by rate payers.

Energy efficiency and demand response can be a clean and cost-effective alternative to generation. Con Edison thus believes that these resources may be a more cost effective way to achieve the State's clean energy goals than an RPS. The cost effectiveness of renewable power in our territory has not been established yet. Contingent upon energy efficiency and demand response being proven to be a financially sound alternative to renewable power, it should be considered a valid alternative for meeting RPS.

5.0 COST BENEFIT ANALYSIS

5.1 ENERGY EFFICIENCY

This plan has been designed by leveraging Con Edison's experience with demand side management, continued dialog with the PSC, as well as industry benchmarks from the Electric Power Research Institute (EPRI). As shown in Figures 5-1 and 2-2, Con Edison's energy efficiency programs are expected to deliver energy savings of 1,735 GWh annually in 2030 and 452 MW of peak demand. Savings in 2010 and 2011, based on approved and filed programs following the energy efficiency portfolio standard (EEPS) proceedings, effectively representing 0.9% and 0.8% of energy sales, respectively. Savings between 2012 and 2015 are extrapolated based on the same growth rate projected for 2009 through 2011, effectively representing between 2.0% and 2.5% of energy sales.

The Company aspires to reach savings levels on par with best practices seen at leading utilities by 2016 and maintain best practice as long as savings can be achieved in a cost-effective manner. Tables 5-1 and 5-2 show the range of benchmarks for energy efficiency programs at leading North American utilities. Savings between 2016 and 2030 are projected based on the top quartile of these benchmarks, or about 2.4% of energy sales and 2.7% of peak demand. It is worth noting that even though incremental savings are flattened out in later years, they sustain aggressive best practice levels based on mature programs. While these are our best projections today, energy and peak demand savings may decrease or increase based on declining potential from efficiency due to saturation of programs or innovations in program design or end use technologies.

Table 5-1. Energy Savings from Energy Efficiency Benchmarks

	Benchmarks of Energy Savings as a Percent of Sales			
	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
New Programs	0.2	0.2	0.4	0.5
Mature Programs	0.6	0.9	1.6	3.4

Table 5-2. Peak Demand Savings from Energy Efficiency Benchmarks

	Benchmarks of Demand Savings as a Percent of Peak Demand			
	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
New Programs	0.2	0.7	1.3	4.0

Expenses associated with these programs, an average of $52 million per year, are based on Public Service Commission guidelines for costs of achieving the Energy Efficiency Portfolio Standard targets through 2015 and after that are projected to be consistent with the levelized cost of energy efficiency resources estimated by the Electric Power Research Institute[15] (shown on Table 1-1), adjusted to account for the higher cost of business in New York City.[16] Between 2016 and 2030, the levelized cost of these resources is expected to be $0.026 per kWh, which is comparable to the national average of $0.03 per kWh projected by EPRI. Energy efficiency, carried out effectively, is generally regarded as a highly efficient investment; this is due in large part to the fact that energy efficiency investments have an average life of about 10 years meaning that the savings from an investment in energy efficiency repeat throughout the life cycle, reducing marginal energy costs and other costs. For the individual consumer, energy efficiency can substantially reduce the energy bill.

The reduction in energy consumption and peak demand from our energy efficiency programs results in significant savings for the Company. A large portion of that savings is the ability to defer necessary T&D investments into the future. For each network the Company identifies the level of customer load at which a new large investment, such as a new substation, will be required. As Con Edison is able to reduce load through EE and DR programs, the point at which the predefined load level is reached is pushed off into the future and so are the load relief investments which translates into dollar savings for the Company and ratepayers.

By deferring investments in load-relief infrastructure, such as transmission lines, new or upgraded substations, network load transfers, and distribution feeders we could expect an estimated $171 million in deferred infrastructure investments over the planning horizon[17].

Reducing system usage also has significant environmental benefits including a 791,000 ton reduction of CO_2e by 2030.

Finally, the Company is able to achieve monetary savings from reduction in purchase power and capacity purchases as shown in Figures 5-4 and 5-5.

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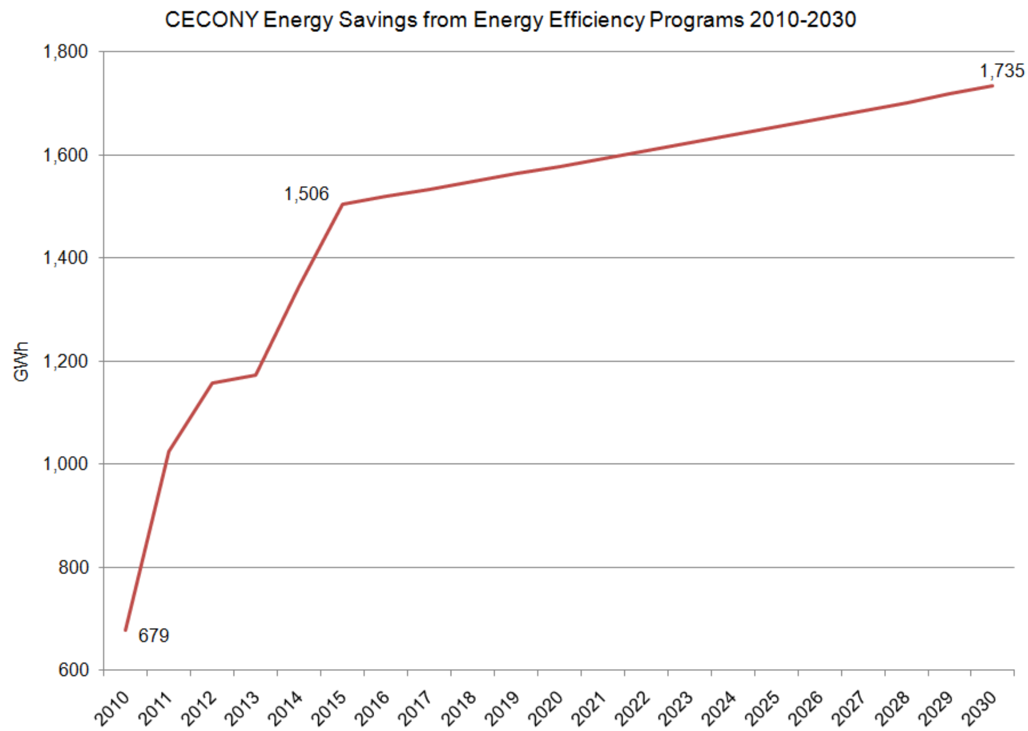
[15] Electric Power Research Institute. *Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. 2010-2030.* January 2009.

[16] Levelized cost of energy for energy efficiency is $0.06 per kWh between 2010 and 2030.

[17] The introduction of our energy efficiency programs could allow the Company to defer the 24 identified large scale substation installations or upgrades by a total of 49 investment years, or an average of 2 years per investment. Based on the cost to the Company of acquiring the necessary capital to fund these projects, this results in an average savings of $9.5 million per project, based on approximations of load-triggers for transmission and delivery investments.

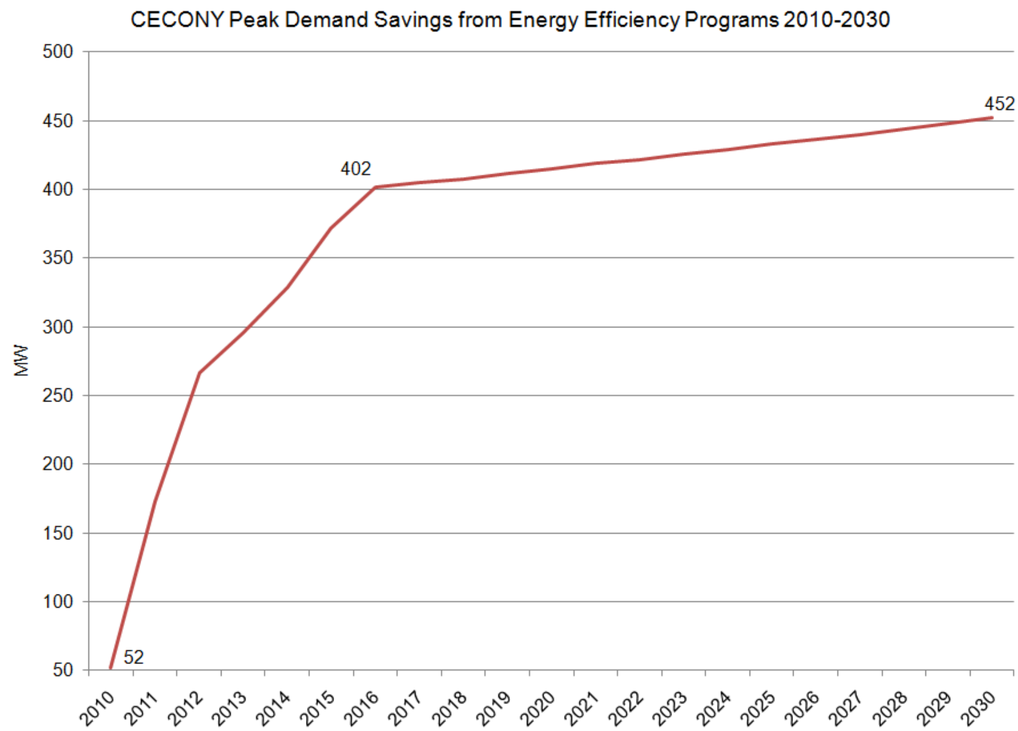
Figure 5-1. Energy Savings from Energy Efficiency[18]



	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Basis	*Current filings with the NY PSC*						*Industry Benchmarks*			
% of Energy Sales	1.2%	1.8%	2.0%	2.0%	2.2%	2.5%	2.4%	2.4%	2.4%	2.4%
Cumulative Savings (GWh)	679	1,025	1,157	1,173	1,346	1,506	1,520	1,579	1,655	1,735
Incremental Savings (GWh)	679	346	133	15	173	160	14	15	16	16

[18] Savings between 2012 and 2015 are extrapolated based on the same growth rate projected for 2009 through 2011, effectively representing between 2.0% and 2.5% of energy sales. Savings are frontloaded as 2009 and 2010 goals are combined. This explains the drop in savings between 2010 and 2012. Filings and approved orders discontinue the programs in 2011. Pending success of these programs, they could be extended beyond 2011. To be conservative in our planning, we have included a small incremental increase in savings.

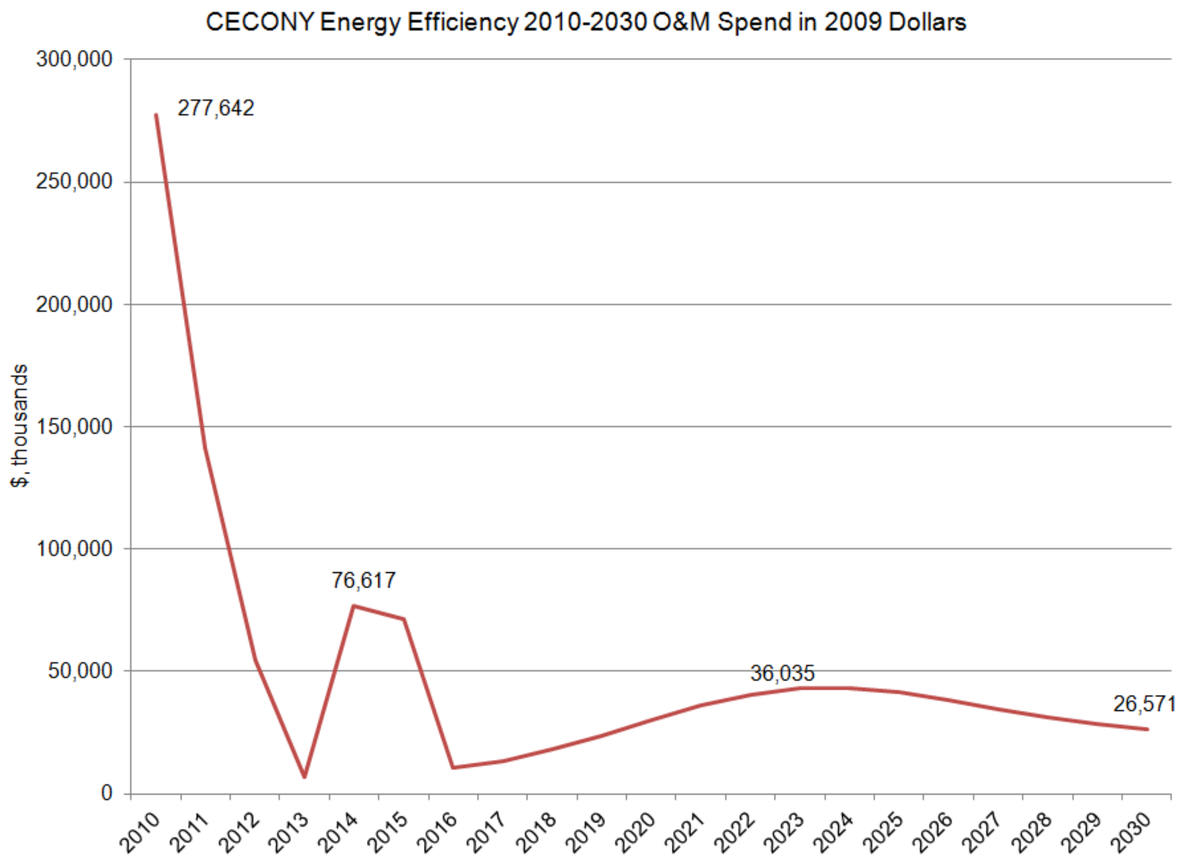
Figure 5-2. Peak Demand Savings from Energy Efficiency[19]



	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Basis	*Current filings with the NY PSC*						*Industry Benchmarks*			
% of Peak Demand	0.4%	1.3%	1.9%	2.1%	2.3%	2.6%	2.7%	2.7%	2.7%	2.7%
Cumulative Savings (MW)	52	173	267	296	329	372	402	415	433	452
Incremental Savings (MW)	52	120	94	30	33	42	30	3	4	4

[19] Peak demand savings 2010-2015 based on current filings with the NY Public Service Commission. Savings for 2016-2030 are based on best practice levels of 2.7% of peak demand, using a constant growth rate of about 1%. Industry benchmarks range from 0.2% to 4.0%. Incremental savings are projected to remain steady beginning in 2017.

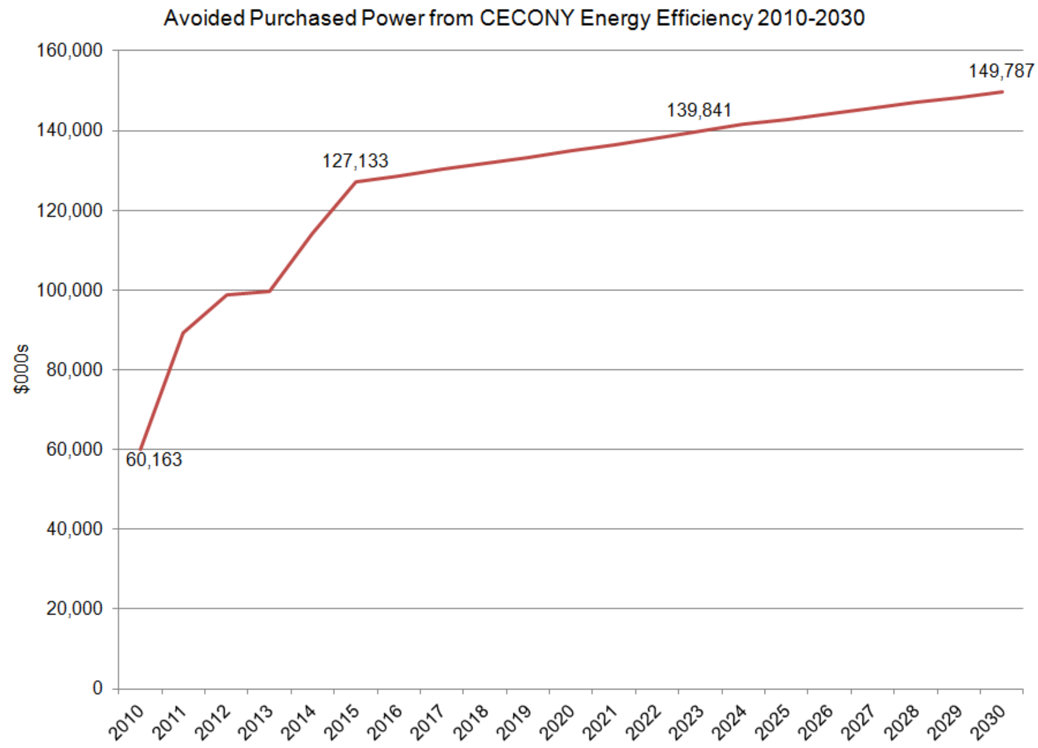
Figure 5-3. Energy Efficiency Expenditures[20]



	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Basis	*CECONY costs based on current filings with the NY PSC*						*Steady projection based on EPRI Benchmark*			
Cost per kWh ($)	0.41	0.14	0.05	0.01	0.06	0.05	0.01	0.02	0.03	0.02
EPRI Benchmark ($ per kWh)	0.02	-	-	-	-	-	-	0.03	-	0.03
Total O&M Spend ($000s)	277,642	141,450	54,314	7,003	76,617	71,389	10,500	30,002	41,479	26,571
% of Revenue	0.5%	0.8%	0.9%	0.9%	1.1%	1.2%	1.2%	1.2%	1.1%	1.1%

[20] Total costs are reduced significantly in 2013 due to the reduction of incremental savings from existing programs. Expenses are estimated based on an assumed average levelized cost of approximately $0.06 cents per kWh between 2010 and 2030, effectively representing about 1.1% of revenue by 2030. Cost in 2016 is 20% greater than 2015 due to high initial overhead. Cost tends to increase after 2016, but at a slower rate, and is driven primarily by market saturation. Replacement is worked into the projections as degradation of energy efficiency measures will occur. Con Edison replaces 25% of the kWh degraded, while the rest is replaced due to codes and standards, the baseline moving up with better technology, or the decision to go ahead with better installation without effort on Con Edison's part. Projections assume an average measure life of 11 years. Degradation follows the shape of the S-curve.

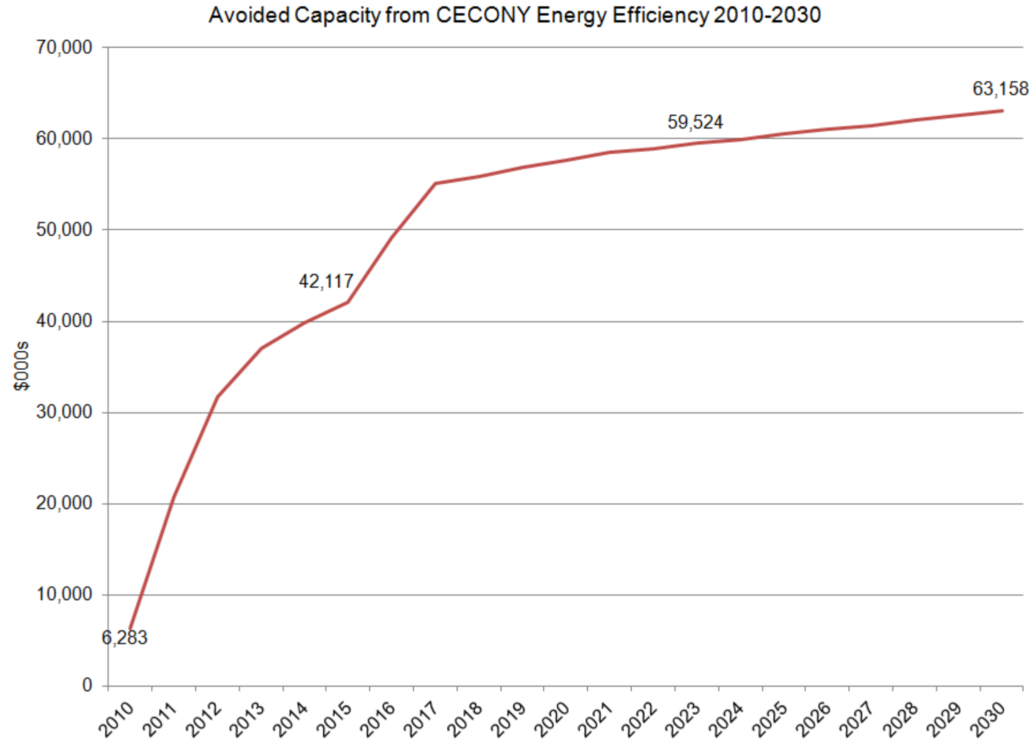
Figure 5-4. Cumulative Purchased Power Avoidance[21]



	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Value of Each MWh Avoided ($)	81.54	80.03	78.56	78.26	77.97	77.68	77.87	78.64	79.42	79.42
Avoided Purchased Power (MWh)	737,837	1,113,685	1,257,826	1,274,609	1,462,935	1,636,630	1,652,178	1,715,862	1,798,928	1,886,016
Avoided Purchased Power ($000s)	60,163	89,128	98,815	99,751	114,065	127,133	128,655	134,935	142,871	149,787

[21] The value of purchased power was quantified using PSC EEPS Fast Track Order January, 2009. The benefit of avoided purchased power is based on energy sendout, not on energy sales.

Figure 5-5. Cumulative Capacity Avoidance[22]



	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Value of Each MW Avoided ($)	120,220	119,740	119,220	125,080	121,040	113,360	122,290	138,980	139,760	139,760
Avoided Capacity (MW)	52	173	267	296	329	372	402	415	433	452
Avoided Capacity ($000s)	6,283	20,672	31,773	37,026	39,843	42,117	49,149	57,663	60,503	63,158

[22] Capacity quantified using the PSC Fast Track Order January, 2009

5.2 DEMAND RESPONSE

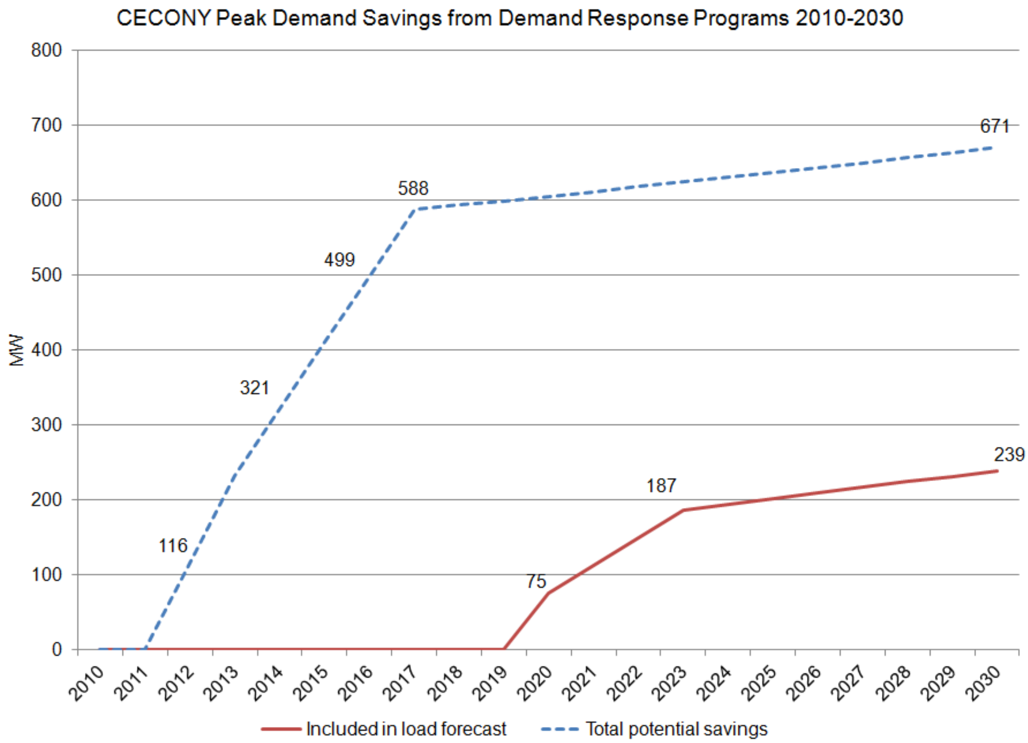
Con Edison’s demand response programs are deployed to meet system-wide and area-specific load shape objectives. The dashed line in Figure 5-6 illustrates the theoretical potential from all programs. The solid line in Figure 5-6 shows that Con Edison’s demand response programs are expected to actually reduce our load forecast by 239 MW by 2030. As several of these programs are not triggered unless certain conditions—such as peak forecast or emergency situations—are present, we do not expect to realize 100% of the theoretically potential load reduction from our programs. We will re-evaluate our projections on an ongoing basis for how much of the potential load reduction is achievable, and thus should be included in our plan forecast.

Expenses associated with these programs (Figure 5-7) are based on Con Edison filings with the New York State Public Service Commission. Beginning in 2016 and through 2030, programs are projected to reach a levelized cost of $134 per kW-year, comparable to EPRI benchmarks[23], with an adjustment for the cost of doing business in our service territory.

The reduction in peak demand from our demand response programs results in avoided capacity savings for the Company, as shown in Figure 5-8, as well as savings from the deferral of T&D investments.

[23] Electric Power Research Institute (Electric Power Research Institute). *Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. 2010-2030.* January 2009.

Figure 5-6. Peak Demand Savings from Demand Response

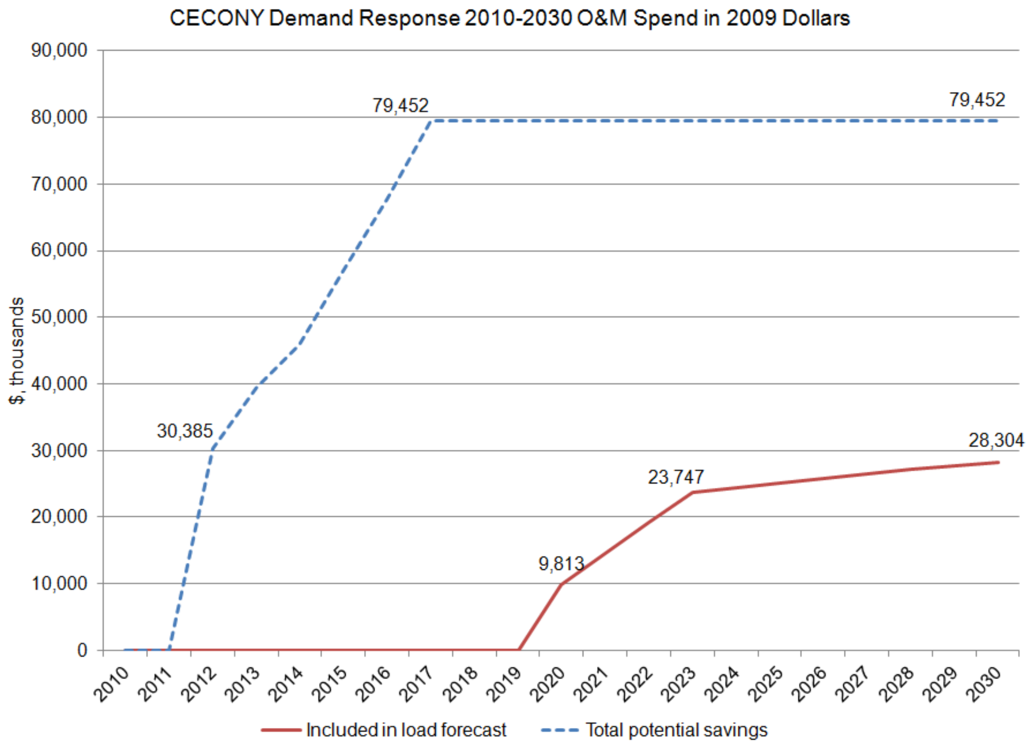


Total Potential	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Basis	*Current filings with the NY PSC*						*Reduced 1% per year*			
Cost per MW ($)	0	0	261,983	169,655	143,116	138,573	135,851	131,366	124,653	118,408
Peak Demand Savings (MW)	-	-	116	233	321	411	499	605	637	671
Total O&M Spend ($000s)	0	0	30,385	39,537	45,971	56,915	67,804	79,452	79,452	79,452

Included in Load Forecast	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Basis	*N/A*						*Reduced 1% per year*			
Cost per MW ($)	0	0	0	0	0	0	0	131,366	124,653	118,408
Peak Demand Savings (MW)	-	-	-	-	-	-	-	75	202	239
Total O&M Spend ($000s)	0	0	0	0	0	0	0	9,813	25,141	28,304
EPRI Benchmark ($ per MW)	50,700	-	-	-	-	-	-	61,810	-	75,340

As described earlier, Con Edison does not plan to claim demand savings from demand response until 2020. Current programs include both voluntary and special case resources (SCR) which cannot be counted on as firm resource. New programs will automatically call on participants when the day ahead forecast reaches 92.5% of the forecasted annual peak demand and should be more reliable. However, these are only pilot programs and until we can be certain of program performance and resource reliability we will not include these resources in demand forecasts. Should callable load programs prove successful and reliable, we will re-evaluate this approach.

Figure 5-7. Demand Response Expenditures



Total Potential	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Basis	*Current filings with the NY PSC*						*Reduced 1% per year*			
Cost per MW ($)	0	0	261,983	169,655	143,116	138,573	135,851	131,366	124,653	118,408
Peak Demand Savings (MW)	-	-	116	233	321	411	499	605	637	671
Total O&M Spend ($000s)	0	0	30,385	39,537	45,971	56,915	67,804	79,452	79,452	79,452

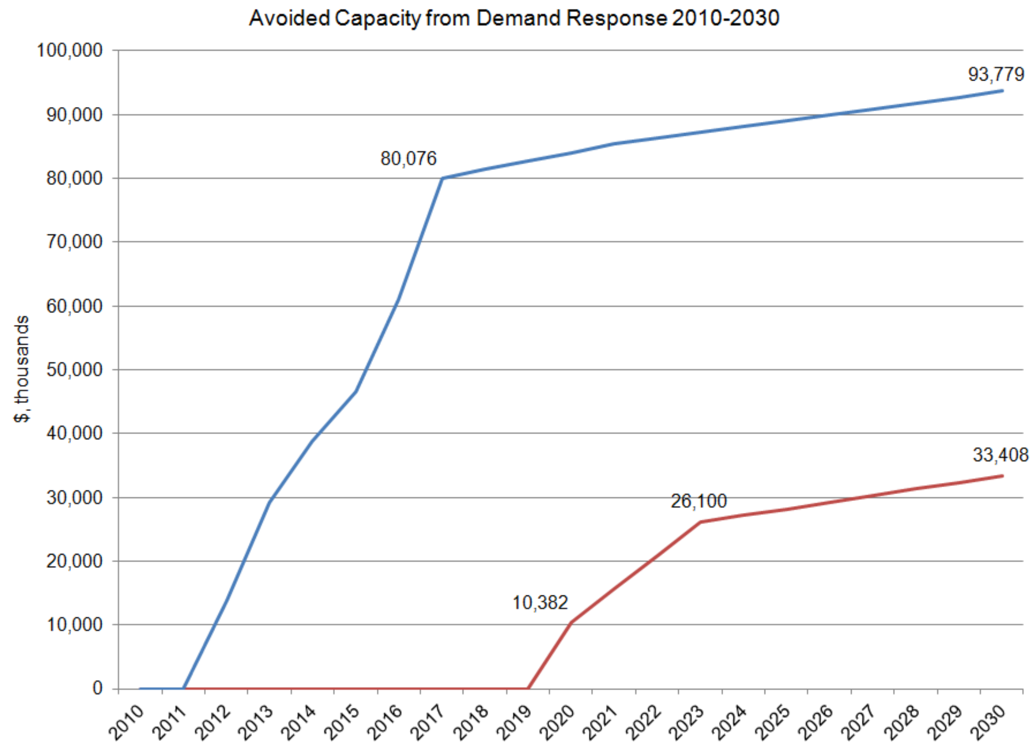
Included in Load Forecast	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Basis	*N/A*						*Industry Benchmarks*			
Cost per MW ($)	0	0	0	0	0	0	0	131,366	124,653	118,408
Peak Demand Savings (MW)	-	-	-	-	-	-	-	75	202	239
Total O&M Spend ($000s)	0	0	0	0	0	0	0	9,813	25,141	28,304
EPRI Benchmark ($ per MW)	50,700	-	-	-	-	-	-	61,810	-	75,340

Expenses associated with these demand response programs, on average $71 million annually, are based on Con Edison filings with the New York State Public Service Commission through 2015. Beginning in 2016, costs are projected to be consistent with the Electric Power Research Institute's[24] assessment of the levelized cost of energy for national demand response programs, adjusted for doing business in New York City[25]. We project costs per MW to reduce by about 1% every year.

[24] Electric Power Research Institute (Electric Power Research Institute). *Assessment of Achievable Potential from Energy Efficiency and Demand Response Programs in the U.S. 2010-2030.* January 2009.

[25] LCOE for energy efficiency is $134 per KW compared to the national average of $76 per KW

Figure 5-8. Cumulative Capacity Avoidance[26]



Total Potential	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Value of Each MW Avoided ($)	120,220	119,740	119,220	125,080	121,040	113,360	122,290	138,980	139,760	139,760
Peak Demand Savings (MW)	-	-	116	233	321	411	499	605	637	671
Avoided Capacity ($000s)	-	-	13,827	29,149	38,880	46,559	61,036	84,057	89,081	93,779

Total Potential	2010	2011	2012	2013	2014	2015	2016	2020	2025	2030
Value of Each MW Avoided ($)	120,220	119,740	119,220	125,080	121,040	113,360	122,290	138,980	139,760	139,760
Peak Demand Savings (MW)	-	-	-	-	-	-	-	75	202	239
Avoided Capacity ($000s)	-	-	-	-	-	-	-	10,382	28,188	33,408

The reduction in peak demand enabled by our demand response programs results in savings for the Company from the deferral of transmission and delivery investments into the future. By deferring investments in load-relief infrastructure (such as transmission lines, new or upgraded substations, network load transfers, and distribution feeders) we could expect to save up to $9 million over the planning horizon.[27] Savings would increase if we find that more of the demand response resources can be called upon and counted upon and thus included in our demand forecasts in coming years

[26] Capacity quantified using PSC Fast Track Order, January, 2009

[27] Total investment years deferred is approximately 5 and the average deferral per project is a fifth of a year resulting in an estimated average savings $400 thousand on each of the 24 large scale substation installations or upgrades.

6.0 ALTERNATIVES CONSIDERED

6.1 ONGOING EVALUATION AND ADJUSTMENT

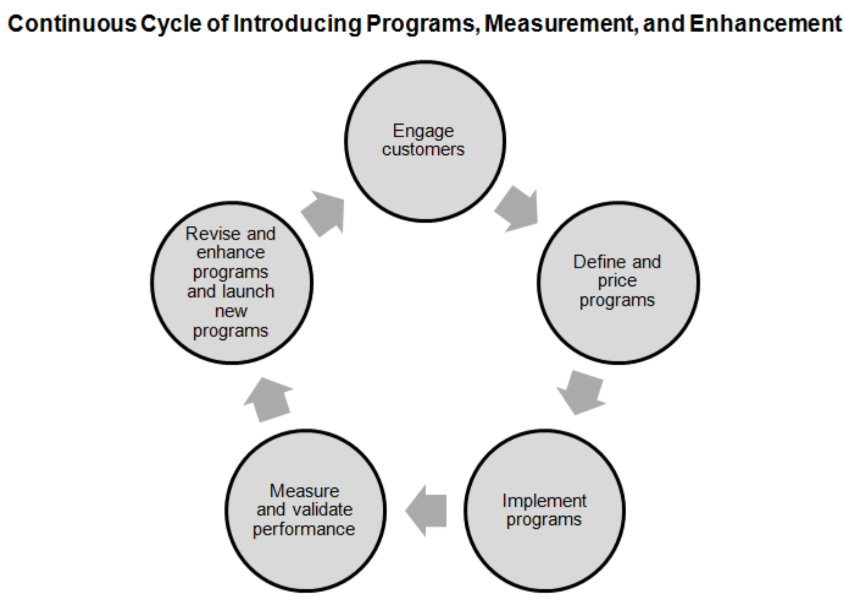
In addition to the plan case highlighted in this assessment document, two additional demand side management scenarios were evaluated consistent with the demand scenarios introduced in Chapter 2.

- **High Case—**In this scenario demand growth returns to historical levels, with a compound annual growth rate of 2.0% over the 20-year horizon. To help mitigate the impact of growing demand on the T&D system, Con Edison would deploy 568MW of demand response in 2030 (as compared to 239 MW in the plan case).[28]

- **Low Case—**In this scenario demand growth of 1.0% (same as the plan case) is driven down to approximately 0.3% based on the efforts of other agencies as well as improving codes and standards. In this scenario, Con Edison would deploy little to no demand response as most infrastructure investments will already be deferred due to the declining usage.[29]

It is important to note that Con Edison will continue to introduce and test new program structures as customer behavior changes and new end-use technologies emerge. The Company is committed to engaging customers and working with them to identify the best solutions to help them control their bills and reduce environmental impact.

Figure 6-1. Evolution of Con Edison Demand Side Management Planning Horizon



[28] Con Edison does not expect to increase energy efficiency expenditures as the plan case is already deemed to be aggressive. However, should more cost-effective opportunities emerge Con Edison would seek regulatory approval to expand our programs.

[29] Con Edison expects to deliver on currently planned energy efficiency programs so would not expect to curtail them under this scenario.

6.2 SIGNPOSTS

This demand side management plan is based on today's technologies, current load growth assumptions, and today's regulatory and legislative environment. The Company has developed signposts that will trigger the review and adjustment of our program portfolio at any point during implementation. More specifically, we will monitor changes in technology innovations, load growth, and legislation, and will change our plan accordingly.

Con Edison may have to increase expenditures or expected energy and demand savings as a result of any of the following:

- Demand growth and/or the widespread use of "smart appliances" and other end-use devices is significantly higher than expected, creating more cost-effective opportunities to leverage demand side management
- Pending Federal legislation is more aggressive than state targets, requiring additional programs and expenditures to meet policy goals
- Energy supply costs skyrocket, increasing customer uptake of programs and making more programs cost effective, causing us to increase spend on programs and/or introduce new programs
- Other agencies do not meet targets in the Con Edison service territory potentially raising the targets for the utility
- Potential change in the mechanism to fund efficiency programs (e.g., SBC) shift more responsibility to the utility
- Building codes and appliance standards do not emerge at the rate currently expected leaving a higher burden on Con Edison and other agencies to drive down energy consumption

On the other hand, the Company may have to decrease expenditures or expected savings if any of the following occurs:

- Achievable potential for energy savings in our service territory are deemed to be significantly below national averages, due to the already low consumption of most residential city dwellers today
- Regulatory proceedings do not turn out as planned, not allowing us sufficient funding to achieve targeted savings levels
- Programs systematically under-perform and fail to meet cost effectiveness tests
- Declining load growth affects the cost-effectiveness of demand response, requiring a re-evaluation of the infrastructure investments that enable these programs

Similarly, the penetration of supply-side distributed resources may increase the demand for demand response programs, or even displace some of the demand-side potential. Throughout the phases of implementation, Con Edison will be monitoring these conditions, and will adjust programs as necessary.

Assessment Document 2: Distributed Generation

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1.0 OBJECTIVES

1.1 DISTRIBUTED GENERATION IS A VALUABLE TOOL FOR CON EDISON TO MANAGE SUPPLY AND DEMAND

As early as 1901, Thomas Edison himself was devising ways to leverage distributed generation (DG) technologies in his home.[30] Although in the end his plan was unsuccessful, a century later some distributed generation technologies have become not only cost effective options, but also offer an opportunity to increase system reliability by relocating load from the central station to the end-use location; and to reduce greenhouse gas (GHG) emissions.

To date, Con Edison has been a partner with the community; assisting customers in interconnection of their distributed generation facilities in both new construction buildings as well as where buildings have been retrofit for onsite generation. In addition, the Company has created the role of Distributed Generation Ombudsperson to serve as a source of information for the public.

Customers can choose to use their distributed generation for emergency use only, to offset thermal energy requirements, for peak shaving, for total energy offset, or to produce surplus energy to sell back to the grid. In most cases, customers do not choose distributed generation to allow them to disconnect from the grid; they choose it instead to offset or supplement some of the energy currently purchased or to provide emergency back-up power.

Distributed Generation (DG), also referred to as distributed energy resources (DER), is 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 or renewable fuel sources such as solar or wind. Natural gas and biogas fueled technologies also offer the customer the extra benefit of using the heat byproduct of electricity generation for facility heating. Such technology is known as combined heat and power (CHP). Natural gas fired distributed generation generally has higher emissions than new central station combined-cycle power plants that have environmental control technologies which are currently not required for distributed generation.

Distributed Generation Technologies include:

- Reciprocating Diesel or Natural Gas Engines
- Microturbines
- Combustion Gas Turbines
- Fuel Cells, Photovoltaics (PV)
- Wind Turbines

[30] New York Times, 2007, "Current Thinking", http://www.nytimes.com/2007/06/03/magazine/03wwln-essay-t.html?_r=1

Distributed generation has the potential to be a future tool in managing both supply and demand in certain load areas, under specific conditions. In order to reach a state where the Company is able to fully incorporate distributed generation into its load management portfolio, we will help address the following factors:

- **Supporting infrastructure investments may be required**—To capture additional value from distributed generation, resources must be monitored at a minimum and preferably dispatchable and verifiable, which may require underlying equipment enhancements such as advanced metering infrastructure (AMI), or other appropriate technologies, and distribution system protection to support two-way power flow as well as communication between the distributed generation resource and the utility control center. The Company has commenced a pilot program in Long Island City that will assess the degree to which AMI can provide dispatchability.
- **Clear environmental regulations need to be adopted for fossil fuel distributed generation**—A study should be undertaken to fully understand the health and environmental impacts of distributed generating facilities in urban areas so that appropriate air emission regulations can be adopted and enforced.
- **Utility ownership of renewables should be permitted in order to support broad scale deployment**—We are considering utility owned solar resources as a way to increase solar distributed generation in our service territory.
- **Safety and reliability protocols must be addressed**—To ensure the safe operation of distributed generation, building codes are being modified to protect all stakeholders including: the Company's employees, employees of other agencies (such as the Fire Department of New York), and the public at large. Con Edison is actively working with stakeholders on electric, gas and steam interconnections to clarify and streamline standards for distributed generation so that they are more easily understood.
- **The adequacy of the gas infrastructure should be evaluated**—Con Edison's gas system long range planning effort is studying what enhancements or upgrades are required to the gas system to support the potential increased gas load from distributed generation.

It should be recognized that not all distributed generation projects are beneficial. From CON EDISON's point of view, distributed generation projects should make sense across the four dimensions: cost effectiveness, reliability, safety, and environmental sustainability.

1.2 OBJECTIVES

Although distributed generation may reduce the customer's reliance on the utility for energy, CON EDISON sees distributed generation as an opportunity to achieve the following objectives:

- Reduce Transmission & Delivery Infrastructure Investments and Power Purchase Costs
- Help Customers Manage Energy Costs
- Improve Environmental Profile and Meet Federal, New York State, and New York City Energy and Environmental Targets
- Enhance Reliability
- Diversify Supply Portfolio

Con Edison believes that to the extent distributed generation is to be examined for these purposes, it should be compared to energy efficiency and load reduction in terms of cost, environmental and reliability impact.

1.2.1 Reduce Transmission & Delivery Infrastructure Investments and Power Purchase Costs

Allowing customers to produce electricity with their own generation assets reduces electric peak demand in certain load areas, thus reducing the need for reinforcement of network and substation equipment. Currently, Con Edison provides standby energy to distributed generation customers; however, customers willing and able to give up partial standby service or that are willing to make themselves interruptible could allow Con Edison to defer future investment.

In addition, highly efficient customer-sited generation lowers the amount of energy losses on the system, reducing energy and capacity purchases.

1.2.2 Help Customers Manage Energy Costs

For some customers, it will be more cost effective to site efficient and/or renewable[31] generation on site rather than purchasing from the utility, particularly when financial incentives are available to lower the first-cost barrier of the generation asset. The associated reduction in line losses and deferred transmission and delivery investments would provide a benefit for all customers.

1.2.3 Improve Environmental Profile and Meet Federal, New York State, and New York City Energy and Environmental Targets

Utility promotion of renewable distributed generation such as photovoltaics and perhaps building mounted wind can potentially play a significant role in helping New York State to achieve its Renewable Portfolio Standards goals. In addition, co-located and/or efficient distributed resources realize less line loss than central supply, providing an opportunity to reduce the greenhouse gas impact of electric delivery.

1.2.4 Enhance Reliability

The proper integration of distributed generation into the secondary network could result in increased reliability of the distribution network by reducing peak loading of system components.

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[31] The Companies oppose the designation of CHP as a renewable resource; the State should continue to prefer repowering at existing sites over installing new fossil fueled DG, especially in non-attainment areas. In 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

1.2.5 Diversify Supply Portfolio

The Company can incorporate diverse technologies and fuel sources by integrating distributed generation. Distributed supply also reduces financial risk through small, geographically dispersed projects. Additionally, as more customers adopt distributed generation, there will be an opportunity for Con Edison to enhance the network with sophisticated technologies, allowing customers to produce more energy than they need—energy which can be supplied to the grid and dispatched by Con Edison to offset other generation needs.

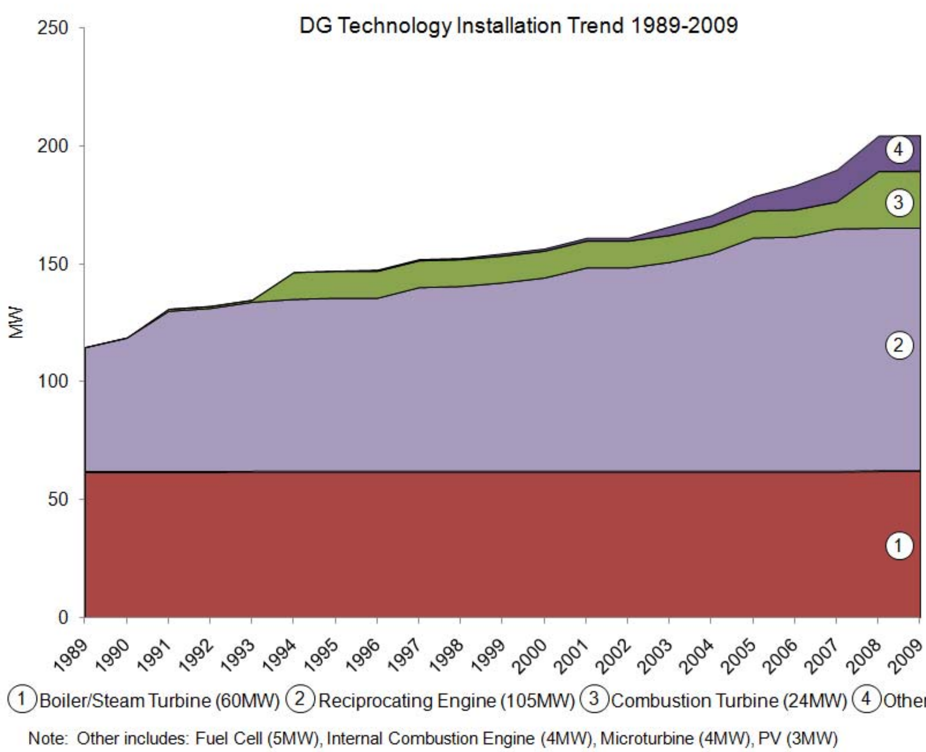
2.0 FORECAST FOR DISTRIBUTED GENERATION IN CON EDISON'S SERVICE TERRITORY

2.1 HISTORICAL ADOPTION OF DISTRIBUTED GENERATION IN THE SERVICE TERRITORY

The adoption of distributed generation is nothing new to Con Edison customers, who had installed as much as 110 MW as early as 1989. Over the last 20 years, periods of increased distributed generation adoption occurred from 1989 to 1994 and from 2004 to the present resulting in the current 206 installed MW in the Con Edison service territory (See figure 2-1).

In the first period, 1989-1994, the technology of choice for customers was reciprocating engines, which use a piston to produce energy and include the commonly known internal combustion engine, steam engine as well as the Sterling Engine. During this five year period 27 of these sites came online, each wi\\th a sizeable capacity, typically in excess of 1.2 MW.

Figure 2-1. Distributed Generation Installation Trend by Technology[32]



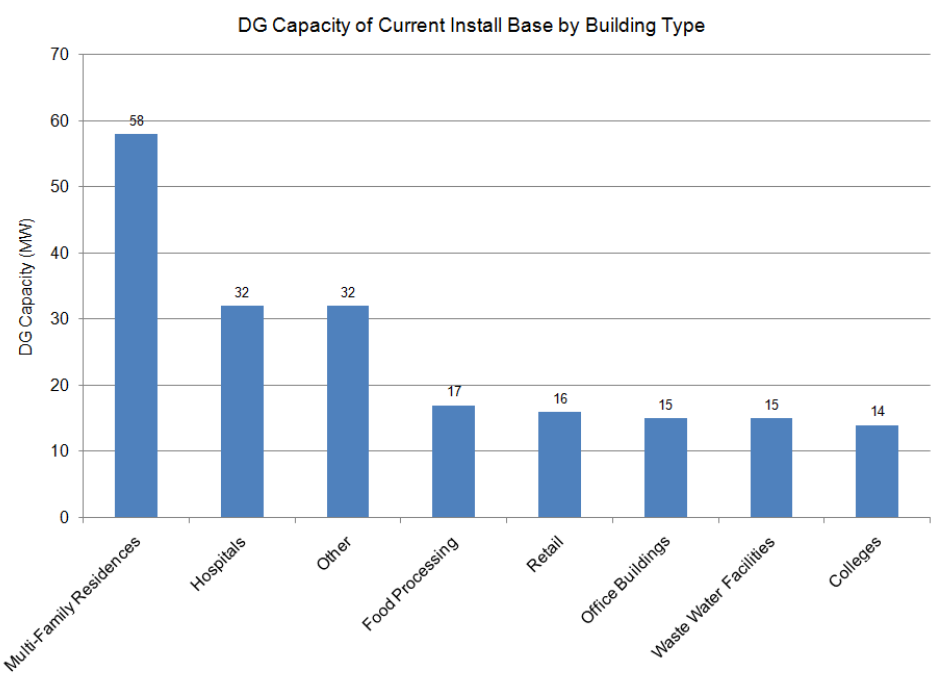
The second wave of distributed generation in the last twenty years started in 2004. Although there have been more distributed generation installations in the last five years than at any time previous, the trend has been for both smaller distributed generation installations focusing on renewable fuel sources and a growing number of larger CHP. During this time there have been 195 separate distributed generation sites to come online within the Con Edison service territory. Of those, 126 (65%) are

[32] DOE, internal Con Edison interconnection data and Con Edison website

photovoltaic solar technology. As previously stated, these solar installations tend to be smaller; the total installed capacity from all 126 sites is roughly 3 MW. It is important to note that because of the intermittent nature of solar as a generation fuel source, this 3 MW cannot be considered as coincident network or system peak capacity.

Another way to view the current install base is by segmenting customers and examining the number of MW installed by each customer type. Viewed from this perspective, multi-family residences and hospitals are the largest users of distributed generation with installations providing an aggregate capacity of 58 MW and 32 MW respectively. In the past twelve months, sizeable distributed generation installations have come online, include a hospital (7.5 MW), an office building (4.5 MW) and a residential complex (45 MW), all taking advantage of combined heat and power (CHP) distributed generation.

Figure 2-2: Current Distributed Generation Online Capacity[33]



2.2 SIGNIFICANT POTENTIAL FOR DISTRIBUTED GENERATION IN THE FUTURE

We developed preliminary forecasts for distributed generation adoption, including technical and market potential in the service territory. Technical potential measures the amount of adoption that is possible taking into account the physical availability of resources as well as any unique constraints of the service territory. Technical potential measures what is possible, but does not project actual adoption as it does not include any evaluation of cost. We use a preliminary estimate of technical potential as

[33] DOE and internal Con Edison interconnection data

an upper bound and then make estimates about the cost of various technologies and fuel sources to arrive at an estimate of market potential, or what we could actually see in our service territory.

In estimating technical potential, the Company took into account constraints that exist in the Con Edison service territory, including geographic and space constraints, technology constraints, and the availability of fuel. Many customers do not have the extra space required for a generating unit and purchasing additional space is often not feasible. High population density requires strict safety guidelines, which limit many customers' abilities to install distributed generation. Installation of technologies that include exhaust or emissions can only be installed by customers able to safely direct those emissions away from people living and working in the vicinity of the unit, something not possible for all customers. The permitting process currently in place is administratively burdensome, but required to ensure all generation assets are safe and will not inhibit the response actions of other agencies, such as the fire department.[34]

Successful installation of distributed generation also requires addressing known problems of power quality and interconnectivity issues, which can cause varying output and system issues. Con Edison has currently identified solutions to many of these hurdles; however, each installation presents its own unique set of issues.

Most of the distributed generation facilities in the Company's service territory will utilize natural gas, while a significant portion are expected to use renewable fuel sources in the future, such as solar and, to a lesser extent, building mounted wind. Due to the intermittent nature of renewable fuels, these distributed generation installations will not be suitable for consistent base load generation in the absence of significant advancements in fuel storage technology.

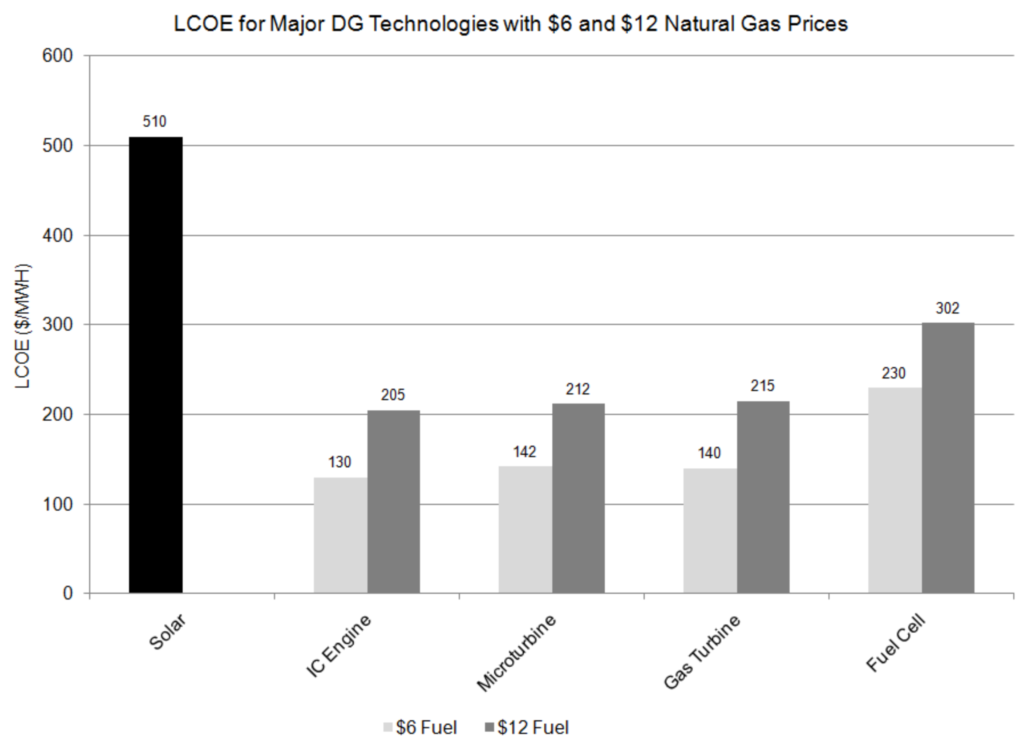
Taking all of these factors into account, the Company has estimated a technical potential of 19,200 GWh of electric energy capable of being produced annually from distributed generation, 12,000 GWhs of which are from renewable fuels with the remaining from natural gas. Currently, Con Edison customers use 55,000 GWhs of energy per year, making the technical potential of distributed generation close to 34% of total sales. Although this is a significant number, the actual market potential is significantly lower due to the cost of equipment, installation, and fuel. In addition, as a significant portion of this technical potential is assumed to be from renewable sources, a large portion will not be coincident peak and only the coincident portion will translate into a reduction of demand on our system.

A customer's willingness to pursue a natural gas distributed generation technology may depend on his expectations for the future level of commodity prices (specifically for natural gas) since the price of fuel often accounts for more than 50% of the total cost of distributed generation over its life. A customer's evaluation of cost can be described using a levelized cost of energy methodology, which is an expression of the average price a customer would have to pay each year, over the life of the distributed generation asset, to install and operate a specific technology (see figure 2-3). Customers must also consider the additional costs of planning and executing a project to install or retrofit distributed generation since, depending on the size and type of the installation, the process can be time-consuming and technically challenging. Customers without technical expertise and without construction project planning experience will need to find partners in order to successfully pursue

[34] The New York City Energy Policy Task Force has noted these difficulties in installing distributed generation in New York City. New York City Energy Policy: An Electricity Resource Roadmap, at 33-34 (January 2004).

distributed generation, which in turn adds additional costs to such a project. Air pollution is also a significant concern for customers considering natural gas fired distributed generation, as well as for those customers living near an installation. Many natural gas-fired distributed generation units remain extremely noisy and odorous and will not be welcomed by residents in certain neighborhoods though new models have come a long way in addressing these problems. Companies concerned about neighborhood relations may hesitate to pursue distributed generation.

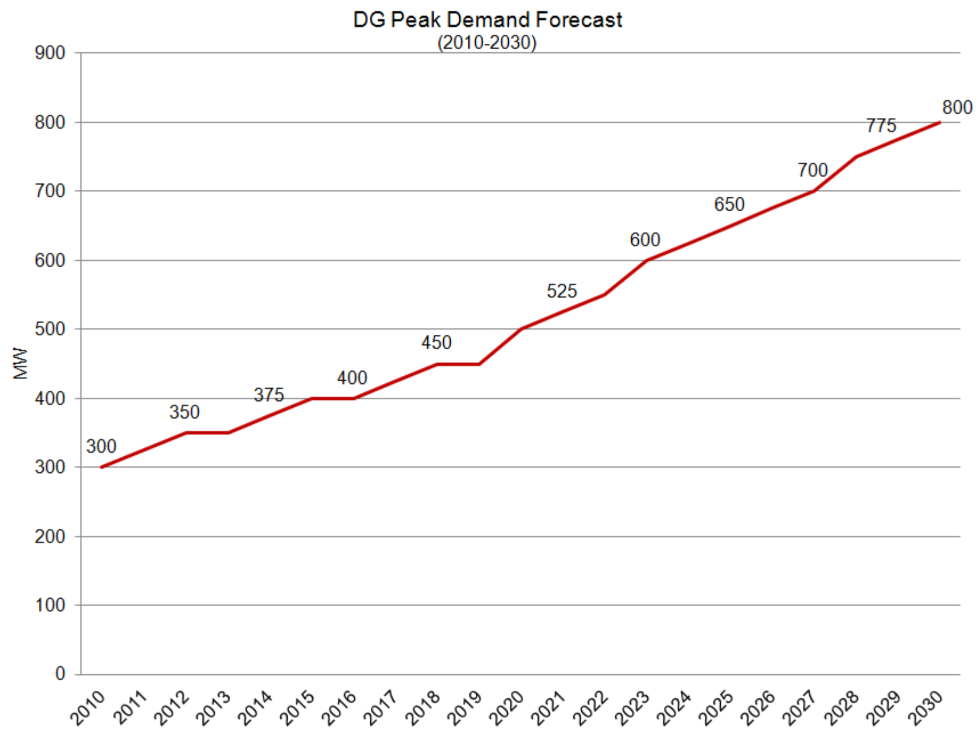
Figure 2-3: LCOE of Distributed Generation Technologies[35]



With these constraints in mind, as well as assumptions about the coincidence factor for renewable sources, Con Edison expects to see continued adoption of distributed generation in the service territory but at a tempered pace and consistent with forecasts made by New York State and city agencies. Estimated distributed generation penetration in terms of peak demand is illustrated in Figure 2-4.

[35]Con Edison Rate Engineering and Internal study using EPA CHP Catalog December 2008 technical assumptions

Figure 2-4: Distributed Generation Market Potential



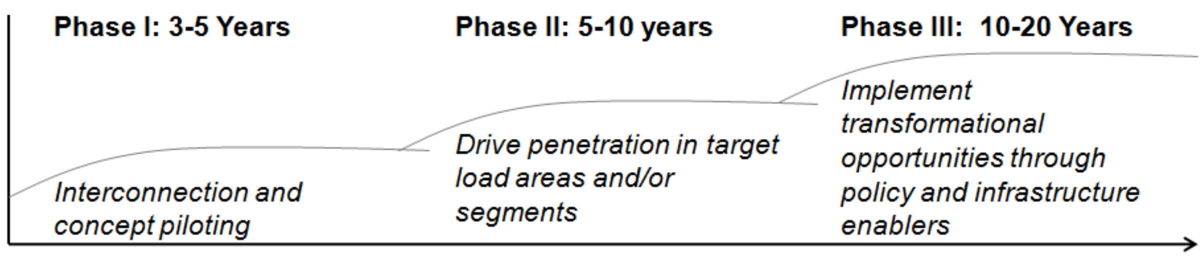
The New York City government has expressed interest in clean distributed generation in the city's PlaNYC, and New York State recognizes the benefits of clean distributed generation in the New York State Energy Plan. The market potential forecasted by Con Edison is similar (800 MW for New York City and Westchester County), but lower than, the 800 MW target set in the city's plan for the city alone, although it would be reasonable to expect that most of the faculties will be located in New York City. Going forward, Con Edison will continue to work with the city, New York State and other agencies to fulfill its appropriate role in facilitating the adoption of clean distributed generation.

3.0 IMPLEMENTATION PLAN

3.1 CON EDISON EXPECTS DISTRIBUTED GENERATION TO BE A LONG TERM STRATEGIC DRIVER

Con Edison's distributed generation strategy can be generally characterized as falling into three phases, illustrated in Figure 3-1. In Phase I, Con Edison plans to continue partnering with customers and other stakeholders, including the New York State Department of Environmental Conservation, the New York City Department of Buildings, the Fire Department of New York, and distributed generation advocates, to facilitate the interconnection of distributed generation installations and examine the opportunity to pilot new projects and concepts. Based on the results of Phase I initiatives, Con Edison will be in a position in Phase II to promote adoption of distributed generation in areas of the service territory where it can be the most beneficial to meet customer and Company objectives, including: reducing cost, increasing reliability, improving air quality and lowering greenhouse gas emissions. Results of the first ten years will shape the subsequent strategy of the Company. Con Edison would hope to employ sophisticated technologies and policy enablers to take advantage of transformational opportunities.

Figure 3-1: Implementation Plan: Distributed Generation



During Phase I, Con Edison will continue to help customers and developers connect their distributed generation installations to Con Edison's delivery system while improving our ability to communicate with our customers via an Online Customer Project Application Website and Tracker. In order to maintain a central source of distributed generation information and drive the overall strategy, we will continue and expand the role of the Distributed Generation Ombudsperson who can be used as an important resource by the public. From a technology perspective, we have also invested in programs to evaluate the long term efficacy of distributed generation in the service territory. Results of these programs will be evaluated and are expected to determine the future direction of the Company's distributed generation strategy.

Table 3-1. Con Edison's Programs To Study Distributed Generation

Program	Description
Distributed Generation Interconnection[36]	Part of Con Edison's application for funding under the American Recovery and Reinvestment Act (ARRA) is to install two-way communication to distributed generation units and network protectors to facilitate interconnection.
DOE/ Verizon/Infotility Project	Program to test interoperability with the Company's control centers. The project's objective is to integrate new hardware, software, and administrative protocols to create a virtual power plant that can safely distribute third party customer power into Con Edison's network system during anticipated electric peak usage times. The study will review both conventional and renewable energy.
DC Link	Expands the DC link technology which allows synchronous distributed generation to interconnect with the distribution system even in areas with limited or no fault duty protection.
Substation Breaker Upgrade	Program to upgrade substation equipment to accommodate distributed generation.
Network Distributed Generation Penetration Load Flow Electro-Magnetic Transient Program	Analyzes the impact of varying types and levels of distributed generation penetration.

In addition to these programs, Con Edison is also piloting technologies which can be used to support distributed generation. Four proposed initiatives (described in Table 3-2) the Company feels are important to developing a strong perspective on how to best use distributed resources are: the Solar Program (filed with the PSC), the Long Island City Smart Grid Pilot, the Grid Support Pilot, and the Distributed Generation Collaborative. Based on the results of interconnection and load flow studies as well as experience with these pilots, we will better understand the benefits, costs, and risks associated with distributed generation.

[36] Con Edison has received a total of $125M from the American Recovery Reinvestment Act (ARRA) for programs aimed to deploy a wide-range of grid-related technologies, including automation, monitoring and two-way communications, to make the electric grid function more efficiently and enable the integration of renewable resources and energy efficient technologies

Table 3-2. Con Edison Distributed Generation Pilot and Collaborative Programs

Program	Description
Long Island City Smart Grid Pilot	Tests automated control technologies for solar resources, battery storage to manage the intermittent nature of solar as a fuel source, and new interconnection concepts.
Grid Support Pilot	Deploys smart communication technologies between distributed generation sites and regional controls rooms and distribution transformer network protectors (NWP) to coordinate the distributed generation output with NWP load flows in order to avoid excess strain on the network.
Distributed Generation Collaborative	Con Edison will chair a distributed generation collaborative sponsored by BOMA and the Pace Energy and Climate Center with the goal of addressing distributed generation stakeholder issues.
Solar Program	Develop customer-sited rooftop solar projects to complement NYSERDA's efforts to increase penetration of customer-sited renewables.

Phase II will bring the results of these pilots together, identify any gaps, and use the results to set implementation strategy. Ideally, Con Edison would like to be in a position to promote adoption of distributed generation in areas or network segments targeted due to cost, reliability or environmental implications. These target areas may be locations that have a high peak demand relative to their network capacity and where distributed generation is a cost-effective method for reinforcing the reliability of these network segments. To convince customers to adopt distributed generation on these specific networks, Con Edison may need to provide incentives that are equivalent to value provided. A structure for possible incentives has not been determined and will be evaluated at a later date. Also starting during this period, Con Edison expects to fully utilize its ability to dispatch and manage load flow coming from third party distributed generation locations to reduce peak and manage external generation costs.

It is expected that Phase III, in the ten to twenty year timeframe, will allow Con Edison to focus on more transformational opportunities through new policy and infrastructure enablers. By this time, technology standards should begin to emerge among the multitude of technologies being tested today. These standards will allow for simplified interconnection and management of disparate devices in the network as well as at utility and customer sited distributed generation locations, two-way communications between the distributed generation resource and the utility control room, and appropriate incentives or tariff structures to support interoperability. The DG may be considered reliable enough that customers with generation may only require an N-1 type connection. Also during this time, customers in close proximity, possibly with the assistance of the Company, may choose to link their distributed generation units together to form a microgrid, a structure in which individual distributed generation assets with excess capacity can serve as emergency backup generation for generation assets of other customers in the same microgrid in the event of an outage. In theory, if sized to meet these customers' peak summer demand, microgrids could disconnect completely from the Con Edison grid.

4.0 KEY DEPENDENCIES

4.1 DEPENDENCIES

CON EDISON's distributed generation strategy, as described in this assessment document is dependent on several factors, also described in section 1.1.

- **Supporting infrastructure investments may be required**—To capture additional value from distributed generation, resources must be dispatchable and verifiable, which may require underlying equipment enhancements such as advanced metering infrastructure (AMI) and infrastructure protection to support two-way power flow and communication between the distributed generation resource and the utility control center. The Company has commenced pilot programs in Long Island City and through DOE/EPRI with Verizon that will assess the degree to which AMI and other communications protocols can provide dispatchability.
- **Clear environmental regulations need to be adopted for fossil fuel distributed generation**—A study should be undertaken to fully understand the health and environmental impacts of distributed generating assets in urban areas so that appropriate air emission regulations can be adopted.
- **Utility ownership of renewables should be permitted in order to support broad scale deployment**—We have filed a plan with the Public Service Commission to increase solar distributed generation in our service territory, and in the future plan to include discussion of utility owned solar resources.
- **Safety and reliability protocols must be addressed**—To ensure the safe operation of distributed generation, building codes are being modified to protect all stakeholders including: the Company's employees, employees of other agencies (such as the Fire Department of New York), and the public at large. Con Edison is actively working with stakeholders on electric, gas and steam interconnections to clarify and streamline standards for distributed generation so that they are more easily understood. Existing IEEE and UL standards may have to be revisited as well, to accommodate higher penetration of DG than current standards envision.
- **The adequacy of the gas infrastructure should be evaluated**—Con Edison's gas system long range planning effort is studying what enhancements or upgrades are required to the gas system to support the potential increased load from distributed generation.

5.0 SIGNPOSTS

Like many other issues the Company faces, the current strategy with regard to distributed generation does not exist in isolation and is open to the effects of external factors that will trigger the review and adjustment of the program, should that become necessary. These signposts will not affect Con Edison's willingness to assist its customers in the interconnection of distributed generation, but may affect the strategic direction the Company desires to pursue. These signposts include:

- **Economic recovery**—If economic recovery is slow, the ability and appetite of many customers to pursue distributed generation is constrained due to reduced energy consumption and limited ability for customers to acquire the capital necessary to make large distributed generation investments.
- **New environmental regulation for local supply resources**—Regulation is likely to control the environmental impacts of distributed generating assets. This regulation is likely to change the economics of certain distributed generation technologies—particularly those powered by natural gas—and thus alter adoption patterns.
- **Enactment of Federal renewable portfolio standards and greenhouse gas legislation**—If Federal guidelines become stricter than New York State's goals, there may be an increased focus on the adoption of renewable distributed generation in order to reach policy and any other goals.
- **Price of natural gas**—Natural gas prices are a major driver of the cost of distributed generation. As prices decline, distributed generation adoption could increase, specifically with regard to internal combustion engines, microturbines, gas turbines, and fuel cells
- **Natural gas infrastructure**—Infrastructure upgrades may be required to provide sufficient capacity and throughput to enable natural gas-fueled distributed generation. The costs of these gas system reinforcements should be considered against benefits of deferred investments on the electric infrastructure.
- **Advancement in distributed generation and storage technologies**—Improved cost profiles of distributed generation technologies will increase the economic viability and therefore adoption of distributed generation.
- **Further net metering legislation**— Favorable economic incentives for selling power back to the grid may drive distributed generation adoption. Con Edison supports the use of transparent subsidies,[37] or paying DG customer-generators with the true avoided cost of energy particularly once 'grid parity' has been realized.
- **Smart Grid enhancements to the utilities' distribution systems**—Technologies allowing bidirectional power flows as well as dispatchable distributed generation will increase the benefits of distributed generation for stakeholders and the Company.

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[37] Net metering, as a subsidy, is non-transparent, since the benefit provided to net metered customers cannot easily be calculated and determined. The Companies support use of transparent subsidies. There are also social issues in net metering because it departs from basic cost-causation principles. At most, the State should allow net metering up to the existing 1% caps only and then begin to explore other methods. The Companies are also concerned about the possible impact of oversized net metered resources on the system. Finally, fossil-fueled resources, even highly efficient CHP, should not be considered to be renewable power and should not be eligible for net metering." 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

Throughout the three phases of implementation, Con Edison will continuously monitor these conditions, and adjust programs as necessary. As the internal and external environments change, additional signposts may be identified and added to this list.

Assessment Document 3: Advanced Metering Infrastructure

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1.0 OBJECTIVES

1.1 OVERVIEW

An advanced metering infrastructure (AMI) is a key enabler of multiple services that facilitate better utility control of its transmission and distribution system, and allows customers a more direct role in their electricity consumption. To support Con Edison's mission to take a proactive and integrated approach to managing supply, demand, and environmental profile, the Company plans to pilot and then deploy AMI in its service territory. This project will enhance reliability, give customers greater control and choice, enable peak shaving and peak shifting, improve operating efficiency, and increase visibility and control of Con Edison's system.

As the other initiatives in Con Edison's Electric Long Range Plan, AMI deployment has been conceived in an integrated fashion. The synergies and dependencies between AMI, demand response, distributed generation, and the integration of intermittent renewables are clear, and will enable the Company to better utilize each dollar invested.

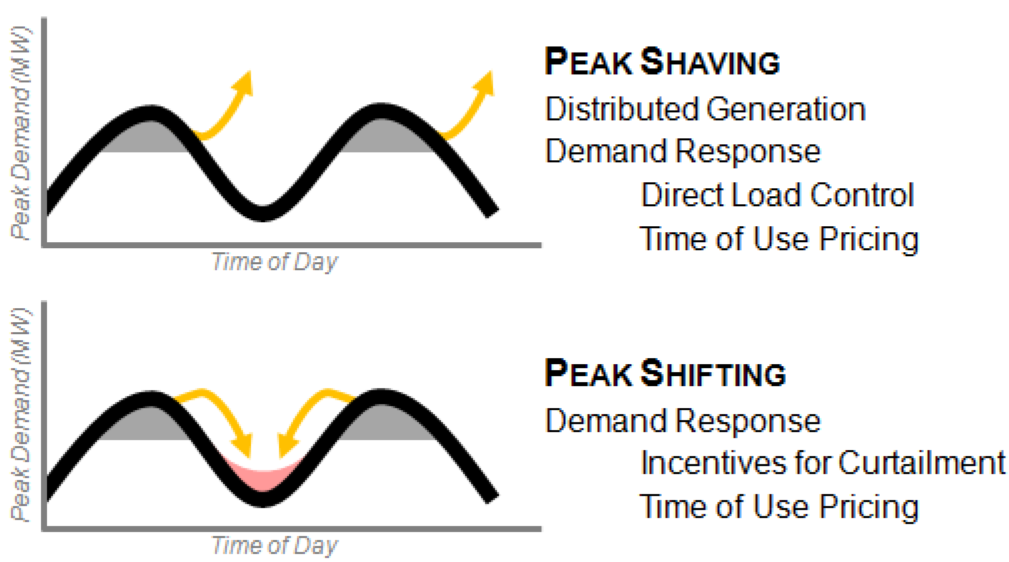
Advanced Metering Infrastructure (AMI) is a collection of hardware and software systems that utilize two-way communication to collect measure and analyze electric data from a smart meter to the central station, often in a real-time or pseudo real-time manner.

Smart Meters are electric meters capable of transmitting data back to the central station as opposed to requiring an agent to read the meter. Smart meters often contain a host of technology solutions capable of monitoring for power outages and power quality issues.

1.2 ENABLE DEMAND RESPONSE AND DISTRIBUTED GENERATION

Con Edison recognizes that better handling of the system's load shape is a cost-effective alternative to infrastructure expansion and expensive peak power purchases. By facilitating measurable and dispatchable demand response (DR) and distributed generation (DG), AMI will allow the Company to meet two of its load shape objectives, which are described in Figure 1-1.

Figure 1-2. Load Shape Objectives



The proposed AMI system will help to minimize the cost of energy and permit a broader range of customers to access various demand response and distributed generation programs that improve system load factor and help to defer the construction of new facilities. AMI is a necessary enabling technology for increasing the success of demand response and distributed generation for three primary reasons. First, AMI provides the reliable interval data necessary to measure and verify load reductions achieved by customers (individually and as groups) at a reduced cost per meter.

Second, AMI provides information necessary for customers, individually and as groups, to determine the peak load reduction actions they should take. This allows customers to make intelligent decisions concerning their energy consumption patterns.

Third, AMI provides a platform to engage a broad customer base in DR and DG activities. The supporting infrastructure enables two-way communication between the utility and its customers, and provides the ability to capture and store meter data. Time-based pricing programs can be tailored carefully and precisely with AMI. Customers can be notified in real-time when DR or DG would save them the most money. Prices and financial incentives can target specific outcomes (e.g., peak load reduction for reliability purposes, reduction of peak energy prices, control of local peak loads that may stress the distribution system). Optional load control measures (e.g., home area networks, or chips in the meter that can manage the operation of individual appliances) can help customers optimize their participation in demand management programs without reducing the benefits and value of those appliances to the customer.

Achieving these objectives in load or reliability constrained areas will allow Con Edison to:

- Defer T&D investments necessary to meet peak load conditions
- Reduce power purchase costs for both the energy and capacity associated with peak load conditions
- Lower customer bills by giving them increased visibility and greater control of their energy consumption e.g. through time-of-use pricing which gives customers incentives to shift usage away from peak times[38]
- Achieve environmental sustainability goals described in Chapter 4

[38] Current New York State law prohibits mandatory time sensitive rates in the mass market

1.3 INCREASED VISIBILITY AND CONTROL AND PROVIDE THE FOUNDATION OF A SMART GRID

AMI is sometimes considered a fundamental enabling component of a smart grid. Much of the customer benefit of a smart grid infrastructure relies on the capture of detailed data, timely enough to communicate the status of the utility distribution system to process-intelligent controls for the distribution equipment. AMI can potentially capture non-traditional data such as voltage and current information at the customer/meter level for smart grid applications, for example:

- SCADA voltage telemetry data at feeder breakers in the substations can indicate the quality of the power supply to the distribution network, but voltage information at customer delivery points may help to discern circuit or transformer level problems for more effective Volt/VAR control. Similarly, better voltage information and control at customer sites can reduce energy costs.

- Substation breaker and reclosure operations can be used to evaluate the scale of an outage, but meter-level outage and restoration notification events are necessary to optimize outage restoration efforts.

- Emergency load response activities such as area load shedding can alleviate potentially catastrophic system concerns, but at a significant cost to customer satisfaction and company image. Demand response information distributed to individual premises allows utilities to achieve expected load reductions while minimizing impact to customers. In addition load-limiting capabilities allow more surgical voltage reductions

Implementation of a meter data management system (MDMS) and integration of AMI data with distribution management systems (DMS), outage management systems (OMS), and other systems provide the information and intelligent control necessary to facilitate the operation of the smart grid.

While Con Edison already has many elements of a smart grid, AMI would extend the Smart Grid down to the customer/meter level and will specifically help to enhance the visibility into and control our distribution network by:

- Enhancing quantity and quality of data for monitoring and modeling for improved asset management
- Enriching data for distribution automation
- Integrating and monitoring of new end-use devices including electric vehicles
- Providing customer end-point data to enhance value of Command and Control System of Systems (C2SoS), described in detail in Chapter 6
- Facilitating dispatchable demand and supply resources
- Enabling advanced building and appliance automation

1.4 OPERATING EFFICIENCIES

In addition to the increased efficiency of crew dispatching discussed in Section 1.1, there are several areas where we expect to gain operating efficiencies from the deployment of AMI. Operations and maintenance (O&M) and capital savings are expected from the following:

- Deferral of Metering Capital Costs
- Reduction of Manual Meter Reading[39]
- Increased Revenue due to Improved Meter Accuracy
- Reduction of Manual Off-Cycle Reads
- Reduction of Estimated Reads
- Reduction of Revenue Losses from Unoccupied Premises
- Reduction of Load Research Costs
- Reduction of Call Center Inquiries and Call Resolution Time
- Reduction of Compensation & Claims for Meter Reading[40]
- Interface to Other Projects[41]
- Reduction of Field Service Orders
- Reduction of Long-Term Outage Restoration Time
- Reduction of False Outage Dispatches
- Reduction of Nested-Outage Restoration Time
- Reduction of Call Center Handling Times for Requests Related to Power Quality

1.5 ENHANCE RELIABILITY

We will enhance the reliability of our system by reducing the duration of outages, and by better controlling the flow of electricity throughout the distribution system.

Real-time monitoring of the distribution network allows for earlier outage detection. Moreover, this information helps to more accurately pinpoint the location and scope of an outage. Having more precise information will increase the efficiency of repair crew dispatching. AMI also greatly improves the ability to verify customer service restoration. These and other outage management tasks are much less automated in our existing infrastructure environment.

The deployment of AMI, supported by the right information systems and operational processes, will allow better control of the distribution system by improving fault/outage isolation and improved power quality.

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[39] Meter reading savings dependent on the simultaneous replacement of gas meters.

[40] Refers to reduced costs for workers' compensation associated with employee injuries and vehicular accidents in the field.

[41] A number of initiatives and R&D projects may rely on the AMI communications network. The Company presently incurs costs for stand-alone, special data communications networks that are currently associated with some of these projects and initiatives. The use of the AMI infrastructure could potentially reduce the cost to gather data from various remote field devices. Specific projects include: Automation of 480V Vaults, High Tension Monitoring Data Acquisition System, Meters for New Service Points (Currently unmetered services).

1.6 INTEGRATION OF INTERMITTENT RENEWABLE RESOURCES

AMI helps manage, monitor, and control the integration of intermittent renewables into the grid, as it enables dispatchable and measurable demand and supply resources which can be leveraged to smooth consumption to coincide with decreased availability of intermittent resources such as wind and solar. Absent AMI, the use of intermittent renewables may otherwise adversely affect service reliability.

2.0 PROJECT COMPONENTS AND FUNCTIONALITY

AMI enables bi-directional communication with customers and increases Con Edison's control of its system. This is achieved by leveraging features embedded in the meters, as well as by integrating the right supporting technology.

2.1 PRIMARY COMPONENTS

One of the main components of AMI is the meters that will be installed by Con Edison. These meters provide the following capabilities, which are either not available in existing meters, or are available at a much higher cost than through AMI:

- Bi-directional registration
- Ability to provide time-stamped interval data at hourly (or shorter) time intervals
- On-board memory capable of storing at least 60 days of readings
- Real-time (time lag of 5 minutes or less), remote read-only access to meter data for customers and/or competitive providers
- Two-way communication, including the capability to remotely read meters on demand
- Ability to send signals to customer equipment to trigger DR functions and/or connect with a home area network (HAN)
- Positive notification of outage/restoration
- Self-diagnostics, including tamper flagging
- Interoperability with Smart Grid applications e.g. like distribution automation
- Remote disconnection/reconnection

Figure 2-1. Smart Meter

2.2 SUPPORTING TECHNOLOGY

The functionality of the AMI meters is enabled by the installation and integration of supporting IT and telecommunication technology such as:

- Local area networks (LANs) that enable meters and modules to convey data and receive information
- HAN controllers and devices that enable customers to view and manage energy use
- A data acquisition system (DAS) that links meters with back-office components such as a meter data management system (MDMS) which stores meter information for billing[42]
- Service relay technology for electric service connection/load limiting/disconnection
- The potential of incorporating meter data points into various analytical models used at the Company
- Cyber security standards

Con Edison expects to manage the sourcing, installation, and ongoing maintenance of all of these supporting technologies, except for HANs. The Company assumes that customers will obtain home energy display components competitively in an open market.

[42] Includes capabilities for metering, mandatory hourly pricing, reactive power, and a variety of other rates and options.

3.0 IMPLEMENTATION PLAN

Recognizing the importance of deploying the right technology in the right areas, Con Edison plans to precede AMI deployment with a pilot in a representative sample of its system. Once the pilot deployment is completed and its benefits are validated, AMI will be deployed across the system in a targeted fashion.

A pilot with approximately 1,500 smart meters[43] is expected to be complete in 2010 in Long Island City. In this pilot, Con Edison will test telecommunication solutions for various customer types and will test home area networks, and incentives for off-peak usage in connection with energy efficiency and demand response. This pilot has been designed to gain experience for evaluating the feasibility of various smart grid technologies.

In accordance with Con Edison's targeted approach to system investments, AMI deployment will focus on networks facing reliability or capacity constraints. By deploying AMI in these networks, Con Edison can be responsive to customer reliability needs and can defer near-term T&D investment through verifiable and measurable DR and DG.

Thirty targeted networks (or load areas) were selected based on capacity and reliability constraints, as described in Table 3-1.

Table 3-3. Criteria for Selecting Targeted Networks

Rationale	Selection Criteria
Capacity Constraints	*Area Station and Subtransmission Feeder Load Relief Program:* Load areas connected to a distribution substation that have investments scheduled over the next 20 years. It is assumed that these investments are primarily intended for load relief.
Reliability	*Feeder Ratings:* Load areas that are at risk of decreased reliability as a result of at least one of their feeders currently running at 90% of capacity. *Network Reliability Index[44] (NRI) Network Ranking:* Load areas in the bottom quarter of the NRI ranking.

Targeted deployment will begin in 2013 and will reach a total of 1.5M electric meters (45% of total electric meters). Fifty percent of the meters would be installed in the first three years and implementation will be complete after 6 years (in tandem with gas meter replacement). The meter deployment schedule will also be aligned with the company's DR programs.

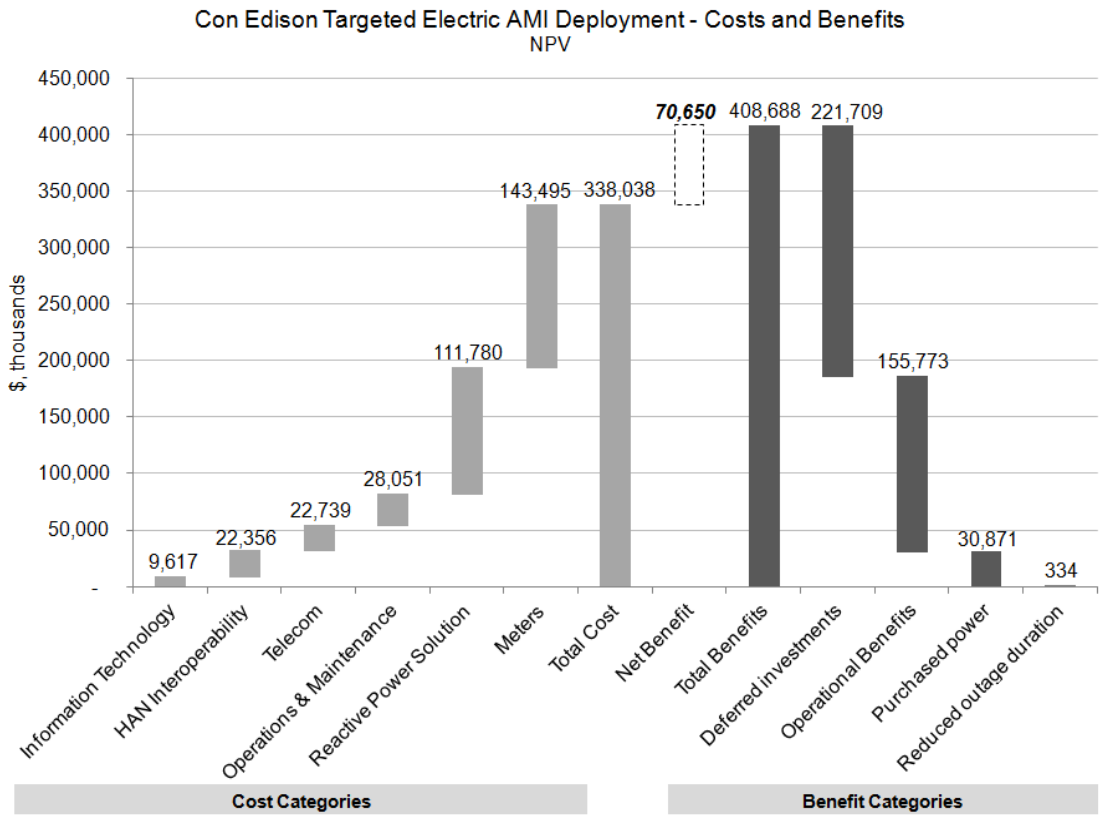
[43] The Long Island City pilot involves 1,500 gas and electric meters. About a thousand of these meters are projected to be electric.

[44] NRI is a probabilistic value, measured in years to reach a worst, fourth contingency in the network and is referred to as its jeopardy value. In layman's terms, the risk of jeopardy is consistent with the risk of network shutdown or the need to employ emergency measures to avoid a network shutdown. Typical scores range from once in 100 years to once in over 1000 years based on the Company's current planning assumptions.

4.0 COST BENEFIT ANALYSIS

After evaluating various alternatives, it was determined that the targeted deployment of AMI with 1.5 million electric meters would provide a positive return on investments, and would position Con Edison to leverage the functionality of AMI while continuing to test the benefits of broad scale deployment. As currently planned, targeted electric AMI in the Con Edison service territory will provide an 18-year[45] net present value of $71 million in net benefits, with a limited investment of $338 million.[46] Rollout of this program is expected to begin in 2013; in the meantime Con Edison will utilize the results of the pilot program to enhance this program as necessary. The targeted approach also allows the flexibility to ramp up to a full deployment without significant sunk costs. Figure 4-1 summarizes the breakdown of the cost and benefit categories that make up the AMI business case and each cost and benefits category is described in detail later in this section.[47]

Figure 4-1. Targeted Deployment Costs and Benefits



[45] An 18-year NPV represents the time from the initial rollout of the program, in 2013, to the end of the ELRP time horizon in 2030.

[46] Subject to success of the pilot and regulatory approval.

[47] Meter reading savings dependent on the simultaneous replacement of gas meters.

Cost Categories

Cost of a targeted AMI deployment is broken into six categories described in detail in Table 4-1.

Table 4-1. Description of AMI Cost Categories

Cost Category	Components	18-year NPV in $000s
IT	Data Acquisition O&M	4,486
	Data Acquisition Hardware	732
HAN Interoperability	ZigBee Components	22,355
Telecom	AMI Infrastructure	17,551
	Infrastructure Integration	5,187
O&M	Infrastructure O&M	26,989
	O&M Tools	1,062
Reactive Power Solution	Reactive Power Solution	111,779
Meters	Meter Hardware	116,964
	Meter Installations	26,529
Total Cost		**338,038**

Deferred Investments (DR+DG) Benefits

AMI allows Con Edison to capitalize on savings by enabling mass market demand response (DR) and distributed generation (DG) programs to offset traditional T&D investment. The use of AMI offers Con Edison a concrete method of measuring and verifying the load offset agreed to by customers when they sign up for the Company's DR and DG programs, as well as the ability to dispatch the resource. This level of insight into the network allows Con Edison to include the load reductions from dispatchable DR and DG in its infrastructure planning processes, and due to load reductions from these programs, infrastructure can be deferred. Under the targeted approach to AMI, Con Edison is able to capture T&D savings by deferring the Gowanus switching station by 7 years, the Nevins substation by 5 years, and the Gateway Park substation to beyond the 2030 time window[48].

[48] At a discount rate of 8% the 7 year deferral of Gowanus switching station amounts to $94 million, the 5 year deferral of Nevins substation amounts to $45 million, and the deferral of Gateway Park substation amounts to $167 million, for a total savings of $307 million.

Operational Benefits

By automating much of the interaction between the customer meters and the central station, the Company is able to reduce the need for manual meter reading, enable the opportunity to read meters at off cycles, as well as improve the accuracy of individual reads. Improved data collection provides Con Edison with more up to date information, enhancing the ability for the Company to proactively reach out to customers when an issue is detected, and to better answer customer inquiries when a customer calls.

Table 4-2. Detail on Operational Benefits

Con Edison Operational Benefits of Targeted Electric AMI Deployment

Benefit Category	**18-year NPV in $000s**
Deferral of Metering Capital Costs	55,228
Reduction of Manual Meter Reading	54,004
Reduction of Off-Cycle Reads	4,852
Reduction of Estimated Reads	4,752
Reduction of Revenue Losses from Unoccupied Premises	3,447
Reduction of Load Research Costs	3,363
Reduction of Call Center Inquiries and Call Resolution Time	2,327
Reduction of Compensation & Claims for Meter Reading	1,584
Interface to Other Projects	980
Reduction of Field Service Orders	938
Reduction of Long-Term Outage Restoration Time	652
Reduction of False Outage Dispatches	527
Increased Revenue due to Reduced Outage Restoration Time	506
Reduction of Nested-Outage Restoration Time	184
Reduction of Call Times Related to Power Quality Calls	6
Total Operational Benefits	**155,773**

Purchased Power (DR-only) Benefits

Demand response programs enabled by AMI are able to reduce peak load on the system which translates into cost savings for the Company. Demand response savings begins in 2020 and amount to a total cost savings of more than $30 million through 2030.

Table 4-3. Annual Purchase Power (DR-only) Benefit

Total Potential	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
DR Savings (MW)	27	40	54	67	70	72	75	78	80	83	86
MW Value ($/MW-year)	138,980	139,760	139,760	139,760	139,760	139,760	139,760	139,760	139,760	139,760	139,760
Total Savings ($000s)	3,730	5,625	7,499	9,372	9,746	10,120	10,495	10,869	11,251	11,632	12,063

Customer Savings from Outage Response Time Reduction

The final benefit category from AMI has to do with the ability of the Company to respond more quickly to service outages that may occur based on the real-time outage data provided by AMI. Once the targeted deployment is complete in 2018, it is expected the Company can reduce outages by roughly 4,000 hours per year. Assuming a value of $12/hour[49] amounts to a total savings for customers of an undiscounted $48,000 annually and $333M in net present value over 18 years.

[49] Pacific Northwest National Laboratory. “Electrical Power Interruption Cost Estimates for Individual Industries, Sectors, and U.S. Economy.” February 2002. Values inflated to 2009 dollars using an inflation rate of 2.5%

5.0 ALTERNATIVES CONSIDERED

5.1 ONGOING EVALUATION AND ADJUSTMENT

Prior to selecting the targeted AMI deployment, Con Edison evaluated the costs and benefits of two other alternatives: the replacement of all electric meters in the service territory with AMI, and no AMI deployment.

Figure 5-1 shows the business case for the full deployment. With this alternative, the net present value of benefits would be larger than in a targeted deployment as a result of greater operational benefits and more avoided energy and capacity. However, since the targeted scenario already focuses on the load areas with the most significant reliability and capacity needs the amount of T&D deferral is similar in both scenarios. Total costs for full deployment are estimated to be $747M.

Figure 5-1. Full Deployment Costs and Benefits

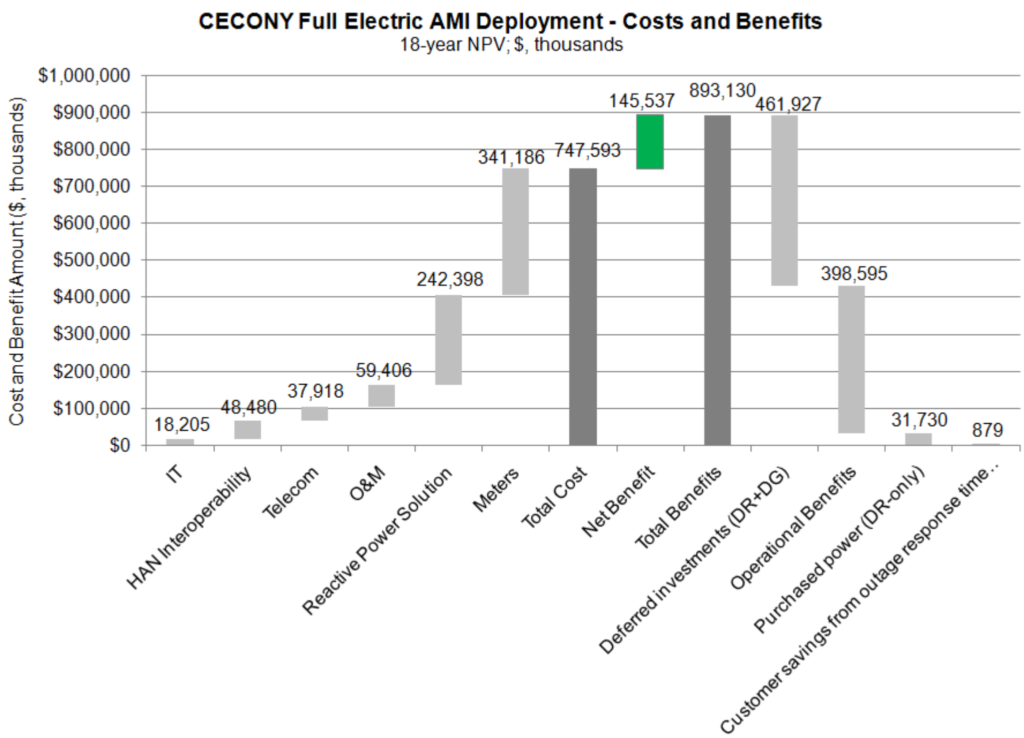
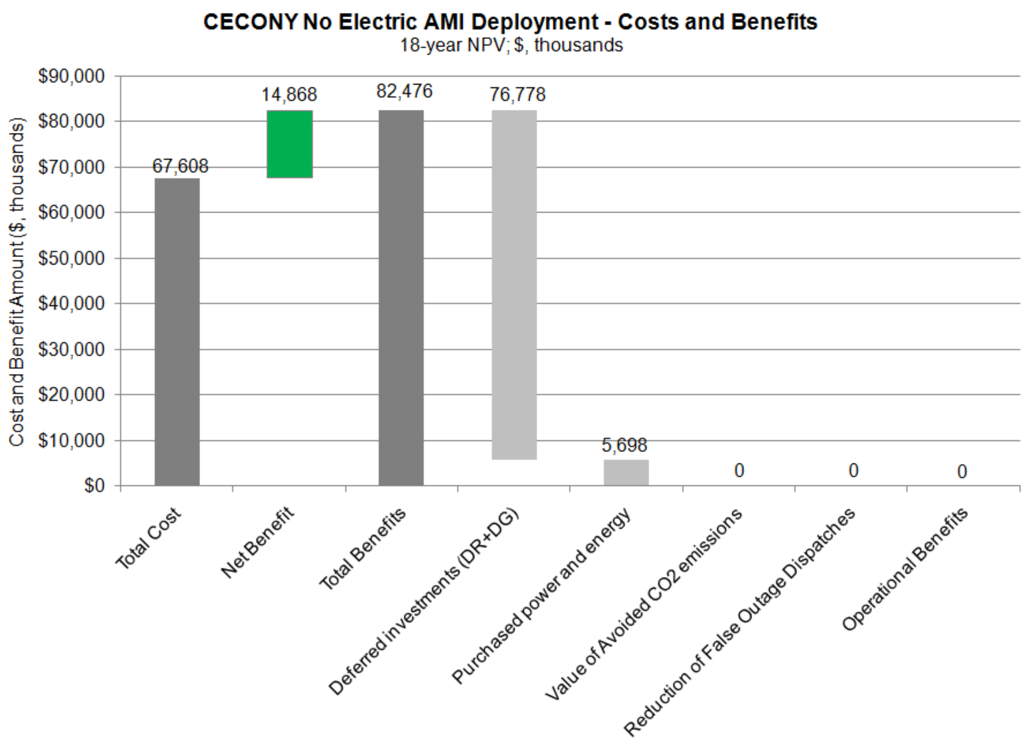


Table 5-1. Electric Meter Rollout Comparison For Full and Targeted Scenarios

	Full Deployment	Targeted Deployment
Year 1	200	131
Year 2	400	276
Year 3	600	328
Year 4	800	194
Year 5	600	145
Year 6	500	260
Year 7	185	162
Total Meters Installed	**3,285**	**1,496**

As shown on Figure 5-2, some of the load shape objectives discussed in Section 1.2 can be achieved via alternative technology solutions that do not require AMI. One way this may be possible is via the continued deployment of interval meters to commercial and industrial customers along with customized telecommunication solutions which in turn enable some of the proposed demand response programs. A high-level and preliminary analysis suggests that expenditures of approximately $67M to expand interval metering and two-way communication in the commercial and industrial segment could generate a net benefit of $15M.[50] An incremental 225,000 end points, including estimated costs for supporting telecommunication and IT, works out to an average per end-point cost of between $300 and $350. The estimated achievable benefits are due to deferred investment as well as purchased power savings as the Company is unable to achieve any operational benefits since mass market customers will still require traditional meter reading.

Figure 5-2. Costs and Benefits of Alternative Solution to AMI



In the process of evaluating the different alternatives, Con Edison quantified not just economic value, but also total capital outlay (ratepayer impact) and risk. Although full deployment maximizes the benefits of AMI, some benefits may not be worth the large capital expenditure and high risk (Figure 5-3). Moreover, Con Edison believes it is best to validate any associated benefits through a targeted approach.

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[50] The analysis of the no AMI alternative is based on a high level analysis that assumes that the utilization of traditional interval meters and one-way and two-way communication solutions will allow the deployment of demand and supply resources in non-residential segments.

Figure 5-3. Comparison of Cost and Benefits for Alternatives Considered

Cost and Benefit Analysis of Deployment Options

Benefits of AMI	Targeted Deployment	Full Deployment	Alternative Solution to AMI	Comments
1. Achieve Load Shape Objectives	◕	●	◔	Hardest economic benefit of load shaping is deferred T&D investments which flow directly to rate payers. Targeted deployment realizes most of these benefits at half the cost of full deployment
• Defer T&D investments	●	●	◔	
• Reduce power purchase costs	◑	●	◔	
• Lower customer bills	◑	●	◔	
• Meet environmental sustainability goals	◑	●	◔	
2. Increase Grid Visibility and Control and Enable Smarter Grid	◑	●	◔	Full deployment may be necessary to fully automate the grid; however until the benefits of automation are more clear a targeted rollout may be more reasonable
• Integration of renewables	◑	●	○	
• Ability to dispatch resources	◑	●	◔	
• Empowerment of customers with dynamic usage data	◑	●	◔	
• Enrichment of data for DA	◑	●	○	
• Integration of new end-use devices	◑	●	○	
• Data for C2SOS	◑	●	◔	
3. Gain Operating Efficiencies	◑	●	○	Most operational savings limited without full deployment
4. Enhance Reliability	◔	●	○	CAIDI's already best in class so may not justify a large investment to improve further
• Reduce duration of outages	◔	●	○	
• Better control over distribution system	◔	●	○	
Capital Expenditure	$340M	$752M	$85M[9]	
Risk • Objectives not achieved • Potential distraction to business operations • Technology risk	Medium	High	Low	Execution, business, and technology risks can be mitigated with a targeted rollout

AMI Objectives

● = Full Benefits ◕ = Most Benefits ◑ = About half of the benefits ◔ = Small portion of the benefits ○ = No benefits realized

5.2 SIGNPOSTS

During the piloting phase, Con Edison will collect better cost and benefits information. The company will revisit its AMI implementation strategy based on the intelligence collected from the pilots, as well as from closely monitoring its business environment. The Company has developed signposts that will trigger the review and adjustment of its plan at any point during implementation. Some of the areas that will be monitored are:

- **Load Growth**—Low and/or negative load growth will place additional pressure on capital expenditures and limit opportunity to manage peak demand.
- **Linkages to Smart Grid and DG strategy**—AMI as an enabler of operational savings and DR is only part of the rationale for the investment. Depending on Con Edison's smart grid strategy the meters, telecommunications infrastructure, and IT systems behind AMI may be necessary to enable more advanced initiatives such as enhanced automation and modeling.
- **Regulatory/Legislative Guidance**—As in other states, the regulatory climate is the largest driver of the pace of adoption of AMI.
- **Technology Obsolescence**—In the 20-year planning horizon there is a chance that traditional meters are no longer commercially available.

Throughout the phases of implementation, Con Edison will be monitoring these conditions, and will adjust programs as necessary.

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[51] The analysis of the "Alternative Solution to AMI" alternative is based on a high level analysis that assumes that the utilization of traditional interval meters and one-way communication solutions will allow the deployment of demand and supply resources in non-residential segments.

Assessment Document 4: Electric Vehicles

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1.0 OVERVIEW

Vehicles fueled by electricity can create an opportunity to reduce greenhouse gas emissions and reduce our reliance on fossil fuel.

The potential exists to drastically reduce our nation's CO_2 emissions by making prudent investments in transportation fuel diversity. The United States Government, as part of its initiative to address climate change, has pledged to invest billions of dollars in cleaner and more efficient alternative-fuel vehicles. Further, the State of New York, in its 2009 Energy Plan, expressed the goal of supporting energy and transportation systems to reduce greenhouse gas emissions. And, PlaNYC published the City's objective of increasing the electrification of fleet vehicles.

Plug-in hybrid electric vehicles (PHEVs) are a vehicle format that combines both an internal combustion engine (ICE) and a fully battery-powered electric motor of an **electric vehicle (EV). Plug-in Electric Vehicle (PEV)** is a term used to encompass any vehicle that can be fueled with electricity

Vehicle-to-grid (V2G) is the potential option of using electric vehicle batteries as a means of energy storage, allowing owners to sell back electricity acquired from the grid when their vehicles are plugged in at home.

Electric vehicles offer an opportunity to move our nation's transportation fuel source away from petroleum. Currently, the vehicle sector is almost completely dependent on liquid fuels. Expanding the diversity of fuels used in the transportation sector will increase flexibility in responding to any disruptions in the supply of petroleum-based fuels. Diversity should, in turn, protect the economy from the adverse impact of sudden changes in the availability and/or price of petroleum products.

Plug-in electric vehicles (PEVs) could have a sizable impact on electric utilities and the demand for power. Nearly every major auto manufacturer is preparing a PEV for introduction to the consumer market. With increased collaboration among auto manufacturers, utilities, government and businesses, PEVs appear to be a promising solution to the environmental consequences of dependence on vehicles with internal combustion engines. As more research and development is completed, designs will likely become more effective, energy efficient, and inexpensive. Plug-in hybrid electric vehicles will likely serve as a technology bridge to fully electric vehicles and a largely electrified transportation sector.[52] Currently, dedicated electric vehicles are viable for niche applications, such as limited commercial delivery. If battery technology evolves and production increases, electric vehicles will likely become useful in other transportation applications.

[52] Plug-in hybrid electric vehicles and electric vehicles, which do not have internal combustion engines, are both generally referred to as plug-in electric vehicles (PEVs).

While the future of electric vehicles is uncertain, the New York State Energy Research and Development Authority plans to examine the potential effect of these vehicles on the electric grid. This study will assess the energy, environmental, and wholesale market electricity price impacts of PEVs in New York. PEVs have the potential to improve our asset utilization but we need to keep a close watch on how usage patterns and market deployment evolve as unexpected concentrated load draws could cause a major additional strain on the existing grid if a sizeable portion of PEV's plug in at local peaks.

This assessment document lays out Con Edison's position to support the adoption of electric vehicles within our service territory. Specifically we discuss what we see as the main drivers of PEV adoption, provide estimates of how those adoption scenarios may impact our business, how we will prepare our grid to facilitate the integration of those vehicles, describe what role we will play to support electric vehicle adoption, and what regulatory and legislative changes we believe are necessary to drive that adoption.

One leading estimate of the nation-wide market for PEVs is half a million by 2015 and over a million by 2020.[53] That is a dramatic increase in a segment of the market which barely exists today. The drivers for this growth are:

- Volatile gasoline prices, which may rise even higher as the global economy recovers
- Increasingly stringent emissions restrictions from both the EPA and impending Federal legislation
- National security concerns from a dependence on foreign oil
- Accelerating timelines for national and regional fuel economy standards
- Government initiatives to promote the use of alternative transportation fuel
- Technology advancements and cost reductions in battery systems development and vehicle production

We believe that significant customer adoption (beyond early or niche adopters) of PEVs will follow rational, economic decision-making patterns. Consumers will embrace them when their benefits (cost savings, net of incremental costs) are positive. PEVs have higher initial costs than conventional vehicles, which the Energy Information Administration estimates to be approximately $5,000 more in 2030, of which the incremental cost of the battery alone accounts for $3,000.[54] These costs are expected to decline with manufacturing volume increases and technology improvement. In February 2009 the American Recovery and Reinvestment Act granted tax credits of up to $5,000 to be applied to the first 250,000 vehicles.

Based on the Energy Information Administration's estimates of the cost differential between PEVs and conventional vehicles and New York City electricity prices projected for 2030, we expect a 2-year break-even if gasoline prices rise to $8/gallon.

[53] Deutsche Bank Research.

[54] Battery costs are currently substantially higher ($12,000 vs. $3,000 in 2030).

There still remain challenges with PEVs, however. Developing a charging and support infrastructure and bringing the total cost of ownership in line with conventional vehicles remain hurdles to widespread customer adoption. Some of these hurdles include:

- Limited commercial charging stations for use by commercial or municipal fleets
- Lack of uniform standards for consumer charging infrastructure
- PEVs currently have a Total Cost of Ownership (TCO) premium over conventional internal combustion engines (ICE) vehicles
- Tax incentives and reduced operating costs often do not offset additional battery cost
- Public safety on the grid infrastructure
- Uncertain impact on road use tax (currently incorporated in price of gasoline)
- Uncertainties about availability of charging away from home-base locations
- Issues with charging when parking is done on-street – as is the case for many New York City residents
- Uncertainties about driving range
- Uncertainties about battery life
- Electric shock and other safety issues during charging (plugging in) and in accident situations

2.0 OBJECTIVES

Con Edison's long range plan for integrating PEVs into the grid, and enhancing our T&D system and customer offerings to accommodate the new load is outlined in this document. Our initiatives pertaining to PEVs were developed to meet five objectives, described on the following pages.

2.1.1 Reduce T&D Infrastructure Investments and Power Purchase Costs

Circuit level planning and measured integration of electric vehicle load into the grid will be important so as not to overload individual circuits where PEV penetration is high.

And potentially down the line, Con Edison may explore the potential to tap into PEVs as a storage option using vehicle-to-grid (V2G) applications may help offset demand growth and/or expensive peak-time power purchases. In a V2G scenario, PEV owners would be able to sell back electricity acquired from the grid when their PEVs are plugged in at home. For example, many fully charged PEVs plugged in during peak electricity-use hours could provide ancillary power to the grid when electricity demand is high. To make V2G a possibility, grid infrastructure changes would be required. Grid operators would need to have the capabilities to communicate with PEV on-board computers and to coordinate and control when electricity will be tapped from PEVs. The ability to utilize V2G is requires overcoming challenges including added costs and tradeoffs in battery / charger-system design required. As an example, home wiring may be most economically designed for charging batteries at a slow or moderate rate rather than providing a path to supply energy back to the grid. Similarly, batteries may be better optimized for powering the vehicle and V2G may be an off-spec use that may impact their life.

2.1.2 Help Customers Manage Energy Costs

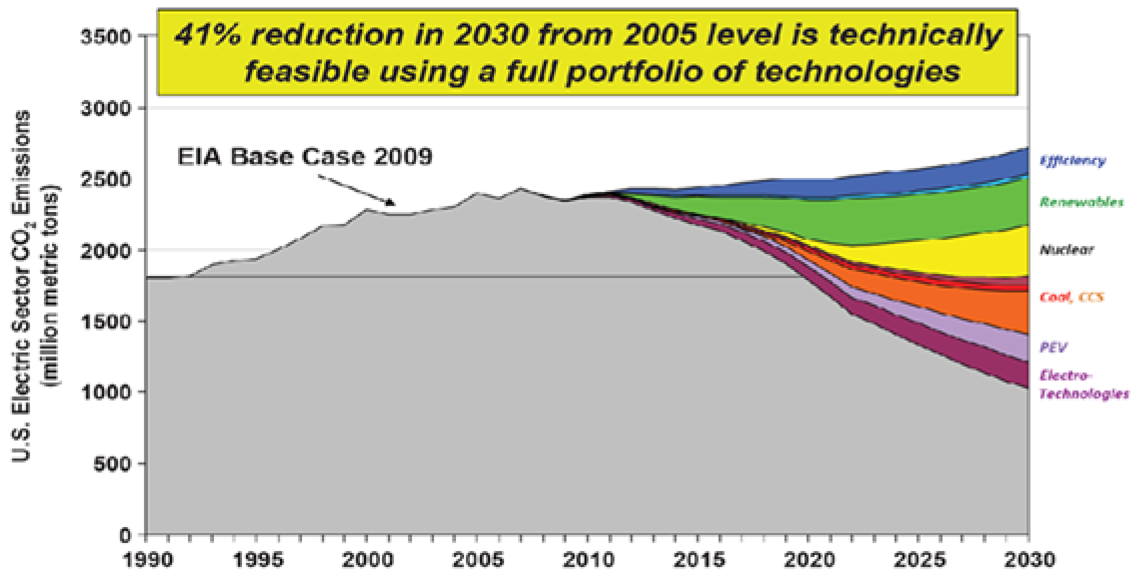
Facilitation of PEVs will lower customers' overall energy expenses by offsetting gasoline purchases with lower cost electricity. Studies have shown that because of the lower cost of fuels consumed to produce electricity as compared to the cost of petroleum, consumers and businesses that use PEVs can reduce the total cost of fuel for their vehicles.

Attractive time-based rates may also be developed to encourage off-peak charging, limiting the increase in electric bills from PEVs. In addition, the potential of vehicle-to-grid power would allow owners to sell electricity back to the grid when their PEVs are plugged in at home.

2.1.3 Improve Environmental Profile and Meet Government Targets

A study by the Electric Power Research Institute and NRDC (spell out) showed that widespread adoption of PHEVs can reduce GHG emissions from vehicles by approximately 150 million metric tons by 2030. This is equivalent to removing the emissions output of 27.5 million passenger cars.

Figure 2-4. Electric Power Research Institute's Assessment of Mechanisms to Reduce CO_2[55]



Preparing the grid for EVs also helps meet the Federal, state, and city environmental objectives and specific goals to increase the penetration of electric vehicles.

Table 2-1. Government Targets

Legislation/Sponsor	Description
Federal Legislation	Pending green house gas (GHG) legislation would require a reduction of CO_2 by 80% by 2050
New York City	Increase electrification of New York City vehicles (Transportation Plan)
New York State Energy Plan	Recommends a move toward wider use of electrification in the transportation sector

2.1.4 Enhance Reliability

Proactively forecasting for PEVs at a circuit level will avoid any negative impacts on reliability from unforeseen load spikes from PEV penetration. Con Edison will plan for PEV penetration based latest available data and conduct circuit-level projections in order to carefully manage the integration of PEVs into the grid.

[55] Electric Power Research Institute (EPRI). *PRISM/MERGE Analyses 2009 Update.*

2.1.5 Diversify Supply Portfolio

Since much of the electricity generated in the New York is generated using natural gas, nuclear, coal, hydro and wind, it could be expected that fueling PEVs will reduce fuel price volatility for consumers. And, potential V2G applications can further diversify the supply portfolio, and may reduce financial risks and volatility from reliance on large-scale centralized resources.

3.0 EMERGING PLAN

While there is still a lot of uncertainty about the viability of PEVs, Con Edison is active in shaping the landscape in our service territory by helping influence standards and conducting pilots to understand the impact on our customers and our infrastructure.

The Company currently has two patent applications for mobile, wireless solutions for metering the power used to charge vehicles, as well as for scheduling vehicle charging. These metering systems will allow us to measure the power consumed for charging electric vehicles through our grid. These systems wirelessly transmit this information through the first available network (e.g., radio, satellite and various cellular networks). The charging system developed by Con Edison R&D manages vehicle charging time slots depending on system demand. Meters coupled to vehicle batteries respond to wireless signals sent by the Company, allowing charging to occur during time of reduced demands on the distribution system.

We are also actively engaged in a number of PEV related initiatives as described below:

- **Utility and original equipment manufacturer PEV stakeholder group**—Con Edison was instrumental in helping develop a utility/original equipment manufacturer PEV stakeholder group with the mission of discussing prevalent issues related to PEVs. The group consists of utilities, auto manufacturers, and PEV component suppliers (battery and controls manufacturers).
- **Ford Escape plug-in hybrid electric vehicle testing and demonstration**—Con Edison, along with Southern California Edison and the Electric Power Research Institute participated in a program to build, test, and demonstrate a fleet of Ford-engineered plug-in hybrid electric vehicles while conducting a set of detailed and comprehensive studies that will help define how to successfully commercialize the vehicles.
- **Electric Power Research Institute/General Motors plug-in hybrid electric vehicle Infrastructure Working Group**—The Electric Power Research Institute, General Motors, Con Edison, and numerous other participating utilities meet periodically to discuss topics related to market analysis, public education, technical features, customer experience, macro value analysis, and public policy.
- **NYSERDA/Electric Power Research Institute/Con Edison Grid Impact Study**—The project's goals are to assess the impact of increased penetration of plug-in hybrid electric vehicles on the electric grid and on air quality in New York State, with particular interest in New York City and Long Island. The project will address four items: 1) identification of the base case scenario of transmission/distribution capacity 2) identification of several realistic plug-in hybrid electric vehicle penetration scenarios, including vehicle characteristics and required load support, 3) grid impacts of the various penetration scenarios, and 4) potential implications of vehicle-to-grid applications or utility aggregated load control.
- **Astoria Prius Fleet demonstration**—Con Edison has purchased Toyota Prius vehicles and has converted them into plug-in hybrids. These vehicles have been integrated into our Con Edison fleet where their charging is metered and monitored.
- **BMW Electric Mini Pilot**—Con Edison has leased an all electric BMW Mini Cooper and is currently testing the vehicle.
- **Supporting New York City PlaNYC readiness study for Electric Vehicles**—Con Edison helped analyze the expected grid impact of projected electric vehicle adoption in the five boroughs of New York City.

Based on what we know today, we expect that the primary utility challenges from PEVs will include system and distribution charging levels and integration with distribution operations and planning. Con Edison will continue to develop and revise plans to address these issues based on our R&D and collaboration with leading thought leaders and industry associations.

System and Distribution Charging Levels

PEVs may represent a significant new source of electricity use for Con Edison's electric distribution system in the future. This use will affect total system requirements as measured by consumption, and even more importantly will affect the distribution grid because of the relative concentration of PEVs on specific circuits or at peak times.

We expect commercial vehicle fleets and buses to be the earliest adopters of PEVs, which while not impacting our overall load significantly, will dramatically impact the load on individual load areas. For example an average size city bus depot could represent in excess of 1 MW of capacity.

The impact of new customer use on Con Edison's system peak will be influenced by the number of PEVs on the system and when they plug in. Charging may be concentrated during the early hours of the day and after arriving at home and the office. This could result in dual charging spikes.

Con Edison recognizes that PEVs may change load-area peaks. These localized changes will be more important than system peaks. PEVs in specific neighborhoods are likely to concentrate loads differently than at the system level. The result will be local circuit loadings significantly different than average system loadings.

Methods for incenting off peak charging will need to be evaluated for cost and effectiveness. Those solutions include, but are not limited to, rate incentives, smart chargers (price based charging), timer based chargers (time based charging) or other third party applications that become commercially available. Controlled charging, accomplished via these means, has the potential to shift charging load to night hours, when electricity demand is at its lowest. While PEV loads are not likely to be shifted completely to the night time, it may be possible to significantly alter customer usage patterns with smart charging capabilities. This in turn may reduce the need for new transmission and distribution assets.

In addition, demand response and other forms of load management can be deployed to smooth circuit-level load impacts. Demand response mechanisms would allow Con Edison to control loadings at specific times on specific circuits.

Con Edison's residential networks, which typically peak between 8PM and 11PM, may require pricing incentives designed to promote charging after the peak or smart charging to avoid local area overloads. Additionally, the long commute times from counties surrounding New York City may also require more daytime charging in New York City than in other regions.

Distribution Operations

Increased peak demand at night may reduce opportunities to perform maintenance, which is typically performed during periods of lower customer demand. In addition, the increased loading at night may change the thermal cycling of transmission and distribution assets and subsequently change our design specifications. These changes could lead to increased capital expenditures to reinforce our infrastructure. Further study is required to develop risk mitigation plans.

Our broader concern, however, is that PEVs must be integrated with the utility system at the distribution level. PEV charging interacts with metering, billing, system reinforcement, load control, and demand response management. Some functionality will require two-way communications for time-based pricing. Integration also requires coordination with utility information systems, as well as with operators. PEV integration is an example of a development that will benefit from Smart Grid technologies and advanced metering infrastructure (AMI) but does not require either for basic operation.

In order to prepare our system for these challenges, Con Edison supports a New York State Electric Fueling Collaborative, an organization created to centralize the analysis of the impact of electric fuel vehicles on the power grid. This collaborative will work with all stakeholders to analyze, through implementation of pilot programs, the impacts of PEVs on the bulk system and local distribution grid and should also assess the impact of emissions on air quality and the economic impact on New York State. The collaborative can also promote efforts to standardize payment and billing systems throughout New York State so that PEVs from anywhere in New York can seamlessly plug in and recharge in any part of the state. Such pilot programs should be implemented quickly in order to study system impacts, benefits, billing and tariff systems and consumer behavior.

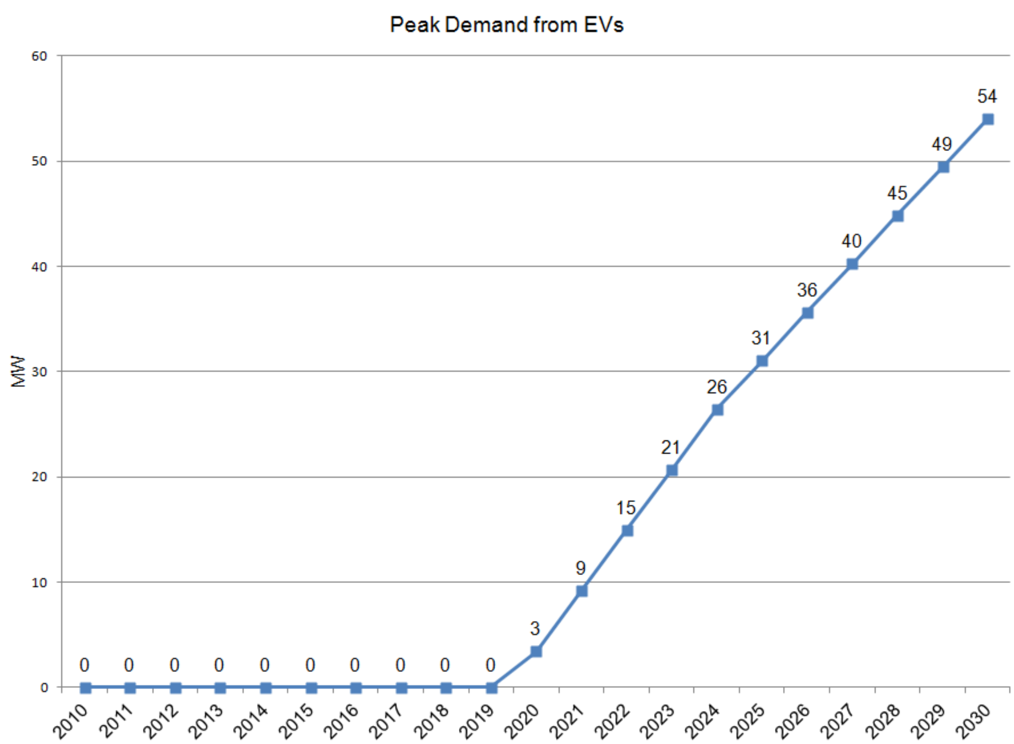
As Smart Grid technologies and advanced metering will impact the way PEVs interact with the electric system including vehicle-to-grid capabilities, we will continue to study and implement Smart Grid technologies that can identify electric vehicles using the electric system. This can be the solution to universal access to the electric grid for PEVs, and remove the barrier of requiring each PEV to have its own account with every utility before recharging.

4.0 FORECASTS

Initial analysis of PEV penetration in our service territory indicates a range of scenarios, with varying assumptions around penetration levels by load area and charging patterns. For our plan case we have assumed a system-level, peak-coincident impact of 54 MW in 2030, illustrated in Figure 1-2.

There are a number of different forecasts available for adoption rates for electric vehicles. Our forecast is based on background studies obtained from the Department of Energy and the Department of Transportation as well as data obtained from Electric Power Research Institute, the U.S. Census, and vehicle manufacturers. Using income and driving patterns as the primary factors influencing adoption, our Plan Case forecast is for 380,000 residential vehicles registered in New York City by the year 2030. This represents approximately 10.7% of the current vehicle registration. PEV adoption for Westchester County is also incorporated into the estimates in Figure 1-2. This demand impact assumes that 15% of vehicles will be charged at peak.[56] The remaining vehicles will be charged either at off-peak hours or use smart charging equipment to charge at times predefined by the owner of the vehicle. In environments with time-based pricing, it is expected that many drivers will charge overnight to take advantage of lower cost of energy.

Figure 4-5. Projected Demand Impact of Electric Vehicle Adoption in Con Edison Territory

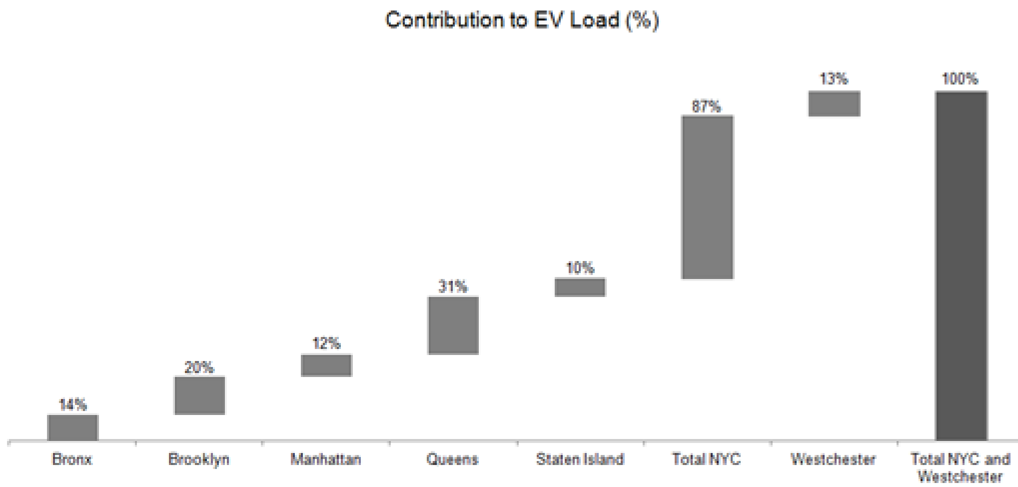


As discussed earlier, our plans to facilitate and manage the integration of PEVs into the grid must be focused on specific load areas as penetration may vary dramatically across our service territory and

[56] Based on Plug-In Hybrid Electric Vehicle Infrastructure Report – November 2008

system reinforcements will be specific to particular locations. The estimates in Figure 1-2 represent the aggregation of load-area specific estimates. Summarized by service territory, regional contribution to PEV load projections for 2030 is illustrated in Figure 1-3.

Figure 4-6. Electric Vehicle Load Contribution by Service Territory



5.0 SIGNPOSTS

The overall rate of adoption of PEVs and our pace of investment in infrastructure re-enforcement will be influenced by a few key factors:

- **Driving range**—A roadblock to widespread utilization for electric vehicles has been their limited driving range, which is entirely predicated on the design of the batteries. Battery development is constrained by inherent tradeoffs between five main battery attributes: power, energy, longevity, safety, and cost. Two leading battery designs rely on nickel-metal hydride and lithium-ion. Other battery technologies are in various stages of development and many different types of chemical combinations are currently being tested to achieve the energy storage density needed to increasing driving range and affordability, thus facilitating the widespread adoption of electric vehicles.
- **Interoperability**—Utility tariffs, which can be designed to accommodate not just local PEVs but also PEVs from other areas, will also drive adoption. The universality of fueling capability throughout the nation must be resolved; no one will buy a car that can’t be filled up outside of one’s own region. Billing becomes a technical issue that must be addressed through Smart Grid technology. This will require an integrated communications infrastructure and corresponding price signals. Smart chargers enabled by the Smart Grid will help manage the distribution infrastructure and allow for accurate billing.
- **Continued support for alternative fuel vehicles**—Government support will also be important to electric vehicle adoption, including current and proposed policies and plans such as Federal policy and pending greenhouse gas legislation.

Assessment Document 5: New Transmission

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1.0 OBJECTIVES

1.1 NEW TRANSMISSION AS A WAY TO INTEGRATE COST EFFECTIVE SUPPLY SOURCES, INCLUDING RENEWABLES

Transmission projects offer another way to access renewable or less expensive sources of generation and to maintain or improve reliability. The Company recognizes and supports examining transmission projects that achieve these goals, but only to the extent that reliability is maintained and the transmission project is the most cost effective method, as compared to local generation or energy efficiency, for achieving those goals. The primary threshold for any transmission project is the project's impact on system reliability. Each merchant generation or transmission project requesting to interconnect to the Con Edison grid must meet a strict set of publicly posted reliability standards. This review takes place under the supervision of the New York Independent System Operator (NYISO) through its interconnection process tariff, which include individual project studies, the system reliability impact study (SRIS), and the class year deliverability and cost allocation studies performed jointly for all projects in the class year. Con Edison is an active participant in those studies.

After it has been determined that a transmission project meets reliability requirements, there are different ways for a transmission project to be financed and built: (1) Con Edison can build a transmission projects itself that meets local reliability needs (e.g., the M29 project); (2) Con Edison can purchase capacity from or invest in a merchant transmission project; (3) other New York City energy companies that serve load, e.g., NYPA, can purchase capacity from or invest in a merchant transmission project; or (4) a transmission project can be approved for regulated cost recovery through either the NYISO's reliability or economic planning processes.

When deciding whether to invest in transmission projects, the Company evaluates projects across four broad objective themes: reliability, strategic implications, customer costs and benefits and societal costs and benefits. These criteria are consistent with statements by the Electric Power Research Institute (EPRI), which has stated, "The fundamental expectation of the electric power industry, in this computer-controlled, internet connected age, is to meet growing demand; cleanly, reliably and sustainably; at low cost"[57]. They are also consistent with IEEE-USA's recently released National Energy Policy Recommendations which state "The primary objective of transmission system expansion is to meet load growth reliably and efficiently.[58]

Reliability continues to focus on system integrity which must always be top of mind. In addition, projects are reviewed on their ability to cost-effectively reduce network congestion in order to minimize waste and reduce unnecessary cost.

Finally, the potential societal benefits of transmission projects should not be overlooked. For example, using transmission to connect to cleaner or renewable fuel sources could reduce greenhouse gas emissions (GHG) while helping New York State meet its renewable portfolio standard (RPS) targets[59].

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[57] EPRI presentation, "Transmission Efficiency Initiative, Regional Workshop Series: A Synthesis of Key Findings, Developments of Industry Demonstrations, and Next Steps to Achieve a Lower Carbon Future", October 05, 2009

[58] http://www.ieeeusa.org/policy/positions/energypolicy.pdf

[59] The PSC, however, has indicated that "It does not appear that the achievement of the RPS goal will be significantly hampered by transmission constraints", Transmission Adequacy To Meet the Renewable Portfolio Standard, November 12, 2009. The

But it should be recognized that it is difficult if not impossible to justify building a long haul transmission line for renewable sources only and that currently it appears that most of the transmission investment necessary for New York to meet its RPS would be for local upstate projects.[60]

Table 1-1 explains how transmission projects, as part of a portfolio of solutions, may help achieve our objectives of managing demand, supply, and environmental emissions impact.

Table 1-1. Role of New Transmission in Achieving Objectives

Objective	Role of New Transmission in Achieving Objectives
Reduce Transmission & Distribution Infrastructure Investments and Power Purchase Costs	Building new transmission could enable integration of less expensive sources of supply, thus lowering purchase power costs.
Help Customers Manage Energy Costs	New transmission projects may be utilized to interconnect the Con Edison transmission system with more diverse supply sources, providing a hedge against risk from volatile commodity price changes. In addition, new transmission projects may offer a way to potentially reduce congestion costs.[61]
Improve Environmental Profile and Meet Federal, New York State, and New York City Targets	Transmission projects can connect to cleaner and/or renewable fuel sources, including offshore wind, which in conjunction with local renewable energy supply sources may reduce greenhouse gas emissions and help both New York State and New York City meet their renewable energy targets.
Diversify Supply Portfolio	New transmission projects, if they provide access to renewable resources may also help to diversify our supply portfolio.

NYISO has preliminarily reached similar conclusions in its wind integration study. *See* http://www.nyiso.com/public/committees/documents.jsp?com=bic_miwg&directory=2010-02-17.

[60] See the NYISO Wind Study referenced in footnote 3.

[61] It should be noted that Con Edison customers are already generally supplied by a diverse portfolio of resources including hydroelectric, nuclear, natural gas and coal.

At this time, however, the New York Independent System Operator is forecasting no reliability needs through 2019 and its first economic transmission planning study, the Congestion Analysis and Resource Integration Study (CARIS), does not show material net benefits resulting from the construction of new transmission.[62] In addition, a study by the New York City Economic Development Corp has indicated that new transmission in New York City is not necessary for reliability until 2019.[63]

1.2 NEW YORK STATE TRANSMISSION ASSESSMENT AND RELIABLITY STUDY (STARS)

In order to study the transmission needs in New York State in the future, the Company is involved in the New York State Transmission Assessment and Reliability Study (STARS), a joint effort initiated by the transmission owners in New York State and supported by the NYISO, with the goal of studying the bulk power system throughout the state to assess its ability to meet the future needs of New York State residents through around 2028. Phase 1 of the study confirmed that transmission reliability needs depend on where generation is sited (i.e. none needed if generation locates close to load). Moreover, the current NYISO interconnection queue indicates a high probability of substantial new generation in New York City. Phase 2 will examine projects that may address longer-term reliability issues identified in Phase 1 as well as aging infrastructure and wind integration. Con Edison may invest in transmission for wind projects as a result of the potential projects that will be identified by this study, but at this time it appears that most of the projects needed will be local upstate projects.

1.3 NYISO COMPREHENSIVE SYSTEM PLANNING PROCESS (CRPP)

In addition, Con Edison provided input into, reviews and votes on the New York Independent System Operator's Reliability Needs Assessment (RNA), a biannual study aimed at ensuring the reliability of the New York State bulk power transmission system over a forward looking ten year period., Con Edison also participates in the NYISO's Congestion Assessment and Resource Integration Study (CARIS). CARIS evaluates the potential to reduce congestion across the New York State bulk power transmission system and provides for regulated cost recovery of economic transmission projects that produce statewide reductions in total energy supply costs and receive favorable support from at least 80% of the project beneficiaries. As discussed above, those studies have shown no need for any reliability projects and that it does not appear that new transmission would provide material benefits at this time. The map and chart from the CARIS report show that there is no transmission project that has benefits that would exceed its costs except at the lowest possible cost estimate for a project that connects the Leeds and Pleasant Valley substations, and even then the benefit to cost ratio is only 1.07 to 1.

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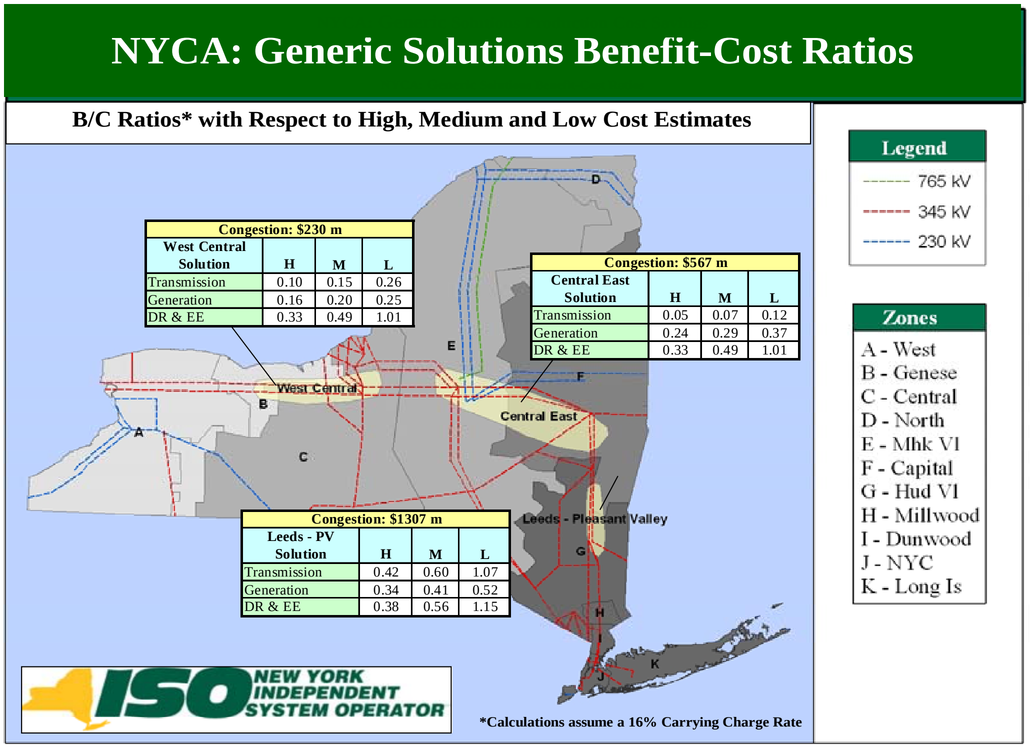
[62] Report available at https://www.nyiso.com/public/webdocs/committees/mc/meeting_materials/2009-12-16/agenda_04_CARIS_Draft_Report_MC_12_16_09.pdf.

[63] HTTP://WWW.NYCEDC.COM/NEWSPUBLICATIONS/STUDIES/MASTERELECTRICTRANSMISSIONPLANFORNYC/PAGES/MASTERELECTRICTRANSMISSIONPLANFORNYC.ASPX

Figure 1-1. NYISO Cost Benefit Solution Center



2.0 PROJECT COMPONENTS AND FUNCTIONALITY

2.1 TRANSMISSION PLANNING OPERATIONAL CRITERIA FOR EVALUATING PROJECTS

With the goal of evaluating projects against the aforementioned strategic objectives, the Company uses a strict set of eleven design principles that must be adhered to by any transmission project desiring to interconnect to the Con Edison system. Based on FERC's Order 890, these design principles are embedded into the Company's Transmission Planning Criteria document EP-7100 posted on the Con Edison website. This process helps to ensure consistency in evaluation as well as consistency in focus with the objectives.

- New generation and transmission facilities shall not require the interruption of any transmission path.
- Interconnection plans for new generators and transmission lines shall satisfy the need for adequate station diversity recognizing that an acceptable configuration may require the relocation of existing feeders.
- A single event (e.g. breaker failure) will not result in the outage of multiple supply sources (generation or transmission) into a Transmission Load Area (TLA). A TLA is a selected portion of the transmission system where transmission into the TLA is insufficient alone to meet reliability criteria and requires the use of generation within the TLA.
- The loss of any single feeder will not result in the outage of multiple bus sections.
- New generation and transmission facilities proposing to interconnect to an existing transmission substation shall do so in a manner consistent with the design basis established by the Company for that substation (i.e. ring bus, double ring bus, or breaker-and-a-half). The new interconnection shall not compromise the basic design concepts inherent in these configurations.
- New generation and transmission facilities proposing to interconnect to an existing transmission feeder shall require the construction of a new substation with the appropriate breaker configuration at the point of interconnection to maintain system reliability. In the case where the existing transmission feeder is one of multiple feeders with common terminals, then all such transmission feeders shall be incorporated into the design of the new substation to prevent the interconnection from causing an imbalance in the power flow distribution.
- Interconnection plans for new generators and transmission lines shall be designed to ensure system reliability, and as such shall comply with basic substation reliability design.
- The Company shall not be obligated to supply or absorb reactive power for entities interconnecting transmission systems (new or modified interconnections) with the Company's transmission system. Such entities shall supply the additional reactive power requirements attributable to such interconnection to ensure reactive power neutrality at the point of interconnection to the Con Edison transmission system, except as otherwise mutually agreed. These requirements are applicable to normal system conditions, as well as steady-state conditions resulting from design criteria contingencies described in the New York State Reliability Council (NYSRC) Reliability Rules for Planning and Operating the New York State Power System.
- All equipment on the transmission system, including but not limited to circuit breakers, bus work, disconnect switches, and structural supports, shall withstand the mechanical forces associated with fault currents.

- The harmonic voltage or current distortion created by any interconnecting facility must not exceed the fundamental 60 Hz voltage or current waveform limits as identified in IEEE Standard 519.
- All facilities, generator and transmission, must be designed to conform with and adhere to all applicable NERC, NPCC, NYSRC reliability rules including NYSRC local reliability rules, as well as applicable Con Edison specifications, procedures and guidelines.

There are a number of initiatives both recently completed and planned for the future which the Company feels exemplify the types of projects submitted for review to the NYISO, and which could have an effect on Con Edison going forward. These do not represent the entire list of transmission projects in the NYISO queue.

Table 2-1. Examples of Future Generation/Transmission Projects in NYISO Queue[64]

Project	***Description***	***State of NYISO Process***
Long Island Offshore Wind Collaborative	A project to interconnect up to 700 MW of offshore wind power to the Con Edison and LIPA service territories. Project completion is scheduled for January of 2015.	Feasibility Study Phase
Astoria Energy II to NYISO GIS substation	Construction of a connection to the new 550 MW combined cycle generation plant in Astoria, Queens, via a new GIS substation in the Astoria Complex. Project completion is expected in the spring of 2011.	Facility Study Phase
Hudson Transmission Project	Interconnection of 660 MW between New York City and PJM via an underwater connection between Ridgefield, NJ and the W. 49th Street substation. Project expected to be complete in Q4 of 2011.	Facility Study
Hess/Bayonne Energy Center	Construction of a connection between a 513 MW generation facility, located in Bayonne, New Jersey, and the Gowanus Substation to be complete in Q4 of 2011.	Facility Study Phase
NRG Berrians III	Interconnection of 789 MW at the same location as the Astoria Energy II project, expected to be complete in Q2 of 2011.	Facility Study Phase

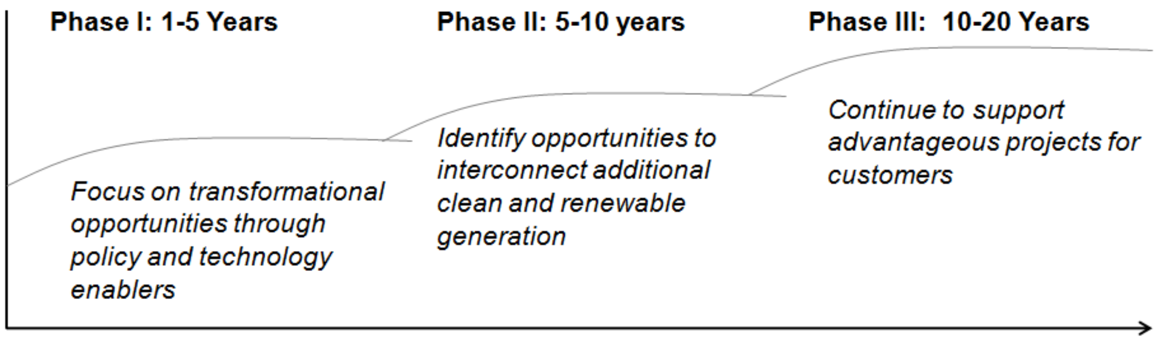
In addition to these projects, Con Edison has plans to build additional transmission substations within the service territory needed for load relief in certain areas of the Con Edison grid. These include the nearly complete Academy station in Manhattan and the future plans for Gowanus switching station in Brooklyn and the West Side switching station in Manhattan, both of which are currently forecasted to be in service in the 2020-2026 timeframe. Con Edison will continue to evaluate load on an annual basis to determine if these stations will continue to be necessary, or if additional stations will be required elsewhere in the service territory.

3.0 IMPLEMENTATION PLAN

3.1 LONG RANGE STRATEGY

As noted above, there are no transmission projects that currently appear to be needed for reliability or economic reasons. In the longer term there may be an opportunity to build new transmission to integrate bulk renewables into the overall generation mix. The combined costs of transmission projects with remote generation, however, must continue to be compared against the cost of adding new local generation and against the cost of demand side management programs to offset additional load growth. Figure 3-1 illustrates that Con Edison's transmission projects generally fall into three phases.

Figure 3-1. Implementation Plan



Three generation/transmission projects, occurring during Phase I, which highlight Con Edison's goal of integrating bulk renewables and/or affordable supply, are the Long Island Offshore Wind Project, the Astoria Energy II Project and NRG Berrians III.

The Joint Con Edison-Long Island Power Authority Offshore Wind Power Project aims to create the largest offshore wind project in the United States. A goal such as this cannot be achieved alone, and therefore a joint venture was created between Consolidated Edison, the Long Island Power Authority, the Port Authority of New York & New Jersey, the Metropolitan Transit Authority, the New York State Department of Environmental Conservation, the New York Power Authority, and the New York State Energy Research and Development Authority. Successful implementation of this offshore wind project, which is expected to reduce CO2 emissions by 40,000 tons annually, will significantly enhance New York's downstate renewable supply portfolio when the project is placed in service (currently scheduled for 2015). In addition to its environmental benefits, this initiative would add 700 MW of intermittent power to the combined service territories of Con Edison and the Long Island Power Authority. The proximity of these wind resources offers a significantly lower transmission cost than other potential projects to interconnect renewables which is an additional benefit to our customers.

The first Astoria Energy unit, online since 2005, is one example of a new clean natural gas plant that has been built in New York City over the last 10 years and uses combined-cycle natural gas technology. This process utilizes exhaust gas normally lost in the combustion process to produce additional electricity, therefore reducing fuel consumption by the plant by 30% per unit of electricity generated over conventional power plants. The second unit is the same kind of generating plant as Astoria I. It is anticipated that this facility will be interconnected where the retired Charles Poletti Power Project in Astoria, Queens once interconnected, the new generation facility, strongly supported by state and city government officials is expected to be online in May 2011 and will supply an additional 550 MW to New York City.

The NRG Berrians III project is aimed at injecting 789 MW of generation at the point of the retired Poletti site.

It is possible that within the near term technology changes will occur that will add to the affordability and availability of renewable sources of generation. As such, the Company will seek to identify opportunities to connect to these resources to help meet any Federal renewable portfolio standard targets and greenhouse gas objectives, as long as the connection of these sources does not include an unwarranted cost burden on our customers for transmission lines that have not been deemed necessary for reliability.[65]

During Phase III Con Edison expects to be involved with transformational opportunities that will enhance the capabilities of the business. These transformation drivers should come from both policy initiatives as well as technological advancements, and Con Edison is committed to utilizing any and all measures that will have significant cost and environmental benefits for customers.

[65] Con Edison favors federal economy-wide greenhouse gas legislation but is opposed to a federal renewable portfolio standard. It has supported the State RPS as a mechanism for developing in-State renewable power.

4.0 COST BENEFIT ANALYSIS

4.1 FUNDING OF NEW TRANSMISSION PROJECTS

Building new large transmission projects is an extremely capital intensive endeavor, and several business models exist for the ownership and operation of transmission assets. The two most common models are for transmission assets to be owned by utilities, generators and municipalities or for the assets to be owned by independent transmission companies. Con Edison's position is that joint ownership of transmission assets by New York State's utilities should be encouraged as an effective and equitable way to finance any new transmission that would, for example, reduce congestion or achieve societal goals like greenhouse gas reduction.

The New York Independent System Operator operates a competitive wholesale market and accordingly maintains a market based philosophy with regard to the need for transmission and generation assets. Only in situations where market based proposals are insufficient to meet identified reliability needs will regulated solutions be required to maintain reliability. Costs of regulated transmission projects necessary to maintain system reliability are passed through to customers via rules specified in the New York Independent System Operator's tariffs on file with the Federal Energy Regulatory Commission (generation and demand-side management projects are subject to the PSC's jurisdiction). Further, costs of regulated transmission projects that reduce congestion and provide statewide economic benefits may be passed through to customers via economic planning rules also outlined in the New York Independent System Operator tariff if the project receives 80% or more approval from the project's intended beneficiaries.

The Federal Energy Regulatory Commission has ultimate jurisdiction over transmission projects and to promote transmission investment has defined several incentives including ROE adders on new investments that owners of transmission assets that meet certain requirements are allowed to earn.[66] Projects which are approved in a regional planning process generally qualify for these returns.[67]

With regard to the overall cost of transmission projects, the Long Island Offshore Wind Project is currently budgeted at $821 million for the on-shore transmission infrastructure, to be spread out over two phases -- $415 million for Phase I and $406 million for Phase II. This cost only applies to the transmission lines needed to interconnect the wind farm to both the Con Edison and Long Island Power Authority systems and does not include the cost to build the wind farm itself.

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[66] FERC Order 679 states: "THE PROPOSED INCENTIVE RATE MUST DEMONSTRATE A NEXUS BETWEEN THE INCENTIVE SOUGHT AND THE INVESMENT BEING MADE (1) Any incentive-based ROE must fall within the range of reasonableness established by the Commission for the particular entity requesting the ROE for its investment in new transmission facilities; (2) While the incentive-based ROE will continue to fall within the traditional zone of reasonableness it will be adjusted upward and will be higher than would otherwise have been granted absent the incentive; (3) No specific ROE adders are established; (4) The Commission will determine the level of the incentive-based ROE on a case-by-case basis when an application for an incentive-based ROE is filed with the Commission; (5) To receive an incentive-based ROE, a public utility must support the ROE request by demonstrating how the new facilities will ensure reliability or reduce transmission congestion."

[67] The New York Public Service Commission is one of the few state commissions that has not unbundled electric transmission and distribution tariffs and as such retains substantial overlapping regulatory authority with Federal Energy Regulatory Commission. Unbundling is a regulatory reform that may be appropriate to pursue.

5.0 ALTERNATIVES CONSIDERED

5.1 ADDITIONAL RENEWABLE PROJECTS MAY BE NEEDED

As of July 2009, there were 23 generation and transmission projects in the NYISO queue related to Con Edison; however, only 1,301 MW of the 14,000 MW in total are directly from renewable sources. This includes 700 MW from the Long Island Offshore Wind Project as well as 601 MW from an additional wind farm in the NYC area known as Winergy. Con Edison will continue to monitor this situation and encourage the use of renewables whenever a reliable and economic solution is presented.

5.2 SIGNPOSTS

In order to be adaptable to the marketplace, Con Edison has defined a number of signposts that will identify changing needs and sentiments of the market and that could require modification of the overall strategy.

- **Enactment of more stringent Federal renewable portfolio standards and greenhouse gas laws**—Federal targets that are more aggressive than New York State targets may provide increased impetus for the interconnection of renewable sources of generation.
- **Dramatic changes in the sources or amount of supply available**—Dramatic changes in supply availability could affect the need for additional transmission assets, for example, Entergy failing to renew the operating licenses of the Indian Point Units 2 and 3, which would result in their retirement at the end of September 2013 and December 2015, respectively.
- **Increased proliferation of storage technology**—The proliferation of new storage technologies may alter the need for additional transmission assets.
- **Changes in federal regulation and oversight**—Policy regarding Independent System Operators, Regional Transmission Operators, and Interconnection-Wide Planning Requirements can have a significant impact on the entire transmission industry.
- **Results of New York State Transmission Assessment and Reliability Study**—Results could call for changes to be implemented by various New York State transmission entities in order to meet the needs of customers and ensure reliability (but does not appear likely at this time).
- **Changes in customer demand, including for cheaper or cleaner sources of energy**—Dramatic changes in customer requirements including conservation measures could impact the pursuit of additional transmission projects.

Throughout the three phases of implementation, Con Edison will continuously monitor these conditions, and adjust programs as necessary. As the internal and external environments change, additional signposts may be identified and added to this list.