A GREENER, GREATER NEW YORK

The City of New York
Mayor Michael R. Bloomberg

PLANYC

A GREENER, GREATER NEW YORK

Introduction

Credit: NYC Economic Development Corporation

PLANYC

Thirty years ago, a plan for New York's future would have seemed futile.

The city was focused entirely on solving immediate crises. Government flirted with bankruptcy. Businesses pulled up stakes. Homes were abandoned. Parks were neglected. Neighborhoods collapsed. Subways broke down. Crime spiraled out of control. New York seemed unsafe, undesirable, ungovernable, unsolvable.

Today, the city is stronger than ever.

Transit ridership is at a fifty-year high. Crime is at a forty-year low. We have our best bond rating ever, and the lowest unemployment. A record 44 million tourists came to visit last year. For the first time since World War II the average New Yorker is living longer than the average American. And our population is higher than it has ever been.

Moving to New York has always been an act of optimism. To come here you must have faith in a better future, and courage to seek it out; you must trust the city to give you a chance, and know that you'll take advantage when it does. You must believe in investing in your future with hard work and ingenuity. You must, in short, believe in accepting a challenge.

This Plan is offered in that spirit.

The challenges we face today are very different from those of the 1970s, but they are no less critical. Our population will grow to over nine million by 2030. Much of our physical infrastructure is a century old and showing its age. Even as we have revitalized the five boroughs, the quality of our air, water, and land still suffer. And today we face a new threat with potentially severe implications: global climate change.

This Plan seeks to repel these threats and to extend the gains we've made over the last thirty years. It seeks active solutions rather than reactive fixes. The 1970s taught us that investing in our future is not a luxury, but an imperative. With that in mind, this Plan seeks to secure for our children a city that is even greater than the one we love today.

The time for such forward thinking has arrived. Just five years ago, let alone thirty, confronting these challenges would have been impossible. In the wake of the September 11th attacks, we planned for the next day, not the next decade. But our economic rebound has been faster than anyone imagined. And so today, we have an opportunity to look further. And we have an obligation to do so, if we are to avoid a repeat of the decay and decline of the 1970s.

The moment for facing up to our responsibility for the city's long-term future is now. The city we pass on to our children will be determined in large part by whether we are willing to seize the moment, make the hard decisions, and see them through.

This is not a plan that supplants other City efforts, such as those we are making on crime, poverty, education, or social services. Here we have focused on the physical city, and its possibilities to unleash opportunity. We have examined the tangible barriers to improving our daily lives: housing that is too often out of reach, neighborhoods without enough playgrounds, the aging water and power systems in need of upgrades, congested roads and subways. All are challenges that, if left unaddressed, will inevitably undermine our economy and our quality of life.

We can do better. Together, we can create a greener, greater New York.

New York City

Our Challenges

Under that mandate, we have identified three main challenges: **growth**, an **aging infrastructure**, and an **increasingly precarious environment**.

GROWTH

OpenNYC

New York's population swings have always been shaped by the tension between the allure of a slower paced life elsewhere and the energy and openness that has drawn new residents from across the United States and around the world.

Over the first half of the 20th century, our population swelled every decade, propelled by the consolidation of the five boroughs into a single city, the expansion of the subway, and surges of immigration. As a result of these forces, between 1900 and 1930, the population soared from 3.4 million to 6.9 million people.

By 1950, the number of New Yorkers reached 7.9 million. But after that, the suburban ideal came within the grasp of many post-war New Yorkers. The pull of new, single-family homes in Westchester, Long Island, and New Jersey was so strong that, despite continued domestic in-migration our population stagnated. In the 1970s, rising crime and a plummeting quality of life caused the city to shrink by 800,000 people.

We have spent the past three decades painstakingly restoring our city's quality of life. As recently as 1993, 22% of New Yorkers cited safety and schools as reasons to leave New York. When asked those same questions again in 2006, only 8% of recent movers gave similar answers. And the opportunities that lured immigrants to our city from around the country and around the world continue to do so. Our city's resurgence has enabled New York to burst through its historic population high with 8.2 million people. We are also more diverse than ever; today nearly 60% of New Yorkers are either foreign-born or the children of immigrants.

Barring massive changes to immigration policy or the city's quality of life, by 2010, the Department of City Planning projects that New York will grow by another 200,000 people. By 2030, our population will surge

Growth in New York City

New York will continue growing through 2030, but not all the changes are intuitive. While the city's population will reach a new record, only two boroughs (Staten Island and Queens) will surpass their historic highs.

Our fastest growing population will be residents over the age of 65, while our number of school-age children will remain essentially unchanged. Overall, our residents will average three years older, a result of the baby-boomer generation reaching retirement and lengthening life spans across the city. This means we must concentrate on increasing the number of senior centers and supportive housing as we look ahead.

As a result, while the city's overall projections are instructive, important differences exist between each borough.

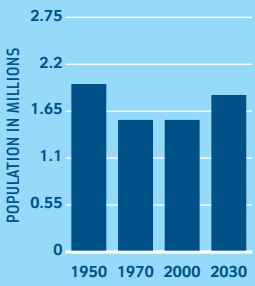
- INDUSTRIAL BUSINESS AREAS
- BOROUGH BUSINESS DISTRICTS
- CENTRAL BUSINESS DISTRICTS

Manhattan

Manhattan's population peaked in 1910, when its 2.33 million residents were piled into tiny apartments with extended relatives, creating densities in the range of 600 to 800 persons per acre. Today, even the most crowded high-rise blocks can claim densities at just one-half that level. As a result, while Manhattan may experience the second-highest growth rate of any borough through 2030, its 1.83 million residents in 2030 will fall far short of its record high. A significant portion of that growth will come from residents over 65, who will increase by nearly 60%.

YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	1.96 MIL	-	37	19.7	8.7
1970	1.54 MIL	-21.5	35	21.7	14.0
2000	1.54 MIL	-0.1	36	17.2	12.2
2030	1.83 MIL	18.8	40	15.2	16.1

Population

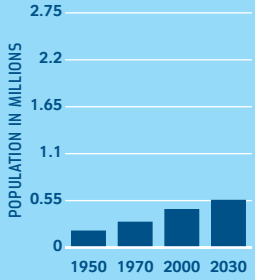


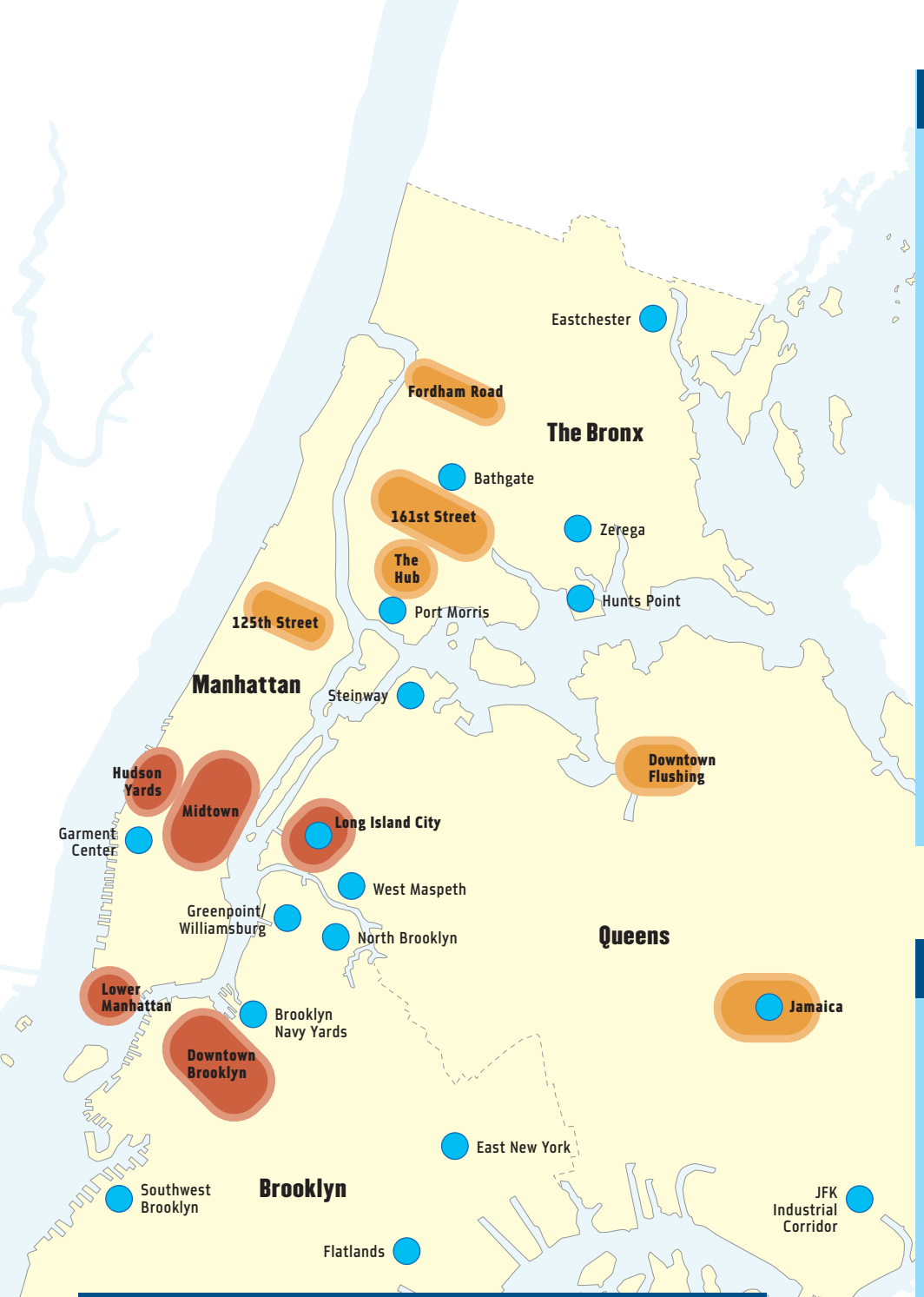
Staten Island

With abundant open space and relatively low density, Staten Island has the smallest population of any borough. But it is the only borough that has experienced growth each decade between 1950 and 2000. This trend will continue, although at a slower pace than between 1970 and 2010. By 2030, the population will reach a historic peak of 552,000 people, a 24.4% increase over 2000. As residents stay longer and settle, the population will age dramatically. In 1970, Staten Island was the city's youngest borough; by 2030, it will be the oldest. These older residents will push the borough's median age to nearly 40 years in 2030, a 12-year increase from 1970.

YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	191,555	-	32	27.9	8.1
1970	295,443	54.2	28	34.4	8.7
2000	443,728	50.2	36	25.4	11.6
2030	551,906	24.4	40	22.0	18.7

Population



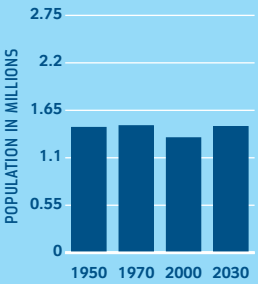


The Bronx

While the population of the Bronx peaked in 1970, the following decade saw disinvestment in housing, rising crime, and the growing appeal of the suburbs. These conditions precipitated a crisis that resulted in the loss of more than 300,000 people. While New York has largely rebounded from the desolation of that decade, the Bronx was most deeply affected. By 2030, the borough is projected to pull almost even with its 1970 historical high of 1.47 million.

Higher-than-average birth rates will compensate for the out-migration to other boroughs and the suburbs. Larger families will also help the Bronx remain New York's youngest borough, with a median age of 33 years.

Population

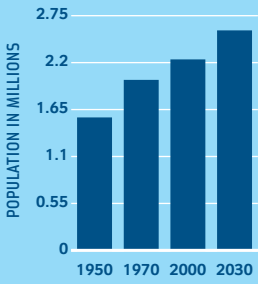


YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	1.45 MIL	-	34	25.6	7.3
1970	1.47 MIL	1.4	30	31.6	11.6
2000	1.33 MIL	-9.4	31	29.9	10.1
2030	1.46 MIL	9.3	33	27.2	11.8

Queens

Over the past 30 years, Queens has captured an ever-increasing share of the city's population. Although Queens comprised just 19.7% of the population in 1950, this number is projected to climb to over 28% by 2030, when 2.57 million of the city's 9.12 million residents will reside in Queens. The consistent growth in Queens will result in a new peak population for the borough by 2030. This growth is fueled by a mix of immigrants from more than 100 countries. As a result, the median age in Queens from 2000 to 2030 is expected to increase by just over three years.

Population

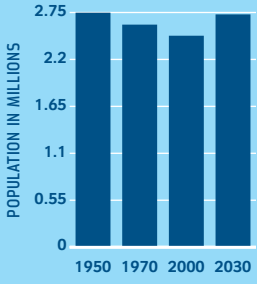


YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	1.55 MIL	-	34	25.5	7.1
1970	1.99 MIL	28.1	36	26.1	12.4
2000	2.23 MIL	12.2	35	22.8	12.7
2030	2.57 MIL	15.1	38	20.5	14.5

Brooklyn

Brooklyn will near its 1950 population peak of 2.74 million, growing 10.3% to reach 2.72 million people. Prior to its merger with Manhattan, Brooklyn was the third largest city in America and continued to grow until 1950. But the Long Island suburbs, the construction of the Verrazano Narrows Bridge to Staten Island, and the devastation of the 1970s drained the borough's population. Now resurgent, Brooklyn will likely remain the city's largest borough in 2030.

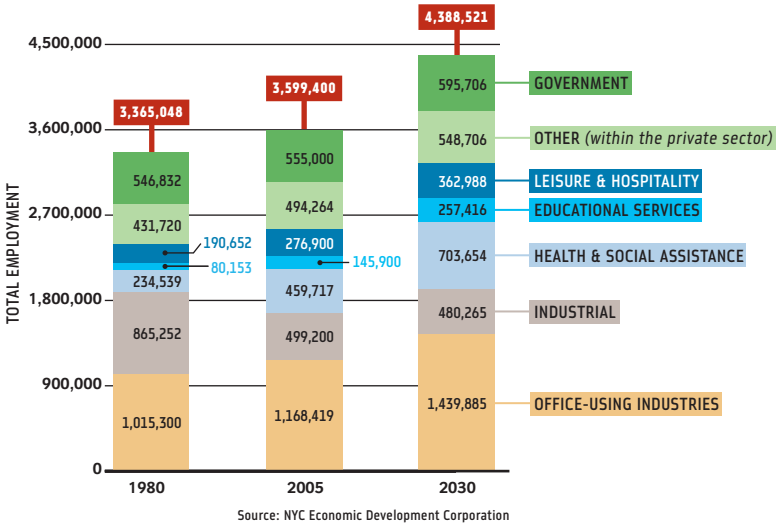
Population



YEAR	POPULATION	% CHANGE	MEDIAN AGE	% UNDER 18	% OVER 65
1950	2.74 MIL	-	33	26.2	7.4
1970	2.60 MIL	-5.0	30	31.3	11.1
2000	2.47 MIL	-5.3	33	26.8	11.5
2030	2.72 MIL	10.3	37	23.0	15.1

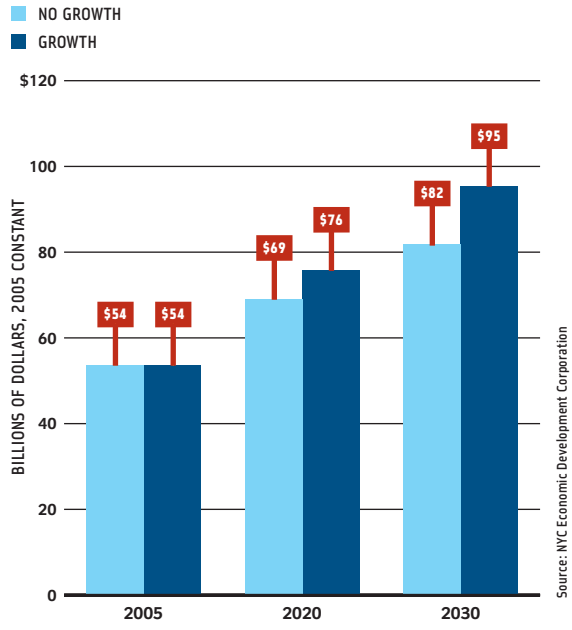
Source: NYC Department of City Planning; NYC Economic Development Corporation

New York City Projected Employment



Source: NYC Economic Development Corporation

New York City Projected Revenues From Population and Job Growth



City revenue includes State and Federal grants. Revenue sources per job or person assumed to grow at 1.7% annually (growth rate of average compensation under Social Security Intermediate scenario).

past nine million, the equivalent of adding the entire population of Boston and Miami combined to the five boroughs.

This growth offers great opportunities. Our employment force will grow by 750,000 jobs, with the largest gains among health care and education. New office jobs will generate needs for 60 million square feet of commercial space, which can be filled by the re-emergence of Lower Manhattan and new central business districts in Hudson Yards, Long Island City and Downtown Brooklyn. To protect our industrial economy, which employs nearly half a million people, we have created 18 Industrial Business Areas. *(See chart above: New York City Projected Employment)*

Our third-fastest growing industry will be fueled by the additional visitors we expect. Tourism has nearly doubled in New York since 1991, when 23 million people visited the City; in 2006, the city received 44 million visitors. Even if hotel and airport capacity begins to constrain this growth, we predict we will still exceed 65 million visitors by 2030.

This growth will also result in enormous revenues. The expansion of our tax base will impact our economy accordingly. The additional jobs, tourists, and residents could generate an additional $13 billion annually—money that can be used to help fund some of the initiatives described in the following pages and to provide the services that our residents, businesses, workers, and visitors deserve. *(See chart above: New York City Projected Revenues From Population and Job Growth)*

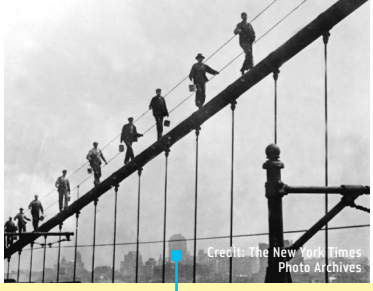
But the expansion ahead will be fundamentally different than growth over the last 25 years.

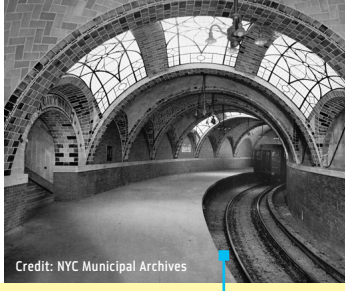
To revive our city, we funneled money into maintenance and restoration, investing in neighborhoods, cleaning and replanting parks, sweeping away the litter that had piled up in our streets and securing our subways. We reclaimed the parts of our city that had been rendered undesirable or unsafe. In short, we have spent the past two decades renewing the capacity bequeathed to us by massive population loss.

But now we have built ourselves back—and we are already starting to feel the pressure. Cleaner, more reliable subways have attracted record numbers of riders, causing crowding on many of our lines. It's not only transit. Growing road congestion costs our region $13 billion every year, according to a recent study. By 2030, virtually every road, subway and rail line will be pushed beyond its capacity limits.

Workers are moving farther and farther out of the city to find affordable housing, pushing our commutes to among the longest in the nation. Neighborhoods are at risk of expanding without providing for the parks and open space that help create healthy communities, not just collections of housing units.

New York City Infrastructure Timeline


Credit: The New York Times Photo Archives


Credit: NYC Municipal Archives

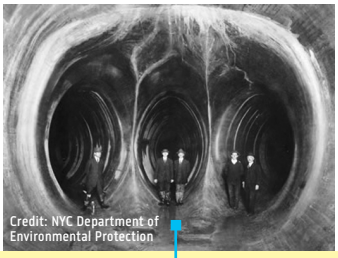
1840 · 1850 · 1860 · 1870 · 1880 · 1890 · 1900

1842 Croton Water Supply System opens, the city's first comprehensive water system

1882 Thomas Edison switches on the world's first commercial electric light system in Lower Manhattan

1883 The Brooklyn Bridge becomes the first bridge across the East River

1904 The first subway line begins service in New York City


Credit: NYC Department of Environmental Protection


Credit: NYC Department of Environmental Protection


Credit: Getty Images

1910 · 1920 · 1930 · 1940 · 1950 · 1960 · 1970

1917 The city's first water tunnel is completed

1920s Utility companies begin putting New York's electrical grid underground; parts are still in service today

1928 Catskill Water Supply System opens

1932 The city's last major subway expansion opens; parts of the original signaling system are still used today

1936 The city's second water tunnel is completed

1944 The Delaware Water Supply System opens; it is the city's last major water supply expansion

1964 The Verrazano-Narrows Bridge becomes the last significant bridge built in New York City

1970 Work on the city's third water tunnel begins; the second of four stages will be done by 2012

INFRASTRUCTURE

maintaiNYC

This growth will place new pressure on an infrastructure system that is already aging beyond reliable limits. New Yorkers pioneered many of the systems that make modern life possible—whether it was Thomas Edison switching on the world's first commercial electric light system in Lower Manhattan, planners plotting out the first modern water network in the 1840s, or thousands of workers, engineers, and architects building the world's largest bridges four times. But our early innovation means that our systems are now among the oldest in America. *(See chart above: New York City Infrastructure Timeline)*

We are a city that runs on electricity, yet some of our power grid dates from the 1920s, and our power plants rely on outmoded, heavily-polluting technology. Our subway system and highway networks are extensive, and heavily-used, yet nearly 3,000 miles of our roads, bridges, and tunnels, and the majority of our subway stations are in need of repair. Our two water tunnels, which provide water to every New York City household, haven't been inspected in more than 70 years. We do not have the redundancy in our system to inspect or make the repairs we need.

We have seen the consequences of inadequate investment in basic services: during the fiscal crises of the 1970s, our streets were pocked with more than one million potholes. By 1982, subway ridership fell to levels not seen since 1917, the result of delayed service and deteriorating cars. Many of the city's bridges faced collapse. The Williamsburg Bridge was taken out of service when engineers discovered that the outer lanes were on the verge of breaking off into the East River. A truck famously plunged through Manhattan's West Side Highway.

We were reminded again during the recent power outage in Queens why reliable infrastructure matters. That's why even as our expansion needs assume a new urgency, we must find ways to maintain and modernize the networks underpinning the city.

ENVIRONMENT

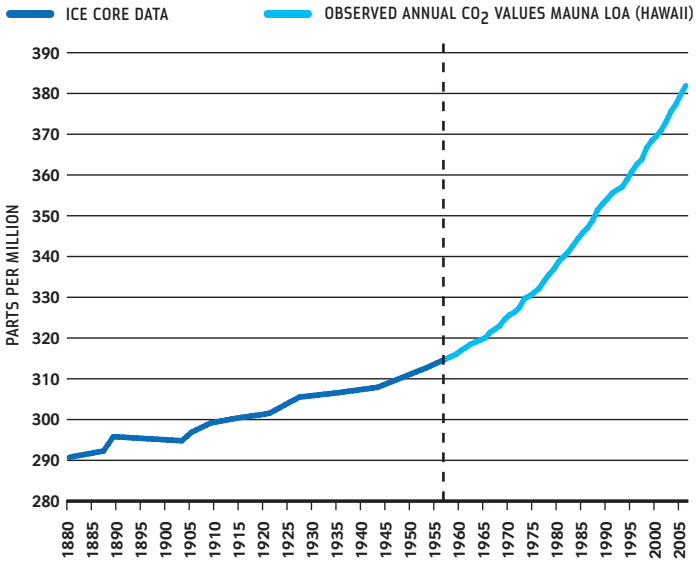
greeNYC

As our population grows and our infrastructure ages, our environment will continue to be at risk.

We have made tremendous gains over the past 25 years in tackling local environmental issues; waters that were unsafe even to touch have become places to boat, fish or swim. Air that could once be seen has become clear.

The Clean Air Act was enacted in 1970, but much of the New York metropolitan area has not reached Federal air quality standards for ozone and soot, and we suffer from one of the worst asthma rates in the United States. The Clean Water Act was passed in 1972, yet 52% of the city's tributaries—the creeks and man-made canals that hug the shoreline and pass through neighborhoods—are still unsafe even for boating. Although we have cleaned hundreds of brownfields across the city, there are still as many as 7,600 acres where a history of contamination hinders development and threatens safety.

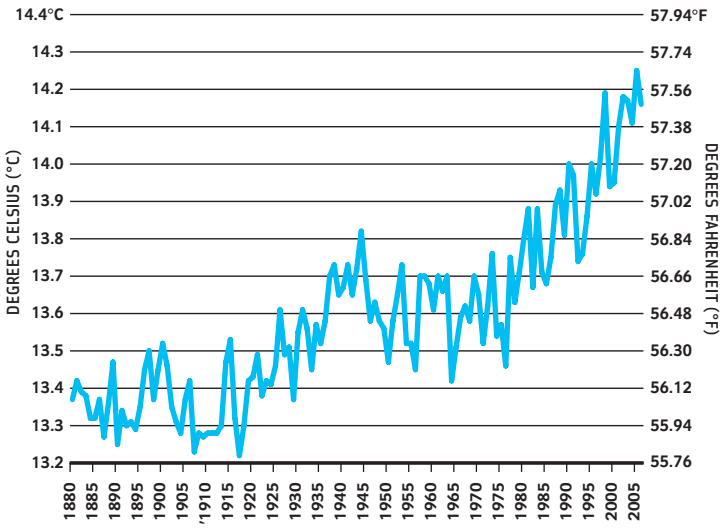
Global Atmospheric CO_2 Concentrations



Source: *Historical CO_2 Record from the Vostok Ice Core:* Laboratoire de Glaciologie et de Géophysique de l'Environnement, Arctic and Antarctic Research Institute.

Historical CO_2 Record from the Siple Station Ice Core: Physics Institute, University of Bern, Switzerland,

Global Average Temperature



Source: Columbia University Center for Climate Systems research based on National Center for Environmental Prediction Reanalysis II

** 5-year averages are plotted*

Climate Change

Cutting across all of these issues is one increasingly urgent challenge: climate change

In February, the Intergovernmental Panel on Climate Change released a report confirming that humans have accelerated the effects of climate change. As a result, the argument has shifted: we are no longer debating the existence of global warming, but what to do about it. *(See chart above: Global Average Temperature)*

It is an issue that spans the entire planet, but New Yorkers are already feeling the effects. As a coastal city, New York is especially vulnerable. Our winters have gotten warmer, the water surrounding our city has started to rise, and storms along the Atlantic seaboard have intensified.

And so we took a close look at the potential impacts of climate change on New York City, and our own responsibility to address it.

A global challenge with local consequences

Global warming and climate change are caused by increasing concentrations of greenhouse gases in our atmosphere. Carbon dioxide (CO_2), the most common greenhouse gas, is emitted from motorized vehicles, power plants, and boilers that burn fossil fuel. It gathers in the atmosphere and acts like panels in a greenhouse, letting the sun's rays through, then trapping the heat close to the earth's surface. *(See chart above: Global Atmospheric CO_2 Concentrations)*

The evidence that climate change is happening is irrefutable. Today there is 30% more CO_2 in the atmosphere than there was at the beginning of the Industrial Revolution. During the same period, global temperatures have risen by nearly two degrees Fahrenheit.

But we don't need global averages to understand how climate change is already affecting our health and future security.

By 2030, local temperatures could rise by two degrees; and our city is affected by rising temperatures more than the rest of the region because urban infrastructure absorbs and retains heat. This phenomenon, known as the "urban heat island effect," means that New York City is often four to seven degrees Fahrenheit warmer than the surrounding suburbs. But it is not only our summers that are getting hotter. In the winter of 2006 to 2007, there was no snow in Central Park until January 12th—the latest snowfall since 1878. *(See chart on facing page: Annual Average Temperature in Central Park, Manhattan)*

We also face the threat of sea level change and intensifying storms. At the Battery in Lower Manhattan, the water in our harbor has risen by more than a foot in the last hundred years, and could climb by five inches or more by 2030. *(See chart on facing page: Annual Average Sea Level at the Battery, Manhattan)*

With almost 600 miles of coastline and over half a million New Yorkers living within our current flood plain, this change is especially dangerous to New York. At our current sea level, we already face the probability of a "hundred-year flood" once every 80 years; this could increase to once in 43 years by the 2020s, and up to once in 19 years by the 2050s. According to one estimate a Category 2 hurricane would inflict more damage on New York than any other American city except Miami.

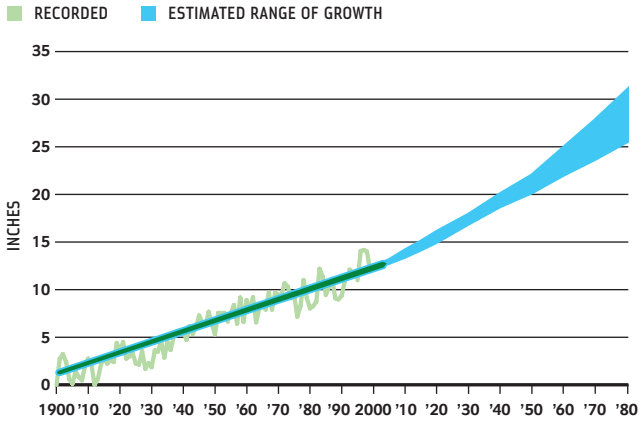
Preventing global warming

Scientists believe that only massive reductions in worldwide greenhouse gas emissions, on the order of 60% to 80% by the middle of the 21st century, will stop the process of global warming.

No city can solve this challenge alone. But New York has a unique ability to help shape a solution. *(See charts on facing page: New York City's Greenhouse Gas Emissions)*

The sheer size of our city means that our contribution to global greenhouse gas emissions is significant. In 2005, New York City was responsible for the emission of 58.3 million metric tons of carbon dioxide equivalent (CO_2e)—roughly 1% of the total carbon emissions of the United States, or an amount roughly equal to that produced by Ireland or Switzerland. This figure has been

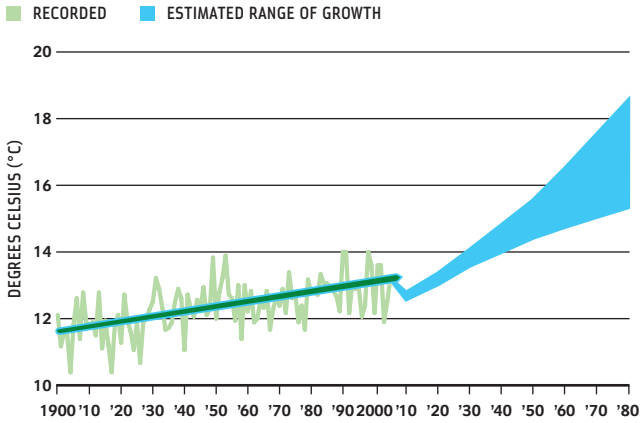
Annual Average Sea Level at the Battery, Manhattan*



Source: Rosenzweig, C., R. Horton, V. Gornitz, and D. C. Major, 2006. Climate Scenarios for the New York City Watershed Region, Technical Report, Columbia University Center for Climate Systems Research

** 1900 sea level used as base*

Annual Average Temperature in Central Park, Manhattan



Source: Rosenzweig, C., R. Horton, V. Gornitz, and D.C. Major, 2006. Climate Scenarios for the New York City Watershed Region, Technical Report, Columbia University Center for Climate Systems Research

growing at nearly 1% per year, the combined impact of both population and economic growth, and the proliferation of electronics and air conditioning. By 2030, without action, our carbon emissions will grow to almost 74 million metric tons

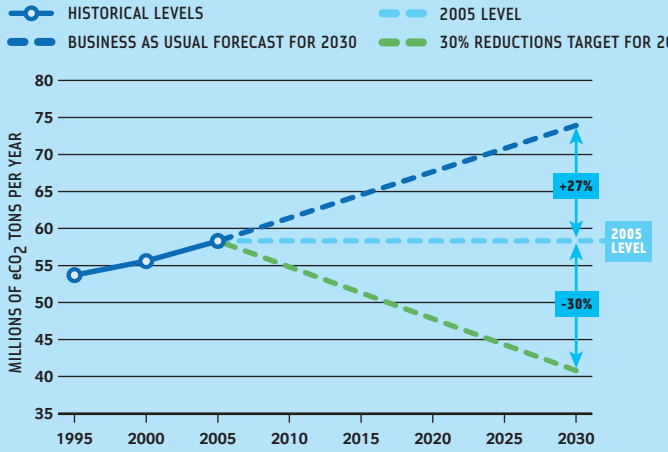
Our carbon comes from many sources, but is mainly affected by three factors. One is the efficiency of the buildings we live in, which determines how much heating fuel, natural gas, and electricity we consume. Another is the way we generate electricity, because inefficient power plants produce far more carbon dioxide than state-of-the-art ones. And a third is transportation, including the amount of driving we do and the truck trips required to haul the freight we need.

But our density, apartment buildings, and reliance on mass transit means we are also one of the most carbon-efficient cities in the United States; New Yorkers produce 71% less CO_2e per capita than the average American. Therefore, choosing to live in New York results in a reduction of greenhouse gases.

Slowing the pace of climate change will require concerted action across the world. But we also cannot afford to wait until others take the lead. Nor should we. New York has always pioneered answers to some of the most pressing problems of the modern age. It is incumbent on us to do so again, and rise to the definitive challenge of the 21st century.

New York City's Greenhouse Gas Emissions

Citywide Emissions



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Emissions Breakdown, 2005

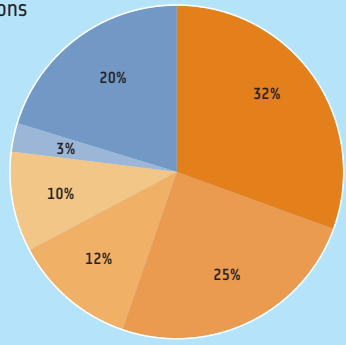
Total = 58.3 million metric tons

BUILDINGS: 79%

- RESIDENTIAL
- COMMERCIAL
- INSTITUTIONAL
- INDUSTRIAL

TRANSPORTATION: 23%

- CARS AND TRUCKS
- TRANSIT



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Figures total to 102% due to carbon absorbtion by waste and independent rounding

This effort began more than a year ago as an attempt to develop a strategy for managing the city's growing needs within a limited amount of land. It quickly became clear that this narrow focus was insufficient. The scale, intricacy, and interdependency of the physical challenges we face required a more holistic approach; choices in one area had unavoidable impacts in another. Each problem in isolation had many possible solutions. But to develop a plan that was not only comprehensive, but also coherent, we realized that we had to think more broadly.

If you seek to solve traffic congestion by building more roads or by expanding mass transit, you make a choice that changes the city. If you care about reducing carbon emissions, that suggests some energy solutions rather than others. If your concern is not only the amount of housing that is produced, but how it impacts neighborhoods and who can afford it, then your recommendations will vary.

That is why in searching for answers, we have wrestled not only with the physical constraints New York will face over two decades, but also with the fundamental values implicit in those policy choices. We have taken as a basic value that economic opportunity can and must come out of growth; that diversity of all kinds can and must be preserved; that a healthy environment is not a luxury good, but a fundamental right essential to creating a city that is fair, healthy, and sustainable.

We have also considered that the world is a different place today than it was half a century ago. Our competition today is no longer only cities like Chicago and Los Angeles—it's also London and Shanghai. Cities around the world are pushing themselves to become more convenient and enjoyable, without sacrificing excitement or energy. In order to compete in the 21st century economy, we must not only keep up with the innovations of others, but surpass them.

We have not done this work alone. The Mayor's Sustainability Advisory Board, composed of some of the city's leading environmental, business, community, and legislative leaders, has helped us at every step. We have worked with scientists and professors at the Earth Institute at Columbia University, New York University, the City University of New York, and elsewhere to understand the policy history, the economics, and the science behind the issues addressed here. And, over three months from December through March, we reached out further.

What kind of city should we become? We posed that question to New York. Over the past three months, we have received thousands of ideas sent by email through our website; we've heard from over a thousand citizens, community leaders and advocates who came to our meetings to express their opinions; we have met with over 100 advocates and community organizations, held 11 Town Hall meetings, and delivered presentations around the city. The input we received suggested new ideas for consideration, shaped our thinking, reordered our priorities.

In all our conversations, one core emerged: the strengths of the city are in concentration, efficiency, density, diversity; in its people, but above all in its unending sense of possibility. We must reinforce these strengths.

The result, we believe, is the most sweeping plan to strengthen New York's urban environment in the city's modern history. Focusing on the five key dimensions of the city's environment—land, air, water, energy, and transportation—**we have developed a plan that can become a model for cities in the 21st century.**

The plan outlined here shows how using our land more efficiently can enable the city to absorb tremendous growth while creating affordable, sustainable housing and open spaces in every neighborhood. It details initiatives to improve the quality of our air across the city, so that every New Yorker can depend on breathing the cleanest air of any big city in America; it specifies the actions we need to take to protect the purity of our water and ensure its reliable supply throughout the city; it proposes a new approach to energy planning in New York, that won't only meet the city's reliability needs, but will improve our air quality and save us billions of dollars every year. Finally, it proposes to transform our transportation network on a scale not seen since the expansion of the subway system in the early 20th century—and fund it.

Each strategy builds on another. For example, encouraging transit-oriented growth is not only a housing strategy; it will also reduce our dependence on automobiles, which in turn alleviates congestion and improves our air quality.

We have also discovered that every smart choice equals one ultimate impact: a reduction in global warming emissions. This is the real fight to preserve and sustain our city, in the most literal sense.

The answers are neither easy nor painless. They will require not only substantial resources but deep reservoirs of will.

In some cases, the key difficulties are administrative; we must achieve a new level of collaboration between City agencies and among our partners in the region. In others, the challenges are legislative. This plan calls for changes at the City, State, and Federal levels—for transportation funding, for energy reform, for a national or state greenhouse gas policy.

Finally, there is the need to pay for what we want. Previous generations of New Yorkers have ignored the reality of financing and have suffered as a result. We cannot make that mistake again. For each of our proposals in this plan, we have described how it will be funded, which in some cases is through the city budget, in other cases through new funding sources. An underlying assumption has been that we should be willing to invest in things that we truly need, and which will pay New Yorkers back many times.

The growth that prompted this effort in the first place will also enable us to pay for many of the answers. By guiding and shaping this growth, we believe it can be harnessed to make a city of 9.1 million people easier, more beautiful, healthier, and more fair than our city of 8.2 million today.

In December, we posed another question to New York: **Will you still love New York in 2030?**

Above all, this report seeks to ensure that the answer to that question is an unequivocal, **Yes.**

Land

- **Create homes for almost a million more New Yorkers, while making housing more affordable and sustainable**
- **Ensure that all New Yorkers live within a 10–minute walk of a park**
- **Clean up all contaminated land in New York City**

As virtually every part of our city grows, one piece remains fixed: the supply of land. That's why we must use our space more efficiently, to accommodate growth while preserving, and enhancing, the city's quality of life.

Housing

To meet the needs of a growing population, we'll need 265,000 more housing units by 2030. We have the capacity to accommodate this growth, but without action our city's housing stock won't be as affordable or sustainable as it should be.

That's why we will **expand our supply potential by 300,000 to 500,000 units** to drive down the price of land, while directing growth toward areas served by public transportation. This **transit-oriented development** will be supported by public actions to create new opportunities for housing, such as **ambitious rezonings** in consultation with local communities, **maximizing the efficiency of government-owned sites,** and exploring opportunities with communities to **create new land** by decking over highways and railyards.

We must also pair these actions with targeted affordability strategies like **creative financing,** expanding the use of **inclusionary zoning,** and developing **homeownership programs** for low-income New Yorkers.

By expanding these efforts into the future, we can ensure that new housing production matches our vision of New York as a city of opportunity for all.

Open Space

Although we've added more than 300 acres of parks in the last five years and set in motion much more, two million New Yorkers, including hundreds of thousands of children, live more than 10 minutes from a park.

That's why we will invest in **new recreational facilities** across every borough, **opening hundreds of schoolyards** as local playgrounds, **reclaiming underdeveloped sites** that were designated as parks but never finished, and **expanding usable hours at existing fields** by installing additional lights and turf fields.

We will improve our streets and sidewalks by adding **new greenstreets** and **public plazas in every community** as part of our strategy to create a more inviting public realm.

Brownfields

Our need for land means that we must foster the reuse of sites where previous uses have left behind a legacy of contamination.

That's why we will make existing brownfield cleanup programs faster, more efficient, and more responsive to New York's unique development challenges. We will develop **city-specific remediation guidelines, pilot new time-saving strategies** for testing, and create a **new City brownfields office** to accelerate redevelopment.

We will advocate for **eligibility criteria expansions** for existing State programs, while creating **a new City program** to oversee the remaining sites. We will ask for the State to **release community development grants** and **incentivize developers to partner with local communities so neighborhoods gain** a stronger voice in shaping the direction of their neighborhoods.

But we can't clean up all the contaminated land in the city if we don't know where it is. That's why we will launch a process to **identify contaminated sites.**

To encourage more widespread testing, we will **create a revolving cleanup fund,** funded through a partnership with the private sector.

Our approach to brownfields will be more comprehensive and inclusive than ever before, as we work to ensure that the remnants of our past contribute to a more sustainable future.

Water

- **Open 90% of our waterways for recreation by reducing water pollution and preserving our natural areas**
- **Develop critical backup systems for our aging water network to ensure long-term reliability**

We have two primary water challenges: to ensure the water we drink is pure and reliable, and to ensure that the waterways surrounding our city are clean and available for use by New Yorkers.

Water Network

We have the luxury of an abundant water supply, but our supply system faces challenges. Critical elements such as aqueducts and water tunnels cannot be taken out of service. Development encroaches on the city's watersheds, so our reservoirs will require continued vigilance.

We must ensure the quality of our water at its source by **building a new filtration plant for the Croton System** and continuing our aggressive **watershed protection program** for the Catskill and Delaware systems.

We will create redundancy for the aqueducts that carry the water to the city through a combination of **water conservation measures,** maximizing the use of our existing supplies through **new infrastructure like the New Croton Aqueduct,** and **evaluating new potential water sources,** like groundwater.

Finally, we must be able to repair and modernize our in-city distribution, which means **finishing Water Tunnel No. 3.**

Water Quality

We are one of the world's great waterfront cities, with nearly 600 miles of coastline. Waterfront revitalization has been a guiding principle of the last five years, across all five boroughs.

Now it is time to accelerate the reclamation of the waterways themselves, particularly our most polluted tributaries. We will **upgrade our wastewater treatment infrastructure,** while we implement proven strategies such as **greening our streets, planting trees** and **expanding our Bluebelt network.** We will also **explore other natural solutions** for cleaning our water bodies through a range of pilot programs that will be coordinated by a **new Interagency Best Management Practices Task Force. We will also begin to assess the protection our wetlands receive—our first step toward a broader policy.**

Through these initiatives, we can restore our city's natural ecology and the recreational use of our waterways.

Transportation

- **Improve travel times by adding transit capacity for millions more residents, visitors, and workers**
- **Reach a full "state of good repair" on New York City's roads, subways, and rails for the first time in history**

New York's success has always been driven by the efficiency and scale of its transportation network. But for the last 50 years, New York has underinvested.

Despite dramatic progress, we have not yet achieved a full state of good repair across our transit and road networks. More significantly, virtually all subway routes, river crossings, and commuter rail lines will be pushed beyond their capacity in the coming decades—making transportation our greatest potential barrier to growth.

We are proposing **a sweeping transportation plan** that will enable us to meet our needs through 2030 and beyond. That includes strategies to **improve our transit network,** through **major infrastructure expansions, improved bus service, an expanded ferry system** and the **completion of our bike master plan.** We must also **reduce growing gridlock** on our roads through **better road management** and **congestion pricing,** a proven strategy that charges drivers a daily fee to use the city's densest business district.

We know what must be done. But essential transit expansions have been stalled, in some cases for decades. Today, not a single major expansion project is fully funded—and overall, there is a $30 billion funding gap.

That's why we will seek to create **a new regional financing entity, the SMART Financing Authority,** that will rely on three funding streams: the revenues from congestion pricing and an **unprecedented commitment from New York City** that we will **ask New York State to match.** This authority would **fill the existing funding gap for critical transit expansions and provide one-time grants to achieve a state of good repair,** enabling our region to achieve a new standard of mobility.

Energy

- **Provide cleaner, more reliable power for every New Yorker by upgrading our energy infrastructure**

New Yorkers face rising energy costs, air pollution, and greenhouse gas emissions from a lack of coordinated planning, aging infrastructure, and growth.

This will require a two-pronged strategy to increase our clean supply and lower our consumption despite our growth—something that no city or state has done before.

We will **encourage the addition of new, clean power plants through guaranteed contracts, promote repowerings** of our most inefficient plants, and **build a market for renewable energies** to become a bigger source of energy. This new supply will also enable us to **retire our oldest, most polluting power plants,** cleaning our air and reducing greenhouse gas emissions.

To reduce demand, we will **target our largest energy consumers**—institutional buildings, commercial and industrial buildings, and multi-family residential buildings—and accelerate efficiency upgrades **through a system of incentives, mandates, and challenges. Demand reductions will help all New Yorkers by lowering energy prices.**

Together, these strategies will produce a reliable, affordable, and environmentally sustainable energy network. But there is currently no entity capable of achieving this goal. That's why we will work with the State to create **a New York City Energy Planning Board.**

By managing demand and increasing supply, **New York City's overall power and heating bill will plunge by $2 billion to $4 billion;** the **average New York household will save an estimated $230 every year** by 2015.

The result will be not only a healthier environment, but also a stronger economy.

Air Quality

- **Achieve the cleanest air quality of any big city in America**

Despite recent improvements, New York City still falls short in meeting federal air quality standards. This is most apparent in the persistently high rates of asthma that plague too many neighborhoods.

We will continue **pressuring the State and Federal governments to require reductions** in harmful emissions, while aggressively targeting the local sources we can control. Transportation is responsible for more than 50% of our local air pollution; that's why we **will encourage New Yorkers to shift to mass transit**. In addition we will mandate, promote, or incentivize **fuel efficiency, cleaner fuels, cleaner or upgraded engines, and the installation of anti-idling technology.**

We must also address our other major sources of emissions: buildings and power plants. That means switching to **cleaner fuels for heating** and **retiring polluting plants.**

Our open space initiatives such as **tree plantings** will move us the rest of the way toward achieving the cleanest air of any big city in America.

To track our progress and target our solutions we will also **launch one of the largest local air quality studies in the United States.**

Climate change

- **Reduce our global warming emissions by 30%**

Collectively these initiatives address the greatest challenge of all: global warming. Scientists have predicted that unless greenhouse gas emissions are substantially stemmed by the middle of the century, the impacts of climate change will be irreversible. Coastal cities like New York are especially vulnerable.

Almost every action we take—from turning on the lights to stepping into a car—has an impact on the amount of carbon dioxide (CO_2) released into the atmosphere.

As a result, **our climate change strategy is the sum of all of the initiatives in this plan.** All of PLANYC's strategies—from reducing the number of cars to building cleaner power plants to addressing the inefficiencies of our buildings—will help us to reduce emissions.

And we will also make a difference in the fight against global warming simply by making our city stronger: **By absorbing 900,000 new residents**—instead of having them live elsewhere in the United States—**we can prevent an additional 15.6 million metric tons of greenhouse gases from being released into the atmosphere.**

We will also embark on a long-term effort to develop **a comprehensive climate change adaptation strategy,** to prepare New York for the climate shifts that are already unavoidable.

As virtually every part of our city grows, one piece remains fixed: the supply of land. That's why we must use our space more efficiently to accommodate growth while preserving—and enhancing—the city's quality of life.

We must provide enough housing; but we must not allow the production of units to eclipse other neighborhood needs—the balance of open space, parks, retail, and aesthetics that is essential to a healthy community.

With competing needs and limited land, we must unlock unrealized housing capacity, complete unfinished parks, and direct growth toward transit centers. By being smarter about our land-use strategies, we can realize the promise of an expanding population, while avoiding the pitfalls of unplanned and unbalanced growth

Land

Housing

Create homes for almost a million more New Yorkers, while making housing more affordable and sustainable

Open Space

Ensure that all New Yorkers live within a 10-minute walk of a park

Brownfields

Clean up all contaminated land in New York City

Housing

Credit: Alexander Garvin

Queens West, foreground

Create homes for almost a million more New Yorkers, while making housing more affordable and sustainable

The saloons began appearing on Hunters Point in the 1860s. As travelers emerged from the new Flushing & North Side Rail Road, they stopped in at new restaurants before transferring to ferries that carried them across the East River to the shore of Manhattan.

The use would soon shift. Although commuters began to dwindle when the railroad started providing direct service to Manhattan, by then gas plants, chemical factories, and other types of heavy manufacturing had begun moving in. By the start of the 20th Century, Long Island City had one of the highest concentrations of industry in the country; some 300 companies employed 16,000 workers, making everything from automobiles to chewing gum.

But as manufacturing declined across the city, the factories and gas plants in Hunters Point also began to close. The saloons shut down. The land was stripped of its activity, leaving behind contaminated soil and a degraded creek. And that's how it stayed for decades.

Today, the southern edge of the waterfront sits stark against the Manhattan skyline; an empty stretch of land against the spires of the cityscape. On a day this past winter, the site was covered in crushed rock and debris; huge cement cylinders and tangles of heavy-duty wire rise in piles. But another shift is underway.

Clusters of tall skyscrapers are starting to rise in Queens West; since the first apartment building opened in 1997, developers have built 1,000 units, with more than 4,000 units either planned or underway. The City is slated to transform the remaining land with 5,000 new units—60% of which will be affordable to moderate and middle income New Yorkers. The former commuter outpost and industrial center is becoming the newest neighborhood in New York, just a five-minute ferry or one-stop subway ride from Manhattan.

You can see growth and reclamation across New York. Construction is at record levels. Swaths of decaying industrial land along the waterfront are being reshaped into new neighborhoods, with riverside promenades, parks, and housing. We are re-evaluating our city's land-use patterns at an unprecedented pace, with more than 60 rezonings in total encompassing over 4,500 blocks including the Brooklyn waterfront, Morrisania and Port Morris in the Bronx, and the west side of Manhattan.

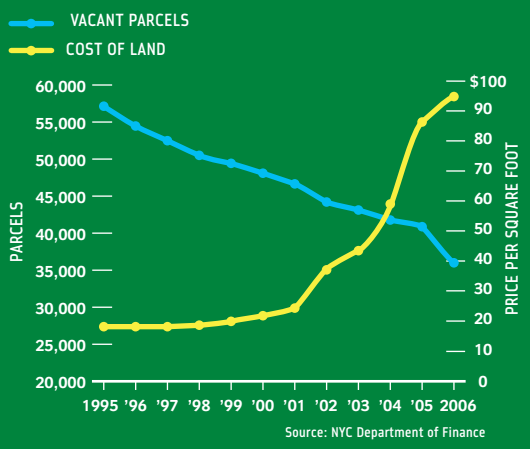
Already, housing for more than 200,000 people is in the pipeline. As we look ahead to 2030, our challenge is to house nearly another 700,000 people between 2010 and 2030.

Growth on this scale is not impossible—indeed, we have done it before. In the last 25 years alone, we added nearly 315,000 new units, and more than 1.1 million new residents.

But two lessons from that period of development have emerged that should guide our growth over the next quarter century.

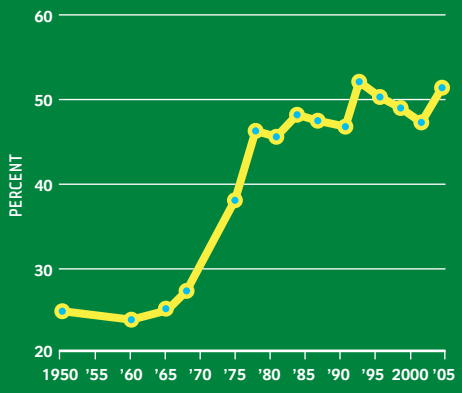
The first lesson is that all growth is not equal.

Vacant Land in New York City
Supply and demand



Source: NYC Department of Finance

Rent-Burdened Households in New York City
Share of households with gross rent/income ratio over 30%



Source: U.S. Census Bureau Housing and Vacancy Surveys

As our city faces unprecedented levels of population, some fear that change will not enable opportunity, but rather erase the character of communities across the city. That is why we cannot simply create as much capacity as possible; we must carefully consider the kind of city we want to become.

We must ask which neighborhoods would suffer from the additional density and which ones would mature with an infusion of people, jobs, stores and transit. We must weigh the consequences of carbon emissions, air quality, and energy efficiency when we decide the patterns that will shape our city over the coming decades.

For most of the 20th century, New York's rapid growth followed the expansion of the subway system, as mass transit allowed residents of an overcrowded city to disperse to lower-cost land on the edges of the city—while giving them easy access to the jobs concentrated at the center.

We have not always made smart choices since. Between 1970 and 2000, many of our greatest areas of growth have been underserved by transit; many of our most connected urban centers have either lost population or experienced only modest growth.

Meanwhile, development pushed out into parts of the city that depend more heavily on cars. Although spreading housing across New York helped fuel the diversity of neighborhoods and lifestyle choices that distinguish our city, growth in these areas will not stay sustainable. As we face unprecedented levels of population, our growth moving forward must be more transit-oriented; this will stem increasing travel times and congestion on our roads, protect our air quality by avoiding the need for more cars, and reduce our global warming emissions.

In the last five years, we have turned the corner. New Yorkers have begun to shift back toward transit centers, into areas with existing density, and away from places with little ability or will to accommodate newcomers. While less than 70% of New York's population lives within a half-mile of mass transit, 80% of the housing unit capacity created since 2000 is transit-accessible.

Today, New York has an opportunity not only to grow, but to enhance the strengths of the city itself.

We have also learned that just planning for the required number of units will not be enough to assure affordability.

Not long ago, our greatest housing challenge was abandonment. But as our city's resurgence continues to attract record numbers of residents, the most pressing issue we face today is affordability. In 2005, more than half of all New Yorkers paid more than 30% of their income toward rent—among the highest burdens in the nation and a three percent increase from the previous Housing and Vacancy Survey in 2002. According to the Furman Center, the number of apartments affordable to low- and moderate-income New Yorkers shrank by 205,000 units between 2002 and 2005. In a recent poll, more than 64% of people cited housing costs as a major factor in moving out of the city. *(See chart above: Rent-Burdened Households in New York City)*

Low vacancy rates and increasing demand have plagued the city's housing market, providing upward pressure on housing prices. And despite the fact that housing production in 2005 and 2006 represented the highest two-year total for residential building permits since 1965, we still face a significant gap between the supply of housing and our population.

As potential building sites have become scarcer across the city, the land price component of housing costs has risen. And the supply continues to dwindle, helping to drive land prices to new levels. *(See chart above: Vacant Land in New York City)*

But one of the biggest pressures on housing prices has been the diminishing cushion between zoned capacity—the number of units that theoretically could be built according to the zoning code—and built units. As the number of housing units continues to rise, developers have to compete for a shrinking supply of vacant or under-built land.

This means developers pay a "scarcity premium" for the remaining sites, and that premium feeds into the price of new housing. The competition also empowers land owners to hold out for the highest possible price without worrying that developers will be able to find easy, comparable alternatives.

In its early history, New York avoided this problem. New York's zoning code in 1958 provided the potential for 55 million people to live in the city—when we had about 7.8 million residents. In 1961, the city overhauled its zoning ordinance, but it still provided potential for 12 million residents. But since then, despite recent rezonings, our overall capacity has actually decreased—to about 400,000 possible new units on soft sites.

That means we only have space—if every significantly underdeveloped and vacant site was developed to its full potential—to build new housing for 1.3 million more people. But many of the sites will not be developed to their maximum capacity. By 2030, we expect 900,000 more people to arrive. If supply is not created as fast as people arrive, affordability could suffer further.

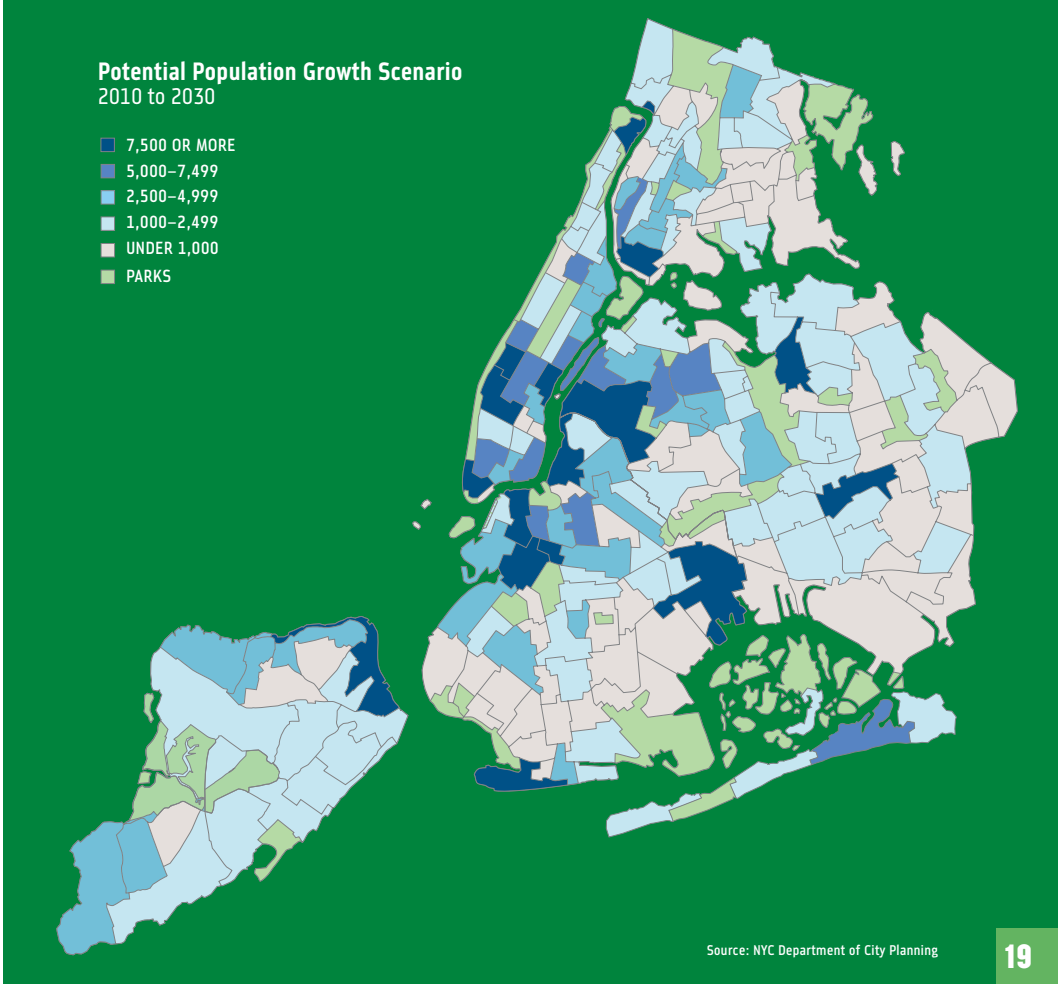
The Mayor's $7.5-billion *New Housing Marketplace Plan,* which will build or preserve 165,000 units for 500,000 people over 10 years, is more than has ever been done before. But it will not be enough through 2030. Housing 500,000 New Yorkers will be an historic achievement; but it must also be the beginning.

Our Plan

This new landscape will require new creativity. Not long ago, our housing strategies revolved around regenerating a market that had all but disappeared from too many New York City's neighborhoods. Our challenge today is to devise new ways to harness—and manage—the demand unleashed by New York's phenomenal success. We must nurture the forces that have infused communities from Fort Greene to Flushing with new energy, immigrants, up-and-comers, emerging families.

That means expanding our supply potential by up to 500,000 units to decrease the gap between housing supply and housing demand that has existed in recent decades. There are certainly other factors that impact housing prices. But of them all, land is the lever that the City holds most firmly. By increasing potential housing opportunities, the pressure to find building sites eases—and with it, prices.

We must also continue to vigorously pursue targeted affordability programs that seek out our most vulnerable populations and provide them with secure homes and needed support.



Much of this growth will occur without government intervention. Private owners will continue to submit private zoning applications to change the allowed uses and densities on their sites. Many of the larger opportunities are underway or on the horizon including the former Domino Sugar Factory on the Brooklyn waterfront and the former Con Edison site on Manhattan's east side. These and other private sites already in the planning and review process could contribute to more than 25,000 units of housing capacity, depending on market conditions.

But private rezonings will not be enough. That is why government must take the lead in ensuring sustainable growth in housing by continuing to work with communities on rezonings and maximizing the use of government land to create new housing opportunities. We must also be thinking more creatively about how to solve our housing needs into the future. That means exploring opportunities to create new sources of land by decking over infrastructure like highways and railyards—and in some cases building new infrastructure like subway extensions to make development more feasible. *(See map above: Potential Population Growth Scenario; see map on following page: Potential Additional Capacity For Residential Growth)*

This will help stabilize our market and provide broader affordability. But we must supplement this effort with targeted affordability programs that build on our ambitious efforts.

Taken together, these policies will not only accommodate 900,000 New Yorkers, but also create a more equitable, healthier, and sustainable city. The map above is a vision of what our city can become. In this scenario, 95% of the new capacity would be created within a half-mile of mass transit, reaffirming the urban values of efficiency, mobility, and environmental responsibility.

Our plan for housing:

Continue publicly-initiated rezonings

1 Pursue transit-oriented development
2 Reclaim underutilized waterfronts
3 Increase transit options to spur development

Create new housing on public land

4 Expand co-locations with government agencies
5 Adapt outdated buildings to new uses

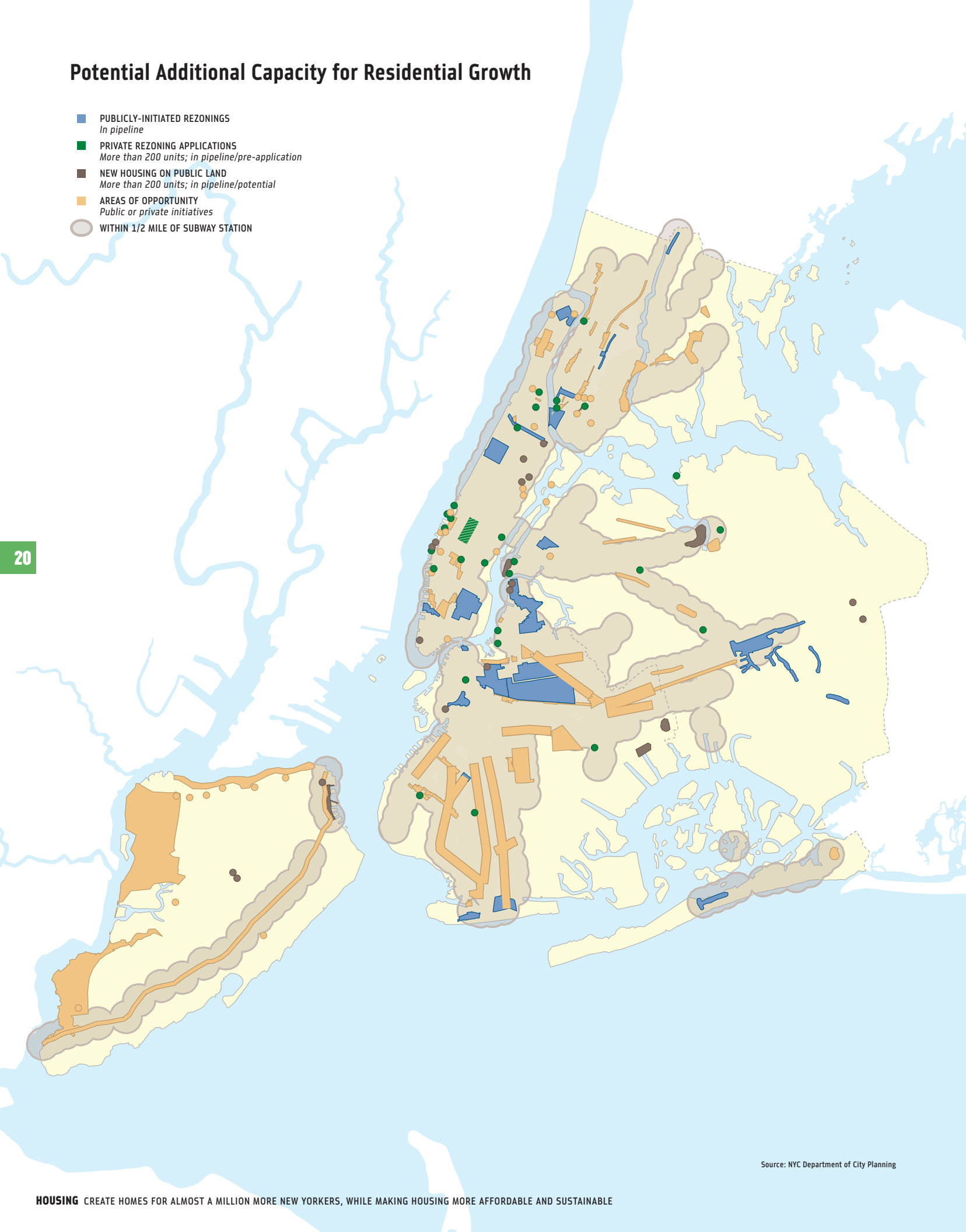
Explore additional areas of opportunity

6 Develop underused areas to knit neighborhoods together
7 Capture the potential of transportation infrastructure investments
8 Deck over railyards, rail lines, and highways

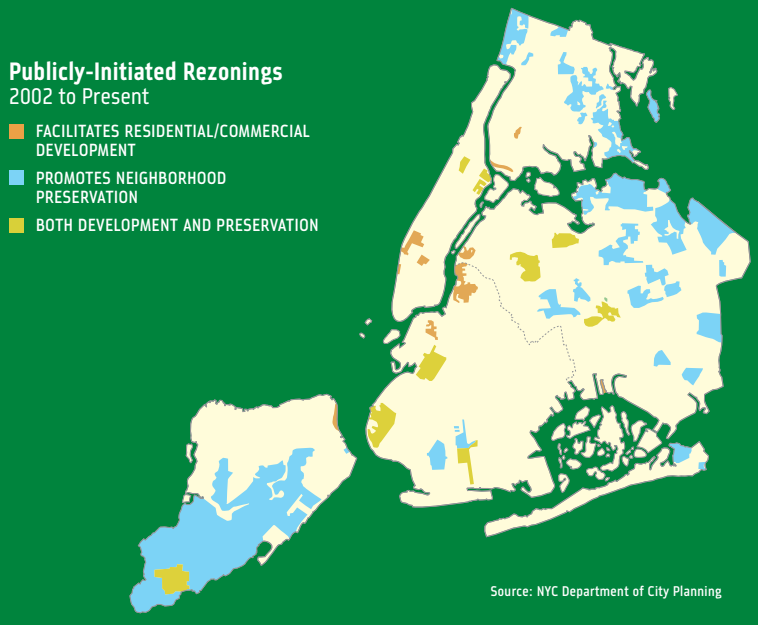
Expand targeted affordability programs

9 Develop new financing strategies
10 Expand inclusionary zoning
11 Encourage homeownership
12 Preserve the existing stock of affordable housing throughout New York City

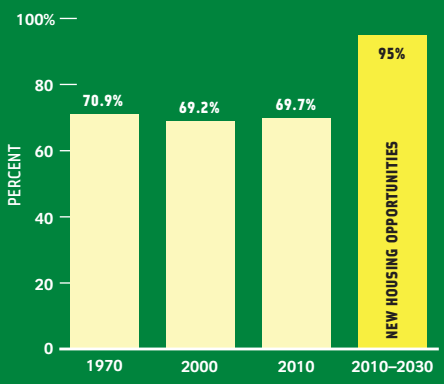
Potential Additional Capacity for Residential Growth



Source: NYC Department of City Planning



Source: NYC Department of City Planning



Source: NYC Department of City Planning

Continue publicly-initiated rezonings

Just 15 years ago, the waterfronts of Williamsburg and Greenpoint were areas left behind. Much of the activity slowly ebbed away after the loss of manufacturing industries along the East River. By 2000, these waterfronts and nearby neighborhoods were a mix of remaining housing, vacant and contaminated waterfront lots, and abandoned industrial buildings that had begun to be reclaimed by a new generation of Brooklynites for housing, art spaces, and craft industries.

Across New York, stretches of land—once teeming with life, action, activity, commerce—sat largely abandoned. As factories and ports closed down after World War II, the land stayed cut off from communities, the piers vacant, the old buildings empty. Our economy had evolved. Our land use did not.

But recently, that has begun to change.

In 2002, the City announced a plan to rezone the Greenpoint-Williamsburg waterfront, replacing the empty manufacturing sites with a mixture of housing, business and open space. The plan adopted in 2005 is expected to produce about 10,000 new housing units—a third of them affordable. Already, over 2,000 units have received permits, the first pieces of the waterfront esplanade are under construction, and the park is scheduled to break ground in 2009.

Greenpoint-Williamsburg has been part of one of the biggest transformations of the city landscape since the rezoning of 1961. In the past five years, nearly 4,500 blocks have been rezoned, with many more in the pipeline. *(See map above: Publicly-Initiated Rezonings)*

The City has set in motion plans to turn about 300 acres of railyards, auto repair shops, and parking lots in the Midtown Manhattan area known as Hudson Yards into a mixed-use commercial, residential, and hospitality district. The West Chelsea initiative is supporting the area's concentration of arts uses and promoting the transformation of aging factories and deteriorating streets into new residential and commercial spaces. Anchored by the conversion of an abandoned rail line into a world-class elevated park, the rezoning is reshaping one of the city's most distinctive and rapidly growing neighborhoods.

Along the way we have sought to ensure that every neighborhood's history and character is protected to preserve what attracted residents in the first place. Each block deserves its own unique consideration. For example, preserving the historic brownstone character of side streets was a primary goal of the recent rezonings in Park Slope and South Park Slope, but the City paired this with an upzoning of Fourth Avenue to promote density where additional bulk and height was appropriate.

Moving ahead, we will continue to ensure that the essential character of the city's communities remains intact as we seek out three main types of opportunities for public rezonings: continuing to direct growth toward areas with strong transit access; reclaiming underused or inaccessible areas of our waterfront; and exploring opportunities to spur growth through the addition of transit, as our subways did more than a century ago.

All of these rezonings together will create the potential for between 54,000 and 80,400 units of housing.

INITIATIVE 1

Pursue transit-oriented development

We will use upcoming rezonings to direct growth toward areas with strong transit access

Central to the City's rezoning strategy is identifying primary avenues and boulevards near transportation hubs whose width and access to transit enable them to support additional density. With easy access to multiple transportation options, these sites can accommodate increased residential development without straining the existing transportation infrastructure. *(See chart above: Transit-Accessible Population in New York City)*

Downtown Jamaica is one such example. There, the J, Z, and E lines and the AirTrain connect the Long Island Rail Road's local station to JFK airport, making it an important gateway for new arrivals to the city. As a result, Downtown Jamaica is a major transit hub, with more than 95,000 riders passing through the area's six subway stops each day. This concentration of transit means that thousands more residents and businesses could grow with modest investments in infrastructure—and without forcing an increased reliance on automobiles.

But much of the current zoning in Jamaica has been unchanged since 1961. This outdated zoning, and its restrictions on density, is one of the major obstacles to Jamaica's current and future economic potential. That's why the City is now engaging community stakeholders, neighborhood residents, and local elected officials in a public review process for the Jamaica Plan, which will build on

the strengths of the area to promote sustainable growth. It is among the largest rezoning efforts in the city's history.

There are other examples across New York. In Coney Island, the newly rebuilt Stillwell Avenue subway station is the genesis and terminus of several train lines in Brooklyn including the D, Q, N, and F trains. The Coney Island Strategic Plan will promote growth around this transit center, enhancing the area's historic attractions, while increasing affordable housing on vacant City-owned land.

INITIATIVE 2

Reclaim underutilized waterfronts

We will continue restoring underused or vacant waterfront land across the city

Although it once supported a flourishing shipping and industrial center, the city's waterfront has experienced a decline in such uses in the past 60 years. Today, New York City's 578-mile waterfront offers one of the city's greatest opportunities for residential development. Already, more than 60 miles of waterfront land is being reclaimed. But the City is evaluating a number of additional ambitious projects that will achieve similar goals as the Greenpoint-Williamsburg rezoning.

The land surrounding the Gowanus Canal in Brooklyn, once a thriving industrial waterway, is already evolving into a mixed-use neighborhood. Because the demand for industrial uses has decreased, a land-use study of the area can provide opportunities for residential development while preserving the neighborhood's existing character and remaining industrial businesses. Similarly, the Astoria waterfront in Queens presents an opportunity to extend residential uses through the creation of new housing while providing better access to the waterfront.

INITIATIVE 3

Increase transit options to spur development

We will use transit extensions to spark growth as the subways did more than a century ago

Today more than 2.5 million New Yorkers live more than half a mile from a subway stop. In these neighborhoods, the lack of transit has led to higher concentrations of drivers—contributing to congestion, air pollution, and global warming emissions; meanwhile, in many cases their development potential has never been realized.

Thousands of Bronx residents used to live along the elevated subway on Third Avenue before it was torn down decades ago. Today, many of the tenements that provided customers for that El are gone. If apartment buildings replaced the underutilized lots that remain, it could produce enough riders to justify installing more mass transit service.

But the lack of transit has prevented this development from occurring. By improving bus service along Webster Avenue, we can better connect residents to the subway system and the regional retail center at the area's main commercial center, the Hub, improve the quality of life for residents, and attract new investment in housing.

As one moves to the outer edges of the city, transit options become scarcer. By providing more neighborhoods with more travel choices, we will dramatically expand usable land within New York.

Create new housing on public land

As New York's population drained away during the 1970s, up to 30,000 units of housing were abandoned every year; Hunts Point and Morrisania alone lost over 60% of their population. But population loss was not limited to the South Bronx: 43 of the city's 59 community districts lost residents during this same time period.

As the abandonment spread and landlords walked away from their sites rather than maintaining them, the City became the "owner of last resort." Between 1976 and 1979, the City increased the stock of housing it managed by forty times, from 2,500 to 100,000 vacant and occupied units. By 1979, the City was managing the same amount of housing that currently exists in Hartford and New Haven combined.

Since then, we have systematically transferred sites to private developers or sold land to produce more affordable units for New Yorkers. And almost 30 years later, we have virtually no land left. In August 2005, the City issued the last four major RFPs for City-owned land taken *in rem* through tax foreclosure.

That means our ability to supply land for new affordable housing opportunities has diminished, even as the need has grown. As a result, we must be more creative and efficient than ever in leveraging the land we have left.

INITIATIVE 4

Expand co-locations with government agencies

We will pursue partnerships with City and State agencies throughout the city

Although the City's supply of vacant or underused land is nearly gone, the City owns 43,000 acres for municipal purposes. Much of this land is fully developed for government operations, but significant opportunities exist for housing to co-exist with the current use—from libraries to schools to parking lots.

We will work with government agencies located in the city to maximize these "co-location" opportunities by assembling an inventory of sites and evaluating their potential as viable sites. Already, we are moving ahead with a partnership between the City's Department of Housing Preservation and Development (HPD) and the City's Department of Transportation to generate up to 1,100 new residential units on municipal parking lots, while replacing all or most of the current parking.

In Astoria, Queens, fenced-off pavement on 29th Street served as a municipal parking lot—despite the neighborhood's increasing urgency for senior housing. By 2009, the surface-level parking lot will be replaced by a new 15-story building, with an adjacent two-level subterranean parking garage for the public. The facility will be designed to reflect the needs of an aging Astoria population, offering 184 units of housing for seniors, commercial space for on-site medical offices, and open space. A senior center will be open to the

community in addition to residents. Topping off the multi-use building will be a green roof—sustaining not just the community's seniors, but the environment in which they live.

This partnership recognized the potential for achieving simultaneous goals on City-owned land: building affordable housing while preserving the supply of affordable parking spaces. The City will seek to form equally productive alliances with other government agencies and departments in its search for additional land for housing.

We will continue our partnership with the New York City Housing Authority (NYCHA) to build 6,000 new affordable units

When NYCHA first began building housing projects across New York in the 1930s, the design of public housing and its integration into the urban landscape differed from our understanding today. The buildings rose as tall towers surrounded by open space, set back from the street and without access to stores or retail. Built into the project were dozens, sometimes hundreds of parking spaces for residents, reflecting the automobile-centered focus of the mid-twentieth century.

These spaces are now lightly used—leaving stretches of the developments sitting as vacant concrete. That's why in 2004, NYCHA signed an agreement with HPD to begin targeting some of these empty areas for new housing. On the west side of Manhattan, 98 underutilized parking spaces were scattered across three separate sites. As part of the Hudson Yards rezoning, these areas will now be redeveloped to provide 438 units of affordable housing.

By 2013, we will develop 6,000 new affordable units through this partnership, including sites in East New York and East Harlem.

Additional opportunities exist to co-locate housing with other functions on government-owned sites. Near Surf Avenue in Coney Island, the Economic Development Corporation is partnering with HPD to create 152 units of housing integrated with a 40,000 square foot community center. Other examples of possible co-locations include schools, libraries, and supermarkets.

INITIATIVE 5

Adapt outdated buildings to new uses

We will seek to adapt unused schools, hospitals, and other outdated municipal sites for productive use as new housing

Across the city, dozens of sites are no longer appropriate for their original intended use; but can be reclaimed for a new purpose. Whether it is redeveloping abandoned warehouses or transforming closed hospitals—like the landmarked Sea View nurses' residence that will become a new housing project for seniors—we can preserve some of our most beautiful buildings while meeting the city's most critical housing needs.

As we move ahead over the next two decades, we must continue searching for other opportunities in underused schools, hospitals, and office buildings. Where appropriate we will partner with the Landmarks Preservation Commission to save this irreplaceable architecture and restore its place as an integral part of our evolving city. We can also rethink these buildings to meet some of our city's unique needs; P.S. 109 is currently being converted into artists' housing and studios. By working with HPD and the Department of Cultural Affairs to open new affordable spaces for artists, we can not only preserve our physical city but also its essential creative spirit. *(See case study: Re-imagining P.S. 109)*

CASE STUDY

Re-imagining P.S. 109

The castle-like P.S. 109 once housed elementary school children from around its East Harlem neighborhood. In 1996, when the Department of Education witnessed a decline in the area's school-age population they closed the school, slating it for demolition three years later.

That's when East Harlem community groups stepped in, seeking to preserve the historic structure, with its slotted roofs and gargoyles intact. They won; and demolition plans were dropped.

But in the years following the decision, P.S. 109 sat abandoned. Surrounding school districts were only at 74% capacity; another school was not needed. That's when Artspace, a Minneapolis-based developer of art housing, and El Barrio's Operation Fightback, a community and housing advocacy organization in East Harlem, approached the City. They asked for the chance to turn the building into affordable housing for neighborhood artists.

Artspace and Operation Fightback are now on their way to converting P.S. 109 into 64 combined living and studio art spaces as part of a $28.8 million renovation project.

The entire building will be affordable and residents from the East Harlem community, including local artists, will be given preference for 50% of the buildings units.

"The building wasn't being utilized, and now we're keeping it as a community center," said Gus Rosado, executive director of El Barrio's Operation Fightback.

Plans include a public space for arts education, and a gallery on the first floor.

"Real estate values in the area are going through the roof, and artists are getting squeezed out—they're the first to go, because they can't find space to practice their craft," Rosado said. "This gives them that opportunity, and it's affordable."

Explore additional areas of opportunity

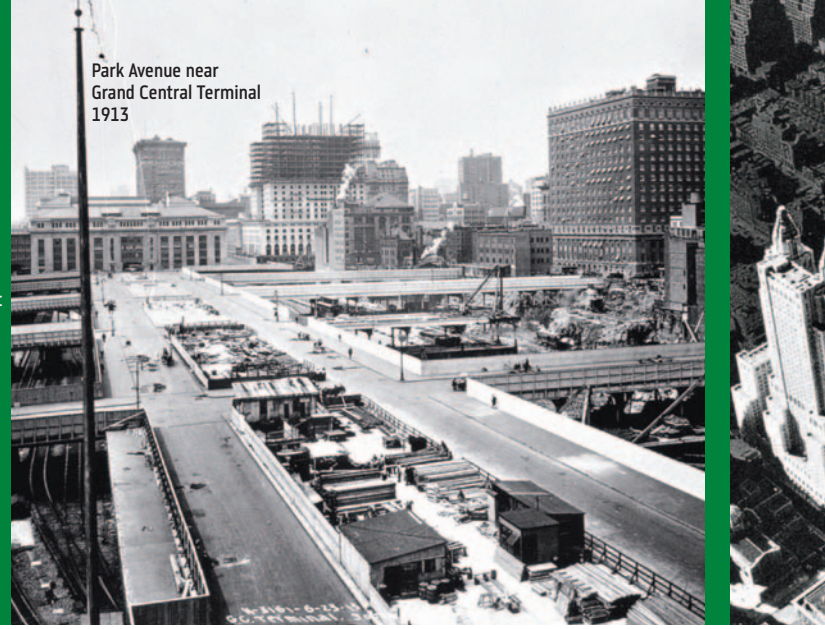
We have also looked further into the future, well beyond current initiatives.

We have identified a number of areas of opportunity that bear investigation over the coming decades for their potential for new capacity. The areas have been selected because they promote our principles of sustainability, transit-oriented development, and walkability. Opportunities have been identified in every borough and collectively represent our largest area of potential growth—up to nearly 350,000 new housing units.

The development of these areas, and others still to be identified, will ultimately be decisions of new administrations and should only be adopted by working with communities, property owners and other stakeholders. Together they will face the challenge of creating plans that support existing communities while accommodating growth and recognizing environmental, infrastructure, and economic concerns. But based on our recent period of historic growth, we believe these initiatives have the potential to anchor new developments, while improving quality of life for New Yorkers.

Creation of Park Avenue

At the start of the 20th century, the railyards around Grand Central Terminal had created an area that was dangerous and unusable. The City covered the tracks, hoping to attract new development around the rail terminal. By 1930, new buildings occupied every site that had been created.



Park Avenue near Grand Central Terminal
1913

INITIATIVE 6

Develop underused areas to knit neighborhoods together

We will continue to identify underutilized areas across the city that are well-served by transit and other infrastructure

Throughout the city, there are areas that fail to take advantage of their significant existing infrastructure. New York City can accommodate part of our growing population by rethinking the uses in these areas.

Working together with communities, we can create places where people want to work and live. We have identified a number of locations to explore, including the Broadway Junction area of Brooklyn, where three subway lines and the Long Island Rail Road converge. But the zoning capacity has never matched this area's potential. By recognizing this neighborhood's ability to absorb responsible growth, we could create capacity for thousands of new housing units.

Across the city, there are other examples of discrepancies between existing infrastructure and investment or strong communities located next to marginal areas. These include portions of Atlantic Avenue in Brooklyn, the Broadway corridor in Upper Manhattan, and the Third Avenue corridor in the Bronx.

Future studies may conclude that the uses in some of these areas are impractical for one or more reasons. Other locations are likely to be identified in the future. We will continue working with communities to identify opportunities for growth that strengthens neighborhoods, and all of New York.

INITIATIVE 7

Capture the potential of transportation infrastructure investments

We will examine the potential of major infrastructure expansions to spur growth in new neighborhoods

Because so much of the transit system is already strained, investment in transit infrastructure is a key component of accommodating growth.

Once New Yorkers were crowded into neighborhoods like the Lower East Side at densities that approximate conditions in some of the world's most congested cities. By extending the city's subway system out into the then-open land of the so-called outer boroughs, we opened up new land for development, reduced overcrowding in Manhattan, and provided a diversity of living conditions throughout the city. While the city has very little open land remaining for future growth, it can incorporate the principle of using infrastructure investment to support future development.

The City is already pursuing this strategy in the Hudson Yards area of Manhattan where it's investing $3 billion in extending the subway's 7 line and building new parks and streets. These investments will support about 100,000 jobs and more than 13,000 apartments in the immediate area and indirectly support employment for another 100,000 people, all in a location that is more transit-oriented than could be provided in any other city in the United States.

Similarly, creating a direct link between Long Island and Lower Manhattan will ensure that the nation's fourth largest business district remains a premier business location and will help attract users for the rebuilt World Trade Center site. But it can be much more than that. If we can find a way to connect it to the Second Avenue Subway, which we believe can be done, we can provide new and improved connections between Brooklyn and Manhattan. This will support both residential and commercial growth in both boroughs. And by extending this to Jamaica, we can provide a unique mass transit alternative for peripheral travel between Brooklyn and Queens and support both residential and commercial growth in Jamaica.

Park Avenue near
Grand Central Terminal
1930s

Expansion of Zoned Housing Capacity

	LARGE PRIVATE APPLICATIONS	PUBLICLY-INITIATED REZONINGS	NEW HOUSING ON PUBLIC LAND	AREAS OF OPPORTUNITY
TIME FRAME	**2007–2030**	**2007–2009**	**2007–2013**	**2010–2030**
Bronx	1,900	5,200–11,500	2,800	68,000–104,000
Brooklyn	4,500-5,000	11,200–25,300	8,600–10,700	86,000–174,000
Manhattan	13,800–14,500	11,100–15,600	7,100–8,100	18,000–22,000
Queens	5,500–6,200	25,400–26,900	9,500–19,000	29,000–39,000
Staten Island	700	1,100	1,400	7,600
SUBTOTAL	**26,400–28,300**	**54,000–80,400**	**29,400–42,000**	**208,600–346,600**
TOTAL				**318,400–497,300**

Source: NYC Department of City Planning

INITIATIVE 8

Deck over railyards, rail lines, and highways

We will explore opportunities to create new land by constructing decks over transportation infrastructure

Throughout the city, in all five boroughs, highway and rail infrastructure is essential to life in the city. But for the most part, they are places where communities stop; where neighborhood is divided from neighborhood. This need not be so. *(See photos above: Creation of Park Avenue)*

Exposed railyards, highways, and rail lines that cleave neighborhoods apart have periodically been built over to open up surrounding land for development—most notably along Park Avenue in Midtown. Just a few blocks west sits Caemmerer Yards in the Hudson Yards area, which will be decked over for housing, offices, a cultural center and public open space. There are numerous opportunities to reknit the city's neighborhoods together.

As our search for land becomes more pressing in the coming decades, we must be prepared to work with communities to explore the potential of these sites.

Probably, the most frequently cited opportunity to use existing infrastructure sites more creatively is the Sunnyside Yards in Long Island City, Queens. With transit access nearby, and new commuter rail access planned as part of the East Side Access project, it has often been looked to as a potential development site. The open railyards span nearly 200 acres; developing even the first section could create hundreds of housing units with stores, schools, playing fields, and parks.

The site could also include an intermodal transportation facility at the intersection for seven subway lines, the Long Island Rail Road, and Amtrak. Residents could walk directly and safely to the shopping on Steinway Street in Astoria; residents in Long Island City could commute from an LIRR station within their neighborhood and children from the surrounding communities could play on new ballfields. By developing the site, the City could create an entirely new neighborhood, connect long-separated communities, eliminate the noise and blight of an exposed railyard, and provide a transportation hub for anyone traveling to or from Queens and Long Island.

To be sure, any such development would be complicated. It is an active and essential rail yard that cannot be disrupted, and additional infrastructure construction as part of the East Side Access project is now underway. As a major portal to Manhattan, the area already suffers from traffic congestion. On the other hand, it offers an exceptional opportunity to expand the existing Dutch Kills and Hunters Point neighborhoods, to provide for new places of employment, and to connect the areas east and west of the yards that are now crossed by only a few streets.

Other examples of possible platform projects are the former railroad space adjoining the Staten Island Ferry that could be used to connect the St. George neighborhood to its waterfront, and the 36th Street Rail Yards on the southern edge of the Green Wood Cemetery in Brooklyn. Building on a platform over it could result in substantial new units of housing.

Exposed highways offer a similar opportunity. One such site is over the Brooklyn-Queens Expressway (BQE) between Carroll Gardens and Cobble Hill also in Brooklyn. Just south of Atlantic Avenue, the BQE dips into a depressed section of roadway bordered on either side by Hicks Street. Continuing straight through to the entrance to the Brooklyn Battery Tunnel, this sunken highway divides Cobble Hill and Carroll Gardens from the river and the community along Columbia Street.

A platform could be constructed over the below-grade section of the BQE to create nine new blocks of housing while reconnecting two neighborhoods. Another example of a disruptive highway that could potentially be covered over includes the Gowanus Expressway.

Some of these areas may be better suited than others for future development due to their accessibility to rail and mass transit, and the physical configuration of the sites. Given market conditions, some may not be able to support development for many years while others may make economic sense sooner. We know that the one-size-fits-all approach of earlier eras will not work. Building communities requires a carefully tailored approach to local conditions and needs that can only be developed with local input. We will begin the process of working with communities, the agencies that operate these facilities, and other stakeholders to sort through these complicated issues. *(See table above: Expansion of Zoned Housing Capacity)*

CASE STUDY

Abandonment to Affordability

Marina Ortiz can remember when she was a girl before her family left East Harlem.

They were not alone. During the 1970s, roughly 360,000 housing units were abandoned across New York. Harlem alone lost 100,000 people between 1950 and 1980. By 1985, the City owned nearly 60% of properties in the neighborhood.

Then Mayor Ed Koch launched a 10-year housing plan to reinvigorate fading neighborhoods. The plan produced or rehabilitated 155,000 units across the city between 1987 and 1996, catalyzing the revitalization of thousands of blocks, from the South Bronx to East New York.

Ortiz, 48, moved back to the neighborhood as soon as she could. But at a January PLANYC meeting held in Harlem, she came to express a new concern.

She likes it here, she said. She wants to stay. The waterfront is a few steps away, and in the other direction sits Central Park. Every summer there are cultural events, arts fairs, concerts, and festivals. She walks to work every morning.

But safer streets have attracted a series of new residents. Already, people she knows are being forced to move in with relatives, friends, and handfuls of strangers—or move out altogether.

Ortiz looked around the room, at the assembled city staff and fellow residents and raised her hand. "Over the next 25 years," she asked, "where are we supposed to go?"

It is a question being asked across New York.

Our challenge has shifted from abandonment to affordability. That's why in 2006, the City announced the expanded $7.5 billion *New Housing Marketplace Plan* which will build and preserve 165,000 affordable units by 2013. In 2006, HPD and the Housing Development Corporation financed more than 17,000 affordable units across the city including more than 140 affordable units in East Harlem.

"I think housing development has been the greatest reason for the more positive changes in East Harlem," Ortiz said. But there must also be "relief for the people who are living here, who want to move out of public housing and advance to the next level."

Expand targeted affordability programs

New York's recent boom in housing permits is already shrinking the gap between housing supply and demand.

But to truly address the challenge of affordability, we must pair these actions with targeted strategies to make sure that these new housing sources are available to the full spectrum of New Yorkers. Some income groups have found themselves priced out of the private market—but unable to benefit from the City's affordable housing programs because their incomes are too high. To maintain a diverse workforce and a vibrant city, we must reach out to these groups and ensure that the City's programs address the broadest range of housing needs.

To this end, we expanded our *New Housing Marketplace Plan* in 2006 to create and preserve 165,000 units of housing by 2013. HPD anticipates that 68% of the units will be affordable to households earning less than 80% of 2005 Area Median Income (which is approximately $50,000 for a family of four or $35,000 for a single person) and the remaining 32% of units will serve moderate and middle-income New York families.

But even though this plan is the most ambitious in American history, we know we will need to continue pushing for new options through 2030. *(See case study above: Abandonment to Affordabilty)*

INITIATIVE 9

Develop new financing strategies

We will continue to pursue creative financing strategies to reach new income brackets

Under the expanded 10-year *New Housing Marketplace Plan,* the City will create 92,000 new units of housing. But just like other cities across the country, New York City struggles to provide housing to a range of incomes. As a result of the existing resources available to create housing, HPD programs have traditionally targeted populations earning between $20,000 and $40,000 per year.

By enhancing our existing middle income programs and committing additional capital funding to develop a new Middle Class Housing Initiative, 22,000 units will be targeted toward New Yorkers earning between $50,000 and $145,000 per year for a family of four.

In addition, the New York City Housing Trust Fund will utilize approximately $70 million of Battery Park City Authority revenues to target households earning below $20,000 and households earning between $42,540 and $56,700.

Finally, the $200 million New York City Acquisition Fund will be used as early stage capital to acquire privately-owned land and buildings that will enable the construction and preservation of 30,000 units of affordable housing.

All three programs provide new sources of funding to meet the housing needs of populations that have been underserved by City programs in the past.

INITIATIVE 10

Expand inclusionary zoning

We will seek opportunities to expand the use of inclusionary zoning, harnessing the private market to create economically-integrated communities

When the Department of City Planning (DCP) approached the rezoning of Maspeth-Woodside, Queens, it wanted to preserve the neighborhood's rows of single-family houses settled along quiet, residential blocks. But along Queens Boulevard, the wideness of the street was not matched by the scale of the housing and shopping opportunities. So, in addition to acting to preserve the character of the interior blocks, DCP opened up the broader boulevards to a mix of affordable units and private market development. But this rezoning was different: the Maspeth/Woodside rezoning included the first inclusionary zoning program ever in Queens.

Inclusionary zoning enables developers to build larger buildings in exchange for dedicating a percentage of their units to affordable housing, either onsite or within a short distance. Traditionally, this strategy has been leveraged across Manhattan and emerging areas of Brooklyn, where the pace of development and surging demand has attracted record numbers of building permits. Developers have been eager to incorporate more units, and in exchange, create more affordable housing for neighborhoods, fulfilling the promise of the city—people from every background living side-by-side in a single neighborhood. Now that kind of demand is spreading across all of New York.

Already, we have incorporated inclusionary zoning provisions in Hudson Yards and West Chelsea on the west side of Manhattan and in Greenpoint-Williamsburg and South Park Slope in Brooklyn. Many other rezonings incorporating inclusionary zoning have been completed or are underway, including in Fort Greene and the Lower East Side. We must continue to maximize this strategy as we evaluate possible new rezonings to ensure that not only is more housing produced, but also that it is more affordable.

INITIATIVE 11

Encourage homeownership

We will continue to develop programs to encourage homeownership, emphasizing affordable apartments over single-family homes

Most people consider homeownership one of the foundations of the American dream. In New York City, the homeownership rate is the highest it has been since we began collecting information on homeownership in 1965: currently 33% of New Yorkers own their own homes. While this is an all-time high for the city, we will continue to encourage homeownership so that more New Yorkers can build equity and savings instead of spending money on rent that they will never recoup.

For those who do leap into the homeownership market, their choices have been constrained by the available supply. Smaller houses, including two-family and three-family homes, have traditionally provided the first opportunity for renters to become homeowners across New York City.

But in a strong real estate market, opportunities for the development of larger, affordable co-operative and condominium buildings have increased—and in some cases been introduced for the first time—into neighborhoods across the city. From Harlem to the South Bronx, new opportunities for the empowerment of homeownership are emerging, without fostering a suburbanized pattern of growth.

In the coming decades, we will continue to build on a range of financing programs and partnerships that encourage homeownership. Today, low-income New York City residents living in overcrowded or substandard housing conditions in Harlem, Queens or Brooklyn can qualify for financing through HPD programs, such as Habitat for Humanity, towards the purchase of a home. For New Yorkers who don't have enough money saved for their down payment and closing costs, HPD's HomeFirst Down Payment Assistance program provides qualified home buyers with up to 6% of the home's purchase price.

In addition, we are continuing to partner with the Nehemiah program, a collaboration between HPD and a consortium of community-based churches in Brooklyn that over the past 15 years has constructed nearly 3,000 single-family homes in East New York and Brownsville. Under the Neighborhood Homes Program, HPD conveys occupied one- to four-family buildings to community-based not-for-profit organizations for rehabilitation and eventual sale to owner-occupants.

INITIATIVE 12

Preserve the existing stock of affordable housing throughout New York City

We will continue to develop programs to preserve the existing affordable housing that so many New Yorkers depend upon today

As we focus on developing affordable housing, we must not forget that a considerable stock of affordable housing already exists in New York. One particular stock of affordable housing that is at risk is the government-assisted stock. A significant number of New Yorkers rely on 250,000 units of affordable housing provided by the Mitchell-Lama program, the Low-Income Housing Tax Credit Program, and HUD-financed properties. These units represent an important long-term source of affordable housing for low and moderate-income New Yorkers. But, many of the original affordability restrictions set by the government to restrict rents on properties are now expiring, and in New York City's strong real estate market, owners are tempted to convert their buildings to market-rate. At the same time, some of these buildings have fallen into disrepair and need help improving housing conditions for their tenants.

To date, HPD has worked with partners to preserve these units using strategies catered to each building or group of buildings. One example of this is HPD's work with the U.S. Department of Housing and Urban Development (HUD) to preserve their properties. In this case, HPD has arranged the successful transfer of more than 1,000 units from HUD's foreclosure pipeline to responsible new owners. But there are thousands more units we need to preserve. Over the coming years, we will work to create a comprehensive strategy to preserve these units with the goal of providing incentives to owners to keep their buildings affordable or to transfer them to responsible ownership. As the housing market in New York continues to evolve, the City is committed to adapting its preservation strategies to ensure we save this valuable stock of affordable housing. In fact, preserving 37,000 of these units is an explicit goal of the *New Housing Marketplace Plan*.

Conclusion

We have seen the shift that can occur over 25 years. Since 1980, the city's housing crisis completely reversed, from abandonment to affordability. Each question has been equally urgent.

We recognize that the strategies discussed here—rezonings, maximizing affordability on public land, looking at new areas of opportunity, developing innovative financing programs, expanding the use of inclusionary zoning, and supporting home ownership—will have to be adjusted as the market changes, and new approaches may need to be added. Our efforts must reflect the dynamism of New York and its growing population if we are to be successful in addressing the city's housing needs. We must be prepared to respond with creativity and compassion as newer challenges emerge.

The mixture of residents will determine, more than anything else, the kind of city we become. By expanding supply possibilities to create healthier market conditions, we can continue ensuring that new housing production matches our vision of New York as a city of opportunity for all. The building blocks are mixed-income communities.

But this principle will not change: If New York loses its socioeconomic diversity, its greatest asset will be lost. We can—and must—do better.

Open Space

Credit: Vincent Laforet/The New York Times

We must ensure that all New Yorkers live within a 10-minute walk of a park.

In 1652, Dutch traders began settling farming villages just east of Manhattan—including one they named Vlackebos, meaning "wooded plain." The area, with its dense forests and flat terrain, would eventually become known as Flatbush, and it remained in its natural state for the better part of three centuries. But, in the 1920s, the new Interborough Rapid Transit linked Flatbush to the rest of the city, sparking new developments that began welcoming successive generations of immigrants. As with the Dutch traders, these newcomers built homes and roads, only more quickly and densely. Riding through East Flatbush today, there are still trees that line its quiet, residential sidewalks. But the area's open space is virtually gone.

Flatbush is not alone. Through much of the 20th century, in too many neighborhoods, the population grew faster than the rate of new park development, even as the City built one of the largest urban park systems in the United States—29,000 acres in all. The challenge today is not only to add new parkland, which is critical to the city's quality of life, but to expand access to parks and open space in communities where they have been scarce for decades. *(See case study on following page: New York City's Three Great Ages of Parks Development)*

Over the last five years, the City has added more than 300 acres of new parkland, much of it by reclaiming stretches of the waterfront that were abandoned by industry decades ago. Yet because of our population density, the city has fewer acres of green space per person than almost any other major American city. And as the city's population continues to grow, and as competition from housing, office space, and other uses intensify, the need to create new parks and open space will increase.

Bryant Park, Manhattan

CASE STUDY

New York City's Three Great Ages of Parks Development

It was predicted to become a "great beer-garden for the lowest denizens of the city."

Instead, Central Park heralded the first of three great ages of parks development in New York's history.

Despite these predictions by *The New York Herald*, by 1863, Central Park was attracting 4 million visitors annually from every social class. Frederick Law Olmsted never doubted that the elegantly wild parks he had visited in Europe would appeal to both wealthy New World tycoons as well as the hardscrabble strivers who were streaming into New York City by the hundreds of thousands. A man of strong ideals, Olmsted almost single-handedly convinced a skeptical nation that common space must be equally accessible to all citizens.

Buoyed by the triumph of Central Park, Olmsted and his partner Calvert Vaux quickly set about co-designing iconic New York City public spaces, including Prospect Park, Riverside Park, Eastern Parkway, and Ocean Parkway. All told, the two landscape pioneers helped create over 1,900 acres of New York City parkland.

Robert Moses unofficially inaugurated the second great age of parks in August of 1929, when, as Long Island State Parks Commissioner, he opened Jones Beach State Park, which attracted 350,000 visitors in its first month of operation alone. Between 1934 and 1960, park acreage increased from 14,000 acres to 34,600 acres. Moses took full advantage of New Deal funding in deploying an army of workers that at one point reached 84,000 people to develop 15 outdoor swimming pools, 17 miles of beaches, and 84 miles of parkways.

But by 1980, the funding, staffing, and quality of our parks had dwindled, leaving behind barren, unkempt spaces. The turnaround began in 1981, when Mayor Ed Koch announced a 10-year capital plan that proposed a $750 million commitment to rebuild our system. That program helped spur the third great period of parks developments in the city.

Over the past five years, we have already added more than 300 acres of parkland. New York City is currently home to more than 1,800 parks, playgrounds and recreation facilities across the five boroughs.

With the egalitarian principles of Olmsted and Vaux as our inspiration, we will make public space easily accessible to every New Yorker—as we launch the most ambitious parks program in half a century.

Left: Central Park
Credit: NYC Department of Records/Municipal Archives

Above Right: Orchard Beach
Credit: NYC Department of Parks & Recreation

Below Right: Rendering of Plans for Fresh Kills
Credit: NYC Department of City Planning

The current standard for park space in New York is 1.5 acres per thousand people. For playgrounds it is 1,250 children per playground. In contrast, East Flatbush's 56,000 residents have access to a total of 4.8 acres of open space, or 0.09 acres per thousand people. The neighborhood's 12,000 children share three neighborhood playgrounds. More than half the population, or 29,000 people, lives farther than a quarter-mile from publicly available open space.

New Yorkers love their parks—and are eager to use them. In a recent survey, 82% of New Yorkers cited open spaces as one of their most cherished city assets. But those assets are increasingly crowded. With population growth expected to continue, and as greater competition for land from housing, offices, schools, municipal uses, and other priorities intensifies across the city, the open space ratio is expected to fall even further. Today, 97 out of 188 neighborhoods have more than 1,250 children per playground. Based on current trends, by 2030, 59 neighborhoods will have less than 1.5 acres of open space per 1,000 residents.

Expanding access to parks is also important for public health. Today, the city's obesity rate among children is 24%, almost 10% above the national average. In 2000, children in New York City were almost twice as likely to be hospitalized for asthma as children in the U.S. as a whole. Expanding access to open space is not a panacea for these health problems, but it can be part of the solution. In the interest of public health and environmental justice, we have to do better.

New Yorkers are clamoring for more opportunities to enjoy parks, and maintaining and expanding our quality of life requires us to answer that need.

By developing a comprehensive, neighborhood-by-neighborhood approach, we can ensure that every child and every adult has open space to relax and play.

Our Plan

When opportunities arise to create new parks we should continue to seize them—as we have by reclaiming Fresh Kills from its languishing status as a 2,300-acre former landfill, re-imagining the East River Waterfront, and Governors Island as part of a new Harbor District, building a new 20-acre waterfront park along Sunset Park's Bush Terminal Piers, transforming the Elmhurst gas tanks site into six new acres of park space, and setting in motion over the last five years the creation of nearly 2,700 acres of parkland—the largest expansion of our system since the New Deal.

But even that will not be sufficient for every neighborhood as we move forward. The need for new parkland must be balanced with the need for additional housing, schools, and transit access, and the available land for these critical priorities is getting scarcer. As a result, we cannot fully solve the challenge by buying more land and converting it into parks. New approaches are needed, strategies that cleverly evolve and co-locate uses on the land we already have. This idea is the core of our Open Space program.

We have developed three main approaches to ensure that nearly every New Yorker lives within a 10-minute walk of a park by 2030. First, we will upgrade land already designated as play space or parkland and make it available to new audiences. Second, we will expand usable hours at our current, high-quality sites. And third, we propose re-conceptualizing our streets and sidewalks as public spaces that can foster the connections that create vibrant communities.

The collective result of these policies will create over 800 acres of upgraded parkland and open space across virtually every neighborhood. Combined with other transformative park projects already being advanced, the total number of acres newly planned, acquired, developed, or opened will total nearly 4,000. No longer will some residents have access to recreation and space for relaxation, while others do not. By 2030, virtually every New Yorker across the city will live within a 10-minute walk of a park. *(See map above: All Park Initiatives)*

Our plan for open space:

Make existing sites available to more New Yorkers

1. Open schoolyards across the city as public playgrounds
2. Increase options for competitive athletics
3. Complete underdeveloped destination parks

Expand usable hours at existing sites

4. Provide more multi-purpose fields
5. Install new lighting

Re-imagine the public realm

6. Create or enhance a public plaza in every community
7. Green the cityscape

CASE STUDY

History of Jointly Operated Playgrounds

Even on a cold January day, the Fort Hamilton High School playground was alive with five and six-year-old kids drawing games on the pavement with colored chalk. After school hours, the playground stays open for the Bay Ridge community, as does Fort Hamilton High's track, football fields, and basketball courts. Mid-winter soccer games and pick-up basketball after school are the norm.

When it opened in 1938, Fort Hamilton's Jointly Operated Playground (JOP) was the first of its kind—a collaboration between the Department of Parks & Recreation (DPR) and the Department of Education (DOE). Then, like today, New York City was looking for a way to maximize the use of its existing resources and provide cost-effective recreational space.

Today, there are 269 JOPs open for public use. But they are the exception—81% of schoolyards are closed to the public after the last bell of the school day.

Even though the JOP program is a sensible use of city resources, it has been stymied by administrative hurdles. Since 1938, JOPs have been considered designated parkland, which restricts how the land can be used. Without the flexibility to meet the potential needs of the schools, the City was concerned that expanding the program would further inhibit school expansions.

That's why we will apply the original JOP program principles to a workable, new administrative model. The DOE and the School Construction Authority will retain control of their property, and will be responsible for capital construction, maintenance and security.

For children like Sasha, a six-year-old playing in scattered snow in the Fort Hamilton JOP after school hours, all that matters is having a space in which to play. Now, he and more than 300,000 children across the city will have more playgrounds to choose from.

Inventory of Schoolyards-to-Playgrounds

CATEGORY	PLANNED IMPROVEMENTS	NUMBER OF PLAYGROUNDS	CHILDREN SERVED
Category I (Can be opened immediately)	No improvements required	69	86,250
Category II (New equipment required)	Depending on the needs of the school and the community, each site will receive playground improvements, including: • Painting and sealing pavement • Upgrading or adding sports equipment • Installing fitness and/or playground equipment • Planting street trees and landscaping	150	187,500
Category III (Capital improvements required)	These sites would benefit from all of the improvements of the Category II sites. In addition, they will undergo: • Repaving damaged asphalt • New fencing and safety improvements	71	88,750
TOTAL		**290**	**362,500**

Source: NYC Department of Parks & Recreation

Make existing sites available to more New Yorkers

Hundreds of playgrounds, dozens of high-quality competition fields, and acres of open space exist in every borough. But in too many cases, they are used only a few hours a day. Schoolyards, high school fields, and open parkland are resources that can be maximized for the benefit of every community.

INITIATIVE 1

Open schoolyards across the city as public playgrounds

We will open schoolyards as playgrounds in every neighborhood

Although East Flatbush lacks traditional sources of open space, opportunities to create greener streets and active playgrounds exist. *(See case study: History of Jointly Operated Playgrounds)*

On a recent afternoon, the tall metal gates of P.S. 135 were open long after classes had ended, revealing a large schoolyard encircled by a silver chain-link fence. More than 20 teenagers were gathered, some playing, others looping their fingers through the links in the fence, peering in and awaiting their turn. The rest of the space sat empty and unused.

There are four schoolyards in the neighborhood that are currently underutilized. Some lock their gates when the school day ends. Others offer minimal equipment to the community. These school yards, some of which are closed all summer, every weekend, and every evening, offer the best opportunity for turning an existing, underused space into a vital community resource.

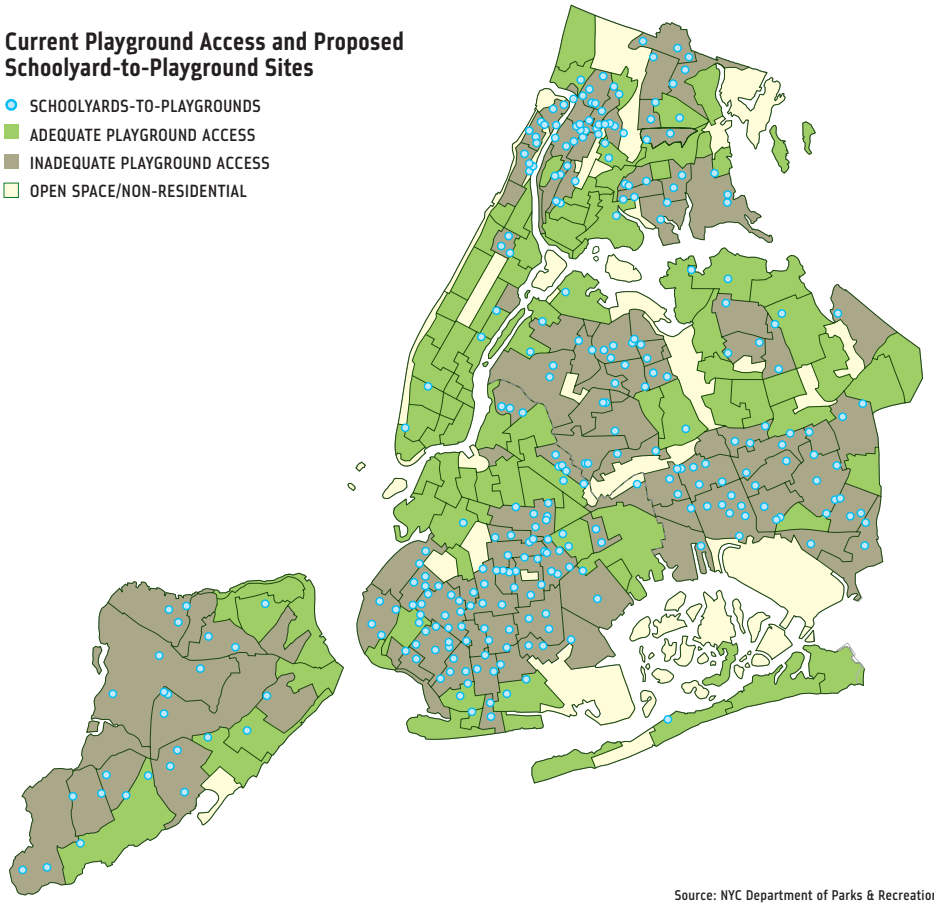
Of the 290 underutilized schoolyards in neighborhoods that lack open space, 69 of them could be opened tomorrow; simply unlocking the gates will open an equipped, playground—a long overdue solution. The other sites would require new investments—such as play equipment, greenery, or asphalt sports fields—to make them attractive as play space. Some of these sites could be opened as early as 2008. *(See table above: Inventory of Schoolyards-to-Playgrounds)*

These playgrounds could provide proper play space for more than 360,000 children by 2030. But expanded access would not be the only benefit. In 2000, there were 97 neighborhoods with more than the accepted standard of 1,250 children per playground; in fact, on average these underserved neighborhoods have almost 2,100 children for each playground. By opening these playgrounds that number would drop to 1,260 children per playground. *(See map on facing page: Current Playground Access and Proposed Schoolyard-to-Playground Sites)*

These new playgrounds will offer children something more than the asphalt expanses that often serve as schoolyards today. Although each site will be evaluated individually, modest investments could turn faded concrete courts into an outdoor exercise center; a junior soccer field, or a walking/jogging course. Trees could bring life and greenery into the playgrounds.

Current Playground Access and Proposed Schoolyard-to-Playground Sites

- SCHOOLYARDS-TO-PLAYGROUNDS
- ADEQUATE PLAYGROUND ACCESS
- INADEQUATE PLAYGROUND ACCESS
- OPEN SPACE/NON-RESIDENTIAL



Source: NYC Department of Parks & Recreation

INITIATIVE 2

Increase options for competitive athletics

We will make high-quality competition fields available to teams across the city

Often the fiercest competition among sports teams in New York City can be finding a place to play. We will increase options for competitive athletes by making high-quality competition fields available to teams across the city.

In recent years we have developed a stock of first-class fields that can be made available to more teams with proper coordination. For example, the "Take the Field" program, a public-private partnership that rebuilds outdoor athletic facilities at public schools, has already created 43 high-quality sports field complexes at high schools in every borough. Altogether, the program has built 36 soccer fields, 35 baseball fields, 35 tracks, and 22 tennis complexes—some of which can be made available to wider use with proper coordination.

Existing fields are currently being used both by school teams and a limited number of community teams. We will work with sports teams and community-based groups to open the sites to new audiences and maintain underused fields.

INITIATIVE 3

Complete underdeveloped destination parks

We will fulfill the potential of at least one major underdeveloped park site in every borough

The most tantalizing opportunity lies in the 500 acres of underdeveloped parkland and underutilized facilities.

New York's park system is built on a foundation of regional and large parks. These parks are the greatest attractions in the system, providing a full range of experiences—athletic, cultural, educational, and relaxing—for every resident in the city. As New York grows, these parks will continue to attract even larger numbers of users. To maintain the quality of the park system, New York will need to create new regional and large park destinations.

We've identified eight sites across the city—at least one in every borough—that were once envisioned as spectacular resources for the surrounding region. All have yet to reach their potential.

One is a former reservoir. Several are located along highways, with few access options. One site lies within a nature preserve, but could safely be developed.

Together, these sites will become regional destinations. For each one, we will engage in a planning effort with the surrounding community to develop green spaces, outdoor recreational centers with opportunities for all ages, and sports facilities—such as for soccer and cricket—that reflect the shifting recreation interests of today's New Yorkers. *(See map on following page: Destination Parks)*

Dreier-Offerman Park (Calvert Vaux Park), Brooklyn
Dreier-Offerman Park, in the Bensonhurst neighborhood of south Brooklyn, was planned as a regional park eight times the size of Bryant Park. But many of the playing fields at this 77-acre park were built by individual community organizations with limited resources and little coordinated planning. By 2013, this park will finally reach its potential, becoming the center for competitive soccer and baseball for all of south Brooklyn.

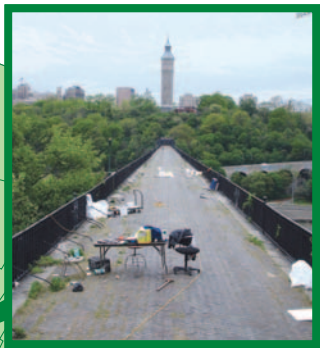
Fort Washington Park, Manhattan
The 160-acre site already offers tennis courts, baseball diamonds, and scenic walking paths along the Hudson. But cars driving by the Henry Hudson Parkway separate this long, narrow park from the rest of the city—and there is only one main entrance along a mile-and-a-half long stretch. Fortunately, the State Department of Transportation has funded plans to improve access to Fort Washington Park. That will provide an opportunity to maximize use of the space by building a new soccer and volleyball facility for Upper Manhattan. Greenway improvements will also be implemented throughout the park.

Highland Park, Queens
The former Ridgewood Reservoir is nestled within the broader expanse of Highland Park. Built in 1856 on a natural basin, the reservoir was used until 1959 and served as a backup water supply for Brooklyn and Queens until 1989. Today its three basins are overgrown. Two of the three basins will be set aside as a nature preserve, while the largest will be transformed into a 60-acre active recreation center.

McCarren Park, Brooklyn
Opened in 1936, then closed in 1984 due to the deterioration of its systems, McCarren Pool will finally be rebuilt as both an outdoor Olympic-size pool and a year-round recreation center serving the people of north Brooklyn.

Ocean Breeze Park, Staten Island
Ocean Breeze is a 110-acre park that used to be part of an adjacent hospital campus. Most of the park is sand dunes and wetland and

Destination Parks



MANHATTAN
Highbridge Park
36 acres
Proposed Improvements: restore bridge with repairs to the brick walkway and stone and steel arches. creating a pedestrian and bike connection between Manhattan and the Bronx

MANHATTAN
Fort Washington Park
160 acres
Proposed Improvements: improve access across Henry Hudson Parkway, build new soccer and volleyball facility, and create greenway improvements

BROOKLYN
McCarren Park, 36 acres
Proposed Improvements: rebuild the McCarren Park pool as an Olympic-size pool and a year-round recreation center

STATEN ISLAND
Ocean Breeze, 110 acres
Proposed Improvements: develop soccer fields, baseball fields, and the city's third indoor track facility

BROOKLYN
Dreier-Offerman Park
77 acres
Proposed Improvements: develop competitive soccer and baseball center

THE BRONX
Soundview Park, 212 acres

Proposed Improvements: undertake environmental improvements, including salt marsh restoration, construct a new athletic fields and facilities

QUEENS
Highland Park, 60 acres

Proposed Improvements: set aside two of three basins as a nature preserve and new active recreation center

QUEENS
Rockaway Beach 44.5 acres

Proposed Improvements: re-establish amenities along the boardwalk for beach visitors

Source: NYC Department of Parks & Recreation

BROOKLYN
Bushwick Inlet Park

Bushwick Inlet Park is an example of a regional park already underway. It will transform formerly industrial land into a 28-acre waterfront park set against the Manhattan skyline. A two-mile waterfront esplanade will wind along the Greenpoint-Williamsburg shoreline, opening up on recreational turf ball field, gardens, and boat launches that enhance the site's dramatic views and riverfront location.

Above: Bushwick Inlet Park before
Credit: NYC Department of Parks & Recreation

Below: Bushwick Inlet Park after
Credit: NYC Department of Parks & Recreation

must remain in its natural state. But there is a large parcel of approximately 10 acres where active recreational activities can take place. Ocean Breeze is our single best opportunity on Staten Island to create much-needed major athletic facilities, including soccer fields, baseball fields, and the city's third indoor track.

Soundview Park, Bronx
Soundview Park was built on a landfill in the South Bronx. Today the 212-acre park offers the surrounding community six grass baseball fields, one cricket pitch, one track, a playground, and a soccer field. Even with those facilities, we can do more. There are 93 acres that could provide additional recreational space for the underserved and growing South Bronx community. New athletic fields will be accompanied by environmental improvements, including the restoration of a salt marsh.

The High Bridge, Bronx and Manhattan
The High Bridge is the oldest remaining bridge in New York City. First opened in 1848, the 1200-foot-long, 116-foot tall High Bridge walkway was closed to regular public use around 1970. Standing majestically over the Harlem River, this restored bridge will provide Bronx residents with new access to the parks of the northern Manhattan greenbelt, including the Highbridge pool and recreation center. The bridge will also provide an important greenway link for all New Yorkers.

Rockaway Park, Queens
More than 35 years ago, the bungalow colonies and amusement parks of the Arverne section of the Rockaway Peninsula were demolished to make way for an urban renewal project that never materialized. The amenities along the boardwalk, such as public comfort stations, have deteriorated. Now major developments in the area, such as the Arverne-by-the-Sea project, are under construction and will soon attract a large, vibrant residential community. This project will provide beachfront facilities to serve these new residents, as well as visitors from all over the city.

Expand usable hours at existing sites

Taken together, the three strategies described above will put hundreds of thousands of additional New Yorkers within a 10-minute walk of a park. But even where facilities and open spaces exist, demand for them far outstrips supply. In certain seasons, and after sundown, some of these facilities are largely unusable. Still others are limited by design to a narrow set of uses, and stay empty too much of the time. To better meet the growing demand for recreational space, we must maximize the use of our existing assets and equip them to most fully meet the needs of New Yorkers.

INITIATIVE 4

Provide more multi-purpose fields

We will convert asphalt sites into multi-use turf fields

During the period when the parks system was last expanded, we constructed our parks to address the interests of the time, including baseball diamonds and basketball courts. But the majority of new additions at that time were multi-purpose asphalt fields that could accommodate a range of games. Since then, our city has changed; we must change as well, in order to meet the demands of a growing and diverse population that plays a wide range of sports.

Today we do not have enough grass fields to accommodate the growing demand for soccer fields, and those we have are quickly worn by intensive use. Other games like field hockey, cricket, and rugby have also emerged as major recreational interests for New Yorkers. To meet the demand, we will accelerate the conversion of at least two dozen asphalt multi-purpose fields to synthetic turf. These turf fields can host a greater range of games, including contact sports, and can better absorb frequent and intensive use. At the same time, we will use the most advanced design and technology to make these fields as environmentally-friendly as possible.

INITIATIVE 5

Install new lighting

We will maximize time on our existing turf fields by installing additional lights for nighttime use

Across the city, dozens of high-quality fields are rendered all but unusable after the sun sets. By placing additional lights around our athletic fields, we can allow people to play longer into the evening at a fraction of what a new field would cost. The best candidates for lighting are synthetic turf fields because they are durable enough to withstand additional use. Today, there are 36 such sites located throughout the five boroughs.

These new lights could provide an additional two hours of competitive use for each field during the summer, and an additional four hours during the spring and fall.

Re-imagine the public realm

New Yorkers frequently see sidewalks as the means to an end. We really do walk faster than other people; travel to another city and the fact—in the form of a meandering pedestrian just in front of you—will be inescapable.

But there are also many among us who have bought a slice of pizza and wished to eat it outdoors when the weather was warm; or bought a book and had nowhere to read outside until getting home; or just wanted to sit down for a moment and watch the street life of our city.

Moreover, whether it's walking to the car, or out of the subway or bus, or down the street on the way to school or shopping, each of our trips begins and ends as a pedestrian. That's why it is important to enhance the pedestrian experience on our streets and sidewalks.

There is no formula for the perfect New York City block. But neighborhoods with trees are generally more pleasant and beautiful than those without; sidewalks that encourage walking, with room for strollers, and gawkers, and go-getters, are more interesting and enjoyable than narrow strips of concrete. Our plan for open space will help bring to life the unique beauty of each of our neighborhoods.

Just as we have begun to re-imagine the waterfront from a set of dilapidated docks and warehouses into a resource for emerging neighborhoods and families, we must similarly turn our attention to the most commonly shared spaces among us. That means creating new plazas in every community where sidewalks in commercial areas allow for more neighborhood life, and where empty spaces could be converted into public plazas. It means filling out the remaining barren streets with trees that will add shade, color, cleaner air and higher property values; and it means encouraging an active, vibrant public realm as essential to the life of our city.

INITIATIVE 6

Create or enhance a public plaza in every community

We will create or enhance at least one public plaza in every community

Even before the City's Department of Transportation (DOT) finished the Willoughby Street Plaza in Downtown Brooklyn, people started to gather at the colorful collection of chairs, tables, umbrellas, and planters. The plaza soon transformed a stretch of roadway primarily used for parking into an inviting and attractive open space adjacent to shops and cafes. *(See case study: WIlloughby Street)*

Each of the city's 59 Community Boards contains at least one opportunity to transform underutilized street space into a successful plaza, as envisioned by Jane Jacobs and others, flanked by a mix of workers, residents, and stores that attract flows of people throughout the day; broad exposure to sunlight; buildings in scale with the open space.

Approximately 31 plaza projects are currently underway or planned to be completed by 2009. While the city already has many existing successful plazas, until now project selection has depended largely on funding and convenience. Starting this year, we will add a new process to the selection criteria: community initiative and need.

DOT will work with other agencies to identify additional sites and opportunities, prioritizing the neighborhoods with the lowest ratio of open space to population.

We will reach out to those communities to discuss potential sites and opportunities. The scale and design of these plazas will vary

Willoughby Street before
Credit: NYC Department of Transporation

Willoughby Street after
Credit: NYC Department of Transporation

CASE STUDY

Willoughby Street

During jury duty in 2005, a City Department of Transportation (DOT) Deputy Commissioner looked out of the courthouse window and noticed that the jagged area formed by Willoughby Street and the east of Adams service road was filled with illegally parked cars and little traffic.

The stretch of road in Downtown Brooklyn was adjacent to both the busy Jay Street-Borough Hall subway station and the bustling Fulton Street shopping area—but it was unused by either pedestrians or traffic.

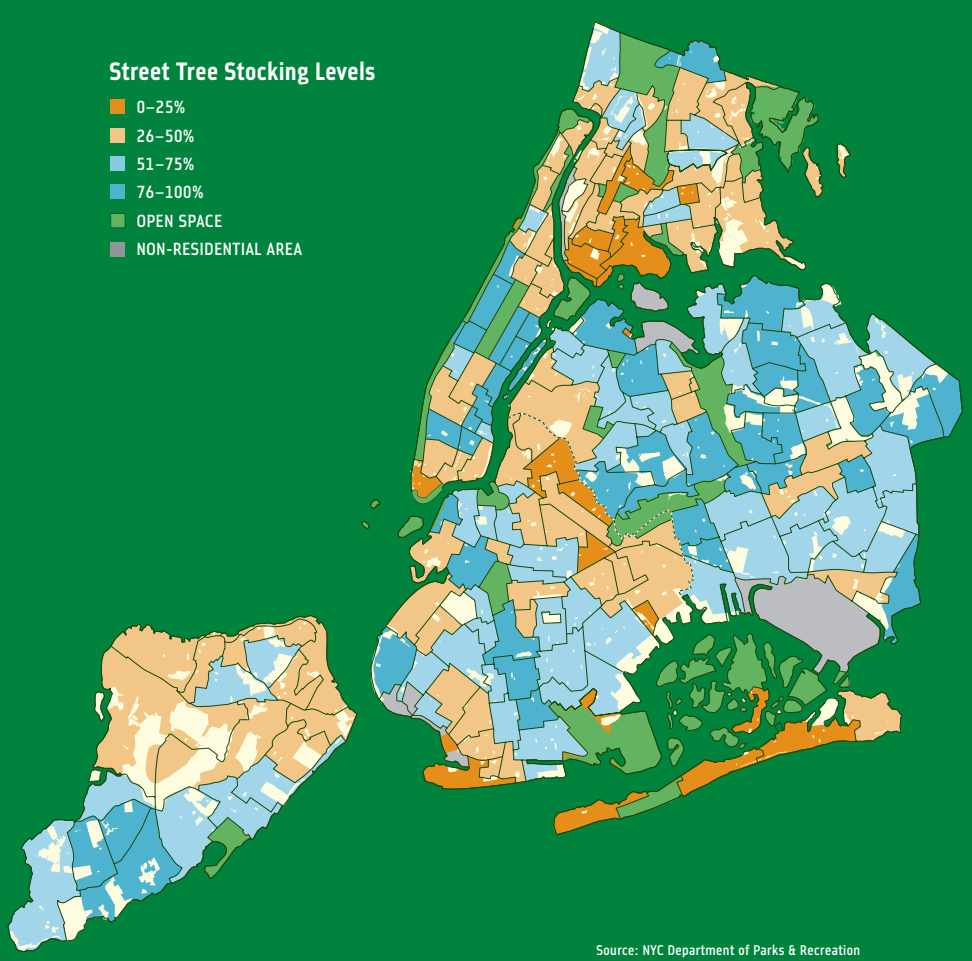
In 2006, DOT decided to reclaim the underused road space as a new public plaza. Before it had even been completed, people had already started to gather at the colorful collection of chairs, tables, umbrellas and planters that replaced the curved stretch of empty roadway. And it cost less than $100,000.

The success prompted the City to begin work on a $1.4 million buildout of the plaza, which will connect to the Fulton Street Mall.

By enhancing the Downtown Brooklyn walking environment, the plaza will encourage area workers to patronize local businesses. It will improve pedestrian safety by reducing crossing distances and slowing vehicles. The landscaped public space will also help the environment by filtering the air.

The project will result in approximately 7,000 square feet of new pedestrian space—room for a tired shopper to rest her feet and sip a cup of coffee.

Two streets in South Jamaica, Queens



Source: NYC Department of Parks & Recreation

widely, just as the scale and design of the city's neighborhoods vary widely. Four new or enhanced plaza spaces will be completed per year until every community board has at least one. In every case, the communities will be consulted on sites and how the space is designed, constructed, and programmed.

INITIATIVE 7

Green the cityscape

We will beautify our public realm to improve the experience of every pedestrian

In 1902, the Municipal Art Society encouraged residents of Brooklyn Heights to beautify their neighborhood by planting sidewalk trees, installing flower-filled window boxes, and creating mini-gardens of potted plants on their stoops. Called *Block Beautiful,* this private initiative led to the adoption of the first sidewalk tree planting program.

In truth, we have always known that trees beautify neighborhoods; but in the late 1980s, scientists began to quantify the benefits of urban trees. Today, an impressive and growing body of knowledge recognizes trees as assets to a city's economic and environmental health. City trees cool summer air temperatures, reduce air pollution, conserve energy, and reduce storm water runoff.

We will fill every available street tree opportunity in New York City

In the past decade, the Department of Parks & Recreation has planted more than 122,000 curbside trees of more than 30 different varieties. Current plantings fill 74% of the existing space for street trees. We will undertake an aggressive campaign to plant trees wherever possible, in order to fully capitalize on tree opportunities across the city. Our goal is to raise the street stocking level from 74% to 100% as part of our overall goal of planting one million more trees by 2030. To achieve this, we will plant approximately 23,000 additional trees annually. *(See map above: Street Tree Stocking Levels)*

We will expand the Greenstreets program

In addition to tree planting, we will expand Greenstreets, a program that has successfully transformed thousands of acres of unused road space into green space since its inception in 1996. Over the next 10 years, we will undertake 40 new Greenstreets projects every planting season, bringing the total number of Greenstreets projects to 3,000 by 2017.

Conclusion

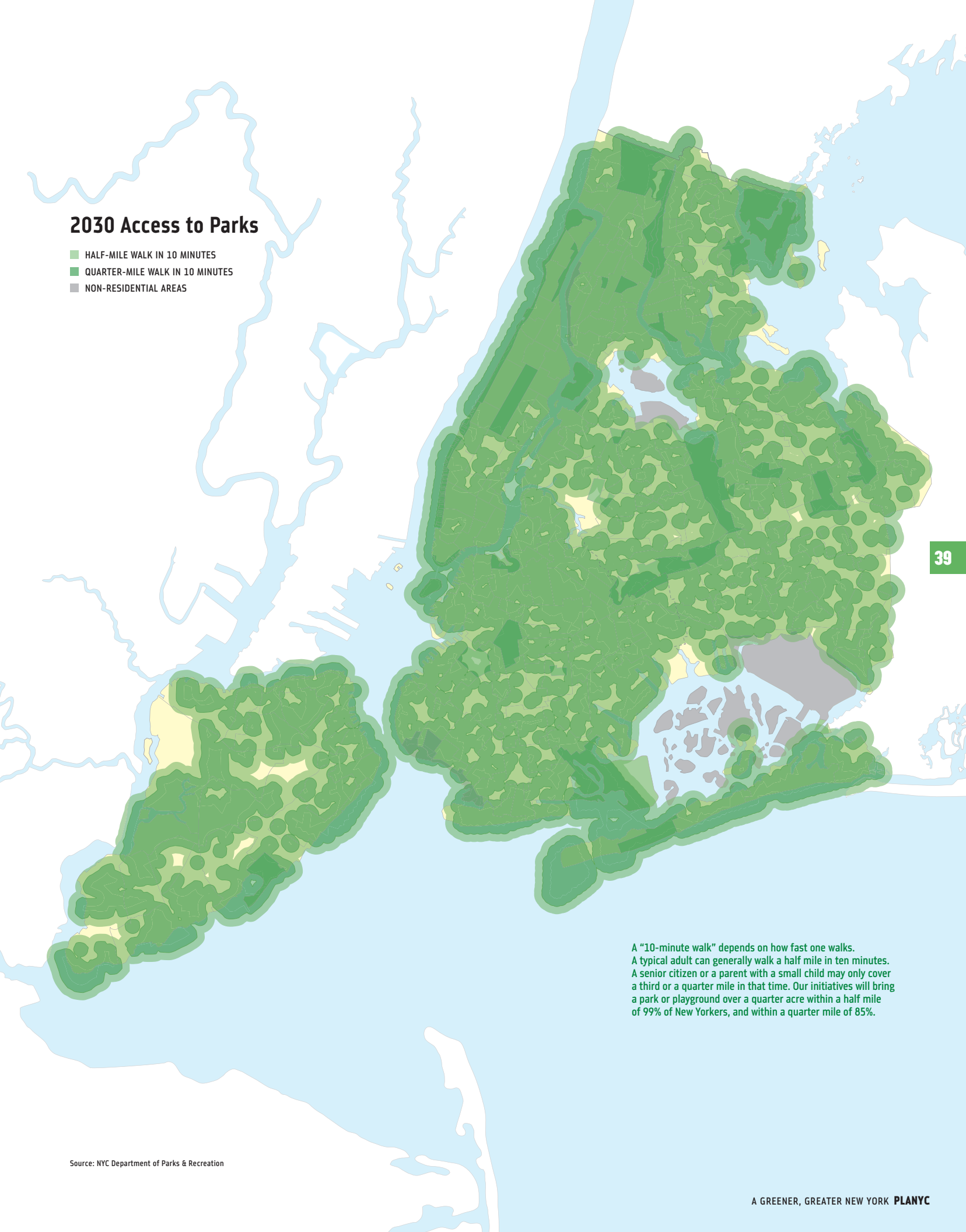
Throughout this chapter, we have defined parks as publicly-accessible open space that offers New Yorkers possibilities for either active recreation or relaxation and enjoyment. No park smaller than a quarter acre has been considered to meet this standard.

We have also considered the question of access. For a typical New Yorker, a 10-minute walk is a half mile. But this is a goal for all ages, and so we've also assessed open space opportunities within a quarter mile, recognizing the different pace set by parents walking with small children and seniors. *(See map on facing page: 2030 Access to Parks)*

As a result of the initiatives outlined here, we can expand opportunities for virtually every New Yorker within the next 10 years, building on the substantial progress from the last five.

With our projected population growth and increasing competition for land, new open space will become more difficult to find. That is why we will be even more vigilant about using what we already have more efficiently—even as we continue to search aggressively for available parkland. Through shared usage and new facilities on existing sites, we will substantially increase open space for New Yorkers to enjoy their parks.

Together, we will create an active, healthier, more beautiful public realm for all New Yorkers across our city.



A "10-minute walk" depends on how fast one walks. A typical adult can generally walk a half mile in ten minutes. A senior citizen or a parent with a small child may only cover a third or a quarter mile in that time. Our initiatives will bring a park or playground over a quarter acre within a half mile of 99% of New Yorkers, and within a quarter mile of 85%.

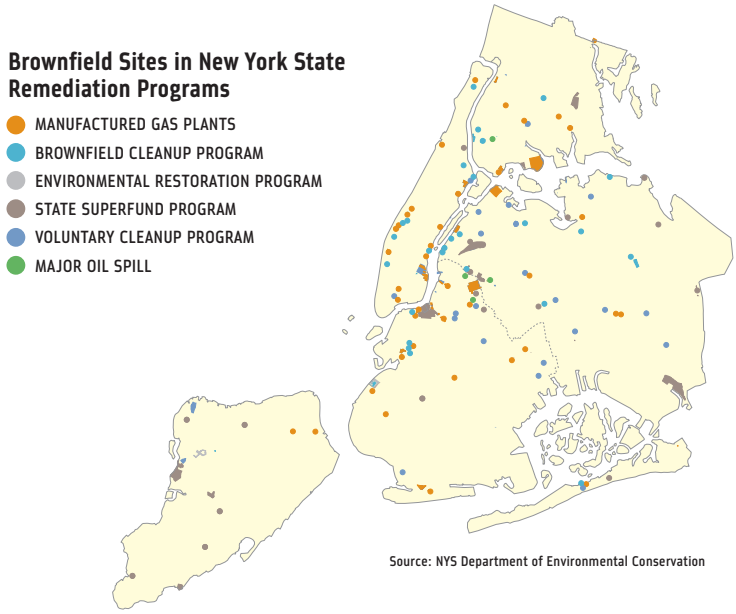
Source: NYC Department of Parks & Recreation

Brownfields

Credit: NYC Department of City Planning

Clean up all contaminated land in New York City

Public Place, Brooklyn



Source: NYS Department of Environmental Conservation

Today, the 5.5-acre brownfield known as Public Place is anything but open to the public. A tall fence encircles the site, separating it from the surrounding community and blocking access to the Gowanus Canal. Dense underbrush has spread over piles of dumped garbage, an old building foundation, and a rusting dump truck. The only active corner is used by a concrete production facility.

Adjacent to the growing neighborhood of Carroll Gardens, framed by the rising ridge of brownstone Brooklyn, and within walking distance of the subway, the area's potential is unquestionable. As the largest City-owned site in the neighborhood, the lot could be reclaimed as housing and open space. But while the surrounding areas have flourished, Public Place has stubbornly remained vacant for decades, despite repeated requests by the local community to restore the land for active use.

Starting in the 1860s, the Brooklyn Union Gas company operated a manufactured gas plant on the site for a century—leaving coal tar waste and other chemicals behind. Since the plant closed in the 1960s, the pollution has sunk as far as 150 feet underground, seeping into, under, and across the canal.

As early as 1970, the community identified Public Place as a redevelopment opportunity—but for the next three decades, nothing happened. Since KeySpan signed a voluntary clean-up agreement in 2002, the process has accelerated—but it has still taken four years just to complete the analysis of contamination on-site, explore the range of possible uses, and negotiate responsibility for the steady flow of toxins leaking into the Gowanus Canal.

Agreement on a remediation design will take another year and the cleanup itself will last one more. By 2008—nearly 40 years after first being identified—the redevelopment of Public Place can begin.

As our need for space grows while our supply of land remains fixed, we must use our existing stock of land more efficiently. Brownfields represent one of our greatest opportunities. All five boroughs contain sites where previous uses have left behind contamination. There might have been a factory that turned coal into natural gas; a dry cleaner that used hazardous chemicals; or a gas station that left behind gasoline in the soil. In some cases, the confirmed presence of these dangers has stalled development; in others, just the fear of pollution has prevented the land from being used more effectively. All together, as many as 7,600 acres across the city may suffer from contamination—an area over eight times the size of Central Park.

The presence of brownfields is most acutely felt in low-income communities where contaminated sites can be concentrated. For years, environmental justice advocates have championed the need for strengthened brownfield remediation programs for years, particularly ones that address community needs.

With enough investment and oversight, even the most contaminated land can be cleaned up for safe use. Barretto Point Park in the South Bronx is built on a site once contaminated by an asphalt plant and a sand and gravel facility. Schaefer Landing, once a manufactured gas plant, sugar refinery and brewery, is now the site of 350 units of housing on the Brooklyn waterfront. And the Shops at Atlas Park in Queens was once a toy factory site that tainted the surrounding soils and groundwater by pouring chemicals down its drains. *(See case study on following page: Schaefer Landing)*

CASE STUDY

Schaefer Landing

For 16-year-old Gabriella Lazzaro, a nascent photographer eager for subjects, the Williamsburg waterfront always held a certain beauty. Lazzaro lives a block from the river, but just a few years ago, her mother Nora wouldn't let her walk through the area after dark.

"Imagine vacant land where people took to dumping garbage—that was Schaefer Landing—overgrown weeds, and all kinds of things moving around in there," said Nora Reissig-Lazzaro, who moved her family to Williamsburg 15 years ago. "It wasn't an area you'd want to walk by alone, night or day."

Schaefer Landing, named after the brewery that operated on the site between 1918 and 1976, has a long history of manufacturing uses. At various times the site housed a sugar refinery and a gas plant. After the decline of the manufacturing sector in the area during the 1970s and after brewery operations ceased, the site fell into default and became one of thousands of sites that was acquired by the City through *in rem* proceedings.

In an effort to remove the blight created by the vacant 1.7-acre site, in 2001, the City decided to rezone the site from manufacturing to residential. They intended to produce affordable housing and reclaim the waterfront. But due to the site's previous uses and the deteriorating bulkhead, it was classified a brownfield.

Recognizing how the site could be a catalyst for the entire area, the City and State created a partnership with like-minded developers to create not just an apartment complex, but an amenity for the neighborhood.

Today Schaefer Landing includes 12,000 square feet of commercial space and 350 units of housing, including 140 affordable units. It contributes the first built piece of a public esplanade along the Williamsburg waterfront. It also provides water taxi service, increasing transit for the growing neighborhood of South Williamsburg to Lower Manhattan.

Now, Gabriella Lazzaro leaves the dinner table and heads to the waterfront esplanade. "I take photos of the Manhattan lights, I walk my dog, and listen to my music," she said,"It's great."

Above: Schaefer Landing, during demolition
Below: Schaefer Landing, today

Source: NYC Department of Housing Preservation and Development; Kent Waterfront Associates LLC

Existing State programs

The programs regulating and encouraging this redevelopment have mainly been at the State and Federal levels. Today, there are nearly 270 sites covering more than 1,900 acres enrolled in the State's brownfields oversight programs, in all five boroughs. *(See map on previous page: Brownfield Sites in New York State Remediation Programs; see case study on facing page: Brownfield Redevelopment History; see graphic on facing page: Timeline of Brownfield Policy Development).*

But despite the scale of enrollment, these programs can be costly and time consuming.

Frequently, sites must undergo testing and analysis before being accepted. This process, known as "phase II environmental site assessment," requires that teams take multiple soil, vapor, and groundwater samples from the site, send them for testing—and then wait for results to determine if more testing will be required. As a result, even just applying for admission into the program can take a year or more.

Once sites have been accepted, the complexity of our development history means that the State's remediation guidelines rarely apply neatly to city sites. As a result, the details of each cleanup must be negotiated with two State agencies in a process that can take years. In this complicated back-and-forth of sampling, soil analysis, and negotiation, a sophisticated, large-scale developer might succeed; a small-scale developer will be at a distinct disadvantage.

More pressures are being caused by today's strong real estate market: the demand on State agencies is growing, with limited resources to handle the increasing caseload of applications.

Sites not in programs

But the sites facing these challenges are already part of a State program; it is likely that they will be returned to productive use. In contrast, the sites not in State programs—roughly 5,700 of the estimated 7,600 acres—have no guarantee of ever getting cleaned up.

Some of these sites have attempted to enter the State cleanup program, but have been prevented because of the State's restrictive eligibility criteria. It is not likely that sites with low levels of contamination or types of pollutants common to New York City, such as some of the fill material used in the early 20th century, will be admitted into the State's Brownfield Cleanup Program (BCP) when the site is redeveloped.

In other cases, many sites are rejected due to a lack of available funding. The current program was designed to encourage development as well as cleanups; therefore, not only do incentives cover the remediation costs, they also contribute toward the actual construction. In New York City, where projects are generally denser, higher, and more expensive than the rest of the state, a small number of sites has consumed a disproportionate amount of funding. As a result, the State has been forced to restrict the number of entrants into the program.

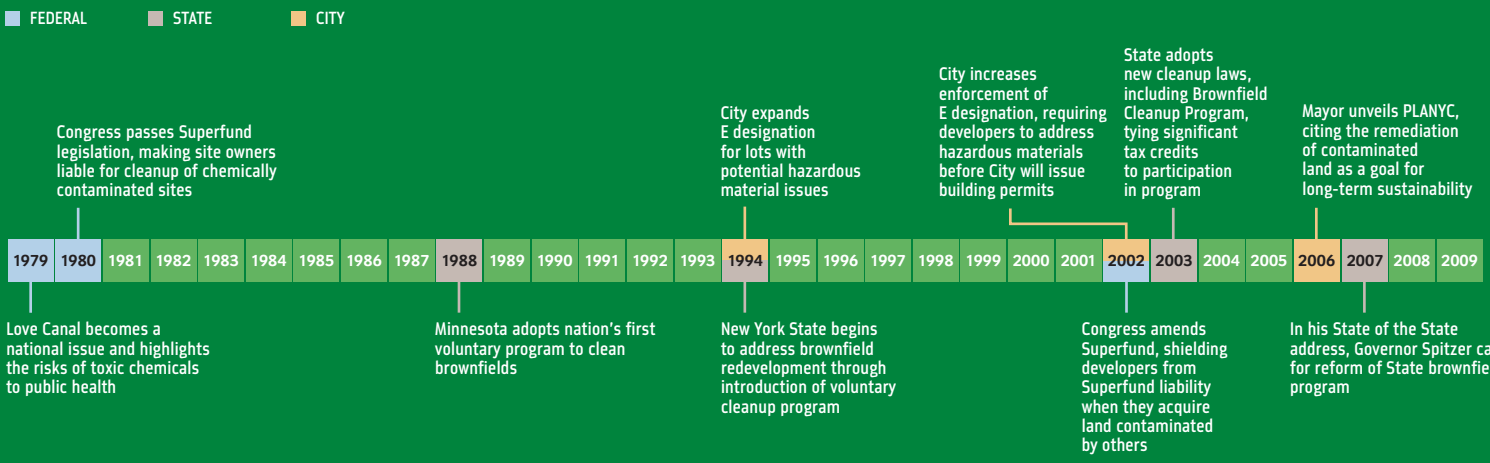
Still others are eligible, but their owners believe that entering current programs will lengthen the time and cost of redevelopment. As a result, the developers have undertaken testing and cleanups without government oversight, accepting the risk that this cleanup might not be sufficient. These "at risk" cleanups pose little safety risk if they are done correctly, but they will only take place on those sites where the value of the site far exceeds the cleanup cost.

Community input

The challenges facing brownfield owners often make them eager to find any economically feasible uses for their sites, whether or not they conform to the vision of the local community. In our current situation, landlords often find that their financial interests dictate development plans that minimize cleanup requirements, time, and costs. Accordingly, they may choose new uses for the land, like parking lots, that do not require high cleanup standards—but also do not reflect community needs or desires.

This mismatch of uses has become an environmental justice issue because brownfields are often concentrated in low-income neighborhoods that find the new develop-

Timeline of Brownfield Policy Development



Source: NYC Mayor's Office of Environmental Coordination

ment around them occurring outside of public processes and without a forum to voice their visions. Existing State law makes it possible for such neighborhoods to undertake community plans, called Brownfield Opportunity Areas (BOA) programs, and the City has supported many of these community-based applications.

But the State's process for releasing BOA funds to communities is cumbersome, and has already delayed some grant-winners by more than three years. Even more importantly, incentives do not exist for landowners to participate in community planning—and since local input does not always align with the development plan, few do so voluntarily. As a result, the BOA process has delivered far less than it could.

Understanding the scope of the problem

Under current conditions and with existing programs, it is difficult to know whether New York City's contaminated land will be developed by 2030, or ever.

We don't even know how many acres of brownfields exist in the city. Previous estimates have counted 4,000 acres of brownfields—including the 1,900 acres already in State cleanup programs. But this analysis was limited to vacant sites in manufacturing areas; it did not include potentially contaminated sites that are underutilized (but not vacant) or located in former manufacturing areas. Including those sites, the number could rise as high as 7,600 acres.

Many of these sites are languishing since our current laws actually discourage owners from understanding the extent of the contamination on their land. As long as there is no confirmed contamination, they are not responsible; but if testing reveals pollution, they could become liable for the cleanup—whether they caused the damage or not.

One thing is clear: if we are to accommodate our need for housing, jobs, and open space, the challenge of cleaning up our brownfields cannot be ignored.

CASE STUDY

Brownfield Redevelopment History

In the winter of 1979, officials near Niagara Falls discovered chemicals leaking into a school's basement from an underground lagoon. The Love Canal incident quickly became a national issue. The fear of health impacts prompted Congress to authorize the Superfund program in 1980, forcing property owners to clean up the worst waste sites regardless of fault. New York and other states followed by passing their own Superfund laws. Ironically, few sites were cleaned over the next decade, largely because the law required complete cleanups regardless of risk. As a result, potential liability prompted owners to shield themselves by pulling their land from the market.

This lack of activity prompted states to experiment with shaving the harsh edges off Superfund liability for less contaminated sites. Brownfield policies were born, and the states led the way. In 1994, New York State created a voluntary cleanup program. In 2003, the State passed legislation that created the present mix of programs, while allowing owners to base their cleanup on the future use of land, and remove only contamination that imperils public health. These risk-based cleanups have made owners more willing to remediate.

Today, significant State and City brownfield programs include:

State programs:

- **Inactive Hazardous Waste (State Superfund) Program:** State Department of Environmental Conservation (DEC) designates and remediates the most contaminated sites in New York, known as Class II sites.
- **Voluntary Cleanup Program:** Voluntary parties clean up brownfield sites under DEC supervision and upon completion receive a liability release.
- **Brownfield Cleanup Program (BCP):** In 2003, expanded brownfields legislation enabled State to add tax credits to a voluntary cleanup program, resulting in fewer sites enrolled. This new program was known as the Brownfields Cleanup Program.
- **Environmental Restoration Program:** Participating municipalities must perform Superfund cleanups of publicly-owned sites and upon completion receive State reimbursement for 90% of their costs, as well as indemnification.
- **Spill Program (petroleum):** DEC requires immediate reporting of all petroleum spills to DEC. The Spill Program addresses thousands of sites each year with limited DEC oversight and reasonable transactions costs.
- **Manufactured Gas Plant (MGP) Program:** DEC cleans up former energy facilities where coal and oil were converted into gas. Today, utilities are responsible for MGP sites which often have left behind significant deposits of coal tar.

City programs:

- **E Program:** Upon rezoning of a manufacturing area to residential use, the Department of City Planning places an E designation on lots where historic information suggests hazardous material may exist. A developer cannot build on an E-designated site until it satisfies the City's Department of Environmental Protection that the conditions that prompted the E designation have been satisfactorily addressed.

Our Plan

Our growing need to maximize the efficiency of every piece of land means that we must foster the redevelopment of brownfields on a large scale, in ways that conform to citywide and neighborhood needs.

Protecting the health of New Yorkers must be our primary concern. But there are opportunities to streamline existing programs to make them more efficient and responsive to the unique challenges posed by redevelopment in New York City. That means accelerating the testing process and reducing the length of negotiations by establishing city-specific remediation guidelines. We will create a City office to serve as a resource for the State, in-city developers, and communities interested in planning brownfield redevelopment for their neighborhoods. This office will also assist community organizations with brownfield redevelopment programs.

As these programs become faster and more effective, we must work with the State to increase the number of eligible participants. We will recommend restructuring State tax incentives to encourage broader participation and also expanding the definition of sites that can be included. For others, we will create a City program that provides oversight and certification for successful cleanups, based on remediation guidelines we will seek to develop in consultation with the State.

For too long, communities have been left out of the process of reshaping their neighborhoods. That's why we will advocate for the State to simplify the process for releasing grant funding to BOA recipients, and create incentives for developers to partner with local communities on brownfield restoration projects, increasing the likelihood that community visions will be acheived.

Finally, we cannot clean up all the contaminated land in our city unless we know where it is. That's why we will develop a database of historic uses across New York City and develop insurance for landowners who are willing to test and remediate their sites, protecting them against debilitating liability. We will also protect our right to chase responsible parties and hold them accountable, where possible.

Current brownfield laws work towards these goals. But in their current form, they have proven insufficient to the challenge in New York City. In partnership with the State, we will take action now to ensure that New Yorkers not only enjoy a clean environment, but also more opportunities to live, play, and work in a vibrant, growing city.

Our plan for brownfields:

Make existing brownfield programs faster and more efficient

1. Adopt on-site testing to streamline the cleanup process
2. Create remediation guidelines for New York City cleanups
3. Establish a City office to promote brownfield planning and redevelopment

Expand enrollment into streamlined programs

4. Expand participation in the current State Brownfield Cleanup Program (BCP)
5. Create a City program to oversee all additional cleanups
6. Provide incentives to lower costs of remediation

Encourage greater community involvement in brownfield redevelopment

7. Encourage the State to release community-based redevelopment grants
8. Provide incentives to participate in Brownfield Opportunity Area (BOA) planning
9. Launch outreach effort to educate communities about brownfield redevelopment

Identify remaining sites for cleanups

10. Create a database of historic uses across New York City to identify potential brownfields
11. Limit liability of property owners who seek to redevelop brownfields

Make existing brownfield programs faster and more efficient

State programs are currently overseeing the remediation of over 1,900 contaminated acres across New York City. But the programs still remain cumbersome, costly, and time-consuming. As a result, the first task for increasing the redevelopment of brownfields is to streamline the existing process, as the Governor has already committed.

As State programs, change will require State leadership, but because New York City comprises such a significant proportion of the State's brownfields, the City can and should also play a role.

INITIATIVE 1

Adopt on-site testing to streamline the cleanup process

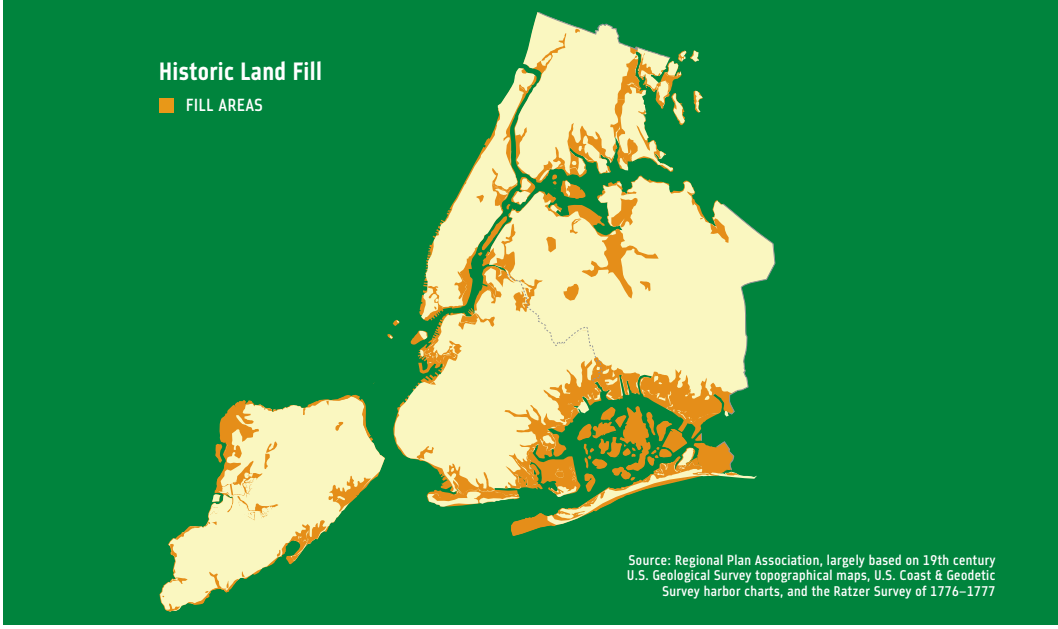
We will pilot the "Triad" program on two sites

Today, determining the level of contamination on a brownfield is a time-consuming process that involves taking multiple soil and groundwater samples, sending them in for analysis, and waiting for the State to respond—with the possibility that additional samples will be required. This back-and-forth can continue indefinitely, causing significant delays.

The Federal Environmental Protection Agency (EPA) is now using an alternative approach. Known as "Triad," the approach assembles an on-site team including representatives of the owners and regulators. The scientists who analyze the soil samples work nearby or in an onsite laboratory. Together, the team conducts a comprehensive assessment of the site, reviews lab results, and reaches agreement on findings without long delays. This more extensive investigation means that Triad costs more than current site investigations—but can shave months off the testing and remediation phases. As a result, the EPA has found that Triad can cut testing and remediation costs by 30% or more.

The City and State will each pilot the Triad approach at one site this year. The City site is at Melrose Commons in the Bronx; the State

site is the former BCF Oil site in East Williamsburg. Pending the success of these pilots, the City will employ the Triad approach on all major City-sponsored remediation projects; the City will also work with the State to promote the approach on privately-held sites.



INITIATIVE 2

Create remediation guidelines for New York City cleanups

We will analyze New York City's soil and develop a set of standard cleanup remedies appropriate for the city

New soil standards adopted by the State in 2006 significantly reduced the uncertainty around what cleanup measures were required—mostly for land outside New York City. Developed mainly for upstate and suburban conditions, the guidelines can be unreasonable in an urban environment. For example, the standards require cleanups that ensure drinkable groundwater, though only a small area of the city uses groundwater for drinking. These standards are based on rural soil conditions, which have not been affected by the centuries of development that has occurred on urban soil. As a result, the cleanup plans for most in-city sites are developed through a case-by-case negotiation, causing substantial delays. *(See case study on page 47: Atlantic Terrace)*

While unique scenarios will always arise, we will develop a set of remediation guidelines for the city's most common situations. We will work with State agencies to study our urban soil to document the level of metals and other contaminants found across the five boroughs. This data, which has never been collected, would allow the creation of remedies that protect the health of the public and are tailored to New York City

Finally, we will seek to revise current cleanup standards and policies affecting many New York City brownfields, including:

- **Historic fill:** In the 19th and 20th centuries, debris and incinerator ash was used to fill in many building sites; it may be present in 20% of the city's land and, since the material was unregulated, much of it may contain some contaminants. While much of it does not pose a public health risk, sites with fill should be eligible for regulatory oversight when redeveloped. When placed under a proper cover, the material can be recycled and safely reused as below-grade material at other construction sites. *(See map above: Historic Land Fill)*
- **Contaminated vapors:** On some sites, contaminated vapors rise up out of the soil or ground water, frequently requiring costly blower systems or extensive indoor air quality testing. In some cases it may be appropriate to employ systems using natural winds and temperature changes to affect air flows where they can provide the same level of protection for lower levels of cost, energy consumption, and noise.
- **Groundwater:** The State requirement to clean up groundwater to drinkable standards makes sense in communities that rely on groundwater for their water supply, but not for most parts of New York City, where the drinking water comes from upstate reservoirs. Standards must be developed that recognize that most parts of New York City do not drink groundwater.
- **Dredged sand:** Brownfield sites require significant amounts of clean fill to replace whatever contaminated soil is removed, often at high cost. But some materials—such as sand and other material dredged from New York Harbor—could be used instead at a cost as low as $5 per cubic yard; in contrast, clean fill from land sources can cost as much as $40 per cubic yard. Regulations should promote the use of this cheaper fill citywide.

INITIATIVE 3

Establish a City office to promote brownfield planning and redevelopment

We will create a new City office to increase resources dedicated to brownfield planning, testing, and cleanups

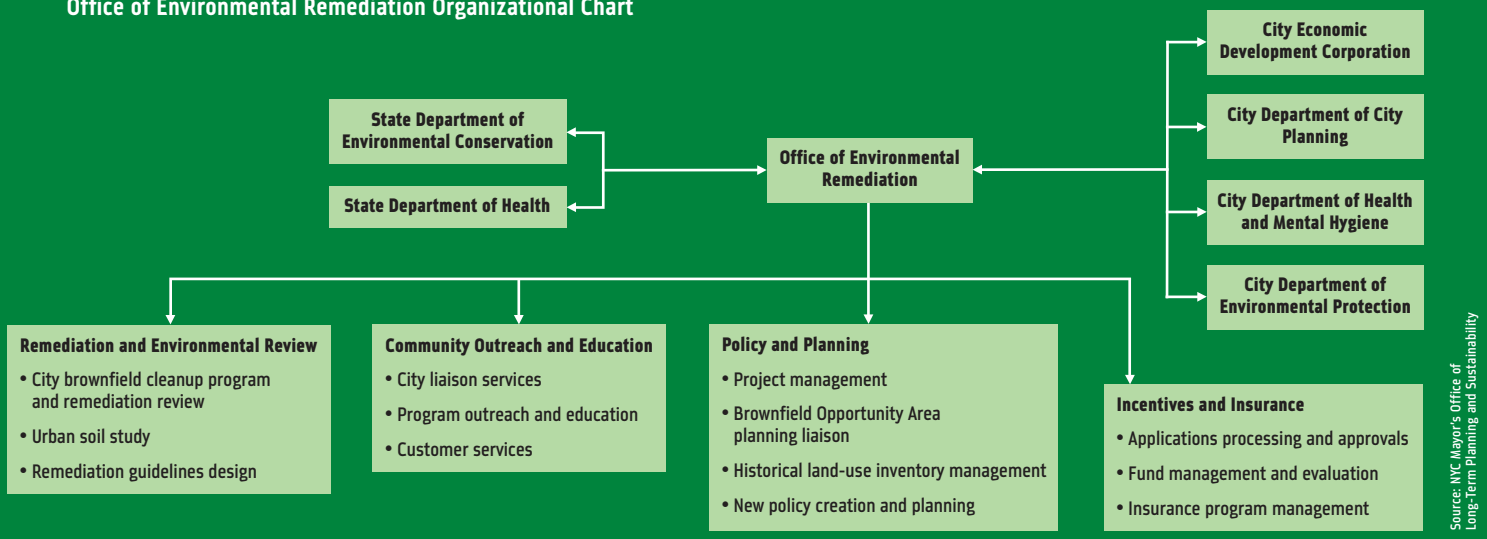
We can do more to assist all parties in their brownfield efforts. The increasing brownfield-related requests are outpacing the staffing levels at both the City and State. There is a need to increase resources to communities wanting to address brownfield redevelopment in their neighborhoods. Further, the City's few brownfield-dedicated staff are spread across multiple agencies.

We will consolidate the City's existing brownfields staff into a new department. This new office won't simply assist the State's staff; it will offer an expanded set of services including planning, outreach, project management and public support. Additionally, the office will execute remediations under the City's jurisdiction and apply for State and Federal grants.

The office will provide a new level of "customer service" to communities and developers, helping them navigate the complicated process of remediating brownfields.

The State's role will remain central. To reduce the time for State review of remedies, we will urge the State to increase the staff of the Department of Environmental Coordination (DEC), DOH, and the Department of State, the three agencies with oversight of brownfield programs. In addition, we will work with DEC and DOH to form partnerships so that joint reviews can streamline State and City processes further. *(See chart on following page: Office of Environmental Remediation Organizational Chart)*

Office of Environmental Remediation Organizational Chart



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Expand enrollment into streamlined programs

Existing programs are only as effective as the number of private owners of brownfields who are able—or choose—to participate. That is why we must identify ways to broaden eligibility and encourage participation, so that as many sites as possible can use incentives to begin productive redevelopment.

INITIATIVE 4

Expand participation in the current State Brownfield Cleanup Program (BCP)

We will ask the State to redistribute BCP tax credits to relieve budgetary pressures, and begin covering New York City-specific contamination

Currently, many sites are ineligible due to definitions and rules that restrict the BCP's value to New York City; in addition, an overly generous set of tax credits continually exhausts State brownfield funds, creating a winner-take-all situation where the lucky few landowners in the program make attractive profits, while other eligible projects are kept out, to a large extent for budgetary reasons.

The BCP should include as many sites as possible: all eligible sites should be virtually guaranteed enrollment, and the eligibility definitions should be broad enough to include all sites that require financial incentives for redevelopment. As a result, we will ask the State to:

- **Amend the brownfields tax credit program to provide less-rich credits, but to more sites.** The BCP currently provides tax credits to developers based not just on cleanup costs but on the cost of the new building construction. Due to their high density, New York City projects can create nearly unlimited exposure for the State, limiting the number of projects that can be accepted into the program statewide. This incentive may not need to be so generous. We will ask the State to restructure the credits, directing a higher percentage toward remediation and placing caps on the redevelopment credits. As a result, more sites can be enrolled in the program without exceeding its budget.
- **Return Class II inactive hazardous waste sites to eligibility.** Class II sites mainly include former industrial or manufacturing facilities—such as a former metal-plating factory—that have been contaminated for years, often for decades. There are 28 of these sites in New York City, covering 345 acres. With very high clean-up costs due to serious contamination, these sites are often the ones least likely ever to be remediated without public incentives. They were eligible for the BCP for a brief period—from 2003 to 2005—and should be given permanent eligibility.
- **Include moderately contaminated sites.** The way the BCP is structured, some sites fall into a middle-ground trap: they are contaminated enough to require a clean up, but may not be contaminated enough to qualify for the BCP. Included in this category are the historic fill sites that are most common in New York City. We will work with the State to include such sites, because it is still a public priority to get these sites back into productive use.

INITIATIVE 5

Create a City program to oversee all additional cleanups

We will create a City-sponsored program to provide oversight of cleanups for any sites not enrolled in other programs

The BCP's tax credits are attractive to for-profit developers, but in many cases are not actually the most important service provided by the program. For some developers, a Certificate of Completion (COC)—which limits their liability for contamination discovered in the future—is of greater value than the tax credits. Non-profits, including many developers of affordable housing, are not even eligible for the tax credits—but their lenders often want some sort of government certification that a clean up has been performed to an acceptable safety standard. Today, however, a private party who voluntarily remediates a site cannot obtain a COC without going through the full BCP.

To fill this need, the City will advance State legislation to allow for the creation of an alternative City program that does not offer tax credits, but instead enables a streamlined certification process. This program would use City staff to review and approve cleanup plans under the new City remediation guidelines. Following successful models being used in other states, this program will also allow licensed environmental professionals to certify compliance on low risk remediations with relevant remediation standards and guidance with more limited governmental oversight than is currently required under the BCP. The integrity of this program will be enforced through frequent audits. Upon completion of a satisfactory cleanup, the City will issue


Atlantic Terrace
Credit: NYC Department of Housing Preservation and Development

a City COC. The City will work with the State and, where necessary, advance legislation to ensure that a City COC is honored by State regulators and provides the same liability relief as the BCP.

INITIATIVE 6

Provide incentives to lower costs of remediation

We will dedicate $15 million to capitalize a fund to support brownfield redevelopment

Although a City brownfield program will increase oversight for remediation projects, many sites will still require financial assistance to begin redevelopment. That's why the City will provide $15 million to a public-private revolving fund. The Remediation Fund will provide below-market rates to developers of contaminated land. These incentives will be directed toward remediation and related costs, including testing and environmental insurance.

The City will partner with private institutions to raise 70% of the Fund's total capital. Because of the risk involved with lending against contaminated property, current interest rates are often greater than 13%. By using City capital in a revolving fund, the interest rate can be much lower, reducing the costs of remediation and testing.

Encourage greater community involvement in brownfield redevelopment

Brownfields are frequently concentrated in former manufacturing areas, many with large concentrations of low-income New Yorkers. From Sunset Park to the South Bronx, environmental justice advocates have launched a variety of community planning efforts aimed at reclaiming brownfield sites for local priorities and needs. But as growth surges across the city and begins to reach these areas, residents must be given greater voices in shaping their communities. That means incorporating amenities such as healthy, open spaces, community centers, and affordable housing, as land values and rents continue to rise.

That's why we will work with the State and local organizations to incorporate community perspectives more fully into brownfield redevelopment projects.

INITIATIVE 7

Encourage the State to release community-based redevelopment grants

We will advocate for the State to reform the Brownfield Opportunity Area (BOA) program and release planning grant funds to community groups

The Brownfield Opportunity Area program (BOA) provides approximately $8 million per year to help communities with large concentrations of brownfields develop visions for how underutilized land in their neighborhoods could be redeveloped to strengthen

CASE STUDY

Atlantic Terrace

When the non-profit Fifth Avenue Committee (FAC) gained custody of an empty lot in Fort Greene, it had an impressive goal in mind. It would make its project, Atlantic Terrace, the first LEED Gold certified affordable housing in Brooklyn.

But for FAC, getting green hasn't been easy. The lot had previously been the site of gas stations and manufacturing businesses. Though seven gas tanks had been removed, they had leaked. This, in addition to the fill used to level the site, meant that Atlantic Terrace had to be a remediation project before an affordable housing development.

"The contamination added bureaucratic complexity, cost, and time to the project. We could have started construction months ago," said Michelle de la Uz, Executive Director of FAC. In fact, by participating in the State's Brownfield Cleanup Program, FAC expects to lose at least six months.

And while FAC is eager to benefit from the tax credits and liability protection offered by the State BCP, it fears the costs of delay. So although the State admitted Atlantic Terrace into the BCP program, FAC is electing not to participate. In the absence of alternatives, FAC will conduct its cleanup without State assistance. By the time FAC is finished, the site will be safe to residents and neighbors, but with potentially significant liability.

This is where a City-sponsored BCP program could play a key role. The City BCP program would allow an alternative for sites like Atlantic Terrace. The City will offer expedited review and oversight that, upon satisfactory remediation, could, with State approval, result in a City approval letter providing liability relief similar to that offered by State programs. The City's BCP program will also make sites like Atlantic Terrace eligible for City programs.

"A program like that would have given us a clear path very early on in Atlantic Terrace's conception," said de la Uz. "That certainly would have helped."

existing or proposed community plans. Between 2004 and 2006, the State awarded 10 BOA grants to local organizations in the city and received nine more City-supported applications. *(See map on previous page: Brownfield Opportunity Areas)*

One of the recipients, the Bronx Council for Environmental Quality (BCEQ), sought to revitalize a seven-mile sliver of land between the Harlem River and the Major Deegan expressway. Spanning 159 acres across 45 sites in the neighborhood, every site in the study area is considered potentially contaminated because each is located downhill from dense urban development and adjacent to railroad tracks. Currently, 33 of these sites are also considered underused.

The BCEQ plan will expand access to the waterfront, creating new parkland curving alongside the river, a restored shoreline and natural habitat, and stronger links with the surrounding areas.

But the progress on this plan—and 18 others—has ground to a halt because of a cumbersome process for delivering the grant money. Since 2005, no grants have been issued at all, despite a backlog of City-supported initiatives. To get BOAs back on track again, the City will request that the State modify its requirements in order to deliver funding to program grantees more quickly. The City also will work with the State to ensure the provision of funding to implement BOA plans, so that community initiatives are more likely to come to life.

INITIATIVE 8

Provide incentives to participate in Brownfields Opportunity Area (BOA) planning

We will advocate for financial incentives for developments constructed in coordination with a BOA

There is currently no incentive for private developers who own property within a BOA to work with the community's redevelopment plan. Often community groups have a limited ability to acquire and remediate sites on their own. Therefore, community-based brownfield redevelopment often requires the participation of site owners and developers in order to have any tangible impact.

When each side works together, projects can be designed that meet the needs both of the landowner and the community; for example, the redevelopment of the Rheingold Brewery in Bushwick was done as a partnership between the community, the Bluestone Organization, and the City's Department of Housing Preservation and Development. It included 300 affordable housing units and won a Phoenix Award for Excellence in brownfield redevelopment.

But, in many cases, landlords note that community-based planning can add further delay to the already-lengthy process of brownfield redevelopment. Although the BOA legislation currently states that projects consistent with BOA plans be given "preference and priority" for incentives, the State has not defined the nature of the preference and no project has benefited.

We will advocate for the State to encourage these partnerships more strongly by creating a financial incentive for plans that reflect BOA guidelines. This incentive would provide a measurable reason for developers to factor community interests into their development plans, maximizing potential coordination opportunities.

INITIATIVE 9

Launch outreach effort to educate communities about brownfield redevelopment

We will educate and provide technical assistance to communities, private developers, and City agencies to promote brownfield redevelopment

Even at its simplest, brownfield remediation is very confusing. Whole industries exist to coordinate the numerous stakeholders in brownfield redevelopments. Lawyers, environmental consultants, lenders, insurance brokers, and Federal, State, and local regulators usually have some part to play in most brownfield transactions, creating tens or hundreds of thousands of dollars in soft costs alone. Though these services are expensive, they are also essential to help maximize the potential benefits of existing programs.

Through its new Office of Environmental Remediation, the City will provide the information, technical assistance, and training necessary to assist less-sophisticated developers and encourage effective community involvement and planning.

The effort will include the creation and continual updating of a brownfields information website to provide information on resources available for site investigation and cleanup. The office will also act as a liaison to DEC, assist in reviewing legal agreements and permitting applications, track sites and progress, create a "toolkit" for interested community groups, and hold workshops for community groups and City agency staff. The group will also actively promote applications to the State BOA program, as well as provide a City liaison to all City projects.

Identify remaining sites for cleanups

Outside of sites enrolled in State programs, and areas that have been rezoned from manufacturing to residential use or awarded redevelopment grants, the City does not have a way of knowing how many brownfields exist or where they might be. This lack of full information prevents the City from being more proactive in promoting remediation. Further, it imposes the full costs of determining dangerous historic uses on the landowner.

INITIATIVE 10

Create a database of historic uses across New York City to identify potential brownfields

We will conduct a historic use assessment for all sites in order to measure long-term progress towards goals

We will create a "historical use database" to assemble information that will help inform our awareness of potential contamination. This will include two types of research. First, we will gather information from a variety of sources, including environmental releases, databases, historic maps, telephone, and finance records. Second, we will ask Community Boards in their annual Community Needs Assessments to include an assessment of local vacant or underused lots that might

be brownfields and consider them in light of other community needs.

We will use the information to identify potential priority areas and provide a baseline set of information that local groups can use to create community-based brownfield redevelopment plans. It would also allow us to track our progress toward the goal of cleaning up and re-using all of our contaminated land.

INITIATIVE 11

Limit liability of property owners who seek to redevelop brownfields

We will create an insurance program and legal protections to limit the liability of developers willing to clean up land they did not pollute

In most cases, brownfields are no longer owned by the person or company who caused the contamination in the soil. But if a developer cleans up land and builds on it, under current State law the developer becomes liable for any harm that might remain, and for the potential costs of any future remediation. For sites that make it into the BCP, and complete it successfully, the State limits these costs and risks to the site owner; but the uncertainty of gaining entrance to that program still leaves many developers fearful that proposing redevelopment, or even just testing their land for contaminants, could leave them vulnerable. As a result, some properties linger either as vacant sites or with obsolete uses, reducing neighborhood quality of life.

To reduce this exposure, landowners are increasingly purchasing brownfields liability insurance that helps protect them against undiscovered contamination and unexpected cleanup costs. But such insurance is currently only available after contamination levels have been tested and confirmed, which is already an expensive and time-consuming task.

In order to get more landowners to consider redevelopment and embark on initial testing, we will work with private insurers to develop insurance policies—with a $10 million City contribution—that will protect landowners before any testing has been done. While such insurance would not cover the full costs of a clean up, it could protect the landowner against the worst possible scenarios and encourage redevelopment planning. This will be of particular value to those developers—like affordable housing builders and small-scale developers—whose access to capital is limited, and who cannot afford to cover the initial stages of a cleanup effort without receiving the benefit of State tax credits.

We will also seek the passage of a new State law that would protect new purchasers from liability for unknown contaminants in land they purchase for redevelopment. Currently, if a purchaser buys land that turns out to be contaminated, the purchaser can be held liable for cleanup costs even in excess of the land's value, whether or not the responsible polluter can be found and made to pay. This makes buyers afraid of certain sites. This exemption, similar to a clause in existing Federal law, would reduce the liability of those who buy land to clean it up, encouraging more developers to generate plans for more sites.

Conclusion

It took over 20 years for the State, the City, and KeySpan, Brooklyn Union Gas's successor, to begin the cleanup of Public Place. But today, they are partnering to accelerate its full integration into a new vision for one of the fastest-growing areas in Brooklyn. The savings from this coordinated planning can be reinvested into amenities like more public space and affordable housing, fulfilling the promise that an abandoned, contaminated lot can be transformed into a true public place.

But this level of partnership is not yet the case at dozens of sites across the city. Thousands of potentially contaminated acres are scattered in all five boroughs—land that could be re-envisioned to meet our city's infrastructure, manufacturing and community needs. Only in the last two decades has New York City begun to deal with the legacy of contamination left behind by its industrial past. We must accelerate this effort.

That's why we will work to improve the efficiency of existing State programs through the application of dedicated City resources, and supplement them with the creation of new programs. With greater community involvement and a more aggressive effort to identify sites requiring cleanups, we will ensure all of New York City's brownfields are recaptured so that they can contribute to our land challenges ahead.

Our water system was an engineering marvel when it was created in the early 19th century. But today growth around our reservoirs and the age of our infrastructure make it more and more challenging to maintain the quality and reliability of our supply.

We must also confront the legacy of our industrial past, which treated New York's waterways as a delivery system, rather than as a source of recreation or a vital ecological habitat. Today, our combined sewer system too often renders our waterways unusable.

These two water challenges—ensuring the water we drink is clean and available, and that the waterways surrounding our city are open to New Yorkers—will require continued investment. That's why we will build critical backup systems for our water network infrastructure, continue to upgrade our wastewater treatment facilities, and explore the potential of more natural solutions to cleanse and filter our waterways.

Water

Water Quality

Open 90% of our waterways to recreation by preserving natural areas and reducing pollution

Water Network

Develop critical backup systems for our aging water network to ensure long-term reliability

Water Quality

Credit: NYC Economic Development Corporation

Open 90% of our waterways to recreation by preserving natural areas and reducing pollution

The opaque two-and-a-half mile twisting Gowanus Canal is part of New York folklore, a gritty piece of city history.

"When I first moved in 11 years ago, it smelled nasty," said John Creech, 44, who lives in the area.

The stench came from a century and a half of sewage and industrial pollutants settling to the bottom of the canal and decomposing. Built in the 19th century to usher Brooklyn into the industrial era, the Gowanus quickly became the nation's busiest commercial waterway. After World War I, six million tons of cargo annually were produced and trafficked through the canal. The resulting industrial contaminants, storm water runoff, and other oil-slicked pollutants—particularly ink—gave the Gowanus its nickname, "Lavender Lake."

Today, more than 154 million gallons of fresh water are pumped into the canal per day, helping to oxygenate the waterway and support aquatic life. But thousands of gallons of sewage still discharge during rainstorms and decades worth of toxic sediment still sits along the bottom.

For more than two centuries, New Yorkers used waterways as garbage bins, dumping waste into the rivers that rushed by their houses. By the industrial age, our attitude remained largely unchanged: waterways were a means to achieving an end, whether convenience or commerce. Oil refineries, factories, and ships rose along the riverbanks and their waste products were often deposited in the water. As manufacturing declined after World War II, the waterfront withered along with it. For decades, stretches of riverfront sat largely abandoned while pollution seeped deeper into the soils and surrounding water.

In 1972, the Clean Water Act established ambitious new pollution regulations, with the goal of making every water body in the country safe for active recreation. Since then, the City has dedicated $35 billion to improving the quality of our waterways.

In dry weather, virtually all of New York City's sewage is treated. During storm events, the added volume of storm water results in Combined Sewer Overflows, or CSOs. CSOs still occur during heavy storms, but the number of these events have dropped dramatically. New infrastructure upgrades have enabled us to capture more of the overflow, increasing our capture rate from 30% to 70% since 1980.

Today, our rivers are experiencing a renaissance. Every year, dozens of races are held in the Harbor which is cleaner than it's been in decades. There are fishing stations set up along the piers of Queens West, kayaking along the Hudson, and plans for canoeing at the new Brooklyn Bridge Park. *(See maps on following page: Tributary Water Quality)*

Kayakers on the Hudson River

Source: NYC Department of Environmental Protection; Hydroqual

As we accelerate the reclamation of former industrial land along the riverbanks, with more than 60 miles of waterfront development underway, the need to improve water quality itself has become more important than ever.

There are two primary areas that require attention. First, significant parts of the harbor estuary, including the Hudson and East Rivers, are periodically forced to close for swimming as a result of heavy rains and resulting CSO events.

Our second, more intractable problem is the series of man-made canals, like the Gowanus, that were designed largely to ease ships more deeply into the city. The majority of these tributaries are embedded within neighborhoods before coming to a dead end. Without a flow of water, they lack the natural currents that would flush out pollutants. Oils, sewage, and toxins simply sink to the bottom, where they have been piling up for decades. Today, more than 52% of these canals and creeks are unavailable for public recreation because their contamination levels are too high.

The problem of CSOs can largely be traced to the original design of our sewer system: 60% of our network captures rain water and sewage in the same pipe. During dry weather, treatment plants can easily handle all of the city's waste. In heavy rain events, our treatment plants can double their dry weather capacity, but that is sometimes not enough to avoid CSOs. The extra flow—which is 90% storm water—is released, untreated, into the surrounding water. These CSOs are sometimes caused by as little as a tenth of an inch of hard rain. This phenomenon is not unique to New York City. Municipalities throughout the United States, particularly the older communities of the Northeast and Midwest, are served by combined sewer systems. However, the City recognizes the need for substantial improvements and requires creative solutions. *(See map on facing page: Wastewater Drainage Areas and Combined Sewer Overflow Locations)*

Although our water quality has improved over the past few decades, progress has started to slow as conditions across the city change. Natural areas and permeable surfaces absorb storm water and help prevent even more sewage from pouring into our waterways. But these areas are disappearing rapidly. Over the last century, the city's wetlands shrank by almost 90%. Even in the last 25 years, we lost more than 9,000 acres of permeable surfaces. *(See map on facing page: Vegetative Cover Change)*

To account for this shifting landscape and to continue making progress toward our goal, we must be more ambitious in our approach to reducing CSO discharges.

Today we capture 70% of CSOs before they enter the surrounding waterways, but other cities are doing better. Boston and Chicago, for instance, have been able to approach rates of 90%. To begin closing this gap we must complete large capital improvements that will expand the capacity of our treatment plants and sewers.

Perhaps even more importantly, we must also prevent water from entering our combined sewer system in the first place. That means pursuing proven water retention and diversion strategies, while piloting a range of promising solutions, often called Best Management Practices (BMPs), that harness natural processes to retain, detain or cleanse the water. These BMPs tend to be less expensive and help achieve multiple environmental ends. For example, trees absorb water, but they also cleanse the air, create a more welcoming public realm, and help reduce global warming emissions.

By overcoming the institutional barriers that have prevented the implementation of BMPs to date and rigorously assessing their performance in the city, we can prioritize sound investments in the coming decades.

Our Plan

We are one of the world's great waterfront cities: a series of islands and archipelagos, with nearly 600 miles of waterfront. But we are just beginning to rediscover our waterways as a source of recreation and inspiration.

To fulfill their potential, we must address the waterways themselves, particularly our most polluted tributaries.

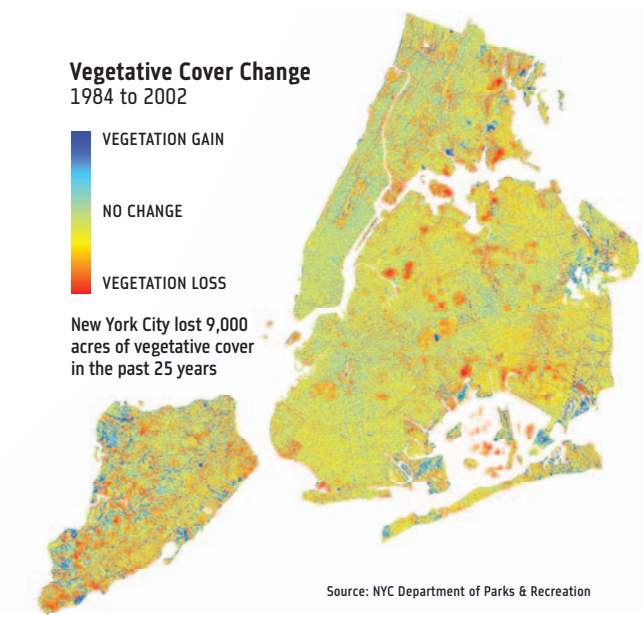
Achieving our goal will require a balance between infrastructure solutions and more natural strategies.

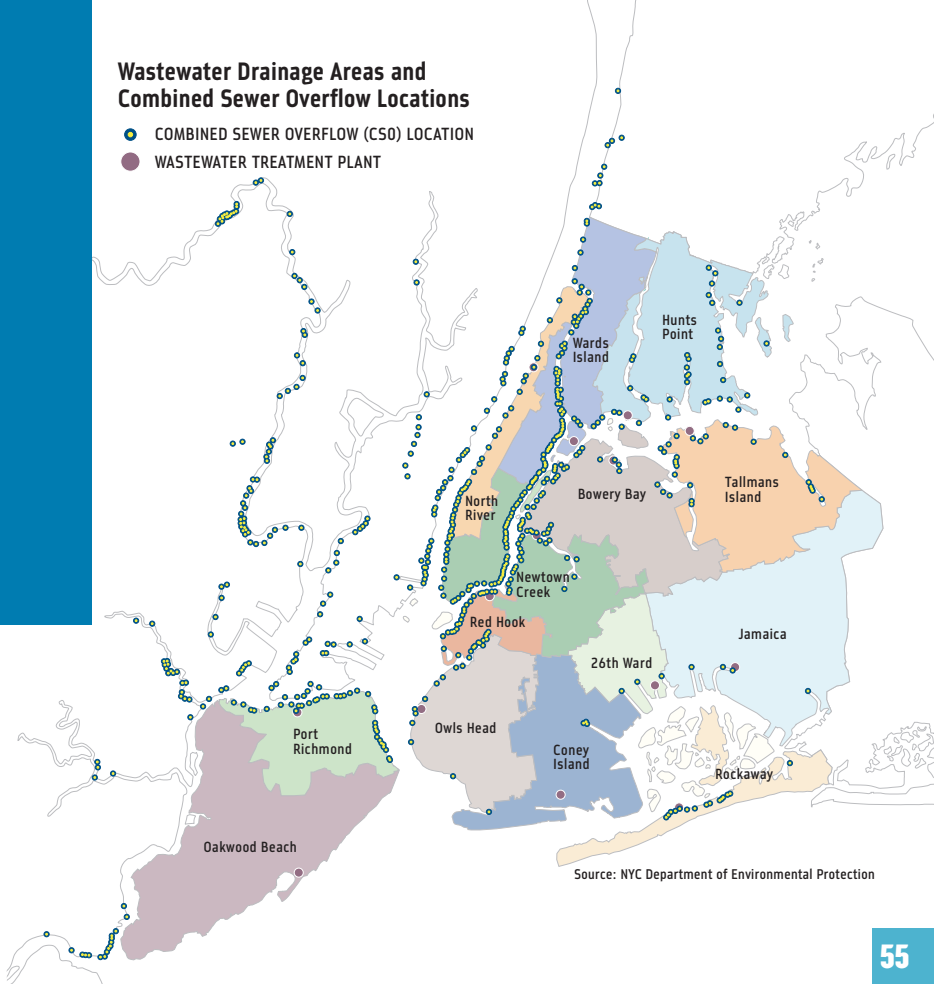
That's why we will upgrade our wastewater treatment facilities, while integrating separated storm sewers into new development projects like Hudson Yards. We will also expand efforts to harness our environment as a natural water filter. That includes expanding our pioneering Bluebelt system, adding nearly one million more trees, and landscaping our streets.

But today we have an opportunity to go even further—we will not only plant trees, but pay more attention to the design of the pit they are planted in to maximize its ability to absorb water. We won't just increase plantings along streets, but study the design of the surrounding median and sidewalk so that it can collect and store water more easily.

These BMP strategies are not fully proven in New Yok City—but their potential could be enormous. A new Inter-agency Best Management Practices Task Force will explore the possibilities for incorporating these initiatives into various planning processes, starting with a range of pilot programs.

Through the initiatives outlined below, we will improve public access to our tributaries from 48% to over 90%; and we will ensure that our larger water bodies are less susceptible to storm-generated pollution. As BMPs and other resources take effect, we will increasingly be able to use some of our waterways for swimming as well.





These policies are expected to improve the CSO capture rate to more than 75% as well as decrease bacterial levels and increase dissolved oxygen—a key indicator of aquatic health. That will ensure that over 90% of the city's tributaries, and 98% of our waterways are open for recreational use.

By making smart choices in the coming decades, we can restore our city's natural ecology and recreational use of our waterways.

Our plan for water quality:

Continue implementing infrastructure upgrades

1 Develop and implement Long-Term Control Plans
2 Expand wet weather capacity at treatment plants

Pursue proven solutions to prevent stormwater from entering the system

3 Increase use of High Level Storm Sewers (HLSS)
4 Capture the benefits of our open space plan
5 Expand the Bluebelt program

Expand, track, and analyze new Best Management Practices (BMPs) on a broad scale

6 Form an interagency BMP Task Force
7 Pilot promising BMPs
8 Require greening of parking lots
9 Provide incentives for green roofs
10 Protect wetlands

Continue implementing infrastructure upgrades

In the 35 years since the Clean Water Act was passed by Congress, we have had the opportunity to evaluate the success rates of a range of infrastructure solutions. The impacts of pumping stations, wastewater treatment plants, and larger storage tanks have all been measured and quantified.

The successes are well-documented across the nation. Here in New York, before 1972, the Hudson River contained bacteria 170 times the safe limit; today it hosts swimming races around Manhattan. In its industrial years, Ohio's Cuyahoga River actually caught fire 10 times. But by 1998, 60% of American lakes, rivers, and shorelines were considered clean enough for swimming and fishing.

As knowledge has improved, the Federal government has adapted its legislation to target one of the last remaining areas for improvement. Today, the greatest obstacle to enhanced water quality is the overflow of untreated sewage into our waterways during rain storms. That's why in December 2000, Congress adopted an amendment to the Clean Water Act requiring municipalities to develop a Long-Term Control Plan (LTCP) to mitigate the impacts of CSOs.

CASE STUDY

Nitrogen

In addition to Combined Sewer Overflows (CSOs), pollutants from brownfields and storm water runoff, there is one more challenge to maintain the quality of our waterways: nitrogen. Discharges from wastewater treatment plants have been identified as a factor in recurring water quality problems in western Long Island Sound and Jamaica Bay.

As a result, State regulators restricted nitrogen levels in the wastewater plant effluent for these waters. Although nitrogen levels don't impact our ability to use the waterways recreationally, nitrogen—and its host compound ammonia—deplete dissolved oxygen in the receiving waters, inhibiting fish habitation.

Traditional nitrogen removal processes require large, capital upgrades and high operating costs. To avoid these costs, the City's Department of Environmental Protection (DEP) will explore and pilot several emerging technologies, which will supplement existing infrastructure and allow for the cost-effective removal of nitrogen. Examples of the technologies DEP will pilot include SHARON, ARP, and Biolysis "O."

- SHARON is a more energy-efficient nitrogen removal process compared to traditional methods
- ARP use ion filters to remove nitrogen
- Biolysis "O" uses ozone to destroy bacteria that produce nitrogen

These pilots, along with a Harbor Estuary Study led by the U.S. Environmental Protection Agency, will inform DEP's future efforts to remove nitrogen from wastewater.

INITIATIVE 1

Develop and implement Long-Term Control Plans

We will complete Long-Term Control Plans for all 14 New York City Watersheds, as required by law

In the upcoming months, we will submit the Waterbody/Watershed (WB/WS) Plans for 18 waterbodies to the State's Department of Environmental Conservation (DEC), detailing strategies for CSO reduction. These plans will rely on proven infrastructure upgrades to expand the capacity of our wastewater treatment plants, by constructing holding tanks, and optimizing our sewer infrastructure. The WB/WS plans will be integrated into the 14 watershed-specific Long-Term Control Plans (LTCP) also mandated by DEC.

Already, the City's Department of Environmental Protection (DEP) has begun some of these improvements; today, all of our plants are equipped to handle twice the volume of flows that would occur on a normal day of dry weather. Other strategies will include aeration, which involves pumping oxygen into waterways to encourage aquatic life; destratification facilities, which churn areas of water to ensure that oxygen is being evenly distributed; sewer optimization, which maximizes the amount of wastewater conveyed to the treatment plant; force mains, which divert CSOs from tributaries with no natural flushing systems into larger water bodies that can assimilate the sewage more easily; and dredging, which will begin to remove decades of bio-solids that have settled onto the bottom of our rivers and tributaries.

Preliminary projections estimate that the implementation of the LTCPs will result in an increase in CSOs captured from approximately 70% to 75%. In addition, the plan will specify other enhancements, including reducing floating debris such as bottles, bags, and other trash through netting facilities.

INITIATIVE 2

Expand wet weather capacity at treatment plants

We will reduce CSO discharges by more than 185 mgd during rainstorms

In addition to upgrading our treatment facilities to reliably comply with existing and emerging regulatory requirements, we are also maximizing the volume of water these treatment plants can process during storms. *(See case study: Nitrogen)*

Currently, all treatment facilities are required to treat twice the amount of flows that would occur on a normal day without rain. But at Newtown Creek, the 26th Ward, and Jamaica Waste Water Treatment Plants, we will be expanding the wet weather capacity. This should reduce the CSO discharges in these sewersheds by more than 185 million gallons per day (mgd) during rainstorms.

Pursue proven solutions to prevent water from entering system

We cannot rely solely on hard and centralized infrastructure upgrades to improve the quality of our waterways. In addition to working to capture more CSOs at the "end of the pipe," after it has already entered our system, we have also begun pursuing a range of proven strategies to keep storm water from entering our combined sewer system at all.

INITIATIVE 3

Increase use of High Level Storm Sewers (HLSS)

We will convert combined sewers into HLSS and integrate HLSS into major new developments, as appropriate

High Level Storm Sewers (HLSS) are one strategy for alleviating pressure on the combined sewer system and limiting CSO events. HLSS are designed to capture 50% of the rainfall, before it enters our pipes, and divert it directly into the waterways through permitted outlets, reducing the volume of flows that pass through the treatment plants and the combined sewer system. In addition, they alleviate street flooding in problematic areas.

CASE STUDY

Hudson Yards

Today, the long swath of Manhattan's Far West Side has a coarse, industrial feel. Stretches of empty streets border open railyards. There is almost no green space.

The recent rezoning of Hudson Yards will transform the area into one of the most dynamic neighborhoods in New York, with 24 million square feet of office, hotel and retail space, and 13,500 units of housing. The expansion of the 7 line will connect midtown to a reconceived convention center, spurring the reclamation of 300 underused acres in the heart of Manhattan.

By 2025, the population of Hudson Yards will more than double. Under a traditional development scenario, the project would bring new jobs, tax revenues and reinvigorated public space, but also generate 43.5 million gallons of Combined Sewer Overflows (CSOs) per year.

That's why the City has developed a comprehensive strategy to absorb growth while protecting the environment.

With each new development, New York City is required to reevaluate our sewer system accordingly. But in Hudson Yards, we won't simply be adding seven new sewers to the 6,700 miles already snaking through the city.


Hudson Yards Redevelopment Area

Credit: Hudson Yards Development Corporation

Five of the seven new sewers will be High Level Storm Sewers (HLSS) which can reduce the amount of storm water entering the system by 50%.

Before storm water even reaches the sewers, it will loiter on the buildings themselves. Specially designed drainage systems will release the water in spurts, through regulated downspouts that control the flow of water.

And as a third defense against CSOs, Hudson Yards plans include at least 66 acres of green, open space on rooftops and in parks. A green roof has the potential to reduce annual runoff by 50%.

These strategies will significantly limit, and possibly eliminate, CSOs generated from Hudson Yards. In employing such environmentally responsible strategies, New York City can simultaneously grow, as we need to, and protect our resources, as we must.

But we cannot simply install these separated sewers at every site. Since they require a separate pipe and outlet to a waterbody, this strategy is only cost-effective for developments near the water's edge.

Therefore, the City will analyze each site carefully on a case-by-case basis to determine the appropriateness of this strategy. One area that is clearly a good candidate is the Hudson Yards area. Other developments that may also be appropriate for HLSS or for the complete separation of their sewer infrastructure include the Bronx Terminal Market, Queens West development, Gateway Estates in Brooklyn, and the Columbia University expansion in Manhattanville. *(See case study above: Hudson Yards)*

INITIATIVE 4

Capture the benefits of our open space plan

We will expand the amount of green, permeable surfaces across the city to reduce storm water runoff

Green spaces act as natural storm water capture and retention devices. The 9,000 acres of vegetative cover lost between 1984 and 2002 could have absorbed, according to an analysis by the U.S. Forest Service and the City's Department of Parks & Recreation (DPR), 243 million gallons for every inch of rain. Trees capture rainfall on their leaves and branches and take up water through their roots, and release significant volumes to the air through evaporation. In all, the DPR estimates that city street trees capture 870 million gallons of stormwater each year. At least four million gallons of water are absorbed by soil around street trees during each storm event.

Over the next 25 years, we will undertake 40 new Greenstreets projects every planting season, bringing the citywide total to more than 3,000 by 2030. A one-acre Greenstreet can hold about 55,000 gallons of storm water. The existing total acreage of Greenstreets sites in New York City is almost 164 acres, which translates into nine million gallon capacity citywide. With an additional 40 new Greenstreet projects, covering 75 acres, the capacity to hold stormwater will increase by four million gallons.

In addition to increasing stormwater storage through Greenstreets, we will increase the number of trees in the city by one million. New designs for the tree pits could significantly increase this capacity as well.

INITIATIVE 5

Expand the Bluebelt program

We will expand the Bluebelt in Staten Island and other boroughs, where possible

In many areas of Staten Island, development preceded the full build-out of the sewer system. For example, some residents of South Richmond still rely on on-site septic systems for sanitary waste disposal. During periods of rain, several areas in this region routinely experience localized flooding and septic tank failures. To address these concerns, in 1997, the DEP created the Staten Island Bluebelt as a natural solution. *(See case study on following page: Reshaping the Urban Environment)*

Nearly 36% of Staten Island's precipitation drains into the current Bluebelt system which covers nearly 10,000 acres. Over the next 25 years, we will seek to add an additional 4,000 acres in the borough, spread across South Beach, New Creek, and Oakwood Beach.

To date, the Bluebelt program has saved the City an estimated $80 million in infrastructure costs, and it has also saved homeowners money in flood damage. In addition, property values in the immediate vicinity of the completed Bluebelt drainage corridors have consistently appreciated, enhancing the city's tax

CASE STUDY

Reshaping the Urban Environment

A New York City planner pioneered the Bluebelt system—more than a century ago.

Nearly three decades after designing Central Park, Frederick Law Olmsted submitted an application to Boston's City Council for the Fens portion of the Emerald Necklace, a collection of waterfront parks circling the Charles River.

It was not an obvious site for new public space. Malodorous fumes from a steady influx of sewage wafted into the surrounding communities. Frequent flooding sent waste and water spilling out of the rivers and into the surrounding land.

Olmsted had been retained to design a park; he ended by pioneering a revolutionary approach to waste management. Arranging wetlands and plants to create storage basins, he concealed a network of retention ponds, drainage systems, and natural filtering within a beautiful, sprawling wilderness of bridle paths, park drives, and boating along the waterways.

By preserving the natural environment, providing a recreational resource, and preventing sewage and flooding from impairing the quality of Boston's waterways, Olmsted integrated ecological and sanitary benefits within a stunning public resource.

Those are principles underpinning New York's Bluebelt system, which spans nearly 10,000 acres in Staten Island

The Bluebelt program is designed to leverage the natural drainage corridors including streams, ponds, and other wetland areas to convey, treat, and detain stormwater prior to its release into the harbor.

To enhance these natural functions, the Department of Environmental Protection has reshaped the natural environment to become a more effective holding tank; reengineering a wetland in the shape of a snake to slow down water flow; planting vegetation to absorb and filter impurities out of the water system; and positioning rocks so that the water bubbles over it, thereby adding air into the streams.

By 2030, we will expand this system approach into other boroughs, striking Olmsted's balance between parkland and environmental benefits.

base. The program has demonstrated that wetland preservation can be economically prudent and environmentally responsible. In 2005, the EPA recognized the leadership of the Bluebelt by awarding it an Environmental Quality Award.

Our ability to replicate this process across the city is limited due to our dense development. However, we do plan to expand the use of Bluebelts outside of Staten Island, where possible:

- **Udalls' Cove and Brookville Boulevard West:** We will install basins to catch storm water from the surrounding neighborhoods in Queens before it travels into Little Neck Bay and Jamaica Bay.
- **Springfield Lake:** We will dredge this 3.5-acre lake, located within Springfield Park in southeast Queens, and enhance it with new tidal marshes and other drainage-related improvements. This will solve ongoing flooding problems, while decreasing algae blooms in the lake and improving water quality in Jamaica Bay.
- **Baisley Pond:** This is a 40-acre freshwater pond in south Jamaica, Queens. This project will solve flooding problems and improve ground water conditions by incorporating natural water retention and filtering strategies.

The City will also assess opportunities in Van Cortland Park, Oakland Ravine, Sailor Snug Harbor, Riverdale Park, Seton Falls Park, and Alder Brook in Riverdale in the Bronx.

Expand, track, and analyze new Best Management Practices (BMPs) on a broad scale

Greenstreets and Bluebelts have proven results; their effectiveness has been tracked and monitored across the city. But a range of emerging strategies that enhance the ecological environment while naturally cleansing our waterways have begun to be tested and installed across the United States. Cities from Seattle to Chicago have begun integrating these softer solutions on a broad scale into their planning and development, with exceptional results.

Within New York City, financial, informational, and institutional barriers have hindered our ability to experiment with these best practices. Our dense environment has also made spaces difficult to identify. But the opportunities are there.

Long-Line Mussel Farm
Valbodalen, Lysekil, Sweden

INITIATIVE 6

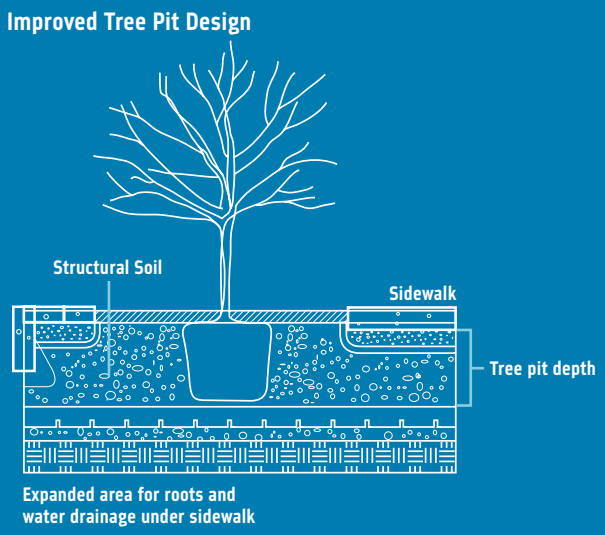
Form an interagency BMP Task Force

We will make the reduction of CSO volumes and other environmental issues a priority for all relevant City agencies

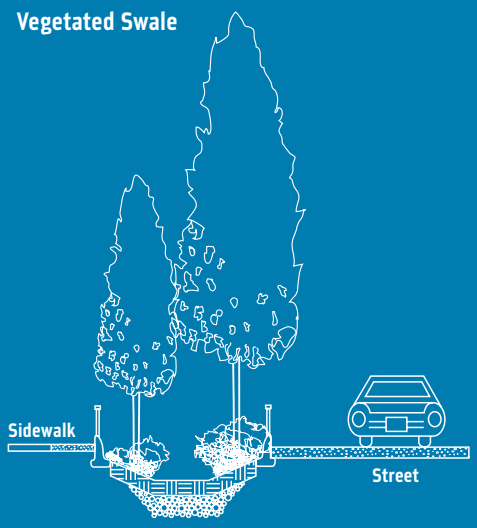
Multiple agencies, including but not limited to the Departments of Transportation, Parks & Recreation, Buildings, and City Planning are responsible for infrastructure or development that has direct impacts on pollution in our waterways. But water quality is seldom considered during the decisions and activities these agencies undertake on a daily basis. Every time the City plants a tree, a contractor builds a house, or an agency constructs a road, there is little opportunity or incentive to integrate water quality measures. This has created barriers to our ability to assess and develop comprehensive policies for the deployment of BMPs on a citywide basis.

That's why we will establish the New York City Interagency BMP Task Force which will bring together all relevant City agencies to analyze ways to incorporate BMPs into the design and construction of projects. This year, the Task Force will pilot three of the most promising BMPs followed by a series of additional pilots across New York and measure the results. After 18 months, the Task Force will announce a plan to integrate the most successful BMPs on a larger scale. The recommendations of this plan will not only reduce CSO volumes, they will also help cool the city and reduce construction and demolition waste creation by City agencies.


Credit: Pia Norling



Source: NYC Department of Environmental Protection



Source: NYC Department of Environmental Protection

The focus will be on greening the public right-of-way, developing BMPs on City-owned land, improving environmental performance of open space, and creating strategies to promote BMPs on private development.

The Task Force and its working groups will be coordinated by the Office of Long-Term Planning and Sustainability with participation from the Departments of Environmental Protection, Design and Construction, Transportation, Citywide Administrative Services, Parks & Recreation, Health and Mental Hygiene, City Planning, and Buildings, and the Office of Management and Budget.

The Task Force also will create a set of performance metrics to be published annually. Possible metrics include market penetration of BMPs on private development, acres of permeable surfaces, storm water capture rates, and improvement in water quality such as reductions in fecal-coliform levels and increases in dissolved oxygen. It will develop a process to monitor, assess, and report agency and BMP performance, as well as a process to reevaluate and modify the report every two years.

INITIATIVE 7

Pilot promising BMPs

We will immediately pilot various BMPs to monitor and assess their performance in New York City neighborhoods

The Task Force will begin by piloting the following three BMPs, selected for their feasibility and proven effectiveness in other programs across the United States:

- Create a mollusk habitat pilot program
- Plant trees with improved pit design
- Create vegetated ditches (swales) along highways

Within the next two years, the City will also pilot other BMPs, including developing storm water BMPs for ballfields along the Bronx River, using vacant public property to create urban storm water systems that offer greater infiltration and protect wildlife habitat. We will also study the treatment and capture of storm water from large parking lots using vegetation and infiltration through pilots in the Jamaica Bay Watershed.

We will introduce 20 cubic meters of ribbed mussel beds

When Henry Hudson first sailed through New York's Harbor, half the world's oysters were alive beneath him. Approximately 350 square miles of oyster beds lined the surrounding harbor estuary, removing impurities from our water free of charge. At one time, oyster trade supported the city's early mercantile economy. But over-harvesting and raw sewage led to the loss of the oyster population by the early 20th century. While scattered populations of oysters and other mollusks, including mussels, can be found in the city's harbor estuary, there are no longer enough to significantly improve the city's water quality. The loss of mollusks has resulted in the loss of one of nature's finest filtration systems.

To once again reap the benefits of these natural bio-filters, the City will create a habitat and reintroduce 20 cubic meters of ribbed mussel beds. Ribbed mussels present little safety risk because they are not eaten. Through this pilot, we will test the capability of mollusks to improve the water quality of our tributaries around combined sewer overflow outlets. Our first location will be Hendrix Creek, a tributary to Jamaica Bay, which is located next to the 26th Ward Wastewater Treatment Plant, at a cost of $600,000. *(See photo on facing page: Long-Line Mussel Farm)*

According to the Gaia Institute, 20 cubic meters of ribbed mussels should be able to filter all the effluent, 65 mgd, from the 26th Ward Wastewater Treatment Plant. But because this premise has not been tested recently in New York City, we can't confirm that this level of performance is possible. Therefore, we will test the solution in order to determine whether or not it should be expanded.

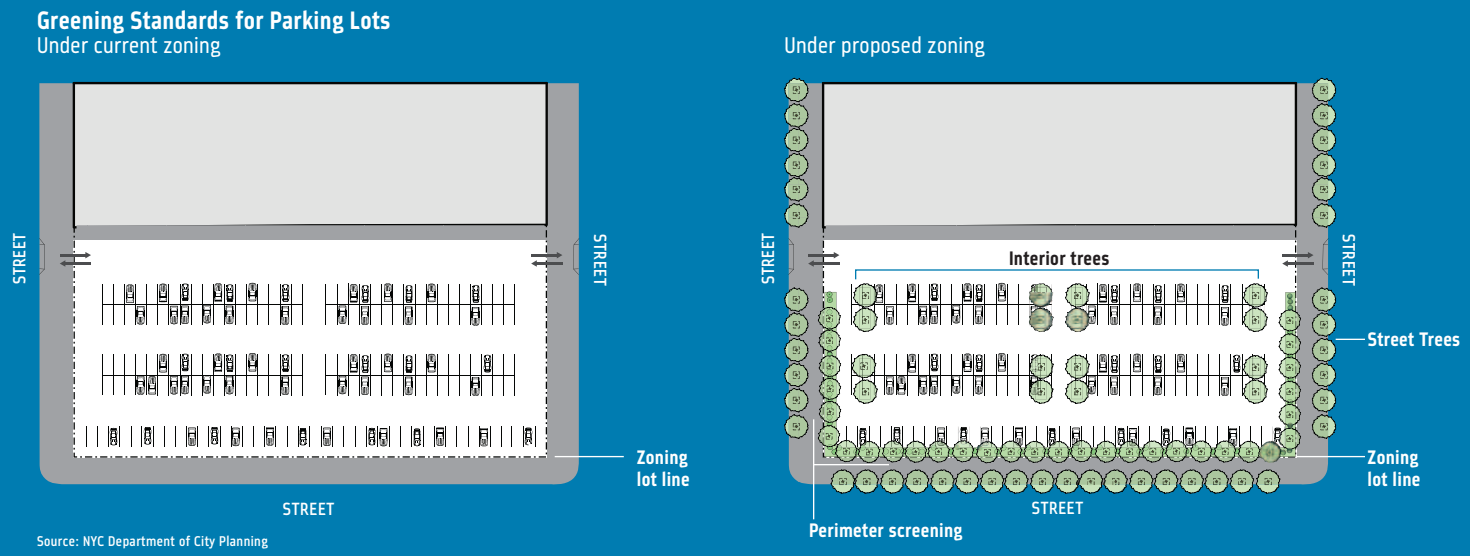
The study will evaluate to what extent mollusks can grow in our waterways, the mollusks densities necessary to address urban pollution and nutrient problems, and the costs associated with achieving various levels of water quality improvement. The demonstration habitat will be monitored, documented, and replicated as appropriate.

We will plant trees with improved pit designs

New York City street trees are often planted in small confined pits—commonly four feet by four feet square and 20 feet apart—with densely packed soil. These characteristics restrict roots, blocking their ability to absorb oxygen, nutrients, and water. In addition, these confined pits limit the amount of storm water that can be captured. *(See illustration above: Improved Tree Pit Design).*

Trees planted in cramped pits can either die or damage the sidewalk as they grow. Improving the design and size of the tree pit will confer the dual benefits of improving the chances for the tree's survival and retaining storm water.

Installing underground storage areas and using structured soils will expand the volume of storm water captured by these redesigned pits. Structured soils have more air space and can be used in trenches between trees, under sidewalks or under porous pavement.



Source: NYC Department of City Planning

DEP, in partnership with the Gaia Institute and DPR, will pilot in the Jamaica Bay watershed five enhanced tree pits with below-grade water catchments to increase storm water infiltration. The pilot program will include three years of monitoring and data collection with annual reports and a final project summary of findings. If successful, this technology will be recommended for widespread application during future sidewalk and road reconstruction.

We will create vegetated ditches (swales) along parkways

Vegetated ditches (called swales) are linear, dry ditches designed to receive runoff and slowly move rain to an outfall point along our waterways, absorbing water along the way. They are especially effective when located adjacent to parking lots, streets, parkways or highways or when used as a median. In addition to storing direct rainfall and reducing storm water volumes entering the combined sewer system, swales provide natural cleansing of runoff through the soil and vegetation. *(See illustration on previous page: Vegetated Swale)*

But there are challenges associated with swale construction, including finding enough space given the city's density. Nevertheless, incorporating swales into the redesign of roadways may prove less expensive than constructing traditional piped drainage systems. For example, Seattle's pilot Street Edge Alternatives Project (SEA Streets) is designed to provide drainage that more closely mimics the natural landscape instead of traditional piped systems. Two years of monitoring show that SEA Streets has reduced the total volume of storm water from the street by 99%.

INITIATIVE 8

Require greening of parking lots

We will modify the zoning resolution to include design guidelines for off-street parking lots for commercial and community facilities

Much of the urban landscape is impervious, including buildings, roads, and parking lots: this means water cannot trickle back into the ground, but instead flows off the hard surfaces into our sewers, putting additional strain on our infrastructure. As described above, there are strategies for reducing this runoff, such as tree plantings, other landscaping projects, porous pavement technology, and underground water storage. *(See renderings: Greening Standards for Parking Lots)*

The addition of trees and landscaping to parking lots offer a feasible and cost-effective means for the private sector to work with the City in curbing storm water runoff and potentially decreasing CSO events. Increased landscaping, along with storm water detention and retention, could slow down the rate at which water enters the sewer system; that will enable New York's combined sewer system to treat a higher percentage of storm water. Vegetated and gravel buffer strips along the edge of landscaped areas or surrounding detention infrastructure can also help filter pollutants from water.

The City will modify the zoning resolution to require perimeter landscaping of commercial and community facility parking lots over 6,000 square feet as well as street tree planting on the adjacent sidewalks. Parking lots over 12,000 square feet would also be required to provide a specified number of canopy trees in planting islands within each lot. The intention of this proposal is to reduce the eyesore of large asphalt expanses while more effectively managing storm water runoff and helping to cool the air.

In addition to the zoning modification, the City will analyze the costs and benefits of integrating additional BMP's into parking lots. From these findings, we will create appropriate policy to improve storm water capture and storage for parking lots as part of the New York City Interagency BMP Plan.

INITIATIVE 9

Provide incentives for green roofs

We will encourage the installation of green roofs through a new incentive program

A green roof partially or completely covers a building roof with plants. It can be a tended roof garden or a more self-maintaining ecology. Similar to swales and tree pits, green roofs can reduce the volume of runoff by absorbing or storing water, and other natural processes, in addition to cooling the air. According to a recent study by Riverkeeper, a 40-square-foot green roof could result in 810 gallons of storm water captured per roof per year. If each installation cost $1,000 then a $100,000 dollar investment could lead to over 81,000 gallons of stormwater captured. *(See illustration on facing page: Components of a Typical Greenroof)*

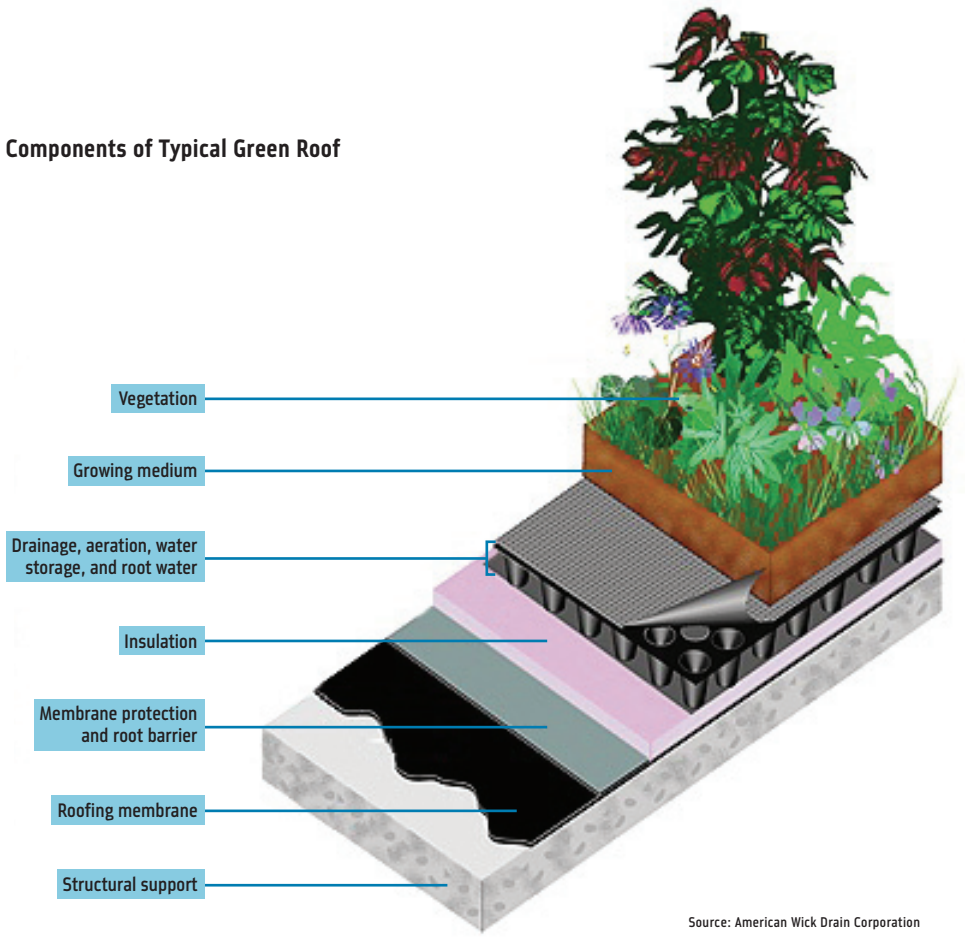
The City is developing four residential and two commercial pilots to analyze the potential cumulative benefits of green roofs on the city's combined sewer system. The expected cost for each is $100,000 for design and $1.3 million for construction and equipment.

In order to achieve direct CSO benefits, a large number of green roofs would be required within a concentrated area—an expensive undertaking. Therefore, incentives are necessary to off-set some of these costs.

The City currently provides incentives for the private development of two BMPs through DEP's Comprehensive Water Reuse Program. This program offers buildings that install "blackwater" or "greywater" systems a 25% discount off their water and sewer charges. "Blackwater" systems capture and treat sanitary wastewater and recycle it within the building for non-potable use. "Greywater" systems capture used water from washing machines, dishwashers, and showers and reuse that water for toilets or other non-potable applications.

Starting in 2007, the City will begin providing incentives for green roofs, as well. New York City will support the installation of extensive green roofs by enacting a property tax abatement to off-set 35% of the installation cost of a green roof. The pilot incentive will sunset in five years, when it will be reassessed for extension and inclusion of other technologies.

Components of Typical Green Roof



Source: American Wick Drain Corporation

INITIATIVE 10

Protect wetlands

We will assess the vulnerability of existing wetlands and identify additional policies to protect and manage them

Wetlands play an important role in maintaining and even improving our water quality. They filter and absorb pollutants from storm water runoff, lower high levels of nutrients, such as nitrogen and phosphorus, and trap silt and other fine matter to reduce cloudiness in local waterways. In addition to water quality improvements, they provide flood protection, erosion buffers, important wildlife habitat, public enjoyment, and they sequester CO_2. But we have lost 86% of our wetlands in the last century. Some of this loss is due to environmental change, such as rising sea level; but the majority of it was due to development.

To further wetlands protection in New York City, in 2005 the City Council sponsored, and Mayor Bloomberg signed Local Law 83 which formed the Wetlands Transfer Task Force to assess available City-owned properties that contain wetlands. By September 30, 2007, the Task Force is required to submit its conclusions and recommendations to the Mayor and Council Speaker on the feasibility of transferring such wetlands to the Department of Parks & Recreation and to other agencies that can protect them against loss.

State regulations provide a framework for local governments to adopt their own freshwater wetland protections, in order to strengthen the New York State Freshwater Wetlands Act. Many other municipalities also regulate their tidal wetlands.

We will launch a study to identify gaps, or areas not effectively addressed under existing Federal and State laws. Specifically, we will assess where existing regulations fall short of protecting New York City's remaining wetlands. This assessment will be the first step in the development of a comprehensive policy to protect and manage wetlands in the city.

Conclusion

In the coming decades we must challenge ourselves to creatively reclaim our waterways for public use. In Gowanus, the Pump Station will be upgraded to move 50% more water to the closest treatment plant; a new force main will move the CSO overflow directly to the treatment plant, instead of traveling a more circuitous route; a modernized flushing tunnel will be able to process 40% more water, enabling the tunnel to bring more dissolved oxygen to the canal's water, encouraging the growth of aquatic life.

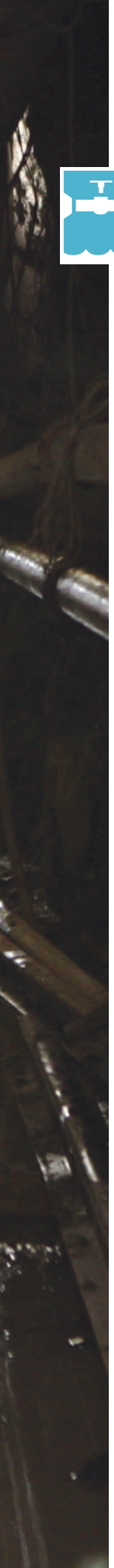
By applying a range of strategies to water bodies across the city, we can reclaim them for New Yorkers. It would not be the first time.

In the 1860s, the City opened 15 pools along Manhattan's waterfront, all open to flowing river water. Despite the pools' popularity, the presence of raw sewage in the waterways soon caused them to be closed. With the city's waters now cleaner than at any time in half a century, it is time to revive ideas like these in a 21st century form.

That means exploring possibilities such as creating permanent pools along our rivers. The structures could be supported by piers, which in turn, could be designed as habitat for mollusks and other life forms, enriching the ecology of the waters and cleansing them. This balance between ecology, recreation, and water quality will underpin our efforts as we continue reclaiming our waterways for the next generation of New Yorkers.

Water Network

Credit: Ozier Muhammad/
The New York Times



Develop critical backup systems for our aging water network to ensure long-term reliability

In 1835, a fire engulfed Lower Manhattan for 24 hours. With the rivers frozen, more than 700 buildings burned to the ground.

The blaze made the need for a new water supply inescapable. New Yorkers accelerated construction of the original Croton System, which would open eight years later. Over the following decades, we added two more watersheds, determined not to make the same mistake again. But though our supply has continued to stay ahead of our population growth, today we face a new challenge.

Growth is no longer our greatest risk. New Yorkers use 1.1 billion gallons a day (bgd), but we are far from reaching the system's capacity. In fact, in the 1980s, our system supplied as much as 1.6 bgd. At our current usage rate, and as citywide conservation efforts continue to succeed, 900,000 more people would only raise our total to a still-manageable 1.3 bgd.

But though we have the luxury of a strong water supply, our supply *system* faces serious challenges. The majority of our network was constructed before World War II. While our two water tunnels are constructed in bedrock and expected to provide water service well into the future, neither has been closely examined since opening more than 70 years ago. And as development encroaches on the city's watersheds, protecting our reservoirs will require continued vigilance.

In order to continue providing reliable water to New York City residents and an additional one million people upstate, we face three fundamental questions: How can we continue to protect the quality of our water supply, ensure it arrives safely to the city, and then deliver it reliably to residents? *(See map on following page: New York City Watershed System)*

New York City's water supply

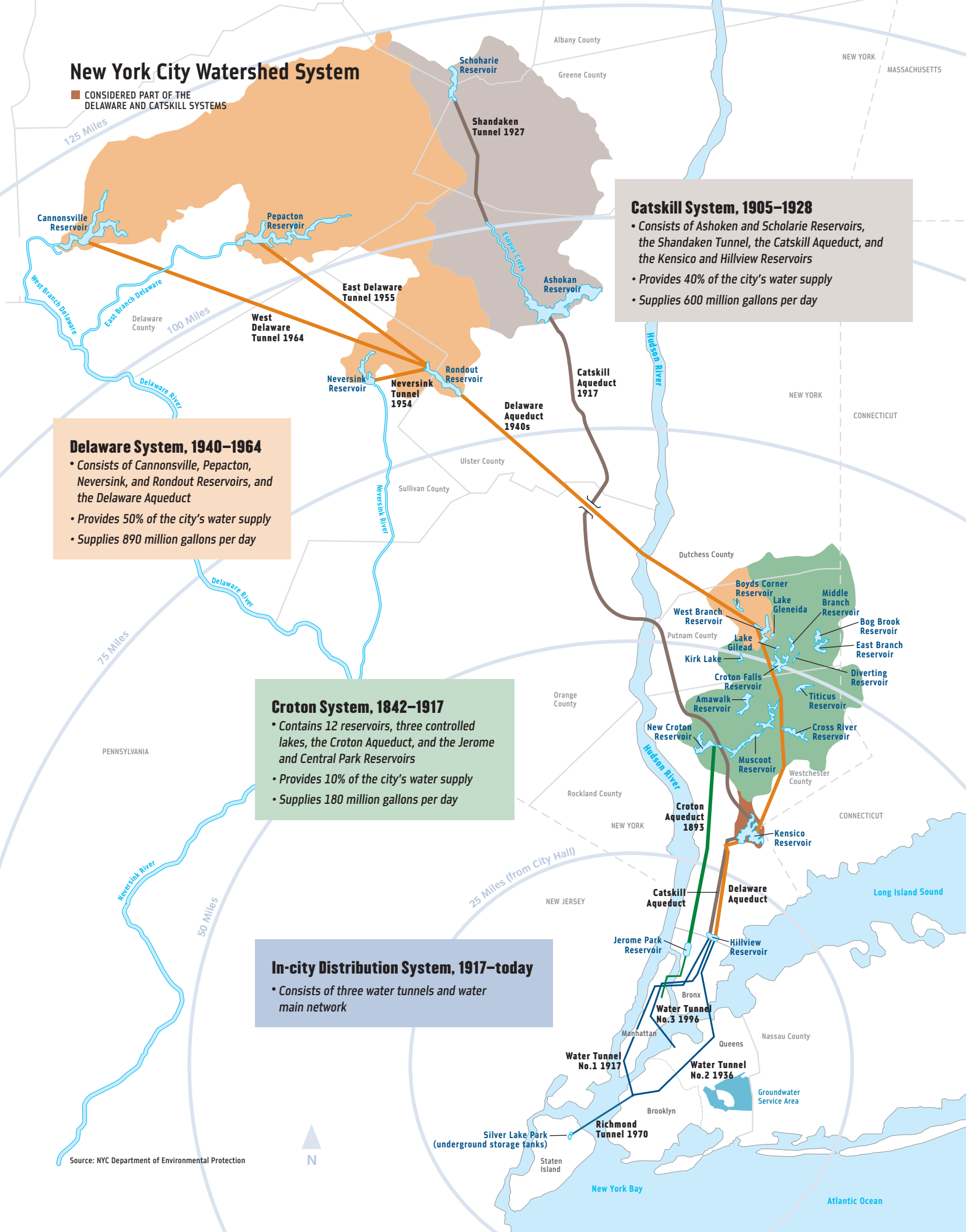
Fresh water is a relatively recent phenomenon for the city.

In the early 1800s, the only freshwater supply in New York City was a single, fouled lake in Lower Manhattan where New Yorkers washed clothes, disposed of waste, and dumped dead animals. The only other sources were 250 public wells sunk along streets traveled by horses, hogs, and other livestock. Water quality remained a serious public health problem for decades, as contaminated water contributed to cholera epidemics and other outbreaks that killed thousands.

In 1837, construction began on the Croton Water Aqueduct System, which brought fresh water from the Croton River through the Bronx and across the Harlem River to what is now the Great Lawn in Central Park. There a reservoir was built to supply water to homes across the city.

Over the next century, the city added two more upstate watersheds and constructed viaducts, creating the world's largest municipal water system. Today, our three watersheds sprawl across 2,000 square miles and contain 19 reservoirs and three controlled lakes, with a storage capacity of 550 billion gallons.

City Water Tunnel No. 3


New York City Watershed System
CONSIDERED PART OF THE DELAWARE AND CATSKILL SYSTEMS
125 Miles
100 Miles
75 Miles
50 Miles
25 Miles (from City Hall)
Albany County
Greene County
NEW YORK
MASSACHUSETTS
Schoharie Reservoir
Shandaken Tunnel 1927
Cannonsville Reservoir
Pepacton Reservoir
Esopus Creek
Ashokan Reservoir
West Branch Delaware
East Branch Delaware
Delaware County
East Delaware Tunnel 1955
West Delaware Tunnel 1964
Neversink Reservoir
Neversink Tunnel 1954
Rondout Reservoir
Delaware River
Catskill Aqueduct 1917
Hudson River
Delaware Aqueduct 1940s
NEW YORK
CONNECTICUT
Ulster County
Sullivan County
Neversink River
Dutchess County
Boyds Corner Reservoir
Lake Gleneida
Middle Branch Reservoir
West Branch Reservoir
Bog Brook Reservoir
Putnam County
Lake Gilead
East Branch Reservoir
Kirk Lake
Diverting Reservoir
Croton Falls Reservoir
Titicus Reservoir
Amawalk Reservoir
Orange County
New Croton Reservoir
Cross River Reservoir
Muscoot Reservoir
Westchester County
PENNSYLVANIA
Rockland County
Croton Aqueduct 1893
CONNECTICUT
NEW YORK
Kensico Reservoir
NEW JERSEY
Catskill Aqueduct
Delaware Aqueduct
Long Island Sound
Jerome Park Reservoir
Hillview Reservoir
Bronx
Water Tunnel No.3 1996
Manhattan
Queens
Nassau County
Water Tunnel No.1 1917
Water Tunnel No.2 1936
Groundwater Service Area
Brooklyn
Richmond Tunnel 1970
Silver Lake Park (underground storage tanks)
Staten Island
New York Bay
Atlantic Ocean
N
Catskill System, 1905–1928
• Consists of Ashoken and Scholarie Reservoirs, the Shandaken Tunnel, the Catskill Aqueduct, and the Kensico and Hillview Reservoirs
• Provides 40% of the city's water supply
• Supplies 600 million gallons per day
Delaware System, 1940–1964
• Consists of Cannonsville, Pepacton, Neversink, and Rondout Reservoirs, and the Delaware Aqueduct
• Provides 50% of the city's water supply
• Supplies 890 million gallons per day
Croton System, 1842–1917
• Contains 12 reservoirs, three controlled lakes, the Croton Aqueduct, and the Jerome and Central Park Reservoirs
• Provides 10% of the city's water supply
• Supplies 180 million gallons per day
In-city Distribution System, 1917–today
• Consists of three water tunnels and water main network
Source: NYC Department of Environmental Protection

Protecting the quality of our water

Conditions in our watersheds have changed since we completed our major infrastructure in the 1960s and our strategies for protecting the purity of our water must evolve accordingly.

When construction on the Croton system began, about 95,000 people lived in the surrounding farmlands of Westchester and Putnam Counties. In the last 170 years, that number has increased to over one million. With population growth has come a resulting rise in fertilizer, sewage, and road salt, all of which run into the reservoirs. Moreover, stricter regulations have made achieving health standards harder than ever before; nonetheless, the City continues to meet and even exceed stringent Federal water quality standards.

Development has been less extensive west of the Hudson River, around the Catskill and Delaware watersheds. With natural systems protecting the purity of the water, the Catskill and Delaware systems remain unfiltered; of the 7,400 surface water supply systems in the United States, only 90 achieve this distinction—and only four other large cities.

Nevertheless, the Catskill Mountains are steep and the soil is clay. During and after extreme storms, when the natural settling in the reservoirs is insufficient to ensure that the water meets standards, we have responded by adding alum to the water, a chemical which bonds with the dust and dirt particles to remove them from the drinking water. In recent years, these storms have been increasing—a pattern that may only get worse as our climate becomes more volatile.

Getting the water to the city

Today, three main aqueducts carry water from our reservoirs toward the city—and the largest one is stable, but leaking. An estimated 15 to 36 million gallons per day (mgd) of water is being lost from the Delaware Aqueduct, or 4% of its daily volume peak flows. According to the professional engineering firm retained by DEP along with its own investigation, there is little immediate risk of failure of the tunnel. But to perform the repair work, the tunnel may need to be shut down and drained. That will make it necessary to increase reliance on other water supplies, and to implement stringent measures to encourage conservation. Under an extended shutdown of the aqueduct, water quality in the remaining reservoirs could potentially suffer as storage volumes are drawn down.

Distributing water within New York City

After the aqueducts carry the water near the city limits, two tunnels distribute it across New York City. Water Tunnel No. 1 was completed in 1917 and supplies most of Manhattan; Water Tunnel No. 2 opened in 1936, and serves the rest of the city. There is no back up for either, meaning we cannot shut them off to undertake any repairs.

Since 1970, we have been building Water Tunnel No.3; the second of four phases is scheduled to open in 2009. But this will only create a backup system for a section of the city. In order to achieve full redundancy, we must commit ourselves to complete the tunnel's final two stages.

Our Plan

We must be vigilant in order to minimize the impact of development on the Croton System, and preserve the natural filters of our Catskill and Delaware Watersheds to avoid expensive and energy-intensive filtration plants. By intensifying efforts to protect the water at its source, we can maintain the high standards New York City residents have enjoyed for 150 years.

We will create redundancy across our system so that we can begin repairing our aging tunnels and aqueducts—and be ready for any unusual weather shifts that result from climate change. We must generate a balanced strategy for reducing demand and for maintaining our most essential infrastructure.

Our plan for the water network:

Ensure the quality of our drinking water

1. Continue the Watershed Protection Program
2. Construct an ultraviolet disinfection plant for the Catskill and Delaware systems
3. Build the Croton Filtration Plant

Create redundancy for aqueducts to New York City

4. Launch a major new water conservation effort
5. Maximize existing facilities
6. Evaluate new water sources

Modernize in-city distribution

7. Complete Water Tunnel No. 3
8. Complete a backup tunnel to Staten Island
9. Accelerate upgrades to water main infrastructure

Ensure the quality of our drinking water

The health, welfare, and economic well-being of New Yorkers are all intrinsically linked to the quality of our drinking water. The City has taken aggressive steps to preserve our water quality, including planning for the building of a major water filtration plant in the Bronx for the Croton Reservoir system, and purchasing almost 80,000 acres to protect our watersheds from development. As a result, the Catskill and Delaware Watersheds provide some of the country's purest water.

But looking ahead, our reservoirs will require increasingly ambitious efforts to protect against threats such as development. To address those challenges, we have embarked on an aggressive program to preserve the quality of our drinking water.

WEST OF HUDSON
CATSKILL AND DELAWARE WATERSHEDS

INITIATIVE 1

Continue the Watershed Protection Program

We will aggressively protect our watersheds as we seek to maintain a Filtration Avoidance Determination for the Catskill and Delaware Water Supplies

Today, New York is one of only five major cities in the United States without a filtration plant processing its drinking water supply. Although the 1986 Safe Drinking Water Act mandated such facilities, New York—along with Boston, Portland, San Francisco, and Seattle—received a special waiver, known as a Filtration Avoidance Determination (FAD).

Since 1993, this waiver has been re-evaluated every five years; the Federal government issued New York City a draft 10-year FAD on April 12, 2007. In order to maintain our status—and meet more stringent Federal standards —we must continue to aggressively protect the purity of our water supply.

That is why we have developed a $462 million Watershed Protection Program that will target the biggest potential threats and enlist the help of the surrounding towns, workers, and residents.

The city owns nearly 114,000 acres within the watersheds, of which 74,000 are open to the public. Over the next decade, DEP will seek to purchase an additional 60,000 to 75,000 acres in key locations to protect even more of the land along the reservoirs.

Privately-owned forests and farms cover two-thirds of the watershed land area, which means the City must work with foresters to establish sustainable forest management plans and to ensure the overall health of these important buffers for the city's water supply. Already, we have worked with 560 landowners covering 100,000 acres to develop long-term forestry programs that we will implement in the coming years. Much of the developed land in the region is also filled with working farms; we will continue partnering with farmers to prevent fertilizers and manure from washing into the waterways.

We will also continue to work with local communities to repair an estimated 300 residential septic systems per year, and install new wastewater treatment systems in a number of communities. Finally, we must address the growing problem of turbidity that occurs during heavy storms and explore possible infrastructure changes to prevent sediment from entering our supply system.

We know that protection efforts can do more than preserve water quality—they can improve it. For example, prior to the enhancement of the city's watershed protection programs in the 1990s, the Cannonsville Reservoir suffered from massive algae blooms that frequently made the water undrinkable. Today, nutrient loading into Cannonsville has been reduced by 40%, reducing algae blooms and making Cannonsville a reliable source of drinking water. But we have to do more.

The Watershed Protection Program is costly. But compared to the costs of constructing and operating a filtration plant, as well as the environmental impacts of the additional energy and chemicals required by filtration, it is the most sustainable choice for New York.

INITIATIVE 2

Construct an ultraviolet disinfection plant for the Catskill and Delaware Systems

We will construct an ultraviolet disinfection facility to destroy disease-causing organisms in our upstate watershed

Although the Delaware and Catskill Water Supplies are not filtered, the EPA still requires us to treat the water with chlorine as an additional layer of protection. The chlorine kills tiny organisms and prevents the spread of waterborne diseases. But one pathogen, known as Cryptosporidium, has always been able to evade this treatment. This microscopic parasite is encased by a shell that enables it to survive outside of a body—and resist chlorine-based disinfectants. When it is ingested by humans or animals, it can lodge in an intestine and cause cryptosporidiosis, a diarrheal disease.

We will open the world's largest ultraviolet disinfection facility in 2012. The plant will use ultraviolet light to destroy the pathogens' abilities to reproduce. Because this is a physical process rather than a chemical one, there are no harmful impacts on humans or aquatic life. This plant will also enable us to scale back the use of chlorine pumped into the water, limiting the amount of disinfection by-products that are created.

The ultraviolet disinfection plant will be located at a 153-acre property in the towns of Mount Pleasant and Greenburgh in Westchester County. It will have the capacity to treat 2,020 mgd from the Catskill and Delaware systems.

CASE STUDY

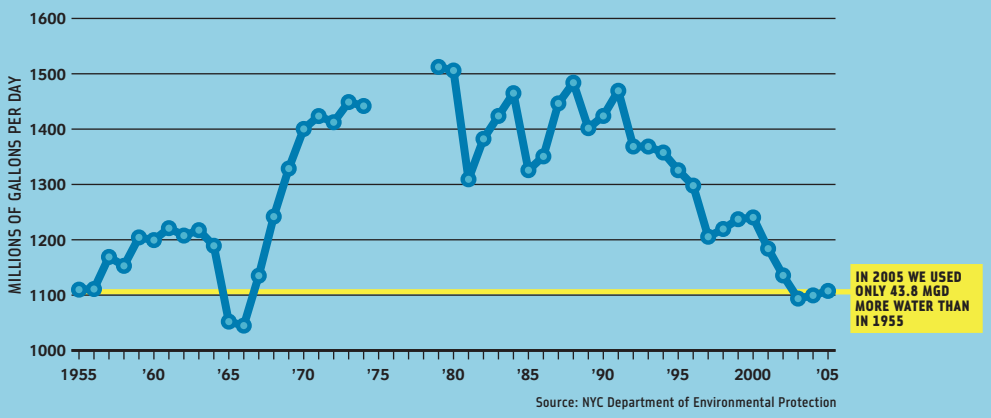
Toilet Replacement Program

The Delaware Watershed has prompted conservation efforts before. In 1949 and 1950, the City was hurrying to complete the system when a dry spell struck. The city announced "thirsty Thursdays," during which residents were encouraged not to shower or drink tap water. Volunteers known as "water conservation commanders" visited homes searching for leaky faucets and circulating gin replaced water at a Tiffany's window display.

But the City's most successful water conservation program came after a Federal law required that new toilets use only 1.6 gallons of water per flush. In 1994, the City launched the world's largest toilet replacement program, offering incentives for owners to retire their old toilets, which could use up to five gallons a flush. Shower heads and faucets were exchanged for low-flow fixtures at the same time.

When the program ended in 1997, more than 1.3 million toilets had been replaced across the city for $290 million—with projected savings of $350 million. The replacement project sliced the city's average water consumption by 70 to 90 million gallons of water per day (mgd), and decreased water usage by 37% in participating apartment buildings.

New York City Average Daily Water Consumption



Source: NYC Department of Environmental Protection

A decade later, technology for toilet efficiency and water conservation has advanced. When the program first launched, Robert Bellini, the owner of Varsity Plumbing and Heating in Queens, tested 150 models that met the efficiency standard. He only recommended four.

"Just because the toilet met minimum requirements didn't mean it flushed well," said Bellini.

The new standard models don't clog or require double-flushing like the first series of efficient toilets, saving up to four gallons. That's why starting in 2008, the Department of Environmental Protection will launch a new conservation program to reduce daily usage by up to 60 mgd. But this time the program will extend beyond toilets, including incentives for buildings and laundromats to replace their most inefficient washing machines.

"A new program could mean even more savings this time around," Bellini said. "The technology has benefited now from experience, time. New York City could benefit greatly from a second program at this point."

EAST OF HUDSON
CROTON WATERSHED

INITIATIVE 3

Build the Croton Filtration Plant

We will construct a water filtration plant to protect the Croton supply

The Croton system is the smallest and oldest of the city's watersheds, supplying on average about 10% of the city's needs and upwards of 30% during droughts. When the Croton system was constructed in the 1830s, the surrounding area was mainly rural. But over the past 50 years, suburbanization has spread through Westchester and Putnam counties.

Since the Croton system opened, one million people have moved into land around the watershed, paving over fields, wetlands, and forests. The resulting impacts of development have caused negative aesthetic impacts on the water leading to occasional seasonal shutdowns.

To meet the requirements of the Safe Drinking Water Act, DEP was ordered to build a filtration plant for the Croton Watershed.

The Croton filtration plant—the city's first—will be constructed within the Mosholu Golf Course in Van Cortlandt Park in the Norwood section of the Bronx by 2012. It will have the capacity to filter 290 mgd of water, and will also feature the City's largest green roof for public year-round recreational use.

Create redundancy for aqueducts to New York City

The Delaware Water Supply has historically provided about 50% of the city's water supply needs and the Delaware Aqueduct is the only way to transport this supply to the city. Although it is not in danger of immediate failure, we must prepare for an extensive repair period that may require shutting the aqueduct down. During any such period, it would be necessary for the city to increase reliance on its other water supplies, and to implement more stringent measures to encourage conservation and decrease demand.

INITIATIVE 4

Launch a major new water conservation effort

We will implement a water conservation program to reduce citywide consumption by 60 mgd

In 1994, DEP launched a Toilet Rebate Program that provided incentives to all property owners to replace older toilets and shower heads with modern, more efficient models. *(See case study above: Toilet Replacement Program)*

Over the past decade, technology has improved even more dramatically. Where the original efficient toilets could save up to 3.5 gallons per flush, the newest models can conserve up to four gallons. One-gallon urinals were considered "best technology" during the 1990s but today half-gallon urinals are mainstream, one-pint urinals are on the market and non-flush urinals are available.

Starting in 2008, we will launch additional rebate programs for toilets, urinals, and high-efficiency washing machines in laundromats and apartment building laundry rooms to lower water usage in the city by 5%. This program will save approximately 60 mgd and $34 million is already budgeted.

Other projects such as water-efficient industrial equipment, water-saving dishwashers and ice machines for the food service industry, water audits, early leak detection, and gray water reuse and recycling are also being evaluated. Between 1990 and 2005, the City identified and repaired leaks that save 15.8 mgd.

INITIATIVE 5

Maximize existing facilities

We will expand our supply potential through increased efficiency

Restore groundwater use in Jamaica, Queens

In 1996, DEP bought the Jamaica Water Supply system, which at its peak supplied 65 mgd to southeast Queens. Pumps extracted groundwater and distributed it across the borough in contrast to our upstate system which relies on gravity 95% of the time. Another difference was flavor: the ground water tasted different from our upstate supply.

Today, only one mgd from this system is circulated throughout southeast Queens, primarily because of the ample supply of cheaper surface water available from upstate. But while groundwater is far more expensive to clean and distribute, it has several advantages. The supply is constant and not subject to drought. Expanding this water source will diversify our supply, providing important redundancy. That is why DEP will begin upgrading the groundwater system in southeast Queens and begin construction on an enhanced treatment plant between 2011 and 2012. By 2016, the Jamaica system will provide an additional 10 mgd.

New Croton Aqueduct

As discussed above, the construction of the Croton Filtration Plant, as well as improvements to the New Croton Aqueduct, will ensure the safe and reliable delivery of up to 290 mgd of water from the Croton water supply system.

Alternative connections to the reservoir for emergency use

Today, the New Croton Aqueduct is the only way to bring water from the Croton Watershed into the city. But the Delaware Aqueduct passes directly through the Croton Watershed; strong pumps could force the water into the Delaware Aqueduct below the point of the leak described earlier.

Although we currently have hydraulic pumps in place, they lose three gallons of water for every gallon successfully transferred. Upgrading these pumps to more efficient models will enable us to convey 125 mgd of Croton Water through the Delaware Aqueduct. We expect these new pumps to be operational by 2011 and cost $62 million.

INITIATIVE 6

Evaluate new water sources

We will evaluate 39 projects to meet the shortfall needs of the city if a prolonged shutdown of the Delaware Aqueduct is required

The additional supply described above will bring us only part of the way toward covering the shortfall if the Delaware Aqueduct is shut down.

That is why since 2004, DEP has identified a broad range of possible solutions that could fill the gap. By summer 2007, we will finalize a short list of projects for piloting and design, based on the capital, maintenance, and operations costs, the schedule, and the City's authority to implement without State legislation.

Below is a sampling of proposals under consideration:

Groundwater

Coursing underneath New York are three giant aquifers of water that were trapped hundreds of thousands of years ago within the earth's crust. Some of this water can be extracted and used as an additional clean supply source.

DEP could rehabilitate 26 existing wells throughout Brooklyn and Queens and construct an additional 12 wells to tap into the Magothy Aquifer, which runs under Queens. To meet water quality standards, DEP would construct six centralized treatment facilities using the finest available treatment technology.

Reusing water

Today, millions of gallons of water in the city are wasted every day. By targeting these sources with the appropriate cleaning processes, we could generate a new reliable source of so-called "grey water" for New York. Those strategies include recovering treated water from the Red Hook Wastewater Treatment Plant for steam, toilets or air conditioning.

Our subway tunnels provide another opportunity. Because tunnels are dug so deeply under the ground, there is constant seepage from the surrounding groundwater. Every day, pumping stations throughout the system push out approximately 25 million gallons of water and dump it into the rivers. The City will seek to partner with the Metropolitan Transportation Authority to capture and collect these streams, clean this water, and pump it into our distribution system.

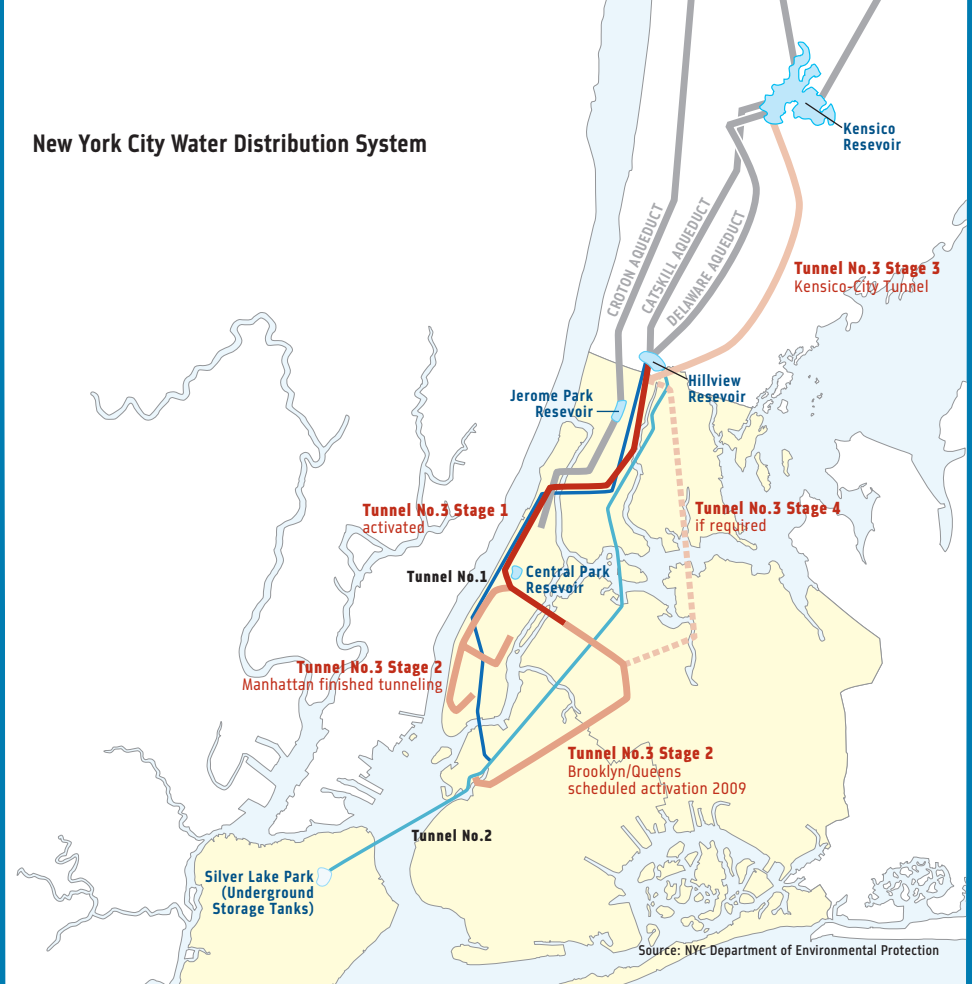
New infrastructure

A new aqueduct connecting the Rondout Reservoir with the West Branch Reservoir across the Hudson River would completely meet the city's water demand if the Delaware Aqueduct was required to be shut for repair. This new 45-mile section would run parallel to the Delaware Aqueduct and into the Croton Watershed, providing a second means of carrying water from the Delaware System into the city.

We could also expand the capacity of the Catskill Aqueduct to 660 mgd, a 10% increase, by pressurizing sections of the tunnel to improve water velocity.

Regional interconnections

Another strategy to secure the city's water supply could be new interconnections across the region. By running pipes between New Jersey, Connecticut or Long Island and the city, each state would gain critical backup systems in case of an emergency.



Modernize in-city distribution

Some of the oldest parts of our system are the tunnels, water mains, and pipes that carry water to the homes of New Yorkers. More than 1,000 miles of water pipes—out of 6,700—are already more than a century old. Our two water tunnels were built in 1917 and 1936 and they each serve distinct parts of the city.

In order to conduct maintenance, we must develop ways to distribute water across the city when the tunnels are out of service. Once they are shut down, we must be prepared for a lengthy rehabilitation period. We will need to design and build equipment especially for this reconstruction.

In order to provide the necessary window, we must complete Water Tunnel No. 3 to provide full redundancy for the system. We must also continue to aggressively upgrade and replace aging street mains. *(See map: New York City Water Distribution System)*

INITIATIVE 7

Complete Water Tunnel No. 3

We will complete construction of Stage 2 and begin repairing Water Tunnel No. 1

Construction on Water Tunnel No. 3, the largest and most expensive capital project in the city's history, began in 1970. The 60-mile tunnel was designed in four stages, beginning at the Hillview reservoir in Yonkers, traveling through the Bronx, moving south to the tip of Manhattan and then on to Brooklyn and Queens.

Stage 1, which serves northern Manhattan and parts of the Bronx, was projected to cost $238 million and be completed within eight years. It finally opened in 1998—at a cost of a billion dollars. *(See case study on following page: Water Tunnel No. 3)*

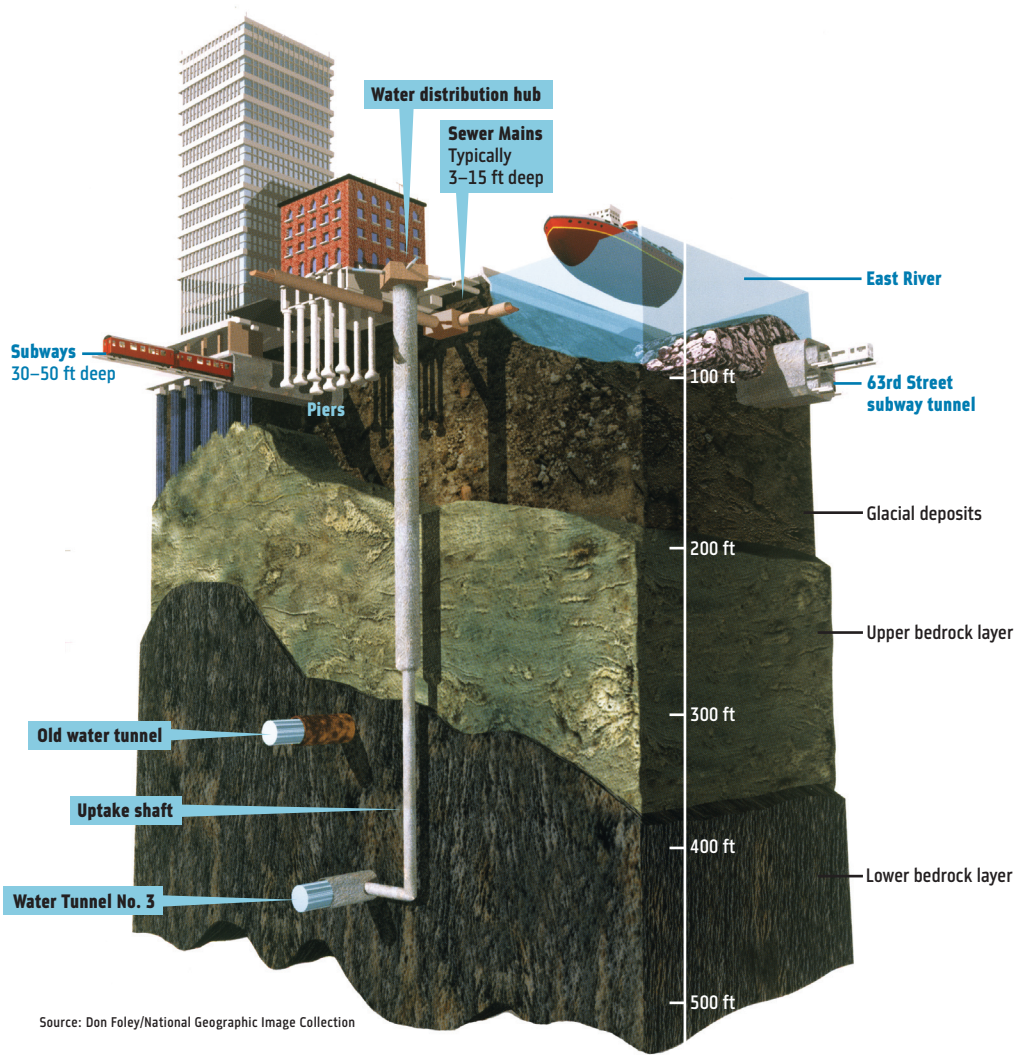
Stage 2 is currently under construction in Brooklyn, Queens, and Manhattan and will begin delivering water in two stages: the Brooklyn/Queens leg will open in 2009, with the Manhattan leg following in 2012. Although Stage 2 will not provide full redundancy for the in-city distribution, its completion will enable Water Tunnel No. 1 to be shut down for repairs, which are estimated to cost $365 million.

We will complete Stages 3 and 4 of Water Tunnel No. 3

The third stage of the water tunnel, also known as the Kensico-City Tunnel (KCT), will extend from the Kensico Reservoir to the valve chamber in the Bronx. This 16-mile section, currently in the planning stage will provide critical redundancy between the Kensico and Hillview reservoirs. Although this stage is estimated to cost between $4 and $6 billion, just $239 million is currently included in the 10-year plan.

Stage 4 of Water Tunnel No. 3 will be 14 miles long and run from the valve chamber in the Bronx under the East River into Queens. It will provide more distribution in Queens and provide full coverage during the eventual shutdown and repair of Water Tunnel No. 2

Cross Section of Underground Infrastructure with Water Tunnel No. 3



Source: Don Foley/National Geographic Image Collection

CASE STUDY

Water Tunnel No. 3

In 1970, the City broke ground on the most expensive construction project in its history. It quickly became larger.

Originally projected to cost $1.5 billion and take 16 years to complete, Water Tunnel No. 3 will ultimately cost more than $6 billion and have taken more than half a century to build.

Much of that pace has to do with the enormity of the project. The tunnel, which will be 60 miles long when completed, has engaged more than 5,000 workers and cost the lives of 24 men. It will be formed by approximately three million cubic yards of concrete. As it snakes through the subterranean city, the tunnel will plunge up to 800 feet underground and rise to a depth of less than 150 feet at its highest points.

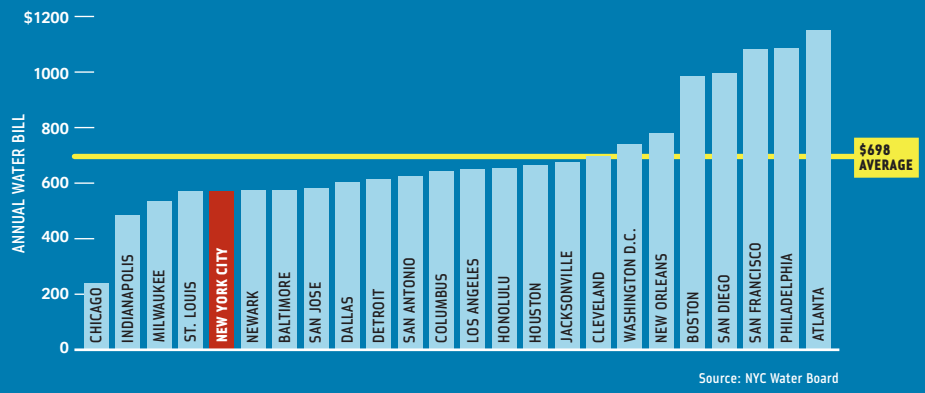
But there is another reason that the tunnel's construction has been delayed. In the early 1970s, the City suspended work after mounting bills, cost overruns, and contract disputes. During the fiscal crisis of the 1970s, construction of the tunnel stopped completely.

Progress continued through the succeeding decades. But in 2002, the City declared its commitment to completing the tunnel.

Even through the economic downturn after September 11th, that commitment has remained resolute. Over the past five years, nearly $2.6 billion has been earmarked to propel the project to completion.

In addition to providing essential redundancy for our in-city distribution network, the tunnel has also been designed to improve the ease of repairs. In the original tunnel, valves controlling the water supply were located within the tunnel. Unlike those inaccessible bronze models, the new valves will be crafted out of stainless steel and centralized in large underground chambers.

Average Annual Water Rate
For a single family household, 2006



Source: NYC Water Board

INITIATIVE 8

Complete a backup tunnel to Staten Island

We will replace water pipelines connecting Staten Island to Water Tunnel No. 2

Staten Island is currently served by the five-mile-long Richmond Tunnel, which connects the borough to Water Tunnel No. 2. Completed in 1970, the Richmond Tunnel tripled carrying capacity to Staten Island, increasing its water supply from 100 to 300 mgd.

Currently, two pipelines embedded into a trench in the Harbor provide redundancy for this tunnel. But by the end of 2007, the Army Corps of Engineers will be dredging the bottom of the waterway to create a deeper shipping channel—dislodging this backup system.

DEP will partner with the Army Corps to build a new 72-inch water main that will replace the pipes, ensuring a continued reliable water supply for Staten Island.

INITIATIVE 9

Accelerate upgrades to water main infrastructure

We will increase replacement rate to over 80 miles annually

Once it leaves our in-city tunnels, water travels through 6,700 miles of water mains to reach our homes, over 1,000 of which were installed over a century ago. These aging pipes require constant repair and continual upgrades. We are currently replacing 60 miles of water mains annually.

At our current pace of replacing 1% of our infrastructure every year, a full upgrade will take a century to complete. Over the next decade, we will accelerate the pace of upgrades to over 80 miles annually. In addition, we will spend approximately $575 million to link Stage 2 of Water Tunnel No. 3 with the water main distribution system. Over 10 miles of new trunk water mains will be installed in Manhattan for this purpose.

Conclusion

The initiatives described above are essential. But they are not inexpensive. Each will take years to complete, and in some cases, decades. And they are massive, sprawling across hundreds of miles and involving thousands of workers, residents, and even communities. That is the price we must pay for continuing to have a reliable source of water—something New Yorkers have only truly been able to count on for the last century.

By investing in these critical backup systems, and making more efficient use of existing resources, we will ensure New Yorkers enjoy a reliable water supply into the next century. *(See chart above: Average Annual Water Rate)*

Transportation has always been the key to unlocking New York's potential. From our origins as a port city to the completion of the Erie Canal, from the construction of the Brooklyn Bridge to the creation of the subway system, New York's growth has always depended on the efficiency and scale of its transportation network. But for the last 50 years, we have underinvested in our most critical network: transit.

While we have made progress in the last two decades in maintaining and improving our existing infrastructure, we still need billions of dollars more to reach a full state of good repair. More significantly, almost all of our subway routes, river crossings, and commuter rail lines will be pushed beyond their limits by 2030.

Transportation is the greatest single barrier to achieving our region's growth potential. Only by strengthening our transit—which uses less land and creates less pollution than autos—can we meet this challenge, and provide a quality trip to those who drive. Our transportation plan will enable us to improve travel times across the region and achieve the funding necessary to meet our transportation needs through 2030 and beyond.

Transportation

Congestion

Improve travel times by adding transit capacity for millions more residents, visitors, and workers

State of Good Repair

Reach a full “state of good repair” on New York City’s roads, subways, and rails for the first time in history

Transportation

Improve travel times by adding transit capacity for millions more residents, visitors, and workers

Reach a full "state of good repair" on New York City's roads, subways, and rails for the first time in history

Bryan Block rises at 6:30 am. By 8:00 am he is waiting at his local bus stop in Cambria Heights, Queens, watching for the bus to arrive. It lumbers to the Parsons/Archer subway station, where Block takes an E train that will be packed well before it reaches Manhattan.

By the time he reaches his office in Midtown Manhattan, his trip has taken an hour and a half. It used to be called a "two-fare zone." Now it's just too long.

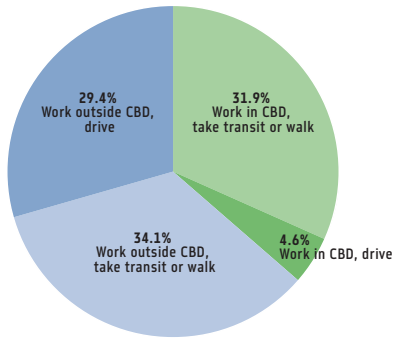
"It's tiresome," said the 50-year old Block, who has been traveling from Cambria Heights into Manhattan for more than 20 years. "By the time I get to work I am fatigued. By the time I get home I am fatigued. If you live in Manhattan you can just jump on the IRT, my co-workers can walk to work, they can take a bus down Fifth Avenue, a bus up from the Village. They don't understand. Once you live in southeast Queens and have to get to Manhattan you're tired when you get to work."

Block loves southeast Queens and the shared work ethic that binds together the neighborhood's cross-section of professions, from doctors to teachers to city workers. He has to remind himself of this on his way to work, especially during the wintertime. "It's cold, you're wet, you're freezing, you're angry, you're frustrated and you have to stand there and wait.

"You have no recourse," he said. "No choice."

Times Square, Manhattan

How New Yorkers Get to Work



Source: U.S. Census Bureau (2000)

CBD = Manhattan Central Business District

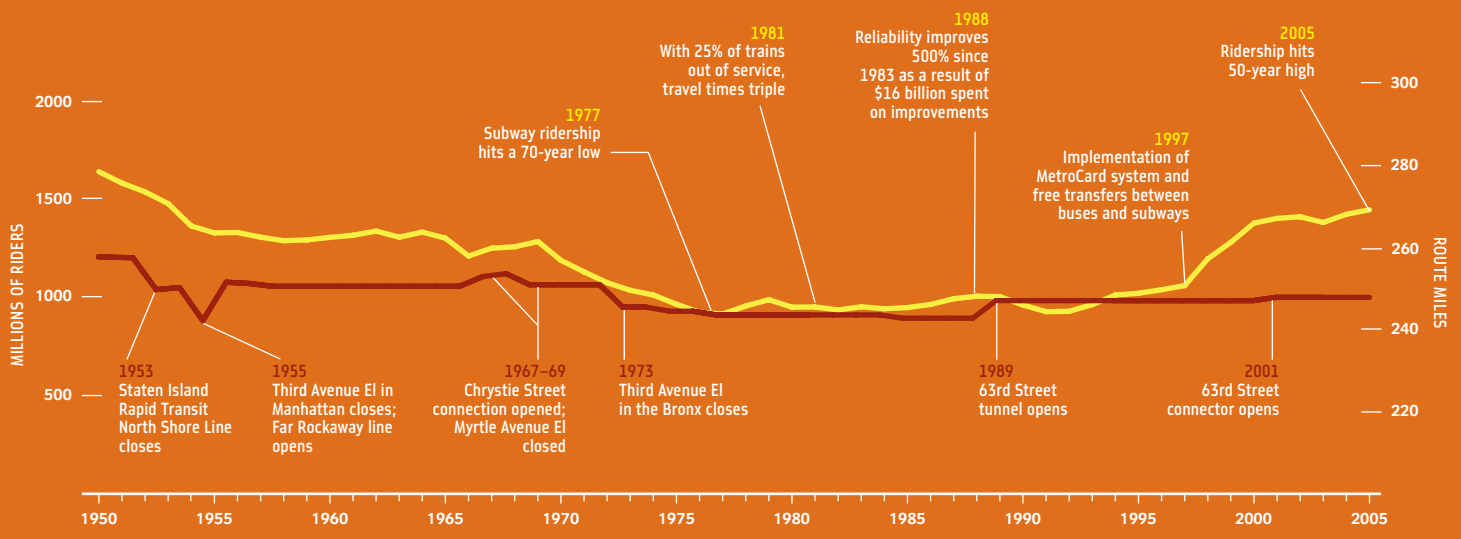
The lack of transit for Bryan and his neighbors in southeast Queens is not a new problem. As early as 1929, planners proposed to extend the subway to the area. But despite widespread agreement that it was necessary, the plan was halted because funding could not be found.

It is a story that has been repeated again and again in New York. Inadequate investment in the basic maintenance of our roads and transit system intensified until the 1970s when the entire network fell apart. A truck plunged through a hole in the West Side Highway. Track fires were common occurrences. Bridges were closed for fear they'd collapse.

In 1981, the Metropolitan Transportation Authority (MTA) halted all new transit expansion until the existing system could be restored. The City made a similar commitment to repave and reclaim its road network. And that has been the focus of transportation investment for the past 25 years: rebuilding, but not expansion.

The improvements are undeniable. In 1981, trains broke down every 6,600 miles; today they run for more than 140,000 miles. The MTA has made great progress in providing cleaner, safer stations, and implementing new technology such as the MetroCard. Our road network has also improved, although the quality of our streets has fallen below the levels achieved in 1999. The City's bridges have done better since the days when they were regularly closed for emergency repairs: in 2005 only four of the City's 787 bridges were deemed to be in poor condition, down from 48 as recently as 1996.

New York City Subway Ridership and Route Miles



Note: Route miles are non-directional; i.e., the distance from terminal to terminal. Several lines may share the same route.

Source: NYC Mayor's Office of Long-Term Planning and Sustainability; Robert Olmsted; Brian J. Cudahy

And yet, there is much more to be done. Today, more than half our stations are awaiting repairs; and 40% of our network's signal systems are obsolete, preventing new services like displays showing the arrival time of the next train. Altogether, we are more than $15 billion short of achieving a full state of good repair on our transit and road networks.

But with population, jobs, and tourism all at record levels, our challenge is no longer simply maintaining the system—we also face an urgent need to expand it. In 2006, ridership on our subways soared to the highest levels since 1952—but during that time the subway network actually shrank by eight route miles. *(See chart above: New York City Subway Ridership and Route Miles)*

Failure to invest adequately in our transit system has had negative consequences for nearly all New Yorkers. Too many don't have access to mass transit; those who do find their trains increasingly crowded. Nearly half of our subway routes experience congestion at key times or are at capacity today.

It isn't just city residents who suffer. Over 70% of all Long Islanders who commute into Manhattan take the Long Island Rail Road (LIRR), but the tunnels into the city have reached their capacity.

Auto use has risen alongside transit use. In 1981, when subway service was at its low-point, 31% of all people traveling to Manhattan's Central Business District (CBD) arrived by car. In 2006, with the quality of subway service at modern-day record levels, that figure has remained essentially unchanged.

While only 4.6% of working New Yorkers commute to Manhattan by car, the congestion they fight through has increased. Rush hour has slowly stretched out over the past two decades, as people have started leaving earlier and arriving home later. This is true for drivers across the region, with local traffic on roads like the Hutchinson River Parkway, the Long Island Expressway, and Interstate 95 competing with cars heading for Manhattan. By 2030, rush hour conditions could extend to 12 hours every day.

It isn't just Manhattan-bound commuters who face the consequences of increasing road congestion—nearly seven times as many New Yorkers drive to jobs outside of Manhattan as to it. These commuters often have fewer transit alternatives, but face the same challenge of escalating traffic. *(See chart on previous page: How New Yorkers Get to Work)*

With every travel mode congested, it should come as no surprise that New Yorkers experience the longest commutes in the nation. Of all large counties in the United States, 13 of the 25 with the longest commute times are in the New York area. The four worst nationwide are Queens, Staten Island, the Bronx, and Brooklyn. *(See chart on page 78: Average Travel Time to Work)*

Road congestion costs all of us money—in higher store prices, because freight deliveries take longer; in higher costs for services and repairs, because delays mean repairmen visit fewer clients each day; in taxi fares, in wasted fuel, in lost revenue. One recent study estimated that traffic jams cost the New York City area $13 billion every year.

And there are other consequences as well. Snarled traffic slows bus service. Emergency vehicles lose valuable response time. Finally, cars and trucks contribute 20% of the City's global warming emissions and a large part of the ozone—a serious pollutant that can cause respiratory illnesses like asthma—in our air.

By 2030, nearly a million more residents, 750,000 new jobs, and millions more visitors will put our system under new pressures. The increasing congestion, and the resulting economic costs, will reverberate throughout the region. *(See map on page 78: Demand for Travel into Manhattan's Central Business District)*

We know what must be done. There is general agreement on the strategy necessary to achieve the level of mobility our city and region need. We must finish repairing our roads and transit system **and** invest to provide more and better mass transit options. We must also proactively embrace strategies to reduce congestion on the city's streets.

The problem is that we do not have the resources to fund our needs. Although we

Second Avenue Subway

Second Avenue Subway groundbreaking in 1972. From left to right: Percy E. Sutton, Manhattan borough president; Senator Jacob J. Javits; John A. Volpe, United States Secretary of Transportation; Governor Nelson A. Rockefeller; and Mayor John V. Lindsay.

Credit: Neal Boenzi/The New York Times

Credit: Metropolitan Transportation Authority

Second Avenue Subway currently under construction

know that the projects will prevent crippling congestion, collectively they face a monumental funding gap. As a result, improved transit will require new sources of funding.

The greatest factor in determining the success of our city in the 21st century may be whether we can summon the collective will to generate the funds necessary to meet the transportation demands of the future. New York City is prepared to make an extraordinary commitment to ensure that we do.

Our Plan

We benefit today from the foresight of past generations of New Yorkers: the street grid, laid out in 1811 for a city of a million at a time when New York only had a 100,000 residents; Central Park, built at a time when few lived above 23rd Street; a water system constructed with the capacity to last for centuries; and the subway system that reshaped the city.

But we seldom think about the fact that those New Yorkers made the decision not only to do those things, but to pay for them as well. In all of those cases, New Yorkers argued over who should pay what, but ultimately settled on financing approaches based on the principle that those who benefited should contribute.

We face a similar challenge today. The recent groundbreaking ceremony for the Second Avenue Subway marked the third time that same project has been started. Each time, New Yorkers were confident the project would be completed; the Second and Third Avenue Els were even dismantled in anticipation of the new route. But each time, the project stalled for lack of funds. This experience ought to have taught us one thing: If we don't know exactly where funding will come from, it's a good indication that we may not get what we want. *(See photos above: Second Avenue Subway)*

Building the new transit we—and our entire region—need and achieving a full state of good repair will require over $50 billion.

Only $13.4 billion is already committed to these projects; we can reasonably expect another $6.3 billion from Federal sources. That means that if we want to see those projects built, the region will have to raise an additional $31 billion between now and 2030. That is why we seek to work with the State to create a new regional partnership, the Sustainable Mobility And Regional Transportation (SMART) Financing Authority. The SMART Authority's mandate will be to provide funding necessary to complete nearly every critical transportation project—and finally bring the full system into a state of good repair.

The Authority would have three dedicated revenue streams: the proceeds from congestion pricing; an unprecedented City investment; and a corresponding contribution from the State, all exclusively dedicated to funding improvements to the regional transportation network.

These dedicated revenue streams would support bond issues to ensure that our most critical projects are not delayed by a lack of funding. Over time, they would also generate enough excess revenues to launch a new wave of projects to improve mobility across the region even more.

The SMART Financing Authority would be governed by an independent and experienced board appointed by the City and State to incorporate a wide range of perspectives about transportation priorities for the region. It would not operate or build anything, but rather would invest in projects proposed by other transportation agencies. It would then monitor those investments, assuring accountability.

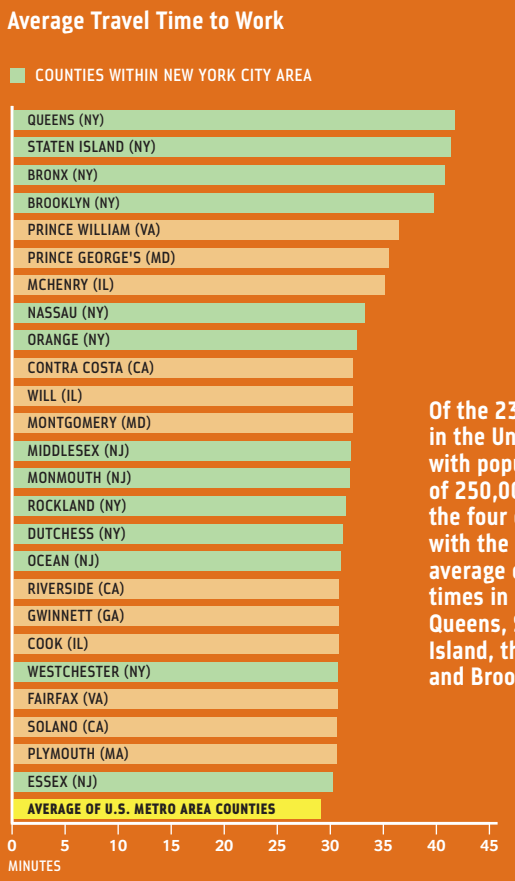
In addition to accelerating major transit expansions, we must also aggressively reduce congestion on the city's streets. Citywide, road travel is growing faster than population. Managing our roads better to improve traffic flow will help, but it won't be enough.

The time has come for New York to try congestion pricing: a carefully-designed charge for drivers in part of Manhattan during business hours. This solution is bold. It is also proven. Cities around the world have shown that congestion pricing can reduce congestion and speed travel times with no significant negative impact on economic activity.

Congestion pricing has three primary benefits. First, it has been proven to reduce congestion and improve travel times. Second, it would generate revenues dedicated to the SMART Authority, which would fund significant expansions and upgrades in transit across the city and the region. In the short-term, the focus would be on neighborhoods with limited mass transit options and high concentrations of drivers. But by reinvesting the proceeds in mass transit, nearly all New Yorkers can benefit, especially the 95% of New Yorkers who do **not drive** to jobs in Manhattan.

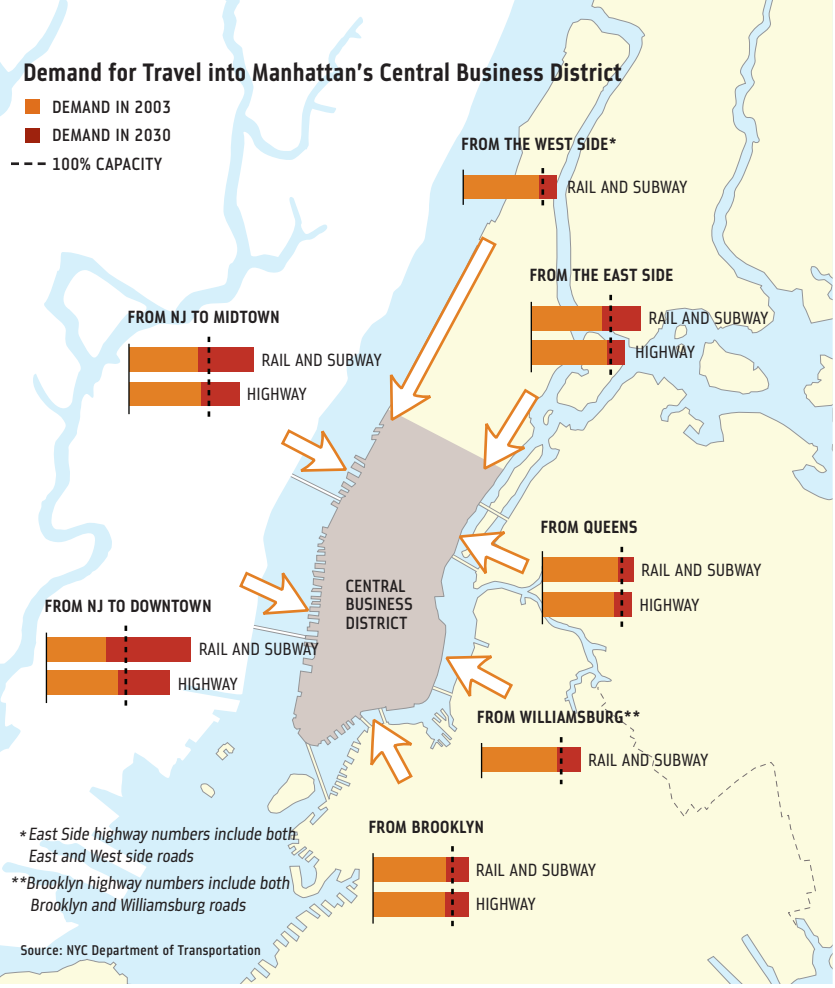
By encouraging mode shifting from private automobiles, it will stem the amount of pollution spewed from tailpipes on city streets, helping us meet our goals of reducing greenhouse gas emissions and achieving the cleanest air of any big city.

The potential benefits of congestion pricing are tremendous. And there is no reason we cannot turn the system off if we do not like it. That's why we propose to pilot congestion pricing for a period of three years. We expect a combination of Federal and private dollars could fully cover the initial investment. After three years, we will know whether it really works for New York.



Of the 231 counties in the United States with populations of 250,000 or more, the four counties with the longest average commute times in 2003 were Queens, Staten Island, the Bronx, and Brooklyn

Source: U.S. Census Bureau, 2003 American Community Survey



By aggressively combating congestion, finding new sources of funding, and making smart choices about priorities for the coming decades, we can reach a state of good repair on our roads, rails, and subways for the first time ever, while expanding our transportation system to improve travel times and convenience for New Yorkers. *(See map on facing page: Transit Capacity Expansions)*

Mass Transit

Despite being the most transit-oriented city in the United States, when it comes to transit ridership, we still lag behind our strongest global competitors. Cities like London, Singapore, and Tokyo have recognized that providing more mass transit options creates a cleaner, healthier, more efficient urban environment—and have invested accordingly.

We must keep pace. That's why we have developed a mix of short-term and long-term solutions that will improve transit throughout the city. The result will be new or improved public transportation options for virtually every New Yorker. *(See chart on page 80: Public Transit Usage Per Capita)*

Our plan for transportation:

Build and expand transit infrastructure

1. Increase capacity on key congested routes
2. Provide new commuter rail access to Manhattan
3. Expand transit access to underserved areas

Improve transit service on existing infastructure

4. Improve and expand bus service
5. Improve local commuter rail service
6. Improve access to existing transit
7. Address congested areas around the city

Promote other sustainable modes

8. Expand ferry service
9. Promote cycling

Improve traffic flow by reducing congestion

10. Pilot congestion pricing
11. Manage roads more efficiently
12. Strengthen enforcement of traffic violations
13. Facilitate freight movements

Achieve a state of good repair on our roads and transit system

14. Close the Metropolitan Transportation Authority's state of good repair gap
15. Reach a state of good repair on the city's roads and bridges

Develop new funding sources

16. Establish a new regional transit financing authority

Transit Capacity Expansions

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Build and expand transit infrastructure

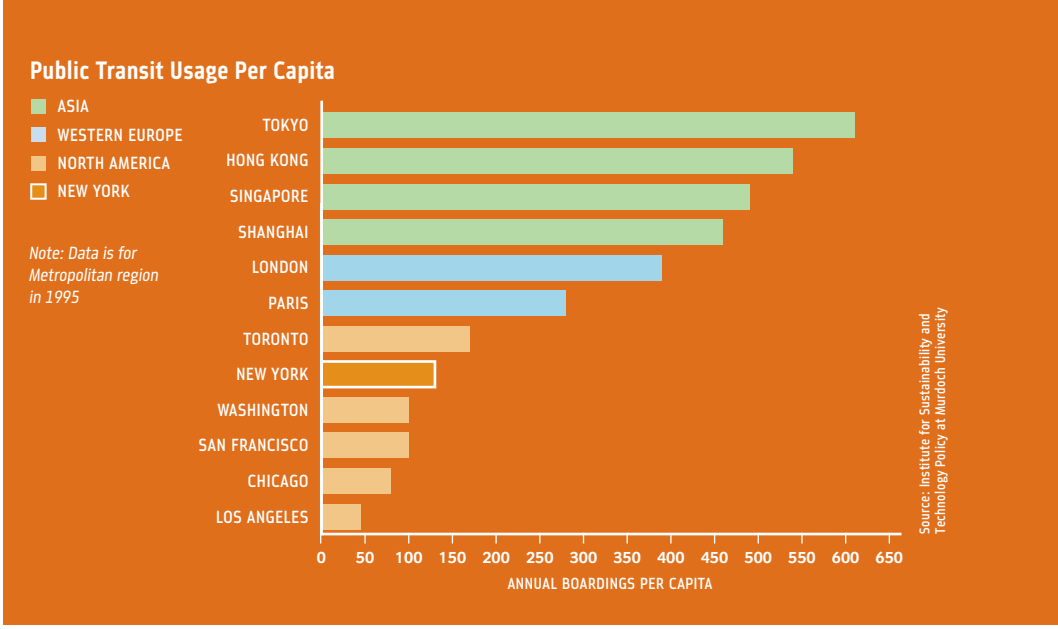
Today, more people take the 4, 5, 6 trains every day than ride the entire Washington, D.C. Metro. The Lexington Avenue line is the most heavily used subway line in the country. Crowding not only makes the trip unpleasant; delays caused by people entering and exiting cars actually result in fewer trains running during rush hour.

For decades, planners have known the answer. The Second Avenue Subway was proposed in the 1920s to provide relief for the Lexington Avenue line and to replace elevated trains. The new subway line is one of 11 major transit projects that would help solve the region's transit congestion problem.

Some, like the Second Avenue Subway, will increase capacity on already clogged routes. Others, like East Side Access, will expand commuter rail options. Several will provide access to growing, but inaccessible communities. The rest will just make life for riders more pleasant. All share one thing: they are not fully funded.

In most cases, some funding is available, from Federal and other sources. But they are all missing the last set of contributions necessary for completion. We may have broken the ground for the Second Avenue Subway—but there is still a significant funding gap for the first of four phases. While the entire project is designed to travel from Harlem to Lower Manhattan, we are still nearly a billion dollars short of the funds needed to build just from 96th Street to 63rd Street.

Overall, the remaining funding gap for just these 11 projects is nearly $21 billion. If we can fill this gap and realize these plans, we will prevent the transit and traffic congestion that threatens to choke our economy in the coming decades.



INITIATIVE 1

Increase capacity on key congested routes

We will seek to fund five projects that eliminate major capacity constraints

Five key projects will ease congestion on some of our most clogged routes into Manhattan—all of which will be pressed beyond their capacity by 2030 unless we act.

The **Second Avenue Subway** is one of our most urgent needs, for a wide range of travelers: workers from the Bronx, local travelers from the Upper East Side, commuters changing trains to get from Westchester to Wall Street. Its construction will be a massive undertaking and cost billions, but we cannot let funding run out on this critical project a third time. *(See case study on facing page: Yorkville, Manhattan)*

The addition of a **third track on the Long Island Rail Road (LIRR) Main Line** will enable the LIRR to run more trains, use its fleet better, and provide more service at local stations in Queens. It will especially serve reverse commuters, who live in New York City but work in Nassau County. Today, nearly 270,000 New York City workers commute to jobs outside city limits, up by 10% since 1990. Facilitating reverse commuting helps New York City residents expand their career options and suburban businesses broaden their worker pool.

Two projects will increase capacity for commuters west of the Hudson. **Access to the Region's Core (ARC)** will create a second trans-Hudson tunnel for New Jersey Transit (NJT), doubling the number of trains NJT can run into Manhattan and enabling direct service to New York on several lines for the first time. These and other Penn Station commuters will be able to get closer to the emerging Hudson Yards neighborhood through the **Moynihan Station Project.** The station will also restore a grand entrance to the west side of Manhattan.

Even more New Jersey commuters arrive by bus than by train—making the Express Bus Lane through the Lincoln Tunnel one of the region's most important assets. The Port Authority's plan for a second dedicated **Express Bus Lane** through the Lincoln Tunnel will allow expanded service for communities not on the NJT rail network.

INITIATIVE 2

Provide new commuter rail access to Manhattan

We will seek to expand options for rail commuters

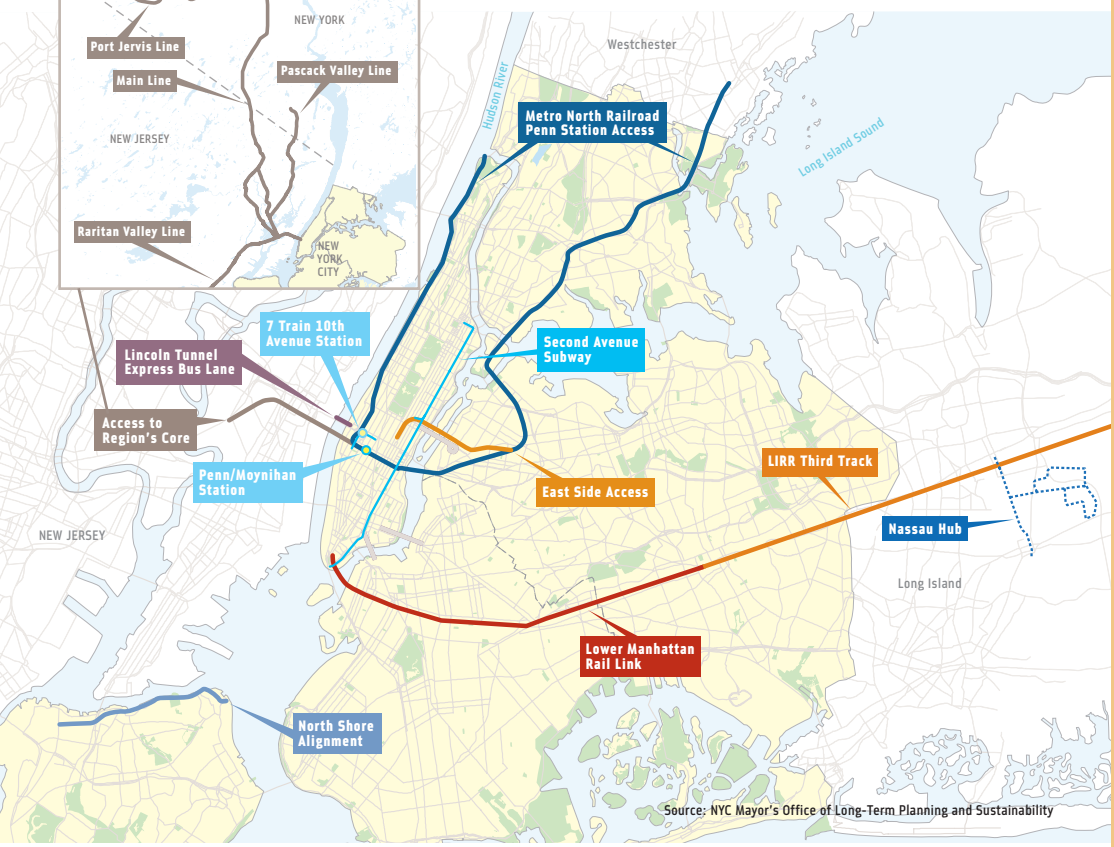
Today's commuter rail service is excellent, but increasingly strained. Rising ridership has meant more crowded rail lines. For thousands of commuters, their trains do not even take them where they need to go. Nearly half of all LIRR riders work on the East Side, but are dropped off every morning at Penn Station; 23% of Metro North riders have jobs on the West Side, but arrive daily in Grand Central Terminal. Traveling across town lengthens their daily commute—and takes up additional subways, buses, and street space. *(See map on facing page: New and Expanded Transit Infrastructure; see commuter profile on page 85: Co-op City to Lower Manhattan)*

Finally, rail lines that run through the Bronx and Queens do not provide as much service to residents as they could, in part because the trains can't fit more riders. Three projects will address these issues.

East Side Access was first planned in the 1960s to offer LIRR riders better access to Grand Central. Its construction will free up track space for **Metro North service to Penn Station**. Combined, these projects will reduce subway crowding and provide most commuters with two Midtown rail options. *(See commuter profile on page 82: Bayside, Queens to Manhattan's East Side)*

They would also improve service to Queens and the Bronx. Additional tracks will allow for a station at Sunnyside Yards (serving Long Island City), and make it easier for additional trains to serve stations in eastern Queens. Metro North will also be able to extend service to new stations—providing residents of

New and Expanded Transit Infrastructure



Co-op City and Hunts Point with fast, direct rides, and helping to reduce auto commuting to job centers in West Harlem.

Long Islanders who work in Midtown are more likely to take the train than those who work in Lower Manhattan or downtown Brooklyn. Those who drive contribute to traffic delays in Brooklyn and Nassau County. Those who do take the train have to transfer to subways to get to their jobs. Further, the lack of good airport access hinders the competitiveness of both areas for job growth. By connecting Jamaica, Brooklyn, and Lower Manhattan, the **Lower Manhattan Rail Link** will address all of these challenges.

INITIATIVE 3

Expand transit access to underserved areas

We will seek to provide transit to new and emerging neighborhoods

Two areas of the city offer immediate opportunities to add new transit options where none currently exist. The 5.1-mile **Staten Island North Shore Alignment**—an abandoned railline linking directly to St. George and the Ferry Terminal—has been unused since 1953. A study will examine the potential for either rail or a dedicated road for buses to give the area its first rapid transit service in two generations.

The second area of opportunity is on Manhattan's West Side: as the 7 train is extended to reach the Javits Center, it will pass through an area that is growing fast but lacks transit. A new **10th Avenue Subway Station** will meet a strong, emerging need at West 41st Street.

But transit-oriented development isn't limited to the city: developing transit hubs around suburban railroad stations can achieve a similar purpose. One such project, the **Nassau County Hub**, envisions a transit loop connecting LIRR stations and several existing and emerging employment centers in Mineola, Hempstead, and Garden City. Serving local riders, inbound commuters, and reverse commuters, the project will help reduce congestion on Long Island and create opportunities for the entire region.

These three projects should only be the beginning of a new era of rapid transit planning in New York. We will work with the MTA to review other potential transit expansions in the city, and we will support other regional efforts to explore local and longer-distance opportunities.

COMMUTER PROFILE

Yorkville, Manhattan

Crammed into the uncomfortable intimacy of New York City's morning rush, passengers on the Lexington Express train play the subway version of Twister to keep from falling. Riders squeeze into spaces between elbows and handbags, breathing in smells of the passengers pressed against them.

Jocelyn Torio confronts this crowd combat every morning.

"A train passes me by once or twice a week and I get stuck waiting on the platform," she said. "They are just too crowded for me to fight my way in."

The 4 and 5 lines start high in the Bronx, extend through Harlem, down to the tip of Lower Manhattan and then through Brooklyn.

There are few other mass transit options for reaching Manhattan's east side; Torio experimented with the bus down Second Avenue from her apartment at 83rd Street to her office on 26th Street and Park Avenue.

"I even got a seat, but it just takes so much time," Torio said.

As early as 1929, planners have known that a Second Avenue Subway was a big part of the solution. But lack of funding has stalled the project for decades.

A Second Avenue Subway would shorten Torio's commute to work and alleviate rush-hour traffic on East Side subways and buses. But the subway won't be her only new choice. By 2009, one of the city's five new Bus Rapid Transit (BRT) lines will be implemented on First and Second Avenue, giving commuters the option of a bus that zooms downtown in its own lane, bringing with it a 22% increase in travel-time savings.

"There's definitely a need for a new way to handle the increasing population." Torio said. "Having that Second Avenue subway line would just make everyone's commute much easier."

COMMUTER PROFILE

Bayside, Queens to Manhattan's East Side

Karin Werner has given up on Bayside. Although the Bayside Long Island Rail Road (LIRR) station is closest to her house in Queens, she drives an extra few minutes to the Auburndale stop instead.

"I never got a seat, and there were always eight to ten of us stuck standing in the middle of the car," she said. "I will not take Bayside in the morning."

When she gets off the train, she is in the wrong place. That's because Werner is one of the nearly 45% of all LIRR commuters who work on Manhattan's East Side, but are dropped off at Penn Station every morning.

The extra 25 minutes spent trekking across town means that she has to leave her house at 6:15 every morning. She's tried driving, but afternoon traffic often leaves Werner sitting in gridlock. And inevitable parking prices make costs prohibitive.

But her transit choices today are not much more cost-effective; she pays over $150 for a LIRR monthly pass and $76 for a monthly MetroCard.

By 2012, Werner's ride could be transformed. The LIRR's East Side Access project would bring east side commuters directly into Grand Central Terminal.

She'll have a seat, and she'll keep it all the way to Grand Central—just like she'll keep that $76 in her pocket.

"So it's not just the 25 minutes," she said. "Though being able to sleep in a little longer would be great."

Improve transit service on existing infrastructure

While these longer-term projects are crucial, transit improvements do not have to wait for major new construction. Through targeted near-term investments and closer partnerships between the city and the MTA, we can improve transit options for all New Yorkers in just a few years.

These improvements are especially important for neighborhoods where subway access requires a long walk or a bus transfer. Almost 30% of New Yorkers live more than a half mile from a subway station. And in 22 areas across New York, the lack of good transit access has led to concentrations of Manhattan-bound commuters who drive.

We have many measures at our disposal to meet the needs of these neighborhoods. We can improve the speed and reliability of our bus network; make better use of existing rail systems like the LIRR; and create better connections to—and among—transit services. Taken together, these steps can provide significant service improvements without major capital investments, and usually without increasing operating costs.

The key barriers to these improvements have been largely organizational. We need to work in closer cooperation with the MTA to develop detailed implementation and financing plans for these improvements. *(See map on page 86: Near-Term Improvements to Transit Service; see table on page 86: Potential Improvements for 22 Neighborhoods with Concentrations of Manhattan-bound Drivers)*

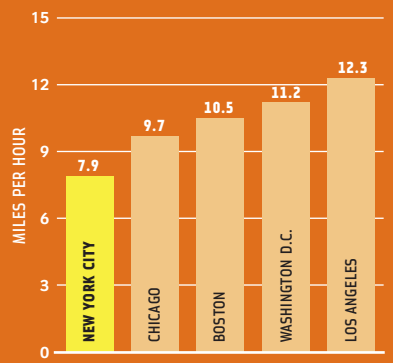
INITIATIVE 4

Improve and expand bus service

We will work pursue a variety of strategies to improve and expand bus service

New York City has the highest bus ridership in the United States, but the slowest buses. As the city grows and vehicles compete for the same road, more riders board buses, causing buses to operate at even slower speeds. Between 2002 and 2006 alone, bus speeds across the city slowed by 4%. *(See chart above: Bus Speeds)*

Bus Speeds
2004



Source: Federal Transit Administration, National Transit Database: revenue bus miles/revenue bus hours

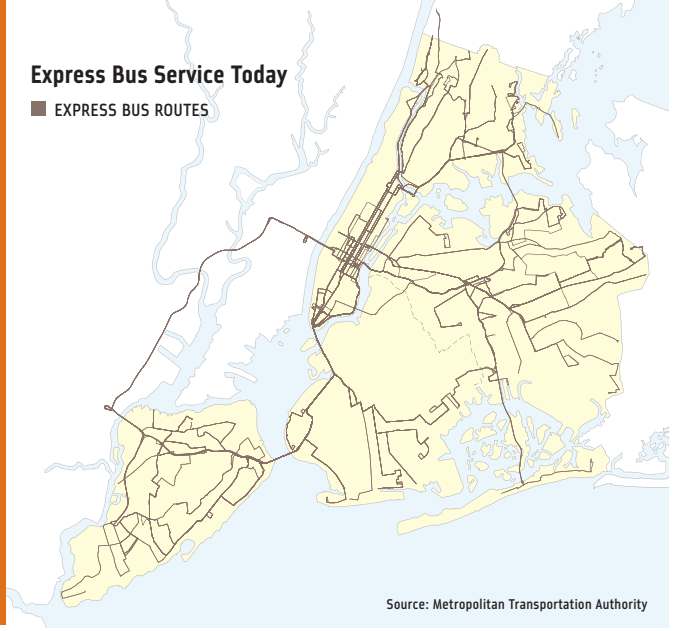
Because traffic routinely delays buses, travelers are often stranded at bus stops with no way to gauge whether to keep waiting or move on. Even on the best days, every rider has experienced the feeling of watching a bus pull away seconds before reaching the stop, knowing that the posted schedule may not be any guide to when the next one will arrive.

Yet buses retain enormous appeal. They offer flexibility that subways cannot match; the capital costs to start a bus service are small compared with rail transit; and they can be up and running in months, not years. With new technology already in use by the MTA, they are environmentally friendly. Many senior citizens, and others, prefer the bus to the subway to avoid climbing stairs. And buses are the most efficient use of our limited road space: one bus takes the same amount of road space as two cars, but can carry 70 people.

The key is to improve speeds and reliability. Cities around the world have begun embracing the benefits of bus travel while addressing the issues that have traditionally undercut buses' effectiveness. Dedicating bus lanes, and enforcing their exclusive use, is an important step. Another strategy is Bus Rapid Transit (BRT), an overall approach that has been implemented in cities around the world. BRT uses dedicated bus lanes, fewer stops, time-saving technologies, and additional efficiency measures to make bus travel fast, reliable, and effective. *(See case study on facing page: Bus Rapid Transit Around the World)*

We will initiate and expand Bus Rapid Transit

Within two years, New York City and the MTA will launch five BRT routes, one in each borough. We will incorporate many of the most successful proven features from domestic and international systems, including establishing dedicated bus lanes with bright, distinctive signage. The lanes will be marked with red paint to distinguish them from regular traffic



Congestion Impacts on Express Bus Service

The MTA's system of express buses is designed to provide direct service to Manhattan for neighborhoods at the ends of subway lines or without subway access. Over 100,000 New Yorkers ride these buses every business day. Like any road vehicle, they suffer from congestion. One of the longest runs, X22 from Tottenville, Staten Island, to Midtown, takes an hour and 17 minutes at its earliest departure, but an hour and 44 minutes at the height of rush hour—a loss of 27 minutes each morning for its riders, and an increase in operating costs of over 25% due to fuel, driver time, and wear and tear on brakes and other components.

lanes, and their exclusive use by buses will be enforced rigorously. To strengthen our enforcement ability, we will seek the approval of the State Legislature to use cameras to issue fines to drivers who violate these lanes. *(See photo: New York City Bus Rapid Transit Stop)*

BRT service will run along the same routes as traditional buses; but, more buses will run along the routes, and stops will be spaced farther apart than local service, with stations every 10 to 15 blocks. (By contrast, regular buses often stop every two to three blocks.) Electronic message boards will provide riders with real-time updates on arrival times. As illustrated below, the savings in terms of travel times will be significant.

FIVE INITIAL BRT ROUTES

ROUTE	DAILY CORRIDOR RIDERS*	DAILY BRT RIDERS*	TRAVEL TIME IMPROVEMENTS (% FASTER)**
First and Second Avenue (Manhattan)	27,100	12,900	22%
Fordham Road/Pelham Parkway (Bronx)	14,700	7,000	8%
Nostrand Avenue (Brooklyn)	20,000	5,300	20%
Merrick Boulevard (Queens)	21,800	2,600	16%
Hylan Boulevard (Staten Island)	4,700	2,800	22%

*Includes other buses that will also benefit from bus lanes

**End to end travel time savings compared to existing local service

Source: NYC Department of Transportation; Metropolitan Transportation Authority

By 2014, we will expand BRT service by at least five additional routes. We will also implement new technologies, including giving BRT vehicles signal priority—which means traffic lights recognize approaching buses and either turn or stay green so that the buses remain on schedule. We are already working with the MTA to test this technology on Victory Boulevard on Staten Island.

Where possible, we will build sidewalk extensions that allow buses to stop without pulling over to the curb—and provide more waiting room for riders who might otherwise impede passing pedestrians. (These are being installed in Lower Manhattan this year.) We are also investigating ways to allow passengers to board and exit buses more quickly. Potential ideas include electronic smart cards and letting passengers pay their fares before boarding buses. If successful, all of these technologies could be implemented system-wide, not only on BRT routes. *(See commuter profile on following page: Staten Island to Brooklyn)*

We will dedicate Bus/High Occupancy Vehicle (HOV) lanes on the East River bridges

As neighborhoods in Brooklyn and Queens grow, congestion on some subway lines across the East River worsens. Crowding is felt most acutely at the stations nearest Manhattan, where rush hour riders are increasingly forced to let packed trains go by before finding one they can squeeze into. That's why bus service across the river would be an attractive alternative for many of these riders.

We will create new or improved bus lanes on the Manhattan, Williamsburg, and Queensboro Bridges to allow the MTA to expand local service to and from Manhattan. These lanes could also serve express buses and carpoolers. We will work with the MTA to identify the bus routes that will benefit most from these lanes, and particularly alleviate crowding on the E train, L train, and 7 train.

We will explore other improvements to bus service

Further opportunities to improve bus service across the system exist. Many of the technologies that will be used for BRT—traffic light priority, electronic message boards, bus bulbs—could be used by regular buses as well. Opportunities besides the East River Bridges may exist where dedicated bus lanes could significantly improve service. Adjustments to service patterns—skip-stop

New York City Bus Rapid Transit Stop rendering

Credit: NYC Department of Transportation and NYC Economic Development Corporation

CASE STUDY

Bus Rapid Transit Around the World

It was in the mornings that Ottawa's Bus Rapid Transit (BRT) system really made the difference for Andrew Harder.

"I don't know how I would've gotten to work," said Harder. "Because of BRT, I didn't have to get up at 5 am."

BRT gives commuters the option of taking mass transit to work, without the sacrifices that bus riders sometimes make to turtle-paced traffic.

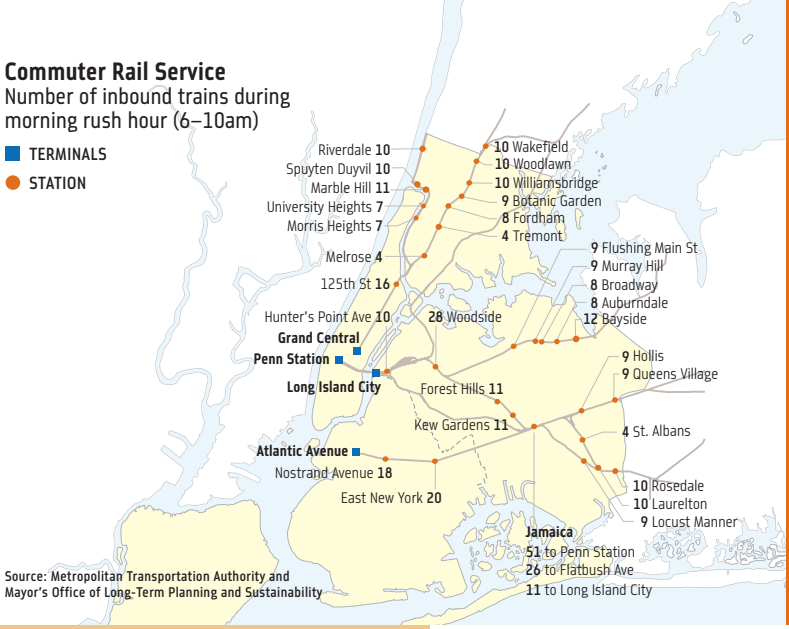
Over the last two decades, Bus Rapid Transit has become a popular tool, used by cities like Bogota, Boston, Sydney, Jakarta, Miami and Seattle to alleviate congestion. Today, Miami's BRT system shuttles around 18,000 passengers each day. Seattle's BRT serves 46,000 weekday commuters, and Boston gives 4,500 commuters a ride during morning rush hour.

Since 1983, Ottawa has installed 28 stations and nearly 20 miles of exclusive busways—the most extensive system in North America. The 900-bus fleet carries more than 200,000 riders every day.

BRT buses frequently receive priority at traffic signals, allowing them to travel through intersections without delay. In Ottawa, message boards at select passenger stations give riders updates on when to expect the next bus, a system that New York City will be adopting for its first five BRT routes, which launch in 2007.

Off-vehicle fare collection is another improvement New York City is exploring. In Curitiba, Brazil—which pioneered BRT routes in 1974—features like these reduce waiting time at the station by at least 20 seconds per stop.

"It's a lot like riding the subway," Harder said. "But with fewer stops, and sunlight."



COMMUTER PROFILE

Staten Island to Brooklyn

Tony Licciardello laughs when asked how long he has commuted from his home in New Dorp, Staten Island, to his job as a court officer in Downtown Brooklyn.

"Oh, a long time," he says. "At least 20 years."

In that time, Licciardello has gotten his daily drive down to a science—one based on the desire to avoid the complex subway and bus route commute that links his borough to Brooklyn.

There is currently no direct transit option to shuttle the more than 2,600 New Dorp residents who commute outside Staten Island every day. Today, if Licciardello wants to leave his car at home, he has to take a local bus to the Staten Island Ferry, which drops him in Lower Manhattan, and then take the subway or bus to Brooklyn. The trip would take 90 minutes—and add an entire borough to his commute.

He opts for his car's relative ease over transfers and inevitable wait times—even though the travel time is roughly the same. But if there was a simpler transit route, Licciardello would leave his car, ending his constant search for parking and cutting down gas costs.

He will be getting the choice soon. A new Bus Rapid Transit (BRT) option from Hylan Boulevard in Staten Island—set to launch in 2007—will provide Licciardello with direct service to the subway—and shave 15 minutes off his commute time. Congestion pricing would give Licciardello a faster drive, too, removing some of the Manhattan-bound traffic that he battles with each day.

"Now it's just more convenient for me to drive," Licciardello said. "But I would definitely take public transit instead—even if it took a little bit longer."

Express Bus service, for example, or stopping some Express Buses in Downtown Brooklyn—might also increase ridership and help to reduce congestion. Changes in traffic patterns, signal timing or street alignment might eliminate "hot spots" where buses routinely get delayed. Because they rely on City-owned streets, good bus service requires close cooperation between the City and the MTA. The City will invite the MTA to work with it to identify a wide range of opportunities, big and small, where joint efforts might provide better transit service. *(See map on previous page: Express Bus Service Today)*

INITIATIVE 5

Improve local commuter rail service

We will seek to expand local use of Metro-North and Long Island Rail Road (LIRR) stations

For some neighborhoods in the Bronx, Brooklyn, and Queens, commuter rail is the best transit option. But local service at many of these stations is infrequent, and commuter rail costs even more even than express buses—especially if a transit transfer is necessary. Of the 33 commuter stations in the city, 15 do not have rush-hour service frequencies comparable to local stations in suburban counties. *(See map above: Commuter Rail Service)*

Capacity constraints drive some of this shortage; in some cases, expanding service will only be feasible after new projects such as East Side Access are complete. At others, higher ridership can come from improved connection from local buses. We will seek to work with the MTA to identify innovative ways that commuter rail service can serve Queens, Brooklyn and the Bronx.

INITIATIVE 6

Improve access to existing transit

We will facilitate access to subways and bus stops citywide

Every transit trip requires the passenger to get to the subway station or bus stop. But in many cases across the city, that can be almost as difficult as the journey itself.

Three main challenges prevent transit stops from being used to their full capacity: subway stations where the sidewalks are congested; bus stops where riders have to wait in the street under elevated rail structures; and bus stops along city streets that lack sidewalks. By making it easier for people to reach and use our existing transit system, we can encourage a broader mode shift in every borough.

All over New York are sites that require simple improvements to make existing transit options more accessible. For example, in the burgeoning neighborhood of Williamsburg, commuters increasingly ride bicycles to the L train. Today the line of bikes at the Bedford Avenue subway station stretches down the block, spilling across the narrow sidewalk. To relieve this condition, we will remove parking spaces, expand the sidewalk, and install more bicycle racks.

After evaluating all 468 subway stations, we have identified 24 areas in Brooklyn, Queens, and the Bronx that are not yet equipped to handle the rise in sidewalk congestion. These sites were selected in 2000, and work is underway to complete all of them by 2019.

In 42 other sites across the city, bus stops are tucked under elevated structures near subway stops. The columns interfere with traffic patterns especially when combined with high volumes of pedestrians. Buses cannot weave through the columns to reach the curb, which forces waiting riders to step into traffic to see if a bus is approaching. When the bus arrives, boarding frequently takes place on the street. To date, we have built raised islands that serve as bus stops at four locations. By 2021, we will complete work at all 42 locations. These upgrades can also include sidewalk extensions to make it easier to get to the stop.

In other cases, there is no sidewalk to the bus at all. For example, at Staten Island's Hylan Boulevard and Fairlawn Avenue, dozens of adults and school children need to cross the road daily to walk to school, work, or the bus stop, but there is no sidewalk along the eastern side of the road leading to the crosswalk or the bus stop.

The Sidewalks to Buses initiative focuses on providing sidewalks, crosswalks, bus waiting areas, and other pedestrian safety improvements to improve access at these locations. Priority will be given to areas where pedestrians are exposed to high-speed or high-volume traffic on their way to and from bus stops. On average, each location will require a quarter mile of sidewalk to provide a safe route. We plan to complete work at up to 15 different stops each year.

TRANSIT ACCESS INITIATIVE

INITIATIVE	LOCATIONS	COMPLETED/ UNDERWAY
Subway/Sidewalk Interface	24	2
Bus stops under Els	Up to 42	4
Sidewalks to Buses	2 pilots identified	0
TOTAL	**68**	**6**

Source: NYC Department of Transportation

INITIATIVE 7

Address congested areas around the city

We will develop congestion management plans for outer borough growth corridors

The vast majority of trips made in New York are not to Manhattan; even among commuters, nearly twice as many outer borough residents work outside of Manhattan as inside—1.56 million versus 841,000. As neighborhoods across the city grow, we must develop targeted plans to diffuse congestion across the city.

The main commercial stretch along Brooklyn's Church Avenue is one such area. This vibrant commercial district attracts shoppers arriving by car and transit, as well as local truck traffic. Double parking causes even more delays between Coney Island Avenue and Utica Avenue, and the B35 bus is slowed by traffic, encouraging more to drive rather than take transit.

We have identified nine corridors that experience this kind of road and transit congestion:

- Fordham Road (Bronx)
- White Plains Road (Bronx)
- Church Avenue (Brooklyn)
- Nostrand Avenue (Brooklyn)
- West 96th Street (Manhattan)
- West 181st Street (Manhattan)
- Northern Boulevard (Queens)
- Woodhaven Boulevard (Queens)
- Amboy Road (Staten Island)

Over the next two years, we will undertake an intensive study of each area, evaluating traffic congestion, truck traffic, pedestrian mobility, transit service, and current and future land use potential. When each study is finished, we will work with affected communities to complete customized plans that reduce traffic congestion, improve air quality, provide a safer environment for vehicular and pedestrian traffic, and improve quality of life.

Actions under consideration will include new bus, pedestrian and bicycle enhancements, changes to the road design, modification to parking rules to free up curb space, and technological upgrades like computerized signaling systems to facilitate traffic flow. Broader improvements, such as taxi or for-hire vehicle stands, increased transit service, and targeted traffic enforcement, could also be part of the solutions.

We will also identify broader congestion "Growth Areas" across the city, potentially spanning entire neighborhoods, and develop neighborhood-specific strategies using many of the same tools.

Promote other sustainable modes

Despite our dependence on subway, bus, and commuter rail service, opportunities exist to expand the use of two other modes of transportation: ferries and bicycles. Today only 55,000 people reach Manhattan island by ferry daily. And although many New Yorkers own bicycles, most consider cycling to be recreational, not a mode of transportation. As a result, we will work to expand ferry service and integrate it into the transit system, and promote broader bicycle use across the city.

For different reasons, bikes and ferries are highly sustainable modes of transportation. Ferries require little infrastructure and make use of space that is already there—our waterways. With modern engines and pollution control equipment, they can also be low-polluting forms of transportation. Nothing is as low-polluting as the human-powered bicycle, which can give many New Yorkers an alternative to the auto for short trips and a way to get exercise as well.

COMMUTER PROFILE

Co-op City to Lower Manhattan

Oscar Alvarado spends at least 720 hours—the equivalent of one month every year—commuting.

On weekday mornings, he leaves his apartment in Co-op City and boards the QBx1 bus, which takes him to the Pelham Bay station. From there, he rides the 6 train to 125th street, where Alvarado waits for the 4 or 5 train. Almost every morning, he lets one train go by—it's always too packed—and gets on the next, which takes him to Lower Manhattan.

"But I'd rather wait than get to work rumpled and frustrated," he said. "I don't get how other people push into the car like that."

In Co-op City, a neighborhood of 50,000 people living in 15,000 apartments, transportation is a serious topic. On any given morning, almost 14,000 people who work in Manhattan, like Alvarado, pour out of the Co-op City complexes and onto crowded local and express buses.

"The whole community here is a little isolated—and transportation improvements are really important," said Oscar Alvarado, climbing onto the bus.

Alvarado has lived in Co-op City for eight years, and his commute to work is 90 minutes each way. He has tried driving in, but the prospect of finding parking around his office in Lower Manhattan is too daunting. He has also tried commuting by express bus, but the ride only brings him to 23rd street.

"And then, I'd have to get off the express bus and walk to the 6 train, anyway," he said. "It's not an easy transfer, and not really a viable alternative."

Alvarado's voice perks up, though, when he is asked about the possibility of a new Metro North line. By 2013, Metro North trains could leave from Co-op City, a quick shuttle ride from Alvarado's home. With the new service, it would take commuters just 30 minutes to glide into Penn Station from Co-op City. Riding Metro North would cut Alvarado's commute time by a third. The project is relatively low-cost for rail transit—under $2 billion—but it cannot happen until the LIRR's East Side Access project frees up space in Penn Station.

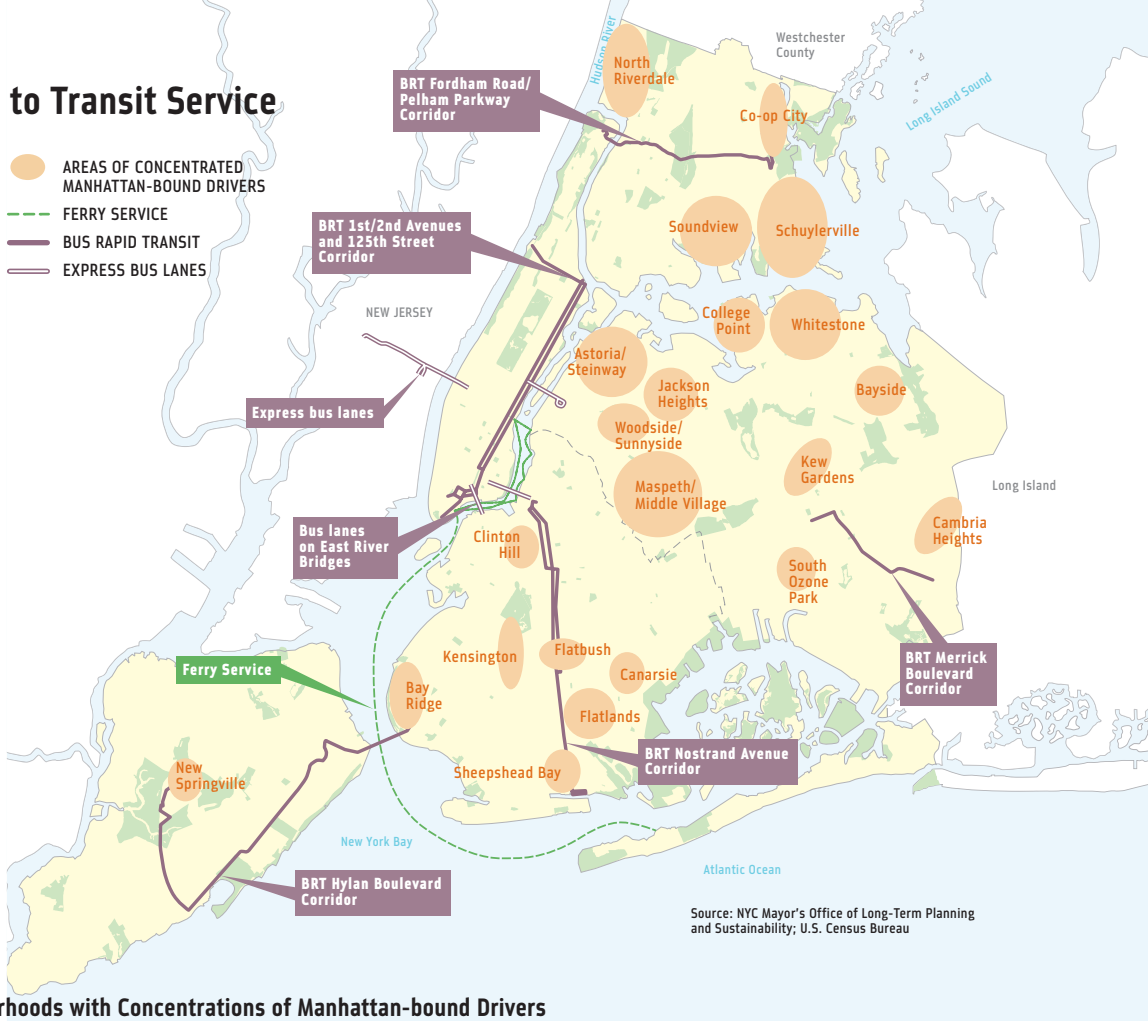
"Going straight to Penn Station, right near all the lines that take me to work, would be just like a regular transfer," Alvarado said. "And it would be quicker, and more comfortable. That would be a major improvement."

Near-Term Improvements to Transit Service

In all New York City neighborhoods, a majority of Manhattan-bound commuters take transit. But the areas shown in this map have higher concentrations of drivers to Manhattan than any other parts of the city. Many of these areas do not have rail transit service; others have subway or rail service that does not meet all residents' needs. With only slight enhancements to the system more people in these areas would choose transit over driving. These enhancements would emphasize connections to the subway or commuter rail system where feasible; minimize transfers; improve reliability; and use existing bus routes and corridors where possible.

Intermodal connections improve the timing or the location of bus stops to make an existing two-seat ride more convenient. **Rerouting existing bus routes** can bring buses closer to potential riders or make routes more direct. **Bus prioritization** can change traffic lights when buses approach to speed bus travel. **Improving subway and rail station access** can cut walking distances or make entrances easier to navigate. On some routes, **bus frequency** is too low for the potential demand and could be increased; on others, frequency is sufficient to allow **skip-stop** or **limited-stop service** that would cut travel times. **New bus routes** would increase options within the system—but are the most expensive of these short-term measures. In addition, many of these neighborhoods will benefit from **other projects** outlined in this plan, ranging from new commuter rail service to BRT.

The table below outlines which of these strategies we would recommend for each neighborhood.

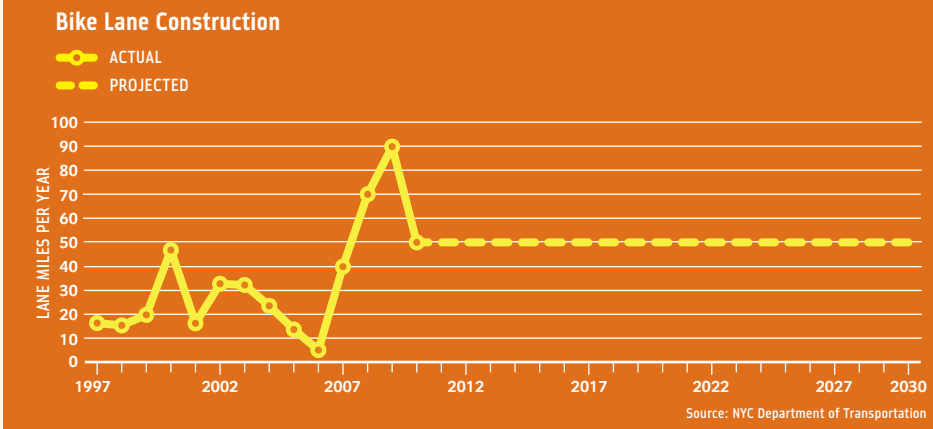


Source: NYC Mayor's Office of Long-Term Planning and Sustainability; U.S. Census Bureau

Potential Improvements for 22 Neighborhoods with Concentrations of Manhattan-bound Drivers

NEIGHBORHOOD		INTERMODAL CONNECTION	RE-ROUTING OF EXISTING BUS ROUTE	BUS PRIORITIZATION	SUBWAY AND RAIL STATION ACCESS	INCREASE BUS FREQUENCY	SKIP STOPS/ LIMITED STOPS	NEW BUS ROUTE	OTHER PROJECTS
BRONX	Co-op City	●							Metro-North to Penn Station; BRT
	North Riverdale	●							Metro-North to Penn Station
	Schuylerville	●		●					
	Soundview	●		●	●				
BROOKLYN	Bay Ridge		●	●			●		
	Canarsie	●	●			●			Nostrand BRT
	Clinton Hill	●			●				Bus Lane on Manhattan Bridge
	Flatbush	●		●					Nostrand BRT
	Flatlands	●		●		●	●		
	Kensington				●				
	Sheepshead Bay				●				Nostrand BRT
QUEENS	Bayside	●	●			●			LIRR East Side Access
	Cambria Heights	●	●	●					Merrick Blvd BRT
	College Point	●		●				●	
	Jackson Heights	●	●		●	●	●	●	Bus Lane on Queensboro Bridge
	Kew Gardens	●	●	●					LIRR East Side Access
	Maspeth / Middle Village / Ridgewood		●		●				
	South Ozone Park	●	●	●	●				
	Astoria / Steinway		●	●	●				Bus Lane on Queensboro Bridge
	Whitestone		●						
	Woodside / Sunnyside	●						●	LIRR East Side Access
STATEN ISLAND	New Springville							●	Hylan Blvd BRT

Source: NYC Mayor's Office of Long-Term Planning and Sustainability



INITIATIVE 8

Expand ferry service

We will seek to expand service and improve integration with the city's existing mass transit system

Along Newtown Creek, which separates Brooklyn and Queens, the transformation of New York's waterfront is clear. To the north, apartment buildings are rising and land is being cleared for thousands of additional units of housing at Queens West, many of which will be affordable to middle-income families. To the south sit the low-lying factories and warehouses of Williamsburg and Greenpoint, which are being converted into a waterfront esplanade, parks, and housing.

Across the city, more than 60 miles of largely-abandoned waterfront land is being reclaimed for recreation and new communities. But some of these neighborhoods lack the basic transportation infrastructure required for sustainable growth. In some areas, the nearest subway stop is more than three-quarters of a mile away. Where there is service, the trains and buses are increasingly crowded as growing numbers of commuters use stations closest to Manhattan.

Ferries and water taxis can help solve both of these problems. In addition, ferries have proven that they can provide critical backup transportation for the city during emergencies, as they did on 9/11 and during the 2003 blackout.

That's why we will seek to expand ferry service to emerging neighborhoods across the city and seamlessly integrate it into the city's transportation network.

The City will seek to initiate a new privately-operated ferry system along the East River that will connect developing areas of Brooklyn and Queens with Midtown and Lower Manhattan. This new service would connect ferry landings at Queens West, Greenpoint and North and South Williamsburg, with landings at Pier 11 (Wall Street) and East 34th Street in Manhattan. In addition, we will seek to pilot service between Manhattan and the Rockaways in Queens. Other parts of the city where ferry service may make sense—such as southern Queens, the south shore of Staten Island, and the Bronx—will be evaluated based on potential ridership and financial flexibility.

Ferry service is most effective when it connects riders with land-based transit bringing them close to their inland destinations. That is why we will work with the MTA to extend bus routes to ferry docks from Midtown. We will also explore the possibility of using BRT or other fast service on crosstown routes for more efficient connections, especially across 34th Street and 42nd Street.

Finally, for ferries to be considered an effective component of the city's mass transit system, they must be treated that way. That is why ferry passengers must be able to use their MetroCards for ferries and the connecting bus service. We will work with the MTA and the ferry companies to achieve this intergration.

INITIATIVE 9

Promote cycling

We will pursue strategies to encourage the growth of cycling across the city

Cycling also offers an environmentally-friendly and space-efficient way to travel around the city. Other cities have embraced cycling as emission-free, low-cost travel mode that promotes a healthy lifestyle—and one that New Yorkers are increasingly embracing. Cycling in the city is estimated to have increased 75% from 2000 to 2006. But there is still plenty of room to grow; less than 1% of New Yorkers commute to work by bicycle. *(See case study: Cycling Emerges Around U.S.)*

We will complete the city's 1,800-mile bike master plan

In order to reduce traffic and reach our clean air and greenhouse gas reduction goals, New Yorkers should be given the option of reaching their jobs and major city destinations through cycling. That is why we will dramatically accelerate the implementation of the City's 1,800-mile bike lane master plan, to ensure that the entire system is in place before 2030. *(See chart above: Bike Lane Construction)*

CASE STUDY

Cycling Emerges Around U.S.

When Brean Martin needs a ride across Chicago, he plops his bike on a rack between a bus's headlights.

"Now, every bus has carriers," said Martin. "I get the feeling it helps bus drivers be more careful about bikers on the road."

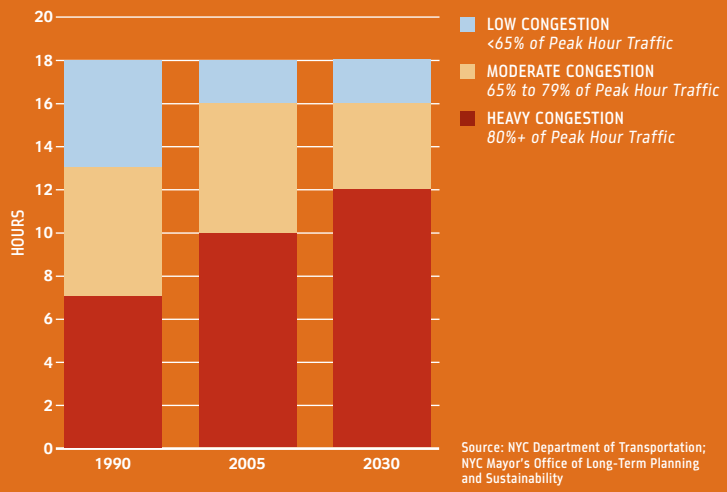
Cities across the nation are looking to the two-wheeler as a key to creating sustainable, enjoyable public transportation. They're planning miles of bike paths, starting public bicycle programs, and zeroing in on safety measures. Seattle, Portland, and Boulder have instituted major networks. Baltimore and Philadelphia are on the road to better biking, too.

By 2015, Chicago wants at least 5% of all trips less than five miles to be on bicycle. The city has discovered that shifting trips to bikes can become a congestion management strategy. It has already installed more than 160 miles of bike lanes throughout the city.

Brean Martin thinks car congestion has already lightened up.

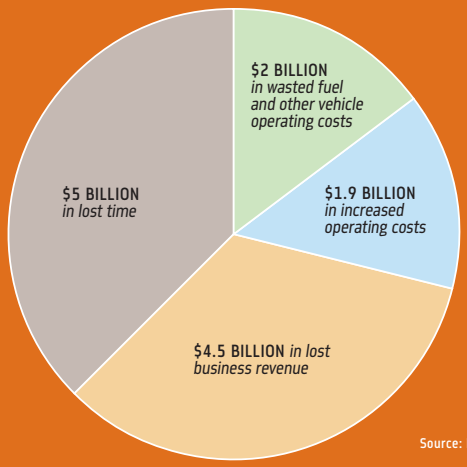
"It used to be that I'd go flying on my bike through dead-stopped traffic," said Martin. "Now, the cars actually move."

Hours of Congestion



Source: NYC Department of Transportation; NYC Mayor's Office of Long-Term Planning and Sustainability

Annual Cost of Congestion to the New York Region



Source: Partnership for New York City

The plan includes 504 miles of separated bike paths (Class 1 facilities) and 1,296 miles of striped bicycle lanes or markings reminding drivers and cyclists to share the road (Class 2 and 3). To date, only 420 miles have been constructed.

We will complete Phase 1 of the plan in 2009, which will add 200 lane miles in targeted areas across the city—with the first 40 finished by June 2007.

We will prioritize areas with high demand, building connections between existing portions of the network, and strengthening access to parks through special bike paths known as greenways. These greenways not only offer their own recreational benefits such as biking, skating, and walking throughout our city's park system; they can also open up new areas of parkland.

Phase 2 and beyond will complete the remaining bike lanes, resulting in 1,800 total lane miles of bicycle facilities in New York City.

BIKE MASTER PLAN STATUS

LANE MILES	CLASS 1	CLASS 2	CLASS 3	TOTAL
Built	200	176	44	420
Planned for 2030	42	1,076		1,380
TOTAL	504	1,296		1,800

Source: NYC Department of Transportation

We will facilitate cycling

In addition to implementing the master plan, we must provide support for city cyclists and encourage New Yorkers to explore this form of transportation. That means improving public education on the benefits of cycling and on safety issues, increasing necessary bicycling infrastructure such as bike racks and lockers, and improving observation of traffic and bicycling laws.

Cyclists often point out that their main concern is having safe places to store their bikes. To solve this problem, the City's Department of Transportation (DOT) will continue the CITYRACKS program by installing 1,200 additional on-street bicycle racks throughout the City by 2009, and commit to that level of installation until every neighborhood has adequate bike parking. We will also pursue legislation to require that large commercial buildings make provision for bicycle storage either on site or reasonably nearby.

Improve traffic flow by reducing congestion

The city's quality of life and economic prosperity depend on a transportation system that can meet demand. That means we must use our streets more efficiently if we are to absorb millions of new residents, workers, and tourists.

To achieve this goal, we will expand proven strategies to smooth traffic flows; and we will encourage commuters to shift from their cars onto an improved transit system, while providing better service for those who choose to continue to drive. *(See charts above: Hours of Congestion and Annual Cost of Congestion to the New York Region)*

INITIATIVE 10

Pilot congestion pricing

We will seek to use pricing to manage traffic in the Central Business District (CBD)

Over the last 30 years, even significant improvements in our subway system have not substantially changed the way New Yorkers get to Manhattan. Despite enhancements in safety, efficiency, and aesthetics, the percentage of drivers has remained essentially unchanged.

On a given workday, the Manhattan CBD is home to nearly 2 million workers from around the region, hundreds of thousands of tourists, and several hundred thousand residents. Cars compete for the road with buses, trucks pedestrians, cyclists and taxis. Vehicles trapped in traffic spew pollution into the air, putting the health of those living near congested roads at risk; and the resulting jams cost the region more than $13 billion dollars every year. As our population grows by another 900,000 people, we add more than 20 million visitors annually, and 750,000 new jobs—many concentrated in the CBD—the consequences of congestion will become ever more severe.

The strategy that has emerged around the world as the most effective tactic to this gridlock is congestion pricing, a system that charges drivers a fee for entering a city's center. London, Stockholm, and Singapore all employ congestion pricing. Here in the United States, the U.S. Department of Transportation has also encouraged cities to undertake market-based congestion reduction initiatives. *(See case study on facing page: London Congestion Pricing)*

In every case where it has been implemented, congestion pricing has been successful at reducing traffic both within the "congestion zone" and outside it, speeding bus service, decreasing delivery times, improving air quality, and cutting greenhouse gas emissions, **with no material impact on the economy**, including retail activity in the zone in which the charge applies.

Key to the success of congestion pricing in those cities—and the widespread acceptance of initially reluctant businesses and residents—is the fact that congestion pricing is only one part of an overall commitment to increase investment in mass transit.

That is what we propose for New York. We believe a thoughtfully designed congestion pricing program should be part of a solution to the regional and city-wide transportation gridlock we will be facing. Its proceeds would be dedicated to funding billions of dollars of transportation improvements, including immediate enhancements to some of New York's least transit accessible communities. *(See following page: New York City's Congestion Pricing Plan)*

Summarized below is an illustrative example of how congestion pricing could be implemented and its impact. The details would have to be determined through a collaborative process between the City and the State, because State legislation would be needed to enable the City to impose a fee and give the City the right to fine violators. State law could authorize the City to define the pricing area, the amount of the charge, the hours it would apply, and the fines for failure to pay, or it could specify those details in the legislation. The legislation would also need to specify the type of environmental review that would be necessary.

Given its successful track record in other major global cities, we seek to pilot congestion pricing in New York for a test period of three years. The best way to predict whether it will work—and whether the benefits outweigh the inconveniences—is to try it. Further, we believe that a pilot could be undertaken with no outlay of City or State funds, but leveraging Federal and private dollars.

Operating congestion pricing

Passenger vehicles entering or leaving Manhattan below 86th Street during the business day (weekdays 6 am to 6 pm)—with the exception of the FDR Drive, the West Side Highway, and West Street—would pay an $8 daily fee. Trucks would pay $21. Autos that drive only within "the Zone" would pay half price. The charge would apply to all vehicles, except emergency vehicles, those with handicapped license plates, taxis, and for-hire vehicles (radio cars).

Vehicles using E-Z Pass that travel through MTA or Port Authority (PA) tolled crossings on the same day would pay only the difference between their MTA or PA tolls and the congestion charge, so that drivers don't have an incentive to detour across free bridges. Because roads on the periphery of Manhattan will not be in the Zone, trips around the Zone (for example, from Harlem to Brooklyn) would not be charged.

Payment would involve no toll gates or waiting areas. The technological backbone of the system would be E-Z Pass, which relies on high-speed sensors, and is used by more than 70% of New York area drivers. The charge would appear on drivers' E-Z Pass statements.

For those drivers without E-Z Pass, their license plates would be checked automatically by cameras mounted on traffic light poles, with payment options available through Internet, the telephone, or at participating retail outlets. Drivers would have two days to pay the charge.

Impact of congestion pricing

The main benefit of congestion pricing would be reduced traffic congestion. Traffic within the Zone would decrease 6.3%. Speeds are projected to increase 7.2%. The impact would also be felt in the other boroughs, since the number of cars passing through other neighborhoods on their way to Manhattan will decline. This is especially the case on key thoroughfares leading to bridges, including Flatbush Avenue in Brooklyn and Queens Boulevard in Long Island City. (One study suggested that 43% of all traffic in downtown Brooklyn and 57% of rush-hour traffic in Long Island City is bound for Manhattan). Overall, travel speeds in all four boroughs would get better due to congestion pricing in Manhattan.

The 4.6% of New York City residents who drive to work in the Zone would pay a daily charge less than the cost of commuting by Express Bus, and they would have a faster commute than today. Everyone who drives, especially in Manhattan, would experience the benefits of reduced traffic and higher speeds. Workers and companies whose income depends on providing services in Manhattan would be more productive. A plumber who currently spends a quarter of his day sitting in his van in Midtown traffic traveling from site to site would be able to do more work every day—increasing his income far more than the $8 fee he pays. Delivery firms would have fewer packages delayed. Buses would run faster. Taxi drivers would carry more fares in a shift. These benefits would lower costs of doing business in the city, and benefit all New Yorkers.

The implementation of short-term improvements would be essential to the success of any congestion pricing program and to the transit infrastructure described earlier in this chapter, including: bus rapid transit, improved express bus service, dedicated bus lanes on bridges, and new ferry service, especially to areas of the city that lack convenient mass transit access to Manhattan today. In many cases, these improvements would be put in place prior to implementation of congestion pricing.

CASE STUDY

London Congestion Pricing

In 2000, headlines often compared the speeds of central London traffic to Victorian horse-and-buggies. And so did Londoners.

"Some days, it took me almost an hour to drive six miles from home to work in the morning," said Gregory Phillips, an architect who works in the city's West End.

But when Mayor Ken Livingstone introduced an internationally proven congestion-mitigation strategy he was named the city's "Deadliest Enemy" by the London *Daily Telegraph.*

The strategy was congestion pricing—a plan to charge drivers a daily fee for the use of London's busiest roads during business hours.

Opponents of the congestion charge argued the charge would "strangle retailers" in the area. More than half of Londoners believed that the fee would make no difference in traffic patterns at all. Westminster City Council called on the High Court to order a full-scale public inquiry into the program, and more than 60% of the city's population stood against the idea.

Despite the skepticism, in February 2003, London began charging cars Ł5 ($10) to access central London's most congested streets.

Traffic delays in London have plunged substantially—by 30%. Road speeds have increased 19% from the introduction of congestion pricing. A feared drop in retail spending never materialized.

Since the program started, more than $360 million has been funneled into expansions and improvements of mass transportation—improvements that are attracting more Londoners to public transit. Bus ridership has increased 30% during peak periods The extra road space has been reshaped into stunning public spaces like the new plaza at Trafalgar Square.

Now, Gregory Phillips rides his bicycle to work. "Since the introduction of the congestion charge, I find that I cycle in almost every day, and I love it," he said.

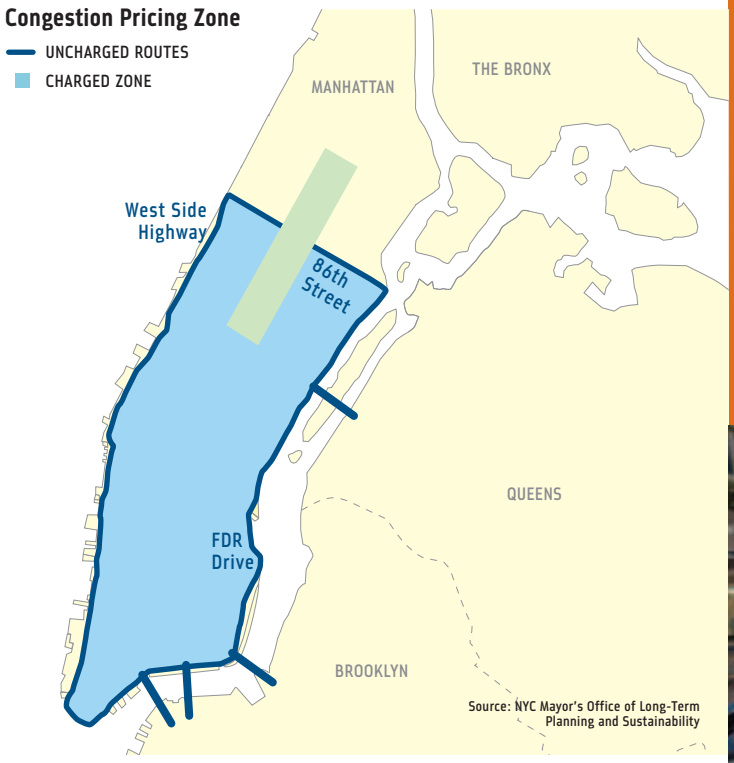
In fact, Phillips said, his commute has actually become much quicker. "If I'm cycling, I can get into the office in 35 minutes."

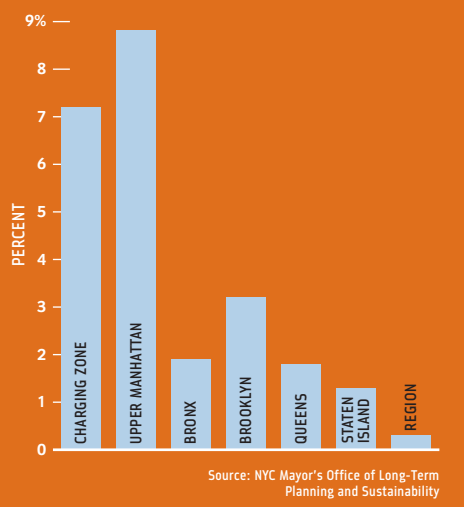
Now that's an improvement.

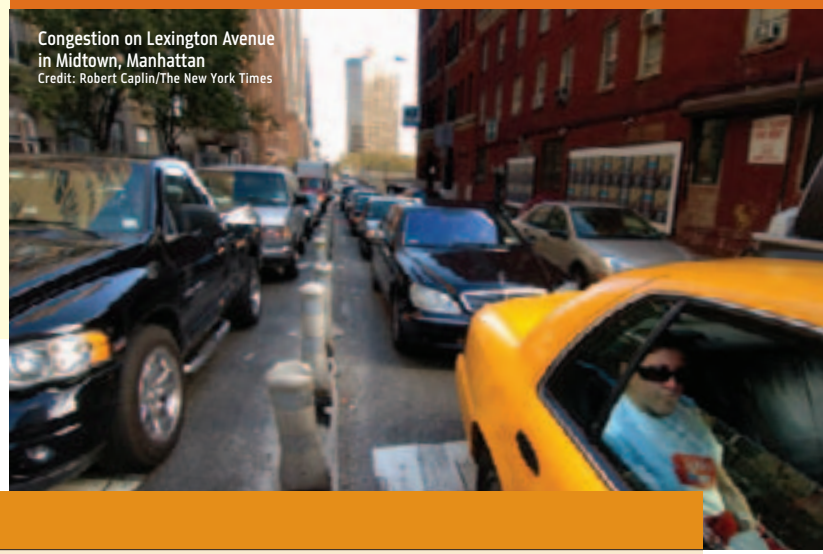
CHANGE IN TRAFFIC WITHIN LONDON'S CHARGING ZONE AFTER CONGESTION PRICING	
Automobiles	–34%
Heavy trucks	–7%
Vans	–5%
Buses	+21%
Taxis	+22%
Bicycles	+28%
ALL VEHICLES	**–12%**

Source: Transport for London

New York City's Congestion Pricing Plan






Congestion on Lexington Avenue in Midtown, Manhattan
Credit: Robert Caplin/The New York Times

CONGESTION PRICING FEATURES	
Zone boundaries	Manhattan below 86th Street, except • West Street and West Side Highway • FDR Drive • Battery Park Underpass • Queensboro, Williamsburg, Manhattan andBrooklyn Bridges and their approaches.
Hours	6 am–6 pm, Monday–Friday (no charges on weekends)
Charges: autos	$8 daily charge to enter, leave, and move within the zone during charging hours $4 daily charge for travel only within the zone during charging hours
Charges: trucks	$21 daily charge to enter, leave, and move within the zone during charging hours $5.50 daily charge for travel only within the zone during charging hours
Trips bypassing the Zone	Drivers do not pay unless they enter the zone. For example, driving from Brooklyn to the Bronx on the Brooklyn Bridge and FDR Drive would still be free
Toll rebates for E-Z Pass users	E-Z Pass users paying bridge and tunnel tolls to enter the zone will be credited the amount of their round-trip tolls that day, up to $8. For example, an E-Z Pass driver who now uses the Battery Tunnel to enter and leave Manhattan will pay no additional charge, because the current round-trip toll they pay is already $8
Exemptions	No charges for: • Handicapped license plates • Emergency vehicles and transit buses • Yellow taxis and livery cabs
Collection technology	At-speed E-Z Pass readers will allow fee collection without slowing vehicles down. Vehicles not equipped with E-Z Pass will be recorded by cameras and drivers can pay the fee by phone, internet or at participating retailers within 48 hours.
Revenues	All net revenues will be dedicated 100% to transportation investments through the SMART Financing Authority
Operating entity	NYC Department of Transportation will control the system, which will be built and maintained by a contractor yet to be selected

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Over time, more and more commuters would benefit from the longer-term investments in mass transit, 50% of which would be funded by the nearly $400 million net revenues of congestion pricing in its first full year.

Although areas near the congestion pricing zone should experience reductions in traffic due to fewer drivers passing through on their way to the Zone, we would work with local communities if it seems that they would be impacted by drivers seeking to avoid the congestion pricing charge. Possible solutions include parking permits for residential neighborhoods and an expansion of the Muni meter program in commercial areas.

Overall, 94,000 travelers are projected to take advantage of new and improved transit choices, achieving the city's first significant mode shift in decades. Only 1.4% are expected not to take the trip into the Zone at all because of the congestion charge. The majority of these will travel instead to destinations in Upper Manhattan and the outer boroughs, helping businesses in those areas. As a result, the overall economic impact of the congestion charge is expected to be neutral to positive, consistent with the experience of cities where congestion pricing is in operation.

INITIATIVE 11

Manage roads more efficiently

We will increase the use of Muni meters within the city and develop an integrated traffic management system for our regional transportation network

We will expand the use of Muni meters

Muni meters, first introduced in New York in 1996, offer numerous advantages compared to traditional single-space parking meters. For drivers, they increase parking capacity by allowing cars to park closer together. They also enable the city to improve traffic flow by charging vehicles progressively higher fees for longer stays, encouraging shorter stays and more turnover. This increased turnover reduces double-parking and cuts the amount of time drivers spend "cruising" for a parking space. The meters also allow for more flexible payment options, accepting coin, credit card or city parking cards, and they create more sidewalk space for pedestrians—one Muni meter can replace up to six single space meters.

While Muni meters are currently only in use in certain areas, DOT will introduce them in business districts across the city, completing installation in all possible locations by 2011.

We will create an integrated traffic management system

The region's congestion problems are compounded by inefficiencies and lack of coordination among agencies and travelers. Poorly timed signals can cause backups, and drivers are often not alerted to traffic jams until they are actually sitting in them.

That's why the City has launched a five-year plan to unify and expand the information systems on our transportation network and enhance coordination throughout the region. Although we have utilized Intelligent Transportation Systems (ITS) for years through the use of cameras and electronic signage on highways, the real benefits can only be achieved when the information is centralized and coordinated.

Also in 2008, the New York Police Department, New York State Department of Transportation and the City's DOT will open the Joint Transportation Management Center, in Long Island City, which will enhance our ability to track and coordinate responses to traffic incidents.

But coordination is only the beginning; significant improvements require significant investments in technology. We will continue technological upgrades. By 2009, we will electronically control the timing on more than 70% of the city's traffic signals, allowing us to respond in real-time to emerging traffic conditions; by 2012, all of the city's highways will be equipped with ITS technologies.

Expanded technology and coordination will improve our ability to respond to traffic incidents, manage traffic congestion, and deliver information to drivers in real time.

INITIATIVE 12

Strengthen enforcement of traffic violations

We will improve our ability to enforce traffic laws

The number of vehicles is not the only contributor to congestion. Drivers who violate traffic laws make congestion worse. While the City undertakes focused efforts to increase enforcement, we must make broader, more systematic changes to enhance enforcement. We will undertake two initiatives and advocate for State action on a third to ensure that many drivers do not suffer from unnecessary congestion due to the illegal behavior of a few.

We will expand the number of Traffic Enforcement Agents

There are an estimated 800 intersections around New York City—in all five boroughs—where the presence of traffic enforcement agents (TEA) will be beneficial—not as ticket writers, but as traffic directors. The NYPD currently has approximately 500 "level 2" traffic enforcement agents whose main role is to direct traffic. But on any given day, the majority wind up not controlling the flow at busy intersections, but ensuring the movement of traffic around construction sites and other disruptions. To provide the coverage that will keep traffic moving, the NYPD will increase the force of level 2 TEAs by 100 agents this year, to be followed by further increases in the future.

We will enable all TEAs to issue blocking-the-box tickets

A major cause of true gridlock is drivers choosing to "block the box"—to cross an intersection even if there is no room on the other side. But writing a "blocking-the-box" ticket is currently a state-regulated moving violation, which may only be issued by police officers and selected traffic enforcement agents. We will seek to create a new parking violation that will allow both police officers and all TEAs to write block-the-box tickets faster, which will encourage more vigilant ticketing of violators.

We will expand the use of traffic enforcement cameras

Along with blocking the box, another significant cause of congestion—and a major safety hazard—is the running of red lights. Currently, New York State law allows the City to use only 100 red light cameras among the city's 12,000 signalized intersections. Further, cameras are not allowed to be used for speeding violations.

To improve the flow of traffic and to improve safety on our streets, we will seek state authorization to expand the use of red light cameras dramatically, and to begin using them to enforce speeding laws. We will also use the cameras more effectively, by rotating them around the city, so that drivers will not be able to predict where they are located. In this way, we will change driver behavior and at the same time minimize the chance that drivers will cause accidents by stopping short at the last minute in order to avoid receiving a summons.

INITIATIVE 13

Facilitate freight movements

We will work to expand options for freight movements

One of the major ways that New Yorkers bear the costs—economic, health, and social—of congestion is in the movement of freight. Delays to deliveries increase the cost of the goods sold in New York stores. Congestion—and inconsistent tolling policies—lead trucks to take circuitous routes through neighborhoods. Deliveries require curbside space, and when trucks can't find it they often cause more congestion, either by cruising for a space or by double parking. Congestion is even threatening the status of John F. Kennedy International Airport (JFK) as one of the nation's leading airfreight hubs—and the airport is one of the largest employers in Queens. Still, for the vast majority of deliveries to New York businesses and homes, trucks are the only viable option, even in the long term.

The City and its regional partners are undertaking several efforts to improve freight access across the region. In some cases, capacity would be added; more often, we would be attempting to manage the capacity we have more wisely, for the benefit of the truckers and the neighborhoods they drive through. For example, the results of the DOT's Truck Route Study will improve the overall management of truck traffic in New York City leading to improved efficiency of truck traffic, while at the same time working to keep non-essential truck traffic out of residential neighborhoods. Muni-meters will create curbside space to allow truckers to make deliveries more easily. Better traffic management and information will speed up all types of traffic. Congestion pricing will apply to trucks, but will also create an incentive for night time deliveries and eliminate the practice of trucks passing through Brooklyn and Manhattan to avoid the one-way tolls on the Verrazano-Narrows Bridge.

Two additional initiatives will be specifically focused on freight movement, but will also have benefits for other travelers.

We will improve access to JFK

Congestion en route to JFK is bad and getting worse, making the city less convenient and business-friendly. It also reduces the airport's competitiveness: in the last decade, JFK has been losing cargo business to airports outside the region, primarily due to delays and congestion on the road leading to the airport.

In June 2006, the City, in partnership with the Port Authority, created a private/public task force focusing on improving roadway access to JFK for passengers, employees and cargo. It has recently issued several short-term recommendations. These include: marketing the Cross Island Parkway as alternative to the Van Wyck Expressway for non-commercial vehicles; improvements to the Van Wyck Expressway; allowing 53' trailer access to JFK; and providing a southern route to JFK for commercial vehicles. We will pursue these recommendations, and explore the long term solutions the task force recommends in the future.

We will explore High-Occupancy Truck Toll (HOTT) Lanes

Around the world and in several states, truck traffic has been accelerated by the creation of new lanes dedicated to trucks, which pay for themselves through tolls charged for traveling on these lanes. In many cases, high-occupancy vehicles are allowed access for free, and in some, those driving alone can choose to pay a variable toll to travel on them. Thus, they are referred to as "HOTT" Lanes—for High-Occupancy Truck Toll.

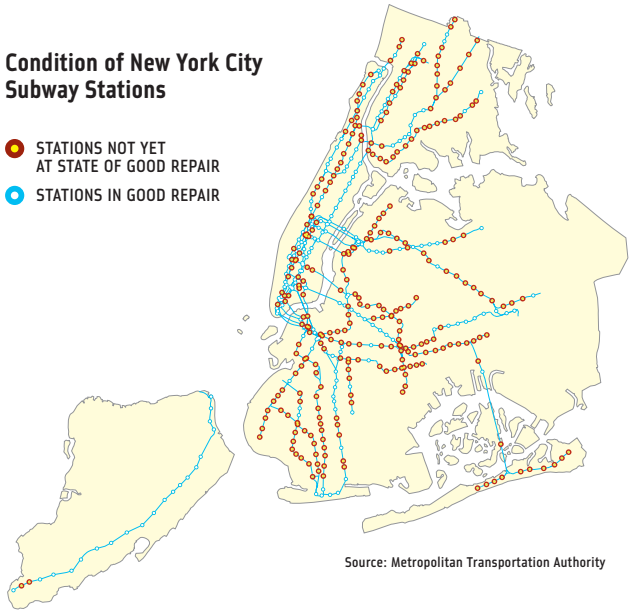
On several of New York City's main highways, the opportunity exists to explore this concept, using medians and in some cases service roads for additional lanes. Key bottlenecks where trucks encounter—and cause—congestion include the Cross-Bronx Expressway, the Staten Island Expressway, the Van Wyck, and the Brooklyn-Queens Expressway.

The City will work with and support the New York State Department of Transportation (NYSDOT), which controls these roads, to explore these self-financing lanes.

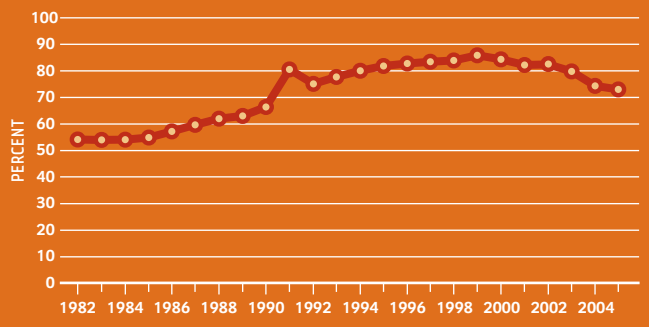
Achieve a state of good repair on our roads and transit system

We have come a long way toward improving the condition of our aging and fragile transportation network. But we must not forget that we have not achieved the state of good repair on our roads, subways, and rail network that we have sought for 30 years. In fact, the need for additional capital is serious, if largely unseen. *(See map on facing page: Condition of New York City Subway Stations)*

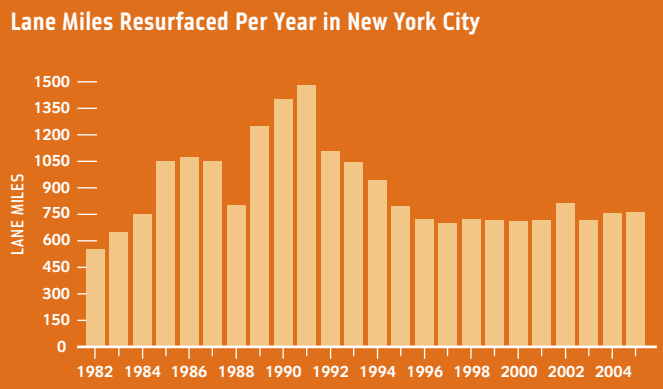
That's why, even as we meet our new expansion needs, we must continue to vigilantly pursue a state of good repair—and preserve the progress that has been made. Doing so will not only prevent the breakdowns that cause crippling delays, but also contribute to our complementary goal of increasing capacity and improving travel times.



Source: Metropolitan Transportation Authority



Source: NYC Department of Transportation



Source: NYC Department of Transportation

INITIATIVE 14

Close the Metropolitan Transportation Authority's state of good repair gap

We will seek a grant from the SMART Authority to cover the MTA's funding gap

In 1981, the MTA halted all expansion projects until the transit system could be brought back into a state of good repair. The goal was to restore all system components so that they could start being upgraded on a normal replacement schedule—before they started to fail. The next year, the MTA launched its first five-year capital plan—an attempt to establish long-term priorities for renewing our deteriorated transit system. Since that decision, New York's transit network has undergone a renaissance. The dedication of the MTA's leadership and staff have made it one of the core components of New York City's recovery.

But even with the progress that has been made, the MTA system is still nearly $15 billion away from a state of good repair, only $5.5 billion of which has a dedicated source of funding—leaving a gap of $9.5 billion that will begin in 2010. More than 60% of our subway stations remain in disrepair. Fan plants, which remove smoke from tunnels during fires and other emergencies, won't be fully upgraded until at least 2028. Almost half of our tunnel lighting does not meet current lighting safety standards, or have additional power sources to stay on in case of a blackout. Last October, there were 514 weekday train delays due to "signal trouble."

Obsolete equipment has capacity consequences as well; older signal technology allows fewer trains to be run safely on the same track than modern systems. Modernizing these could dramatically improve service on crowded lines such as the E train. The MTA has invested $288 million to test its first computerized signaling system on the L line—including electronic messaging boards alerting passengers of train arriving times—but we are billions away from modernizing the full system.

The challenge is that the MTA is chronically under-funded. Every five years, it develops a capital plan and then has to ask the State for the funding sources to cover the costs. We believe that achieving good repair is as fundamental as expanding the system, and will seek to have the SMART Authority provide the MTA with a one-time grant to cover its unfunded need to achieve a full state of good repair.

INITIATIVE 15

Reach a state of good repair on the city's roads and bridges

We will seek a grant from the SMART Authority to fund accelerated capital repairs and upgrades

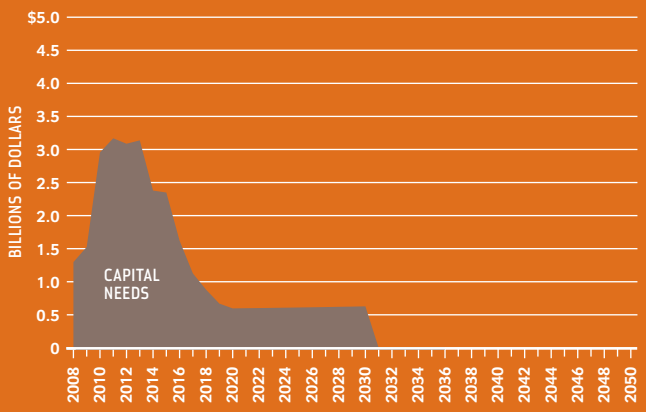
During the 1970's fiscal crisis, the City's road resurfacing efforts virtually stopped. Repaving was limited to our principal arterials, which received a lower quality of resurfacing than would be acceptable today. New layers of asphalt were simply laid over the older, damaged sections and sealed up. Each new layer caused the road level to rise closer to the curb. To avoid having streets at the same level as the sidewalks, repairs were simply avoided longer.

As the city's budget crisis eased, New York restored funding for street repair. Using new equipment, as well as additional personnel and private contractors, resurfacing increased through 1991, and the roads steadily improved. *(See chart above: Lane Miles Resurfaced Per Year in New York City)*

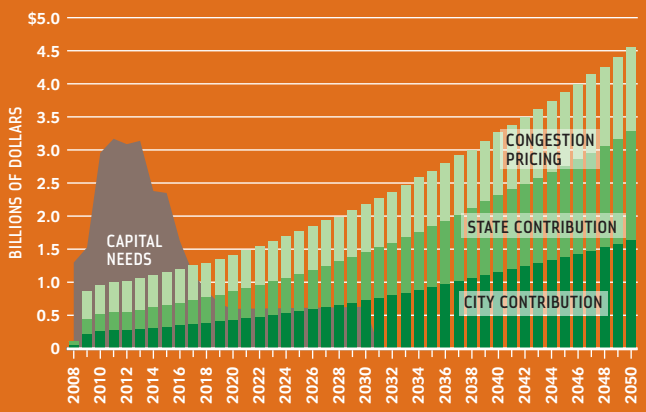
But since then, the average yearly resurfacing has fallen back below what was needed to maintain the quality of the city's streets. To keep pace with the wear of daily travel, we must resurface approximately 1,000 lane

How the SMART Financing Authority Would Fund Regional Transportation Projects

Expenditures



Expenditures and revenues



miles of its roads per year. In the past 15 years we have averaged only 800 lane miles. This under-investment has resulted in a consistent decline in street assessment ratings, to a current low, where only 69.9% of our streets are rated "good" or better. *(See chart on previous page: Lane Miles in Good Repair in New York City)*

We will reverse this trend by increasing the City's street resurfacing output with a limited SMART grant paid out over 20 years.

We will also seek to improve our efficiency by increasing the use of recycled asphalt pavement (RAP). With RAP the City takes the asphalt that is about to be removed and recycles it as fresh asphalt. RAP has the potential to replace as much as 50% of the new material we use for asphalt. In addition to reducing our waste disposal needs, this will cut down on truck trips and on the need for new aggregate and asphalt cement.

The City has done a better job at maintaining the 787 City-owned bridges and tunnels that connect the five boroughs. After the Williamsburg Bridge was closed in 1988 for emergency repairs, the City began a significant rehabilitation program and is in the process of completing all deferred maintenance. But with more traffic every year, the City's bridges require significant periodic capital upgrades and replacement. We will not substitute that work for routine maintenance, but we will seek a SMART Fund grant to provide enough capital to allow the needed, but costly upgrades necessary to keep our bridges safe.

Develop new funding sources

There is wide agreement on a series of projects that would bring mobility to our city. But despite impressive recent funding commitments, none of them has actually secured enough financing to be completed. For all the projects outlined in this plan, the combined budget gap is $30.9 billion. And the longer it takes to fund these projects, the higher the costs—so the combined budget gap will grow. *(See chart on facing page: Projects Financed through the SMART Fund; see maps on page 96: Rail and Subway Conditions)*

Good planning is not enough to secure the future of our city; we must be willing to identify, organize, and raise the financing that is required to build the things we need. To that end, we will work to create a dedicated, regional fund to finance our needed transportation infrastructure, tapping new sources of revenue as well as dedicated commitments from existing sources.

INITIATIVE 16

Establish a new regional transit financing authority

We will seek to create a SMART Financing Authority to advance new projects and achieve a state of good repair

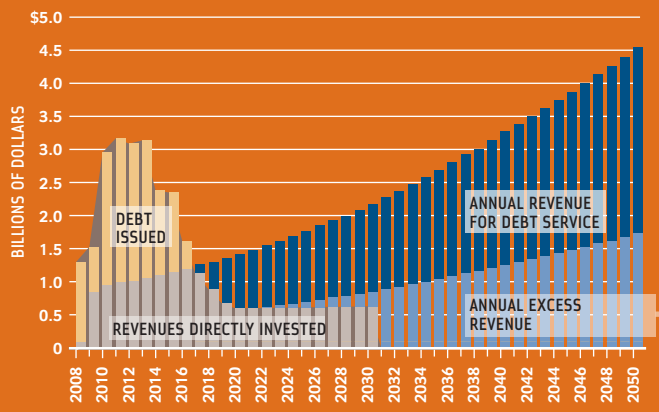
We will seek to work with the State to establish the Sustainable Mobility and Regional Transportation (SMART) Financing Authority, which would serve as a transportation infrastructure bank for the region. This authority would be funded through dedicated revenue streams that could be bonded against to advance critical capital expansions that improve connections between the city and the surrounding region. *(See charts above: How the SMART Financing Authority Would Fund Regional Transportation Projects)*

Revenues

For two generations, our inability to raise sufficient funds for transportation investments has undermined the mobility of our region. That is why we must tap new sources of funding if we are to make our goals a reality. Further, that funding responsibility must be borne equitably.

All of these projects serve New York City in some way, so the City must share in funding them. Virtually all of them—even those wholly within the five boroughs—serve the region's commuters as well, and so non-city residents should also contribute. That is why we will seek to partner with the State to establish three dedicated revenue streams that split the contributions evenly between city and non-city resident commuters.

Financing Capital Plan Through 2050*



*Note: Debt fully paid off in 2050.

Additional projects eligible for SMART Fund financing include:

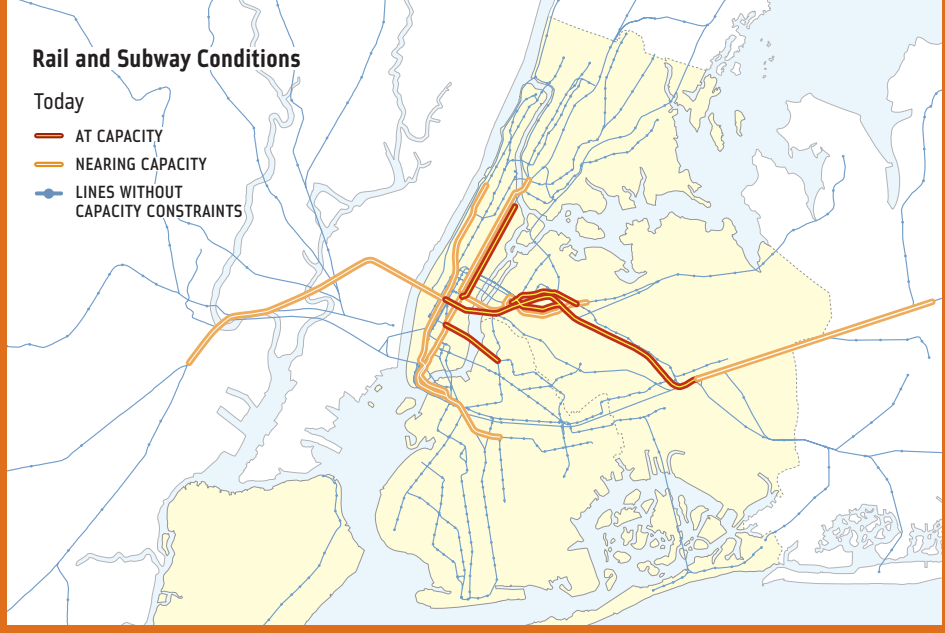
- **Improvements and extensions to the region's subway, light rail, and commuter rail networks**
- **Improved local transit systems serving transportation centers and business districts in the city and the region**
- **Improved transit access to the region's airports**
- **Enhanced, high-speed intercity rail services**

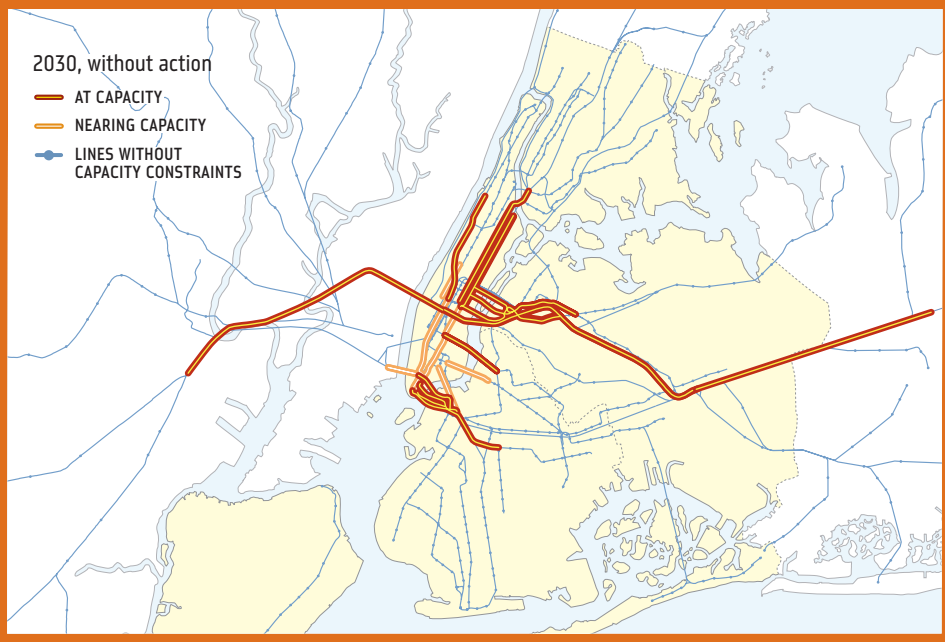
Source: NYC Mayor's Office of Long-Term Planning and Sustainability

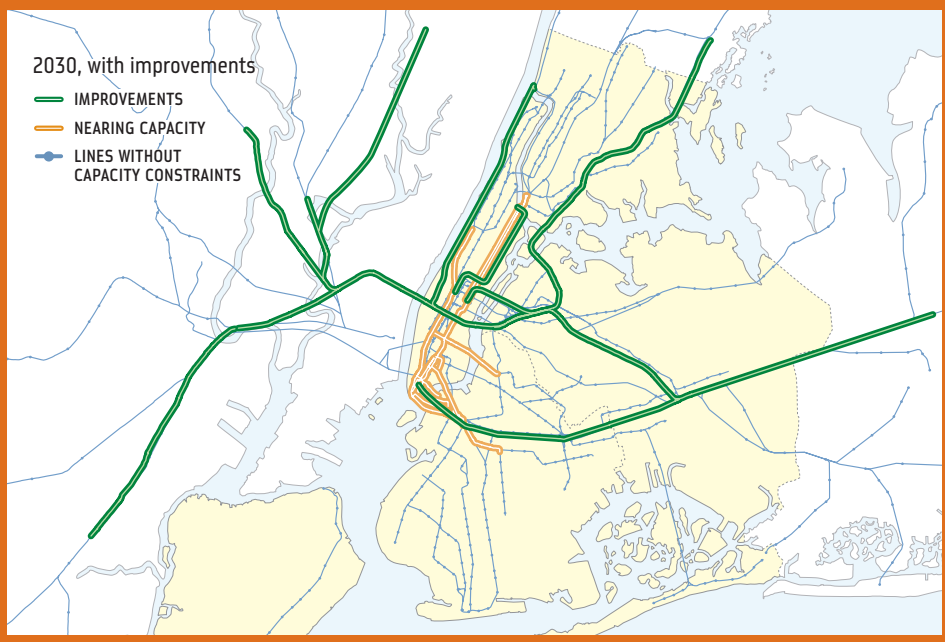
Projects Financed Through the SMART Fund

PROJECTS	TOTAL PROJECT COST (DOLLARS IN MILLIONS)	CONSTRUCTION		EXISTING FUNDING		GAP COVERED BY SMART FUND
		START	END	AVAILABLE	EXPECTED	
7 Train - 10th Avenue Station	$450	2013	2017		$225	$225
Access to the Region's Core	$7,381	2009	2016	$2,580	$1,111	$3,691
Bicycle Lanes	$23	2008	2030		$12	$12
BRT: First Five Routes	$438	2008	2014	$ 60	$159	$219
BRT: Five Additional Routes	$527	2010	2016		$264	$264
Congestion Pricing	$224	2009	2009			$224
East River Bus/HOV Capacity	$43	2009	2010		$21	$21
East Side Access	$6,350	2007	2013	$4,382		$1,968
Express Bus Lane to Lincoln Tunnel	$1,300	2010	2011	$100	$550	$650
Ferry Service	$40	2011	2013		$20	$20
LIRR Third Track	$770	2010	2013	$416		$354
Lower Manhattan Rail Link	$7,500	2010	2015	$2,960	$790	$3,750
MNR Penn Station Access (Hudson Line)	$455	2012	2013		$228	$228
MNR Penn Station Access (New Haven Line)	$357	2012	2013		$178	$178
Nassau County Hub	$738	2010	2013		$369	$369
North Shore Alignment	$350	2012	2016		$175	$175
Penn / Moynihan Station	$1,000	2008	2015		$500	$500
Second Avenue Subway (Phase 1)	$3,838	2007	2013	$2,864		$974
Second Avenue Subway (Phase 2)	$3,400	2011	2018		$1,700	$1,700
State of Good Repair (MTA)	$13,681	2010	2030			$13,681
State of Good Repair (NYC Roads & Bridges)	$1,722	2009	2029			$1,722
TOTAL FIRST PRIORITY PROJECTS	**$50,222**			**$13,362**	**$6,302**	**$30,925**

Note: Costs are nominal, year of construction. Where available, agency's year-of-construction estimates are used. Otherwise, annual construction industry inflation estimates used. Existing funding includes Federal, state, local, and agency funding; "expected" is based on reasonable expectation based on past trends. Second Avenue Subway Phase 1 estimate assumes receipt of Federal Full Funding agreement. MTA SGR estimate based on unfunded remaining state of good repair gap after current MTA Capital Plan.







City and State Contributions

The City proposes a matching partnership with the State. The City will commit $220 million to the SMART Authority in an annual payment starting in 2008, rising to $275 million in 2012 and increasing at the growth rate of the City's personal income tax thereafter.

The City contribution will be contingent on the State matching these funds. To ensure that the SMART Financing Authority is able to issue bonds against these revenues, both commitments must be enshrined in law. The State could determine any source of funds for this contribution.

Congestion Pricing

Congestion pricing is projected to generate net revenues of $380 million in the first year of operation, increasing to over $900 million by 2030. Based on traffic patterns, roughly half the revenues from congestion pricing would be paid by New York City residents, and the other half by non-city residents.

Investment criteria

Regional, state, and city transportation agencies would apply for funding for specific projects. These projects would be evaluated by a board of directors with representatives from around the region and appointment criteria to ensure a balanced and impartial perspective. The board would be supported by a professional staff that would analyze funding requests, undertake independent assessments of regional transportation needs, and develop financing structures for selected projects. Once a project has been chosen, the SMART Authority would monitor its progress to ensure that investments are being spent efficiently and as promised.

Although regional priorities may change over time, the SMART Authority will only provide support to two broad categories of projects:

Expansions or improvements to our regional transit system

Meeting the following criteria:

- **Capital investment** to expand or improve transit infrastructure in the New York City Metropolitan region, with all projects needing to provide either direct or indirect service to New York City
- **Ready-to-go projects** that have received all required legislative, local, and environmental approvals
- **At least 50% funded** so as to use the SMART Fund to provide a match to local, State, agency, and Federal funding already in place

Achieving a state of good repair on city streets and the transit system

A series of **one-time block grants** would be awarded to the MTA and the City's DOT to achieve a state of good repair as the need was identified in 2005. These grants would be conditional on the agency's certification each year that it is replacing infrastructure on a normal cycle and conducting preventative maintenance at a level to prevent a relapse into disrepair.

Financing

The series of urgent capital projects—such as Second Avenue Subway, East Side Access, and ARC—are sufficiently far along in their planning and construction that the need for investments over the next several years will exceed even the revenues projected here. To provide the resources needed *when* they are needed, the SMART Authority would issue debt secured by its three revenue streams. Based on extensive modeling, not only should we be able to meet all of our identified needs, but there would also be excess funding available. Beginning in 2022, this could be used for the final phases of the Second Avenue Subway and a next wave of regional projects, such as subway extensions and expansions, commuter rail lines, and providing transit on a new Tappan Zee Bridge.

Governance

With its revenues split between City and State sources, the SMART Financing Authority should be governed by a Board that is similarly evenly split. Further, to ensure the independence of the Board, the enabling legislation should state that Board members must not be government employees; that membership terms should be staggered; and that expertise in finance, planning or transportation be a prerequisite for membership.

Implementation

Multiple legislative actions will be required in order to establish the SMART Financing Authority. The State Finance Law must be amended to establish the entity and empower it to issue debt and allocate funding to regional projects. In order to bond against future revenues, a dedicated funding source must be secured. That means the identified revenue streams must be protected to the extent possible by State law and bond covenants.

Conclusion

We can accept increasing congestion and the damage it will inflict on our economy and quality of life. Or we can act to reshape our transportation network and ensure that New York maintain its position as the world's premier city. That means providing every New Yorker, visitor, and worker with transportation that is as attractive, efficient, and sustainable as possible.

As a result of the policies outlined above, New Yorkers like Bryan Block will experience reduced travel times, more comfort, and more reliable rides, whether they are going to work, going shopping, attending cultural events, or visiting family and friends. By accelerating long-delayed projects, implementing smart, short-term improvements, and embracing a new set of transportation priorities, New York can achieve a new standard of mobility.

New Yorkers face rising energy costs and carbon emissions from an ineffective market, aging infrastructure, inefficient buildings, and growing needs.

That's why we must make smart investments in clean power and energy-saving technologies to reduce our electricity and heating bills by billions of dollars, while slashing our greenhouse gas emissions by nearly 27 million metric tons every year.

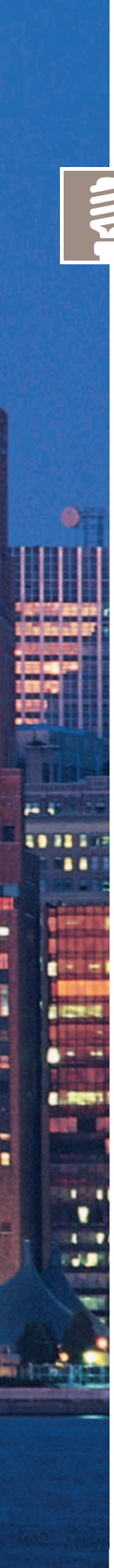
Energy

Energy

Provide cleaner, more reliable power for every New Yorker by upgrading our energy infrastructure

Energy

Credit: NYC Economic Development Corporation



New York City skyline

Provide cleaner, more reliable power for every New Yorker by upgrading our energy infrastructure

On July 17, 2006, the electric cables began to fail. As the lights started flickering off, the residents of western Queens began alerting Con Edison that a blackout had begun.

Over the next nine days, Con Edison recorded these calls to assess the scope of the outages—because there was no automated way to find out. Finally, their employees drove through the streets of western Queens and counted the number of buildings without lights to estimate how many customers had been affected.

Although we have the most reliable energy network in the United States, the recent Queens power outages betrayed the weaknesses in our aging grid. Less familiar, though, are the risks revealed over the rest of the summer.

Ten days after the blackout, a third multi-day heat wave gripped the city, with temperatures reaching as high as 102º. Although institutions and large companies began extinguishing lights, raising air conditioning temperatures, and shutting down elevators, there was no systematic way to slow the skyrocketing demand. Con Edison customer representatives, police officers and members of the City's Office of Emergency Management began knocking on doors across the city. The Real Estate Board of New York began emailing many of its 12,000 members. Newspapers, radio stations, and local news networks carried announcements. All urged New Yorkers to slow down their energy use. It wasn't enough.

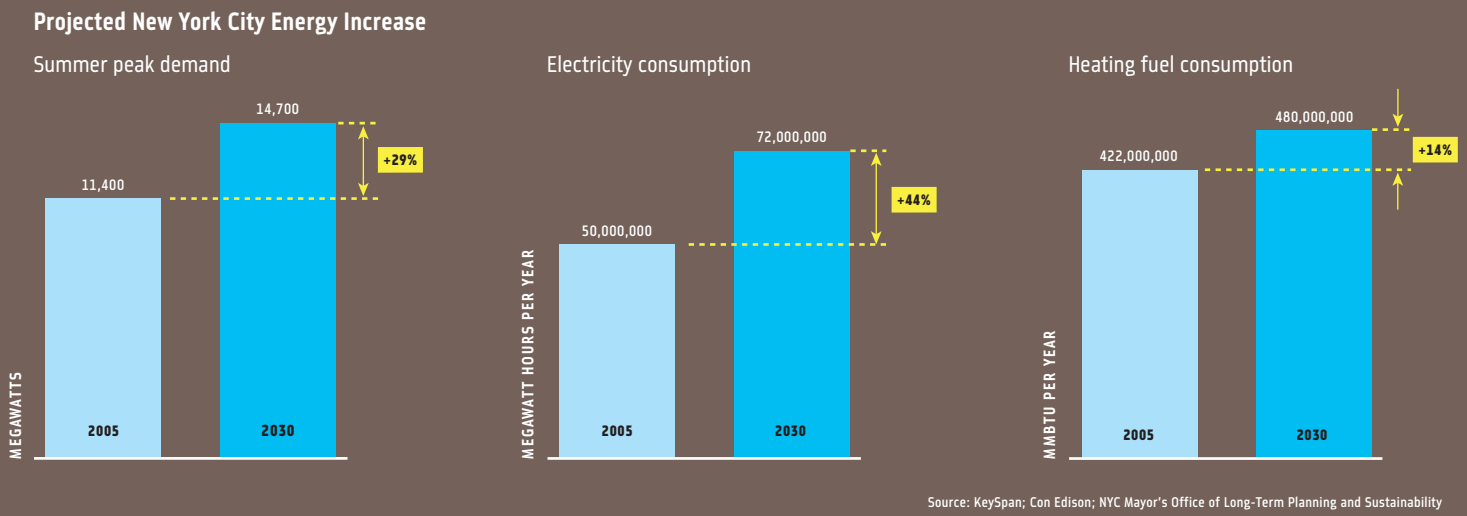
On August 1-2, the city set two consecutive records for electricity demand, topping the previous record set a year earlier. To prevent a blackout, businesses began switching to backup diesel generators that spewed pollutants into the air. Our dirtiest and least efficient power plants were turned on, making our air quality unhealthy for people with heart or lung disease, the elderly, and children. And since these aging plants are more expensive to run, the city's electricity prices—already among the highest in the nation—soared by 500% that day.

Every year, New Yorkers collectively spend approximately $13.4 billion on the energy that lights our buildings and powers our electronic devices, on our electrical delivery system, and on the fuel used for heating and hot water; the average residential energy bill is $145. But this consumption has additional costs. It is responsible for roughly 80% of our global-warming emissions and more than 40% of all locally generated air pollution.

Even on regular days, our supply is neither as clean nor as affordable as it should be. Our existing fleet of power plants averages around 30 years old, and uses mostly out-of-date technologies. These older plants use 30% to 60% more fuel and produce several times the air pollution of newer plants to generate the same amount of electricity.

But by 2012, even this supply will not be enough. We are continually setting new records for energy usage. As the summer of 2006 showed, our ability to reduce demand in a coordinated, efficient way is limited. And our delivery infrastructure is under increasing pressure.

By 2030, population and economic growth will strain the city's energy network further. If current trends continue, energy demand could grow substantially. By 2015 alone, the city's annual electricity and heating bill, excluding delivery costs, will increase by $3 billion, translating into energy bills that are annually $300 to $400 higher for the average New York household. As we consume more energy, our environmental impact will increase accordingly. By 2015, we will be pumping an additional 4.6 million metric tons of CO_2 into the atmosphere. *(See chart on page 103: New York City Price of Electricity)*



Source: KeySpan; Con Edison; NYC Mayor's Office of Long-Term Planning and Sustainability

Reducing prices and CO_2 emissions will require displacing high-cost, inefficient plants through an unprecedented demand reduction strategy and new, clean sources of supply.

Energy planning

Today, there is no entity capable of addressing these challenges. There are eight organizations responsible for some dimension of energy planning in New York City, but not one of them is designed to take the city's unique needs into account. None are empowered to bargain on behalf of New Yorkers, while prioritizing air quality, lowering global-warming emissions, and ensuring affordable prices. And there is no existing planning body that analyzes how supply and demand-side strategies can work together to achieve reliable power for the city.

Demand reduction

Reducing our demand while absorbing growth will not only be difficult—it has never been done before. Energy efficiency programs in the United States began during the 1970s, but consumption has still steadily risen along with the proliferation of air conditioners, cell phones, laptops and other electronic devices. Even the most successful programs in the country have failed to flatten demand; while California has held its per capita energy use constant, the state's overall energy needs have continued to grow *(See chart on facing page: Electricity Consumption Per Capita)*

In New York, under-investment, a series of fragmented programs, and the absence of city-specific programs or planning have prevented us from achieving our efficiency potential. Participation in programs has also been hampered by the city's high installation costs and greater proportion of renters; building owners are reluctant to invest in upgrades that will only benefit their tenants through lower energy bills.

We can do better. Smarter choices and targeted investments can yield substantial savings. Our density is an advantage; less than 4% of our buildings contain roughly 50% of the city's built area. By focusing on these sites—and our other largest energy consumers—for upgrades, the impact could be enormous.

Unchecked, our city's peak electricity demand—the highest amount of electricity we will need over the course of a year—is projected to grow by 29% by 2030. Total electricity consumption could rise by 44% or more and our consumption of heating fuels by 14%. But it does not have to grow. We will seek to meet the entirety of this need by increasing our energy efficiency and expanding programs to manage demand on our "peak" days—while actually reducing our consumption of heating fuels by 17%. *(See charts above: Projected New York City Energy Increase*)

New, clean supply

It will take several years to benefit from this ambitious efficiency effort. In the meantime, we must prepare for a short-term rise in our power consumption. We must also add enough clean supply to retire our dirtiest plants, which are frequently located in some of the city's most underserved communities, and make our prices more competitive with the rest of the region. As a result, securing a clean, reliable, affordable energy supply will require generating an additional 2,000 to 3,000 MW of capacity by 2015.

In our current market, that won't be easy. Before the mid-1990s, Con Edison was a regulated monopoly that built, owned, and operated the city's power plants and delivered the electricity they supplied. They were guaranteed a return on their investment, because they could raise ratepayer costs to cover new construction. But in 1998, the company was directed to sell its power plants to foster a competitive electricity market in New York State. Since deregulation, power plant construction and operation is now the role of private developers and owners. But without long-term contracts, there is no guarantee that power prices will provide a sufficient return—and land constraints, construction costs, and higher financing requirements have made the price of building power plants in New York almost three times the national average.

Virtually every existing power plant in the city has the capacity to expand or improve its efficiency and environmental performance—but owners currently have no incentive to do so. Adding more supply would risk lowering prices across the market. While the health benefits are clear, there is no guarantee that owners will make back their investment.

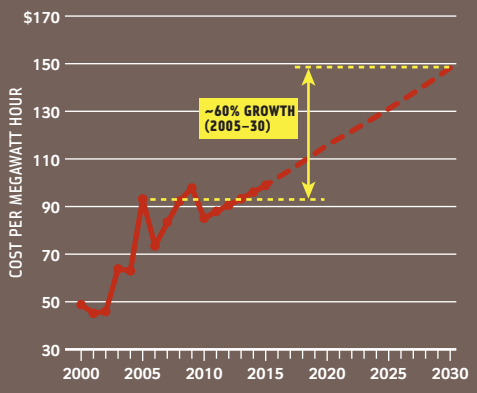
As a result, only one repowering has ever taken place in the city. Since deregulation with the exception of investments by NYPA—a public authority—only two private powerplants have been built.

Our heating and electricity will increasingly rely on natural gas, which is the cleanest-burning fossil fuel. But our delivery capacity is limited, creating some of the highest natural gas prices in the nation.

The cleanest energy sources—such as wind and solar power—are promising, but they are not yet financially feasible to play a large role. Without significant support, they will not be able to assume a greater role in our energy generation.

New York City Price of Electricity*

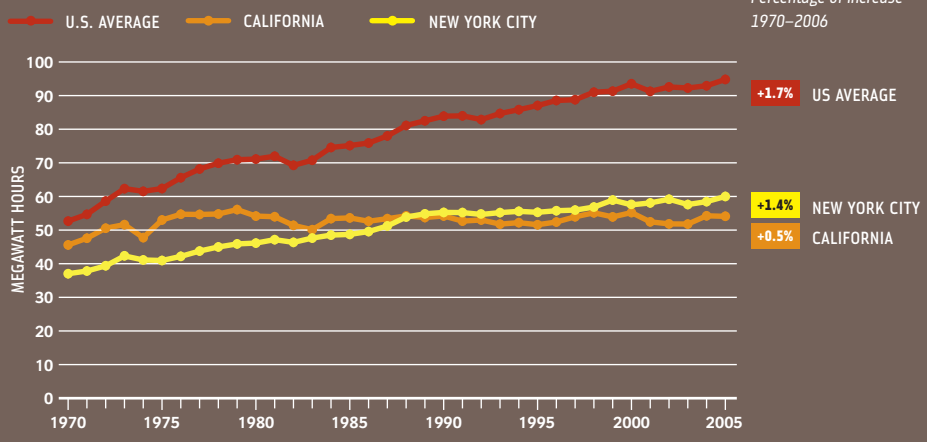
**Assumes constant real gas price after 2007. Price is wholesale: does not include delivery, surcharges or taxes.*



Source: ICF Consulting and NYC Economic Development Corporation Analysis

Electricity Consumption Per Capita

Compound Annual Growth Rate Percentage of Increase 1970–2006



Source: U.S. Department of Energy; U.S. Census Bureau; and Global Insight

Delivery infrastructure

We also must make sure that the supply we have can reach its recipients.

The world's first electric power delivery system was developed in New York City in 1882. When Thomas Edison switched on the first electric station in Lower Manhattan, it lit up a total of four hundred bulbs. A year later, there were over 10,000 electric lights in Manhattan fed by a web of overhead wires, which were moved underground after the blizzard of 1888 to improve public safety.

The design of this underground grid has remained essentially unchanged in the decades since. As a result, although we have the most reliable network in the United States, the grid's current technology and complexity make it difficult to repair. This can be especially damaging during events like the 2006 power outages in western Queens, when the lack of "smart" technologies meant that we were unable to assess the extent or location of outages in a timely fashion.

To overcome these challenges, we have developed an aggressive, integrated plan that puts the city's energy, air quality, and greenhouse gas targets within reach.

Our Plan

We know the solution: greater investment in a comprehensive energy efficiency plan, coupled with an increase in clean supply.

We must target our largest energy consumers—institutional buildings, commercial and industrial buildings, and multi-family residential buildings—and accelerate energy efficiency upgrades through a system of incentives, mandates, and challenges.

To retire our oldest, most polluting plants, we must encourage the addition of new, clean power plants through guaranteed contracts, and expand the market for renewable energies in the future.

Together, the strategies just outlined can produce a reliable, affordable, and environmentally sustainable energy network for New York City.

But today there is no entity capable of implementing these projects and realizing their goals.

That's why we will work with the State to create a New York City Energy Planning Board that will help us shape our energy future. The Board will oversee a new entity that will coordinate all energy efficiency efforts within the city.

This plan will require significant effort, capital, and political will. The City will propose an amendment to the City Charter that will require it to invest 10% of its energy bill in reducing the energy consumed by City operations. Citywide initiatives will be funded through an increase in the energy bill surcharge that customers already pay.

By spreading the charges of these initiatives among all energy users, the costs will be reasonable—approximately $2.50 per month for the average household. But they will reap enormous benefits for the entire city.

By implementing an unprecedented energy efficiency strategy, while increasing supply, New York City's overall power and heating bill will plunge by $2 billion to $3 billion annually—saving the average household $230 a year on its energy bill by 2015.

The environmental impacts will be equally impressive. By 2015, our carbon emissions will have been slashed by seven million tons, bringing us closer to our goal of reducing the city's greenhouse gases by 30% by 2030 and providing a healthier environment for all New Yorkers. *(See table on following page: Our Plan for Electricity)*

Our plan for energy:

Improve energy planning

1 Establish a New York City Energy Planning Board

Reduce New York City's energy consumption

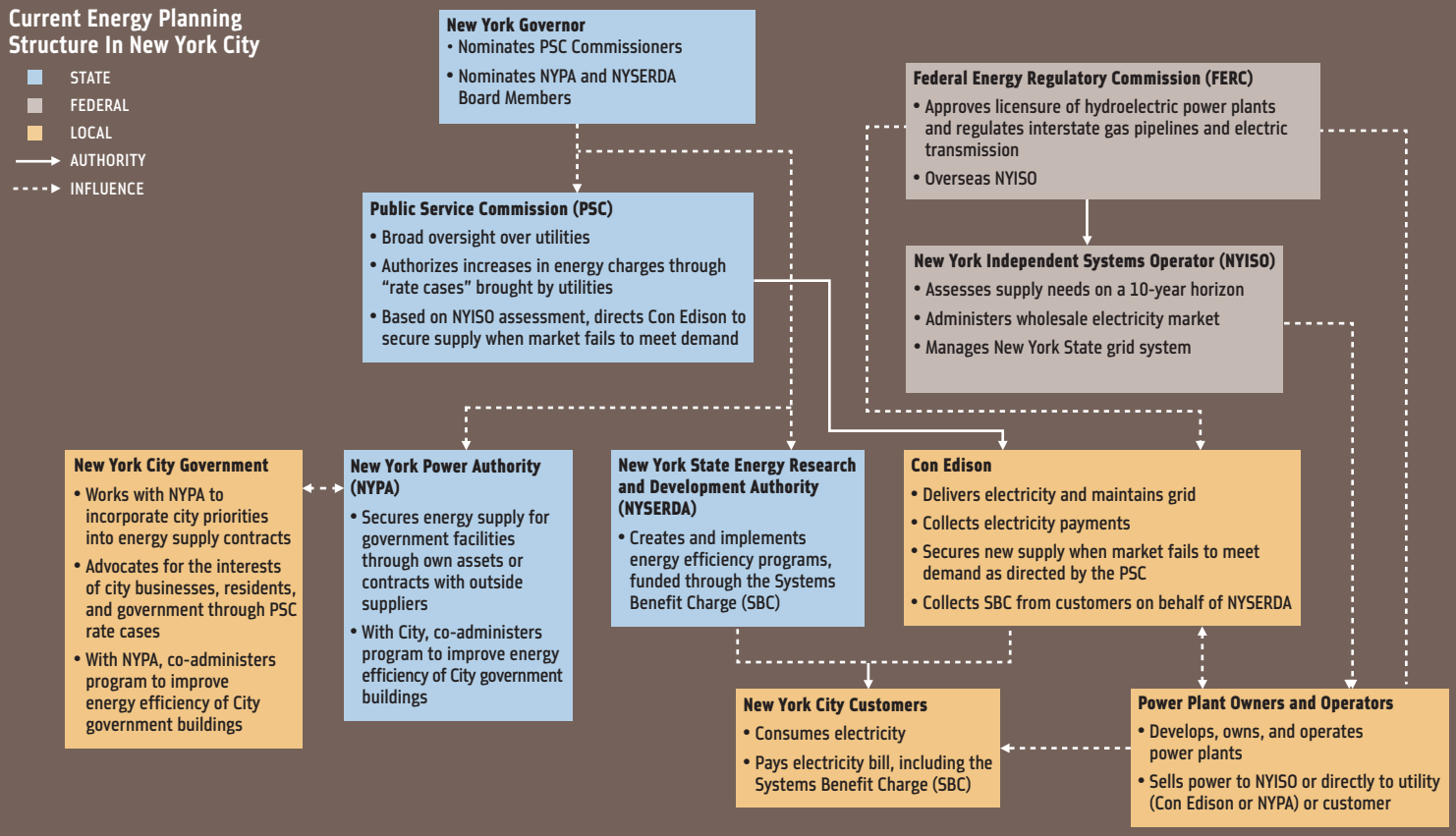
2 Reduce energy consumption by City government
3 Strengthen energy and building codes for New York City
4 Create an energy efficiency authority for New York City
5 Prioritize five key areas for targeted incentives
6 Expand peak load management
7 Launch an energy awareness and training campaign

Expand the city's clean power supply

8 Facilitate repowering and construct power plants and dedicated transmission lines
9 Expand Clean Distributed Generation ("Clean DG")
10 Support expansion of natural gas infrastructure
11 Foster the market for renewable energy

Modernize electricity delivery infrastructure

12 Accelerate reliability improvements to the city's grid
13 Facilitate grid repairs through improved coordination and joint bidding
14 Support Con Edison's efforts to modernize the grid



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Our Plan for Electricity

NEW ELECTRICITY NEEDS	MEGAWATTS
Gap between existing in-city capacity[1] and projected peak demand[2]	2,300
Additional in-city resources required (to meet PLANYC goals, including retirement of inefficient plants) • Reduce greenhouse gas emissions • Reduce pollution • Reduce citywide electricity prices	5,000
TOTAL NEW ELECTRICITY NEEDS	**7,300**

NEW SOURCES OF ELECTRICITY	MEGAWATTS
Reduce New York City's energy consumption • Energy efficiency • Peak load management or demand response	2,500
Facilitate repowering and construction of new clean power plants and dedicated transmission lines	3,400
Expand Clean Distributed Generation	800
Foster the market for renewable energy • Build the market for solar energy • Expand energy production from sustainable biogas and biomass • Support future opportunities: large-scale far off-shore wind, on-site wind, and tidal energy	600
TOTAL NEW SOURCES OF ELECTRICITY	**7,300**

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

1. Includes existing and committed in-city capacity resources (i.e., in-city generation, dedicated generation connected to the New York City grid but located outside the 5 boroughs, and participation in certain New York Independent System Operator demand response programs). It also assumes the retirement of NYPA's 875-megawatt old Poletti power plant in 2010.
2. The New York State Reliability Council and the New York Independent System Operator require that 80% of New York City's projected summer peak demand be met through in-city resources due to limited transmission infrastructure. The projected peak demand for 2030 reflects this 80% rule.

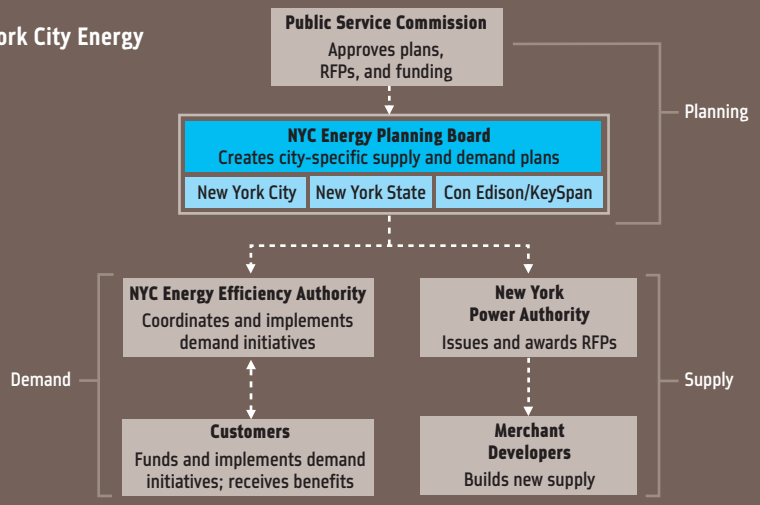
Improve energy planning

To stem global warming, improve the health of New Yorkers, and reduce the city's energy bill by billions of dollars, we must take several big steps: implementing aggressive energy efficiency and peak load management measures, upgrading our aging fleet of polluting power plants, building more Clean Distributed Generation, and developing renewable energy sources.

But the existing organizations, programs, and processes are inadequate to implement these policies. They are not charged with considering goals for cleaning up the environment, moderating prices to consumers, and minimizing land use impacts—and they are not designed to overcome the city's unique challenges.

Finally, no organization is currently empowered to develop a broad vision for energy planning in the city that considers supply and demand together as part of an integrated strategy. *(See chart above: Current Energy Planning Structure in New York City)*

Proposed New York City Energy Planning Board



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

INITIATIVE 1

Establish a New York City Energy Planning Board

We will work with the State and utilities to centralize planning for the city's supply and demand initiatives

There is a clear need for a more comprehensive, coordinated, and aggressive planning effort, focused on the specific needs of New York City. That is why we are pursuing State legislation and regulation to establish a New York City Energy Planning Board. *(See chart above: Proposed New York City Energy Planning Board; see case study: Long Island Power Authority)*

Functions

Comprehensive planning: This entity's primary function would be to review and approve energy plans that include supply and demand strategies to meet the city's needs. This plan would be submitted to the Public Service Commission (PSC) for regulatory and funding approval.

To ensure that these plans are revised regularly, we will urge the State to pass a new energy planning law similar to Article VI, which lapsed four years ago. Article VI required the periodic issuance of a State Energy Plan that assessed capacity needs and identified strategies to meet or manage demand. We believe the law should additionally require the development of localized plans across the state, and should take into account not only peak demand capacity, but also energy consumption, costs to rate payers, environmental impact, and greenhouse gas emissions.

In addition to overseeing the creation of New York City's energy plan, the Board would recommend any necessary ratepayer charges for the fulfillment of its plan to the PSC.

Reducing demand: The Board would set demand reduction targets as part of the city's overall energy plan, recommend funding levels and approve strategies for reaching those goals. A new authority will also be created dedicated to the coordination and implementation of energy efficiency initiatives in New York City.

This authority, a partnership among the organizations involved with energy efficiency programs in New York, would be responsible for developing plans to meet the Board's targets.

Expanding supply: The Board would also set supply targets and recommend a budget for spending on supply initiatives. The Board would facilitate the supply of new clean power to the city by enabling a process to issue long-term contracts to energy supply developers. These contracts would provide a constant revenue stream to pay off investment costs. As a result of this security, power plant owners would be able to attract investors at better financing rates.

One way long-term contracts could be issued is for the State to empower the New York Power Authority (NYPA) or another existing entity to issue and award a power supply request-for-proposals (RFP) that reflects the city's priorities and needs. NYPA already performs this service for government institutions located in the city, including our municipal government, the Metropolitan Transportation Authority (MTA), and the New York City Housing Authority (NYCHA).

Board structure: To ensure a range of perspectives and technical experience, the proposed Board would include representatives from the City, the State, and the utilities.

The City and State representatives would ensure that their respective public policy priorities are reflected in the planning process. The City's representative would also articulate local community perspectives, including environmental justice concerns.

CASE STUDY

Long Island Power Authority

The Long Island Power Authority (LIPA) doesn't just focus on providing electricity to Long Island consumers.

It does that, too. But as the entity empowered by State legislation to generate a power strategy for all of Long Island, LIPA considers how reducing demand and adding supply can work together to meet the area's reliability needs.

When it does procure more power, it offers investors the security of long-term contracts in exchange for supply that is clean, affordable, and efficient.

As a result, while developers are hesitant to enter New York City's volatile energy market, LIPA's willingness to enter into long-term contracts spurred new power plants and transmission lines to serve Long Island.

"We realize how urgent it is to keep our rates and charges as low as possible," said Richard M. Kessel, LIPA's CEO and President. "Since we make no profit on the sale of electricity, we make every effort to do so."

Until 1998, Long Island residents got their power from LILCO, a privately-owned corporation. After a financially-strapped LILCO saw its cost of debt skyrocket, New York State's Legislature stepped in, creating LIPA to act as a single, coordinated buyer. Over time, LIPA has lowered rates by an average of 20%—the largest single electric rate reduction in U.S. history.

LIPA also aims at balancing supply and demand side programs—further keeping prices down.

LIPA's Clean Energy Initiative (CEI) is one of the most ambitious programs of its kind in the nation. The CEI is a 10-year, $355 million commitment to promote energy efficiency and clean generation technologies including the largest commercial solar project in the country.

LIPA also rewards green energy choices, encouraging customers to purchase wind-generated power and soliciting proposals from developers for renewable resource projects.

"With each alternative or renewable energy project we advance," Kessel said, "we take another step away from our over-dependence on fossil fuel burning technologies. Future generations as well as our environment will be the beneficiaries."

The representative from Con Edison would leverage the company's technical capabilities, understanding of grid and reliability issues, and familiarity with energy efficiency programs to shape the city's electricity and steam plans. Both Con Edison and KeySpan would create their own plans for gas demand and supply.

Additional regulatory changes to promote coordination and to increase investment

There are four additional regulatory changes that will help maximize the coordination between energy efficiency and supply efforts and generate new funding sources.

Today, utilities like Con Edison profit from the volume of energy consumed. In order to encourage greater participation with our energy efficiency efforts, we must separate Con Edison's profits from the amount of energy used in the city and replace it with incentives for reducing demand.

We will also advocate for the creation of a forward capacity market, which pays upfront for future capacity. Under this system, developers can secure prices years in advance, creating a level of financial assurance for backers since they know their initial rates of return. This guarantee can also be applied to energy efficiency strategies; programs that pledge a peak reduction can secure payment as if they were selling additional supply. The money can be invested into further efficiency efforts, providing a new revenue stream for reductions into the future.

The Regional Greenhouse Gas Initiative, a multi-state cap and trade program to reduce greenhouse gas emissions from power plants, could potentially bring millions of additional dollars to energy efficiency initiatives in New York. Starting in 2009, greenhouse gas credits will either be given, sold or auctioned to generators. Generators that use less than their allotted amount will be able to cash in the excess credits; those who need more will be able to buy them from the market. The City will continue to advocate that all of these credits are auctioned to power generators, forcing power plants to purchase credits for each ton of carbon dioxide they produce. This money could then be used to finance more energy efficiency efforts.

Finally, we will advocate for an energy planning law similar to Article VI, which lapsed four years ago, to be implemented on a statewide level. This law would serve as a complement to the New York City Energy Planning Board since energy planning for areas adjacent to the New York metropolitan area, such as the lower Hudson Valley and Long Island, can affect the city. Reducing transmission congestion could reduce prices in the city as well as regional CO_2 and other emissions. Therefore, the City will urge passage of a new State planning statute to accomplish these aims.

Reduce New York City's energy consumption

The answer to meeting our city's energy needs cannot simply be to add more supply. For both environmental and economic reasons, our first step toward a comprehensive energy policy must be evaluating how to maximize our energy efficiency.

Nationwide, energy efficiency efforts are focused on industry and automobiles, but in New York, our challenge is different—it is primarily the buildings. Over two thirds of our energy is used in buildings, compared to a national average of less than one third.

And when buildings *are* mentioned, the context is usually new construction. New York City has emerged as a leader in green buildings, with some of the world's most sustainable skyscrapers and affordable housing developments. We have also established new standards for new municipal buildings.

But by 2030, at least 85% of our energy usage and carbon emissions will come from buildings that already exist today. Therefore, we must focus our efforts on improving the city's large existing building stock.

If we ensure that energy-saving measures in our existing buildings are incentivized—and, later on, mandated—we can absorb growth while keeping our power consumption constant and reducing our heating fuels by 14%. This will result in seven million fewer tons of global warming emissions, and help lower the city's overall energy bill by $2 billion to $3 billion by 2015. *(See table on facing page: Energy Usage by Building Type in New York City)*

In addition to lowering energy usage on a daily basis across the city, we must also find more effective ways to manage demand during the periods of greatest need. Our power needs are assessed based on these "peak" moments; by keeping our peak demand constant, we can reduce the need to rely on the most polluting plants during our hottest summer days and relieve the burden on our delivery grid.

INITIATIVE 2

Reduce energy consumption by City government

We will commit 10% of the City's annual energy bill to fund energy-saving investments in City operations

New York City's government spends nearly $800 million a year on electricity, natural gas, and heating oil—and consumes roughly 6.5% of the city's energy. Investments in LED stoplights and retrofits to City-owned buildings have already saved the City money and reduced the City's energy consumption. The opportunity exists to go much further—but the hurdle has always been the competing priorities that pit energy-saving investments against other uses of City funds.

That is why we will propose an amendment to the City Charter requiring that New York City invest, each year, an amount equal to 10% of its energy expenses in energy-saving measures. These measures will include creating systems and tools to manage the energy use of City buildings centrally; conducting routine energy audits and tune-ups of City buildings; retrofitting City buildings and improving maintenance to save electricity and heating bills; and converting streetlights to LEDs when the technology becomes available.

With aggressive management and the funding that this amendment would provide, we are committed to reducing the City government's energy consumption and CO_2 emissions by 30% within 10 years.

INITIATIVE 3

Strengthen energy and building codes for New York City

We will strengthen energy and building codes to support our energy efficiency strategies and other environmental goals

New York City is completing its first major revision to the building code in nearly 40 years, with adoption expected in summer 2007. This will be followed by regular reviews and updates of the code, to be conducted on a three-year cycle.

Energy Usage by Building Type in New York City
Percent of total energy in British Thermal Units (BTU)

WHAT WE USE FOR ENERGY FOR							
BUILDING TYPE	**HEAT**	**HOT WATER**	**LIGHTING**	**APPLIANCES***	**COOLING****	**OTHER**	**TOTAL**
1–4 family residential	7.6%	2.6%	1.7%	2.2%	0.6%	0.0%	**14.7%**
Multi-family residential	7.4%	7.4%	3.0%	3.9%	1.2%	0.0%	**22.0%**
Commercial	8.5%	2.8%	10.2%	4.5%	4.5%	0.9%	**31.4%**
Industrial	2.6%	2.1%	4.0%	3.3%	1.1%	0.2%	**13.0%**
Institutional/government	6.3%	4.0%	3.6%	1.7%	1.4%	0.9%	**17.9%**
ALL TYPES	**32.4%**	**18.9%**	**22.5%**	**15.6%**	**8.8%**	**2.0%**	**100%**

*Appliances include electronics and refrigerators as well as other appliances
**Cooling includes ventilation as well as air conditioning

Source: Con Edison; KeySpan; U.S. Department of Energy; New York State Energy Research and Development Authority

Electricity Savings from Compact Fluorescent Light Bulbs

If you replace one standard light bulb with a CFL, **you will save $107 and 12 light bulb changes over the 9-year lifetime of the CFL**

If all 3 million New York City households replace one standard light bulb with a CFL, **the energy savings would be enough to power three Empire State Buildings**

If all New York City households replace 75% of their standard light bulbs with CFL bulbs, **the energy savings would be enough to run all the subways and light all the stations**

Assumptions
- *Average standard (incandescent) light bulb uses 75 Watts and lasts for 750 hrs; equivalent CFL bulb uses 20 Watts and lasts for 10,000 hrs.*
- *Average of 15 incandescent light bulbs per household, each used 3 hours per day*
- *Annual electrical consumption in NYC: 52,280 GWh*

While the new code will include a number of green elements—including rebates for some green building features, requirements for cool (white) roofs and energy code certification, and more stringent ventilation standards—more can be done.

We will make "greening the code" a central focus of the next revision cycle, with an emphasis on implementing the city's energy efficiency strategies, streamlining the process for incorporating new, sustainable technologies into construction, and adaptation to climate change.

Another area of focus will be reducing the amount of cement used in concrete. Creating cement is an energy-intensive process that releases a ton of CO_2 for every ton of cement produced. We will advocate for a different form of concrete production that uses 30% to 40% less cement while retaining strength.

The next three years are also an opportunity to amend other codes influencing the city's energy efficiency, such as the State Energy Conservation Construction Code and New York City's Fire Code. While the State code is required to be amended every three years, the process is often delayed and its provisions are not adequately enforced. We will strengthen enforcement of these codes and push for higher standards, particularly regarding lighting requirements. We will also seek to integrate sustainability considerations more fully into the City's other codes, striking an appropriate balance between reducing implementation barriers while preserving safety standards.

INITIATIVE 4

Create an energy efficiency authority for New York City

We will create the New York City Energy Efficiency Authority responsible for reaching the city's demand reduction targets.

There are currently a number of programs that target demand reduction and energy efficiency in New York City, including NYPA and NYSERDA at the State level and Con Edison at the local level. But these efforts have not always been coordinated, and the City has not had the opportunity to play a more active role in either coordination or in shaping programs of its own, beyond participating in Public Service Commission proceedings. This will have to change if the city is going to achieve unprecedented reductions in energy consumption.

To that end, we propose to create the New York City Energy Efficiency Authority which will direct all of New York City's efficiency and demand reduction efforts. These efforts would be funded through rate-payer based surcharges. This would enable the City to develop a unified effort that is well-tailored to our unique circumstances. The Authority would be charged with developing and managing programs and establishing the incentive structures required to reach the city's demand reduction targets as set by the New York City Energy Planning Board. The City, NYSERDA, Con Edison, and Keyspan would serve on the Authority's board—allowing the Authority to marshal coordinated action among these entities and utilize their resources.

The Authority's first task would be to undertake the three city-wide initiatives that follow: targeting five key areas for energy efficiency; expanding peak load management programs; and undertaking an energy awareness and training campaign. In all three of these, the City will begin working immediately through its existing institutions, but full implementation will require the coordination and funding the Authority would provide.

INITIATIVE 5

Prioritize five key areas for targeted incentives

We will use a series of mandates, challenges, and incentives to reduce demand among the city's largest energy consumers

With 5.2 billion square feet of space parceled into almost a million buildings, reining in the energy consumption of New York's building sector presents a challenge of remarkable complexity and scale. *(See table on following page: Key Areas for Targeted Energy Efficiency Initiatives; see case study on following page: Energy Efficiency Tools)*

As described in the following table, our efforts will be focused around five key areas: institutional and governmental buildings, commercial and industrial buildings, residential buildings, new construction, and appliances and electronics. We have focused primarily on upgrades to existing buildings, since they will still form the overwhelming majority of our building stock by 2030.

We have also singled out the largest sources of consumption for reforms, such as lighting and inefficient appliances. By replacing outdated lighting systems with more energy-efficient models, working at the State and Federal level to steadily improve standards for appliances and electronics, and

Key Areas for Targeted Energy Efficiency Initiatives

	KEY AREA	INITIATIVE WITH ILLUSTRATIVE EXAMPLES	AVERAGE INVESTMENT BY OWNER*	AVERAGE INVESTMENT INCENTIVE**	IMPACT PAYBACK TO CONSUMER AFTER INCENTIVE	IMPACT % CITYWIDE ENERGY REDUCTION BY 2015 (FROM TREND)
1	**GOVERNMENT & INSTITUTIONAL** 30% by 2017	City Government to **"Lead by example":** • 30% reduction in buildings and operations by 2017 • Achieved through audits/retrofits, lighting upgrades, and improved maintenance	$400,000 (public school)	n.a.	7–8 yrs.	1.5%
		Mayoral Challenge to institutions, Federal & State Government • Pledge to match the City government target by 2017 • Benchmarking & retro-commissioning or audit/retrofit (< 5-yr payback measures) • Financial incentives from NYCEEA	$880,000 (300,000 sf hospital.)	$470,000	5–6 yrs.	1.3%–2.0%
2	**COMMERCIAL & INDUSTRIAL** Upgrades & Lights	**Efficiency Upgrades** for large commercial & industrial buildings (>100,000 sq. ft.) • Benchmarking & retro-commissioning or audit/retrofit (< 5-yr payback measures) • Mandated by 2015; efficient buildings exempt • Financial incentives from NYCEEA	$220,000 (300,000 sf building.)	$120,000	2–3 yrs.	1.8%
		Lighting Systems brought up to energy code • Required for all spaces at time of renovation or change of tenancy	$4,500 (10,000 sf.)	$2,500	1.5–2 yrs.	2.1%
3	**RESIDENTIAL** Upgrades & CFLs	**Efficiency Upgrades** for large residential buildings (> 50 units) • Retro-commissioning or audit/retrofit (< 5-yr payback measures required) • Mandated by 2015; efficient buildings exempt • Financial incentives from NYCEEA	$39,000 (100,000 sf building.)	$21,000	2–3 yrs.	1.1%
		Large-Scale Direct Install Program for CFLs for all residential properties • Free replacement of incandescent bulbs for 180,000 units per year (voluntary)	29,400–42,000	$150	Immediate	1.5%
4	**NEW CONSTRUCTION** 15-20% Better than Code	New construction to **Exceed Energy Code** by 20%; major renovation by 15% • Commissioning for new construction or major renovation > 100,000 sq. ft. • Aggressive upgrades and enforcement of State energy code	$500,000 (200,000 sf building.)	$0	3–4 yrs.	0.8%
		Graduated Incentives for higher energy savings & environmental performance • For gold or platinum LEED equivalent with superior energy and water savings	$625,000	$125,000	3–4 yrs.	0.3%
5	**APPLIANCES & ELECTRONICS** Incentives & Standards	**Incentivize High Efficiencie**s for appliances, electronics, and air conditioners • Sales and stocking incentives to retailers and distributors • Incentivize efficient washer/dryers in apartment buildings	$0***	$110	Immediate	1.0%
		Work at State & Federal level for **improved standards** for appliance and electronics • Monitor and comment on Federal rule-making on EPCA settlement • Propose streamlining the State process for setting appliance standards	n.a.	n.a.		0.3%
					TOTAL	**12.7%–13.4%**

After incentive **Incentive by the proposed New York City Energy Efficiency Authority * No additional cost after incentive*

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

CASE STUDY

Energy Efficiency Tools

There are three key tools to comprehensively reduce energy consumption in buildings: audits, retrofits and commissioning. An **energy audit** analyzes how changes in equipment, fixtures and design can reduce energy use. The implementation of those changes is called a **retrofit** and often involves the physical upgrade of building energy systems and components. Retrofits, depending on the scope of work, can be designed to pay for themselves through the resulting energy savings, with a three to seven year typical payback. Retrofits can involve any component of the building, but usually focus on lighting and heating and cooling systems.

Commissioning for new buildings, and **retro-commissioning** for existing buildings, refer to a process of insuring that a building's equipment is installed correctly and operating at maximum efficiency. These strategies are most effective when combined with improved maintenance. Commissioning typically pays for itself within a year; retro-commissioning within two to three years.

leveraging renovations to enforce our energy code more vigorously, we can achieve enormous savings—in our usage and energy bills. *(See table on previous page: Electricity Savings from Compact Florescent Light Bulbs)*

For private sector change, government has three basic tools in its arsenal: challenges, requirements, and incentives. We will be able to use all three, sometimes within the same targeted area. In many cases, such as the energy upgrades for large commercial and industrial buildings, we will incent behavior to encourage early adoption and then mandate compliance by 2015. We will also challenge the city's leading non-profit and commercial building owners to match the City's commitment to cut its own energy use by 30% in 10 years. The City's commitment will not only set an example, but also help incubate the expertise required for the larger citywide transformation. This, in turn, will reduce the costs of these measures for all.

Every energy-saving measure included is cost-effective, with paybacks within five years or less. And by prioritizing the largest buildings first, the maximum impact will be achieved with minimal complexity.

INITIATIVE 6

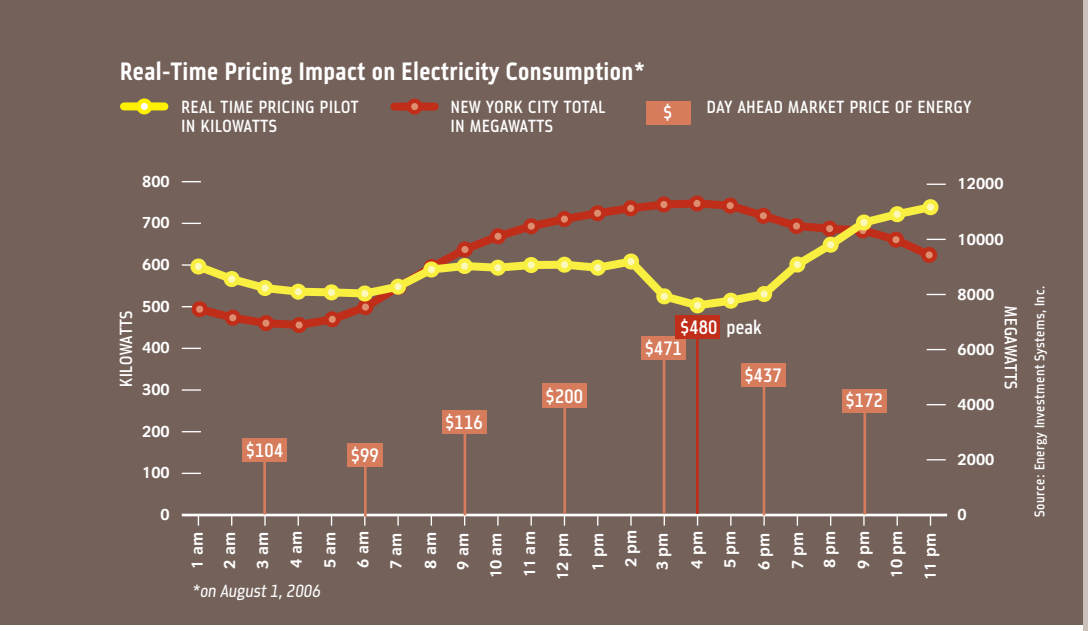
Expand peak load management

We will seek to cut peak load by 25% through increased enrollment in peak load management programs and real time pricing

Reducing our daily energy usage is critical to achieving our 30% carbon reduction goal and saving money on energy across the city.

But special measures must be taken to manage electrical power usage during the hottest days of the year, when air conditioners are running on high and our power usage is at its peak. At these times, our electric grid is strained and our oldest and least efficient plants must run to meet the city's demand. These power plants guzzle 62% more fuel and release 140% more CO_2 than newer plants. They are also more expensive to run. Our new, natural gas power plants cost $74 to produce one MWh, while our oldest plants, which were designed in the 1960s and 1970s and run on oil, cost over $250 to produce the same amount of electricity.

Peak load management programs are one way to balance electricity supply with demand, reduce the strain on the grid and



limit the use of the more expensive and often least efficient plants. The following initiatives could enable 25% of our peak demand to be shaved from the electric load.

We will seek to expand participation in peak load management programs through smart meters

In peak load management programs, customers agree to reduce their electricity load on the hottest days—either by using less electricity or by using alternative sources of generation. Participants are paid for enrollment and/or for responding during a peak event. Already, the customers enrolled can collectively reduce the city's peak load by appoximately 500 MW—or 4% of the peak electric demand in the city.

We can measure their impact because participants have installed a more sophisticated metering system that allows buildings to track their own energy use—and sometimes the energy consumption of individual tenants—in real-time. But these meters can be costly: a standard meter costs around $30, while smart meters range from $100 to $600.

Although enrollment has increased by 7% over each of the past three years, full participation is not realized due to the high cost of smart meters and the fact that entrance is mostly limited to the largest electricity consumers, such as large commercial and industrial buildings.

To overcome these challenges and allow for wider enrollment in the peak load management programs, the City will urge the PSC to approve Con Edison's plan to install smart meters in every building by 2014.

The City will work with NYPA and Con Edison on installing smart meters in all City-owned buildings before 2014. This could result in a 4% decrease in City government's peak energy usage, while reducing overall energy consumption by 5%. We will also challenge all other institutional, State, and Federal agencies located in the city to participate in peak load programs and increase their overall impact.

We will support expansion of real-time pricing across the city

Currently, consumers are able to make informed choices about when to use their cell phones; in peak times, they know that minutes will cost more than off-peak hours and can adjust their behavior accordingly. Although energy prices fluctuate just as much over the course of a day, this information is almost entirely unavailable to the vast majority of New Yorkers. *(See chart above: Real-Time Pricing Impact on Electricity Consumption; see case study: Real-Time Pricing in New York)*

If customers were able to see the costs of electricity at different times, they could make more educated decisions about when and how they use electricity throughout the day. This is known as Real-Time Pricing (RTP).

Although the State initiated a residential RTP pilot program between 2004 and early 2006, it has not provided incentives for any additional pilots since 2005.

The City will advocate for new incentives to expand RTP pilots in the city and encourage residential participation, with the goal of enrolling 50% of small businesses and residents by 2015. In addition, the City will push the PSC to mandate that 100% of medium and large non-residential customers enter RTP programs over the same time frame.

CASE STUDY

Real-Time Pricing in New York

Ellen Funk loads the dishwasher after dinner, and then she waits until 7 am the next day to turn it on.

"Running the dishwasher after dinner costs five times as much as turning it on in the morning," Funk said. "Why wouldn't I wait?"

Funk is a resident of 322 Central Park West, the first of four buildings across New York City to volunteer for a real time pricing program. Real-time pricing uses sophisticated metering—which 322 CPW installed in 2002—to track the energy usage of building residents. Most homes have meters that are read monthly, but Funk knows how much her electricity costs her every hour.

"I think everyone will buy power this way in the next ten years," said Lewis Kwit, President of Energy Investment Systems (EIS), who manages the building's energy-conserving initiative.

Monthly bills inform 322 CPW residents of their daily usage trends, and color-coated seasonal bulletins tell them what to expect at various hours in the coming months. Peak rates—often found in the hours when everyone gets home from work—represent about 25% of a building's total bill. The more residents conserve energy use during peak hours, the more money they save.

According to research done at Carnegie Mellon University and reported by *The New York Times*, American consumers would save nearly $23 billion a year if they shifted just 7% of their usage during peak hours to less expensive times—the equivalent of the whole nation getting a free month of power every year. Several real time pricing pilots are happening throughout the country, including projects in Illinois, Florida, and California.

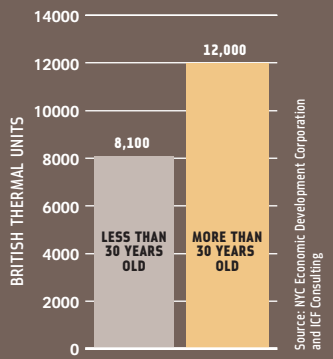
The program at 322 CPW not only helps residents save money, it also allows them to conserve energy when utility companies need it most. This could mean the difference between a brownout and a sufficient energy supply.

"When New York expects a power emergency, our buildings are notified," said Kwit. "And they respond."

Last summer, there were five blackout alerts in New York. During the heat-wave in July 2006, when parts of Queens went dark for days, 322 Central Park West cut their energy use by 42% and sold the unused capacity for $3,000.

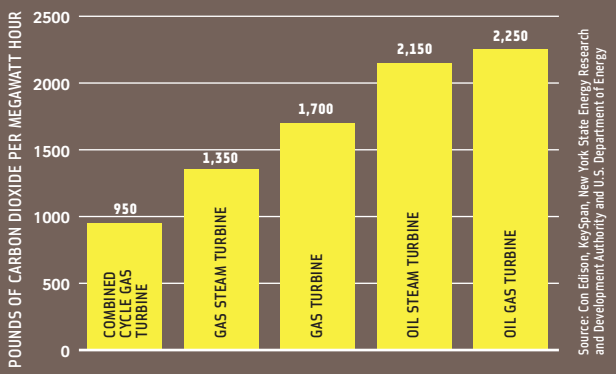
"The people in our building feel really good about the program," said Funk. "It's been a big success."

Average Energy Consumed to Produce 1kWh of Electricity*



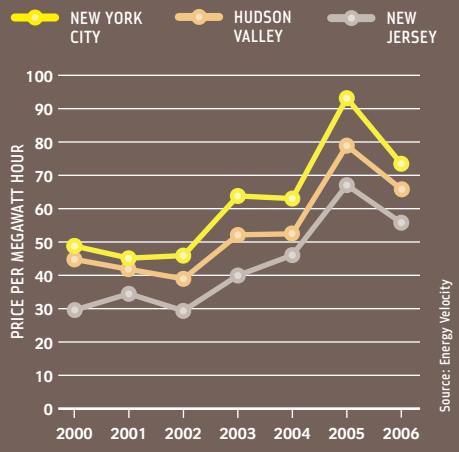
Based on 2006 capacity factors and reported heat rates for all in-city plants

Average Greenhouse Gas Emissions of City Power Plants



PERCENTAGE OF IN-CITY POWER SUPPLY				
CCGT	Gas Steam Turbine	Gas Turbine	Oil Steam Turbine	Oil Gas Turbine
24%	27%	20%	20%	10%

Electricity Prices Across the Region



Price is wholesale, does not include delivery, surcharges, or taxes.

INITIATIVE 7

Launch an energy awareness and training campaign

We will increase the impact of our energy efficiency efforts through a coordinated energy education, awareness, and training campaign

The cost savings of efficiency strategies are clear. In many cases, the programs and opportunities already exist. But unless the public and building professionals appreciate the urgency, are informed about the choices ahead, and understand the savings they can achieve, we will not meet our goal.

As a result, the New York City Energy Efficiency Authority will undertake extensive education, training, and quality control programs to promote energy efficiency. The City will begin to undertake these efforts through a series of partnerships until the Authority is established.

Education: In partnership with schools, marketing professionals, and non-profit organizations, we will develop customized awareness campaigns tailored to specific sectors of the public, including the press, schoolchildren, and those in the building trades.

Training: The effectiveness of each strategy will depend on its proper implementation. That's why we will also create training programs for building operators, builders, designers, retailers, and energy service providers to ensure that building practices reflect the most energy-efficient strategies.

Quality Control: Building owners must be confident that they will receive the expected energy savings. That's why we will establish a certification process for energy auditors, commissioning agents, and contractors performing retrofits.

We will make energy usage in buildings more transparent by encouraging building owners to file an Environmental Protection Agency Portfolio Manager survey, a web-based energy usage breakdown for buildings. This will enable us to analyze consumption patterns, and adapt our efficiency strategies to have the maximum impact.

Finally, we will establish a process to measure and verify the progress of each demand reduction initiative to establish credibility, facilitate consensus about the most cost-effective procedures, and fine-tune our policies to achieve greater effectiveness over time.

Expand the city's clean power supply

Flattening consumption will not happen overnight. Despite our efficiency efforts, by 2015 we will need at least 900 MW of new generating capacity just to keep up with rising demand and expected power plant retirements.

But to achieve New York's environmental goals and lower our energy bills, we must go beyond merely closing the gap between supply and demand. To accelerate the retirement of the city's oldest, most polluting power plants and address environmental justice issues, we must generate enough supply to compensate for that loss of power. In addition, we must also increase supply to make our prices more competitive with the region.

To accelerate the retirement of the older, less efficient plants we will build 2,000 to 3,000 MW of new electric capacity by as early as 2015. The new, efficient plants will displace generation from older plants, help drive down prices in the wholesale market, and enable us to retire 1,000 to 2,100 MW of capacity. Between now and 2015, the City will mostly rely on conventional, clean energy sources to increase supply, but we will work to set the stage for renewable energies such as solar, wind, and tidal power to play a larger role in the future. *(See charts above: Average Energy Consumed to Produce 1kWh of Electricity and Average Greenhouse Gas Emissions of City Power Plants)*

INITIATIVE 8

Facilitate repowering and construct power plants and dedicated transmission lines

We will facilitate the construction of 2,000 to 3,000 MW of supply capacity by repowering old plants, constructing new ones, and building dedicated transmission lines

Achieving clean and reliable energy will require upgrading, expanding, and replacing much of our current energy supply. Between now and 2015, the City will pursue three strategies to increase supply from cleaner power plants. *(See chart above: Electricity Prices Across the Region; see case study on facing page: East River Repowering)*

First, we can maximize existing power plant sites, either by building additional generation facilities within the existing site or modernizing the plant's technology. This process, known as "repowering" can increase efficiency up to 40% and significantly reduce greenhouse gas emissions. Replacing old turbines will also improve local air quality. The City will explore opportunities to facilitate in-city repowering that offers significant addi-

tional capacity and achieves immediate local air quality improvements.

Our second option is to build new plants on new sites. New construction costs about the same or less than repowering, but land is limited and construction costs in New York City remain high compared to the surrounding region.

Our final option is to build power plants outside city limits that are completely dedicated to providing electricity to the New York City grid. By controlling the types of plants constructed and connecting those plants directly to the city grid, we can ensure that we do not import energy from dirtier sources such as conventional coal plants.

All three of these options will provide a cleaner energy supply that is also cheaper to run. Through the New York City Energy Planning Board described above, we will help facilitate the issuance of long-term contracts to encourage new plants that are sensitive to communities.

We will also work actively with a broad range of community stakeholders to advocate for the re-enactment of Article X, which established a single streamlined process for reviewing all permitting and siting issues for power plants.

INITIATIVE 9

Expand Clean Distributed Generation ("Clean DG")

We will increase the amount of Clean DG by 800 MW

Not all power generation has to occur at central power plants. Mini-power plants located close to or at the site of use, referred to as distributed generation (DG), currently contribute 180 MW to our supply. Clean DG uses clean fuels, such as natural gas, and is a more efficient form of energy production because the energy travels a shorter distance to its destination, retaining up to 8% more energy. Clean DG can be even more efficient when it utilizes the waste heat from electrical generation to create hot water, heating, and cooling for buildings, so it is often called Combined Heat and Power (CHP). CHP can be done on a building level or developed as a "mini-grid" for multiple buildings within a small area, known as "district energy."

As a result, Clean DG can produce twice as much energy for the same amount of fuel used by older conventional power plants. This can result in substantial cost savings; new projects that integrate Clean DG can earn back their investment in three to five years, while existing buildings can cover costs in approximately five to eight years.

But this technology is not always compatible with our existing grid. As a result, Con Edison sometimes limits the amount of DG that can be connected. Applications that meet the reliability requirements established by the PSC must still undergo a lengthy 11-step connection process that can take months to complete. Lastly, permit applications to the City have also caused delays for Clean DG projects.

The City will work with Con Edison and relevant agencies to reduce the financial, technical, and procedural barriers related to interconnection in order to achieve, at minimum, 800 MW of Clean DG by 2030.

We will work with Con Edison to expand the amount of Clean DG that can be safely connected to the grid.

This spring, Con Edison will be filing with the PSC for a change in the rates that they charge customers. The City will use this opportunity to advocate that Con Edison study the capacity of individual networks to handle more DG without impacting network reliability and power quality. During the same rate case, the City will also ask Con Edison to study new technologies that would increase the amount of Clean DG that can be safely connected to the grid.

In addition, to improve communications between Con Edison and prospective developers of Clean DG, the City will push for Con Edison to develop an on-line interconnection application tracker that clearly shows what stage interconnection applications are in and sends automatic alerts when delays occur.

We will promote opportunities to develop district energy at appropriate sites in New York City

In 2005, Con Edison analyzed the projected energy needs of the Hudson Yards Redevelopment Area. It found that extending the existing steam infrastructure used for heating in Manhattan below 96th Street to reach the Hudson Yards area would be prohibitively expensive—but district energy may be a viable alternative.

At the City's urging, Con Edison is currently overseeing a more extensive analysis of the economic and technical feasibility for a district energy project in the Hudson Yards area. If the study finds that district energy is feasible, the City will seek to implement a district

Source: Con Edison

CASE STUDY

East River Repowering

In April 2005, Con Edison completed a massive repowering project involving a complex choreography of equipment, experts and energy—steam, to be exact.

The company's East River steam generating facility, for years the target of community criticism about the high level of emissions, underwent an extensive program of operational enhancements, equipment upgrades, and reduced oil burning in favor of clean natural gas.

As a result, the facility now is one of the cleanest power generating facilities in New York State.

Steam—which can be used in some cases instead of electricity—is an efficient way to cool a building. Steam cooling in New York is especially valuable because Con Edison's nine central steam plants currently replace the need for 375 MW of electricity, which helps to reduce the city's peak demand on the hottest summer days.

The East River repowering helped expand the city's steam supply, enabling the plant to produce 25% more steam per hour.

But while repowerings lower emissions and increase efficiency, they come at a high cost. All of the new equipment must be installed within the existing parameters of the building, while the old equipment continues operating.

To solve these challenges, most of the large machinery—including two dual-fuel combustion turbines and two heat-recovery steam generators—had to be constructed off-site, shipped to the plant on a barge, and then lifted over the FDR Drive and lowered into the building through openings in the roof and walls.

We will encourage additional repowerings, especially at Con Edison's steam plant on Hudson Avenue in Brooklyn. We will also support the expansion of steam as a power source for the city by expanding the existing discount program to steam.

energy plan through Con Edison or independent developers.

In addition, we will require through the building code that new developments larger than 350,000 square feet across the city complete an analysis on the technical and economic feasibility of installing CHP. This analysis will help building owners understand the benefits of CHP and help accelerate transformation of the CHP market.

INITIATIVE 10

Support expansion of natural gas infrastructure

We will support critical expansions to the city's natural gas infrastructure

New power plants and expanded Clean DG will both require the use of natural gas, the cleanest-burning fossil fuel. Already, natural gas fuels 80% of our power plants and more than a quarter of all energy used in buildings—and in the coming decade its use will continue to rise.

But there are two challenges to reliable, affordable supply of natural gas in New York.

Four long pipelines carry natural gas into the city, extending from the Gulf of Mexico and the Canadian border. On the hottest and coldest days of the year, our demand already exceeds the capacity of these pipelines by up to 1.2 billion cubic feet. We have been able to ensure reliable heating and power by keeping enough gas in storage to cover this gap, but as demand continues to increase it will become more difficult to meet the need.

This delivery constraint leaves us vulnerable to any disruptions along the pipelines or unexpected temperature swings. New York already has some of the highest natural gas prices in the nation. But when cold weather strikes, the spike in demand propels prices even higher. For example, during a cold snap in February 2003, natural gas prices went from $7.50 to $28/MMBtu in one day and momentarily reached $40/MMbtu. While other regions in the Northeast and Midwest were experiencing a similar cold front, the price impact was not nearly as dramatic.

As the demand for heat and power grows, these problems will only get worse—unless we take action to expand our natural gas supply. That's why we will support siting and permitting applications to the Federal Energy Regulatory Commission and other relevant regulatory authorities for additions to our natural gas infrastructure. Currently, there are several active proposals for pipeline projects and liquefied natural gas ("LNG") terminals that would expand our access to gas.

Given how critical new natural gas infrastructure is to our long-term energy security, the City will support the development of new infrastructure projects that are designed to be sensitive to environmental and community needs.

INITIATIVE 11

Foster the market for renewable energy

We will provide incentives and reduce barriers to renewable energy and pilot emerging technologies

Renewable energy is derived from emission-free and seemingly unlimited sources such as solar, wind, and hydroelectric power. Over the long-term, renewable energy has the potential to play a significant role in our energy supply. *(See case study on facing page: Tidal Power in New York City)*

New York State is a leader in renewable power, with extensive hydroelectric and wind resources already located upstate, and several major wind farms currently under development. The State has also committed to ensure that 25% of its energy comes from renewable sources by 2013.

Today, New York City receives over 6% of its electricity from the State's renewable energy resources. In addition, the City recently committed to purchase 20 MW of wind for City government operations starting in 2008. This agreement helped support the development of a second phase of a 107 MW wind farm upstate. New York City consumers also have the opportunity to further support the market for upstate wind and other renewables by selecting green power as their energy source.

If we expand our reliance on renewable energy, we could help secure our energy supply, reduce our greenhouse gas emissions and improve air quality.

Solar energy

Of all the renewable energy sources, solar currently has the greatest potential to generate electricity within the five boroughs. The technology is commercially available, our abundant roofs offer ample space for panels, and solar energy is most available when the city needs it most—during hot, sunny days.

Estimates of solar potential by Columbia University, the City University of New York, and NYSERDA range from 6,000 MW to over 15,000 MW, with one study claiming solar can contribute 18% of peak load by 2022. But solar energy is still not as cost-effective as gas-fired electricity. And New York City is uniquely expensive: our taller buildings require more wires and cranes to carry equipment to rooftops, while extensive interconnection requirements and inspections delay implementation. For these reasons, installed costs for solar are approximately 30% higher than in New Jersey and 50% higher than in Long Island.

As a result, even with incentives from the Federal government and the State, the City has only been able to achieve 1.1 MW of solar capacity. To ensure solar meets its long-term potential to contribute more significantly to our supply, we must employ a range of strategies to develop a more competitive market.

We will create a property tax abatement for solar panel installations

In order to spur the market in the private sector and help achieve needed economies of scale to bring down prices, New York City will offer a property tax abatement for solar installations. The incentive will cover 35% of installation costs for the first three years of the program, with the incentive scaling back to 20% in years four and five. The graduated structure of this incentive will grant early adopters greater benefits, ensuring that a market is established.

In addition, the City will study the cost-effectiveness of solar electricity when evaluated under a Real Time Pricing scenario. The City will also support the construction of the city's first carbon neutral building. This building, located along the East River, will be powered primarily by solar energy.

We will increase use of solar energy in City buildings through creative financing

Since City facilities are not eligible for NYSERDA incentives or tax credits, the economics for public solar projects are even more difficult than in the private sector. In order to facilitate solar projects on City buildings, we will release an RFP to attract private solar developers to build, own, operate, and maintain the panels on City buildings. The City will enter into a long-term contract with the developer to purchase the solar energy generated by these panels.

CASE STUDY

Tidal Power in New York City

A thin sliver of the East River between Queens and Roosevelt Island looks just as it did a year ago. But there's an important difference under the river's surface. Today, turbines in the water's depths are testing the river's ability to harness the tide, creating a powerful kind of energy.

Last December, Verdant Power built and installed two of six planned underwater turbines eight feet below the surface of the East River as part of the Roosevelt Island Tidal Energy project (RITE). The turbines look like windmills, and as the tide goes in and out, they capture some of its energy, converting it directly into electricity.

Tidal power is predictable and reliable, flowing with the everyday force of the moon on New York City's rivers. The density of the water means that fewer turbines are necessary to produce the same amount of electricity as wind turbines.

"It's the depth and strength of the current in New York's waterways that makes them turbine-friendly," said Mollie Gardner, a geologist who works with Verdant Power. "The water is perfect."

Not only is the water itself perfect—it's perfectly situated. Because our rivers are near underground transmission lines, the turbine-generated power could easily be plugged into the existing power grid, allowing for the tidal energy to be sent swiftly to waiting customers. RITE turbines in the East River have already generated more than 10,000 kilowatt hours of tidal power for a supermarket and parking garage just yards away from the pilot site off the Roosevelt Island waterfront.

A third of the $6 million budget went to sonar radar equipment to study the project's effect on its surrounding environment and ensure nearby fish and swooping birds won't be harmed.

If the project is successful, the East River could become home to 300 turbines, providing 10 MW of renewable energy for New York City, enough to power up to 8,000 homes. That power could displace the equivalent of 68,000 barrels of oil, or 430 million cubic feet of natural gas per year.

"We're making such wonderful breakthroughs in harnessing water for energy with the least amount of environmental impact," said Trey Taylor, Co-Founder and President of Verdant Power. "And what excites me is that it's all taking place here in New York City."

We will work with the State to eliminate barriers to increasing the use of solar energy in the city

To further promote solar energy, the City will work with the State Legislature and the PSC to reduce two existing barriers: the amount of solar that can be connected to the grid, currently capped at 8.1 MW, and the amount of excess power that can be sold back to the grid, currently limited to 10 KW of residential power.

Methane and organic waste

Our garbage and sewage offer both potential and perils. If used productively, organic waste or biomass can provide a plentiful source of energy, producing as much as 450 MW—or the equivalent of a medium-sized power plant. Handled improperly, it can add significantly to our greenhouse gas emissions through the production of methane—which is 21 times as potent a greenhouse gas as CO2.

New York City's three main sources of methane include its current solid waste, its former landfills, located within the city, and its sewage treatment plants. Currently, some of this methane is captured and either flared—burned and converted into less potent CO_2—or used to create energy. But much of it still escapes into the atmosphere.

That's why New York City will work to maximize the safe, cost-effective extraction of useful energy from its organic waste streams and minimize the methane and CO_2 emissions associated with waste.

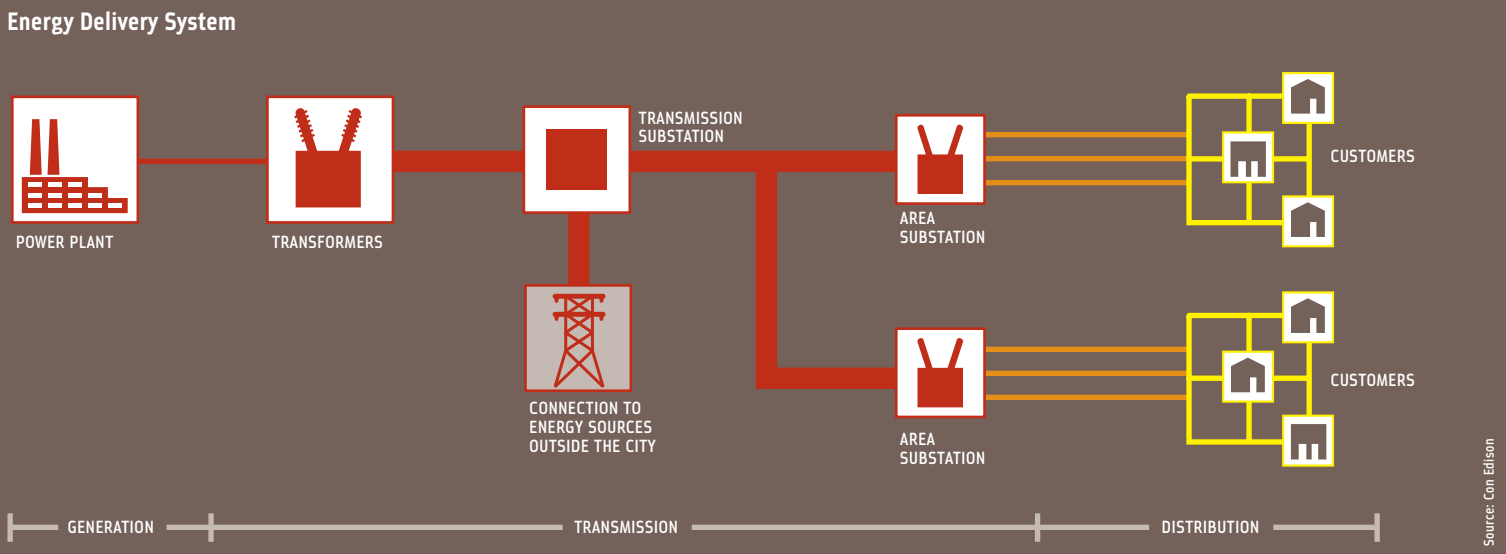
We will pilot one or more technologies for producing energy from solid waste

The City's recently approved Solid Waste Management Plan (SWMP) called for the evaluation of alternative waste technologies for converting organic waste into usable energy. Out of 43 technologies studied, two offered superior environmental performance and cost-effectiveness—anaerobic digestion and thermal processing. We will launch pilot projects to test both of these technologies for broader application.

The City is also pursuing a pilot in the Hunts Point Food Distribution Center. In 2004, the City commissioned a study to investigate the feasibility of on-site organic waste recovery at the Food Distribution Center in the Hunts Point neighborhood of the Bronx. The study concluded that it is feasible to site an anaerobic digestion facility that would provide a reasonably priced organics recovery option. The facility would create jobs for the Hunts Point community, generate a renewable energy source and a marketable compost product, and reduce exports of waste to out-of-state disposal facilities with associated truck emissions. The City will work with stakeholders to learn more about the potential for such a facility in Hunts Point, including more exact costs of a potential organics recovery facility. To do so, the City will issue an RFP to target the short list of firms identified in the feasibility analysis, and set specific operational and economic parameters for a facility.

We will end methane emissions from sewage treatment plants and expand the use of digester gas

When wastewater is processed in a sewage treatment plant, it produces digester gas, which contains methane and CO_2. Currently, roughly 60% of New York City's digester gas is collected and used to create energy via fuel cells, most of which is used to power the sewage treatment plant itself, another 25% is flared, and the remaining 15%—the equivalent of 165,000 tons of CO_2—escapes. Over the next three years, the City will end all methane emissions from sewage processing, and will work to expand the use of digester gas for energy production.



We will study the expansion of gas capture and energy production from existing landfills

Beginning in the 1970s, some of the methane from Fresh Kills has been processed and marketed as natural gas, generating revenue for the City. Since the original gas collection system was installed, new technologies have emerged, the cost of natural gas has skyrocketed, and the City has committed to a greenhouse gas reduction target of 30%. Given these changes, the City will initiate a study to explore the feasibility of generating more energy from its landfill gas, and it will review the standards regarding methane capture and flaring at the city's existing landfills every five years to see whether they should be amended to support the City's greenhouse gas reduction goal.

Modernize electricity delivery infrastructure

The final important component of clean, reliable power is the delivery of that energy to New York City customers. *(See graphic above: Energy Delivery System)*

Today, New York City's power grid is the largest underground electric cable system in the world. Operated by Con Edison, there are almost 90,000 miles of underground cable and almost 20,000 miles of overhead cables in the city.

This system is subdivided into mini-grids or network neighborhoods that deliver power directly to each building. The interconnections within our grid provide essential redundancy, making it the most reliable network in the United States. But when power failures do occur, the network's age and complexity can often make it more difficult to identify the problem and restore power. These problems were illustrated most clearly during the 2006 power outages in western Queens when Con Edison could not easily assess the scope of the outages. Calls from customers became the primary way to assess the extent of the damage.

In addition, upgrading our infrastructure —especially the underground cables—can be time consuming, costly, and difficult. Finding locations to site substations in growing neighborhoods is a difficult challenge. In order to improve reliability, we must adapt our grid to the demands of the 21st century, improving communications between customers and the utility, making our grid more transparent so that problems can be identified more easily, and improving its ability to respond to new pressures and incorporate new technologies.

INITIATIVE 12

Accelerate reliability improvements to the city's grid

We will advocate for Con Edison to implement recommendations from the City's report on the western Queens power outages

The damage caused by the 2006 power outages demonstrated the need for extensive upgrades to the city's electric delivery system. A City evaluation found that some of the failures in western Queens could have been avoided if equipment had been updated in a timelier manner, if upgrades to the system had been monitored more closely or if Con Edison had fully implemented recommendations made after the Washington Heights blackout in 1999.

We will advocate before the PSC and through the upcoming Con Edison electric rate case for the implementation of the 53 recommendations contained in the City's report. These recommendations include:

- Expanding the installation of advanced meters, which will improve Con Edison's ability to instantly identify the number of customers affected by a power outage
- Accelerating repairs to failure-prone components of the grid and strengthening oversight of contractors
- Completing the implementation of all recommendations from the 1999 blackout, while evaluating similarities with the Queens blackout for additional lessons on how to improve grid reliability

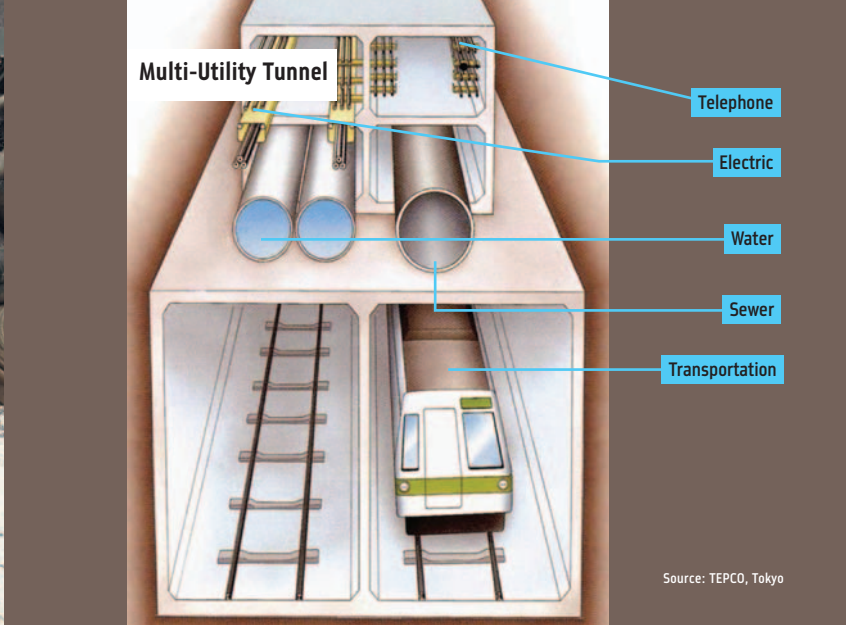
INITIATIVE 13

Facilitate grid repairs through improved coordination and joint bidding

We will pursue the passage of joint bidding legislation

When the City undertakes a construction project that involves tearing up the street, each affected utility is responsible for protecting its own cables and other infrastructure. Improved coordination between City contractors and the utilities will result in fewer delays and lower costs.

Joint bidding enables a single contract to cover all the work associated with a project. The City will support joint bidding legislation citywide to allow for fair competitive bidding and more seamless project planning, resulting in fewer street openings and lower costs to the public.



In addition, the City will review its policies governing the utilities' ability to open up the street for regular maintenance and repairs. This analysis will identify any unnecessary delays that prevent utilities from undertaking essential improvements such as installing new cables and transformers in a timely manner. We will also look to pilot new models to improve coordination among developers of underground infrastructure, such as the use of a multi-utility tunnel which allocates space for each utility with designated access points. *(See graphic on facing page: Multi-Utility Tunnel)*

We will ensure adequate pier facilities are available to Con Edison to offload transformers and other equipment

Transformers and other heavy equipment needed to maintain New York's energy infrastructure are often delivered via the waterways. This equipment is then offloaded at pier facilities throughout the city. Sites must be capable of handling heavy loads and provide access to acceptable transportation routes to assure prompt and safe delivery of the equipment. In order to maintain and upgrade the reliability of the electric system, it is essential that Con Edison have access to specific dock facilities to offload this equipment during both emergencies and during the regular course of business. This is particularly critical in areas where there is a regular need to install, replace or remove equipment and Con Edison does not own its own waterfront property.

For this reason, the City will work with Con Edison to identify specific critical sites and maintain open access for delivery of equipment along the waterfront.

INITIATIVE 14

Support Con Edison's efforts to modernize the grid

We will support Con Edison's 3G System of the Future initiative

Our current grid was designed during the 1920s. Today, parts of that original system are still in use—and the way it functions remains fundamentally unchanged. But grid technologies are evolving around the world and new models have emerged in Tokyo, Paris, and London.

Con Edison initiated a state-of-the-art research and development project called the *3G System of the Future* to study how to transform our network into a 21st century grid. This will include how to integrate advances in communications, computing and electronics to respond faster and more effectively to localized network problems and demand fluctuations.

This research and development will require a significant investment. The City will support funding requests by Con Edison to advance this research and improve reliability and service for New Yorkers.

Conclusion

Last summer, we saw the strains on our energy infrastructure and the impact it had on our air quality, energy bills, and overall quality of life. And these stresses—growing demand, inefficient supply, and aging delivery network—continue to test our system.

That's why we will launch the most ambitious energy efficiency program in the United States, while easing the financial risks associated with expansion and construction of power plants and dedicated transmission lines. The combination will enable us to retire our city's most polluting plants.

At the same time, we will reduce barriers to Clean Distributed Generation or "mini" power plants that are more efficient and cleaner than centralized power plants.

Lastly, we will continue to purchase wind energy, support the market for solar energy, and pilot new and emerging technologies that use wind, tides, hydrogen, and biogas to generate electricity. By encouraging these emerging, clean technologies, we will begin building a market to establish the cleanest possible energy supply for New York City's future.

Implementing all of these policies will reduce the city's global warming emissions and cut the average New Yorker's energy bill by $230 annually from projected costs in 2015. The new strategies will also result in new economic opportunities as new industries swell around installation, renovations, and production; the retro-fit and retro-commissioning program alone could result in 5,000 new jobs.

By investing in these efforts now, the city of endless energy can stay that way.

Despite decades of improvement, New York City still fails to meet Federal air quality standards—and we have no way of measuring the air quality in individual neighborhoods.

That's why we will create a comprehensive program to reduce emissions from a variety of sources within the city, including vehicles, power plants, and buildings. Natural solutions such as planting one million trees will bring us the rest of the way towards cleaner air for all New Yorkers. To track our progress and target our solutions to the areas of greatest need, we will launch the largest local air quality study in the United States.

Together, these initiatives will enable every New Yorker to breathe the cleanest air of any big city in America.

Air

Air Quality

Achieve the cleanest air quality of any big U.S. city

Air Quality

Credit: © Rob Howard/Corbis

Achieve the cleanest air quality of any big U.S. city

Trucks begin entering the Hunts Point neighborhood hours before sunrise. They arrive by the hundreds under expressways, over highways.

By sunset, more than 15,000 trucks have driven through the peninsula, virtually all powered by diesel fuel. The trucks rattle down alternate routes, of 10 slipping down side streets, past houses and apartment buildings, as they search out the Produce Market, the Fulton Fish Center, the meat market.

Fifteen million people eat food distributed through the center every day. Facilities like the Produce Market were built in the 1960s, when the demand for produce was significantly less. Now there is not enough storage space to meet the need. The trucks help solve this problem. Up to 1,000 act as refrigerators every day, engines gunning for hours to keep the cool air pumping into the back so the produce can stay fresh in its stacked boxes.

Trucks are a fraction of the traffic through the South Bronx. More than 77,000 vehicles pass through the neighborhood daily, spewing exhaust and gasoline fumes. The area is served by only one bus route and the nearest subway can be a significant walk. But with the work of the Hunt's Point Task Force, the opportunity for change is beginning to be realized.

Not so long ago, incinerators, industrial factories, and the rise of traffic and diesel fuels lent most images of our city a blurred, gray edge. The pollution from these sources hurt our city's air quality—and had harmful consequences for the health of New Yorkers.

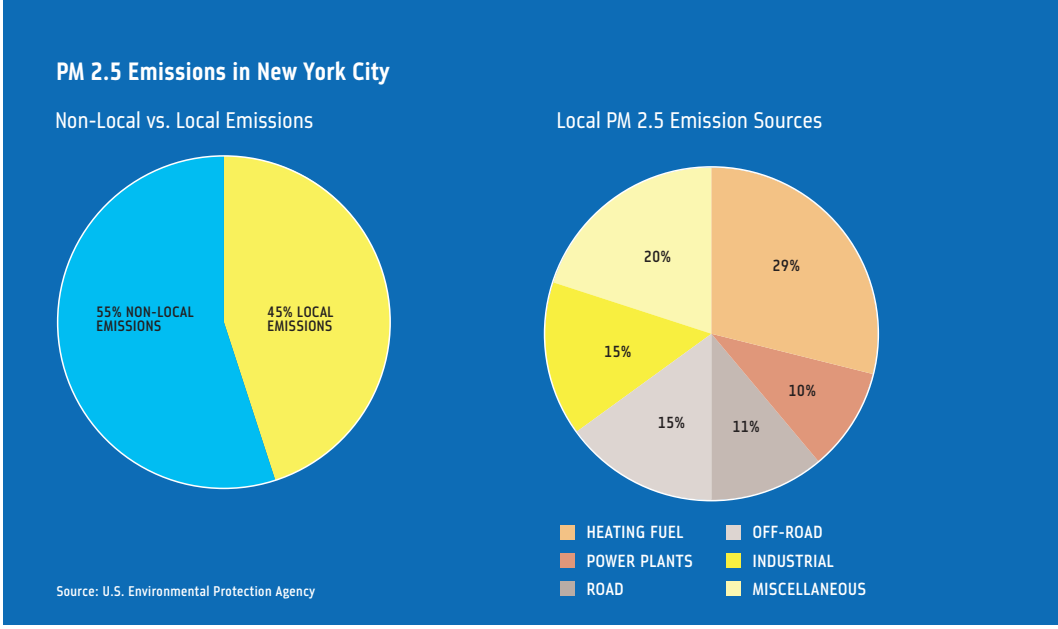
That has changed. Over the past two decades, Federal, State, and local governments have recognized the need for action. In addition to the Federal Clean Air Act, the City has lobbied—and, when necessary, litigated—all levels of government to strengthen these standards. Within the five boroughs, local programs and legislation—such as the retrofit program for City school buses and Metropolitan Transportation Authority (MTA) buses, the City's purchase of hybrid and Compressed Natural Gas (CNG) vehicles, and new construction standards—have all combined to give New York its cleanest air in half a century.

Still, the improvements that have occurred citywide are not felt equally among our neighborhoods. In some communities, the impacts of exposure to local air emissions have likely contributed to higher asthma rates and other diseases. Citywide, air quality fails to meet all of the Federal standards, in large part because of air pollutants that travel here from other states.

The New York City metropolitan area has not yet fully attained Federal air quality standards for two of six ambient air pollutants designated by the Environmental Protection Agency (EPA): ozone, and soot (PM 2.5). This puts us behind all but one of the largest cities in America.

Despite our progress, there is more to be done.

View over Central Park



In the 37 years since the passage of the Clean Air Act, our understanding and awareness of pollution has continued to increase. As our knowledge has evolved, the focus of air quality efforts has shifted. Three main considerations have shaped our approach to improving air quality in every neighborhood.

First, it is becoming clearer where the real dangers lie. Although the EPA tracks six criteria pollutants, among the most dangerous is PM 2.5—more commonly known as soot. Its small size lets it drift deeper into the lungs, where it can cause inflammation and other damage. According to the EPA, exceedances of the PM 2.5 standard cause up to 15,000 premature deaths annually. Estimates from the City's Department of Health and Mental Hygiene show that a 10% decrease of current levels in New York City would result in hundreds fewer deaths annually.

PM 2.5 is a by-product of burning fuel in trucks and buses, factories and power plants, and boilers. Other criteria pollutants—sulfur dioxide (SO_2), nitrogen dioxide (NO_X), and volatile organic compounds (VOC)—form additional PM 2.5 through chemical reactions. In fact, according to the State's Department of Environmental Conservation (DEC), somewhere between 45% and 60% of PM 2.5 levels in New York City comes from sulfate transformed in the atmosphere from SO_2 emissions. *(See charts above: PM 2.5 Emissions in New York City)*

Second, we have also learned what we do not control. More than 50% of New York's PM 2.5 originates outside the city. Some pollution drifts in from other states, mostly from mid-western power plants and factories; more is expelled from airplanes. The wind catches exhaust from the west and carries it into the city. Depending on the time of year, up to 70% of particulate matter measured in the city comes from somewhere else.

Some of these polluters can be held accountable. In 2003, the City joined several states and municipalities in a successful lawsuit challenging the EPA's plans to change regulations to enable older, more polluting facilities to increase air pollution emissions, which would have impacted New York City's air quality. The City also joined a number of states in a public nuisance action designed to force the five largest United States power plant CO_2 polluters to reduce their emissions.

Finally, it is clear we need to re-examine the methods we use for measuring pollutants to more accurately reflect their local impact.

The EPA began addressing regional air pollution issues as part of a broad, interstate approach. The EPA and DEC deliberately placed most monitoring systems away from highways, power plants, and heavily-trafficked roads so that their emissions wouldn't skew the results. The intent was not to record the output of an individual smoke stack, but to understand how that smoke affected the region.

Today, the EPA still largely measures its success by looking at overall area concentrations; the cumulative pollution gathered over a given region. But implicit in that decision is the acknowledgement that the closer one gets to an actual polluter, the greater the exposure to that pollution. In cities like New York, where roads, power plants and highways are interwoven through communities, the ambient measurements are inadequate indicators of actual exposure. Virtually all of us live, work, or walk near heavily trafficked streets. And we are learning that those are the highest risk zones.

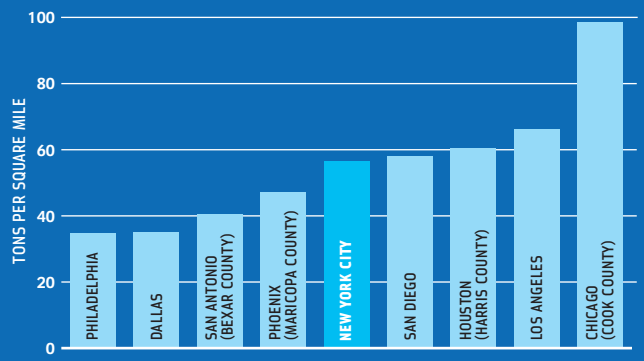
Recent studies have begun to measure local pollution exposure correlated with health impacts of the surrounding communities. This is the next front of air quality science. It is also an area where the City can have an enormous impact. When the issue is solving regional ambient air quality, the impact on any neighborhood is uncertain. But when the focus is on local exposure and community health, there are various opportunities to decrease environmental disparities.

In the South Bronx, where asthma rates are particularly high, the City has worked with local communities to begin installing a network of parks. We are exploring an alternative fuel station for drivers, a program to retrofit and upgrade trucks, and conversion of entire fleets to Compressed Natural Gas, which has 90% lower carbon monoxide and particulate matter emissions than diesel. And there's a lot more we can do.

The findings of these local exposure studies are compelling. We must build on these efforts to gain an accurate understanding of the air quality variations across New York City. Meanwhile, we can begin moving forward on policies designed to reduce our biggest known polluting sources—diesel fuels, gasoline exhaust, building heating oil, and aging power plants with outmoded technology—while promoting natural solutions like trees.

We will also support an air quality plan being developed by New York State to meet Federal standards. This plan will be released in 2008.

PM 2.5 in U.S. Cities*



Source: U.S. Environmental Protection Agency

In cases where city-level data is unavailable, county-level data is provided

PM 2.5 Air Quality Improvement Plan

CATEGORY OF EMISSION SOURCES	PM 2.5 EMISSION IMPROVEMENT
On-road Vehicles	9%
Off-road Vehicles	7%
Electricity And Heating Fuels	23%
Natural Strategies	≈1%
TOTAL	**40%**

Source: NYC Mayor's Office of Long-Term Planning and Sustainability
Calculations based on U.S. Environmental Protection Agency 2001 National Emissions Inventory

Our Plan

We must continue pressuring the states and Federal government to reduce air emissions nationwide. But even as we seek to hold others more accountable, we can begin targeting the sources in New York City even more aggressively. *(See charts above: PM 2.5 in U.S. Cities and PM 2.5 Air Quality Improvement Plan)*

Based on current emissions levels, we will need to reduce our local PM 2.5 by 39% per square mile to achieve the cleanest air of any big city in America. But as other cities take steps to improve, we must keep pace. That means we must be continually re-evaluating our goal and benchmarking it against other cities.

We have chosen PM 2.5 as our standard because of its significant impacts—and because we lag behind our peer cities in stemming its release into the air. But other pollutants such as SO_2, NO_X, and VOCs also contribute to our PM 2.5 levels, so achieving further reductions in those emissions will also be essential.

In order to achieve this goal, we have developed a four-pronged strategy. Transportation accounts for more than 50% of our criteria pollutant emissions. That's why we will reduce emissions from cars, trucks, and buses by promoting fuel efficiency, cleaner fuels, and cleaner or upgraded engines. We will also increase the use of exhaust filters and reduce the added pollution caused by congested streets and idling.

Second, we will apply similar strategies to off-road vehicles, including ferries, construction equipment, and planes. By partnering with the Port Authority, the MTA, New Jersey Transit, and private operators, we can achieve substantial reductions across all transportation sectors.

Third, the electricity and heating fuels used to power and heat our buildings accounts for over a third of emissions. As described in our energy plan, we must tackle old, outdated power plants and exchange them for modern, more efficient models; we must also switch to cleaner burning fuels and remove polluting boilers from schools, prioritizing sites where children suffer from higher rates of asthma and other diseases.

And finally, we must increase natural areas within the city to act as filters to further improve air quality. Trees, plantings, and landscaping serve multiple environmental and aesthetic ends—improving water quality, reducing carbon emissions, and enhancing quality of life in neighborhoods.

But we have an opportunity to do even more. In addition to improving air quality across the city, we can begin understanding how air quality impacts the health of New Yorkers in every neighborhood. That's why we will launch the largest local air quality study ever in the United States and develop an approach for tracking local emission levels. By advancing efforts to understand the real scope of the problem, we can direct our resources to the areas of greatest need.

Through these strategies, we will accelerate air quality improvements so that every New Yorker can depend on the promise that they are breathing the cleanest air of any big city in America.

Our plan for air quality:

Reduce road vehicle emissions

1 Capture the air quality benefits of our transportation plan
2 Improve fuel efficiency of private cars
3 Reduce emissions from taxis, black cars, and for-hire vehicles
4 Replace, retrofit, and refuel diesel trucks
5 Decrease school bus emissions

Reduce other transportation emissions

6 Retrofit ferries and promote use of cleaner fuels
7 Seek to partner with the Port Authority to reduce emissions from Port facilities
8 Reduce emissions from construction vehicles

Reduce emissions from buildings

9 Capture the air quality benefits of our energy plan
10 Promote the use of cleaner burning heating fuels

Pursue natural solutions to improve air quality

11 Capture the benefits of our open space plan
12 Reforest targeted areas of our parkland
13 Increase tree plantings on lots

Understand the scope of the challenge

14 Launch collaborative local air quality study

Reduce road vehicle emissions

In 2005, vehicles traveled 18.6 billion miles throughout the five boroughs, approximately 48 million miles per day. Each year, these trips generate about 11% of our local PM 2.5 emissions, as well as 52% of NO_X and 32% of VOC emissions, both of which contribute to PM 2.5 levels.

There are four main ways to reduce transportation-related emissions: use fewer vehicles by shifting to mass transit; decrease the amount of time vehicles spend stuck in congestion and idling; use less and cleaner fuels; and filter exhaust before it is released into the air.

To fund these efforts, a variety of sources exist: the Port Authority, the Federal Transit Administration (FTA), and the Congestion Mitigation and Air Quality (CMAQ) program. CMAQ grants are awarded in areas that currently or recently failed to meet Federal standards. They are funded by Congress through Federal highway funds and are intended to mitigate any impacts associated with road development.

All of these are necessary to **reduce overall PM 2.5 emissions across the city by 9% by 2017.**

INITIATIVE 1

Capture the air quality benefits of our transportation plan

We will address a significant source of harmful emissions by promoting the use of mass transit

The most effective way to use less fuel is to reduce the number of cars on the road. But this has not been easy over the past 25 years. Although our subway system improved dramatically, the percentage of drivers has remained essentially unchanged. It is clear that improvements to mass transit will not be enough to achieve a significant mode shift among New York drivers, an imperative for our economy and public health. Without intervention, traffic conditions will continue to deteriorate. By 2030, rush hour could last 12 hours every day.

That's why we will seek to implement congestion pricing, a system that charges drivers to enter a city's central business district. Already used in London, Stockholm, and Singapore, New York City's system will assess Manhattan drivers in the designated zone an $8 charge between 6am and 6pm. This charge will result in a 6.3% reduction of vehicles miles traveled in the area, which could yield a 3.7% reduction in VOC, a 2.8% reduction in NO_X, and a 2.8% reduction in carbon monoxide emissions across the city. *(See case study on facing page: Congestion Pricing's Air Quality Impact)*

INITIATIVE 2

Improve fuel efficiency of private cars

We will promote wider use of clean vehicles

In addition to using fewer vehicles, we can also make the ones we have more efficient. Already, New York State has adopted some of the newer vehicle emission standards enacted by California. This alone will reduce New York City's total CO_2 emissions by over 6% by 2030. But there is still room to be more ambitious; we will encourage the state to follow new fuel standards established by California that would reduce carbon emissions from all gasoline sold in New York State.

The City can also do more to reduce emissions of both criteria pollutants and CO_2 by encouraging the purchase of the cleanest, most efficient cars, and increasing the efficiency of taxis and for-hire vehicles.

We will waive New York City's sales tax on the cleanest, most efficient vehicles

In a five-year pilot program, the City will waive its portion of the New York State sales tax on the purchase of the cleanest and most efficient vehicles, including hybrids, according to the highest performance ratings in criteria set by the EPA.

On average, qualifying vehicles attain roughly twice the fuel efficiency and reduce air emissions by half. If 10% of the city's gas vehicles were efficient hybrids, it would reduce our citywide CO_2 emissions by 1%, and by 2030, if market trends accelerate, this will result in more than a 3% PM 2.5 emissions reduction citywide.

We will work with the MTA, the Port Authority, and the State Department of Transportation (State DOT) to promote hybrid and other clean vehicles

In other cities, toll discounts, preferential lane access, and other privileges have been granted to owners of hybrid cars to encourage people to buy them. Such incentives must be applied cautiously; for maximum effect, a single, region-wide approach would need to be adopted. The City will work with the other operators of the region's transportation network to identify approaches for promoting the most efficient vehicles that would make sense for New York.

We will pilot new technologies and fuels, including hydrogen and plug-in hybrid vehicles

The City was an early convert to hybrid vehicles and helped build a broader market for this technology. Over 1,700 hybrids have been added to the City's vehicle fleet in the past five years. By 2006, hybrids represented nearly 7% of the City's total fleet, as compared with less than 1% of the private vehicles registered in New York City.

To maintain our position as a leader in clean transportation technologies, the City will construct a hydrogen fueling station and pilot six hydrogen vehicles starting in 2008. Hydrogen cars emit little more than water vapor upon combustion. As a result, they are essentially zero emissions vehicles.

The three-year demonstration project will introduce the city to the possibilities and potential challenges of this technology. Through this pilot, we will establish a permitting process for hydrogen refueling and vehicle operation within the city and partner with the New York City Fire Department to develop safety standards for operating and refueling. By testing and refining these procedures, we will be able to accelerate a broader transition to hydrogen as soon as the technology becomes more readily available.

The fueling station will be owned and operated by Shell Hydrogen, a division of the Shell Group. Two sites in the Bronx and Staten Island are currently under consideration to be the first hydrogen fueling location in the city. To fund the $820,000 project, the City has applied to the New York State Energy Research and Development Authority (NYSERDA) for a grant.

In addition to hydrogen, we are carefully tracking the development of plug-in hybrid technology. A plug-in hybrid functions like a regular hybrid, but its battery can be charged by plugging into a standard outlet, instead of relying exclusively on the car's gasoline-fueled engine. Drivers can run on the electric mode to achieve 100 miles per gallon, consuming significantly less petroleum and emitting fewer air pollutants and greenhouse gases.

INITIATIVE 3

Reduce emissions from taxis, black cars, and for-hire vehicles

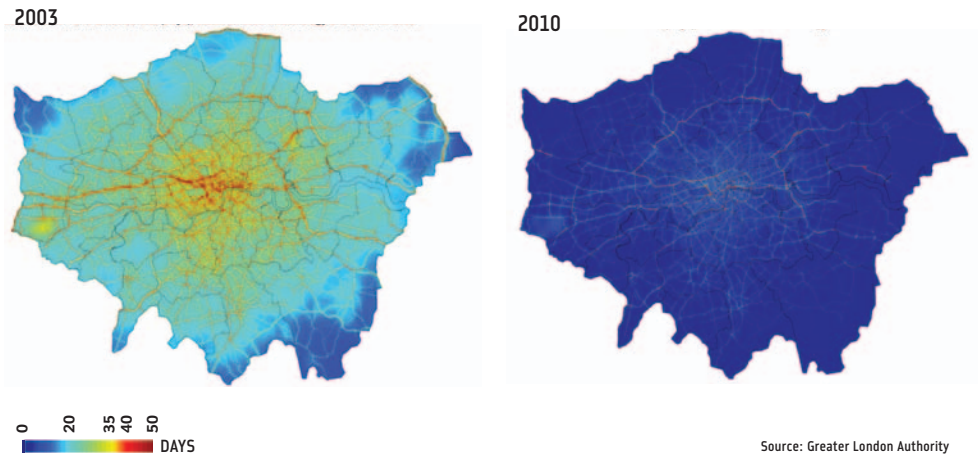
In New York City, there are currently over 13,000 yellow taxi cabs, 10,000 black cars, and 25,000 for-hire vehicles. Because taxis travel tens of thousands of miles per year and the current fleet is so fuel inefficient, taxis account for a substantial share of city emissions: 4% of all ground transportation CO_2 emissions and 1% of all city CO_2 emissions. This initiative will reduce citywide CO_2 emissions by 0.5% while also improving air quality.

We will reduce taxi and limousine idling

Idling is the continuous operation of a vehicle's engine while it is stopped. Many of the city's yellow taxis and black cars spend significant time idling in order to maintain access to their air conditioning and heating. Although there is currently no way to keep air conditioners reliably running with the engines off, emerging technologies have it made it possible to keep a car heated without idling.

In 2007, the City will complete an evaluation of different anti-idling technologies with the black and yellow car industries and select the best option. We will implement this $6 million program between 2008 and 2010 to equip cars with the chosen anti-idling solution, bolstered by a $4.8 million CMAQ grant. We will also launch a citywide anti-idling campaign to reduce idling of all vehicles even more.

Days in London and Surrounding Areas with Excessive PM 10 Levels



Source: Greater London Authority

Models based on 2003 meterology and London atmospheric Emissions Inventory. The daily mean PM 10 is set to an objective level of 50 micrograms per cubic meter, allowed to be exceeded up to 35 days a year.

CASE STUDY

Congestion Pricing's Air Quality Impact

In addition to Buckingham Palace and Trafalgar Square, visitors to London can now take advantage of a new attraction: cleaner air.

As a result of an ambitious congestion pricing experiment aimed at reducing traffic in the city's central business district, congestion fell by 30% and bus use rose by 38% during the morning peak in the first year—this, in a section of the city once infamous for its maddening bumper-to-bumper traffic. And the program is literally a breath of fresh air.

Smog-causing nitrogen oxide emissions and soot in the city have declined by 12%. In addition, carbon dioxide emissions are estimated to have declined by 20%, along with fossil fuel consumption. Region-wide concentrations of particulate matter are also falling.

Congestion pricing programs, which also have been implemented globally in places like Stockholm and Singapore, charge motorists a fee to drive into the densest business districts, providing an incentive for drivers to find other methods of transportation or to carpool.

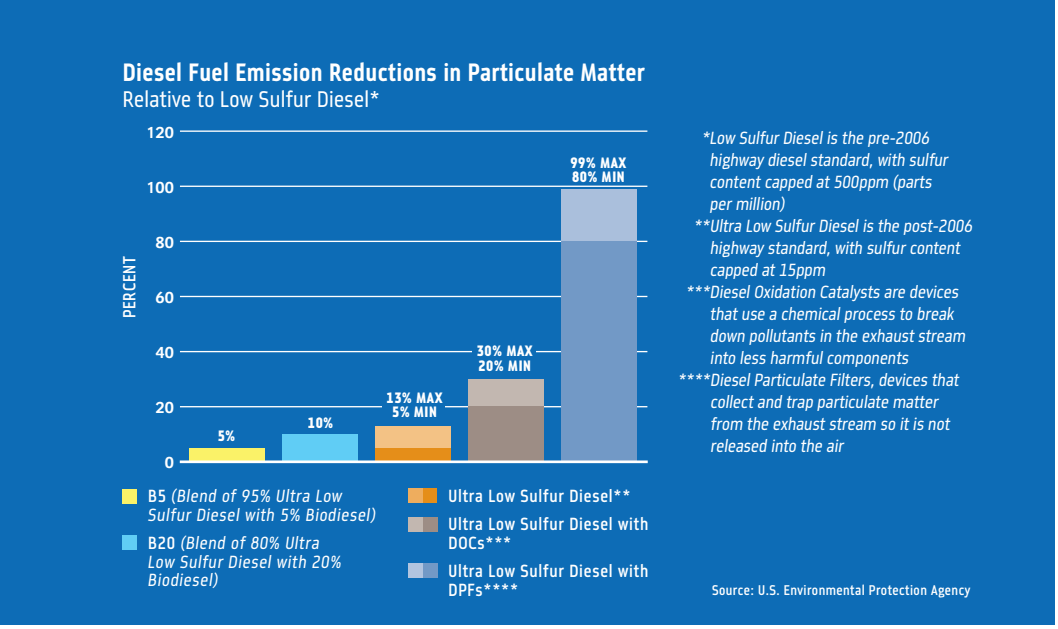
Wherever they have been implemented, these programs have had similarly positive results on both traffic and air quality.

For example, Singapore has seen a 176,400 pounds-per-day reduction in carbon dioxide emissions and a 22-pound reduction in soot.

These pollutants have been linked to increased rates of asthma, emphysema, cancer and heart disease—a fact that has not gone unnoticed in New York City, where child hospitalization rates for asthma are more than twice the national average. In the South Bronx, where more than 77,000 vehicles pass through each day, it is almost four times as high.

"The fumes from those cars and trucks make asthma-triggering pollution commonplace," said Andy Darrell, New York Regional Director for Environmental Defense.

"London already has used congestion pricing to reduce traffic congestion by 30% and pollution by 12% to 20%," said Darrell. "There's no reason why New York—the greatest city in the world—can't do it."



We will work with the Taxi and Limousine Commission (TLC) and the taxicab industry to double the taxi fleet's efficiency

The dominant taxi vehicle today achieves only 10 to 15 miles per gallon (mpg). More fuel-efficient vehicles are used in limited numbers today, including hybrid-electrics and even a lithium-ion battery powered vehicle. These vehicles are in the first years of use and questions regarding their durability as 24-hour, seven-day-a-week vehicles have yet to be fully answered. We will aim to double the efficiency of new taxis by 2012. Achieving the stated goal will require aggressive work on the part of the TLC to push the automotive industry and the taxicab industry towards answering these questions and ensuring that the vehicles used as taxicabs meet the high safety, service, and sustainability standards of New Yorkers.

This Plan could result in the entire fleet being converted to more fuel-efficient vehicles within eight to 10 years.

We will work with stakeholders to double the fuel efficiency of black cars and for-hire vehicles

In addition, we will work with the TLC to set new standards for additions to the fleet. By 2010, we will require that new cars achieve double the fuel efficiency of today's non-hybrid vehicles. The city's black car industry includes generally late-model luxury sedans that serve a largely corporate clientele through long-term contracts. After several years of use, many of these cars are transitioned to use as community car service vehicles. There are more than 25,000 for-hire vehicles in the city, and many are recycled black cars or law enforcement vehicles. Therefore, cleaner black cars today means cleaner community car service vehicles tomorrow.

This commitment would result in the entire black car fleet being converted to cleaner vehicles within five years, with a 50% decrease in CO_2e emissions from this sector, or 0.8% of the city's overall CO_2e emissions, while also improving air quality.

In addition, TLC will begin working with the community car services, vehicle owners, and lenders to improve awareness of the public benefits and cost savings of running clean vehicles with good gas mileage over old vehicles with poor gas mileage. This will help us work towards a goal of reducing CO_2e emissions from these fleets by 50% by 2017.

INITIATIVE 4

Replace, retrofit, and refuel diesel trucks

We will reduce diesel emissions through City investment and incentives

A substantial amount of the pollution from on-road vehicles is concentrated in one mode; according to a 2002 study, 25% to 50% of the city's local overall criteria pollutant emissions can be traced to heavy duty diesel-trucks.

Significantly reducing emissions from diesel vehicles requires either buying new trucks or employing a range of alternate strategies to improve performance. With the new Federal diesel regulations that went into effect in 2007, all new trucks will release 90% fewer emissions. But diesel vehicles tend to operate for many years; as a result, immediate air quality benefits will require improving the performance of older vehicles. Strategies include retrofitting trucks with diesel oxidation catalysts (DOC) or diesel particulate filters (DPF), upgrading engines, using cleaner fuels, and reducing idling.

A DOC is installed on the tailpipe of the truck to convert CO (carbon monoxide) and HC (hydrocarbons) to H_2O (water) and CO_2. DOCs are often used when equipment is too old to accept the modern retrofits, and range from $2,000 to $5,000 each. A DPF includes the DOC converter but also incorporates a ceramic honeycomb-like structure to capture additional diesel soot or small particles. That means that it can capture a substantially higher amount of PM 2.5, but can be three times as expensive. The cost of a DPF ranges from $10,000 to $15,000, depending on the type and age of the vehicle on which it is installed.

In conjunction with Ultra Low Sulfur Diesel (ULSD), it is possible to reduce PM 2.5 emissions from a single truck by 85% to 90% using these strategies.

We will introduce biodiesel into the City's truck fleet, go beyond compliance with local laws, and further reduce emissions

In 2005, the City Council required the retrofit or replacement of most heavy-duty City highway vehicles with the "best available retrofit technology" and the use of ULSD by 2012. *(See chart: Diesel Fuel Emission Reductions in Particulate Matter)*

The City is in the process of retrofitting its heavy duty vehicles to achieve and exceed compliance thresholds. While compliance can be reached through the use of DOCs or DPFs, some agencies are going above and beyond the requirement with purchases of new compressed natural gas (CNG) trucks. For example, the Department of Sanitation (DSNY) will purchase 10 new CNG trucks in 2007. Similarly, the Department of Parks & Recreation (DPR) purchased 20 CNG sedans this fiscal year and plans to purchase 20 more in the next fiscal year.

With alternative fuels, we will go beyond the legislative requirements and explore even more ambitious options. Biodiesel is an alternative diesel fuel that is produced from animal fats or vegetable oils (including recycled restaurant oils). It can be used alone, but is more commonly mixed with regular diesel. B5 fuel combines 5% biodiesel with 95% regular diesel, while B20 mixes 20% biodiesel with 80% diesel.

Biodiesel has significantly lower emissions than petroleum diesel. DSNY and DPR have already established B5 biodiesel fueling stations for their heavy duty vehicles. During the summer, DPR uses B20 when the fuel is not at risk of gelling from the cold weather.

The City will introduce biodiesel throughout its heavy-duty vehicle fleet. For example, in spring 2007, the City's Department of Transportation (DOT) will begin using B5 biodiesel. The City will gradually increase the percentage of B20 biodiesel as the higher mixtures are proven to work under different conditions and there is an adequate and reasonably priced supply.

We will accelerate emissions reductions of private fleets through existing CMAQ programs

In addition to the City's efforts to improve the environmental performance of its own fleet, we will also work to reduce emissions from private fleets. Private delivery fleets log thousands of miles a year on New York roadways. Since 2000, we have worked with NYSERDA to manage a Federal CMAQ-funded initiative that helps private sector companies and non-profit entities retrofit their vehicles or switch to alternative fuels. Program participants can convert to either CNG or hybrid vehicles or retrofit their diesel vehicles. To date, the City has reached approximately 90 trucks, spending roughly $4 million. And we will do more. *(See case study: FedEx)*

Over the next five years, we will significantly expand this program through $20 million in CMAQ funding. Depending on the type of upgrade and the vehicle, this will allow us to possibly reach more than 450 trucks.

We will work with stakeholders and the State to create incentives for the adoption of vehicle emission control and efficiency strategies

To achieve our air quality goal, we need to reduce emissions from an even greater number of diesel vehicles. The City will work with the State and other stakeholders to create a fund to support costs for retrofits and anti-idling technologies for at least 1,200 more vehicles in the city over five years.

California has developed a program that can serve as a strong model for New York State. The California Carl Moyer Program offers over $140 million a year to fund retrofits to diesel trucks. Over the first six years, the fund has resulted in retrofits of about 7,000 vehicles and emission reductions of 14 tons of NO_X and over one ton of PM per day. In addition, this program has lead to wide-scale adoption of tailpipe controls and the use of lower carbon fuels such as ethanol, biodiesel or natural gas. Another state with a similar programs is Texas, while Massachusetts and Pennsylvania will be unveiling rebate programs by the end of 2007. It is time for New York State to join them.

We will improve compliance of existing anti-idling laws through a targeted educational campaign

Idling releases pollutants into the air, increases engine operating costs for fleets, and shortens engine life. The best anti-idling strategies include a mixture of incentives for retrofits, laws and enforcement of those laws, and education. The CMAQ-funded program and the proposed State incentive mentioned above will play a significant role in reducing emissions from truck idling. But there is even more we can do locally.

Anti-idling technologies are already explored and implemented when feasible, including cold plating (allowing the vehicle to stay refrigerated when the engine is turned off for short periods of time). The City is evaluating these technologies as solutions for our local refrigerated delivery and long-distance trucking fleets. Once the most effective strategies have been identified, we will use CMAQ funding to incentivize owners to incorporate the technologies.

New York also limits the amount of time a vehicle can idle. New York City has a three-minute idling limit that targets all vehicles, including trucks and buses. New York State established an anti-idling law in 1990 that set a five-minute idling limit for heavy-duty diesel vehicles, excluding marine vehicles.

To achieve the widest compliance, the City will partner with community organizations and businesses to launch a series of public service announcements, signage, and other marketing strategies in 2008 to educate the public on the anti-idling laws and the environmental and economic benefits of reduced idling. In addition, the city and its partners will employ a more targeted outreach to drivers, business owners, fleet operators, and unions. A similar program launched by Toronto cost $100,000 to $300,000 and, in some specific locations, resulted in more than a 60% reduction in idling.

CASE STUDY
FedEx

For 36 years, a battalion of diesel-powered FedEx trucks have made their way through our city's streets.

That began to change, though, in 2004, when FedEx began delivering cleaner air as part of a City initiative to reduce emissions from private fleets. Since then, the company has rolled out 48 low-emission, hybrid electric trucks in New York City.

Emblazoned with FedEx's ubiquitous logo, the environmentally-friendly vehicles decrease particulate emissions by 96% and travel 57% farther on a gallon of fuel, reducing fuel costs by over a third.

The project began when FedEx applied for Congestion Mitigation and Air Quality (CMAQ) funds administered by the City's Department of Transportation and New York State Energy Research and Development Authority (NYSERDA). The funds, which are targeted to fleets that will see the greatest emissions and fuel reductions, allowed FedEx to purchase newly-designed vehicles that blended conventional and electric technology.

"New York City is a dynamic economy with many trucks on its streets essential to keep commerce moving," said John Formissano, FedEx's Vice President of Global Vehicles. "It is important that we continue to develop innovative solutions to reduce vehicle emissions."

Indeed, if 10,000 hybrid electric vehicles were on the road rather than current standard vehicles, annual smog-causing emissions would be reduced by 1,700 tons—the equivalent of taking all passenger cars off our roads for 25 days. Carbon dioxide emissions would be reduced by 83,000 tons—the same as planting two million trees. And diesel fuel usage would be cut by 7.2 million gallons, which requires one million barrels of crude oil to produce.

INITIATIVE 5

Decrease school bus emissions

We will retrofit both large and small school buses and reduce their required retirement age

In 2005, the City Council passed Local Law 42, which mandated the use of ULSD and Best Available Technologies (BATs) in school bus transportation. Approximately 3,800 buses are subject to the law. The Department of Education (DOE) is currently working with private school bus companies to retrofit all full-size school buses. To meet BAT requirements, buses will receive DPFs, DOCs, and other filtration systems.

But several thousand smaller school buses were not considered under this local law. The majority of these buses (approximately 2,700 of over 3,000 buses) are diesels.

The City will retrofit all buses with the best available retrofit technology, including DPFs. DPFs would eliminate at least 85% of the small particulate matter. State DOT, which controls the CMAQ funds, has stated that it is willing to provide $20 million for this project and the City will fund the remaining $5 million.

In addition, in the new or extended contracts with the private bus owners, DOE will require that all buses are retired earlier than the existing 19 year limit. Over the next several months, the City will evaluate the appropriate retirement age based on cost and environmental performance.

While private school buses are not covered by the local law, the City will challenge private schools to encourage similar environmental performance.

Reduce other transportation emissions

The EPA separates vehicles that drive on roads and other forms of transportation into two separate categories of study. These "off-road" vehicles include airplanes, trains, ferries, outdoor power equipment, and construction machinery such as dozers, loaders and cranes.

With a growing ferry network and a construction boom, these off-road vehicles contribute almost 15% of the city's PM 2.5 emissions.

The methods to reduce emissions from some of these vehicles are similar to those used for on-road vehicles: improve efficiency, burn cleaner fuels, and filter emissions. By employing these strategies, we will reduce citywide PM 2.5 emissions by 7%.

INITIATIVE 6

Retrofit ferries and promote use of cleaner fuels

We will retrofit the Staten Island Ferry fleet to reduce emissions

Staten Island ferries carry over 19 million passengers annually on a 25-minute, five-mile ride. But these diesel-fueled boats each contain two or three propulsion engines that release significant emissions of PM 2.5, NO_X, hydrocarbons, and sulfur.

The Port Authority is currently funding replacement or retrofits of engines, reducing the eight-boat fleet's total NO_X emissions by an estimated 40%, or 570 tons per year. The replacement/retrofit program will also have a positive effect on PM 2.5. But to further target the PM emissions, the City will install DOCs on each propulsion engine, at a cost of $75,000 to $90,000 per engine.

The City will reduce emissions from the ferries even more with the use of Ultra Low Sulfur Diesel 2 (ULSD2), once a usable form is locally available.

We will work with private ferries to reduce their emissions

Already, we have been working with regional private ferry companies to reduce their emissions. All 41 private ferry boats that serve New York City have agreed to install DOCs in 2007, under a fully-funded Federal program.

But there is an opportunity for even greater reductions. Because they use a different type of engine than the Staten Island Ferries, the private ferry engines are able to operate on Ultra Low Sulfur Diesel 1 (ULSD1), which is available in the region. Although this will increase fuel costs by a few cents per gallon, the emissions reduction is substantial. Therefore, the City will join with the City Council in proposing this conversion. The use of ULSD1 would reduce PM 2.5 by 5% to 10% beyond the reductions expected when DOCs are installed on the city's 41 private ferries in 2007.

INITIATIVE 7

Seek to partner with the Port Authority to reduce emissions from Port facilities

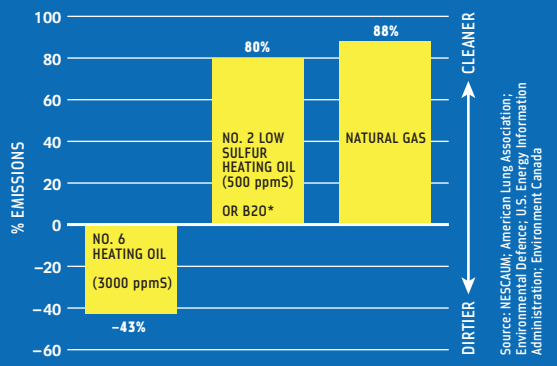
We will seek to work with the Port Authority to reduce emissions from the Port's marine vehicles, port facilities, and airports

Airports and port-related equipment contribute substantially to our local emissions: 11% of particulate matter and 23% of our locally-generated NO_X come from these sources.

This infrastructure is largely controlled by the Port Authority. We will seek to partner with them to position the region's ports as environmental leaders by developing a comprehensive air quality and greenhouse gas emissions plan.

Possibilities for improvements at airports include the use of electric plug-ins at gate ports, clean auxiliary power units, or towing to move planes to and from the gate. The Federal Aviation Administration operates a program to reduce emissions at airports and could be a source of funding for these initiatives.

Comparison of Heating Fuel Emissions
Percentage Reduction in Particulate Matter Emissions Relative to No. 2 heating oil (2000–2500 parts per million Sulfur)



Source: NESCAUM; American Lung Association; Environmental Defence; U.S. Energy Information Administration; Environment Canada

*B20 is a blend of 80% No.2 Low Sulfur Heating Oil with 20% Biodiesel

INITIATIVE 8

Reduce emissions from construction vehicles

We will accelerate adoption of technologies to reduce construction-related emissions

Construction equipment significantly impacts local emissions, accounting for as much as 13% of NO_X and 30% of PM from off-road vehicles. In 2003, Local Law 77 required that City construction projects use the best available technologies on-site to reduce emissions, such as DPFs, DOCs, and emerging plug-in technologies that allow vehicles to run on electricity instead of combusting fuel. More than 800 City-owned vehicles are subject to the law, along with an additional 115 pieces of leased equipment. Upgrades by City contractors will also impact emissions in private development projects, as the contractors use these new tools for other projects.

The City will accelerate compliance with the law by requiring a consultant to work with all City agencies on implementation. That includes cataloguing every piece of relevant equipment, analyzing possible technologies, and developing standards for construction sites. The consultant will help agencies navigate this process and avoid duplication of effort.

In addition, in City Requests-for-Proposals and the resulting contracts, we will go beyond Local Law 77 and require certain on-road vehicles involved with City projects, such as trucks that remove debris, to meet the same standards. City contractors will be able to meet the terms of the contracts either through retrofits or through new vehicle purchases.

Reduce emissions from buildings

Buildings and industry are responsible for roughly 55% of our PM 2.5 emissions. Improvements in efficiency, as targeted for our energy and carbon goals, will result in a 15% reduction in PM 2.5 for this sector, for a reduction of approximately 6% of overall city PM 2.5 emissions. Further reductions in these sectors will require the use of cleaner fuels. The switch to more natural gas burning power plants or biodiesel blends along with the clean fuel initiatives outlined below will result in an additional 17% reduction in PM 2.5.

INITIATIVE 9

Capture the air quality benefits of our energy plan

We will reduce energy-related emissions by cutting energy consumption and cleaning our energy supply

As described in the energy chapter, there are currently 23 large power plants in New York City; the oldest was constructed in 1951. By 2030, more than 50% of our power plants will be more than 70 years old. These older plants can use as much as 50% more fuel than new technologies such as combined cycle gas turbines (CCGT). In addition, the fuel in older plants tends to be dirtier than the natural gas used in newer plants or the biodeiesel recently piloted by NYPA.

As part of our comprehensive energy plan, we will aggressively improve the energy efficiency of our buildings to reduce electricity and heating fuel consumption. We will also facilitate the repowering, replacement, and retirement of the out-of-date turbines of older plants through long-term contracts for new, clean energy supply. Finally, we will expand clean on-site generation and incorporate more renewable energy. All three strategies reduce the emissions of pollutants and, at the same time, they cut CO_2.

INITIATIVE 10

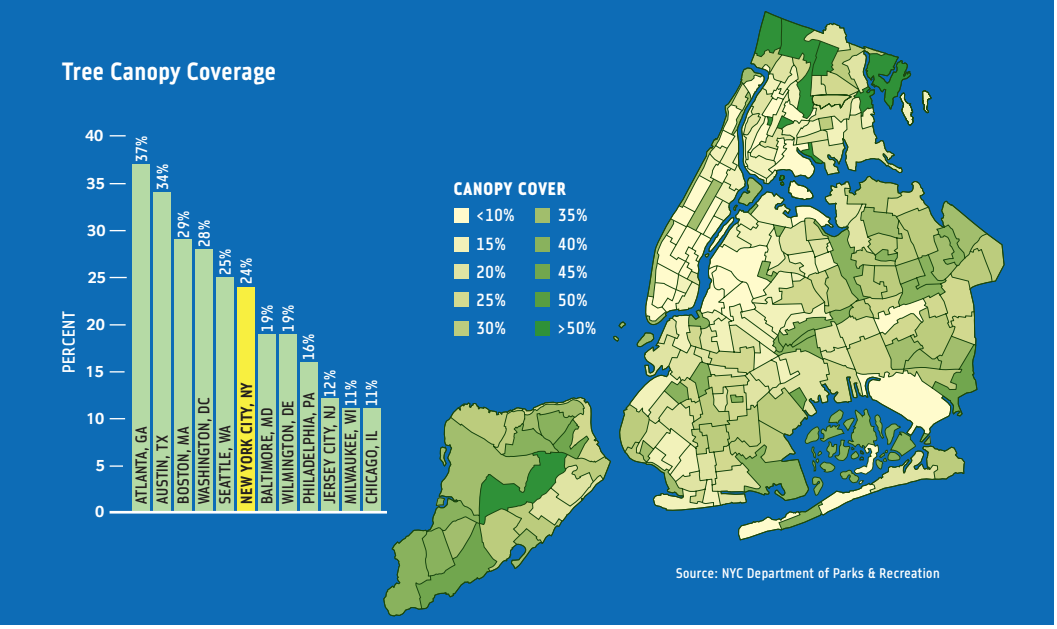
Promote the use of cleaner burning heating fuels

We will pursue multiple strategies to reduce heating fuel usage and enforce stricter emission standards in buildings

Our energy strategy aims to reduce greenhouse gas emissions from heating fuel by 17% through promoting efficiency and improving building insulation. This will also lead to significant reduction in SO_2, NO_X, and PM 2.5 emissions. But we can reduce these emissions further by improving the environmental performance of the fuels we use. *(See chart above: Comparison of Heating Fuel Emissions)*

Heating oil is classified into six types, numbered one through six, based on its boiling temperature, composition, and purpose. The higher numbers are heavier, more viscous, and tend to emit more pollutants when burned. They are also the least expensive. Fuel oils No. 1, No. 2, and No. 3 tend to burn more cleanly and are more costly to purchase. Each of these fuels can have higher or lower concentrations of sulfur, which also impacts the pollution they produce.

Currently, buildings have the option of using either a standard home heating oil—No. 2 fuel with 2,000 sulfur parts per million (ppm)—or a heavier No. 6 fuel. Other cleaner fuel options exist, including natural gas bio-diesel, and cleaner grades of heating oil.



American cities. Approximately half those trees are located within City-owned parks and along our streets; the other half are largely located on private property. By 2030, we will add an additional one million trees to the city. To achieve this goal we will pursue three main strategies.

We will lower the maximum sulfur content in heating fuel from 2,000 ppm to 500 ppm.

Currently the sulfur content in No. 2 heating oil—the most commonly used heating oil in the city—is capped at 2,000 ppm. Lowering that cap to 500 ppm, a grade also known as "low-sulfur" that until recently was used for on-road diesel, would result in significant reductions in criteria emissions, with little impact on fuel cost. The City will work with the State to lower the maximum sulfur content permitted in No. 2 fuel used for heating buildings to 500 ppm, creating significant air quality improvements with a modest increase in fuel cost. This grade is readily available and is the current standard in much of New England.

This reduction in the maximum sulfur content in No. 2 heating oil will result in 85% reductions of SO_2 and roughly 50% reductions in PM 2.5. This alone will reduce overall PM 2.5 emissions in the city by 5%. This change will also improve burner efficiency, thereby reducing the amount of fuel consumed. In addition, furnaces burning cleaner fuel do not have to be serviced as frequently. This will reduce operating costs for the customer, generating savings that outweigh the increased cost of the fuel.

We will reduce emissions from boilers in 100 city public schools

Currently, 478 city schools burn No. 4 or No. 6 heating oil; many of these are in neighborhoods where the asthma rates are over three times higher than the national average. By 2017, the City will modify the boiler systems of 100 of these schools, to enable the boilers to burn a cleaner fuel. Schools located in neighborhoods with the highest asthma hospitalization rates—generally rates greater than seven per 1000—will be prioritized in order to achieve the maximum local benefits. These neighborhoods are concentrated in the Bronx, Harlem, Central Brooklyn, and along Jamaica Bay. On average, boiler replacement will cost $5.7 million per school. The cleaner burning boilers will emit 44% less PM 2.5 emissions. Additional benefits will be lower maintenance expenses and CO_2 reductions in the range of 50% because of fuel switching and increased efficiencies, as well as reduced maintenance expenses.

Pursue natural solutions to improve air quality

Trees and other natural areas confer tremendous benefits on the city, including improvements to air and water quality, retention of greenhouse gases, reduced energy costs, and a more inviting streetscape. Trees in particular are effective at cleansing the air. They do this by absorbing pollutants—sulfur dioxide, nitrogen dioxide, and carbon monoxide—through their leaves and intercepting airborne particulate matter on leaf surfaces. Every year, New York City trees remove an estimated 2,200 tons of criteria pollutants from the air. They also take in 42,300 tons of carbon each year. *(See graphic above: Tree Canopy Coverage)*

Indirectly, trees further reduce air pollution by shading buildings, thereby reducing the need for air conditioning during the peak electricity demand periods. In addition, shaded streets have lower temperatures in the summer, slowing the formation of ground-level ozone from NO_X and VOCs. Trees also block wind in the winter, slightly reducing the need for heating. Finally, trees make neighborhoods more beautiful and have been shown to raise property values.

The city's 5.2 million trees cover 24% of the city, 3% below the average for major

INITIATIVE 11

Capture the benefits of our open space plan

We will rely on accelerated tree plantings to help remove harmful emissions as we improve the public realm

As mentioned in our public realm plan, we will ensure that every New York street is fully lined with trees by 2030. Achieving 100% "stocking" for these street trees will require almost tripling the number of trees planted every year in the city.

To achieve this accelerated tree planting schedule, we will revise the zoning code to require new construction and major redevelopment projects to plant one street tree for every 25 feet of street frontage. Private development is projected to provide 3,000 to 5,000 trees a year, with an additional 3,000 per year generated through major capital construction projects.

The City will also plant an additional 12,500 per year at an annual cost of $17 million. We will prioritize plantings in neighborhoods with the lowest stocking levels and highest air quality concerns.

INITIATIVE 12

Reforest targeted areas of our parkland

We will reforest 2,000 acres of parkland

The City will expand efforts to reforest approximately 2,000 acres of parkland by 2017, without compromising space for existing ballfields. Reforestation will take place in Fresh Kills Park in Staten Island, Cunningham Park in Queens, Van Cortlandt in the Bronx, Highbridge in Manhattan, and other parks around the city at a cost of $118 million.

INITIATIVE 13

Increase tree plantings on lots

We will clean our air while we safeguard our water quality

To increase our tree canopy cover, we must increase coverage beyond our parks and sidewalks. That will require more trees on public and private lots, including parking lots, private housing, institutional properties such as schools and university campuses, and City-owned land.

We will capture the benefits of our water quality strategy

According to the Department of City Planning, parking lots comprise almost 2,000 acres or approximately 1% of the city's land area. The dark asphalt pavement contributes to the heating of the urban area on hot, sunny days, which accelerates the formation of ground-level ozone. In addition, the hard, smooth surfaces contribute to rain runoff that inundates sewer systems during storms. Currently, 10% of the land area of parking facilities in New York City is covered by tree canopy.

The proposed zoning regulations will require perimeter landscaping of commercial and community facility parking lots over 6,000 square feet as well as street tree planting on the adjacent sidewalks. Parking lots over 12,000 square feet would also be required to provide a specified number of canopy trees in planting islands within each lot. This change will not only support cleaner air, it will also mitigate the visual impact of large asphalt lots while more effectively managing storm water runoff and the urban heat island effect.

We will partner with stakeholders to help plant one million trees by 2017

The City will work with community, non-profit, and corporate partners on a 10-year goal to plant trees on private residential, institutional, and vacant land properties in order to achieve our goal to plant one million trees. The City and its partners will focus on areas whose natural environments have borne the brunt of past City policies, and neighborhoods with few green spaces.

Understand the scope of the challenge

The existing air quality monitoring network is designed to track concentrations of the EPA's six criteria pollutants over large geographic areas. This is helpful for identifying broad trends, but does not let us understand the exposure New Yorkers experience every day in their neighborhoods.

That's because there are only 24 monitors for the entire city—and they are located on roof tops, away from the traffic, people, and sidewalks. As a result, we cannot focus our reduction efforts on the areas of greatest need—or track our successes with any precision.

To develop a comprehensive plan that will protect the health of New Yorkers in every neighborhood, we must develop new tools to understand the real nature of the challenge we face.

INITIATIVE 14

Launch collaborative local air quality study

We will monitor and model neighborhood-level air quality across New York City

Over the next 12 months, the City will work with experts in the academic, medical, and private sectors to develop one of the largest local air quality studies ever in the United States. Starting in 2008, the City will begin to study, monitor, model, map, and track local pollution and local adverse impact across New York City, with an emphasis on traffic-related emissions. *(See chart above: Asthma Hospitalizations)*

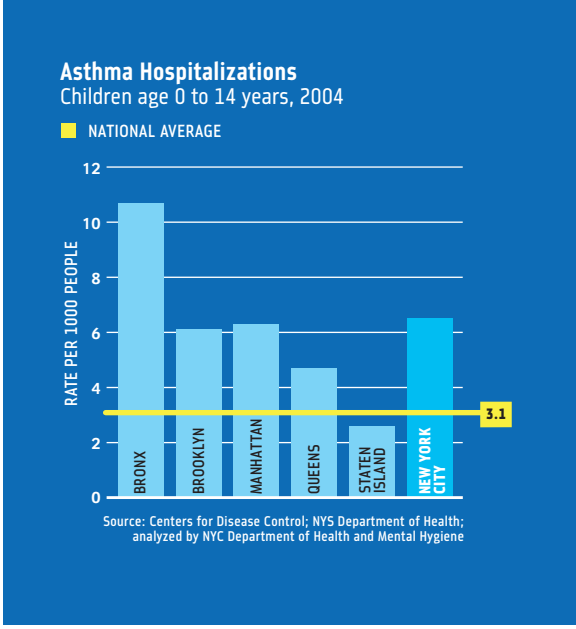
This enhanced monitoring system in New York will:

- Measure the variation in air quality across all neighborhoods over time
- Assess the impact of development, infrastructure changes, traffic changes, and traffic mitigation measures in our communities
- Provide guidance for future efforts to improve neighborhood air quality

Although a study of this scale is almost unprecedented, our effort will build on recent successful projects to track local emissions. For example, exposure to certain pollutants at schools in the South Bronx have been correlated with hourly truck traffic on nearby highways, and students with asthma had more symptoms on high traffic pollution days.

This research has employed a variety of cost-effective approaches that we can adapt for understanding air quality in all 188 neighborhoods. Strategies will include periodic monitoring at a range of sites and developing statistical models that correlate the impact of traffic and land-use patterns with air quality.

The study findings will establish priority neighborhoods for improvement and provide baseline data to track the impact of development, policy, and transit changes over the coming decades.



Conclusion

These initiatives are designed to provide everyone in our city with healthier air to breathe. We should expect no less than the cleanest air of any big city in America, given the track record we have set in becoming the country's safest large city.

By working to reduce emissions both nationally and locally, we can surpass the air quality of the nation's other largest cities, including Los Angeles, San Antonio, Phoenix, San Diego, Dallas, Chicago, Philadelphia, and Houston.

But these cities will not stop trying to achieve cleaner air for their citizens—and we won't either. That's why we will pioneer a process to track changing pollution levels in every New York neighborhood. As our knowledge improves, we will be able to target our efforts more precisely, and calibrate them to achieve the greatest gains for public health and environmental justice.

One challenge eclipses them all: climate change. We have already started to experience warmer, more unpredictable weather and rising sea levels. But greater changes are ahead. By the end of the century, temperatures across the globe could rise by as much as eight degrees Fahrenheit. In New York, scientists project that 40 to 89 days annually could have 90 degree heat—or hotter. And as a coastal city, we are vulnerable to the most dramatic effects of global warming: rising sea levels and intensifying storms.

We have a special stake in this discussion—but also a unique ability to help shape a solution.

The sheer scale of our city means that New York emits nearly 0.25% of the world's total greenhouse gases; becoming more efficient will have a tangible impact.

But these efforts will build on the strength of the city itself. Our density, reliance on mass transit, and smaller, stacked living spaces mean that New Yorkers produce a fraction of the greenhouse gases compared to the average American. That means growing New York is, itself, a climate change strategy.

Since establishing a model of multi-culturalism and tolerance more than 400 years ago, pioneering the infrastructure networks that enabled modern life, and embodying an ideal of possibility and aspiration, New York has always been the most eloquent argument about why cities matter. Now is our opportunity to define the role of cities in the 21st century—and lead the fight against global warming.

Climate Change

Climate Change

Reduce global warming emissions by more than 30%

Climate Change

Credit: Mario Tama

East River Park, Manhattan

Reduce global warming emissions by more than 30%

This Plan is an attempt to sustain our city's success and our momentum forward; to sustain what we love about New York and want to pass on.

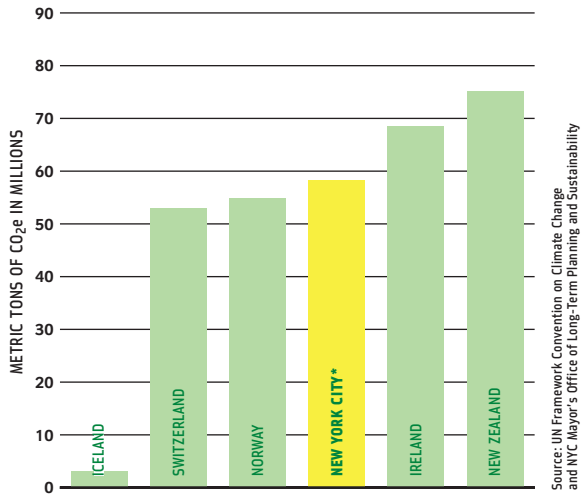
In it we have sought to solve a series of distinct challenges; how to generate enough housing in a way that doesn't simply accommodate population growth, but helps shape the city we want to become; how to balance that need against the open space that every neighborhood deserves, while our supply of land remains limited. We have proposed a plan to unleash the most dramatic expansion of our transit system in over half a century and shift people out of their cars; outlined strategies to secure the reliability of the energy and water networks underpinning our city and plans to empower every community through cleaner air, land, and waterways.

These efforts will require substantial investments—but each will provide an even greater return. Improving our energy infrastructure and lowering demand will reduce our energy costs by billions of dollars over the next decade. Protecting our watershed will avoid a multi-billion-dollar investment in new water filtration plants. Improving transit and reducing congestion will cut down the $13 billion cost to our economy from traffic delays. And the action required to execute these initiatives—constructing new transit lines, retrofitting old buildings, deploying new technology—will create thousands of well-paying jobs.

Each solution serves multiple ends; transit-oriented development can help address our need for housing and reduce traffic congestion; modernizing our energy supply system can reduce air pollution; greening our open spaces can protect the quality of the water in our harbor.

But collectively these initiatives all address our greatest challenge: **climate change.**

Greenhouse Gas Emissions
2004



*New York City data is for 2005

Scientists have now proven that human activities are increasing the concentration of greenhouse gases in the earth's atmosphere—and these gases are raising global temperatures. The warming of the earth is causing longer heat waves, rising sea levels, and more violent storms. *(See chart above: Greenhouse Gas Emissions)*

Average temperatures across the world could soar eight degrees Fahrenheit by the end of the century. But the problem isn't only global—we are already feeling the effects in our city.

In Lower Manhattan, the water at the Battery has risen more than a foot during the last century; as a result, what's called a "hundred-year flood" is actually likely to occur every 80 years. In the future, such floods could become twice or even four times as frequent. Violent storms could threaten our homes and we are not yet prepared: a Category 3 hurricane can produce winds of 111 to 130 miles per hour, but our current building code only requires windows to withstand gusts of 110 miles an hour. As a coastal city, New York is especially vulnerable to all of these forces.

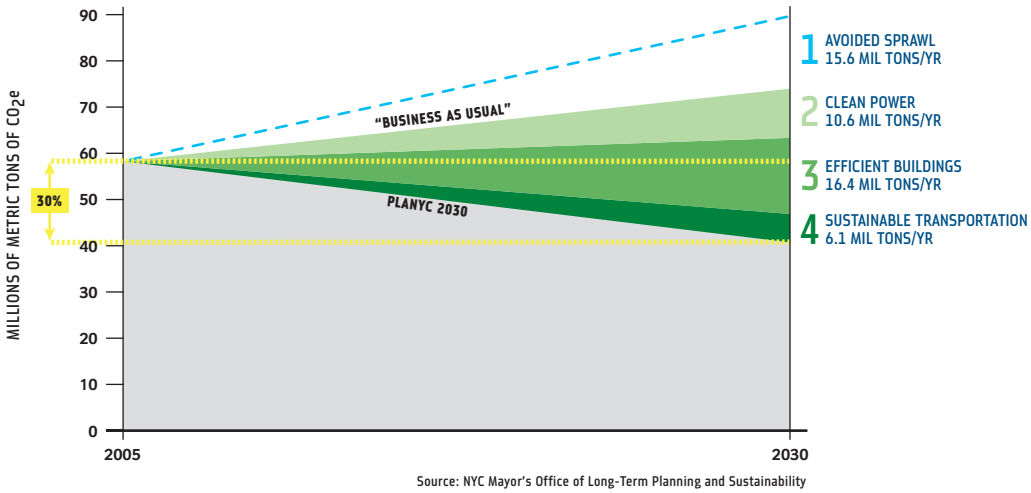
And without action the impacts will continue to intensify. In New York, we could experience days hotter than 90 degrees between 11% and 24% of the year. The heat would drive up energy consumption for cooling, making the problem worse, threatening the health of all New Yorkers—especially the elderly—and even increase the number of disease-bearing insects who emerge in warmer, wetter weather.

There are things that can be done now: We can amend the building code, work to protect our infrastructure—we could even consider a storm surge barrier across the Narrows. But the massive changes that scientists predict under extreme scenarios would still place much of the city underwater—and beyond the reach of any protective measures.

No city can change these forces alone, but collective effort can. And New York can help lead the way. *(See chart on following page: Greenhouse Gas Reduction Strategy)*

Our plan to reduce greenhouse gas emissions

Projected Impacts of Our Greenhouse Gas Reduction Strategies



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

The result will be an annual reduction of 33.6 million metric tons—and an additional 15.6 million metric tons avoided by accommodating 900,000 people in New York City

1 AVOIDED SPRAWL

Attract 900,000 new residents by 2030 to achieve an avoided 15.6 million metric tons

- Create sustainable, affordable housing
- Provide parks near all New Yorkers
- Expand and improve mass transit
- Reclaim contaminated land
- Open our waterways for recreation
- Ensure a reliable water and energy supply
- Plant trees to create a healthier and more beautiful public realm

2 CLEAN POWER

Improve New York City's electricity supply to save 10.6 million metric tons

- Replace inefficient power plants with state-of-the-art technology
- Expand Clean Distributed Generation
- Promote renewable power

3 EFFICIENT BUILDINGS

Reduce energy consumption in buildings by 16.4 million metric tons

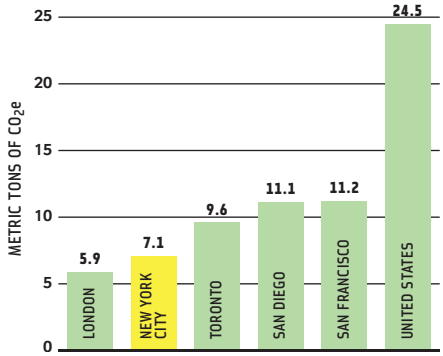
- Improve the efficiency of existing buildings
- Require efficient new buildings
- Increase the efficiency of appliances
- Green the city's building and energy codes
- Increase energy awareness through education and training

4 SUSTAINABLE TRANSPORTATION

Enhance New York City's transportation system to save 6.1 million metric tons

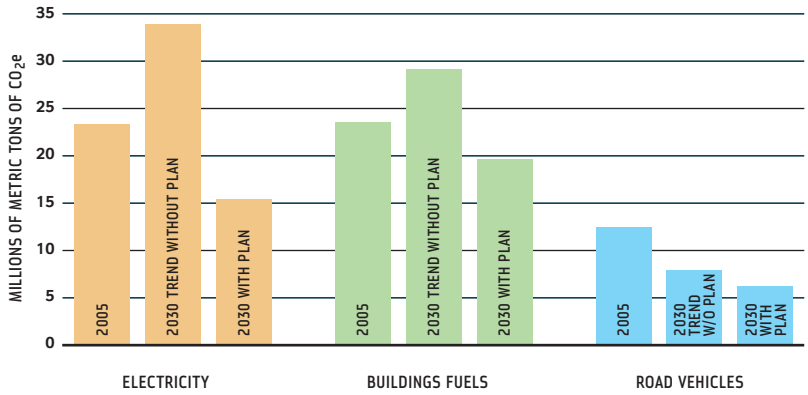
- Reduce vehicle use by improving public transit
- Improve the efficiency of private vehicles, taxis, and black cars
- Decrease CO_2 intensity of fuels

Greenhouse Gas Emissions Per Capita



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Projected Emissions and Targeted Reductions



Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Our Plan

There is no silver bullet to deal with climate change. Greenhouse gas emissions are caused by a variety of sources; there are millions of cars, boilers, and light bulbs contributing to our emissions. By necessity, any solution must be multi-faceted as well.

As a result, our strategy to help stem climate change is the sum of all of the initiatives in this plan.

In our **transportation** plan, we described shifting people from their cars onto an expanded mass transit system because our economy will stall if we can't clear the roads. But a transit trip also uses far less energy than an auto trip, producing less carbon dioxide.

In our **energy** plan, we proposed investing in repowered or new power plants, because they will cost less to operate and improve our air quality. But these new plants will also burn far less fossil fuel and release fewer greenhouse gases.

In our **open space, air quality,** and **water quality** plans, we committed to planting more trees to cool our sidewalks and beautify our neighborhoods; these efforts, too, will reduce greenhouse gas emissions, because trees—especially within the concrete landscape of a city street—cool the air and sequester carbon dioxide.

PLANYC will reduce our city's greenhouse gas emissions by 30% simply by extending and enhancing the inherent strength of New York City itself.

Cities can make the difference.
Cities have always been incubators of ideas, gathering together concentrations of diverse people to produce genuine innovation. But today they matter more urgently than ever before—because of climate change.

Although the word "environment" may not evoke the dense buildings and sidewalks of cities, these very qualities make urban centers the most sustainable places on earth.

Among American cities, New York is the most environmentally efficient. Per capita, New Yorkers produce less than a third of the CO_2e generated by the average American. *(See chart above: Greenhouse Gas Emissions Per Capita)*

This efficiency results from our city's fundamental design. Dense neighborhoods provide stores and services within walking distance, enabling us to run many errands on foot or by bicycle. An extensive public transportation system allows the majority of commuters to travel by mass transit.

We tend to inhabit smaller spaces than our suburban counterparts, with fewer lights and appliances, and less area to heat and cool. Many of these apartments share walls, reducing the need for heat even more. With many buildings dating from prior to World War II, and thus constructed before the era of cheap energy, many of the city's older buildings have natural daylight and ventilation built into their design.

And as New York attracts more residents, it reduces the burden that population places on the global environment in the form of sprawl, which consumes land, energy, and water at a truly gluttonous pace.

On average, each New Yorker generates 7.1 metric tons of CO_2e, compared to 24.5 metric tons from an average American lifestyle. That means that making the city a more appealing place to live—through affordable housing, easily accessible parks, or cleaner air and waterways—radically reduces environmental impacts.

And by investing in the maintenance of the infrastructure that supports urban life—the water system, the roadways, the subways, and our power grid—we ensure that this efficient lifestyle can continue to be sustained for generations.

If New York can absorb 900,000 more people by 2030, it will avoid future increases in global warming emissions by 15.6 million metric tons per year, simply by giving more people the option to settle in our city.

In spite of our inherent efficiency, we can do better. And we must.
Instead we are doing worse. From 2000 to 2005, New York's greenhouse gas emissions increased almost 5%. Almost half of this growth can be traced to the rising energy consumption of every New Yorker in the form of cell phones, computers, and air conditioners; the rest is due to new construction. If these trends continue, by 2030, the city's CO_2e production will increase 27% over our 2005 emissions.

Efficiency efforts often focus on automobiles and power plants. But in New York, we must add a third critical category: buildings. With 950,000 structures containing 5.2 billion square feet, buildings account for 69% of our emissions, compared to 32% nationally. Energy turns on our lights and televisions, runs our heating systems in the winter, and cools us in the summer. It also powers proliferating numbers of air conditioners and other appliances. *(See chart above: Projected Emissions and Targeted Reductions)*

When buildings *are* discussed, standards for new construction are generally the focus. New York has emerged as a leader in green design, with some of the most sustainable skyscrapers and affordable housing developments in the country—and we must continue these efforts. But 85% of the buildings we will have in 2030 already exist today.

That's why our energy plan focuses on reducing consumption in the city's large existing building stock. We have also outlined strategies to ensure that the energy we do use is cleaner and more efficient than our supply today, addressing the second major category of CO_2 emissions: power.

Transportation is the final significant culprit, accounting for 23% of our emissions. Of that, 70% comes from private vehicles—

even though they account for only 55% of all trips in the city. By contrast, mass transit is responsible for only 11.5% of our transportation emissions, meaning car trips are, on average, five times more carbon intensive than a subway ride.

The most effective strategy is simply to reduce the number of vehicles on the road. A simultaneous expansion around of our transit system combined with congestion pricing would help achieve the city's first major mode shift in decades. But we must also address the trucks and automobiles that we *do* have; making them more fuel-efficient, and ensuring that they burn cleaner fuels.

The graph on page 134 shows how we will reduce our CO_2 emissions. Around 50% of our reductions will come from efficiencies in buildings; 32% from improved power generation; and 18% from transportation.

These initiatives will achieve our 30% goal, but ultimately that won't be enough. Scientists agree that far deeper cuts—on the order of 60% to 80%—will be necessary by mid-century if we are to stabilize global temperatures.

That is why we must aggressively track emerging technologies and encourage their adoption. For example, the rooftops of New York City, if covered with solar panels, could produce nearly 18% of the city's energy needs during daytime hours. We have not depended on the widespread use of solar energy in this plan because its costs today are too high for general use; we have tried to rely only on technologies feasible today. But near-term advances promise to reduce the cost of solar panels dramatically; we are also actively accelerating this process by incorporating solar energy into City buildings and reducing some of the legislative barriers to expansion. Once these renewable energy strategies become economically viable, we must be ready to promote adoption on the widest possible scale.

Improvements in batteries, biofuel-burning engines, wind power, and fuel cells for vehicles; higher-efficiency electricity transmission lines; building materials that weigh less and insulate more; and new types of appliances and lighting that consume less electricity: all would help us achieve, and exceed, our 30% goal.

These additional savings must be used to surpass our target, not substitute for the measures envisioned in this plan. Our 30% goal is only a starting point toward the greater cuts that will be required after 2030. That means we cannot rely on technology in the future to replace the initiatives we propose for the near-term; we will need those additional savings later.

New York City will lead the way. Municipal government accounts for approximately 6.5% of the city's overall emissions, concentrated mainly in buildings, wastewater treatment, and transportation. Since 2001, the City has managed to keep its emissions constant, despite an annual 2% rise in electricity use. Actions the City has already taken, such as local laws requiring energy efficiency in new buildings, new purchases of energy-using equipment, and more efficient City fleets, would keep our emissions stable for the next decade. But that won't be enough. (*See chart above: New York City Municipal Greenhouse Gas Emissions)*

That's why our energy plan has set an ambitious, accelerated goal to reduce emissions from City government operations by 30% by 2017.

We also recognize that New York City cannot stop climate change by itself. While there is no substitute for Federal action, all levels of government have a role to play in confronting climate change and its potential impacts.

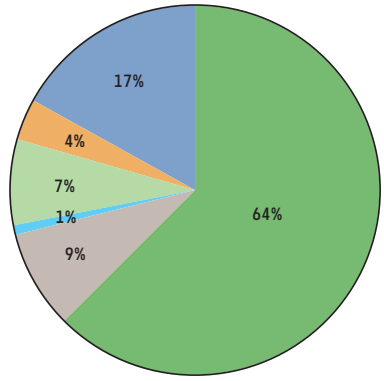
Broader solutions—such as a cap and trade system, which would allow industries to buy and sell carbon credits, or a carbon tax, which would tax all fuels, cars and power plants on the basis of their carbon intensity—cannot feasibly be implemented at the city level. They must be State, regional, or national efforts—and we will advocate for their adoption.

These measures will help slow the pace of climate change, and—if other cities, states, and nations around the world act in concert—we can stabilize our environment by mid-century.

But climate change is already underway. Worldwide, more than 256 billion tons of carbon dioxide have already been released into the atmosphere during the past 10 years, and the impacts will continue being felt for decades. We also cannot depend on the actions of others.

That is why, even as we work to stem the rise of global warming, we must also prepare for the changes that are already inevitable.

New York City Municipal Greenhouse Gas Emissions
Carbon Dioxide Equivalent in Metric Tons per Year, 2006



Total: 3.8 million metric tons

- MUNICIPAL BUILDINGS
- MUNICIPAL VEHICLE FLEET
- SCHOOL BUSES
- DSNY LONG-HAUL TRANSPORT
- STREETLIGHTS/TRAFFIC SIGNALS
- WATER AND SEWER

Note: Figures total to 102% due to carbon absorption by waste and independent rounding

Source: NYC Mayor's Office of Long-Term Planning and Sustainability

Our plan for climate change adaptation:

1. Create an intergovernmental Task Force to protect our city's vital infrastructure
2. Work with vulnerable neighborhoods to develop site-specific strategies
3. Launch a citywide strategic planning process for climate change adaptation

Adapting to climate change

We will embark on a broad effort to adapt our city to the unavoidable climate shifts ahead. This will include measures to fortify our critical infrastructure, working in conjunction with City, State, and Federal agencies and authorities; update our flood plain maps to protect areas most prone or vulnerable to flooding; and work with at-risk neighborhoods across the city to develop site-specific plans. In addition to these targeted initiatives, we must also embrace a broader perspective, tracking the emerging data on climate change and its potential impacts on our city. *(See case study on facing page: New York City Disaster Planning; see map on facing page: New York City Flood Evacuation Zones)*

CASE STUDY

New York City Disaster Planning

The sobering images of Hurricane Katrina still haunt us—a testament to our vulnerability in the face of nature's ferocity.

For many New Yorkers, the idea of a similar catastrophe affecting our own city is unthinkable. But a 1995 study by the U.S. Army Corps of Engineers concluded that a Category 3 hurricane in New York could create a surge of up to 16 feet at La Guardia Airport, 21 feet at the Lincoln Tunnel entrance, 24 feet at the Battery Tunnel, and 25 feet at John F. Kennedy International Airport. The impacts could be even greater as a result of waves following the surge or tides, both of which could increase the damage.

As many as three million people would need to be evacuated.

In 2006, the City responded to this threat by unveiling an emergency response plan. A team of more than 34,000 City employees would lead the mobilization effort, bringing residents to evacuation shelters throughout the city. The Fire Department would assist in evacuating the elderly and infirm from hospitals and nursing homes. Mass transit would also be used in the evacuation process, with fares and tolls waived.

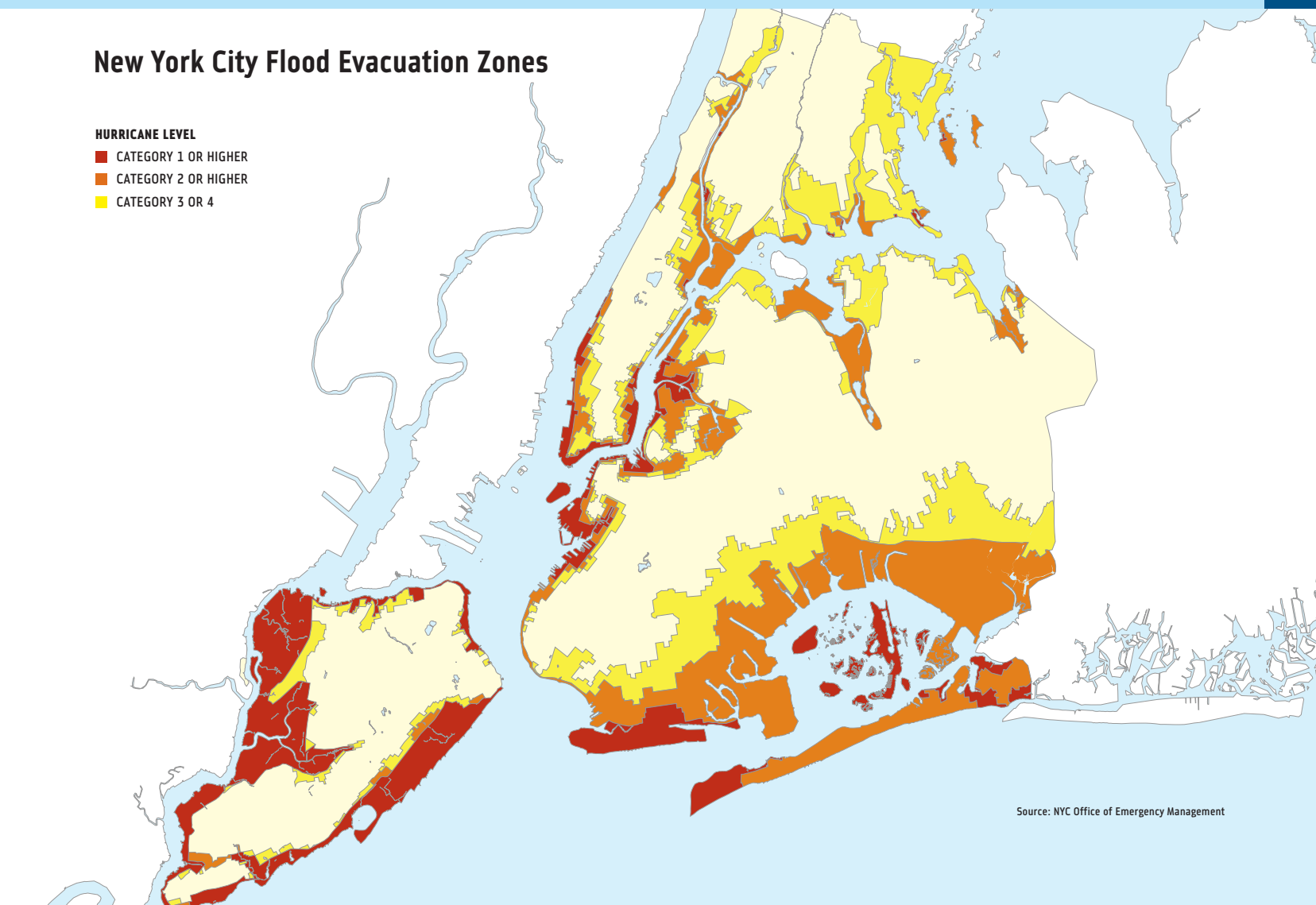
Credit: NYC Office of Emergency Management

Illustrative Depiction of Holland Tunnel Flood Level from Storm Surge

But our dense urban environment would require new approaches from previous disaster recovery efforts. That's why the City has also launched a design competition to create "safe, clean, affordable and rapidly deployable" housing for up to two years.

The only way to reduce the risk of violent storms in the future is to reduce greenhouse gas emissions and thus prevent dangerous climate change. But that will not eliminate the need to be prepared for the worst. By planning for potential future storms today, the worst impacts can be avoided.

New York City Flood Evacuation Zones



Source: NYC Office of Emergency Management

INITIATIVE 1

Create an intergovernmental Task Force to protect our vital infrastructure

We will expand our adaptation strategies beyond the protection of our water supply, sewer, and wastewater treatment systems to include all essential city infrastructure

In 2004, the City's Department of Environmental Protection (DEP) initiated a Climate Change Task Force to study the potential impacts of climate change on our water infrastructure. Working with research scientists at the NASA Goddard Institute for Space Studies, Columbia University's Center for Climate Systems Research, and other institutions, DEP has generated global and regional climate models that have been included in the agency's strategic and capital planning.

For example, the design and operation of our sewer and wastewater treatment systems have been based on existing sea levels—as they are in most jurisdictions. But these levels are changing. When combined with increasingly severe storm surges, there will be significant operational effects. The Task Force evaluated these impacts, enabling DEP to take such risks into account as they site new facilities and invest in existing ones.

But substantial other aspects of our infrastructure remain at risk, especially from sea level change; our subterranean subway system and tunnels, the airports, which are at sea level, power plants, which are often on waterfront sites, waste transfer terminals, and other critical infrastructure are all potentially vulnerable. As these facilities are owned and operated by a variety of entities, protecting these sites will require a coordinated effort among the City, the State, the MTA, the Port Authority, and the utilities.

That's why the City will invite these and other relevant public and quasi-public entities to join the New York City Climate Change Task Force. The Task Force will create an inventory of existing at-risk infrastructure, analyze and prioritize the components of each system, develop adaptation strategies, and design guidelines for new infrastructure.

This will not be an easy task. For most agencies, planning for climate change is a new challenge and given other competing—and often immediate—needs, it is often difficult to prioritize. As a result, integrating climate change impacts into long-term capital planning will require new ways of thinking. But it is essential to begin.

INITIATIVE 2

Work with vulnerable neighborhoods to develop site-specific strategies

We will create a community planning process to engage all stakeholders in community-specific climate adaptation strategies

Protecting our infrastructure is crucial, but we also need to prepare our city to deal with the consequences of climate change, especially in flood-prone areas. There are obvious impacts to people's property and livelihoods from windstorms, flooding, heat waves, and other direct effects of climate change. Shifting climate patterns can take lives and pose major public health dangers.

While all five boroughs have vulnerable coastline, each community's risk and the optimal solutions to minimize that risk will vary. Therefore, preparing for these impacts must include community-specific planning.

A successful community planning process provides the neighborhood with the tools necessary to understand the challenges, engage in problem solving, and effectively communicate preferred solutions. In addition, the process must take into account the unique challenges associated with planning for climate change. Beyond a broadening awareness of the general issues, the details about climate change remain unfamiliar to most of the public—and most publications on the topic are extremely technical and difficult to read. Also, all scenarios are based on projections that continue to evolve.

To begin addressing these challenges, the City has partnered with Columbia University, UPROSE, and the Sunset Park community to design a standardized process to engage waterfront neighborhoods in conversations about climate change adaptation.

We will work with the community to inform them about the potential impacts of climate change and possible solutions—and seek to understand their priorities moving forward. By 2008, we will have a process that can be applied to all at-risk neighborhoods across the city, mostly along the waterfront. We must ensure that all new plans consider the effects of climate change and develop strategies that respond to each community's unique characteristics, including building types, access and use of waterfront, and existing community planning efforts, such as 197A plans and Brownfield Opportunity Area applications.

INITIATIVE 3

Launch a citywide strategic planning process for climate change adaptation

We will begin developing a comprehensive climate change adaptation policy

But all New Yorkers—not just individual neighborhoods—will be impacted by climate change. Protecting the city will require a citywide strategy. *(See case study on facing page: The Cost of Inaction)*

Countries around the world have begun to develop this kind of broad-based framework for climate change adaptation—in Britain, Japan, and the Netherlands.

But New York will become the first major American city to comprehensively assess the risks, costs, and potential solutions for adapting to climate change.

This effort will be unprecedented and challenging. Climate change projections for sea level rise, intensifying storms, and hotter temperatures are just that—projections. The variables involved in forecasting mean that there are no certainties, only probabilities. As a result, a step-by-step approach, with decision points along the way, will be necessary.

Further, some proposals require thinking on a scale that is beyond the traditional scope for public planning. Concepts like sea walls—concrete barriers that would surround the city's coast line—or a series of more targeted storm surge barriers are possibilities, but each raises serious questions. Storm surge barriers could protect significant swaths of our coastline, but still leave others exposed—and cost billions. Any assessment of investments on that scale will need to be undertaken carefully.

We will create a strategic planning process to adapt to climate change impacts

That's why we will create a New York City Climate Change Advisory Board. Composed of non-City government agencies, as well as scientists, engineers, insurance experts, and public policy experts, the advisory board will help the Office of Long-Term Planning and Sustainability develop a planning framework by:

- Developing a risk-based, cost-benefit assessment process to inform investment decisions, including the establishment of clear metrics and decision points
- Assessing possible strategies to protect against flooding and storm surges, and providing recommendations

As the first American city to undertake such a comprehensive climate change planning process, the first phase of this effort includes a scoping study to identify necessary experts, methodology, and design of the larger planning process. This study will look to models abroad, as well as to academic and other work here in the United States.

In addition, we will work with other coastal cities in the United States to share information on climate change planning experiences, develop joint strategies, and pool resources when appropriate.

We will ensure that New York's 100-year floodplain maps are updated

FEMA's floodplain maps for New York City are significantly out of date. The last major revisions were in 1983, based on even earlier data. Since that time, numerous shifts have occurred that should be reflected in these plans: changes to the shoreline and elevations, rising sea levels, and an increased severity of storms, along with technological changes that allow for more accurate mapmaking. Mapping like that done by the U.S. Army Corps of Engineers for the city's hurricane zones will inform the revisions.

These maps determine insurance rates and establish areas subject to building code requirements, so it is critically important that they be accurate and up-to-date. We will work with FEMA to ensure that our floodplain maps reflect the most current information.

We will document the City's floodplain management strategies to secure discounted flood insurance for New Yorkers

The National Flood Insurance Program's (NFIP) Community Rating System (CRS) is a voluntary incentive program that recognizes community floodplain management strategies that go beyond the minimum required. On the basis of this rating system, the 15,000 flood insurance policyholders in the city can receive discounts for aggressive action.

New York City already has relatively strict standards that should make residents eligible for reduced premiums, but we must submit an extensive application documenting our actions to FEMA. The City will compile and submit the documentation required to establish its CRS rating.

We will amend the building code to address the impacts of climate change

The Department of Buildings will assemble a task force composed of City officials, building professionals, and other experts to make recommendations for changes to the building code that address the consequences of climate change. Impacts to be considered include the increased potential for flooding, droughts, high winds, heat waves, the disruption of utility services, and the need for buildings to be inhabitable without energy, a concept known as "passive survivability." This task force will coordinate with other working groups analyzing the impacts of climate change and requirements for adaptation.

CASE STUDY

The Cost of Inaction

Preparing for climate change will be costly. But it is becoming increasingly clear: not preparing will be worse.

According to the Stern Review on the Economics of Climate Change, the overall costs and risks of not adapting to climate change will be equivalent to losing 5% of global Gross Domestic Product (GDP). If environmental and health impacts are taken into account, the estimates of damage could rise to 20% of GDP or more.

Whether or not one believes the science behind global warming, more and more markets do. The insurance industry is already beginning to evaluate municipal investments in light of risks due to climate change. Cities that don't have strong climate change strategies in place may face lower credit ratings, increased insurance costs, and reduced bonding capacity. For example, the world's largest reinsurer, Swiss Re, has instructed corporate clients to come up with strategies for handling global warming or risk losing liability coverage.

The insurance industry's response to the consequences of climate change is continuing to shape the economy. U.S. insurers are already raising rates or leaving markets as a result of increased risk in coastal and fire-prone areas.

In areas where insurers feel the risk is too great, or their ability to raise premiums is hampered by political or regulatory limitations, the risk burden will be shifted to the public as well as to banks and investors. For example, Allstate considered cancelling 20,000 homeowner policies in the Tampa Bay Area; the cuts would have come on top of 32,000 policies that Allstate canceled in South Florida since the 1992 storm. CIGNA Corporation stopped writing new policies in South Florida entirely to reduce its risk of claim losses. CIGNA's sales moratorium took effect a month before the start of the Atlantic hurricane season.

These developments, and others like them, make clear that the costs of inaction now outweigh the expense of action.

Next Steps

This Plan has laid out an ambitious agenda for action that can create a sustainable New York City—and allow us to achieve the overall goal of leaving our children a city that is cleaner, healthier, and more reliable than it is today.

This agenda will require tremendous effort: on the part of City officials and State legislators; by community leaders and our delegation in Washington; from the State government and from every New Yorker. It will not be easy, and it will not be free. But the payoff is real, and big; and the perils of inaction are far greater than the costs of action.

Further, we must start today. We may call this a long-term plan, but building that future will require immediate action. Some will have an impact and meet a need right away; in 2007 we will begin unlocking school playgrounds. For others, like reducing our greenhouse gas emissions, a window of opportunity may be closing.

As a result, we are committed to acting quickly to begin implementing this Plan. We will submit draft legislation to the State Assembly, State Senate, and City Council, and work with legislators to secure its passage. We will work closely, starting immediately, with State agencies to implement the regulatory and administrative aspects of this plan at the State level.

Many of the initiatives in this Plan can be implemented directly by the City. All of the relevant City agencies have participated in shaping these initiatives and will begin as quickly as possible to implement everything that is under our control. The Mayor will ask his Sustainability Advisory Board to continue providing their assistance to this effort, through ongoing advice and by helping City agencies work through the challenges of implementation.

In addition, we will expand the Office of Long-Term Planning and Sustainability to take on new responsibilities, such as fostering interagency cooperation on stormwater management practices and developing a climate change adaptation strategy.

The office will also begin issuing two annual reports. One will report on progress made on each of the Plan's initiatives and overall progress towards the goals. The other will report on climate change, which will include annual updates to the city's greenhouse gas emissions inventory; an assessment of how well our strategies are working toward achieving our greenhouse gas reduction goals; reports on the extent of climate change and the impacts we face; and updates on the city's efforts towards climate change adaptation.

While 2030 may seem like a long way off, there is much that we can accomplish in the next few years. For virtually all of our initiatives, we have identified short-term milestones that can be achieved before the end of this Administration and this City Council in December 2009. Fast action now will be crucial to setting this Plan on the way to realization.

There are now 8.2 million New Yorkers—more than at any time in our history. And more are coming.

They are coming because New York has renewed itself; because over the past three decades **we have achieved one of the greatest resurgences of any American city.**

Growth is ultimately an expression of optimism; it depends on a belief in possibility—essential to New York's soul since its days as an inclusive, turbulent, tolerant Dutch colony.

That is why our recovery has not only strengthened our quality of life, but also our sense of hope. We have proven that challenges once considered insurmountable can be overcome. **It is time to summon that spirit again.**

Over the next two decades, more people, visitors, and jobs will bring vibrancy, diversity, opportunity—and revenue. But **unless we act, they will also bring challenges;** infrastructure strained beyond its limits; parks packed with too many people; streets choked with traffic; trains crammed with too many passengers. Meanwhile, we will face an increasingly precarious environment and the growing danger of climate change that imperils not just our city, but the planet.

We have offered a different vision.

It is a vision of providing New Yorkers with the cleanest air of any big city in the nation; of maintaining the purity of our drinking water and opening more of our rivers and creeks and coastal waters to recreation; of producing more energy more cleanly and more reliably, and offering more choices on how to travel quickly and efficiently across our city. It is a vision where contaminated land is reclaimed and restored to communities; where every family lives near a park or playground; where housing is sustainable and available to New Yorkers from every background, reflecting the diversity that has defined our city for centuries.

It is a vision of New York as the first sustainable 21st century city—but it is more than that. **It is a plan to get there.**

The 127 new initiatives detailed here will strengthen our economy, public health, and quality of life. Collectively, they will add up to the broadest attack on climate change ever undertaken by an American city.

New Yorkers used to think this boldly all the time. Previous generations looked ahead and imagined how their city would grow. They built subways through undeveloped land and established Central Park far from the heart of the city. They constructed water tunnels that could serve millions when our city was a fraction of the size.

Their actions made our modern city possible.

Now it is our turn.

Goals

The concept of "sustainability" brings together economic, social, and environmental considerations precisely because these goals are inter-related. Solutions in one area can bring benefits in another.

Similarly, we have approached this plan holistically, not as a series of separate challenges. Each initiative achieves multiple ends. Some, in fact, rely on others; for example, we cannot meet our air quality goal if we do not also reduce road congestion. And virtually every initiative in this plan contributes to the global fight against climate change, because enabling the most energy- and land-efficient city in America to grow will help reduce our nation's global warming emissions.

Throughout this document, each initiative has appeared with icons representing the various goals it helps achieve. Here we present them in one place, demonstrating the interdependence of our solutions to building a sustainable New York.

	INITIATIVE	HOUSING	OPEN SPACE	BROWNFIELDS	WATER QUALITY	WATER NETWORK	CONGESTION	STATE OF GOOD REPAIR	ENERGY	AIR QUALITY	CLIMATE CHANGE
HOUSING	**CONTINUE PUBLICLY-INITIATED REZONINGS**										
	Pursue transit-oriented development	●	●				●			●	●
	Reclaim underutilized waterfronts	●	●	●			●			●	●
	Increase new transit options to spur development	●					●			●	●
	CREATE NEW HOUSING ON PUBLIC LAND										
	Expand co-locations with government agencies	●					●			●	●
	Adapt outdated buildings to new uses	●					●			●	●
	EXPLORE ADDITIONAL AREAS OF OPPORTUNITY										
	Develop underused areas to knit neighborhoods together	●									●
	Capture the potential of infrastructure investments	●					●			●	●
	Deck over railyards, rail lines, and highways	●	●				●			●	●
	EXPAND TARGETED AFFORDABILITY PROGRAMS										
	Develop new financing strategies	●									●
	Expand inclusionary zoning	●									●
	Encourage homeownership	●									
	Preserve the existing stock of affordable housing throughout New York City	●								●	●
OPEN SPACE	**MAKE EXISTING SITES AVAILABLE TO MORE NEW YORKERS**										
	Open schoolyards across the city as public playgrounds		●								●
	Increase options for competitive athletics		●								
	Complete underdeveloped destination parks		●								●
	EXPAND USABLE HOURS AT EXISTING SITES										
	Provide more multi-purpose fields		●								
	Install new lighting		●								
	RE–IMAGINE PUBLIC REALM										
	Create or enhance a public plaza in every community		●		●					●	●
	Green the cityscape		●		●				●	●	●

Create homes for almost a million more New Yorkers, while making housing more affordable and sustainable.

Ensure that all New Yorkers live within a 10-minute walk of a park.

Clean up all contaminated land in New York City.

Open 90% of our waterways for recreation by reducing water pollution and preserving our natural areas.

Develop critical backup systems for our aging water network to ensure long-term reliability.

	INITIATIVE	HOUSING	OPEN SPACE	BROWNFIELDS	WATER QUALITY	WATER NETWORK	CONGESTION	STATE OF GOOD REPAIR	ENERGY	AIR QUALITY	CLIMATE CHANGE
BROWNFIELDS	**MAKE EXISTING BROWNFIELD PROGRAMS FASTER AND MORE EFFICIENT**										
	Adopt on-site testing to streamline the cleanup process	●		●							●
	Create remediation guidelines for New York City cleanups	●		●							●
	Establish a City office to promote brownfield planning and redevelopment	●		●							●
	EXPAND ENROLLMENT INTO STREAMLINED PROGRAMS										
	Expand participation in the current State Brownfield Cleanup Program (BCP)	●		●							
	Create a City program to oversee all additional cleanups	●		●							●
	Provide incentives to lower costs of remediation	●		●							●
	ENCOURAGE GREATER COMMUNITY INVOLVEMENT IN BROWNFIELD REDEVELOPMENT										
	Encourage the State to release community-based redevelopment grants	●		●							●
	Provide incentives to participate in Brownfields Opportunity Area (BOA) planning	●		●							●
	Launch outreach effort to educate communities about brownfield redevelopment	●		●							●
	IDENTIFY REMAINING SITES FOR CLEANUPS										
	Create database of historic uses across New York City to identify potential brownfields	●		●							●
	Limit liability of property owners who seek to redevelop brownfields	●		●							●
WATER QUALITY	**CONTINUE IMPLEMENTING INFRASTRUCTURE UPGRADES**										
	Develop and implement Long–Term Control Plans				●						
	Expand wet weather capacity at treatment plants				●						
	PURSUE PROVEN SOLUTIONS TO PREVENT WATER FROM ENTERING SYSTEM										
	Increase use of High Level Storm Sewers (HLSS)				●				●		●
	Capture the benefits of our open space plan		●		●				●	●	●
	Expand the Bluebelt program		●		●				●	●	●
	EXPAND TRACK AND ANALYZE NEW BEST MANAGEMENT PRACTICES (BMPS) ON A BROAD SCALE										
	Form interagency BMP Task Force				●				●	●	●
	Pilot promising BMPs				●				●	●	●
	Require greening of parking lots				●				●	●	●
	Provide incentives for green roofs				●				●	●	●
	Protect wetlands				●					●	●
WATER NETWORK	**ENSURE THE QUALITY OF OUR DRINKING WATER**										
	Continue the Watershed Protection Program					●			●		●
	Construct an ultraviolet disinfection plant for the Catskill and Delaware Systems					●					
	Build the Croton Filtration Plant					●					
	CREATE REDUNDANCY FOR AQUEDUCTS TO NEW YORK CITY										
	Launch a major new water conservation effort				●	●			●		●
	Maximize existing facilities					●					
	Evaluate new water sources					●					

Improve travel times by adding transit capacity for millions more residents, visitors and workers

Reach a full "state of good repair" on New York City's roads, subways, and rails for the first time in history.

Provide cleaner, more reliable power for every New Yorker by upgrading our energy infrastructure.

Achieve the cleanest air of any big city in America.

Reduce global warming emissions by more than 30%

	INITIATIVE	HOUSING	OPEN SPACE	BROWNFIELDS	WATER QUALITY	WATER NETWORK	CONGESTION	STATE OF GOOD REPAIR	ENERGY	AIR QUALITY	CLIMATE CHANGE
WATER NETWORK	**MODERNIZE IN-CITY DISTRIBUTION**										
	Complete Water Tunnel No. 3					●					
	Complete a backup tunnel to Staten Island					●					
	Accelerate upgrades to water main infrastructure					●					
TRANSPORTATION	**BUILD AND EXPAND TRANSIT INFRASTRUCTURE**										
	Increase capacity on key congested routes						●			●	●
	Provide new commuter rail access to Manhattan						●			●	●
	Expand transit access to underserved areas						●			●	●
	IMPROVE TRANSIT SERVICE ON EXISTING INFRASTRUCTURE										
	Improve and expand bus service						●			●	●
	Improve local commuter rail service						●			●	●
	Improve access to existing transit						●			●	●
	Address congested areas around the city						●			●	●
	PROMOTE OTHER SUSTAINABLE MODES										
	Expand ferry service						●			●	●
	Promote cycling						●			●	●
	IMPROVE TRAFFIC FLOW BY REDUCING CONGESTION										
	Pilot congestion pricing						●	●		●	●
	Manage roads more efficiently						●			●	●
	Strengthen enforcement of traffic violations						●			●	●
	Facilitate freight movements						●			●	●
	ACHIEVE A STATE OF GOOD REPAIR ON OUR ROADS AND TRANSIT SYSTEM										
	Close the Metropolitan Transportation Authority's state of good repair gap						●	●		●	●
	Reach a state of good repair on the city's roads and bridges						●	●		●	●
	DEVELOP NEW FUNDING SOURCES										
	Establish a new regional transit financing authority						●	●		●	●
ENERGY	**IMPROVE ENERGY PLANNING**										
	Establish a New York City Energy Planning Board								●	●	●
	REDUCE NEW YORK CITY'S ENERGY CONSUMPTION										
	Reduce energy consumption by City government								●	●	●
	Strengthen energy and building codes in New York City								●	●	●
	Create an energy efficiency authority for New York City								●	●	●
	Prioritize five key areas for targeted incentives								●	●	●
	Expand Peak Load Management								●	●	●
	Launch an energy awareness and training campaign								●	●	●

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Ensure that all New Yorkers live within a 10-minute walk of a park.

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Develop critical backup systems for our aging water network to ensure long-term reliability.

	INITIATIVE	HOUSING	OPEN SPACE	BROWNFIELDS	WATER QUALITY	WATER NETWORK	CONGESTION	STATE OF GOOD REPAIR	ENERGY	AIR QUALITY	CLIMATE CHANGE
ENERGY	**EXPAND THE CITY'S CLEAN POWER SUPPLY**										
	Facilitate repowering and construct power plants and dedicated transmission lines								●		●
	Expand Clean Distributed Generation ("Clean DG")								●	●	●
	Support expansion of natural gas infrastructure								●	●	●
	EXPAND THE CITY'S CLEAN POWER SUPPLY										
	Foster the market for renewable energy								●	●	●
	MODERNIZE ELECTRICITY DELIVERY INFRASTRUCTURE										
	Accelerate reliability improvements to the city's grid								●		
	Facilitate grid repairs through improved coordination and joint bidding								●	●	
	Support Con Edison's efforts to modernize the grid								●		●
AIR QUALITY	**REDUCE ROAD VEHICLE EMISSIONS**										
	Capture the air quality benefits of our transportation plan						●			●	●
	Improve fuel efficiency of private cars									●	●
	Reduce emissions from taxis, black cars, and for hire-vehicles									●	●
	Replace, retrofit, and refuel diesel trucks									●	●
	Decrease school bus emissions									●	●
	REDUCE OTHER TRANSPORTATION EMISSIONS										
	Retrofit ferries and promote use cleaner fuels									●	
	Seek to partner with the Port Authority to reduce emissions from Port facilities									●	●
	Reduce emissions from construction vehicles									●	
	REDUCE EMISSIONS FROM BUILDINGS										
	Capture the air quality benefits of our energy plan								●	●	●
	Promote the use of cleaner burning heating fuels								●	●	●
	PURSUE NATURAL SOLUTIONS TO IMPROVE AIR QUALITY										
	Capture the benefits of our open space plan				●					●	
	Reforest targeted areas of our parkland				●					●	●
	Increase tree plantings on lots				●				●	●	●
	UNDERSTAND THE SCOPE OF THE CHALLENGE										
	Launch collaborative local air quality study									●	
CLIMATE	**PROTECT OUR VITAL INFRASTRUCTURE**										
	Create an intergovernmental Task Force to protect our vital infrastructure										●
	DEVELOP SITE–SPECIFIC STRATEGIES										
	Work with vulnerable neighborhoods to develop site-specific strategies										●
	INCORPORATE CLIMATE CHANGE CONCERNS INTO PLANNING PROCESS										
	Launch a citywide strategic planning process for climate change adaptation										●

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Reduce global warming emissions by more than 30%

Implementation

One of the biggest challenges to long-term planning in government is that the terms of elected leaders rarely extend into the long term. It means that time will be up before the job is finished, which in some cases limits the desire or ability to embark on multi-year efforts. But we rarely appreciate the extent to which long-term challenges require near-term action to solve or avoid them. As a result, this plan requires fast implementation.

The Bloomberg Administration has made a significant commitment to the fulfillment of this plan, including budget allocations and a commitment to expand the Office of Long-Term Planning and Sustainability. But its implementation will require action by many leaders—in City government, in the City Council and the State Legislature, and in the public authorities that serve the city. Here we outline the responsibilities, critical steps, milestones, and City budget commitments as a guide to how this plan will be implemented.

DOB NYC DEPARTMENT OF BUILDINGS
DCAS NYC DEPARTMENT OF CITYWIDE ADMINISTRATIVE SERVICES
DCP NYC DEPARTMENT OF CITY PLANNING
DEP NYC DEPARTMENT OF ENVIRONMENTAL PROTECTION
DOE NYC DEPARTMENT OF EDUCATION
DOF NYC DEPARTMENT OF FINANCE
DOHMH NYC DEPARTMENT OF HEALTH AND MENTAL HYGIENE
DOT NYC DEPARTMENT OF TRANSPORTATION
DPR NYC DEPARTMENT OF PARKS & RECREATION
DSNY NYC DEPARTMENT OF SANITATION
EDC NYC ECONOMIC DEVELOPMENT CORPORATION
HPD NYC DEPARTMENT OF HOUSING PRESERVATION AND DEVELOPMENT
MTA METROPOLITAN TRANSPORTATION AUTHORITY
NYCEEA NYC ENERGY EFFICIENCY AUTHORITY (PROPOSED)
NYS DEC NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATIOIN
NYSERDA NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY
PANYNJ PORT AUTHORITY OF NEW YORK AND NEW JERSEY
NYS PSC NYS PUBLIC SERVICE COMMISSION
OLTPS NYC MAYOR'S OFFICE OF LONG-TERM PLANNING AND SUSTAINABILITY
OER NYC OFFICE OF ENVIRONMENTAL REMEDIATION (PROPOSED)
SCA NYC SCHOOL CONSTRUCTION AUTHORITY
SMART SUSTAINABLE MOBILITY AND REGIONAL TRANSPORTATION FUND (PROPOSED)
TBTA TRIBOROUGH BRIDGE AND TUNNEL AUTHORITY
TLC NYC TAXI AND LIMOUSINE COMMMISSION

	SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
				2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
HOUSING	**CONTINUE PUBLICLY-INITIATED REZONINGS**							
	1 Pursue transit-oriented development							
	Use upcoming rezonings to direct growth toward areas with strong transit access	DCP		Complete current Administration agenda for rezonings and land use studies		-	-	
	2 Reclaim underutilized waterfronts							
	Continue restoring underused or vacant waterfront land across the city	DCP		Complete current Administration agenda for rezonings and land use studies		-	-	
	3 Increase transit options to spur development							
	Use transit extensions to spark growth as the subways did more than a century ago	MTA/OLTPS/DOT	Transit extensions	Implement increased transit options including BRT to spur development	Undertake rezonings alonside transit expansion	-	-	
	CREATE NEW HOUSING ON PUBLIC LAND							
	4 Expand co-locations with government agencies							
	Pursue partnerships with City and State agencies throughout the city	DCAS/HPD		Create database of City, State, and Federal land for co-location opportunities and housing	Execute on co-location opportunities	2.0	0.2	
	5 Adapt outdated buildings to new uses							
	Seek to adapt unused schools, hospitals, and other outdated municipal sites for productive use as new housing	DCP/HPD		Use database to identify and execute on initial sites	Execute on co-location opportunities	-	-	
	EXPLORE ADDITIONAL AREAS OF OPPORTUNITY							
	6 Develop underused areas to knit neighborhoods together							
	Continue to identify underutilized areas across the city that are well-served by transit and other infrastructure	DCP		Complete current Administration agenda for rezonings and land use studies	Begin studying areas of opportunity and select few for in-depth re-zoning initiatives	-	-	

	SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
				2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
HOUSING	**EXPLORE ADDITIONAL AREAS OF OPPORTUNITY, CONTINUED**							
	7 Capture the potential of transportation infrastructure investments							
	Examine the potential of major infrastructure expansions to spur growth in new neighborhoods	DCP			Identify rezoning opportunities that emerge with implementation of new transit projects	-	-	
	8 Deck over railyards, rail lines, and highways							
	Explore opportunities to create new land by constructing decks over transportation infrastructure	DCP		Identify railyards, rail lines, and highways that coincide with sustainable development and have the capacity for anticipated growth	Conduct feasibility assessments and identify opportunities for rezonings and required infrastructure investments	-	-	
	EXPAND TARGETED AFFORDABILITY PROGRAMS							
	9 Develop new financing strategies							
	Continue to pursue creative financing strategies to reach new income brackets	HPD		Create Mayor's *New Housing Marketplace Plan* to build 165,000 units of affordable housing	Pursue new opportunities to continue programs to promote affordable housing	-	-	
	10 Expand inclusionary zoning							
	Seek opportunities to expand the use of inclusionary zoning, harnessing the private market to create economically-integrated communities	HPD		Pursue inclusionary zoning in all appropriate rezonings initiated and reviewed by the city	Continue use of inclusionary zoning in all appropriate rezonings initiated and reviewed by the city	-	-	
	11 Encourage homeownership							
	Continue to develop programs to encourage homeownership, emphasizing affordable apartments over single-family homes	HPD		Complete *Mayor's New Housing Marketplace* plan to build 165,000 units of affordable housing	Promote home ownership opportunities where appropriate	-	-	
	12 Preserve the existing stock of affordable housing throughout New York City							
	Continue to develop programs to preserve the existing affordable housing that so many New Yorkers depend upon today	HPD		Complete Mayor's new housing marketplace plan to build 165,000 units of affordable housing	Pursue new opportunities to continue programs to promote affordable housing	-	-	
OPEN SPACE	**MAKE EXISTING SITES AVAILABLE TO MORE NEW YORKERS**							
	1 Open schoolyards across the city as public playgrounds							
	Open schoolyards as playgrounds in every neighborhood	DPR/DOE		Open all Category 1 sites not requiring capital improvements	Open all school yards in priority neighborhoods	117.2	3.5	Private donors
	2 Increase options for competitive athletes							
	Make high-quality competition fields available to teams across the city	DPR		Open fields up for community use on 43 fields	Continue to maintain fields	-	-	
	3 Complete underdeveloped destination parks							
	Fulfill the potential of at least one major undeveloped park site in every borough	DPR		Complete community outreach and designs for all regional parks	Complete construction of all regional parks	386.4	-	
	EXPAND USABLE HOURS AT EXISTING SITES							
	4 Provide more multi-purpose fields							
	Convert asphalt sites into multi-use turf fields	DPR		Complete development of all proposed multi-purpose fields	Maintain transformed fields for continued use	42.1	-	
	5 Install new lighting							
	Maximize time on our existing turf fields by installing additional lights for nighttime use	DPR		Complete installation of all proposed field lights	maintain installed field lighting and seek new opportunities	21.6	-	
	RE-IMAGINE THE PUBLIC REALM							
	6 Create or enhance a public plaza in every community							
	Create or enhance at least one public plaza in every community	DOT		Continue development of identified plaza initiatives and develop process for community identification of potential new plazas	Construct 10 to 15 plazas; identify new plaza opportunities in priority neighborhoods	134.3	-	
	7 Green the cityscape							
	Fill every available street tree opportunity in New York City	DPR		Plant 15,000 street trees a year	Achieve 100% street tree stocking level	246.9	8.1	
	Expand Greenstreets program	DPR		Complete 240 greenstreets	Complete 640 greenstreets	15.0	0.6	Private donors

	SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
				2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
BROWNFIELDS	**MAKE EXISTING BROWNFIELD PROGRAMS FASTER AND MORE EFFICIENT**							
	1 Adopt on-site testing to streamline the cleanup process							
	Pilot the "Triad" program on two sites	OER		Conduct first two pilots of Triad and evaluate their effectiveness in the city environment	If effective, promote the use of Triad in City and private developments	-	-	
	2 Create remediation guidelines for New York City cleanups							
	Analyze New York City's soil and develop a set of standard cleanup remedies appropriate for the city	OER		Complete urban soil study; city-specific remediation guidelines under development	Achieve agreement on all city-specific presumptive remedies based on urban soil studies	-	-	
	3 Establish a City office to promote brownfield planning and redevelopment							
	Create a new City office to increase resources dedicated to brownfield planning, testing, and cleanups	OLTPS		Establish and fully staff office; regularly evaluate city applications and E-designated sites		-	0.5	
	EXPAND ENROLLMENT INTO STREAMLINED PROGRAMS							
	4 Expand participation in the current State Brownfield Cleanup Program (BCP)							
	Ask State to redistribute BCP tax credits to relieve budgetary pressures, and begin covering New York City-specific contamination	OLTPS	State law	Enact recommended changes to State law		-	-	State
	5 Create a City program to oversee all additional cleanups							
	Create a City-sponsored program to provide oversight of cleanups for any sites not enrolled in other programs	OER	State law	Establish City BCP; oversee all voluntary clean ups and E-designated (Council legislation, State DEC approval, and regulations promulgated)	Continue to oversee voluntary cleanups in New York City not enrolled in a State program	-	0.5	
	6 Provide incentives to lower costs of remediation							
	Dedicate $15 million to capitalize a fund to support brownfield redevelopment	OER		Establish a revolving loan fund; issue first loan for City remediation project		-	15.0	
	ENCOURAGE GREATER COMMUNITY INVOLVEMENT IN BROWNFIELD REDEVELOPMENT							
	7 Encourage the State to release community-based redevelopment grants							
	Advocate for the State to reform the Brownfield Opportunity Area (BOA) program and release planning grant funds to community groups	NYS DEC/OLTPS	State law	Allocate funds to all previous BOA awardees; advocate for new process to streamline state grants to BOAs	Promote additional BOA applications and support community organizations who want to plan brownfield redevelopment	-	-	State
	8 Provide incentives to participate in Brownfields Opportunity Area (BOA) planning							
	Advocate for financial incentives for developments constructed in coordination with a BOA	NYS DEC/OLTPS	State law	Enact State tax incentives for private developers working in coordination with BOA application		-	-	State
	9 Launch outreach efforts to educate communities about brownfield redevelopment							
	Educate and provide technical assistance to communities, private developers, and City agencies to promote brownfield redevelopment	OER		Begin outreach campaigns and liaison services to private developers and non-profit organizations		-	-	
	IDENTIFY REMAINING SITES FOR CLEANUPS							
	10 Create a database of historic uses across New York City to identify potential brownfields							
	Conduct a historic use assessment for all sites in order to measure long-term progress towards goals	OER		Launch study to aggregate all relevant data for a City environmental database	Launch database and provide public access	-	1.5	
	11 Limit liability of property owners who seek to redevelop brownfields							
	Create an insurance program and legal protections to limit the liability of developers willing to clean up land they did not pollute	OER		Design and launch a market-feasible supplemental insurance policy		-	10.0	
WATER QUALITY	**CONTINUE IMPLEMENTING INFRASTRUCTURE UPGRADES**							
	1 Develop and implement Long-Term Control Plans							
	Complete Long-Term Control Plans for all 14 New York City Watersheds, as required by law	DEP		Submit Waterbody/Watershed (WB/WS) Plans for 18 waterbodies NYS DECD, detailing strategies for CSO reduction	Integrate WB/WS plans into the 14 watershed specific Long-Term Control Plans (LTCPs) and submit draft city wide LTCP	-	-	
	2 Expand wet weather capacity at treatment plants							
	Reduce Combined Sewage Overflow (CSO) discharges by more than 185 mgd during rainstorms	DEP		Continue construction	Complete upgrades to 26th Ward and Jamaica WWTP (2015)	-	-	

SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
			2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
WATER QUALITY							
PURSUE PROVEN SOLUTIONS TO PREVENT STORM WATER FROM ENTERING SYSTEM							
3 Increase use of High Level Storm Sewers (HLSS)							
Convert combined sewers into HLSS and integrate HLSS into major new developments as appropriate	DEP		Create standardized process to analyze proposed sites for possible HLSS (process for HLSS will always be dictated by the unique characteristics of the site)	Continue to implement HLSS process	-	-	
4 Capture the benefits of our open space plan (See the open space initiatives on page 147 for more information)							
5 Expand the Bluebelt program							
Expand Bluebelt in Staten Island and other boroughs, where possible	DEP		Begin expanding Bluebelt to other parts of Staten Island	Create bluebelt strategies in Udalls' Cove and Brookville Boulevard West, Springfield Lake, and Baisley Pond	-	-	
EXPAND TRACK AND ANALYZE NEW BEST MANAGEMENT PRACTICES (BMPs) ON A BROAD SCALE							
6 Form an interagency BMP Task Force							
Make the reduction of CSO volumes and other environmental issues a priority for all relevant City agencies	DEP	Launch NYC BMP Inter-Agency Task Force	Complete Comprehensive BMP plan and associated budget	Continue to implement BMPs citywide	-	-	
7 Pilot promising BMPs							
Introduce 20 cubic meters of ribbed mussel beds	DEP		Complete pilot and plan for additional mollusk habitats	Continue to foster natural ecology of city waterways	-	-	
Plant trees with improved pit designs	DEP / DPR		Complete pilot	Continue practices to improve the ability for tree pits to capture stormwater	-	-	
Create vegetated ditches (swales) along parkways	DEP/DOT		Complete pilot and identify additional appropriate locations	Continue practices to capture stormwater runoff from streets	-	-	
8 Require greening of parking lots							
Modify the zoning resolution to include design guidelines for off-street parking lots for commercial and community facilities	DCP		Complete ULURP process; zoning requirement in effect	Continue to look for ways to reduce the impacts of open parking lots	-	-	
9 Provide incentives for green roofs							
Encourage the installation of green roofs through a new incentive program	OLTPS/DOF	City Administrative Code amendment	Launch initiative	Reevaluate success of incentive	-	1.0	
10 Protect wetlands							
Assess the vulnerability of existing wetlands and identify additional policies to protect and manage them	DPR/DEP/OLTPS		Complete wetlands study and draft policy	Implement policy recommendations	-	-	
WATER NETWORK							
ENSURE THE QUALITY OF OUR DRINKING WATER							
1 Continue the Watershed Protection Program							
Aggressively protect our watersheds as we seek to maintain a Filtration Avoidance Determination for the Catskill and Delaware Water Supplies	DEP	Renewal of Filtration Avoidance Determination	Renew the City's Filtration Avoidance Determination and fulfill commitments	Continue to work with communities upstate and protection our water supply West of the Hudson	-	-	
2 Construct an ultraviolet disinfection plant for the Catskill and Delaware systems							
Construct an ultraviolet disinfection facility to destroy disease-causing organisms in our upstate watershed	DEP		Begin construction of UV disinfection plant	Open UV disinfection plant	-	-	
3 Build the Croton Filtration Plant							
Construct a water filtration plant to protect the Croton supply	DEP		Continue to construct Croton Filtration Plant	Complete construction of Croton Filtration Plant (2012)	-	-	
CREATE REDUNDANCY FOR AQUEDUCTS TO NEW YORK CITY							
4 Launch a major new water conservation effort							
Implement a water conservation program to reduce citywide consumption by 60 mgd	DEP		Launch water conservation program	Achieve 60 mgd of water consumption reduction	-	-	

	SUB-INITIATIVE	IMPLEMENTATION LEAD AGENCY	NON-CITY ACTION NEEDED TO PROGRESS	MILESTONES FOR COMPLETION BY END OF		NEW YORK CITY FUNDING, (IN $ MILLIONS, NOMINAL)		OTHER FUNDING SOURCES
				2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
WATER NETWORK	**CREATE REDUNDANCY FOR AQUEDUCTS TO NEW YORK CITY, CONTINUED**							
	5 Maximize existing facilities							
	Expand our supply potential through increased efficiency	DEP		Begin installation of new hydraulic pumps; begin designing enhanced filtration plant for greater use of Jamaica groundwater	Complete installation of new hydraulic pumps (2011); begin construction of an enhanced filtration plant for greater use of Jamaica groundwater; resume use of	-	-	
	6 Evaluate new water sources							
	Evaluate 39 projects to meet the shortfall needs of the city if a prolonged shutdown of the Delaware Aqueduct is required	DEP		Finalize a short list of projects for piloting and design	Begin planning for implementation of chosen projects	-	-	
	MODERNIZE IN-CITY DISTRIBUTION							
	7 Complete Water Tunnel No. 3							
	Complete construction of Stage 2 and begin repairing Water Tunnel No. 1	DEP		Open Brooklyn/Queens leg	Open Manhattan leg	-	-	
	Complete Stages 3 and 4 of Water Tunnel No. 3	NYC Water Board/DEP		None	Complete design of stage 3	-	-	
	8 Complete a backup tunnel to Staten Island							
	Replace pipelines connecting Staten Island to Water Tunnel No. 2	DEP	Complete dredging of Harbor by U.S. Army Corp of	Begin replacing pipelines	Complete replacement of pipelines	-	-	
	9 Accelerate upgrades to water main infrastructure							
	Increase replacement rate to over 80 miles annually	DEP		Continue to replace water mains	Continue to replace water mains	-	4.0	
TRANSPORTATION	**BUILD AND EXPAND TRANSIT INFRASTRUCTURE**							
	1 Increase capacity on key congested routes							
	Seek to fund five projects that eliminate major capacity constraints	SMART Authority	State law to create the SMART Authority	Have funding mechanism in place	Complete ARC, third track, Lincoln Tunnel XBL, Second Avenue Subway (Phase I), and Lower Manhattan Rail Link	-	-	SMART Fund
	2 Provide new commuter rail access to Manhattan							
	Seek to expand options for rail commuters	State Legislature/ SMART Authority	State law to create the SMART Authority	Continue construction of East Side Access and Second Avenue Subway, move other projects into engineering phase	Complete East Side Access and Metro-North to Penn Station, move other projects forward	-	-	SMART fund
	3 Expand transit access to underserved areas							
	Seek to provide transit to new and emerging neighborhoods	MTA/DCP/OLTPS	State law to create the SMART Authority	Complete Staten Island study and study of potential subway expansion	Open North Shore transit	-	-	SMART Fund
	IMPROVE TRANSIT SERVICE ON EXISTING INFRASTRUCTURE							
	4 Improve and expand bus service							
	Initiate and expand Bus Rapid Transit	MTA/DOT		Open five BRT routes	Open ten BRT routes (5 additional ones)	46.4	1.2	SMART Fund
	Dedicate Bus/High Occupancy Vehicle (HOV) lanes on the East River bridges	MTA/DOT	MTA operation	Operate bus service lanes on all three bridges				SMART Fund
	Explore other improvements to bus service	MTA/DOT		Complete implementation of operating improvements for 22 locations				
	5 Improve local commuter rail service							
	Seek to expand local use of Metro-North and Long Island Rail Road (LIRR) stations	MTA		Improve local connectivity	Increase service frequency after East Side Access opens	-	-	
	6 Improve access to existing transit							
	Facilitate access to subways and bus stops citywide	DOT		Complete construction of up to three bus stops under Els, up to two Sub-Side interface, and up to 15 new sidewalks to bus stops	Continue implementation of up to three bus stops under Els, up to two SSI locations and up to 15 sidewalks to buses	15.2	-	
	7 Address congested areas around the city							
	Develop congestion management plans for outer-borough growth corridors	DOT		Complete studies for nine corridors, and begin implementation (2009)	Undertake studies of growth areas and begin implementation	124.8	-	CMAQ grant

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			2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
TRANSPORTATION							
PROMOTE OTHER SUSTAINABLE MODES							
8 Expand ferry service							
Seek to expand service and improve integration with the city's existing mass transit system	EDC/DOT/OLTPS		Issue contract and launch service; study crosstown BRT	Continue operating ferry	-	-	
9 Promote cycling							
Complete the 1,800-mile bike master plan	DOT		Complete 200 new directional miles of bike routes	Complete 820 directional miles of bike routes (inclusive of 2009 commitment)	6.2	8.1	SMART Fund
Facilitate cycling	DOT		Install 400 new CITYRACKS per year; improve and update maps annually	Continue installation of 400 new CITYRACKS per year and map improvements	-	-	
IMPROVE TRAFFIC FLOW BY REDUCING CONGESTION							
10 Pilot congestion pricing							
Seek to use pricing to manage traffic in the Central Business District (CBD)	DOT	State law	Install and run congestion pricing system by Spring 2009	Continue operation of the congestion charge	-	-	SMART Fund
11 Manage roads more efficiently							
Expand the use of Muni meters	DOT		Install Muni Meters in most outer borough central business districts	Install Muni meters on all block faces that warrant them (2010)	-	-	
Develop an integrated traffic management system for our regional transportation network	DOT		Consolidate TMC	Implement ITS on all regional highways	57.3	4.0	
12 Strengthen enforcement of traffic violations							
Expand the number of Traffic Enforcement Agents (TEAs)	NYPD		Hire 100 TEAs and deploy		-	5.3	
Enable all TEAs to issue blocking-the-box tickets	NYPD	State law			-	-	
Expand the use of traffic enforcement cameras	Law	State law	Install cameras		-	-	
13 Facilitate freight movements							
Improve access to JFK	EDC		Implement short-term recommendations from JFK Access Task Force		-	-	
Explore High Occupancy Truck Toll (HOTT) Lanes	NYS DOT/DOT	Study	Complete study		-	-	
ACHIEVE A STATE OF GOOD REPAIR ON OUR ROADS AND TRANSIT SYSTEM							
14 Close the Metropolitan Transportation Authority's state of good repair gap							
Seek a grant from the SMART Authority to cover the MTA's funding gap	MTA/OLTPS	State law			-	-	SMART Fund
15 Reach a state of good repair on the city's roads and bridges							
Seek a grant from the SMART Authority to fund accelerated capital repairs and upgrades	DOT	State law	Resurface 1,925 lane-miles of city streets, exceeding our current pace of resurfacing by 125 lane-miles	Resurface 6,925 lane-miles of city streets, excee ding our current pace of resurfacing by 625 lane-miles v	-	-	SMART Fund
Invest in bridge and tunnel upgrades	DOT	State law	Complete scheduled 10-year bridge capital plan on schedule		-	50.0	SMART Fund
DEVELOP NEW FUNDING SOURCES							
16 Establish a new regional transit financing authority							
Seek to create a SMART Financing Authority to advance new projects and achieve a state of good repair	OLTPS	State law	Establish SMART Fund		-	50.0	SMART Fund

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			2009	2015	CAPITAL (FY '08-'17)	OPERATING (FY '08)	
IMPROVE ENERGY PLANNING							
1 Establish a New York City Energy Planning Board							
Work with the State and utilities to centralize planning for the city's supply and demand initiatives	EDC/OLTPS	State law	Establish NYC Planning Board		-	-	
REDUCE NEW YORK CITY'S ENERGY CONSUMPTION							
2 Reduce energy consumption by City government							
Commit 10% of the City's annual energy bill to fund energy-saving investments in City operations			Begin investing approximately $80 million a year into improving the energy efficiency of City buildings	Achieve 30% reduction in energy consumption (2017)	-	81.2	
3 Strengthen energy and building codes in New York City							
Strengthen energy and building codes to support our energy efficiency strategies and other environmental goals	DOB/NYSERDA		Complete and adopt first rounds of code changes (2008, 2010)	Continue to update codes, as required	-	-	
4 Create an energy efficiency authority for New York City							
Create the New York City Energy Efficiency Authority responsible for reaching the city's demand reduction targets	EDC/OLTPS	State law to establish the NYCEEA	Create a new authority responsible for the implementation of NYC energy conservation and efficiency programs	Continue to implement efficiency programs	-	-	Energy efficiency surcharges on electricity bill and future RGGI and Forward Capacity funds
5 Prioritize five key areas for targeted incentives							
Use a series of mandates, challenges, and incentives to reduce demand among the city's largest energy consumers	NYCEEA	PSC approval to allocate ratepayer surcharges to NYCEEA	Pass necessary local laws, building code and energy code	Complete all targeted programs and begin to implement new ones	-	-	Energy efficiency surcharges on electricity bill, future RGGI and Forward Capacity funds, and private capital
6 Expand Peak Load Management							
Expand participation in Peak Load Management Programs through smart meters	PSC/Con Edison	PSC to mandate deployment of advanced meters	Ensure Con Edison begins deployment of advanced meters with plan for greater deployment	Achieve 1,000 MW of peak load management	-	-	Energy efficiency surcharges on electricity bill and NYISO incentive programs
Support expansion of real-time pricing across the city	NYSERDA/NYCEEA		Establish appropriate rate and incentive structures	Achieve enrollment of 50% of small businesses and residents by 2015	-	-	
7 Launch an energy awareness and training campaign							
Increase the impact of our energy efficiency efforts through a coordinated energy education, awareness, and training campaign	NYCEEA/OLTPS/CUNY		Launch energy awareness campaign; setup training, certification, and monitoring programs	Continue to improve programs	-	-	Energy efficiency surcharges on electricity bill
EXPAND THE CITY'S CLEAN POWER SUPPLY							
8 Facilitate repowering and construct power plants and dedicated transmission lines							
Facilitate the construction of 2,000 to 3,000 MW of supply capacity by repowering old plants, constructing new ones, and building dedicated transmission lines	NYC Energy Planning Board	State law	Establish NYC Planning Board	Increase clean supply by 2,000 to 3,000 MW and retire 1,000 to 2,100 MW	-	-	Private developers/owners
9 Expand Clean Distributed Generation ("Clean DG")							
Increase the amount of Clean DG by 800 MW	PSC/Con Edison/EDC	Con Edison interconnection study	Study the capacity to increase interconnection limits in each network and work with manufacturers on new circuit breaker technologies	Increase capacity of clean DG citywide by 100 MW	-	-	Energy efficiency surcharges on electricity bill, private capital and NYISO incentives programs
Promote opportunities to develop district energy at appropriate sites in New York City	Con Edison/EDC	Completed study of Hudson Yards District Energy feasibility	Review completed Con Edison Hudson Yards District Energy Study and move forward on district energy projects based on report findings	Update City building code to include requirement for developers of developments over 350,000 square feet to study feasibility of clean DG	-	-	
10 Support expansion of natural gas infrastructure							
Support critical expansions to the city's natural gas infrastructure	EDC	FERC and other regulatory agency approvals	Support appropriate natural gas expansion proposals	Reduce gas prices by $600 million to $900 million	-	-	Private developers/owners

ENERGY

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ENERGY	**EXPAND THE CITY'S CLEAN POWER SUPPLY, CONTINUED**							
	11 Foster the market for renewable energy							
	Create a property tax abatement for solar panel installations	EDC/DOF	City Administrative Code amendment	Launch solar incentive	Achieve competitive solar market in New York City	-	0.4	
	Study the cost-effectiveness of solar electricity when evaluated on a Real Time Pricing scenario	EDC		Complete study		-	0.1	
	Support the construction of the city's first carbon-neutral building, primarily powered by solar electricity	Solar One/EDC		Begin construction of the city's first carbon-neutral building	Complete construction and operate environmental education programs	3.0	-	
	Increase use of solar energy in City buildings through creative financing	EDC/ DCAS/OLTPS	Release RFP for solar developer	Select solar developer to install solar panels; enter into long-term solar power purchase agreement	Continue to increase the amount of solar electricity generated on City buildings	-	-	NYSERDA/US Department of Energy
	Work with the State to eliminate barriers to increasing the use of solar energy in the city	PSC	PSC regulatory amendments on solar cap; State statute	Increase/remove solar cap in NYC and increase net-metering opportunities statewide	Achieve competitive solar market in New York City	-	-	
	Pilot one or more technologies for producing energy from solid waste	EDC/DSNY		Begin designing at least one pilot alternative waste technology facility	Complete pilots of alternative waste technologies and evaluate policies to implement successful technologies on a larger scale	-	-	
	End methane emissions from sewage treatment plants and expand the use of digester gas	DEP	Analyze opportunities for productive use of digester gas	End methane emissions from waste water treatment plants		-	-	
	Study the expansion of gas capture and energy production from existing landfills	EDC/DEP/DSNY/ OLTPS		Complete initial study; begin to follow-up on recommendations	Create a process to review use of gas for energy	-	-	
	MODERNIZE ELECTRICITY DELIVERY INFRASTRUCTURE							
	12 Accelerate reliability improvements to the city's grid							
	Advocate for Con Edison to implement recommendations from the City's report on the western Queens power outages	PSC/Con Edison/EDC	PSC mandate for implementation of recommendations	Begin implementation of City recommendations and all other appropriate recommendations to improve grid reliability	Complete or near complete implementation of City recommendations	-	-	Con Edison
	13 Facilitate grid repairs through improved coordination and joint bidding							
	Pursue the passage of joint bidding legislation	State Legislature/EDC	State law	Approve joint bidding citywide, improve coordination, and begin work on pilot multi-utility tunnel with location identified by formalized team of City, State, and utility representatives	Resolve all regulatory, legal, financial, engineering and operational issues through legislation, if required, to make multi-utility tunnels standard practice for major public capital infrastructure projects	-	-	
	Ensure adequate pier facilities are available to Con Edison to offload transformers and other equipment	EDC				-	-	
	MODERNIZE ELECTRICITY DELIVERY INFRASTRUCTURE							
	14 Support Con Edison's efforts to modernize the grid							
	Support Con Edison's 3G System of the Future initiative	PSC/EDC	PSC approval of Con Edison plans			-	-	Con Edison and Con Edison ratepayers
AIR QUALITY	**REDUCE ROAD VEHICLE EMISSIONS**							
	1 Capture the air quality benefits of our transportation plan (See the transportation initiatives on page 150 and 151 for more information)							
	2 Improve fuel efficiency of private cars							
	Waive New York City's sales tax on the cleanest, most efficient vehicles	OLTPS/DOF	City Administrative Code amendment	Offer incentive	Complete; evaluate extensions	-	1.6	
	Work with the MTA, the Port Authority, and the State Department of Transportation to promote hybrid and other clean vehicles	MTA/PANYNJ/OLTPS	Interagency cooperation	Release assessment of policy options and begin implementation		-	-	
	Pilot new technologies and fuels, including hydrogen and plug-in hybrid vehicles	DOT, OLTPS	NYSERDA funding	Have an operational hydrogen station in New York City	Complete demonstration	-	-	NYSERDA/Shell Hydrogen

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AIR QUALITY							
REDUCE ROAD VEHICLE EMISSIONS, CONTINUED							
3 Reduce emissions from taxis, black cars, and for-hire vehicles							
Reduce taxi and limousine idling	TLC/DOT/NYSERDA		Equip participating yellow taxis and black cars with anti-idling equipment		-	-	CMAQ
Work with the Taxi and Limousine Commission (TLC) and the taxicab industry to double the taxi fleet's efficiency	TLC		Work toward completing new standards for taxis	Complete conversion of all taxis to more fuel efficient vehicles	-	-	Private fleet owners
Work with stakeholders to double the fuel efficiency of black cars and for-hire vehicles	TLC		Work toward completing new standards for for-hire vehicles by 2010	Complete conversion of all for-hire vehicles to more fuel efficient vehicles	-	-	Private fleet owners
4 Replace, retrofit, and refuel diesel trucks							
Introduce biodiesel into the City's truck fleet, go beyond compliance with local laws, and further reduce emissions	All agencies with heavy duty fleets		Dispense a biodiesel blend at all city-owned diesel fueling stations	Continue to increase biodiesel blend as needed	-	-	
Accelerate emissions reductions of private fleets through existing CMAQ programs	DOT		Upgrade additional vehicles	Complete upgrades of approximately 450 more vehicles; request additional CMAQ funds	-	-	CMAQ
Work with stakeholders and the State to create incentives for the adoption of vehicle emission control and efficiency strategies	NYS DEC/OLTPS	Creation of State fund	Draft proposed parameters of fund	Seek to retrofit over 12,000 vehicles	-	-	State
Improve compliance of existing anti-idling laws through a targeted educational campaign	OLTPS		Launch anti-idling campaign	Launch additional anti-idling campaigns	-	-	Partnership
5 Decrease school bus emissions							
Retrofit both large and small school buses and reduce their required retirement age	DOE	Receive State funding /renew contracts with bus owners	Begin retrofits on smaller school buses	Complete upgrades to all school buses; reduce retirement age of school buses	5.1	-	State Department of Transportation
REDUCE OTHER TRANSPORTATION EMISSIONS							
6 Retrofit ferries and promote use of cleaner fuels							
Retrofit the Staten Island Ferry fleet to reduce emissions	DOT		Complete engine upgrades to Staten Island Ferry fleet	Complete installation of DOCs and switch to ULSD, or cleaner fuel if locally available for marine engines	2.3	-	PANYNJ
Work with private ferries to reduce their emissions	DOT/NYSERDA	Local law	Install DOCs in ferries; pass legislation promoting the use of ULSD		-	-	CMAQ
7 Seek to partner with the Port Authority to reduce emissions from Port facilities							
Seek to work with the Port Authority to reduce emissions from the Port's marine vehicles, port facilities, and airports	PANYNJ/OLTPS	Partnership with PANYNJ	Begin creating a plan	Complete and implement plan	-	-	PANYNJ
8 Reduce emissions from construction vehicles							
Accelerate adoption of technologies to reduce construction-related emissions	DEP		Require, through contracts, applicable on-road vehicles used in city construction projects to follow requirements of Local Law 77	Pursue strategies to reduce emissions from all construction projects	-	-	
REDUCE EMISSIONS FROM BUILDINGS							
9 Capture the air quality benefits of our energy plan (See the energy initiatives on page 152 and 153 for more information)							
10 Promote the use of cleaner burning heating fuels							
Lower the maximum sulfur content in heating fuel from 2000 ppm to 500 ppm	State DEC/OLTPS	State Code amendment	Draft new sulfur content requirements for State Code	Reduce maximum sulfur content to 500 ppm or less	-	-	
Reduce emissions from boilers in 100 city public schools	DOE/SCA/OLTPS	State funding	Begin replacing boilers	Replace 80 school boilers that burn No. 6 oil to cleaner burning boilers	285.0	-	State
PURSUE NATURAL SOLUTIONS TO IMPROVE AIR QUALITY							
11 Capture the benefits of our open space plan (See the open space initiatives on page 147 for more information)							
12 Reforest targeted areas of our parkland							
Reforest 2,000 acres of parkland	DPR		Begin reforesting 2,000 acres of parkland	Complete reforestation project by 2017	118.8	-	

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AIR QUALITY	**PURSUE NATURAL SOLUTIONS TO IMPROVE AIR QUALITY, CONTINUED**							
	13 Increase tree plantings on lots							
	Partner with stakeholders to help plant one million trees by 2017	DPR/OLTPS		Launch partnership and begin planting trees	Plant 800,000 trees	-	-	Partnership
	UNDERSTAND THE SCOPE OF THE CHALLENGE							
	14 Launch collaborative local air quality study							
	Monitor and model neighborhood-level air quality across New York City	DOHMH		Launch study	Create and implement a series of policy recommendations based on results of monitoring	-	3.0	
CLIMATE CHANGE	**PROTECT OUR VITAL INFRASTRUCTURE**							
	1 Create an intergovernmental Task Force to protect our vital infrastructure							
	Expand our adaptation strategies beyond the protection of our water supply, sewer, and wastewater treatment systems to include all essential city infrastructure	OLTPS	Cooperation of non-City agencies	Complete an inventory of all at-risk infrastructure with a priority list of high risk components	Complete agency plans and continue to encourage non-city entities to do the same	-	-	
	DEVELOP SITE-SPECIFIC STRATEGIES							
	2 Work with vulnerable neighborhoods to develop site-specific strategies							
	Create a community planning process to engage all stakeholders in community-specific climate adaptation strategies	OLTPS		Complete community planning toolkit and create a climate adaptation plan with UPROSE	Engage all waterfront communities in the discussion of climate change	-	-	
	INCORPORATE CLIMATE CHANGE CONCERNS INTO THE PLANNING PROCESS							
	3 Launch a citywide strategic planning process for climate change adaptation							
	Create a strategic planning process to adapt to climate change impacts	OLTPS	Advisory Board appointments	Release scoping study for a comprehensive climate adaptation planning process	Complete NYC Climate Change Study	-	-	
	Ensure that New York's 100-year floodplain maps are updated	DOB/OEM/DCP/ OLTPS		Complete remapping of NYC hundred-year floodplain		-	-	
	Document the City's floodplain management strategies to secure discounted flood insurance for New Yorkers	DOB/OLTPS		Complete application to FEMA		-	-	
	Amend the building code to address the impacts of climate change	OLTPS	Code updates	Create a Task Force to evaluate necessary changes to the Building Code	Implement climate adaptation strategies into the Building Code	-	-	

This Plan is the result of an enormous collaborative effort on the part of government agencies, civic organizations, academic experts, community groups, consultants, interns, representatives of organized labor and the private sector, elected officials and thousands of New Yorkers. Although it is impossible to acknowledge each individually, we wish to thank all those who contributed their ideas, their time, their expertise, and above all, their passion for New York City.

The paper used for this book is recycled, made from 100% post-consumer fiber. In addition, it was manufactured according to carbon neutral standards (excluding the cover).

Design: Two Twelve New York