

## NYC + NYS Policy

### **Big Cities Phase Out Fossil Heating**

**Danielle Manley** Policy Manager, Urban Green Council

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Transforming buildings for a sustainable future in NYC and around the world.



## CONVENE





### BLUEPRINT FOR EFFICIENCY

THE R. P. LEWIS CO., LANSING, MICH.

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New York City's Energy and Water Use 2014 and 2015 Report October 2017

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## RESEARCH

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**R NYSERDA** 

### **DRIVES CONVERSATION AND INFORMS POLICY**



THE NEXT









90 BY 50:

ITS

DECEMBER 201





2016

ORLDWIDE

ESSONS

BUILDING

RESILIENCY

TASK

urban | green |

FORCE



## ADVOCATE

### since 2010

**BOH** PIECES OF LEGISLATION

5

## EDUCATE

36,000

PEOPLE ACROSS 57 CITIES IN THE UNITED STATES AND CANADA

## CONQUER THE GPRO

## **BUILDING ENERGY CONSUMPTION**



. Global: https://webstore.iea.org/world-energy-balancess201a-overview; https://www.bp.scintum.global/compor https://www.eia-gov/energyesolained/index.php?page=us\_energy\_use (Adjusted for 2018); https://data.cityofnewyork.us.Environment/inveniony-of-Nerv-York-City-Greenhouse-Gas-Emission/k3e2-emisg

IN THE USA

## 78% IN NEW YORK CITY

w/outlooks/aeo/data/www.set/#/?id=2-AEO2017&sou\*cekey=0

## WHY BUILDINGS MATTER

## **NYC Emissions by Source**

Transport and Waste 32% Building Gas and Oil 40%

Building Electricity and Steam 28%





## **FOCUS ON EXISTING BUILDINGS**



of New York City's carbon emissions come from energy used in buildings



of the buildings we'll have in 2050 are already built

## **GREENER BUILDINGS PLAN**

In Dec of 2009, NYC passed a suite of energy efficiency mandates

- 1. New NYC Energy Code and requires all renovations to meet the energy code
- 2. Benchmarking & transparency
- 3. Audits & retro-commissioning

4. Lighting upgrades & sub-metering

Revised and expanded in 2016

THE NEW YORK CITY GREENER, GREATER BUILDINGS PLAN

## BENCHMARKING

## Local Law 84

- Annual reporting of energy and water use
- Buildings over 25,000
- Submitted through Portfolio Manager

## ENERGY STAR® PortfolioManager®





## **ENERGY AUDITS & TUNE UPS**

## Local Law 87

- Energy audit to identify ways to save energy
- Retrocommissioning (aka "tune ups") to test and tune-up building systems for efficiency
- Buildings over 50,000 square feet
- Submitted through Energy Efficiency Report every 10 years



## LIGHTING AND SUBMETERING

### Local Law 88

- Upgrade lighting in compliance with NYC Energy Conservation Code
- Sub-metering in commercial tenant spaces, monthly energy statements
- Buildings over 25,000 square feet
- By 2025



## 80x50 Climate Target



- Local Law 66 of 2014
- Commits NYC to reduce carbon emissions 80% by 2050
- Citywide target across buildings, transportation, and waste

## Fuel Oil #6 and #4 Phase Out



Two laws phased out the use of high emitting Fuel Oils in NYC's boilers:

- Fuel Oil #6 by 2016
- Fuel Oil #4 by 2030

*New NYC bill <u>this week</u> seeks to accelerate Fuel Oil #4 timeline to 2025.* 

## **PROGRESS IN LARGE BUILDINGS**

### NYC has committed to reduce emissions 80% by 2050



**Download the report** 

### Benchmarked emissions from large buildings over time 2010-2019.

Shown as % change from 2010 levels for buildings 25k+ square feet.



## 



## **SUMMARY**



- A building performance standard
- Annual carbon caps starting in 2024 and tightening in 2030
- Flexible compliance options
- Prescriptive path for affordable housing
- Large fines for non-compliance

## WHAT'S COVERED



- Buildings larger than 25,000 SF
- 2+ buildings on same tax lot, together larger than 50,000 SF
- 2+ condo buildings with same board of managers, together larger than 50,000 SF

## FEW BUILDINGS, BUT LOTS OF IMPACT

Buildings Larger Than 25,000 sq. ft.

- About 5% of total buildings in NYC, ~50,000 buildings covered by LL97
- Nearly 60% of NYC's built area (over 3 billion SF)
- Around half of all carbon emissions from buildings



## **ANNUAL CARBON LIMITS**

## Apply to total energy used in a building

Measured in metric tons  $CO_2e$  / square foot



## **TIMELINE FOR GHG LIMITS**



## **CAPS VARY BY BUILDING TYPE**

## Different limits for 10 occupancy groups

	2024 – 2029 (kg of CO <sub>2</sub> e per SF)	2030 – 2034 (kg of CO <sub>2</sub> e per SF)
Occupancy Group R-2 (includes apartments)	6.75	4.07
Occupancy Group B (includes offices)	8.46	4.53
Occupancy Group R-1 (includes hotels)	9.87	5.26



## **BUILDING CARBON BUDGET**

Square footage × applicable limit = Annual "budget"



100,000 SF multifamily building 2024 intensity limit for multifamily (R-2) Annual building emissions limit

## **HOW OWNERS COMPLY WITH LOCAL LAW 97**

## **1. Building Improvements**

Decrease energy use

Improve energy efficiency

Electrify heating, hot water, and cooking



## **HOW OWNERS COMPLY WITH LOCAL LAW 97**

## 2. Flexible compliance options

GHG offsets (up to 10% of cap)

Renewable energy credits (local)

**Deductions for clean distributed energy** 



## **HOW OWNERS COMPLY WITH LOCAL LAW 97**

3. Pay a fine

## Up to \$268/ton CO2e annually



## **COMPLIANCE REPORTS**

## **Owners are responsible** for a building's carbon emissions

## **Compliance Reports**

- Due by May of each year
- Demonstrate carbon emissions from the year before
- Certified by registered design professional





## **OTHER NYC LAWS**

## SUSTAINABLE ROOF LAWS

### Local Laws 92 & 94, 2019

- All new construction and major roof renovations, regardless of building size
- Available roof area must be covered with a "sustainable roofing zone" of solar PV, green roof or both
- Exceptions for recreational space, mechanical equipment, setbacks, etc.



## **ENERGY EFFICIENCY GRADES**

Local Law 95, 2019 (+ LL33, 2018)

- Buildings over 25,000 SF
- Building energy grades must be posted starting October 2020
- Based on Energy Star score



## PACE LOANS (PROPERTY ASSESSED CLEAN ENERGY)

Local Law 96, 2019 (Sustainable Energy Loans)

- Up to 100% financing for energy efficiency and renewable energy projects
- Little or no money down, long terms
- Repayments sized to project savings
- Loans repaid through building's property tax bill



www.NYCEEC.com/PACE

## **ALL-ELECTRIC NEW CONSTRUCTION**

### Local Law 154, 2021

## CO<sub>2</sub> caps prohibit fossil-fuel systems in new buildings

- Jan 2024 under 7 stories
- July 2027: 7+ stories

### **Exceptions**

- Hot water delayed to July 2027, except 1-2 family homes
- Affordable housing (50%+) has longer timeline
- Certain uses exempted (labs, commercial kitchens, hospitals, etc.)



#### NYC ALL-ELECTRIC NEW/ BUILDINGS LAW/ Local Law 154

Groundbreaking legislation phases fossil fuels out of new construction starting in 2024.

#### HIGHLIGHTS

- Sets CO<sub>2</sub> limits that effectively prohibit fossil fuel systems in new buildings and gut renovations
- Phases in requirements starting with lower-rise buildings in 2024 and taller buildings in mid-2027
- Allows more time for af ordable housing and hot water systems in buildings other than one- and two-family homes
- Includes exceptions where required for select uses like manufacturing, hospitals and restaurants

Urban Green Council helped shape the law, including as lead witness testifying at the City Council <u>hearing on</u> <u>November 17, 2021 Read our written testimony</u> to see how our recommendations were incorporated into the <u>f nal law</u>.

#### IMPACT

- With few exceptions, new buildings will be all-electric, using high-performance technologies like induction stoves for cooking and heat pumps for heating, cooling and hot water
- Ef cient, all-electric buildings have lower carbon emissions and improve local air quality while making occupants more comfortable

#### WHAT DOES NEW CONSTRUCTION LOOK LIKE N NYC?

Construction rates vary signif cantly year to year, but statistics from the last decade shed light on potential impact:

- 1000 to 3000 new buildings are constructed in NYC each year. That's 35 to 45 million square feet of new building area annually<sup>1</sup>
- Most new buildings are one- and two-family homes, plus about 200 new buildings that are seven stories or higher each year
- The <u>latest NVC data</u> show that all-electric multifamily buildings are only about two percent more expensive to build, and that cost gap is closing.<sup>2</sup>

#### FIGURE 1 New York City GHG Emission Sources On-site fossil fuels are NYC's largest source of carbon collution



Source: 2019 NYC GHG Inventory

#### FOSSIL FUELS IN NYC BUILDINGS

Fossil fuel furnaces, boilers and hot water heaters cause over 40 percent of all NYC carbon emissions, more than all uses of electricity and district steam combined.<sup>3</sup>

Gas and oil f red appliances can last 15 to 20 years, locking in decades of warming emissions for every appliance installed. Electrifying space heating and hot water with highly ef cient heat pumps reduces emissions now, and emissions will continue to decline as the electric grid gets greener.<sup>4</sup>

Read more about how NYC's electric grid can support this transformation in Urban Green's latest publication, <u>Grid</u> <u>Ready: Powering NYC's All-Electric Buildings</u>.

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URBAN GREEN COUNCIL

#### Read Urban Green Council summary here



## NEW YORK STATE CLIMATE LEADERSHIP AND COMMUNITY PROTECTION ACT (CLCPA)

Economy-wide GHG mandates 40% by 2030 85% by 2050

## **Prioritizes equity**

Requires 35-40% of the benefits Of the CLCPA transition go to disadvantaged communities





## NEW YORK STATE CLIMATE LEADERSHIP AND COMMUNITY PROTECTION ACT (CLCPA)

## Statewide Clean Energy Targets

By 2025

6,000 MW solar185 TBtu on-site energy savings

By 2030

70% renewable grid6,000 MW energy storage

**By 2035** 9,000 MW offshore wind By 2040 100% zero-carbon power

## NEW YORK STATE CLIMATE LEADERSHIP AND COMMUNITY PROTECTION ACT (CLCPA)

## **Statewide Clean Energy Targets**

Renewables already in the pipeline will supply 63% of NYS power by 2030.



## **NEW RENEWABLES TO NYC ANNOUNCED**



## Champlain Hudson Power Express

New 1250 MW transmission line from Quebec
 to NYC

## **Clean Path NY**

- 3400 MW of new NYS wind and solar
- New 1300 MW transmission line to NYC

## Expected to provide 1/3 of NYC electricity needs by 2027\*

\*Compared to 2019 demand

## **SUMMARY: NYC & NYS GREEN BUILDING POLICY**

### **Foundational NYC Policies**

### Next Stage NYC Policies

### NYS Clean Energy Policies

- An efficient **energy code** that governs how buildings are designed to use energy
- Annual benchmarking of energy
   and water in large buildings
- Energy audits and tune ups in large buildings every 10 years
- Basic **lighting** upgrade requirements
- City government mandate to reduce ghg's 80% by 2050
- Requirements to phase out harmful Fuel Oils #6 and #4

- A building performance standard that sets carbon caps on NYC's large buildings
  - Energy efficiency letter grade posting requirements for large buildings
- Sustainable roof laws requiring solar panels and green roofs on new buildings
- **PACE loans** to finance green building energy efficiency and renewable projects
- All-electric new construction
   requirements

- State government ghg reduction mandate 40% by 2030 and 85% by 2050
- Statewide clean energy procurement targets
- Renewable electricity grid
   requirements

## **Thank You!**

### <u>Contact</u>

Danielle Manley Manager, Policy

Questions? Please email me at mourbangreencouncil.org



## Resource Efficient Decarbonization





# Resource Efficient Decarbonization (RED) is a heuristic emerging from Empire Building Challenge collaboration



## **Resource Efficient Decarbonization**



# Enabling steps in tall buildings can overcome heat pump size and cost barriers.

Review	<ul> <li>Disaggregate time-of-use profiles to identify heat waste and recovery opportunities and to right-size equipment.</li> </ul>
Reduce	<ul><li>Repair, upgrade and refresh envelopes.</li><li>Optimize controls.</li></ul>
Reconfigure	<ul> <li>Eliminate or reduce inefficient steam and forced air distribution.</li> <li>Create thermal networks and enable heat recovery.</li> <li>Lower supply temperatures to ranges of optimal heat pump performance.</li> <li>Segregate and cascade supply temperatures based on end-use.</li> </ul>
Recover	<ul> <li>Simultaneous heating &amp; cooling in different zones of building</li> <li>Eliminate "free cooling" economizer modes</li> <li>Exhaust heat recovery; sorbent air cleaning</li> <li>Building wastewater heat recovery</li> <li>Municipal wastewater heat recovery</li> <li>Steam condensate</li> <li>Refrigeration heat rejection.</li> <li>Other opportunistic heat recovery and heat networking.</li> </ul>
Store	<ul> <li>Store rejected heat from daytime cooling, for overnight heating.</li> <li>Store generated heat— centrally, distributed, or in the building's thermal inertia.</li> <li>Deploy advanced urban geothermal and other district thermal networking solutions.</li> </ul>

## Taxonomy of heat pumps to **Replace/Remove** fossil fuel heat capacity

Central Plants	• Air-to-air • Air-to-water	
	• Air source domestic hot water (e.g. CO2 refrigerant) • Ground source	
	Storage-source, wastewater-source	
	Heat Recovery Chiller (water-to-water)	
Distribution System	Water-to-Air     Water-to-Water	
	<ul><li>Variable refrigerant flow (VRF)</li><li>Hybrid VRF (water distribution)</li></ul>	
Distributed Standalone	<ul> <li>Packaged terminal heat pumps</li> <li>Mini-split single-zone/multi-zone heat pumps</li> <li>Unitary domestic hot water heat pumps</li> </ul>	
	<ul> <li>Split domestic hot water heat pumps</li> </ul>	

# A whole-system, thermal network approach to clean heat in cold-climate tall buildings:



# A Strategic Decarbonization Assessment is a critical step in the process.

A Strategic Decarbonization Assessment (SDA) is a long-term financial planning tool for building owners to manage carbon emissions and energy use.



- Develop your decarbonization term (years)
- Feed in your baseline starting point
- Define a business-as-usual path and analyze divergence from this
- Develop Discounted Cash Flow model of different investment scenarios with as much detail as possible
- Value non-energy benefits
- Near-term years require more accuracy and detail
- Long-term years are more directional
- Phase-in is critical





High Rise, Low Carbon Series



https://www.nyserda.ny.gov/ebc

## **Empire Building Playbook:** An Owner's Guide to Low Carbon Retrofits

https://knowledge.nyserda.ny.gov/display/EBF



https://be-exchange.org/high-rise-low-carbon-series/

## Global collaboration opportunity!

Governor Hochul Announces \$9.5 Million to Establish the Empire Technology Prize Program and Advance Building Decarbonization in New York State

## **Thank You**

Connect With Us www.nyserda.ny.gov/EBC EBC@nyserda.ny.gov

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