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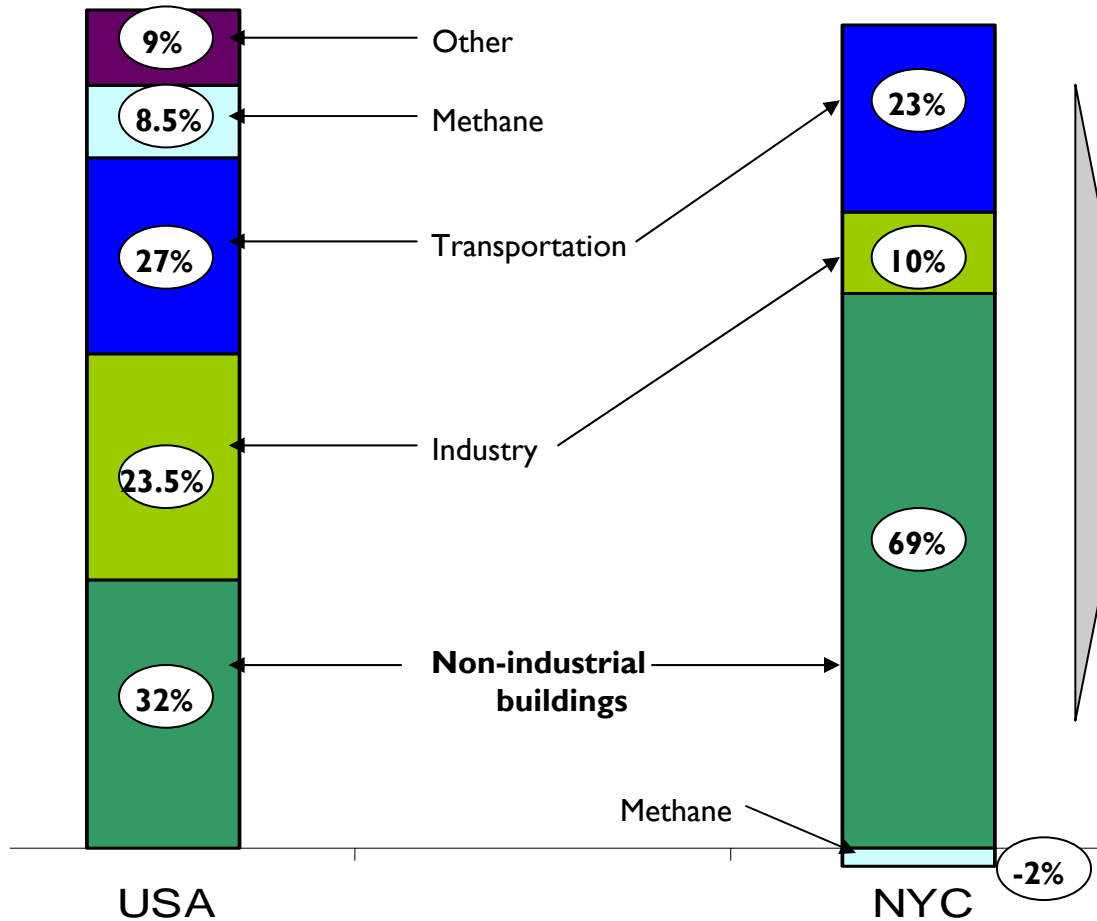


30:

New York's Greenhouse Gas Reduction Plan & Greening the Codes

Laurie Kerr, RA
Sept. 19, 2007

New York's CO2 emissions differ from the rest of the country. Buildings dominate.



NYC's CO2 emissions reduction strategy will have to concentrate on the building sector...in particular the **existing buildings**.

New Yorkers are responsible for less than 1/3 of the CO2 emissions of the average American

Annually...

Each New Yorker generates 7.1 metric tons of CO2

The average American lifestyle generates 24.5 metric tons of CO2

So if New York can absorb 900,000 more residents, the **avoided sprawl** amounts to 15.6 million metric tons avoided per year – more than twice the emissions of Seattle

Still New York City generates as much CO2 as a **small country**

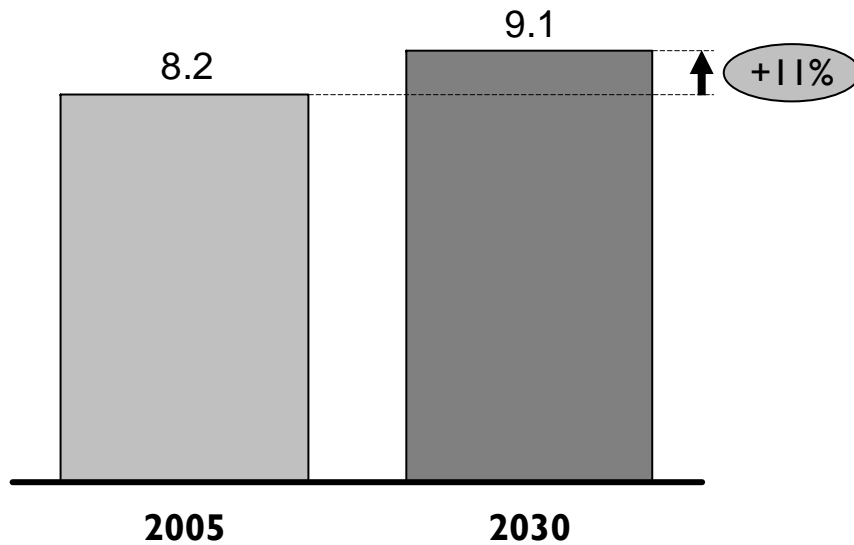
– somewhere between Norway and Ireland.

As NYC grows, power and heating needs will increase substantially



New York City population forecast

Millions of residents

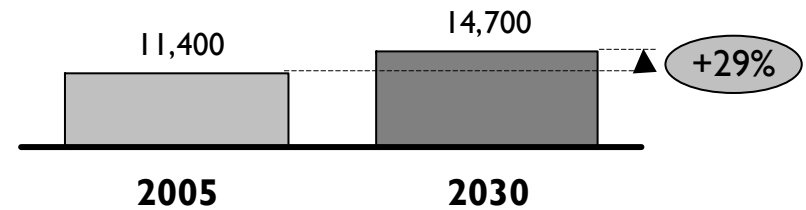


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Increased use of appliances and air conditioning

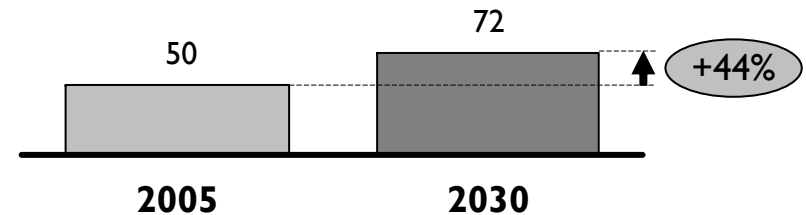
Electrical capacity requirement forecast

Summer peak load, MW



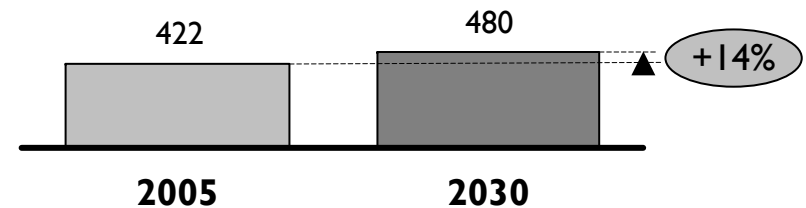
Electrical consumption forecast

Millions of MWh per year



Heating fuels demand forecast

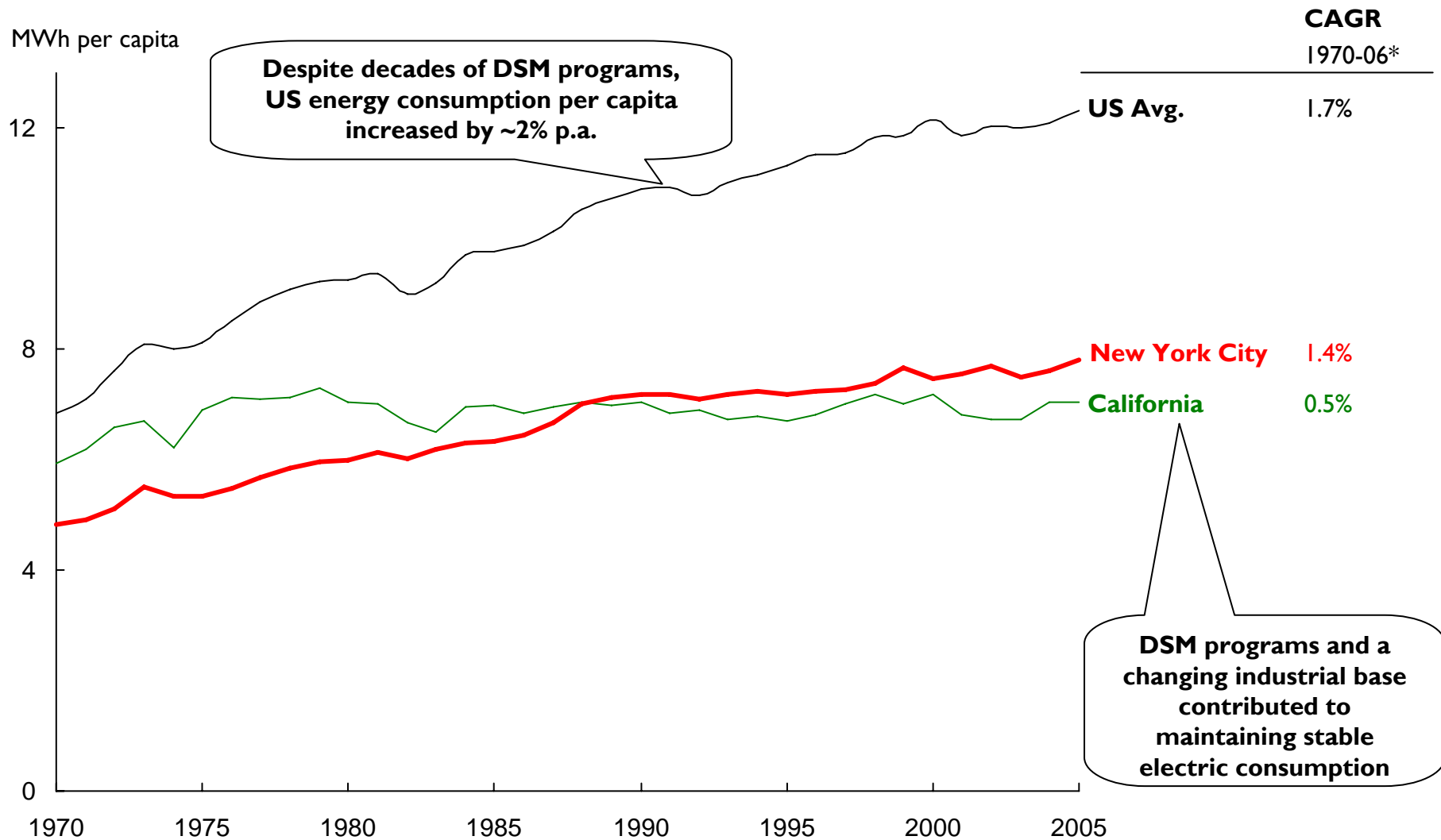
Million MMBtu per year



Reversing this trend is difficult and will mean flattening consumption – something no state has yet done...

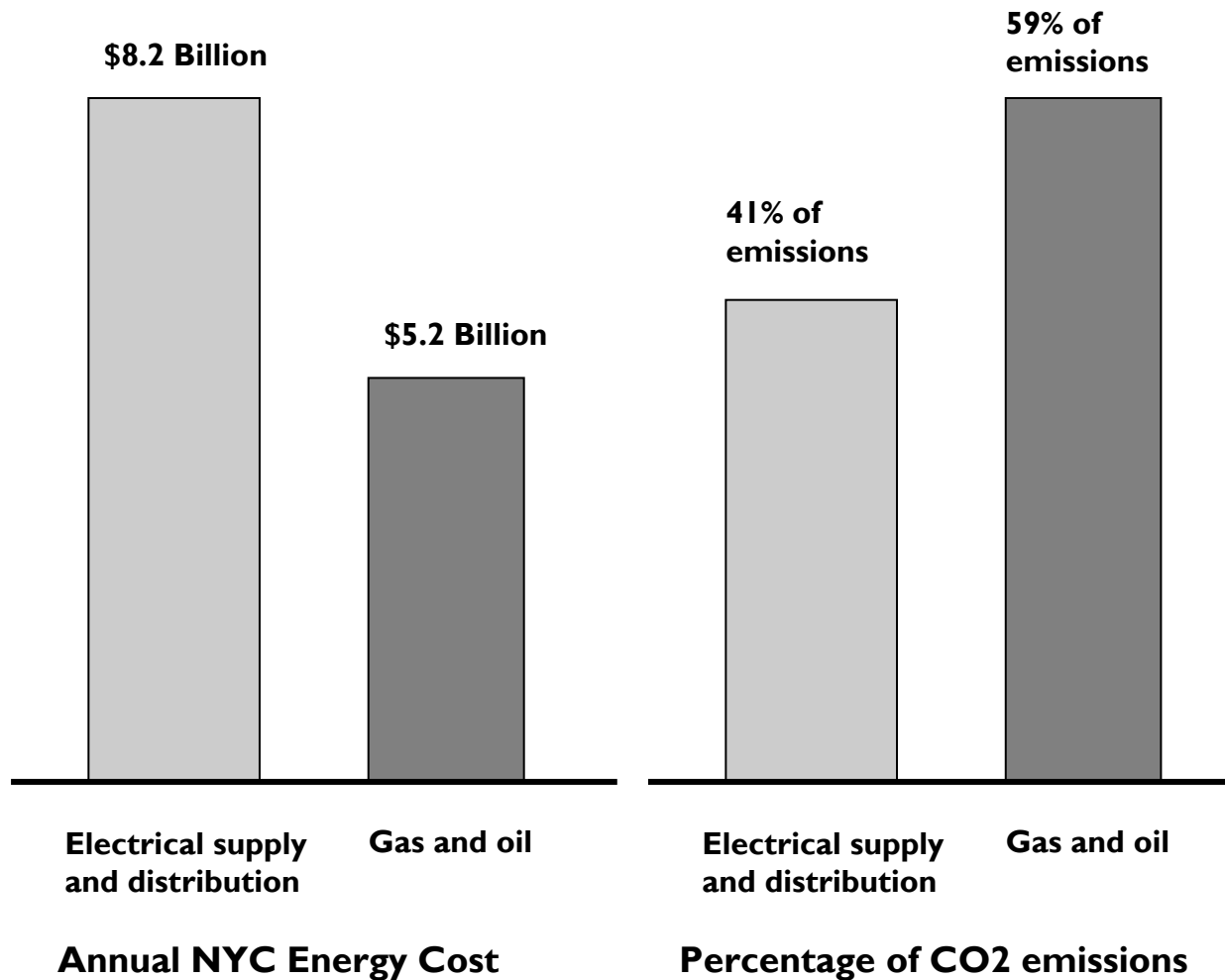


DSM = Demand Side Management



Source: EIA, US Census Bureau; Global Insight (WMM); team analysis

New York's energy costs are dominated by electricity;
it's carbon emissions are building-fuel dominated.



New York's CO2 reduction strategy is going to place more emphasis on heat and hot water than energy efficiency programs have done in the past.
(They have concentrated on electricity because of cost and the importance of maintaining grid reliability.)

New York City will keep electrical consumption flat, increase supply efficiency, and reduce heating fuel demand



Targets, expressed as change based on 2005 levels		<i>ESTIMATES</i>		
		Power supply CO ₂ intensity reduction	Power demand growth	Heating demand growth
Tactical steps for City to enable now	Business as usual changes by 2015	-2%	+17%*	+3%
	A Incentivize displacement of dirty NYC plants with ~2-3 GW of new builds (1.5 GW ahead of need)	-13 to -17%**		
	B Diversify and expand NYC's natural gas supply,	-0%		
	C Enable clean distributed generation and demand response	-1%		
	D Foster the market for renewable energy	-0%		
	E Fast-track 6 demand management initiatives across:			
	1) Institutional/Government		-1%	-6%
	2) Commercial/Industrial		-6%	-2%
	3) Residential		-4%	-1%
	4) New construction		-0%	-2%
5) Appliances		-2%		
6) Smart metering		-1%		
Potential long-term steps to monitor	Interim subtotal (2015)	-16 to -20%	+3%	-8%
	Business as usual changes 2015-30	-2%	+27%*	+11%
	Deploy alternative technology (nuclear/wind/solar)	-14 to -18%		
	Long-term demand reduction (add'l penetration, etc.)		-30%	-20%
	PlaNYC goal	-34%	0%	-17%

Drive less

Reduce Vehicle miles traveled:

- Transit oriented development
- Congestion Pricing
- Improved public transit
- Green the public right of way (Make walking and bicycling more pleasant!)

Drive more efficiently

Increase the Efficiency of Fleets

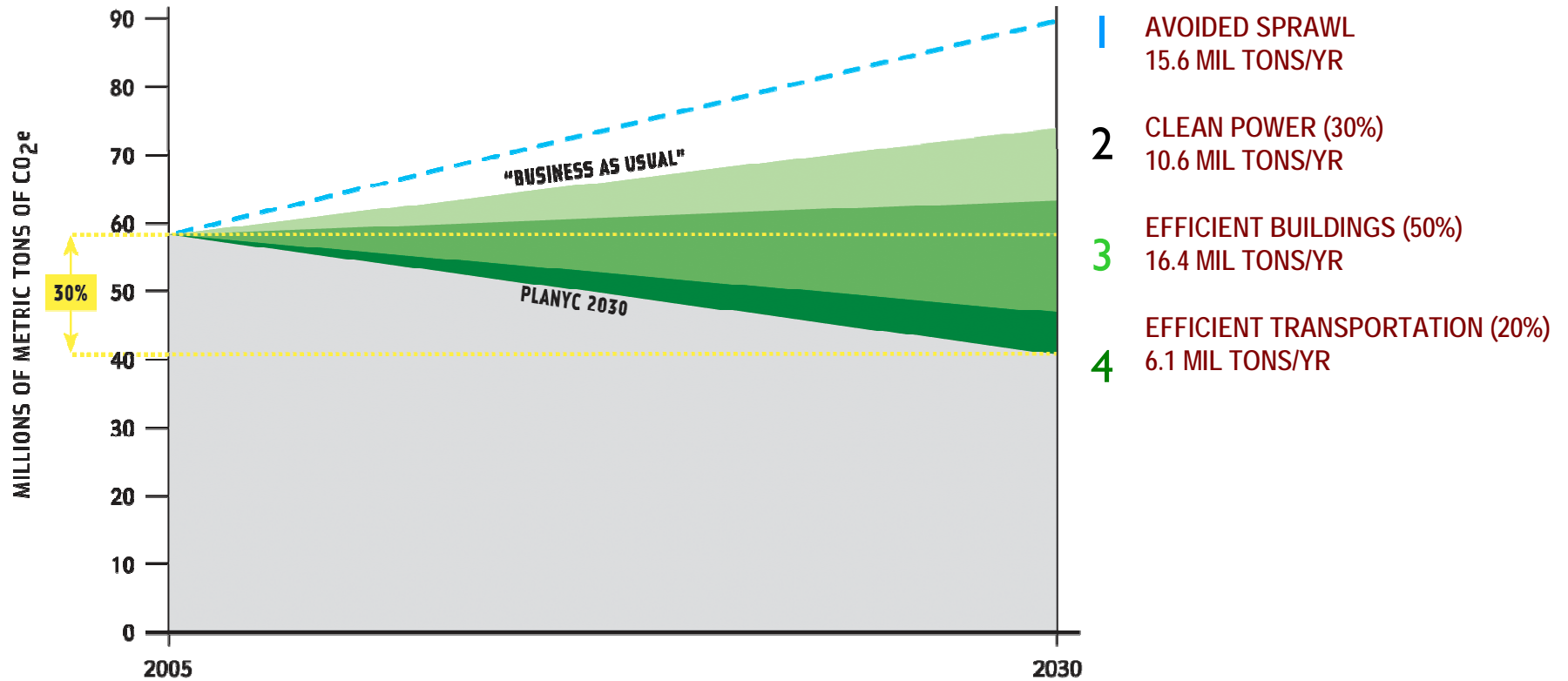
- Double the efficiency of taxis and for-hire vehicles
- City sales tax excused on efficient hybrids
- State efficiency standards following California

Drive cleaner

Decrease the carbon intensity of fuels:

- NYS is considering following California's legislation requiring a 10% decrease in carbon intensity of fuels
- Bio-diesel program for city-owned vehicles

Overview of NYC CO2 emissions reduction plan



Long term vision

The New York City Energy Efficiency Authority to be created by NYS Legislature

Partnership of City, NYSERDA, and Utilities

Funding through a greatly increased SBC

Charged with developing programs for energy efficiency and demand reduction, and meeting the targets set by the Planning Board

Short term strategy

Collaboration: Mayor's office and EDC collaborating with NYSERDA and ConEd to coordinate programs with city's goals and regulatory strategies

Alignment: 15 x 15 is the first step to 30 x 30

Structure: Energy Efficiency position being created at EDC

Rate Cases: NYC pushing for funding on Energy Efficiency in the rate case process

Percent of total Energy (Btu)

		What we use energy for						Total
		Heat	Hot water	Lighting	Appliances*	Cooling**	Other	
Where We Use Energy	1-4 family res % of City's total	7.6%	2.6%	1.7%	2.2%	0.6%	0.0%	14.7%
	Multi-family residential % of City's total	7.4%	7.4%	3.0%	3.9%	1.2%	0.0%	22.7%
	Commercial % of City's total	8.5%	2.8%	10.2%	4.5%	4.5%	0.9%	31.4%
	Industrial % of City's total	2.6%	2.1%	4.0%	3.3%	1.1%	0.2%	13.2%
	Institutional/Government % of City's total	6.3%	4.0%	3.6%	1.7%	1.4%	0.9%	17.9%
All types		32.4%	18.9%	22.5%	15.5%	8.7%	2.0%	100%

* Appliances includes plug loads: electronics, refrigerators and appliances **Cooling includes ventilation as well as air conditioning

Source: ConEd, KeySpan, NYSERDA. Additional assumptions for sector breakdowns for NYS from EIA (DOE) website and US Census NYC Housing survey; Components of sector breakdowns from National data on EERE (DOE) Website

Efficiency - Prioritize five key areas for targeted incentives



		Incremental monthly residential (HH) charge*	Average cost to participant	Payback to avg. participant		
1	Institutional & Governmental	<ul style="list-style-type: none"> ▪ City to lead by example: 30% reduction in energy use by 2017 (retro-fits, lighting upgrades, O&M) ▪ All major institutional buildings (medical, spiritual, educational) challenged to match the city's targets 	\$0.18	School: \$400k Hospital: \$265k	10 yrs 4-6 yrs	EX
2	Commercial & Industrial	<ul style="list-style-type: none"> ▪ Large commercial buildings – efficiency upgrades to centralized systems and upgrade lighting ▪ Small commercial and retail – upgrade lighting at change of occupancy or major rehab 	\$0.61	Large: \$340k Small: \$7k	3 yrs 3 yrs	EX
3	Residential	<ul style="list-style-type: none"> ▪ Efficiency upgrades to centralized systems in large residential buildings with >50 units ▪ Direct install program of compact fluorescent lights in all residential units 	\$0.32	Large: \$50k Small: \$0	3-4 yrs Immediate	EX
4	New construction	<ul style="list-style-type: none"> ▪ New buildings required to be 20% better than Energy Code ▪ Graduated rewards system for applying ambitious energy efficiency standards in new buildings 	\$0.12	Cost neutral	Immediate payback	
5	Appliances	<ul style="list-style-type: none"> ▪ Market transformation through incentives along supply chain ▪ Work at state and federal level to steadily improve standards for appliances and electronics 	\$0.45	Cost neutral	Immediate payback	
*	Outreach, training and quality control	<ul style="list-style-type: none"> ▪ Education of the public ▪ Training for building professionals ▪ Certification of energy efficiency professionals 				

* Assumptions: ratepayer funds spread over 8.5 yrs; contribution to SBC funds from residential segment at 31%; ~18% funding overlap of existing DSM programs and new initiatives

Source: NAESCO, team analysis

	Key Action:	Agent
<div data-bbox="191 342 533 495" style="border: 1px solid black; padding: 5px;"> City Government </div>	<ul style="list-style-type: none"> • City Government will Lead by Example, achieving a 30% reduction in greenhouse gas emissions in 10 years. • City Government upgrades will be city-funded • Strategies will include: audits/ retrofits, retro-commissioning, data and tracking, centralized metering and monitoring, improved O&M, and standardized specifications 	<p>Executive Order/ Local Law</p> <p>City charter</p> <p>City- managed</p>
<div data-bbox="191 812 533 964" style="border: 1px solid black; padding: 5px;"> Institutions and Federal and State Government </div>	<ul style="list-style-type: none"> • Mayoral Challenge to major institutions & federal & state government • Pledge to meet the city government’s accelerated emissions reduction target • <u>OR</u> conduct efficiency and lighting upgrades as per commercial or residential buildings • Financial incentives offered to institutions to be similar to those for commercial sector; higher incentives for early adaptors 	<p>Mayor</p> <p>NYCEEA program</p> <p>NYCEEA program</p>



Key Action:

Agent

Efficiency upgrades

- **Requirements** will pertain only to buildings \geq 100,000 sf. Upgrades to be completed by 2015, with feasibility of deadline to be assessed by NYCEEA. Buildings required to benchmark energy performance as per the EPA Portfolio Manager (if applicable), and perform retro-commissioning or audits/retrofits on central systems, with retrofits with combined paybacks of less than 5-years required. To be repeated on a periodic cycle.
- **Incentives** made available to all buildings and will be offered for both energy and water upgrades. Incentives offered for retrofit packages with combined paybacks of up to 10-years. Incentives to average 35% through 2015 -- starting at ~ 50% and decreasing to ~ 20% to encourage early adopters.
- Buildings with Portfolio Manager scores \geq 75 to be **exempted** from requirement. Other exemptions TBD.

Local law

Code Change

NYCEEA program

Code Change

Lighting systems brought up to NYS Energy Code

- **Required** for all spaces at time of renovation or change of tenancy
- Flat **incentive** of 35% offered for qualifying lighting designs
- Spaces within 15% of lighting portion of Energy Code **exempted**
- City to support amending NYS Energy Code to reference ASHRAE 90.1, 2004 version

Local law

NYCEEA program

OLTPS and EDC

Key Action:

Agent

Efficiency upgrades

- **Requirements** will pertain only to buildings with ≥ 50 units. Upgrades to be completed by 2015, with feasibility of deadline to be assessed by NYCEEA. Buildings required perform retro-commissioning or audits/retrofits on central systems, with retrofits with combined paybacks of less than 5-years required. To be repeated on a periodic cycle.
- **Incentives** made available to all buildings and will be available for both energy and water upgrades. Incentives offered for retrofit packages with combined paybacks of up to 10-years. Incentives to average 35% through 2015 -- starting at ~ 50% and decreasing to ~ 20% to encourage early adopters.
- **Exemptions** for high-performing buildings to be determined. Authority to work with EPA or other to develop energy benchmarking standards for multifamily buildings.

Local law

Code Change

NYCEEA program

NYCEEA

Compact Fluorescents

- **Large-scale direct install program for CFL's** (compact fluorescents) for all residential properties. Voluntary program, modeled on City's toilet replacement program.
- Free replacement of incandescent light bulbs in 180,000 residential units per year. Program to run for 7 years.

NYCEEA program

Key Action:

Agent

Raise the basic standards

- New construction **required** to exceed State Energy Code and current requirements for water efficiency by 20%; substantial renovations to exceed codes by 15%
- Commissioning **required** for new construction or major renovation $\geq 100,000$ sf; Projects $\geq 350,000$ sf. to assess their potential for clean distributed generation – threshold to be adjusted depending on the technologies approved for use in NYC
- The City will aggressively enforce the Energy Code and work with the State to expedite stringent code upgrades
- The Efficiency Authority will develop a simple methodology to document energy savings for smaller projects
- The Efficiency Authority will review the feasibility of meeting designated percentages for exceeding code as the State Energy Code is upgraded

Local law

Code Change

NYS Code Changes

DOB & OLTPS

NYCEEA program

NYCEEA

Encourage high-performance

- Graduated **incentives** for:
 - Buildings achieving LEED Gold and 30% above code for energy and water
 - Buildings achieving LEED Platinum and 40% above code for energy and water
- Incentives will be designed to offset 30% to 40% of the additional costs of improved energy and water performance, on average

NYCEEA program

Code Change / procedural change?

Key Action:

Agent

Incentivize the sale of effective products

- The Authority will provide supply chain **incentives** to encourage the stocking, display, and sale of the most efficient products. Retailers and distributors to be targeted.
- The Authority will incentivize route operators to provide efficient washer/dryers to multi-family residences.

NYCEEA program
NYCEEA program

Improve State and national standards

- DOE has been required to issue or upgrade the energy standards for 30 categories of appliances. The City will monitor DOE's compliance with the court-ordered rule promulgation timetable and comment on proposed rules when issued
- The City will prepare legislation to streamline New York State's process for providing standards for products that are not currently regulated

City Law, OLTPS
State Legislation

	Key Action:	Agent
Outreach	Partner with schools, marketing professionals, and non-profits organizations, to develop customized public awareness campaigns tailored to specific sectors of the public, including the press, schoolchildren, etc.	NYCEEA program
Training	Create training programs for designers, contractors, retailers, building operators and energy service providers to ensure that building practices reflect the most energy-efficient strategies	NYCEEA program
Quality Control	<ul style="list-style-type: none"> • Establish a certification process for energy auditors, commissioning agents, and contractors performing retrofits. • Make energy usage in city buildings more transparent by encouraging building owners to file an EPA Portfolio Manager survey, a web-based energy rating for buildings. • 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. 	NYCEEA program

Energy Goal #6: We will seek to cut peak load by 25% through increased enrollment in peak load reduction management programs.

Key Action: _____ **Agent**

City and institutional buildings

Work with NYPA and Con Ed to install smart meters in all city-owned buildings by 2015
 Challenge other institutional and governmental agencies in the city to participate in peak load programs

Smart meters allow customers to track their energy use, which reduces peak demand

Large commercial and industrial buildings

Support Con Ed plan to install smart-meters in every building by 2014 and encourage expanded participation in peak load management programs
 Push PSC to mandate that all large commercial & industrial customers enter Real Time Pricing programs by 2015

RTP helps customers make educated decisions about when and how they use electricity

Residential and small commercial buildings

Encourage RTP in small businesses and residential properties to achieve 50% participation by 2015
 Advocate for new incentives to expand RTP

City government/
 NYCEEA

General Green Building

Rebates for Green Strategies such as:

- Renewable energy
- Water and energy conservation
- Recycling of construction and demolition waste

Streamlining procedures for **approval of technologies**

Urban Heat Island Effect

Requirements for **cool roofs**

Introduction of **green roof standards**

Energy Efficiency & CO2 reduction

Ventilation standards modified to allow for greater efficiencies

Required documentation showing **Energy Code compliance**

Reduced requirement for cement in concrete and broader allowances for flyash and slag as a replacement

Water efficiency

Introduction of water conservation plans to permit the use of **greywater, blackwater, and/or waterless urinals**

Fast-tracked items

Ideally to be completed within **one year**

Energy efficiency code changes supporting PlaNYC:

- Requirements for energy efficiency upgrades in existing large residential, commercial, and industrial buildings
- Requirements for tenant spaces to meet the lighting requirements of the code
- New construction to exceed energy and water requirements
- Explore possibility of expedited process for very high performance buildings

Other Fast-tracked items:

- Minimal requirements for the use of **fly-ash and slag** in concrete
- Minimal requirements for **construction and demolition waste** recycling
- Require **recycling areas** in new buildings
- Simplify approval process for **water-saving** technologies
- Further streamline the approval processes for **green technologies?**

Comprehensive greening effort

Completed within the **three-year cycle** of code revision
Reconvene the green advisory committee

Thorough review of all codes to:

- **Remove impediments** to green practices
- **Set reasonable requirements** for green practices
- Set requirements for **existing buildings**

Revisit issues such as modest cost increases for green requirements

Amendments to other codes

Revisions to other codes, such as NYS ECCC, Fire Code

- **Ongoing involvement** in NYS ECCC
- **Removing impediments within the Fire Code** – to be a mixture of fast-tracked and a three-year cycle

Adaptation to climate change

Phase One: Study of **Impacts of Climate Change on Buildings** –

- To be a collaboration between academia, consultants, DOB, and OEM
- To include: increased flooding, rising groundwater tables, increased wind loads, heat waves, the potential need for passive survivability in buildings, etc.
- This is relatively uncharted territory

Phase Two: Recommendations for specific code changes

May extend for more than one three-year cycle of revisions