

The logo for the 2014 National Conference on Building Commissioning (NCBC). It features a stylized blue outline of a city skyline with four buildings of increasing height. To the right of the skyline, the year '2014' is written in green, and 'NCBC' is written in large, bold, blue letters below it.

2014
NCBC

A wide-angle photograph of a city skyline under a clear blue sky. In the foreground, there is a green lawn with a white canopy tent. In the background, several skyscrapers are visible, including a prominent one with a tall, ornate spire. The scene is brightly lit, suggesting a sunny day.

22ND NATIONAL CONFERENCE ON BUILDING COMMISSIONING

The Impact of Energy Efficiency Policy: Perspectives from the Northeast

New York City Mayor's Office of Long-term Planning & Sustainability
John Lee, RA, LEED AP

Session Learning Objectives

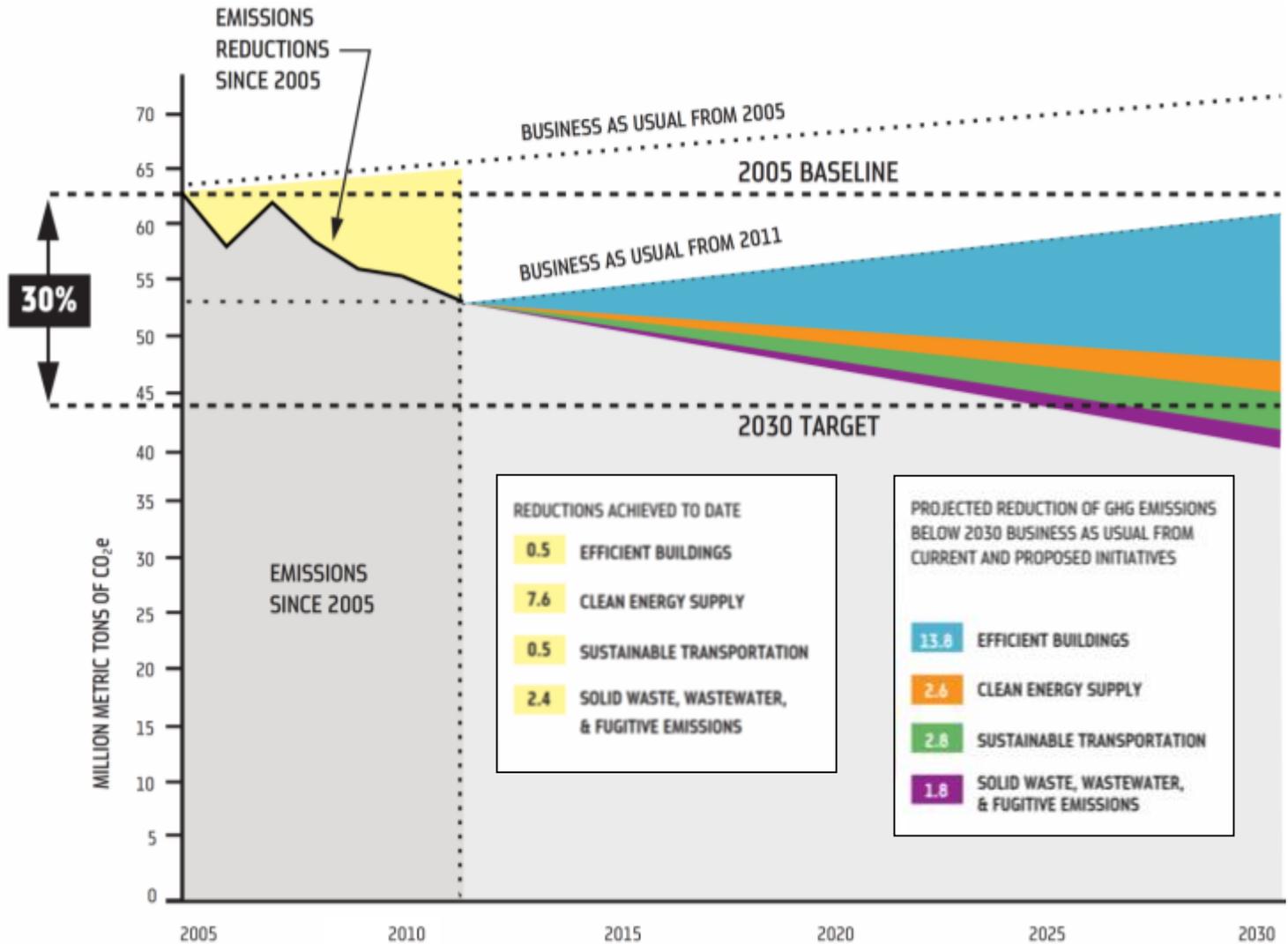
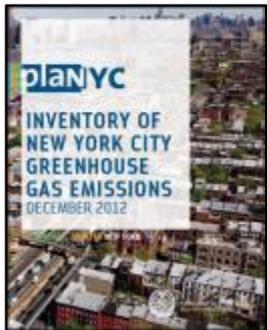
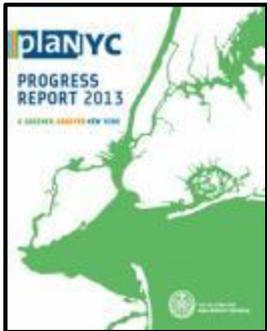


The Impact of Energy Efficiency Policy: Perspectives from the Northeast

At the end of this session participants will be able to:

1. Gain a better perspective on energy efficiency policy challenges, early policy results and speculation about the potential direction of energy efficiency policies nationwide
2. Apply lessons learned from NYC's Greener Greater Buildings Plan and how the progressive energy efficiency policy may affect other cities
3. Participate in state and local "Lead by Example" initiatives that encourage energy efficiency and sustainability
4. Share knowledge of "real life" energy efficiency policy implementation successes and challenges

PlaNYC goal to reduce citywide GHG emissions by 30% by 2030



Buildings dominate New York City's GHG footprint

Total = 53.4 million metric tons

Buildings = 74%

Residential

Commercial

Industrial

Institutional

Transportation = 21%

On-road transportation

Transit

Wastewater, fugitive = 1%

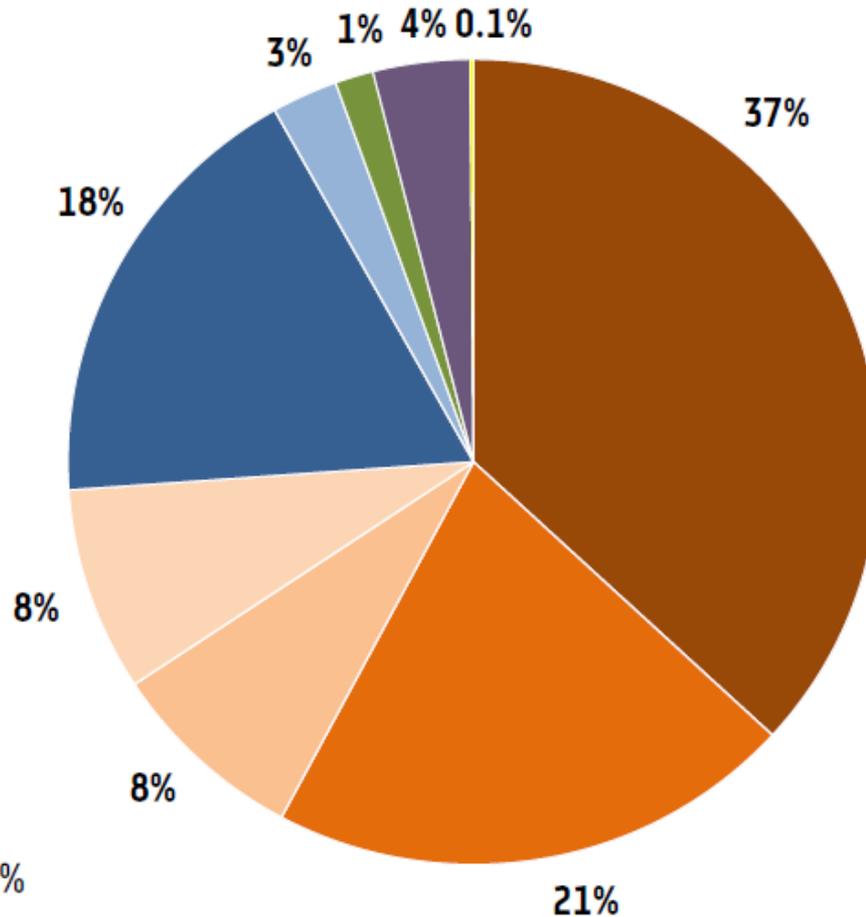
Wastewater, fugitive

Solid waste = 4%

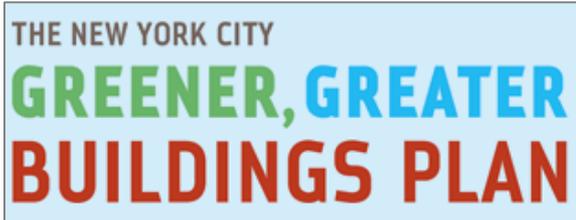
Solid waste

Streetlights and traffic signals = 0.1%

Streetlights and traffic signals

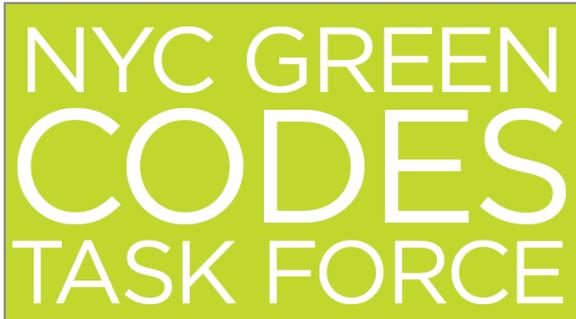


Three major energy efficient buildings policies in New York City



The Greener, Greater Buildings Plan

- New York City Energy Code
- Benchmarking
- Energy Audits and Retro commissioning
- Lighting Upgrades and Sub-metering



New York City Green Codes Task Force

- 111 proposals to green local codes, with 51 reducing energy use in buildings
- 51 proposals have been passed to date



Voluntary: 30x17 and Mayor's Carbon Challenge

- Accelerated sectors to achieve 30% GHG emissions reduction in 10 years

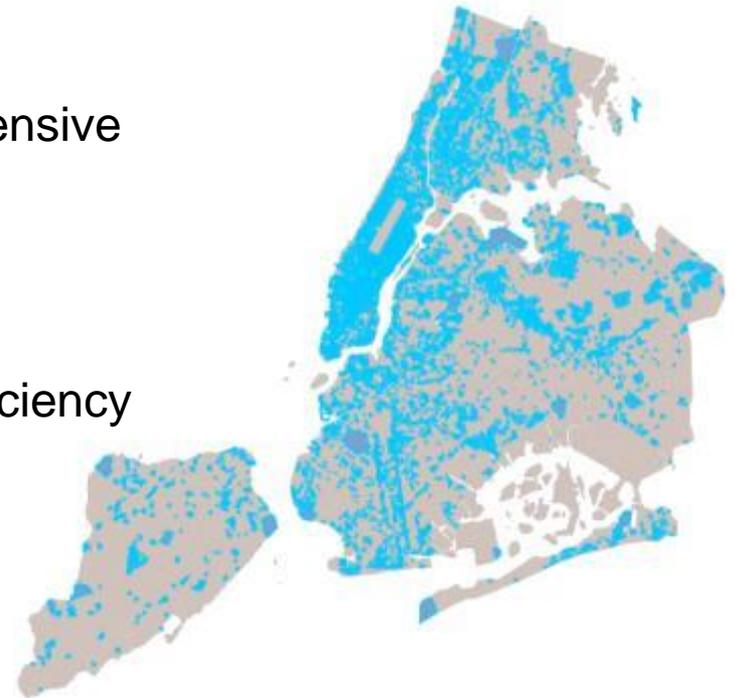
The 13,000 properties subject to the Benchmarking law account for only 2% of all properties and nearly half of all built floor area

THE NEW YORK CITY
GREENER, GREATER
BUILDINGS PLAN

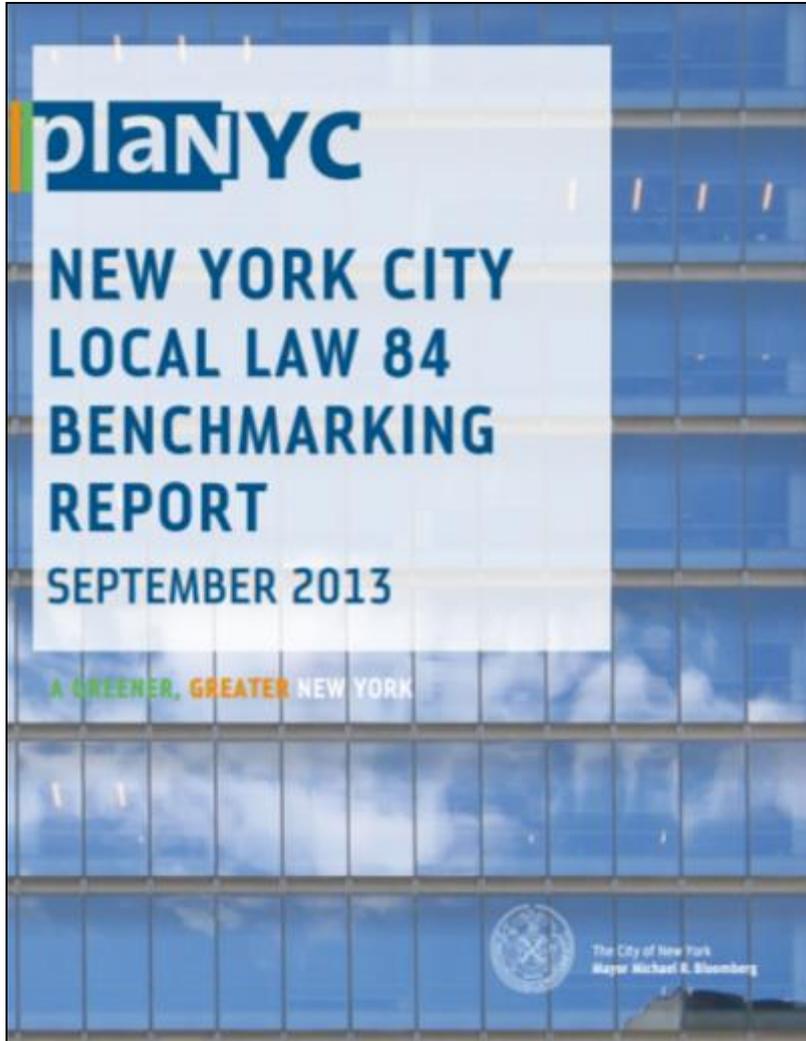
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Benchmarking

- Mandatory benchmarking produces a comprehensive City-wide picture
- Transparency in building energy use
- Annual benchmarking provides tracking
- Public disclosure allows the market to value efficiency



New York City's second benchmarking report



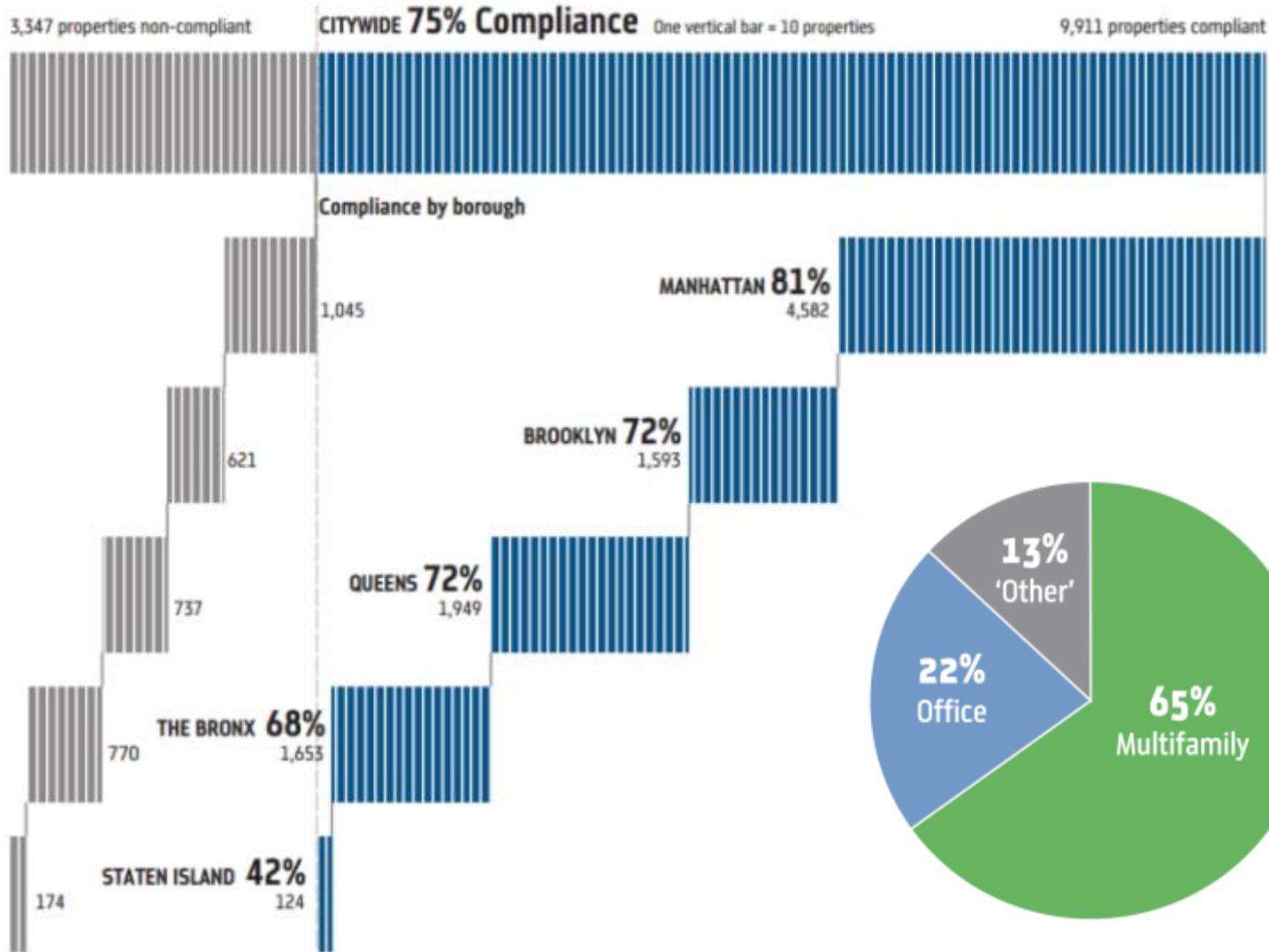
- Based on data from the second year of benchmarking year (CY 2011)
- Benchmarking data was merged with City records of building characteristics
- Includes analysis conducted by New York University, University of Pennsylvania, and the NYC Mayor's Office
- First disclosure of multi-family benchmarking data immediately followed in September 2013 based on third year data (CY 2012)

New York City's second benchmarking disclosure – September 2013

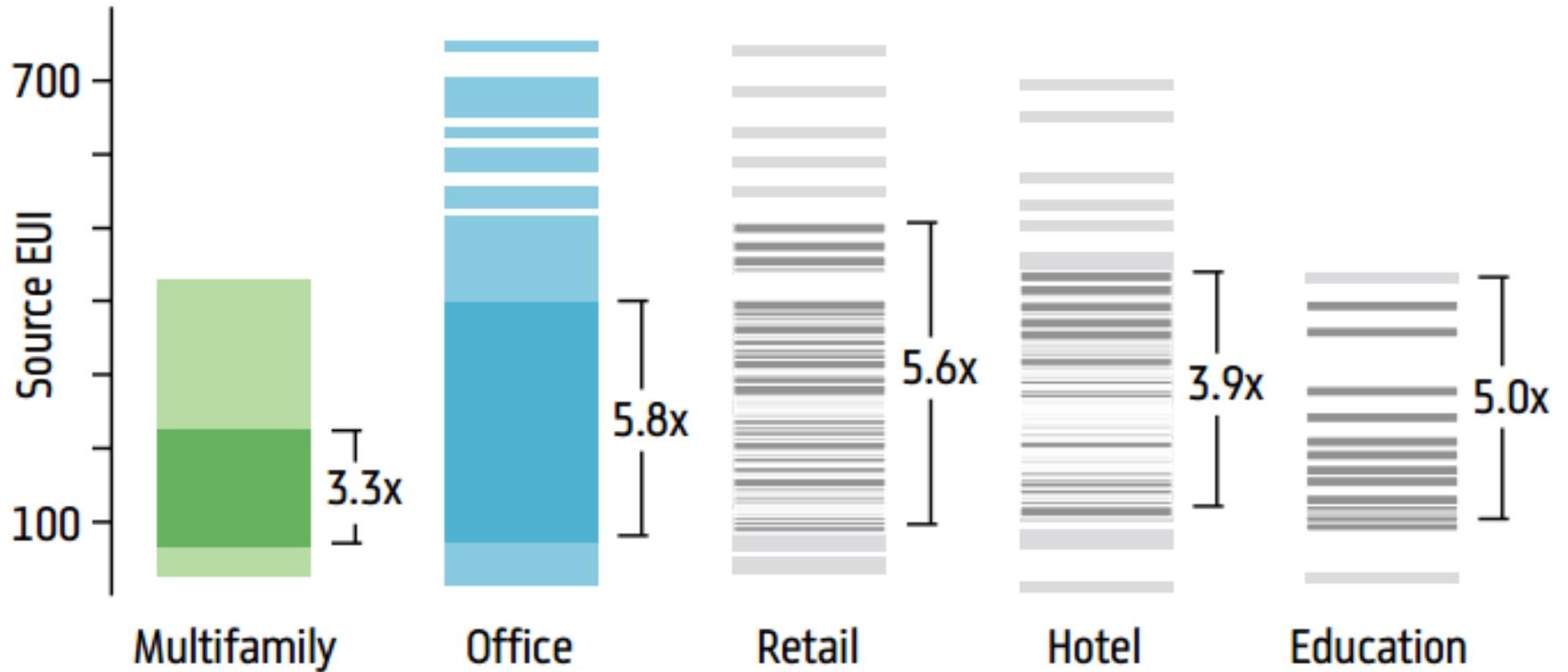
- Included EUI, Water Intensity, GHGe, and ENERGY STAR Score

Street Number	Street Name	Borough	Zip	Benchmarking Submission	Entry Number	Site EUI
15	BROAD STREET	MANHATTAN	10004	No DOF Record as of 08/01/12		
34	WHITEHALL STREET	MANHATTAN	10004	Yes	1518	157.9
17	STATE STREET	MANHATTAN	10004	Yes	312	91.5
24	WHITEHALL STREET	MANHATTAN	10004	Yes	52	137.2
33	WHITEHALL STREET	MANHATTAN	10004	No DOF Record as of 08/01/12		
90	BROAD STREET	MANHATTAN	10004	Yes	602	53.5
1	WHITEHALL STREET	MANHATTAN	10004	Yes	48	113.1
80	BROAD STREET	MANHATTAN	10004	Yes	2531	77.2
1	BROADWAY	MANHATTAN	10004	Yes	1925	
11	BROADWAY	MANHATTAN	10004	Yes	275	100.9
25	BROADWAY	MANHATTAN	10004	Yes	2538	132.8
18	1 PLACE	MANHATTAN	10280	Yes	2542	128.3
00	LIBERTY STREET	MANHATTAN	10281	Yes	22	117.3
25	LIBERTY STREET	MANHATTAN	10280	No DOF Record as of 08/01/12		
00	VESEY STREET	MANHATTAN	10281	No DOF Record as of 08/01/12		
50	VESEY PLACE	MANHATTAN	10282	No DOF Record as of 08/01/12		
50	NORTH END AVENUE	MANHATTAN	10282	Yes	589	88.2

New York City's benchmarking reports – high rate of compliance

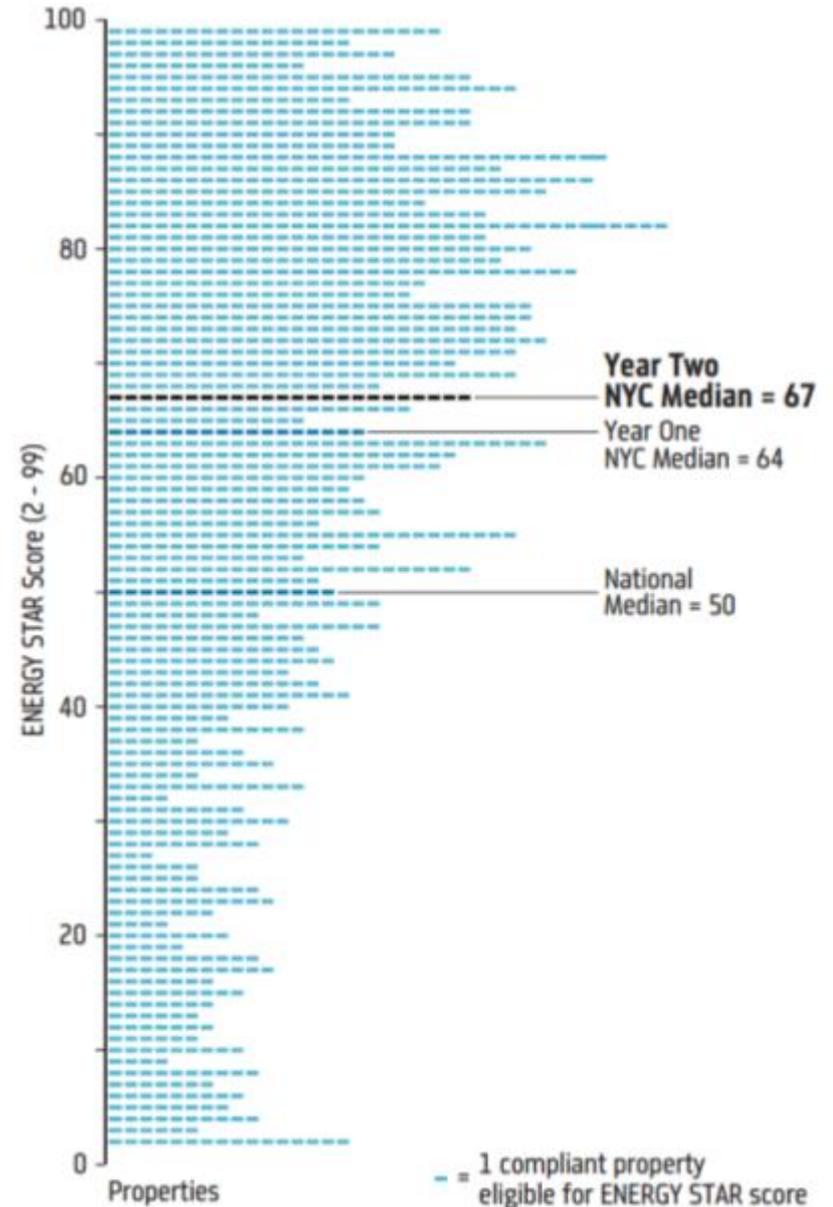
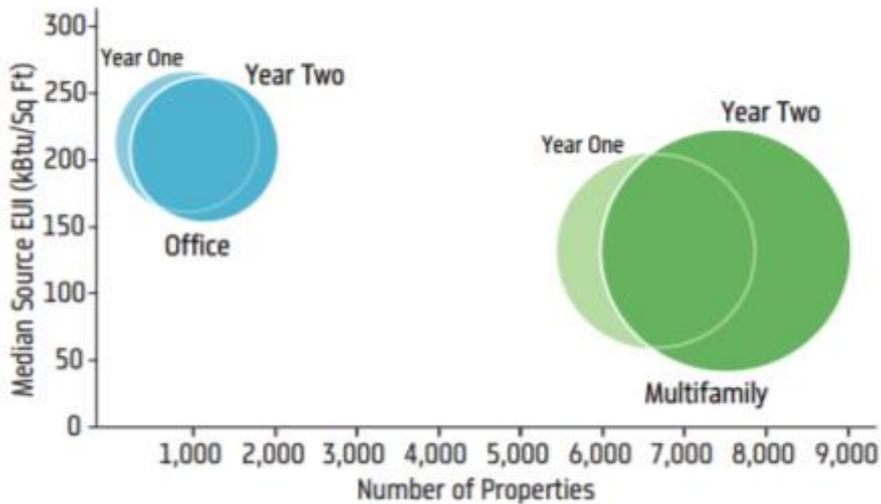


Sector variations in energy use are most prevalent in office and retail

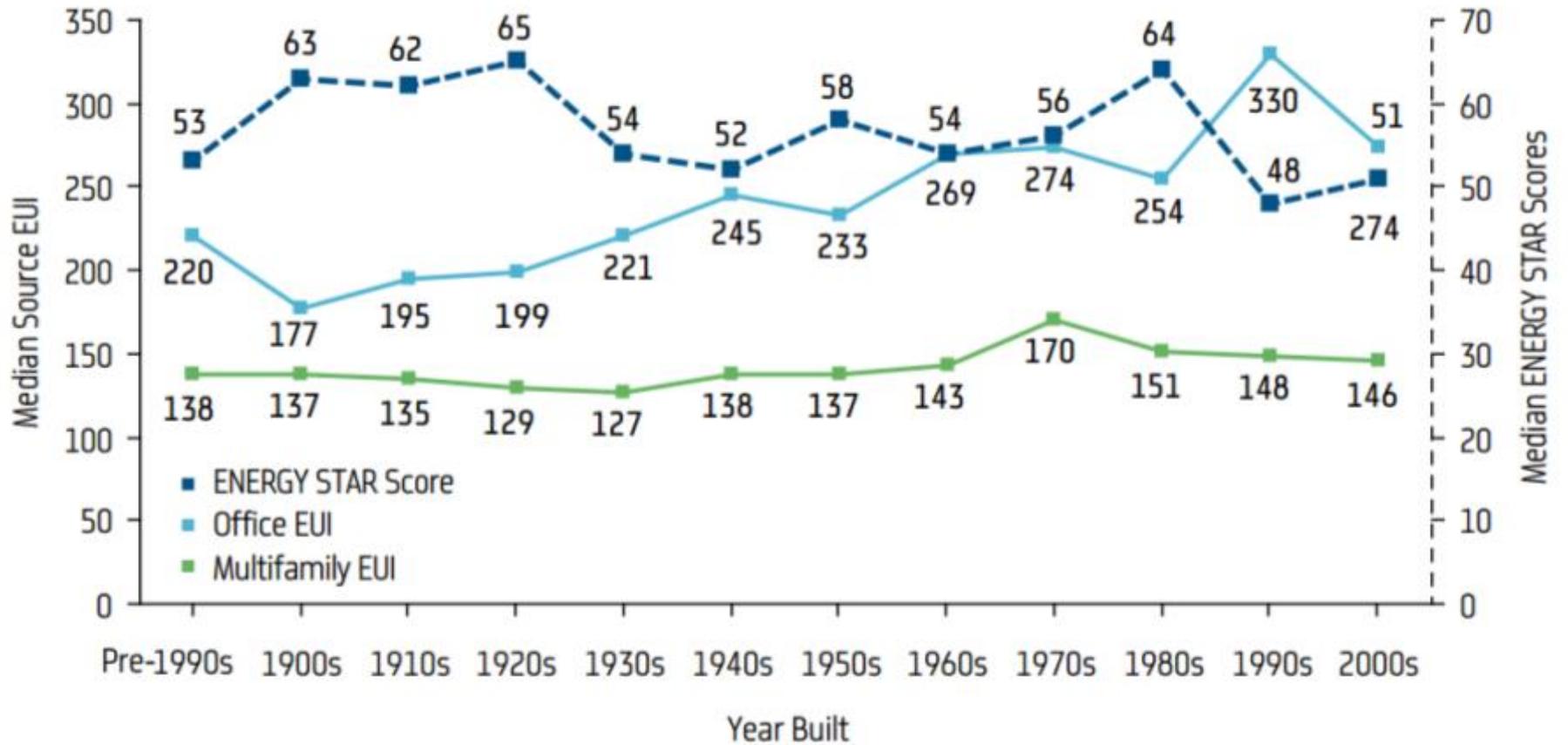


New York City's median Energy Star score consistent with buildings in the Northeastern U.S.

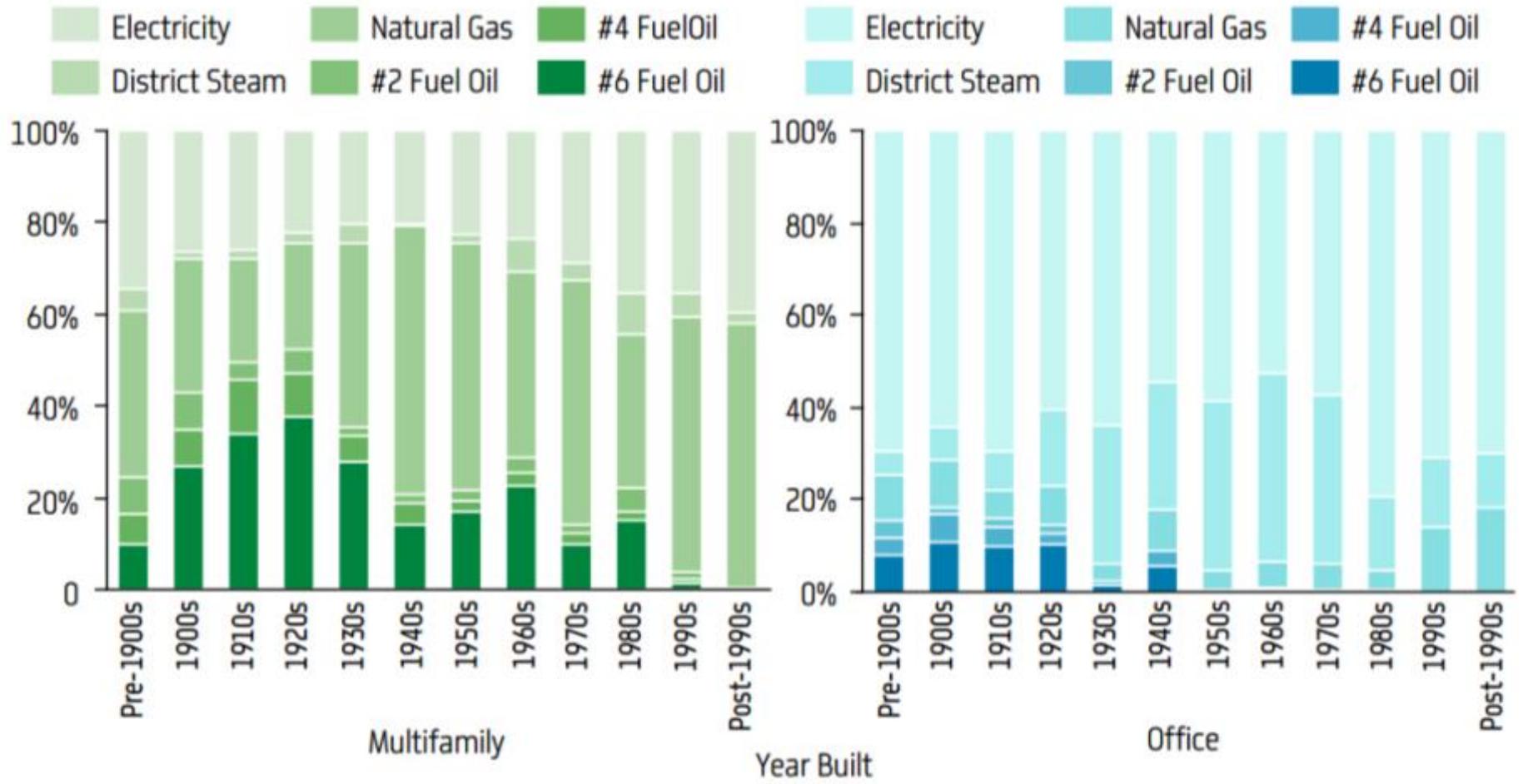
Year-over-year analysis of 2010 and 2011 data exhibit consistencies in reporting



Energy use intensities relative to built era



Fuel use intensities relative to built era



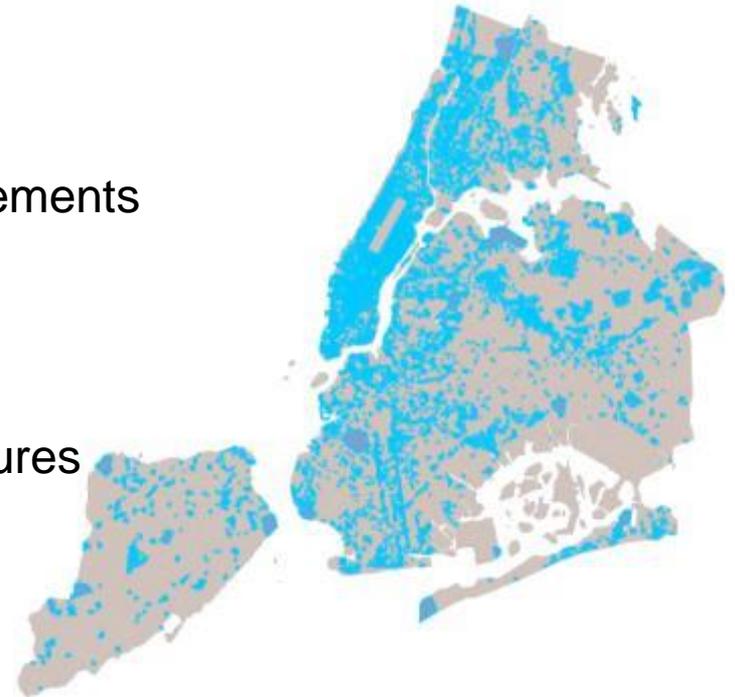
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Energy Audits & Retrocommissioning

- Required once every 10 years
- Identifies opportunities for major capital improvements with paybacks and energy savings
- Mandates optimizing existing systems to run as designed
- Mandates audit of systems to ASHRAE Procedures for Commercial Building Audits, Level II



Through required Energy Audits, New York City is collecting extensive data on existing equipment inventories and energy performance

Heating System	Heating System 1	Heating System 2	Heating System 3
Heating System Type	Hot Water Boiler		
if 'Other', please specify:			
Quantity	3		
Equipment Tag#(s)	HWB-1; HWB-2; HWB-3		
Spaces Served	Whole Building		
Year Installed	1992; 1992; 2005		
Fuel Source	Natural Gas		
if 'Other' or 'Dual Fuel', please specify:			
Controls	Other		
if 'Other', please specify:	Aquastat Setpoint		

Burners	Burner 1	Burner 2	Burner 3
Equipment Type	On/Off		
Quantity	3		
Year Installed	1992; 1992; 2005		

Distribution Systems	Distribution System 1	Distribution System 2	Distribution System 3
Central Distribution Type	Hydronic		

End Use Equipment / Terminals	Terminal Type 1	Terminal Type 2	Terminal Type 3
Equipment Type	Radiator		
if "Other", please specify:			
Controls	None		

Property owners are afforded information on their energy savings potential and associated costs

Category	Measure Name	Measure Description	Annual Energy Saving			
			Electricity (kWh)	Natural Gas (Therms)	Fuel Oil (Gallons)	Ste
Lighting	Upgrade to Fluorescent	Upgrade Interior Common Area Lighting	43,054.00	-990.00	0.00	
Domestic_Hot_Water	Install Low-Flow Aerators	Install Low Flow Aerators and Showerheads	0.00	250.00	0.00	
HVAC_Controls_and_Sensors	Install TRVs	Install Thermostatic Radiator Valves in all apartment units	14.00	3,360.00	0.00	
Heating_System	Replace Boiler	Replace (2 of 3) existing atmospheric type boilers with condensing boilers	7,684.00	2,550.00	0.00	
Domestic_Hot_Water	Separate DHW from Heating	Upgrade existing DHW system	0.00	1,070.00	0.00	
Envelope	Increase insulation - Roof	Increase roof insulation to R-37	-969.00	570.00	0.00	
Envelope	Replace Windows	Install Low E Double Pane Aluminum Windows with Thermal Break	990.00	2,630.00	0.00	

Property owners must implement low-cost retro-commissioning measures, based on a prescribed list of implementation items

1. Operating protocols, calibration, and sequencing:

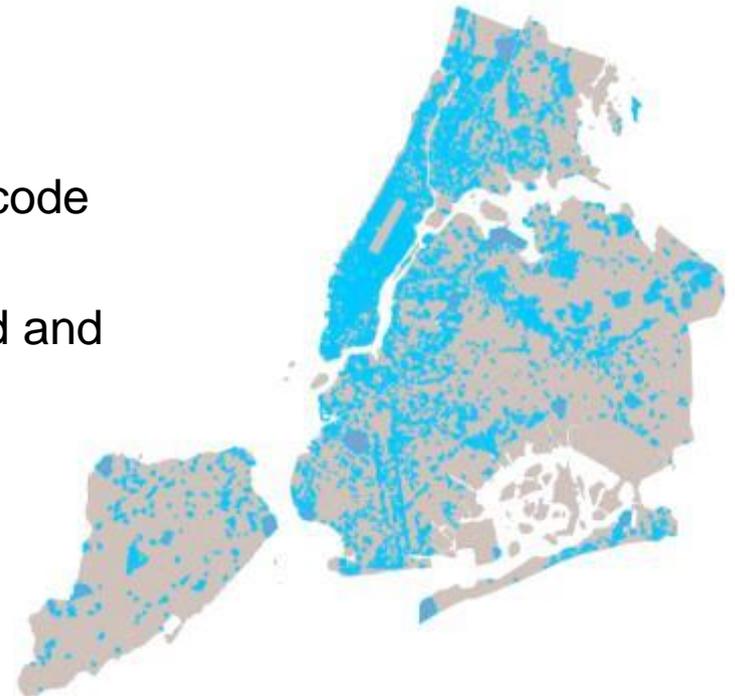
<p>1.1. HVAC temperature and humidity set points and setbacks are appropriate and operating schedules reflect major space occupancy patterns and the current facility requirements.</p>	<p>YES</p>	<p>Deficiency Observed and Corrected</p>
<p>1.2. HVAC sensors are properly calibrated.</p>	<p>YES</p>	<p>Deficiency Observed and Corrected</p>
<p>1.3. HVAC controls are functioning and control sequences are appropriate for the current facility requirements.</p>	<p>YES</p>	<p>Deficiency Observed and Corrected</p>
<p>1.4. Loads are distributed equally across equipment when appropriate (i.e. fans, boilers, pumps, etc. that run in parallel).</p>	<p>N/A</p>	<p>Major HVAC equipment at this facility is not designed to run in parallel. Each of the four chilled water pumps serve different pieces of equipment/areas throughout the facility (i.e. radiators, AHU coils, duct reheats, etc.). These pumps do not run in parallel.</p>

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Lighting Upgrades and Sub-metering

- Compliance by 2025
- Commercial spaces must meet current energy code requirements for lighting power density
- Large commercial tenants must be sub-metered and provided with energy use history

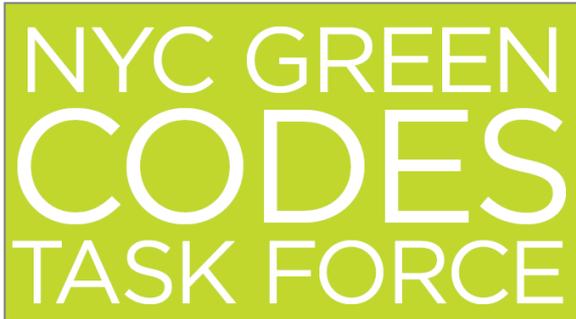


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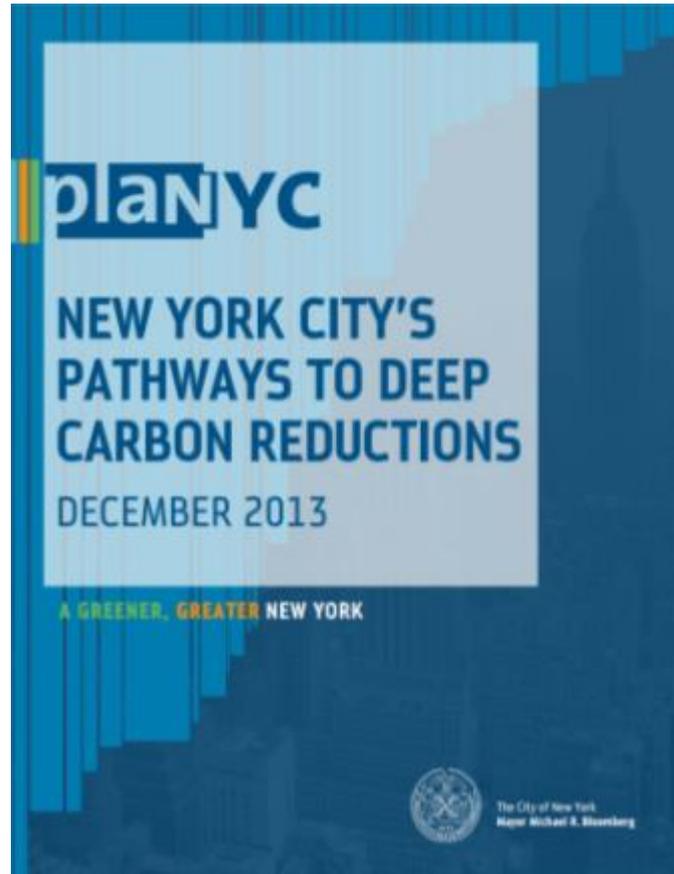
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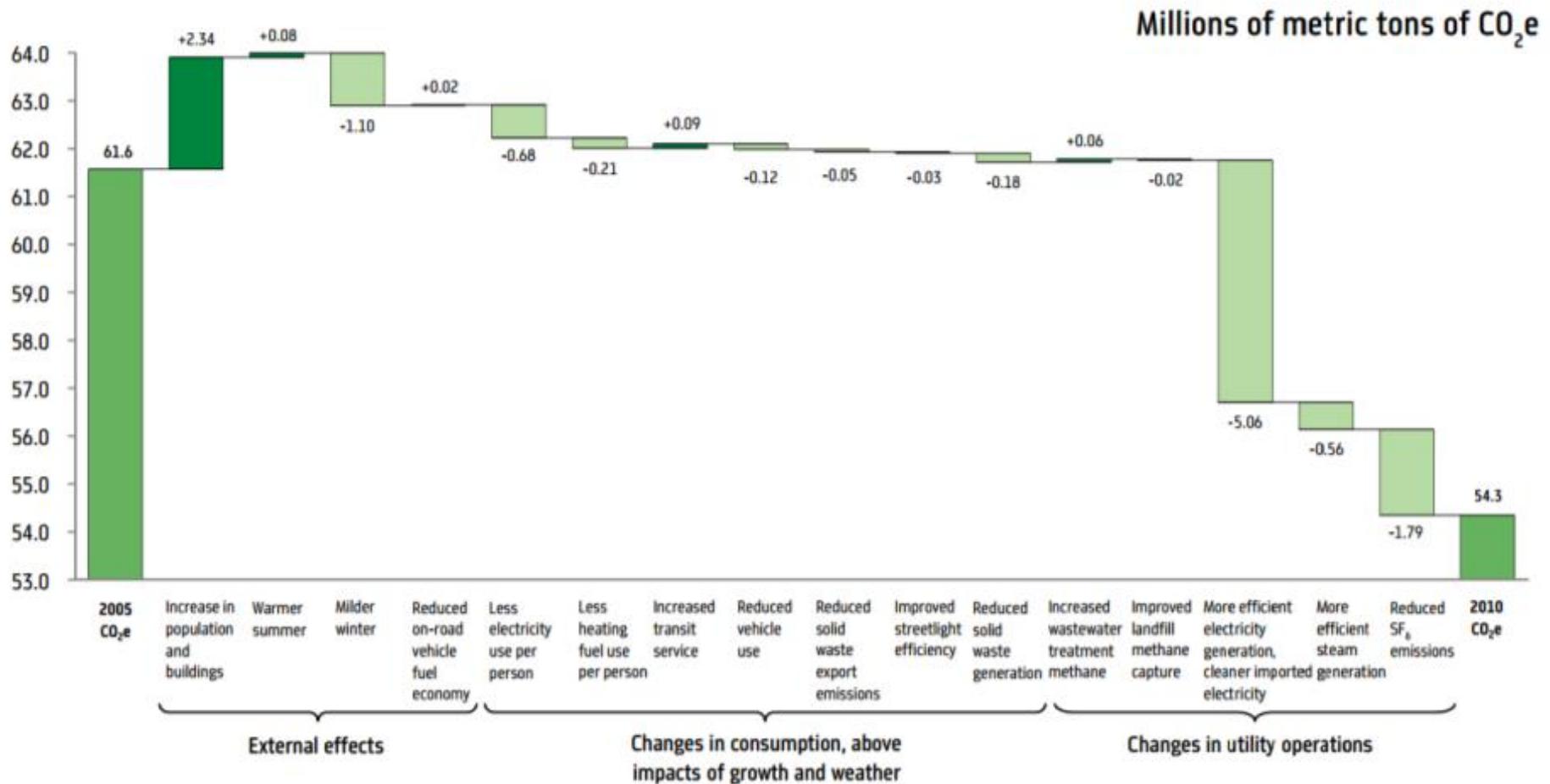
Voluntary: 30x17 and Mayor's Carbon Challenge

- Accelerated sectors to achieve 30% GHG emissions reduction in 10 years



A menu of public policy initiatives, programs, pilots, and research studies that together could unlock near-term investments and position the City along the pathway to deep carbon reductions by 2050

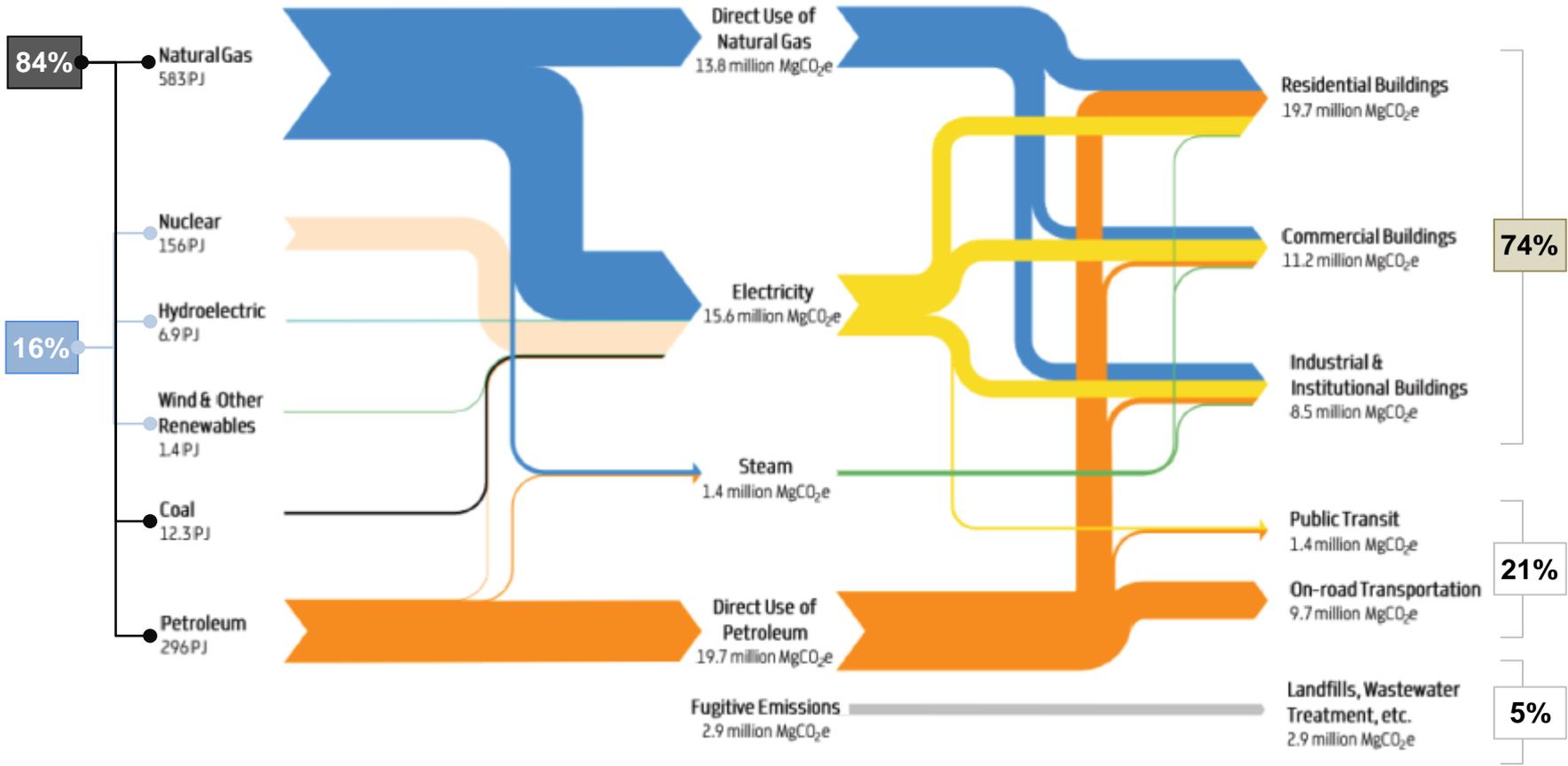
New York City's carbon footprint decreased 11.7% from 2005 to 2010, due to milder weather, reduced electricity and heating fuel use, reduced vehicle use, reduced solid waste generation, new power plants and cleaner imported electricity, more efficient steam generation, and reduced SF₆ emissions



84% of New York City's energy comes from fossil sources, and 74% of it is consumed in buildings

Source Energy (1,056 Petajoules)

Greenhouse Gas Emissions (53.4 Million MgCO₂e)

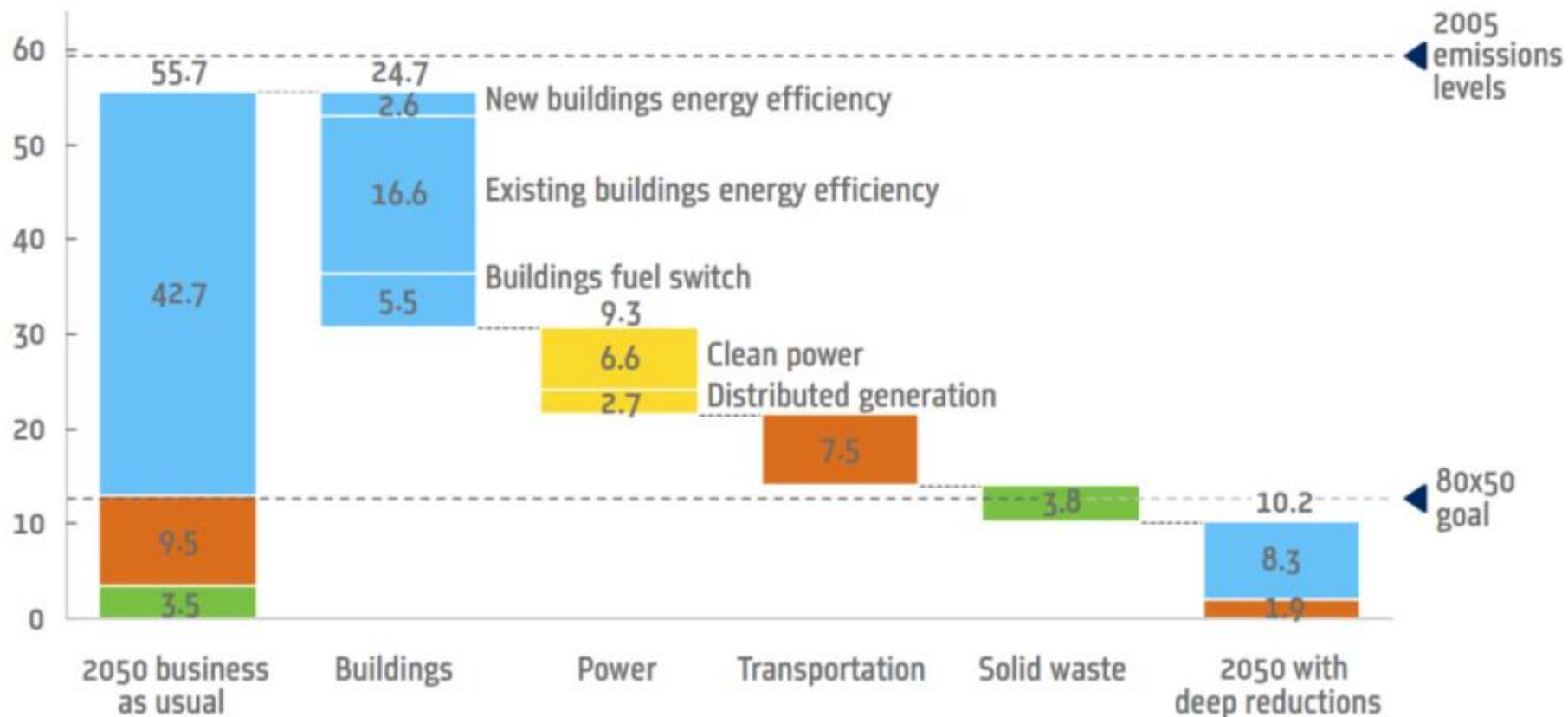


The study generated seven main findings

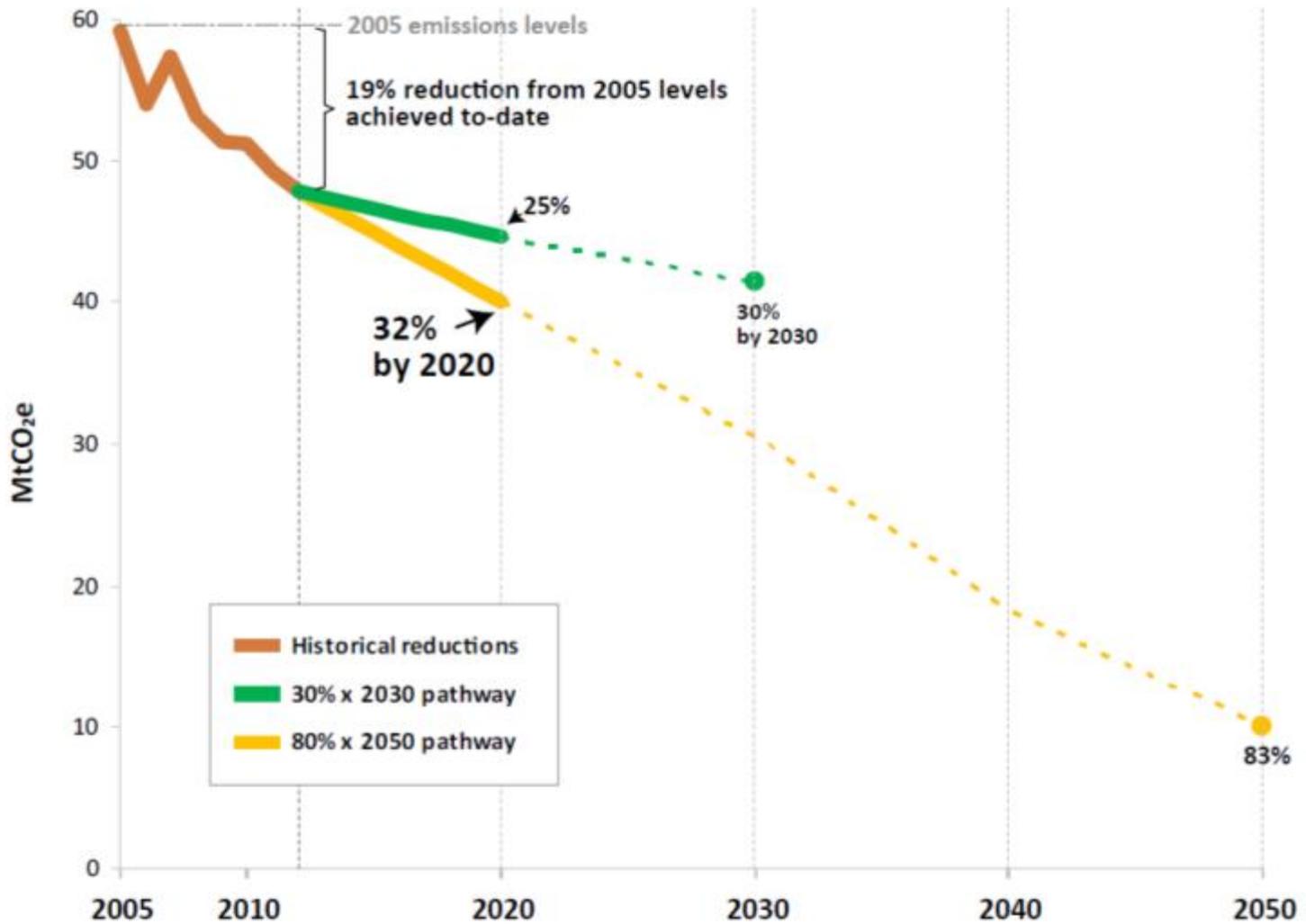
- 1** An 80x50 GHG reduction **is possible** – but very difficult; there are **no shortcuts**, and every sector needs to undergo deep changes
- 2** **Buildings** would play biggest role, generate most savings, but be most challenging to coordinate; **power** would be easiest to coordinate but cost most
- 3** **70%** of the targeted reductions could be achieved with **no net societal cost**; the rest require **substantial subsidies or incentives**
- 4** Even for no net cost measures, **financial, regulatory, technical, and informational barriers** constrain adoption – though City government can address some of them
- 5** **Federal action** would help by sending stronger price signals through a carbon policy and improving Energy Star/CAFE, but **we can lead without waiting for it**
- 6** **80x50** would **create new industries** in energy efficiency and renewables; it would lead to **wealth transfer** among sectors, but make the economy **more competitive**
- 7** **Energy efficiency for existing buildings, clean power, scale-up of recycling and organic waste processing, and electric vehicle infrastructure** should be the highest short-term priorities for City government

Greatest opportunities are in building energy efficiency, fuel switching, and cleaning the grid

Abatement Potential by Sector
 Million Metric tons of Carbon Dioxide Equivalent (MtCO₂e)



80x50 pathway requires achieving a >30% reduction by 2020





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