One City: Built to Last

Transforming New York City's Buildings for a Low-Carbon Future

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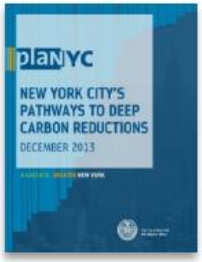
NYC Mayor's Office of Sustainability

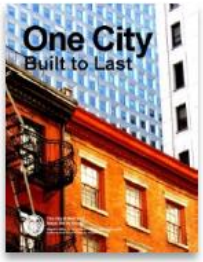
New York City's Journey to 80 x 50

80x50 Introduced

2016 Earth Day Releases



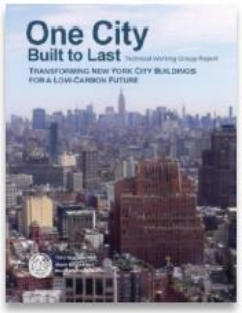
2014
PlaNYC: NYC's Pathways to Deep Carbon Reductions



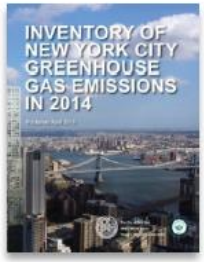
2014
One City Built to Last

2015
One New York: The Plan for a Strong and Just City

2016
OneNYC 2016 Progress Report



2016
One City: Built to Last Technical Working Group Report



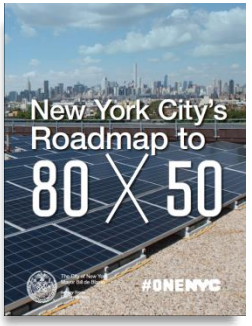
2016
2014 Inventory of NYC GHG emissions

February 2015
Buildings Technical Working Group kickoff

January 2016
Energy Supply, Transportation, and Waste sectors begin 80x50 planning

September 2016

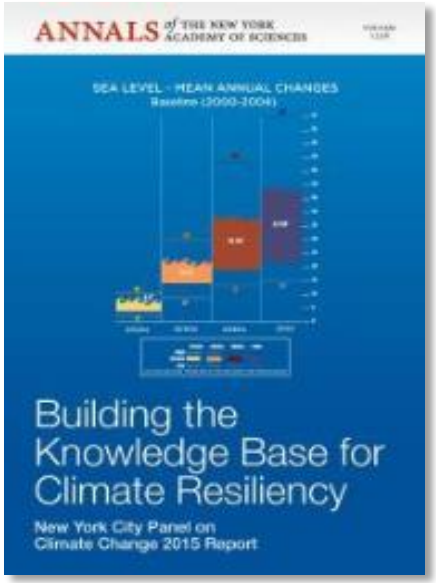
New York City's Roadmap to 80x50



#ONENYC

Why 80 x 50?

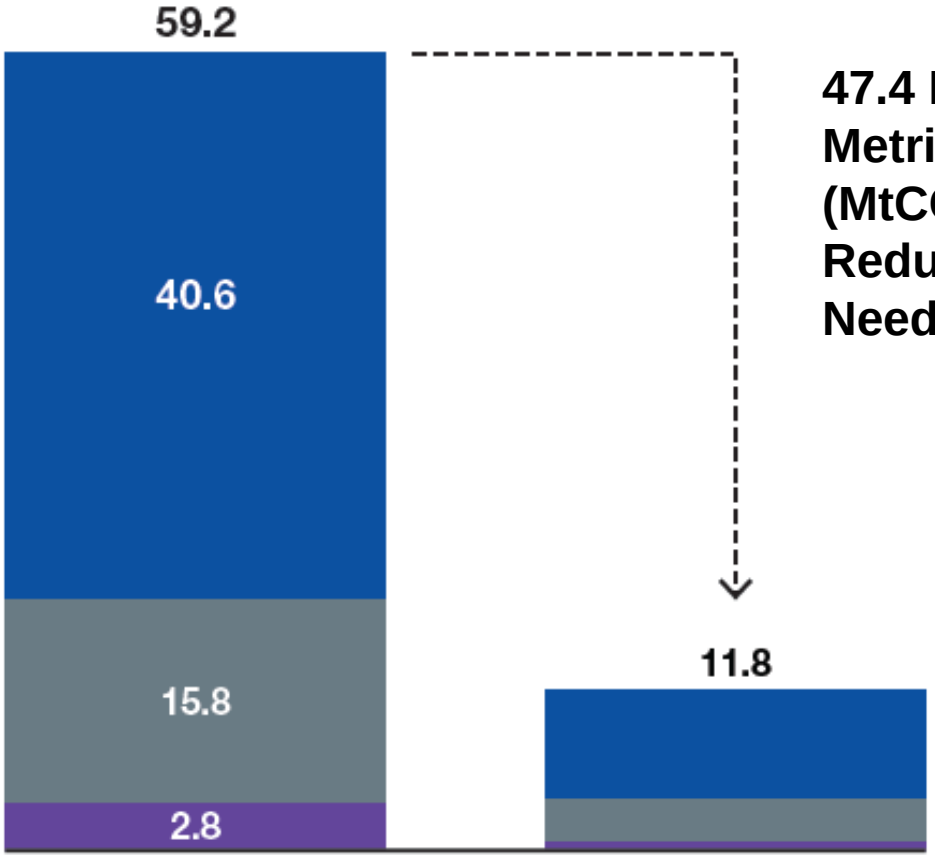
- According to the IPCC, developed nations must reduce greenhouse gas emissions 80 percent by 2050 to avoid catastrophic impacts of climate change
- The NYC Panel on Climate Change (NPCC) projects increased chronic climate hazards and increase impact from extreme water events



By the 2050s:

- 4.1ºF to 5.7ºF increase in average temperature
- Number of days in NYC above 90^0 could triple
- Sea levels likely to rise 1-2 ft.; maybe 2½ ft.

New York City's 80 x 50 Commitment

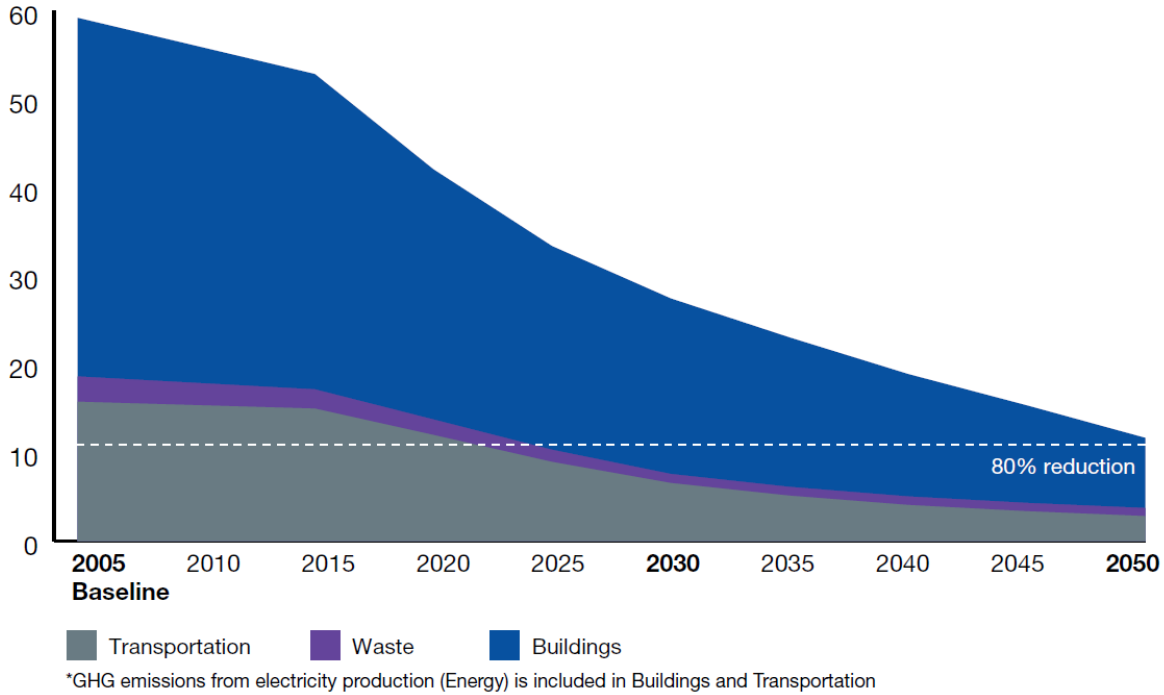


47.4 Million Metric Tons ($MtCO_2e$) Reduction Needed

Getting to 80 x 50

Achieving 80 x 50 will require aggressive movement on all strategies across energy supply, buildings, transportation, and waste.

A Roadmap to 80 x 50 (MtCO2e)



*GHG emissions from electricity production (Energy) is included in Buildings and Transportation

GHG Emissions Reductions Relative to 2005

	2030	2050
Buildings	-52%	-82%
Transportation	-58%	-82%
Waste	-64%	-68%
Total	**-54%**	**-80%**

Full Suite of Strategies Include:

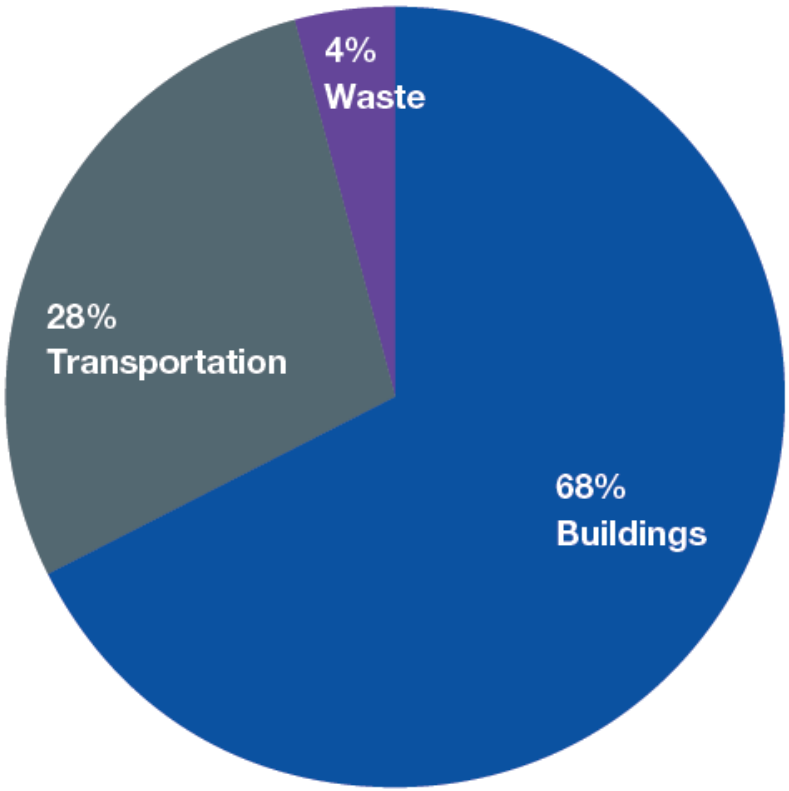
- 70-80% renewables-based electric grid
- Deep energy retrofits in 100% of buildings, with 50-60% implementing high efficiency electric heating systems
- Install roughly 7 GW of distributed solar PV
- District heating and cooling networks in key areas of the city
- Mode shift from vehicles: 40%
- Remaining on-road electric vehicle penetration: 40%+
- Improved freight efficiency
- Achieve net-zero wastewater treatment plants
- Zero Waste fully achieved

Why focus on existing buildings?

Improving energy efficiency in buildings is critical to achieving 80 x 50.

- **68%** of NYC's GHG emissions come from the energy used in buildings
- **90%** of NYC buildings that exist today will still exist in 2050

2016 NYC GHG Emissions by Source



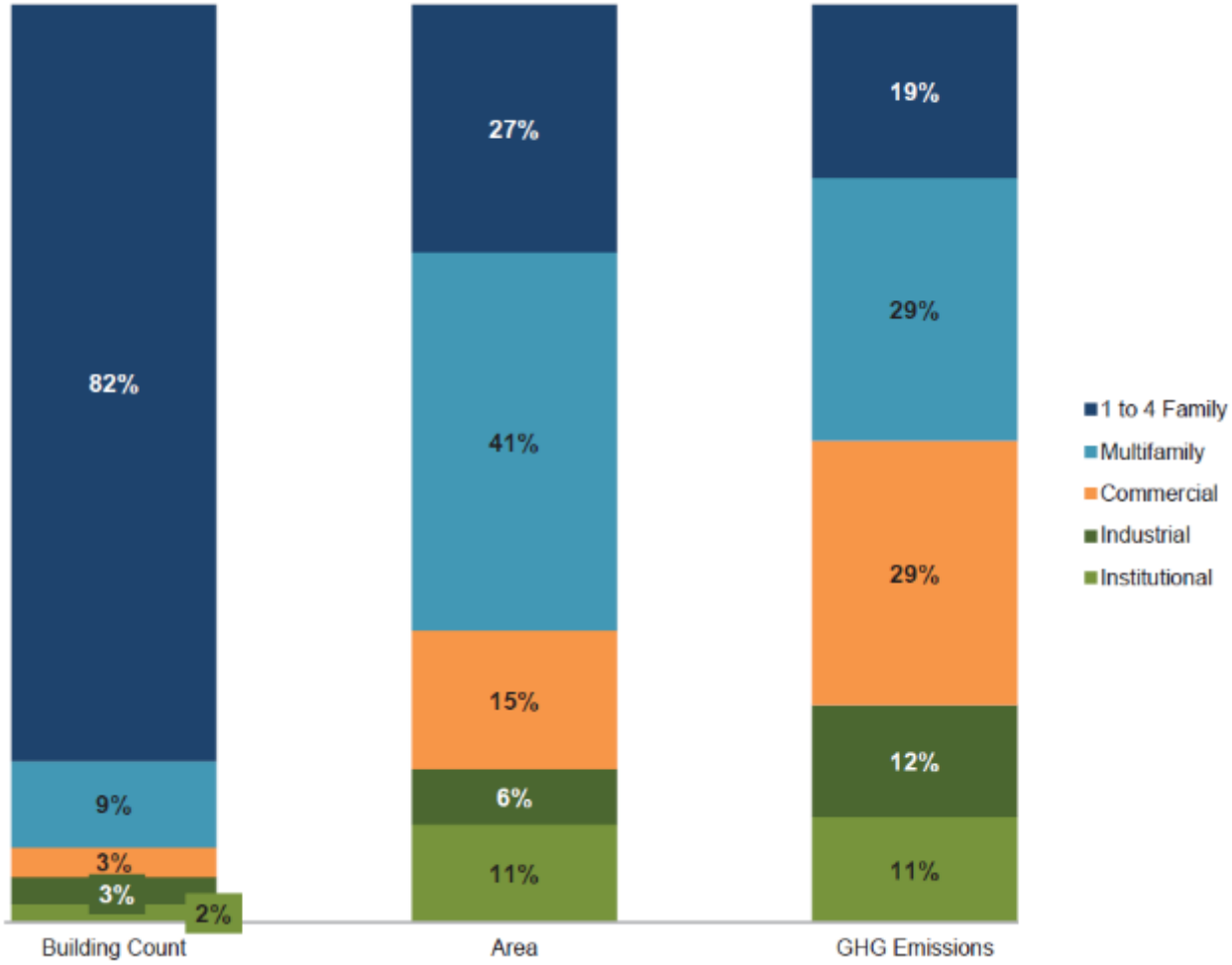
Source: 2016 NYC GHG Inventory

Key Findings about Building Energy Use

- **Greatest absolute number** of buildings: 1-4 family homes

- **Greatest share of GHG emissions**: Commercial and multifamily buildings

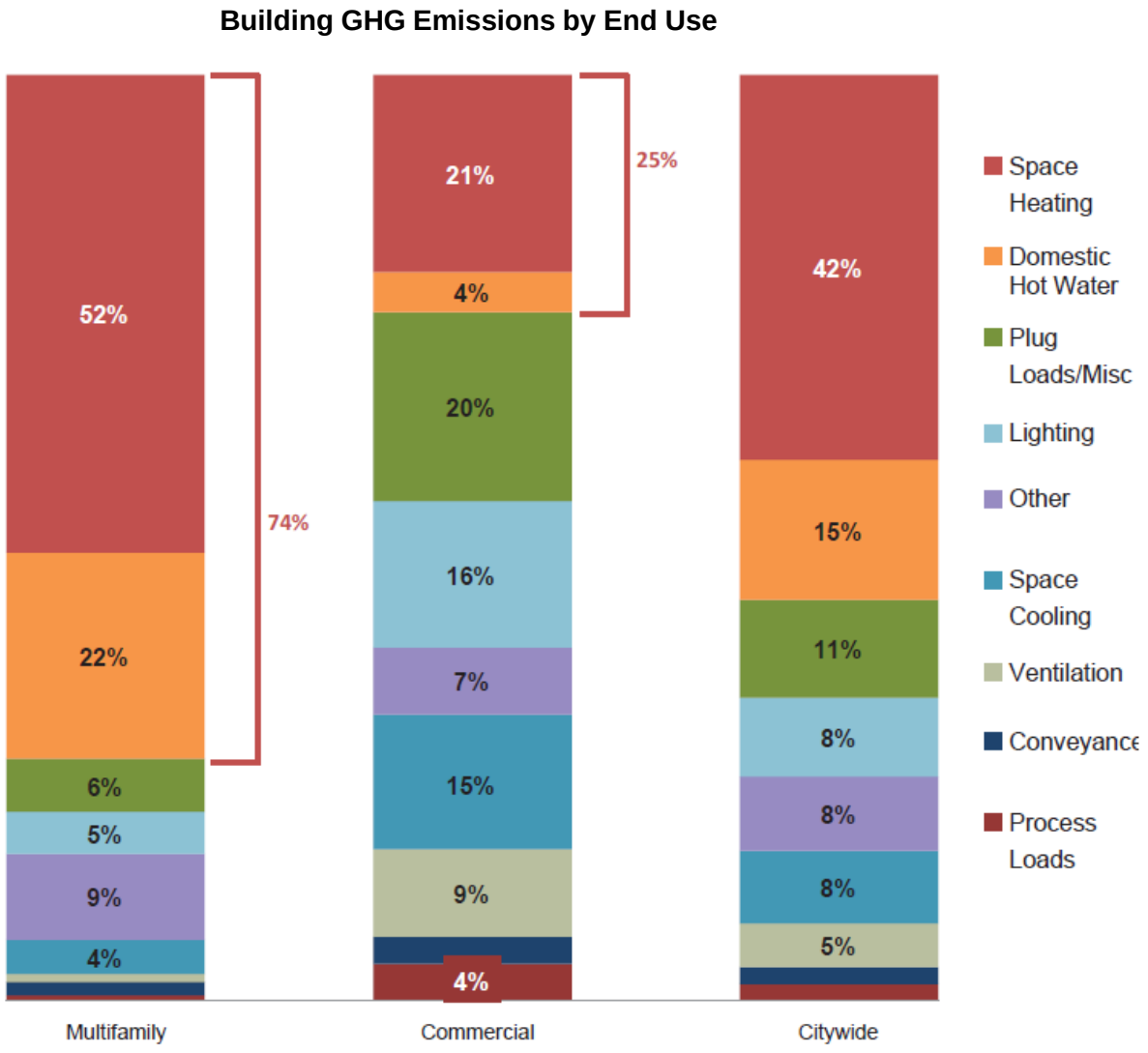
Building Uses by Building Count, Floor Area, and GHG Emissions



Source: PLUTO and 2015 GHG Inventory

Key Findings about Building Energy Use

- The energy used for **space heating** and **domestic hot water (DHW) production** accounts for the majority of building-based emissions

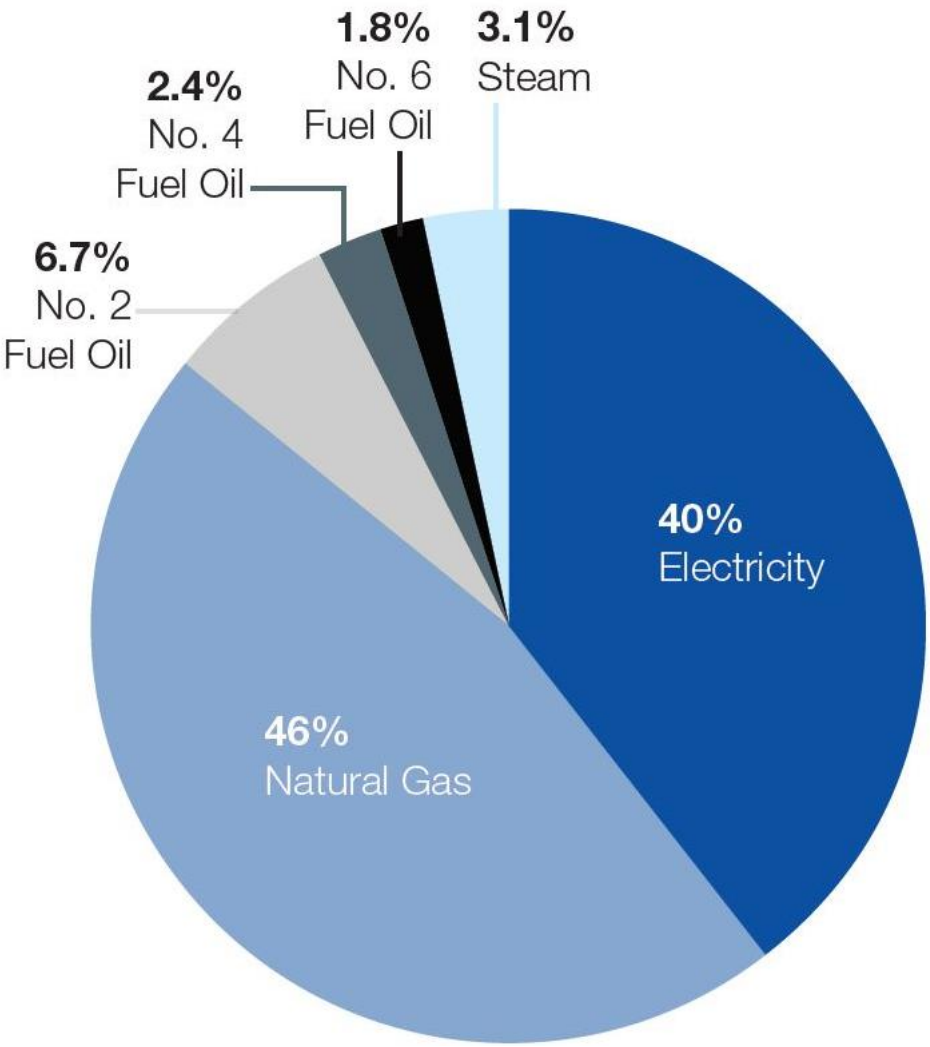


Source: 2013 and 2014 Local Law 87 Submissions

Building Energy Use by Fuel Type

- **Fossil fuels dominate** energy use and GHG emissions from New York City's buildings.

Sources of NYC Building-based Emissions by Fuel Type



Existing Buildings: Programs and Policies

Information

THE NEW YORK CITY GREENER, GREATER BUILDINGS PLAN

NYC Benchmarking HELP CENTER

Financing

NYC Department of Housing Preservation & Development

Green Housing Preservation Program

Training

NYC BUILDING OPERATOR TRAINING

No-Cost Energy Efficiency Training for Multifamily Operations & Maintenance

Leadership

NYC CARBON CHALLENGE

NYC Citywide Administrative Services

Assistance

NYC Retrofit ACCELERATOR

COMMUNITY RETROFIT NYC

BETTER BUILDINGS, BLOCK BY BLOCK

SOLARIZE NYC

NYC CoolRoofs

The NYC Carbon Challenge:

A cross-sector voluntary leadership program to reduce greenhouse gas emissions by 30% or more in ten years.

18 leading universities

9 largest hospital organizations

28 commercial firms

13 commercial owners

22 residential management firms

19 hotels

510 million square feet

9% of citywide square footage

1,455,000 metric tons of carbon projected to be eliminated

$700 million in projected cost savings

NYC Retrofit ACCELERATOR

Free, personalized advisory services that streamline the process of making energy efficiency improvements.

NYC Mayor's Office of Sustainability
Mayor Bill De Blasio

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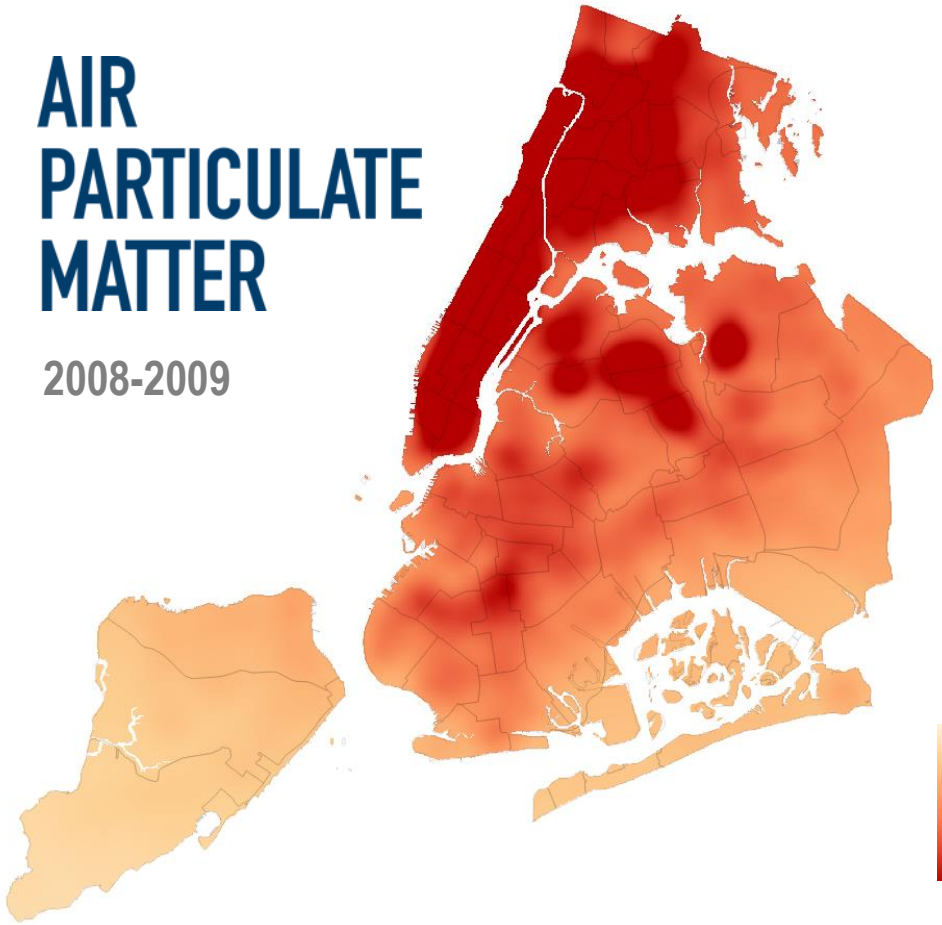
NYC Clean Heat was a success.

AIR PARTICULATE MATTER

2008-2009

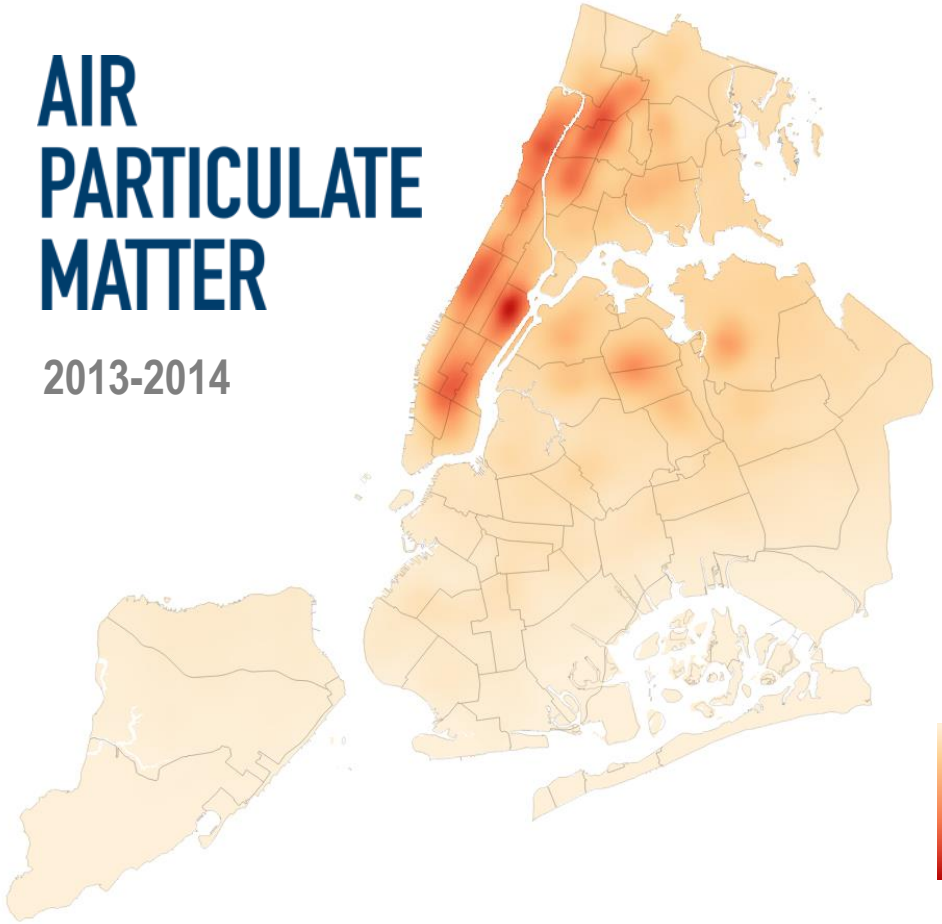


SO_2 (ppb), Source: NYC Department of Health and Mental Hygiene

NYC Clean Heat was a success.

AIR PARTICULATE MATTER

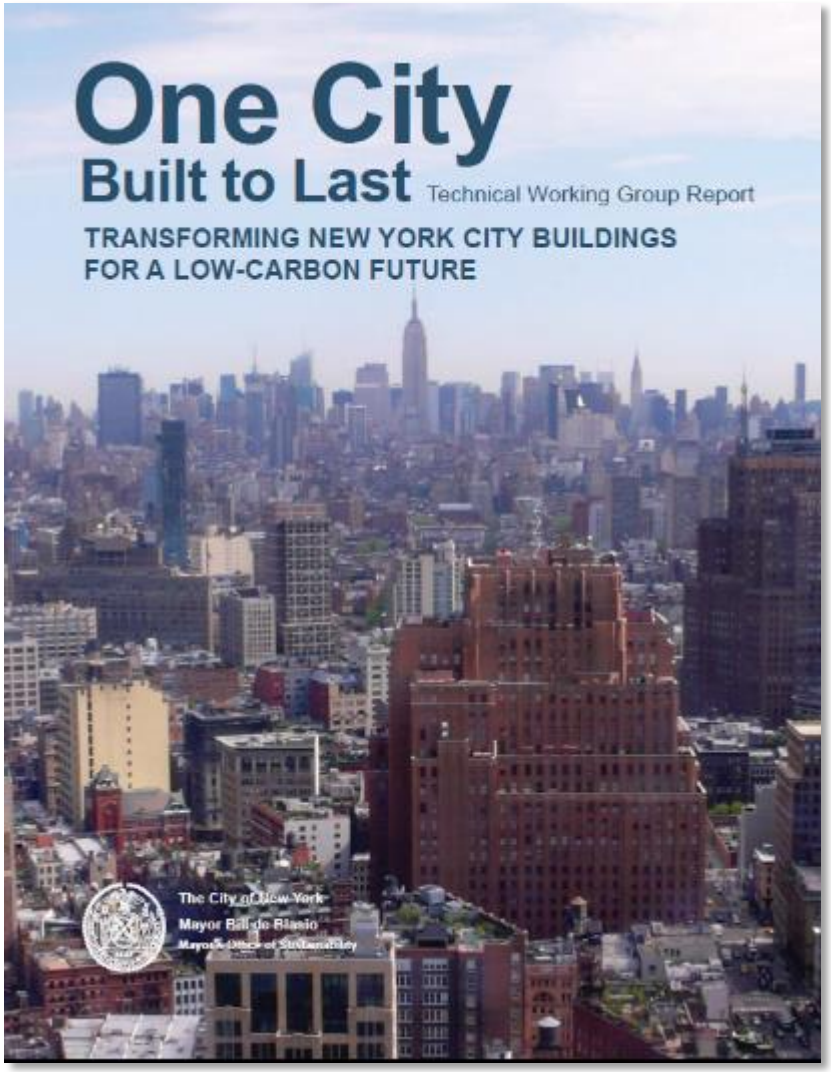
2013-2014



SO_2 (ppb), Source: NYC Department of Health and Mental Hygiene

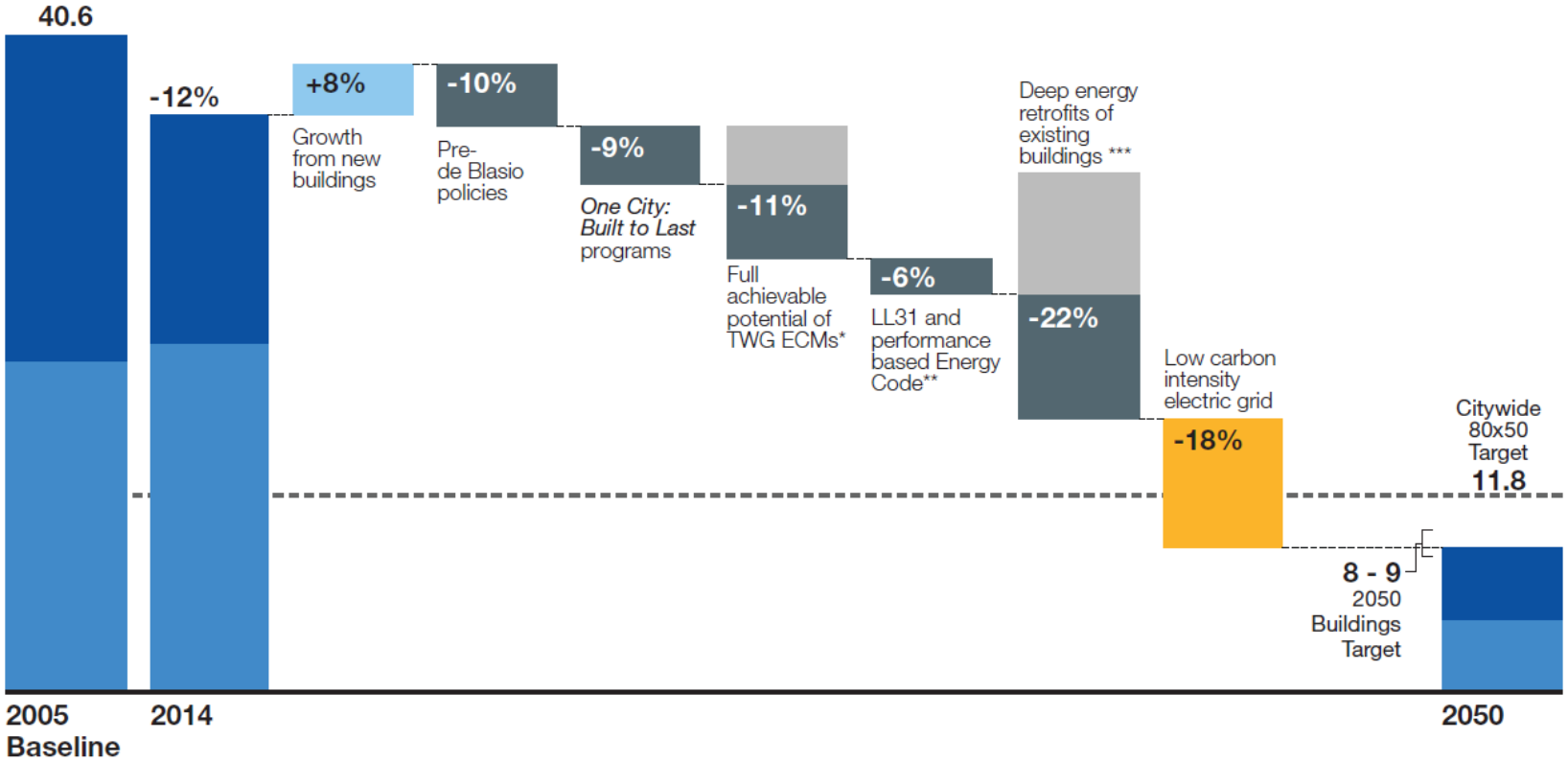
Buildings Technical Working Group

- NYC convened over 50 stakeholders to participate in the **Buildings Technical Working Group (TWG)**
- The TWG conducted the **most comprehensive analysis** of energy use in NYC's buildings to date
- The final report recommended **new requirements and supporting programs for buildings**
- Findings were integrated into **New York City's Roadmap to 80 x 50**



A Buildings Pathway to 80 x 50

Nearly every building will need to complete a deep energy retrofit, and many will need to move away from fossil fuel-based heating and hot water systems.



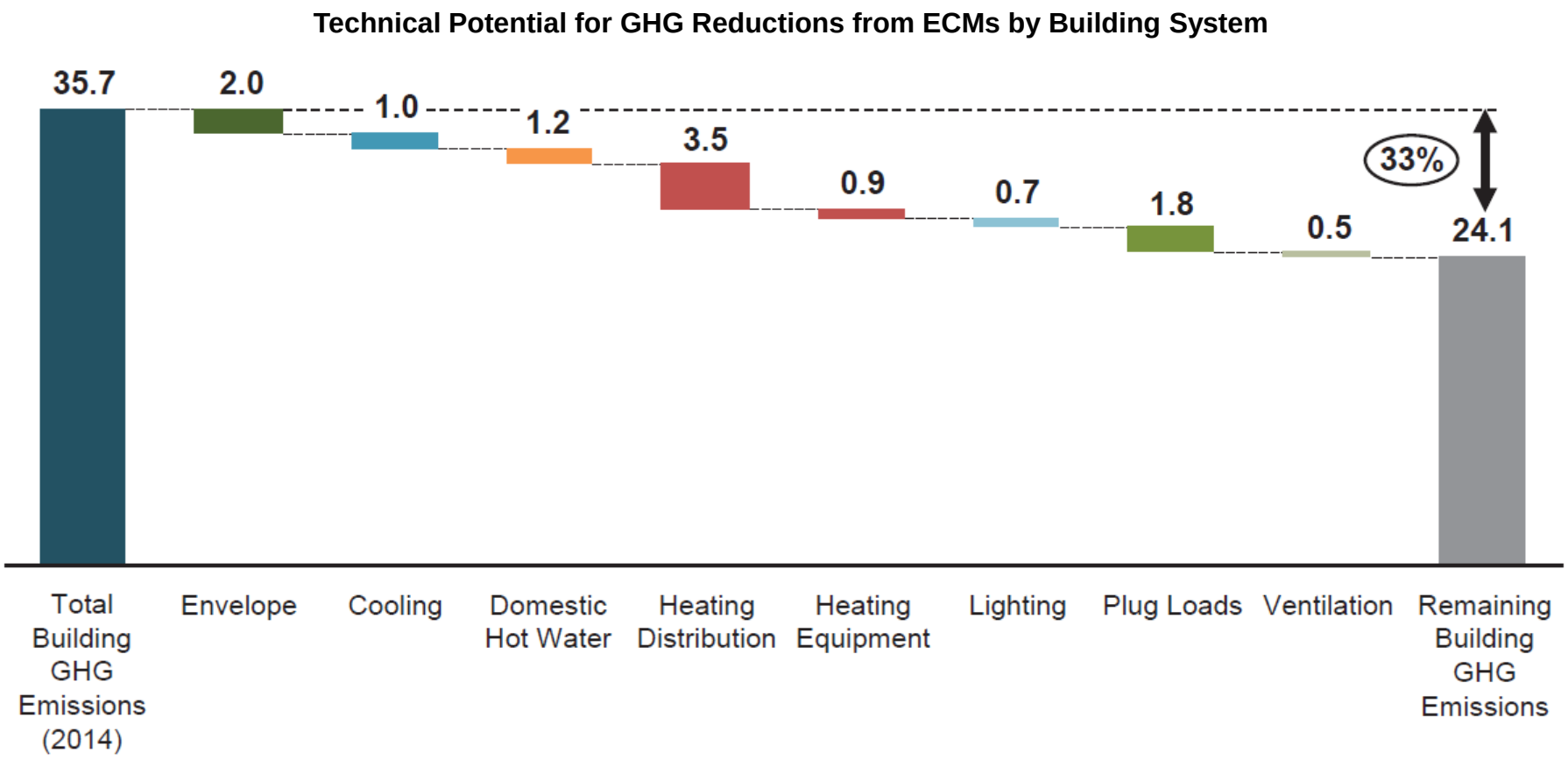
* Full implementation of TWG ECMs includes 100% overlap with One City: Built to Last initiatives

** Assumes a 50% reduction from ASHRAE 2013 standards for new construction and substantial renovations in public buildings beginning in 2017, and a 70% reduction from ASHRAE 2013 standards implemented in 2022 for both public and private buildings.

*** Includes 100% overlap with ***One City Built to Last initiatives*** and TWG ECMs. 50-60% of buildings implement strategies that include high efficiency electric technologies for heat and hot water.

Low- and Medium-Difficulty ECMs

Low- and medium-difficulty ECMs are not sufficient to achieve the necessary GHG reductions from buildings.



Deep Energy Retrofit Paths

Models of deep energy retrofit paths show that **40-60 percent energy reductions are possible using existing technologies and strategies.**

Eight Key Building Typologies

Commercial, Pre-war, ≤ 7 Stories

Citywide Building Area: **2.7%** | Citywide Building-based GHG: **5.4%**

Commercial, Pre-war, > 7 Stories

Citywide Building Area: **2.7%** | Citywide Building-based GHG: **5.5%**

Commercial, Post-war, > 7 Stories

Citywide Building Area: **0.7%** | Citywide Building-based GHG: **1.3%**

Commercial, Very Large

Citywide Building Area: **5.9%** | Citywide Building-based GHG: **11.7%**

1-4 Family Home

Citywide Building Area: **25.7%** | Citywide Building-based GHG: **18.9%**

Multifamily, Pre-war, ≤ 7 Stories

Citywide Building Area: **15.8%** | Citywide Building-based GHG: **11.5%**

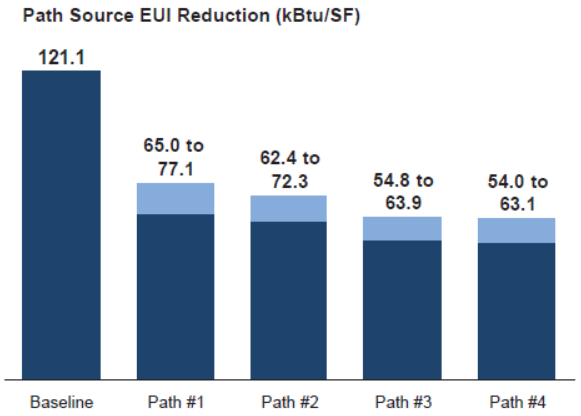
Multifamily, Post-war, > 7 Stories

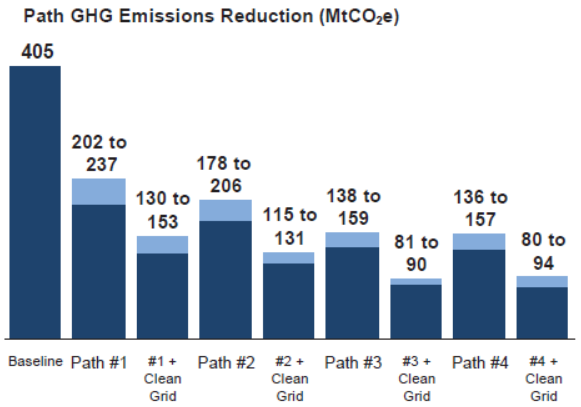
Citywide Building Area: **5.9%** | Citywide Building-based GHG: **4.3%**

Multifamily, Post-1980, > 7 Stories

Citywide Building Area: **3.3%** | Citywide Building-based GHG: **2.4%**

Sample Deep Retrofit Path Results
Multifamily, Post-War, > Seven Stories





Next Steps

The High Performance Retrofit Track

- Pilot deep energy retrofits in real buildings
- Phase in retrofits as part of a long-term capital plan
- Provide free technical assistance through the Retrofit Accelerator
- Develop a pathway for implementation across larger portfolios

NYC Retrofit ACCELERATOR

Thank You

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