

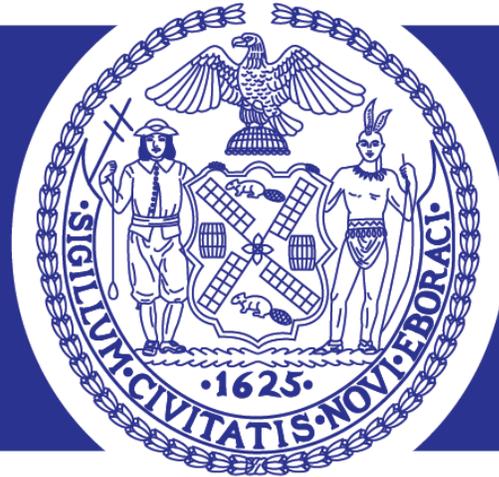
SCALE IT UP: HOW NYC AGENCIES WILL REACH 80X50

Panelists:

- **Tarek Arafat, NYC Department of Citywide Administrative Services (DCAS)**
- Chris Diamond, NYC Department of Design & Construction (DDC)
- Mikael Amar, NYC Department of Environmental Protection (DEP)
- Bomee Jung, NYC Housing Authority (NYCHA)
- Jessica Wurwarg, Caitlin Churchill, NYC Department of Transportation (DOT)

Moderator:

- Ellen Honigstock, Urban Green Council



New York City Department of
Citywide Administrative Services



AGENDA

- **Background**
 - DEM Mission
 - Goals and Targets
- **Status**
 - City GHG emissions
 - DEM programs
 - Progress to date
- **Operations focus through scaling up and leveraging metering**
 - Metering infrastructure
 - Programs: Demand Response and Load Management
 - Case study: integration toward change



DEM MISSION

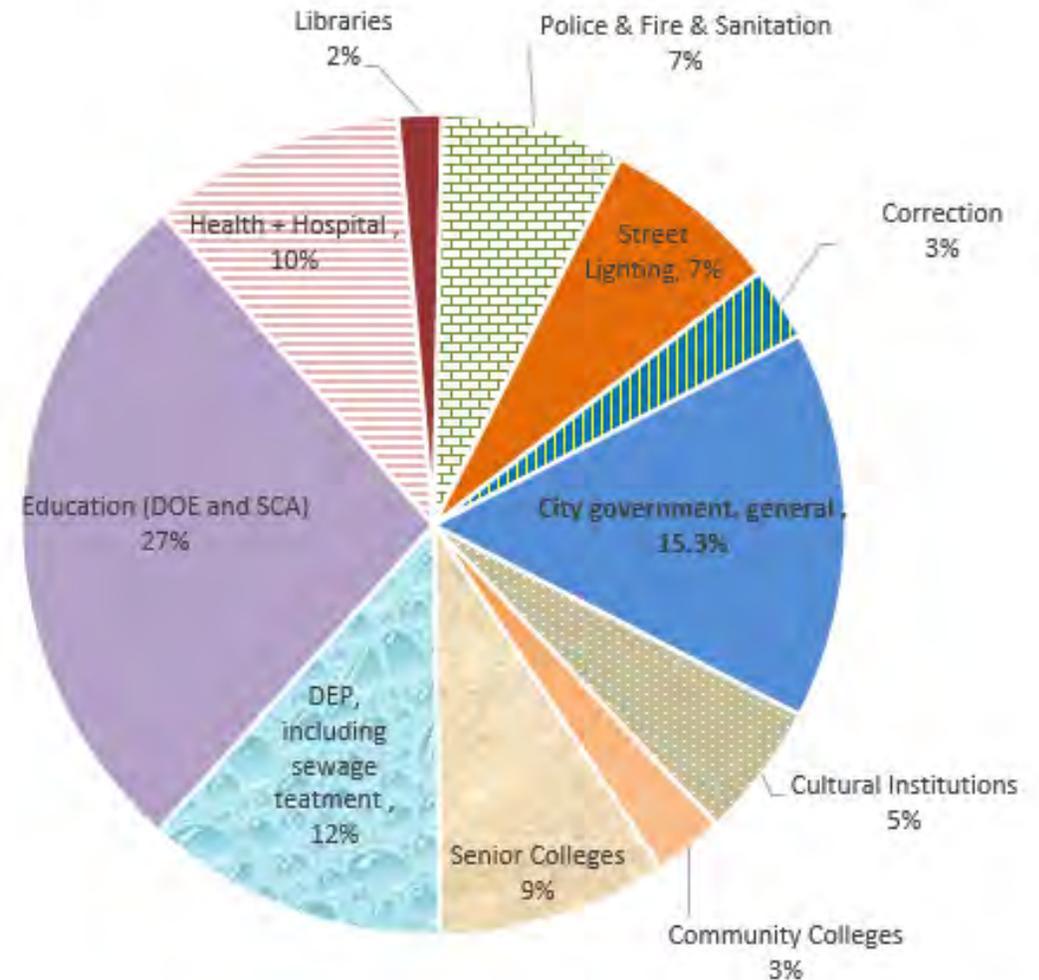
Lead the City's efforts to reduce GHG emissions from City government operations (non-transportation)

- Run variety of programs
- Support efforts to increase resiliency and energy grid reliability

Serve as the hub for energy management for City government operations

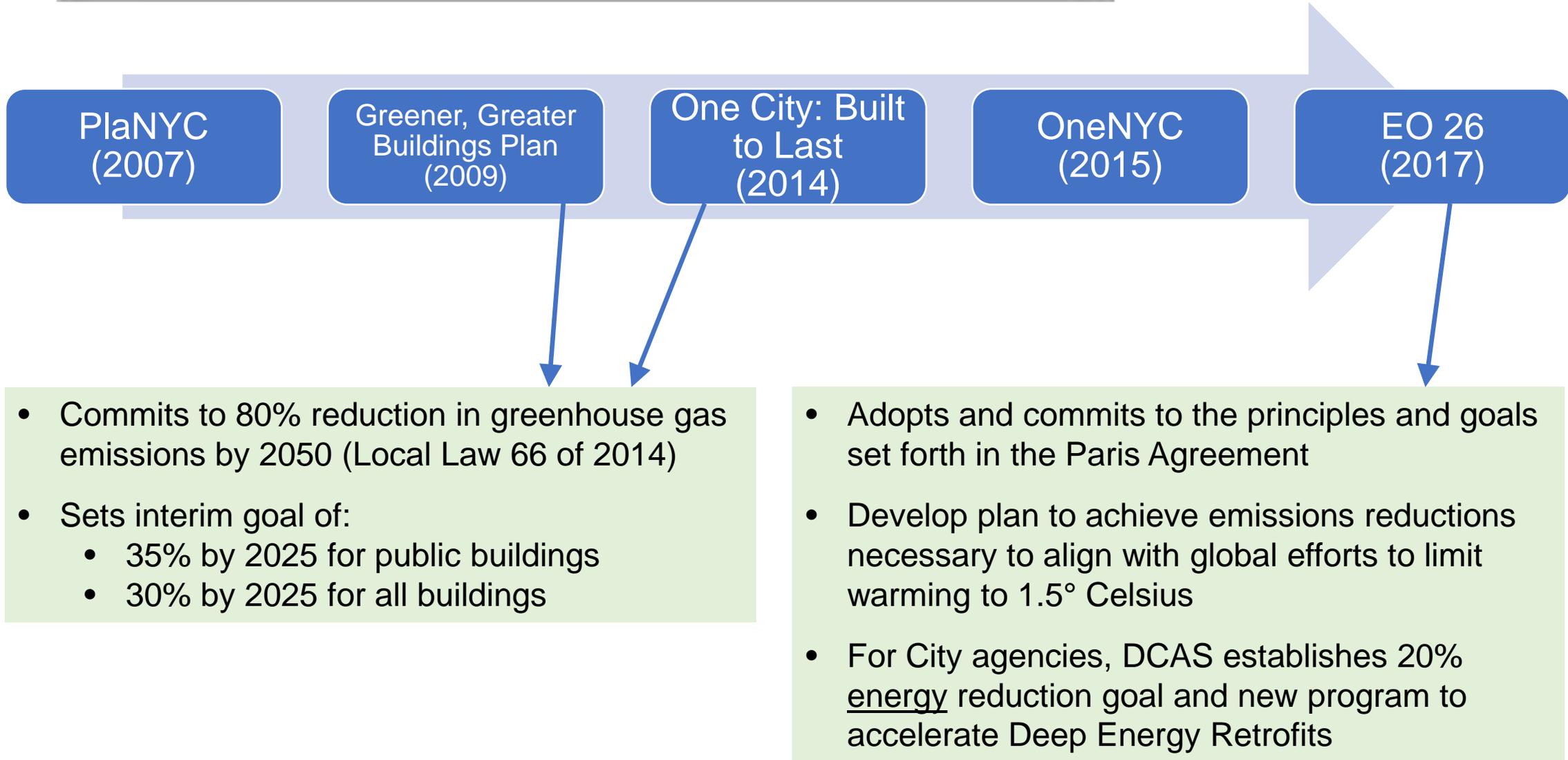
- Manage electricity, natural gas, and steam utility accounts that serve 80 agencies and ~4,000 buildings

City Government Utility Energy Budget, by Function, FY 18



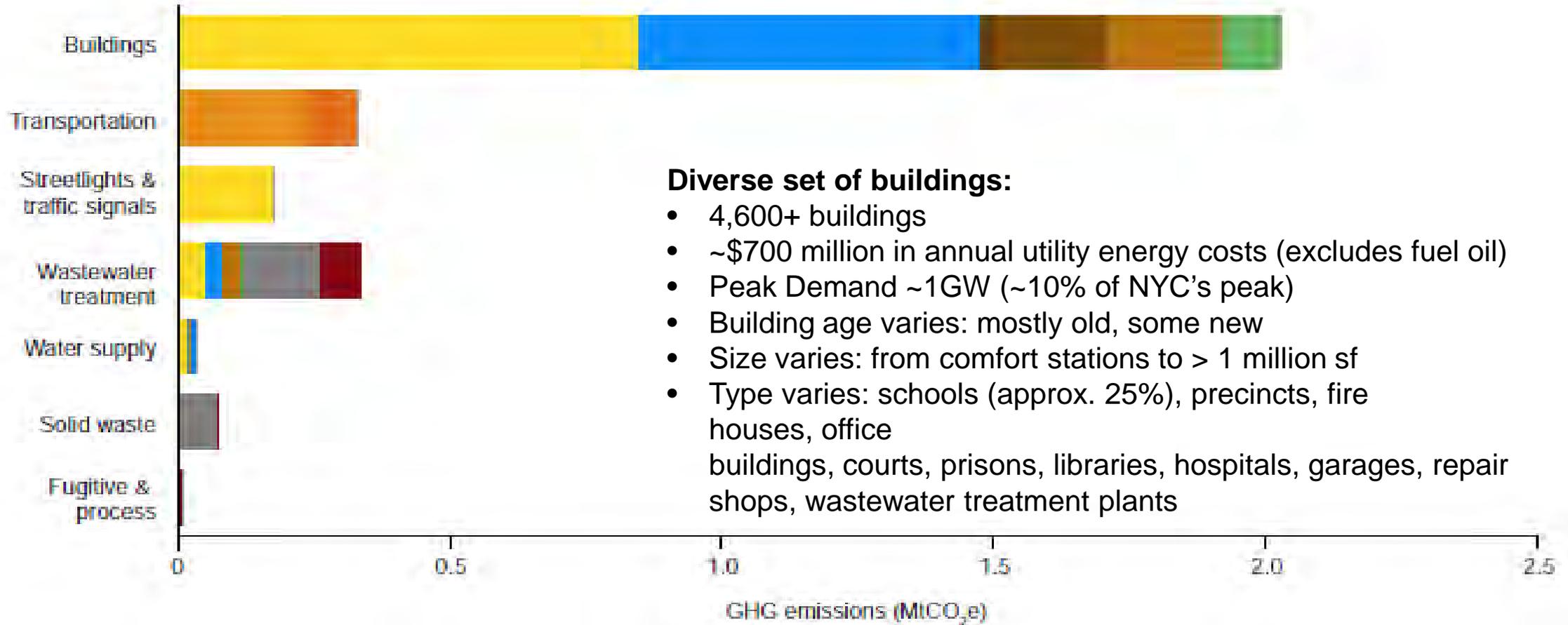


CONTEXT: GOALS AND TARGETS



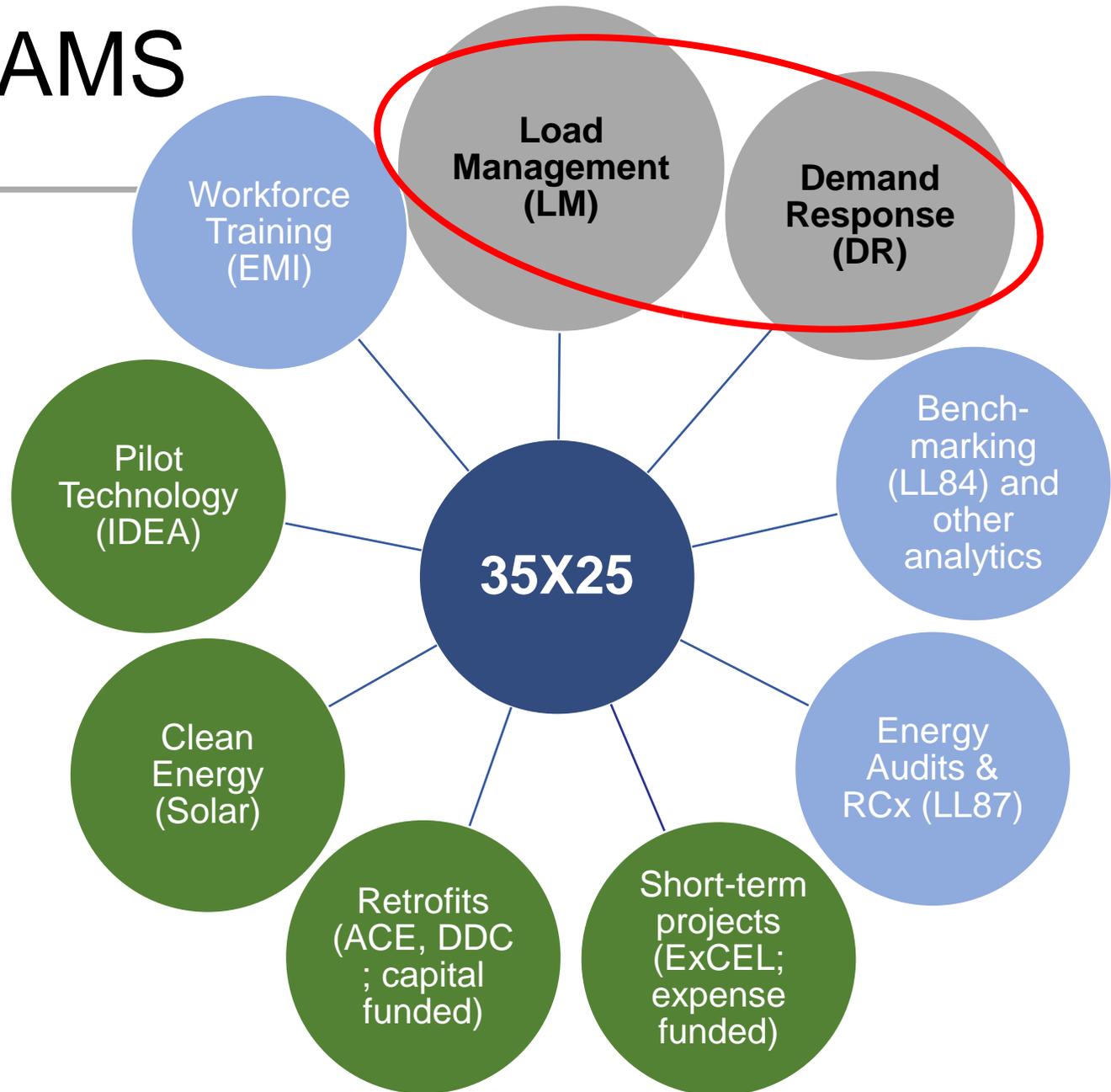


FOCUS ON MUNICIPAL BUILDINGS



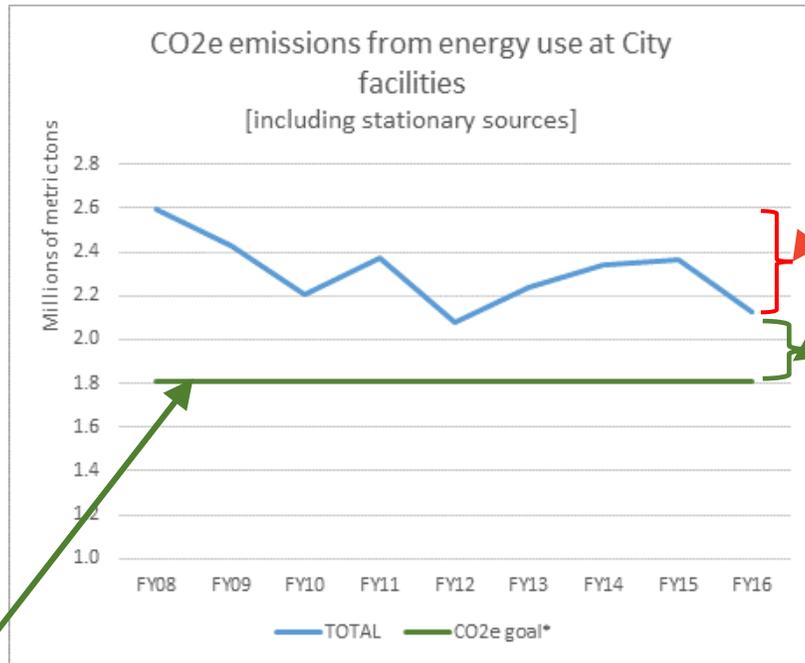
68% of city government operations' carbon emissions are from buildings in FY15 (about 2 million metric tons)

DEM PROGRAMS





PROGRESS TO DATE

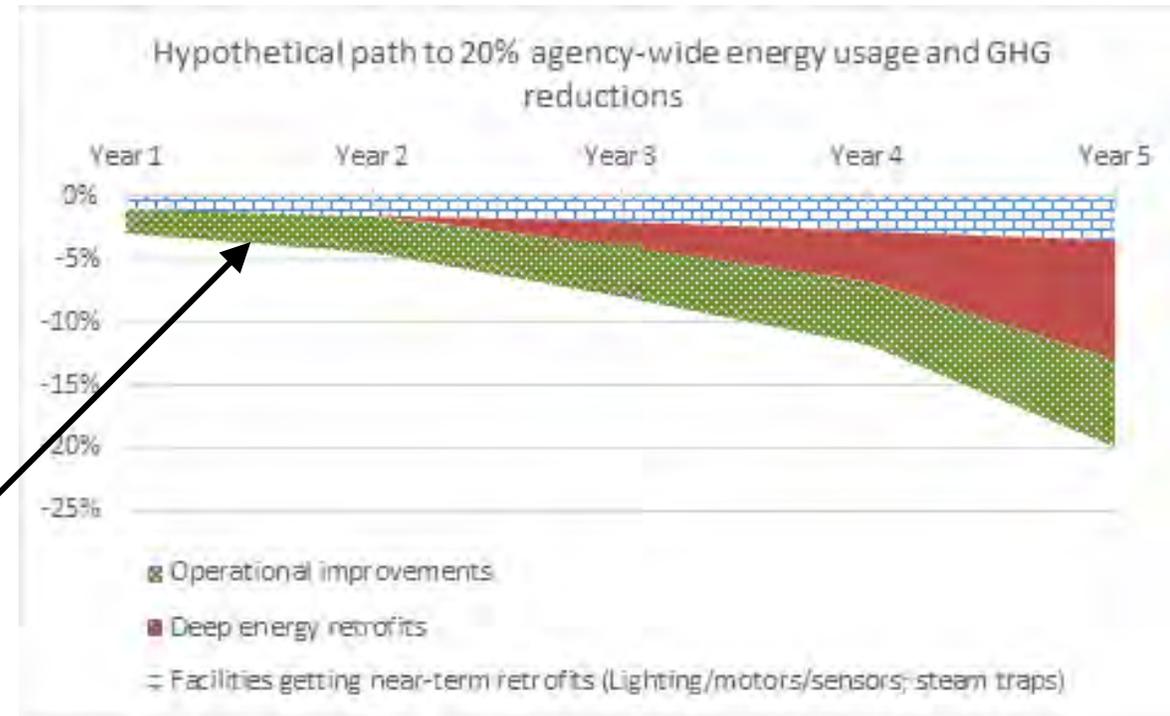


24% reduction achieved from FY06 (programs + cleaner power)

20% reduction needed from FY17 levels to reach goal

35% reduction from FY06 emissions

Path forward to more reductions will have to include measureable operational contributions





Metering and Operational Savings

- In 2013, DEM began a re-vamped DR initiative for enterprise-wide real-time metering.
- Vendor NuEnergen selected through RPF process, and has worked with us on required infrastructure, including:
 - Utility demarcation boxes
 - metering upgrades
 - Communication



Metering and Operational Savings

- Platform(s) for facility management and agency oversight.
 - Features: display peaks and baselines over a given time period; set building-specific alerts based on % percentage & trailing peak; roll-up agency and citywide loads and reports; custom charts
 - Mobile version recently released
- Highlights:
 - > 300 locations on line to date, representing about **35%** of municipal building demand (16 agencies + 6 cultural institutions)
 - RTM pilots for gas and steam
 - Continued growth will build on earnings incentives, training, communications, with goal of **70%** of electric load to be real-time metered by 2023

PROGRAMS CURRENTLY USING RTMS: DEMAND RESPONSE AND LOAD MANAGEMENT



Demand Response (DR)

Financial incentives for reducing electricity consumption during periods of high stress on grid

Summer 2017:
400 facilities (23 agencies) committed to reduce 75 MWs (8% of load); \$10 million in earnings last year

Load Management (LM)

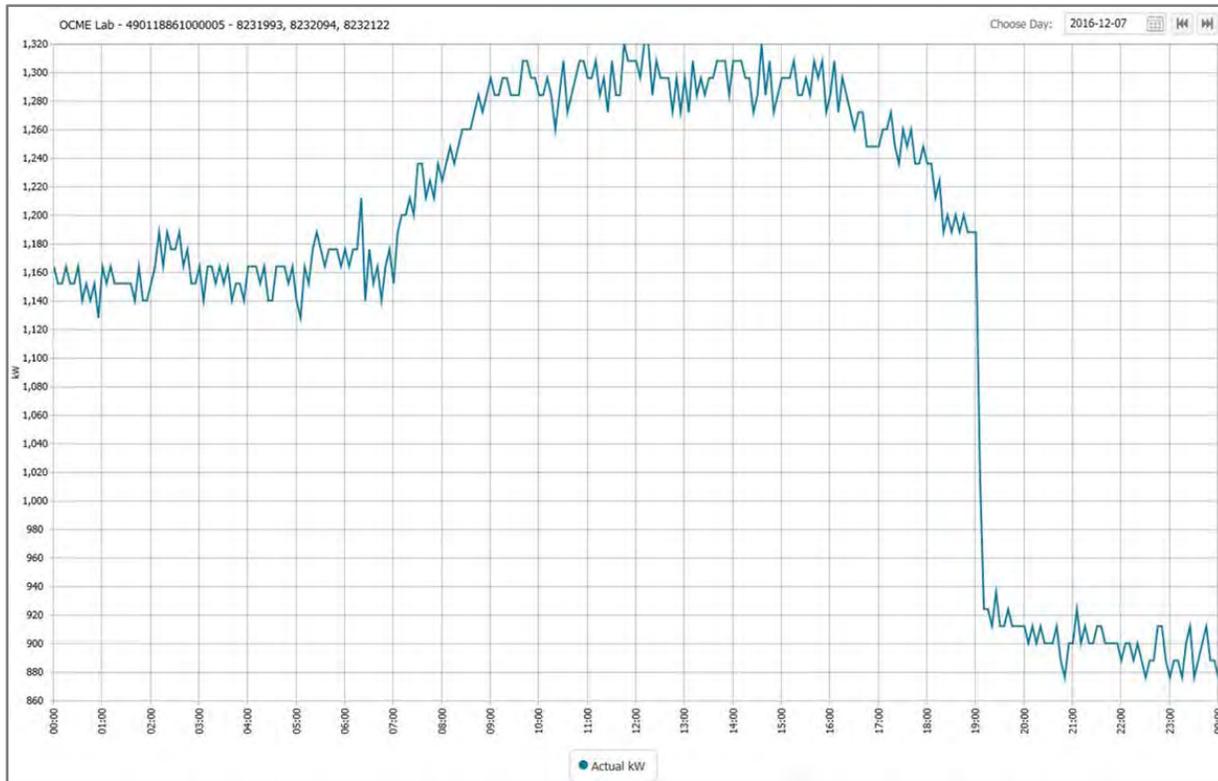
Combines analysis of real-time electricity data with building operator knowledge, to find low-cost operational efficiencies to reduce energy use & GHG emissions.

Pilot project at OCME Lab: 16% kwh reduction over 7 months (citywide benchmark for period was 1% reduction)

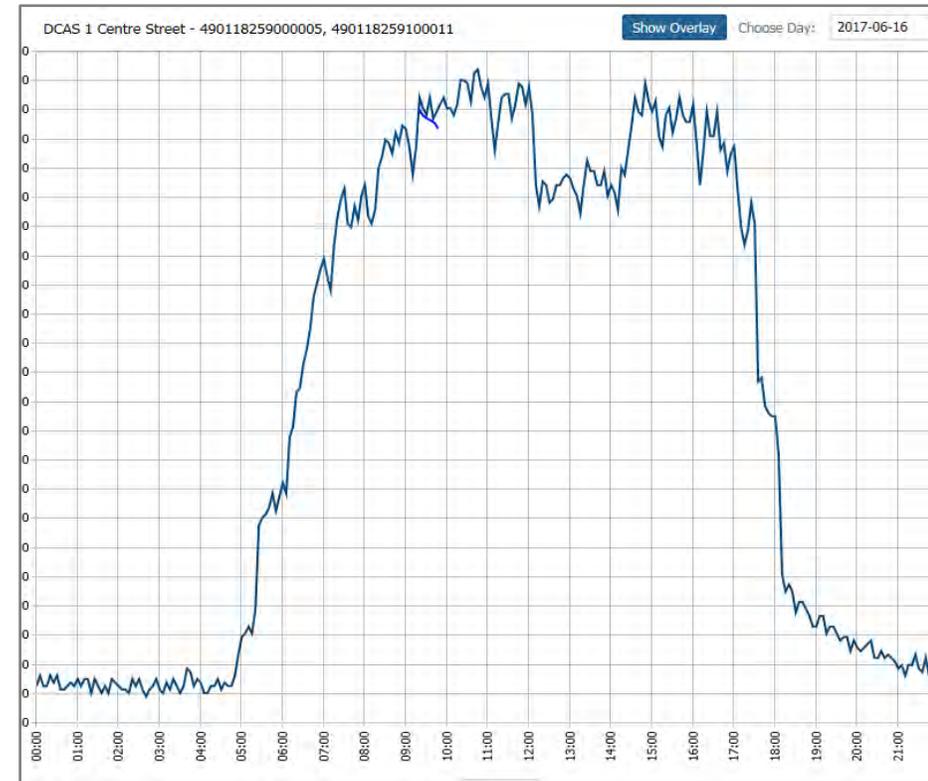


PROGRAMS CURRENTLY USING RTMS: DEMAND RESPONSE AND LOAD MANAGEMENT

Energy and facility managers can know right away the effectiveness of operational changes



OCME impact of rescheduling air handling units at their lab after 7 pm

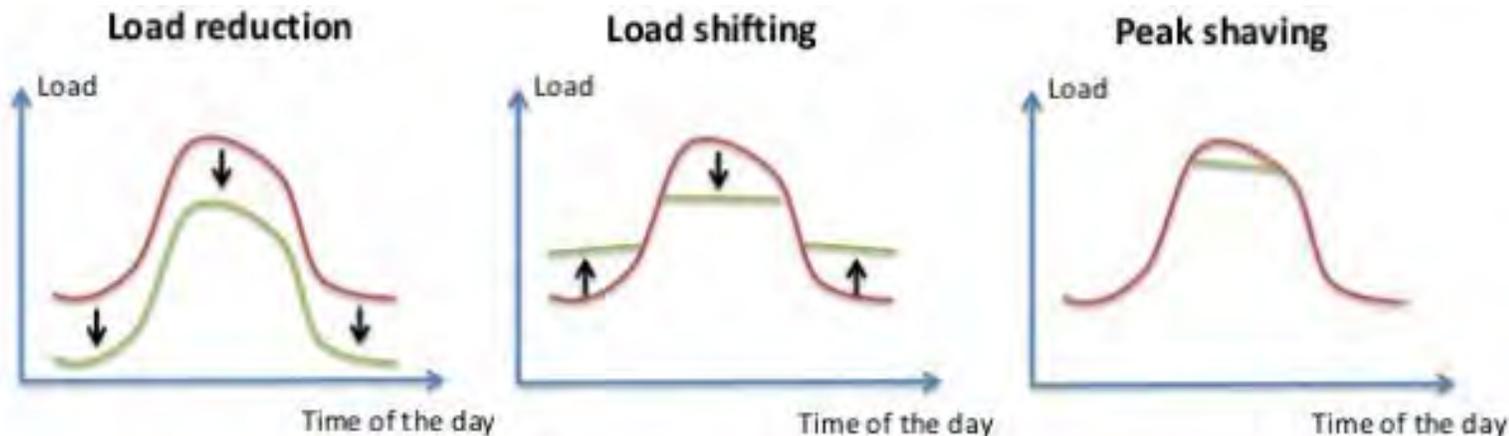
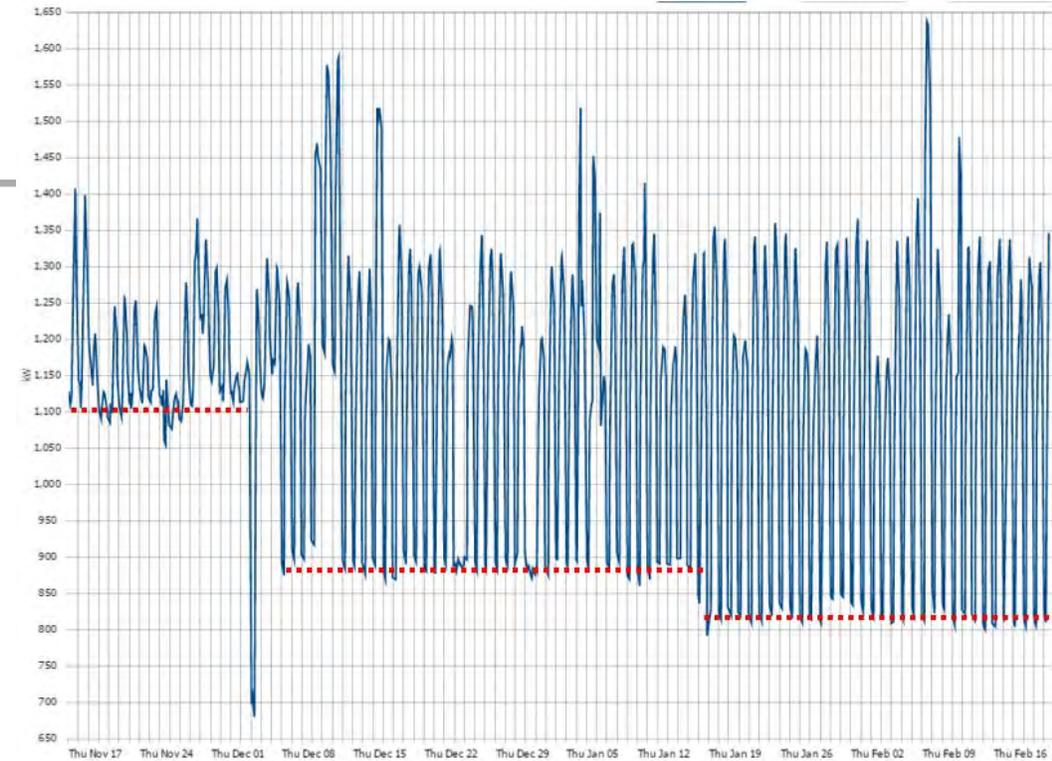


Electricity reductions for “daylight” hour from noon to 2 pm, 1 Center, 6/16/17



Load Management (LM)

- Optimizing a building's energy load via operational improvements.
- Integrates real-time data analysis and visualization with building operations
- Positions facility personnel for efficient long-term building management.
- Goal is progressive reductions through load reductions, shifts, and peak shaving.



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NextGeneration NYCHA: Comprehensive Sustainability Agenda

Released in April 2016

NYCHA's commitment as a landlord to create healthy and comfortable homes that will withstand the challenge of climate change

Invitation to residents and surrounding communities to work with NYCHA to realize a shared long-term vision of equity, sustainability, and resiliency

<http://j.mp/green-nycha>

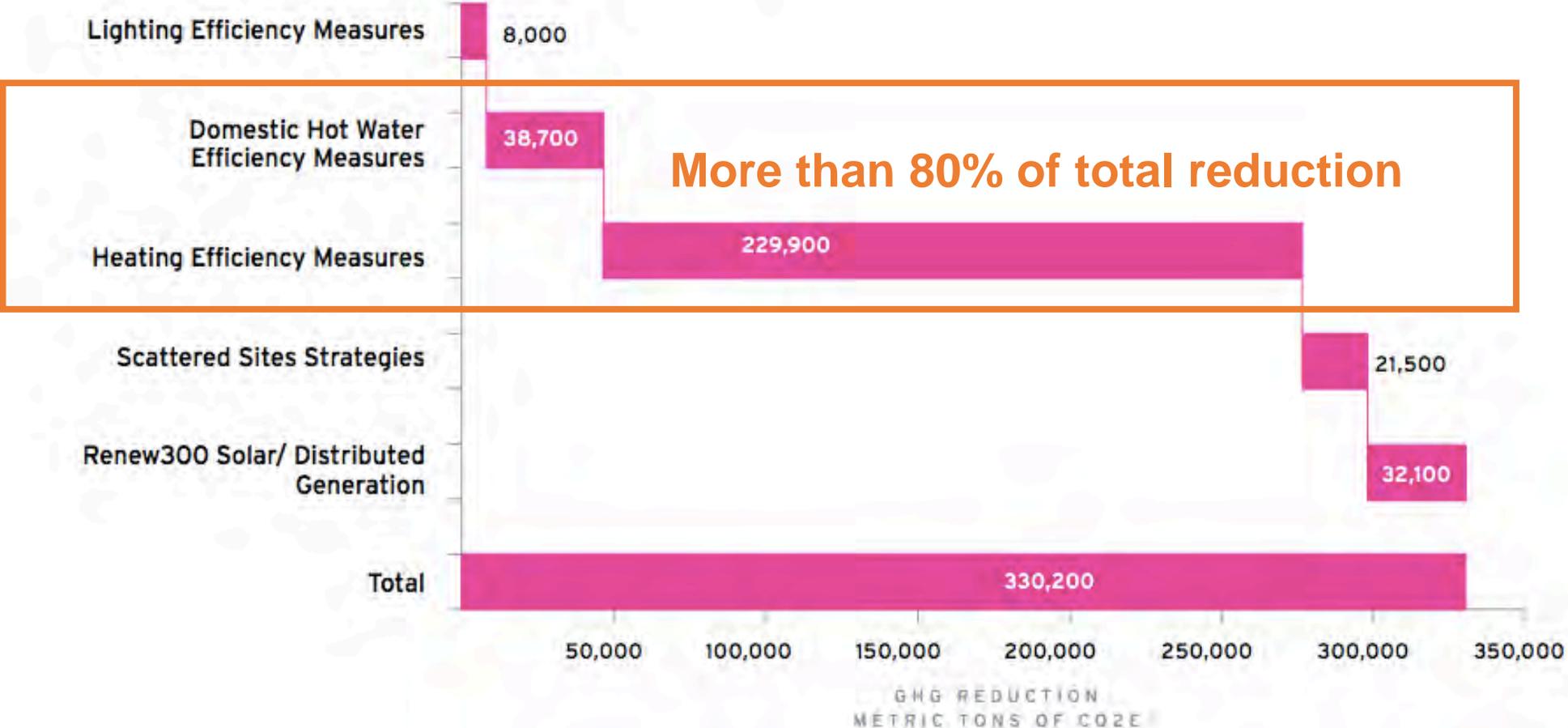


Sustainability Agenda: Climate Mitigation Commitments

- 20% reduction in energy consumption by 2025
Equivalent to removing 52,000 cars from the road
- 25 MW renewables by 2026
Equivalent to electricity demand of 4,000 homes
- 30% reduction in greenhouse gases by 2027
Part of NYC Carbon Challenge

Mid-term (2025) Goals: Improving heating/hot water efficiency is critical.

**GHG emissions reduction through 2025
by energy conservation measure**



Source: NYCHA Dept. of Energy and Sustainability

Priority Outcome: Comfortable & Reliable Heat

92%

of apartments are heated with steam, the most inefficient way to heat buildings.

1,379

boilers provide NYCHA's heat. Each has a life expectancy of 30 years. 45% are already 25+ years old.

Apartments are overheated because outdoor temperature sensors can't tell when it's hot inside—only that it's cold outside.

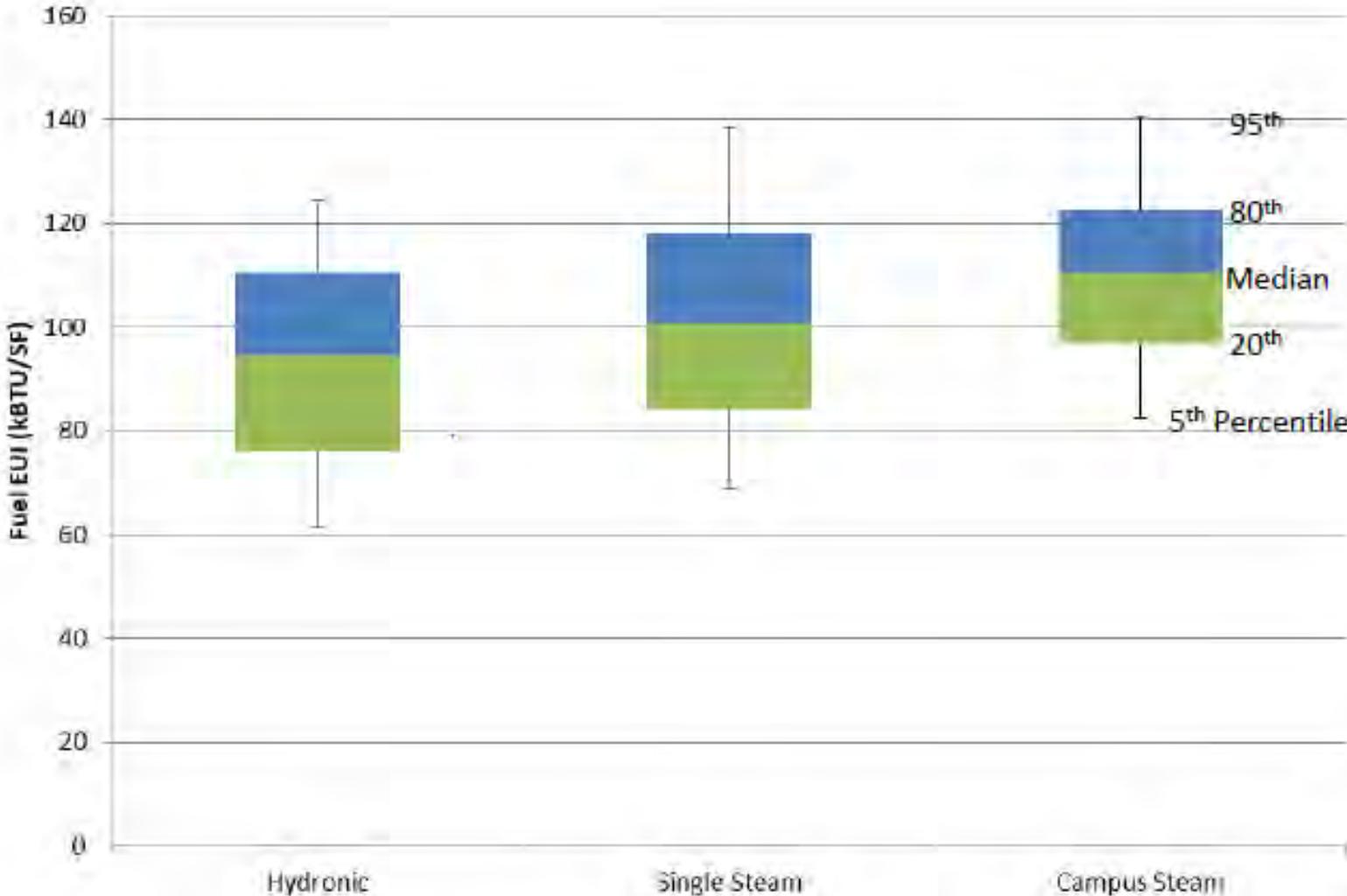
Winter-time indoor temperature



That's like keeping the lights on inside because it's dark outside—even when you're sleeping or not home.

Mid-term (2025) Goals: Mostly a question of what to do with campus steam.

10-year Average Fuel EUI

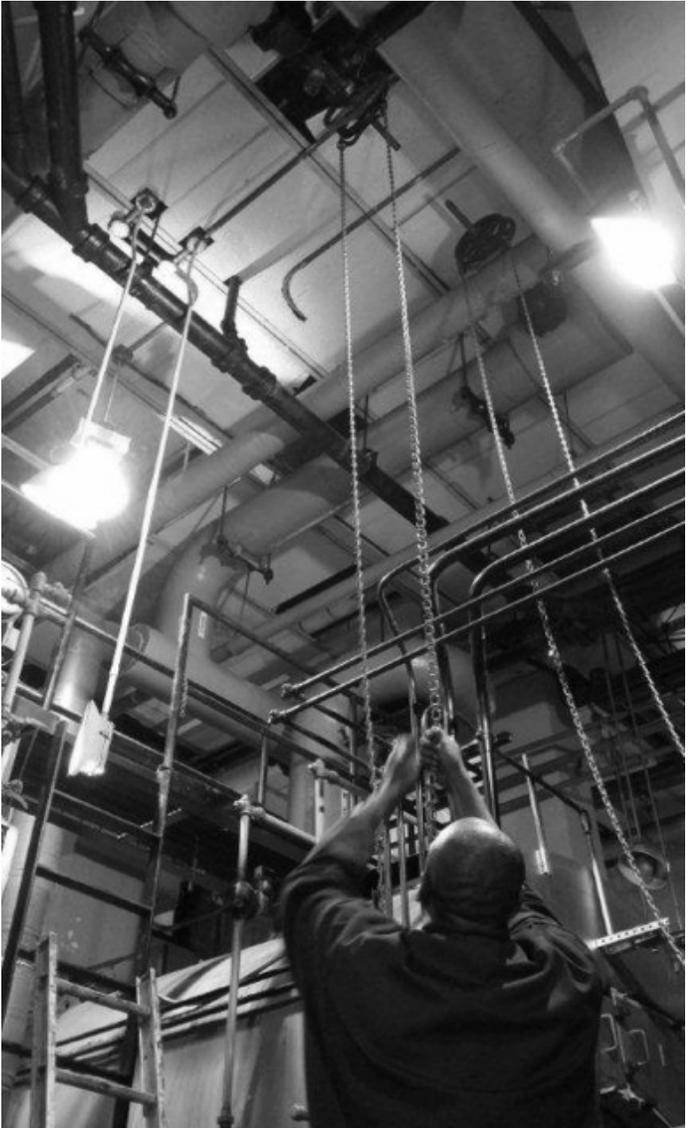
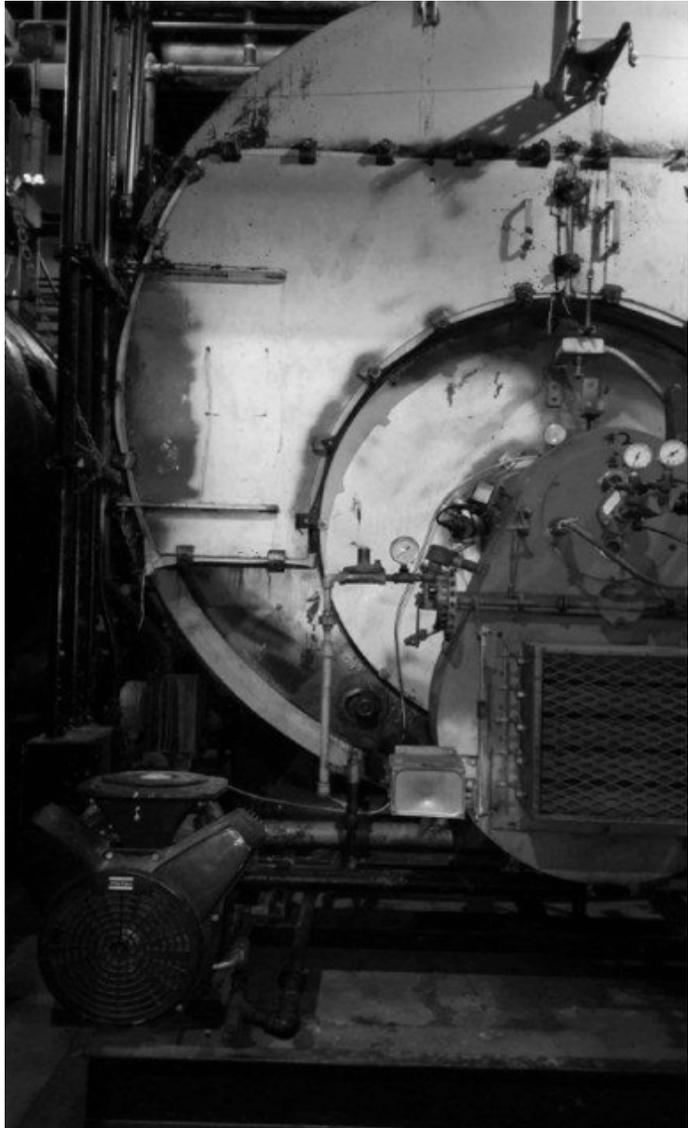
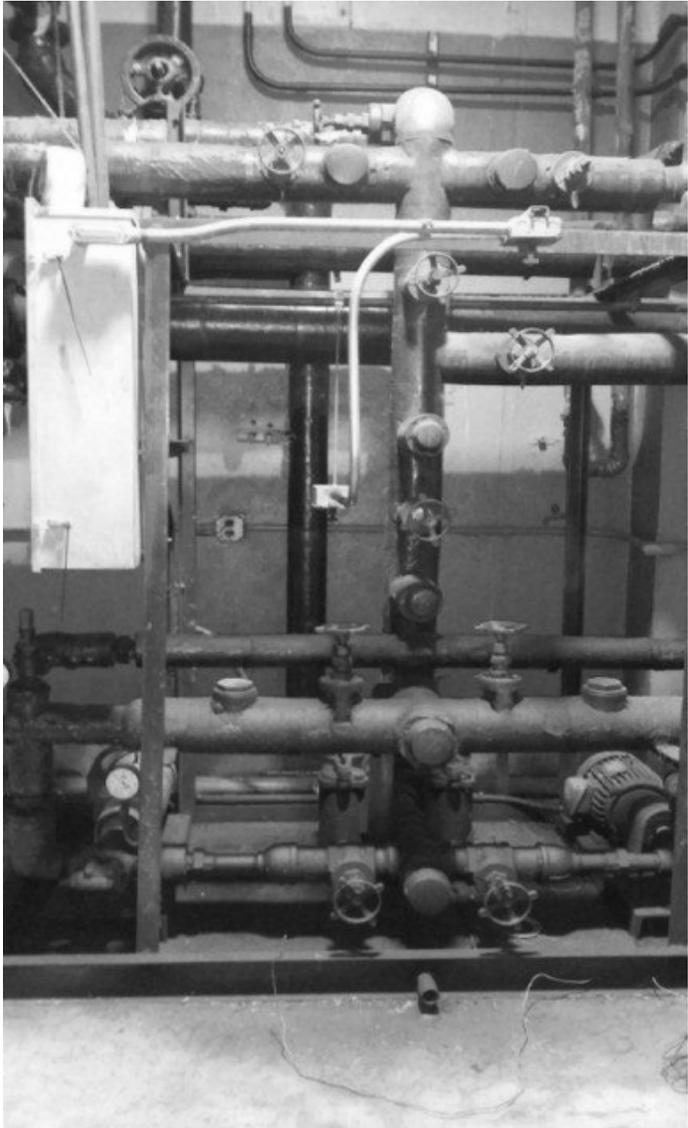


Context:

What was state of the Art in 1939...



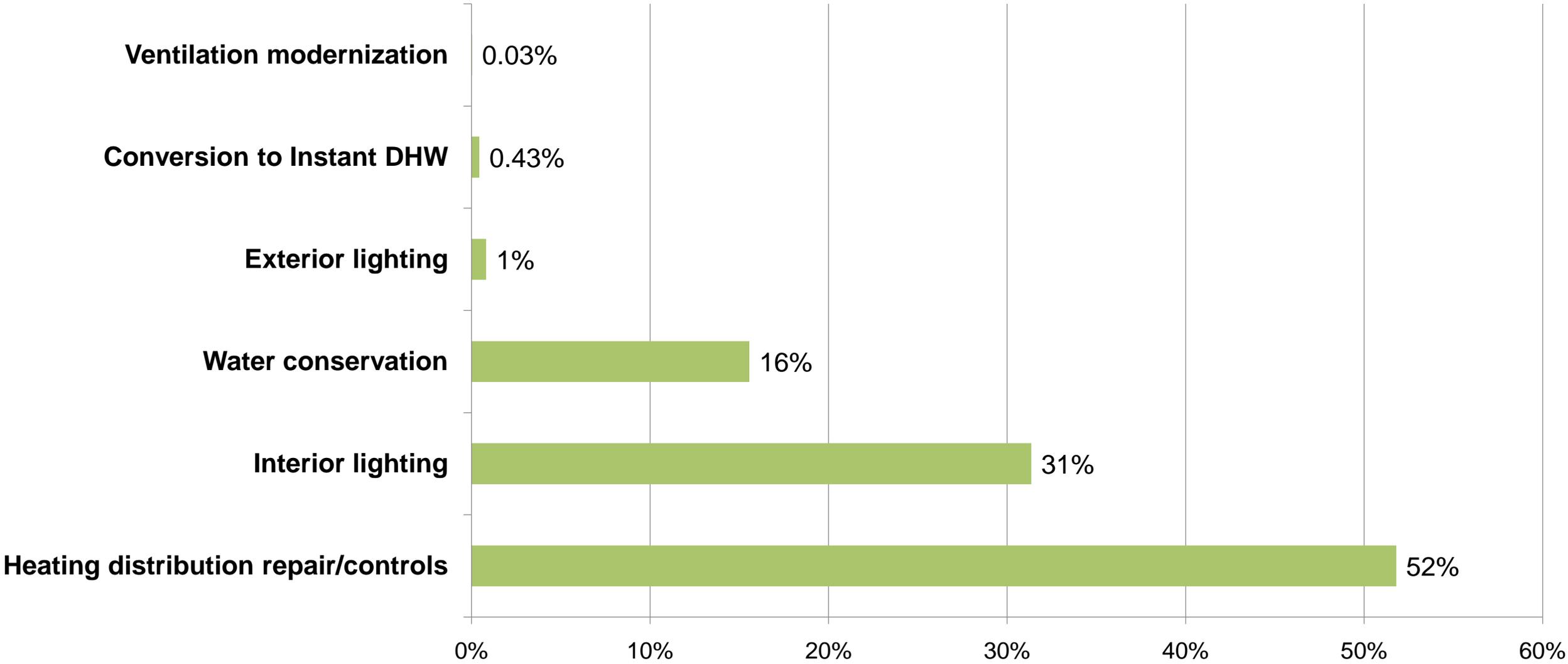
Context:
Is, unfortunately, still with us in 2017.



Mid-term (2025) Goals: Key Initiatives

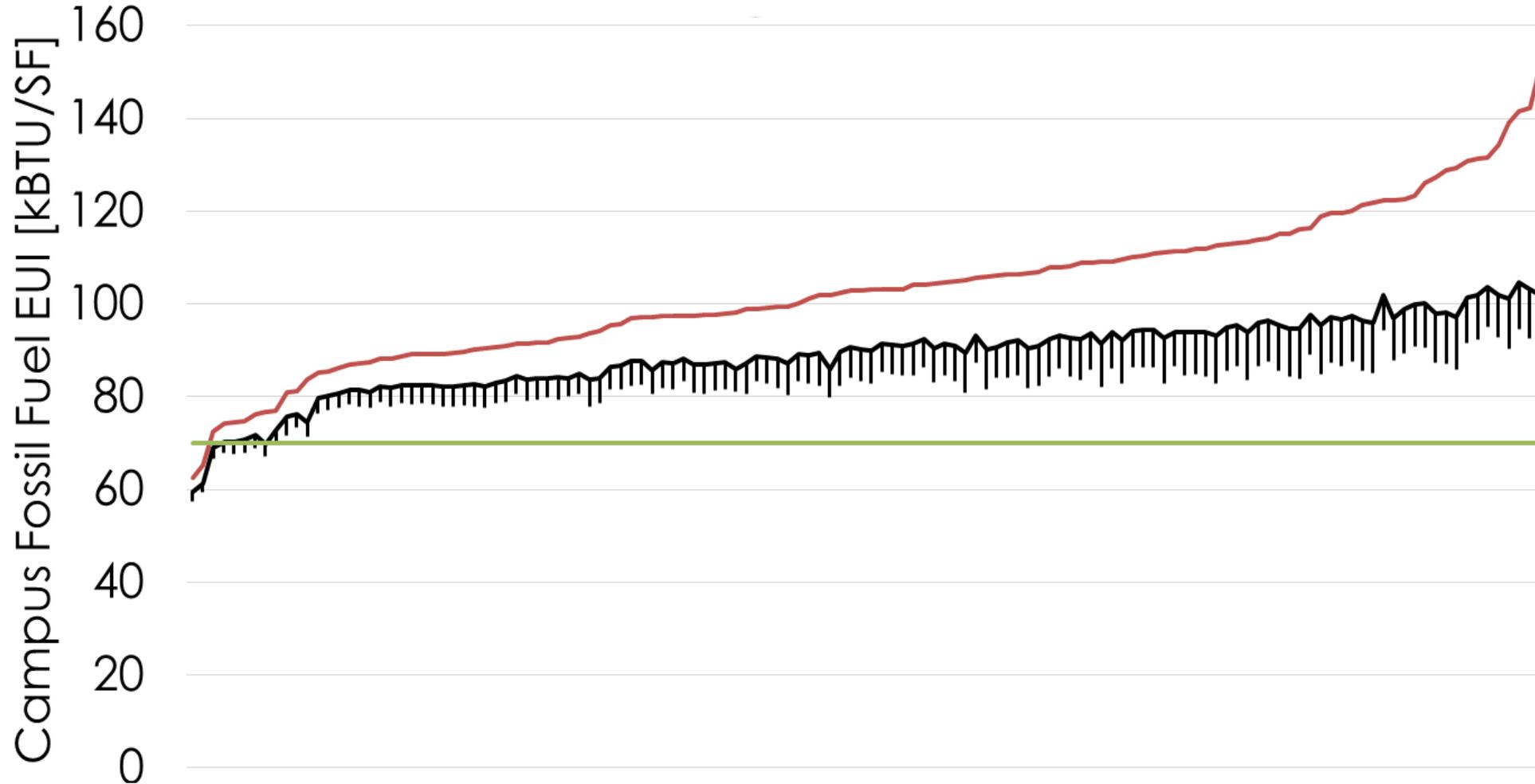
- **Basic energy reduction package in all master-planned developments through Energy Performance Contracts**
 - \$300 million goal; \$167 million approved
 - 56 developments (48,000 apartments) already approved
 - 30 developments (31,000 apartments) to be submitted in 2017
- **Comprehensive energy reduction in scattered-site developments through Weatherization Assistance Program**
 - \$30 million goal; \$1 million approved (2 pilot developments)
 - 8 developments (459 apartments) in 2017-2018 program
- **Improve heating operations through smart-building technology and operator capacity building**

Energy Performance Contracts: Typical Scope of Work



Mid-term (2035) Goals: Getting to a “new normal”

- Baseline
- New Normal
- Fuel EUI 2035 Target



Beyond the Base Package

Some alternatives, not mutually exclusive

Option 1: Comprehensive steam upgrade

- Balance distribution with TRVs and inlet orifice plates

Option 2: Decouple hot water from heating (Condensing gas DHW)

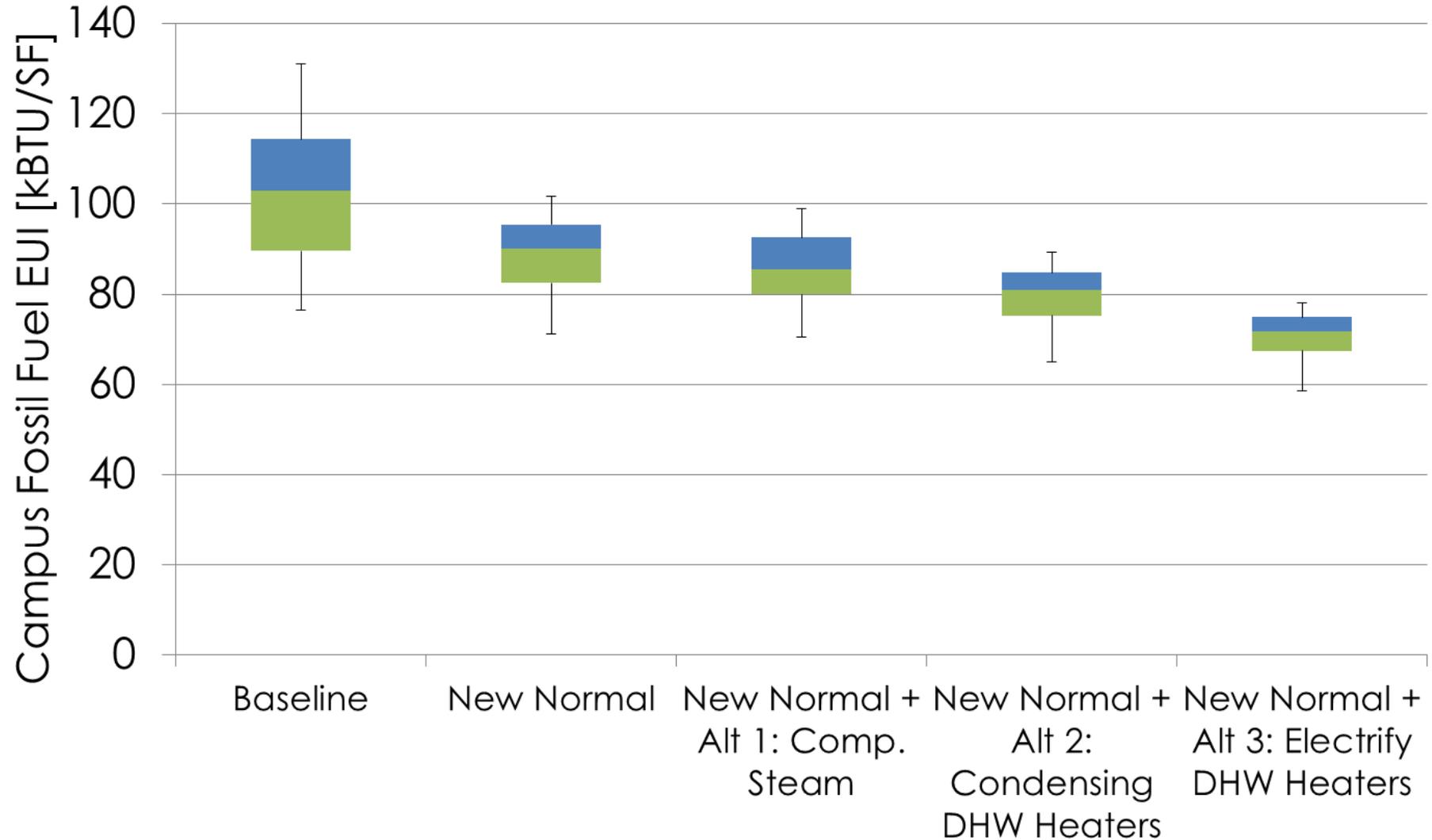
- Turn off steam distribution for 1/3 of the year

Option 3: Decouple hot water from heating (Heat pump)

- Turn off steam distribution for 1/3 of the year

Beyond the Base Package

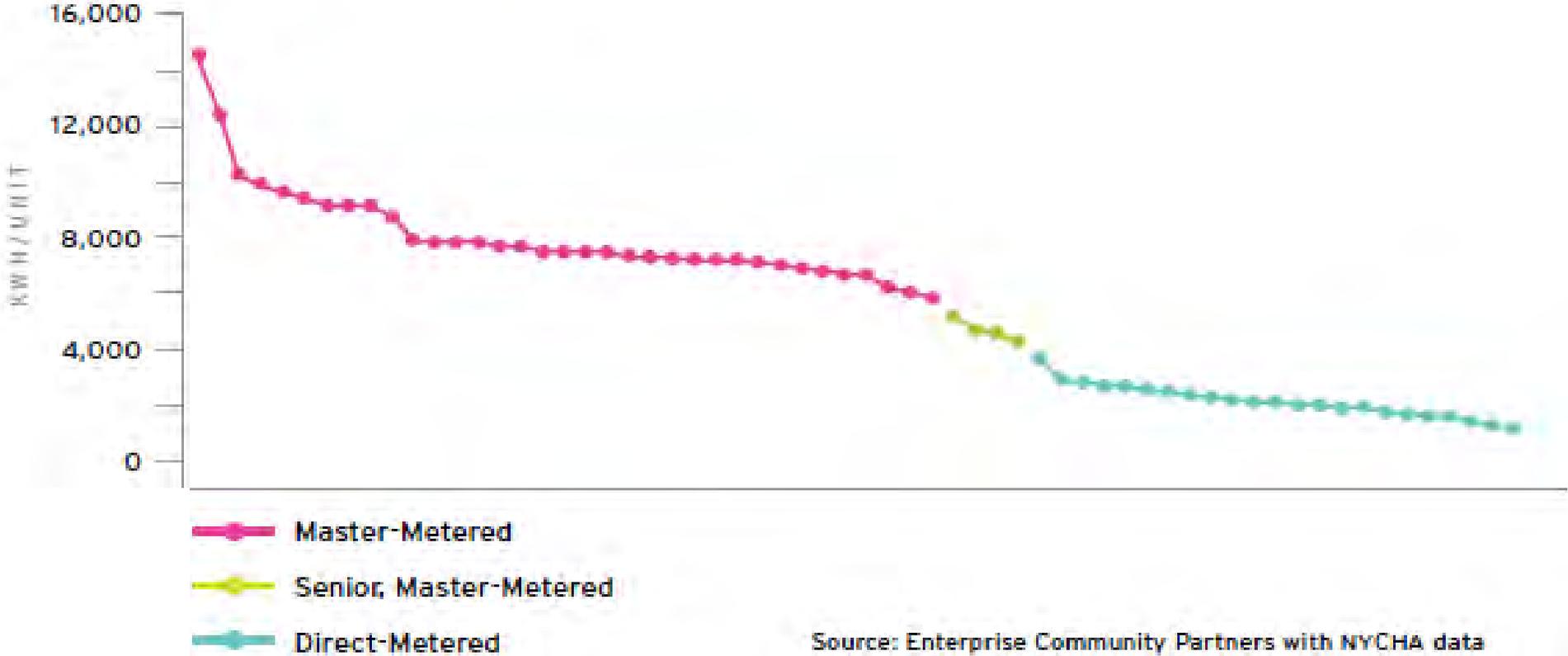
Some alternatives, not mutually exclusive



And then there is also this: Master-metered residents use a lot of electricity

Master-metered developments use 4 times the electricity of direct-metered developments

Comparison of electricity consumption at 62 developments in Brooklyn from August 2013 to July 2014



Source: Enterprise Community Partners with NYCHA data

And also this: Increased need for cooling over time as a result of Climate Change

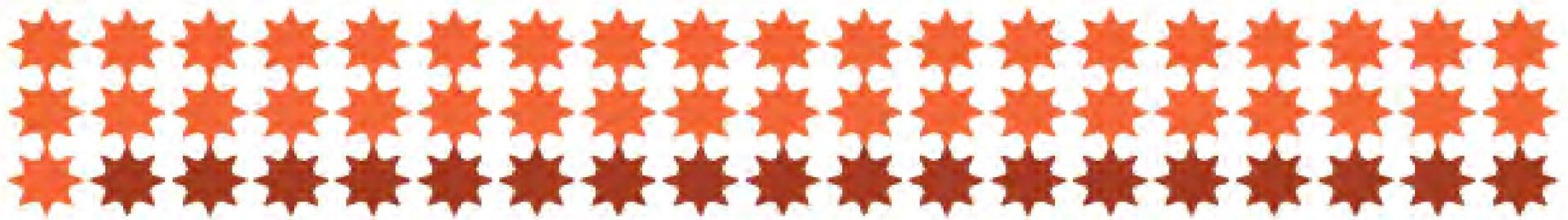
90°F days per year in New York City¹

1970–2000



18

By the 2050s (*As many as Birmingham, AL*)

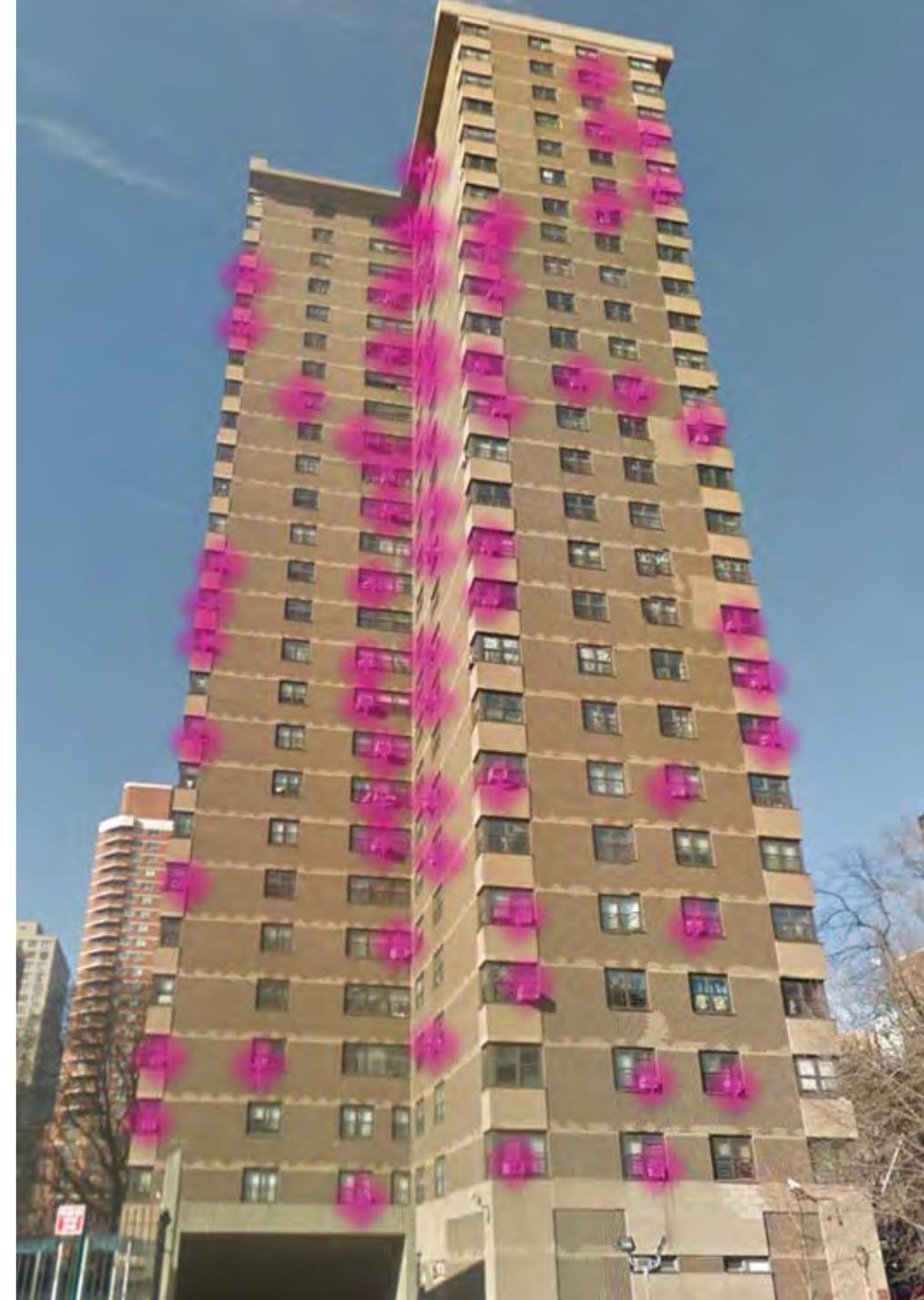


39–57

1. Average per year, New York City Panel on Climate Change

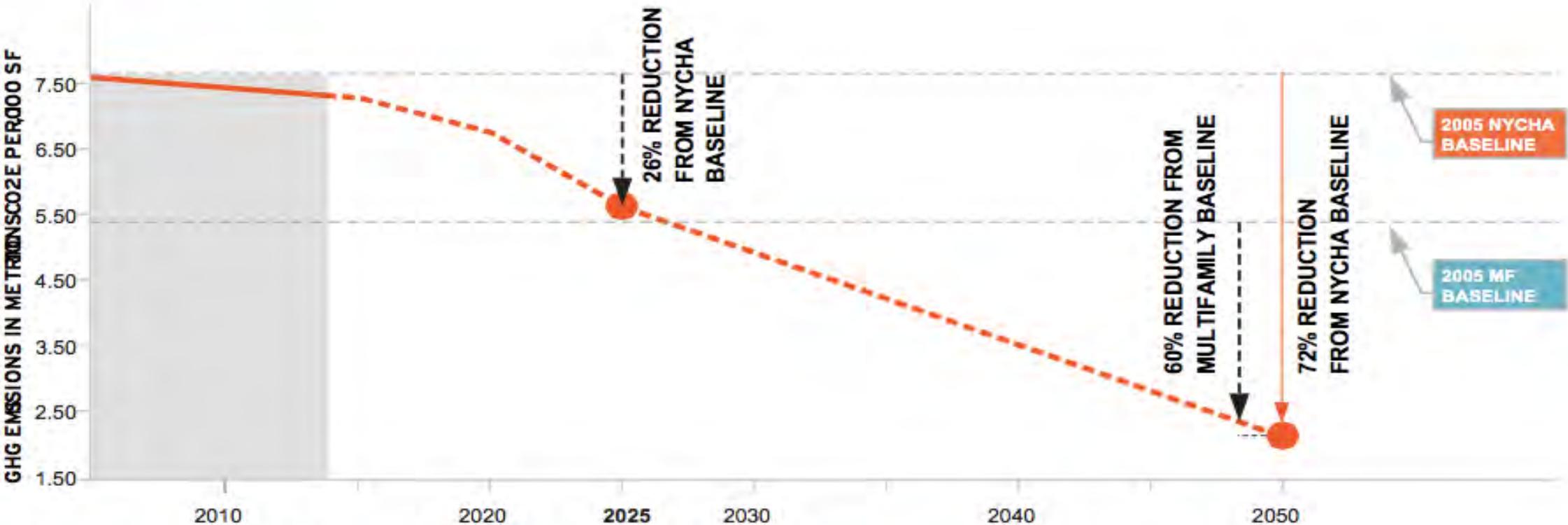
In-apartment Electric Consumption Smart AC Pilot Project (Spring 2018)

- 1.5 – 2 AC units per apartment
- Registered ACs subject to \$8-10 monthly surcharge
- Up to 85% AC units go unregistered to avoid fee
- 25% of apartments had more than the allowed number of ACs



2050 Outlook: Will we get there?

Pathway for Reductions in Greenhouse Gas Emissions from NYCHA Portfolio



Source: Mayor's Office of Sustainability and NYCHA Dept. of Energy and Sustainability

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BUILDINGENERGY NYC 2017

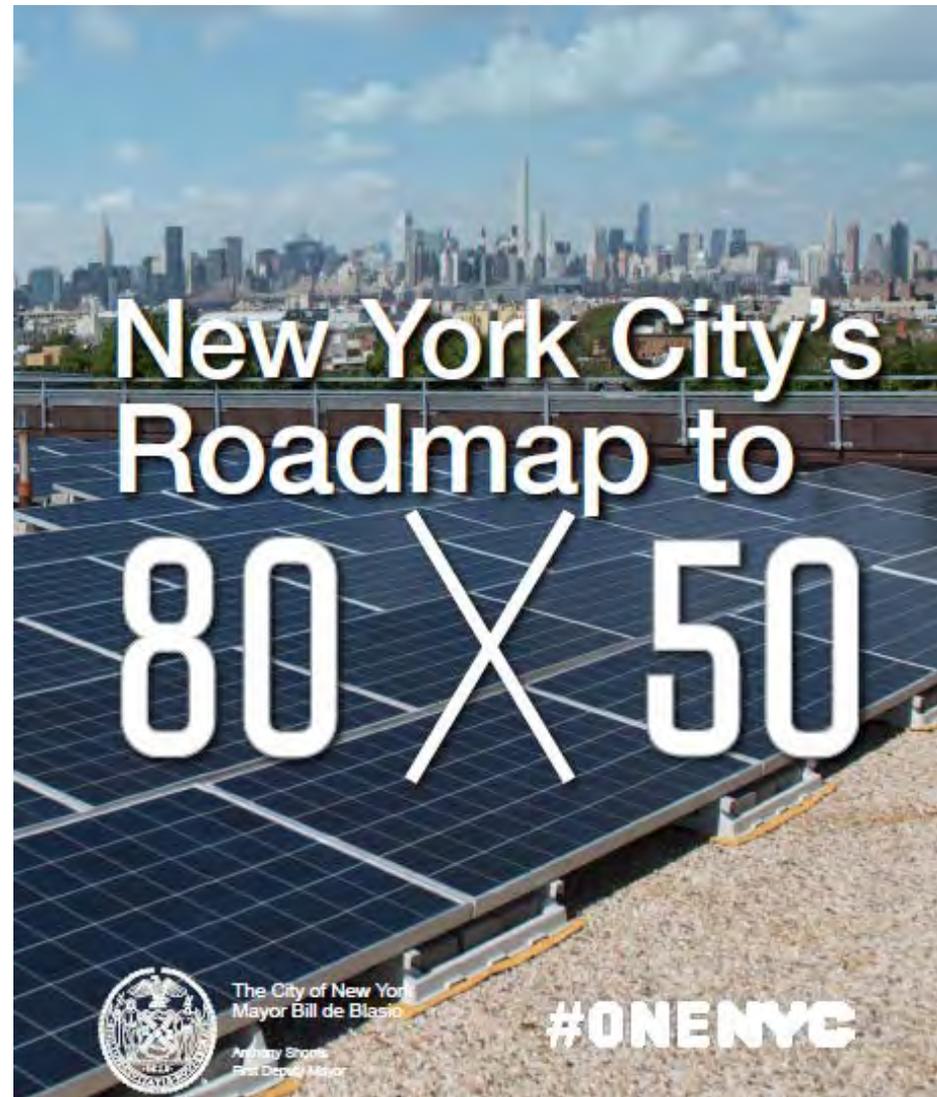
DOT ENERGY MANAGEMENT

Jessica Wurwarg and Caitlin Churchill

October 12, 2017



CITY AND AGENCY GOALS



CURRENT INITIATIVES



LED Street Light Upgrade



Upgrading street lights throughout the city, currently throughout Brooklyn, Queens, and the Bronx

Lighting Studies and Upgrades



Conducting studies and upgrading lighting in facilities and parking garages

Solar PV



Planning to install rooftop solar PV at two facilities and solar carports in garages and parking fields

Energy Audits (Facilities Condition Assessment)



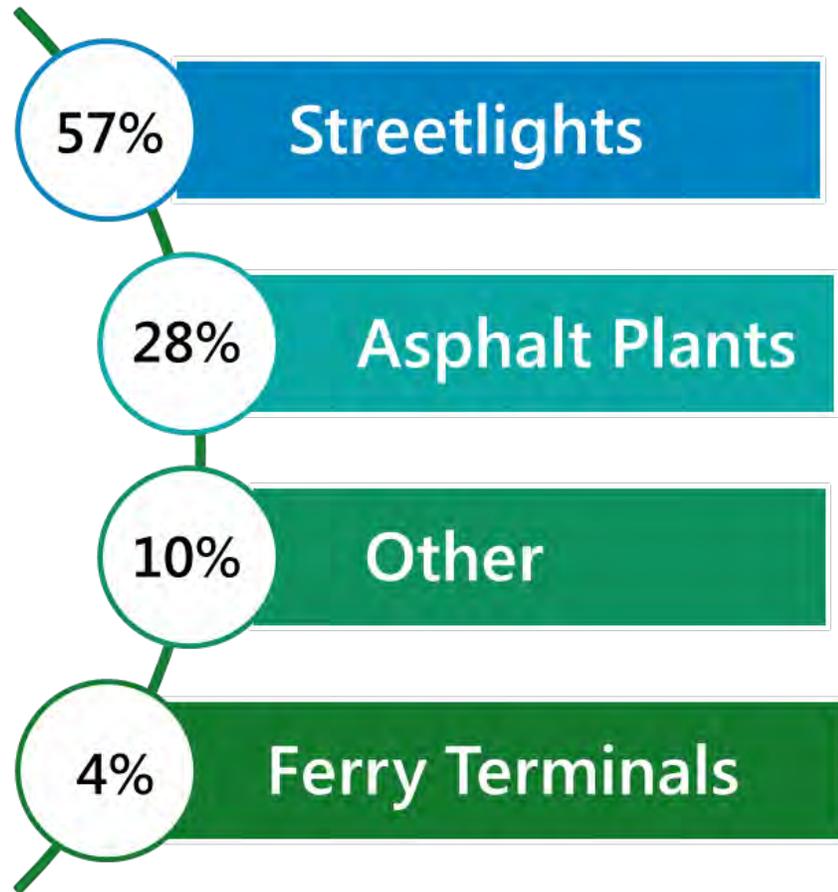
Conducting studies to identify ways to improve the efficiency of DOT facilities

Demand Response



Reducing demand at DOT facilities when the electric grid is overloaded

AGENCY ENERGY USAGE



STREET LIGHT LED UPGRADE

- Over 60% completed
- Estimated 58 million kWh savings
- Estimated \$17 million in energy and maintenance cost savings



PRIORITIES



STRATEGY, OPPORTUNITIES AND CHALLENGES



Strategy and Opportunities

- Facilities Condition Assessment and Energy Audit
- Preventative Maintenance
- LED Upgrades
- Renewable Energy
- HVAC Controls and Real Time Metering

Challenges

- Staffing
- Procurement
- Competing agency priorities



OUTREACH

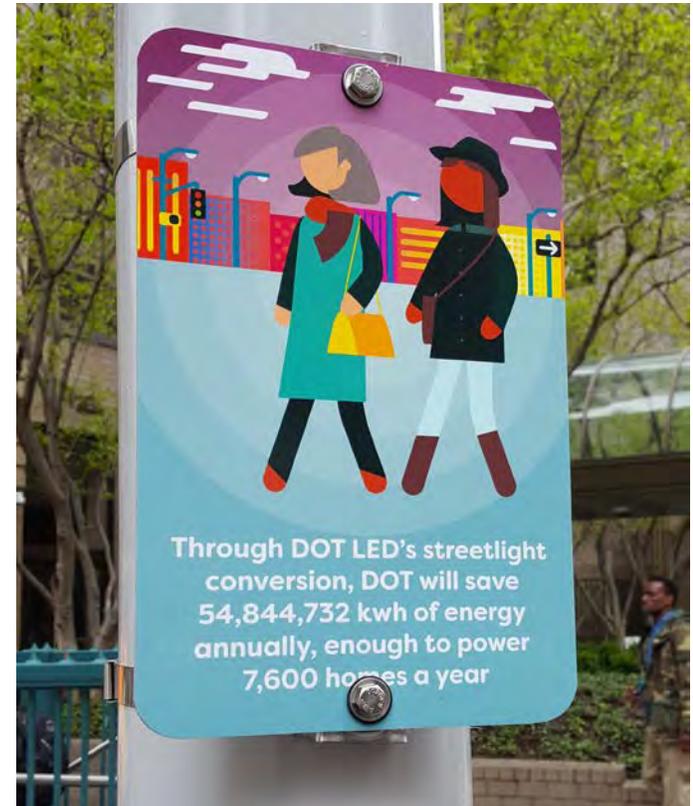


DOT Events

Conferences

Website

Public Displays



Thank you!
Questions?



Jessica Wurwarg

jwurwarg@dot.nyc.gov

Caitlin Churchill

mchurchill@dot.nyc.gov

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QUESTIONS

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