

Climate Resilient Design and Sustainability Planning

May 19th, 2025



Agenda

- Introduction
- Office Overview
- Adaptation: Designing Resilient Buildings and Infrastructure
- Sustainability: Electrification, Efficiency, and Decarbonization

Overview: NYC Mayor's Office of Climate & Environmental Justice

What is the Mayor's Office of Climate & Environmental Justice?

The Mayor's Office of Climate and Environmental Justice (MOCEJ) is committed to doing the critical work of **addressing climate change** in our city with a focus on **equity, justice, and public health**. By leading the city's strategy to confront our climate crisis, we're creating a **more sustainable and resilient future** for the 8.3 million people who call our five boroughs home and for future New Yorkers.

Our Three Main Areas of Work



Resilient & Sustainable Buildings



Adapting & Transitioning Infrastructure



Working with Communities

We are addressing climate risks in our buildings, infrastructure, and communities



EXTREME HEAT

Projected 4x more heat waves by the 2080s



EXTREME RAINFALL

Up to 22% more precipitation by the 2080s



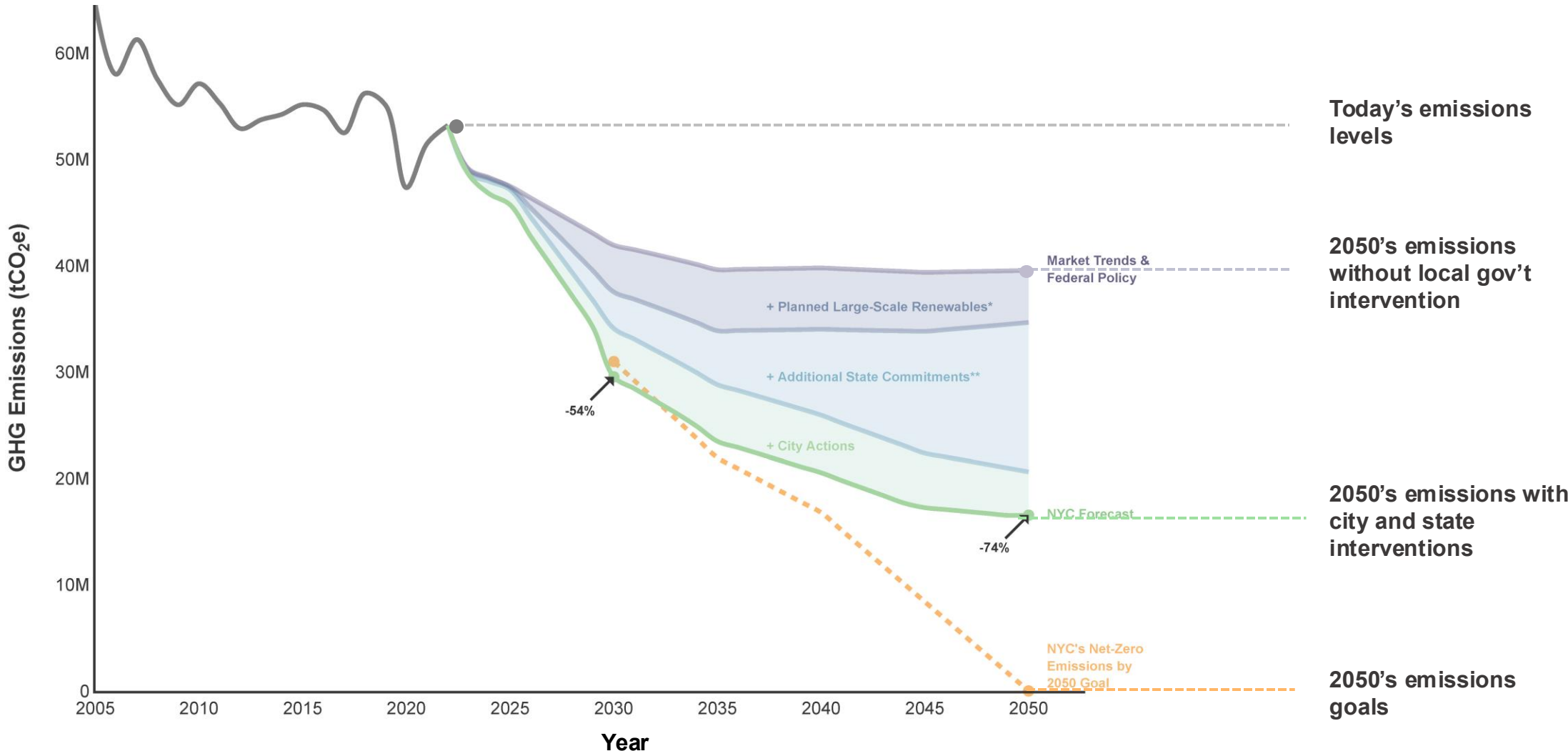
CHRONIC TIDAL FLOODING

Up to 3.75 feet of sea level rise by the 2080s



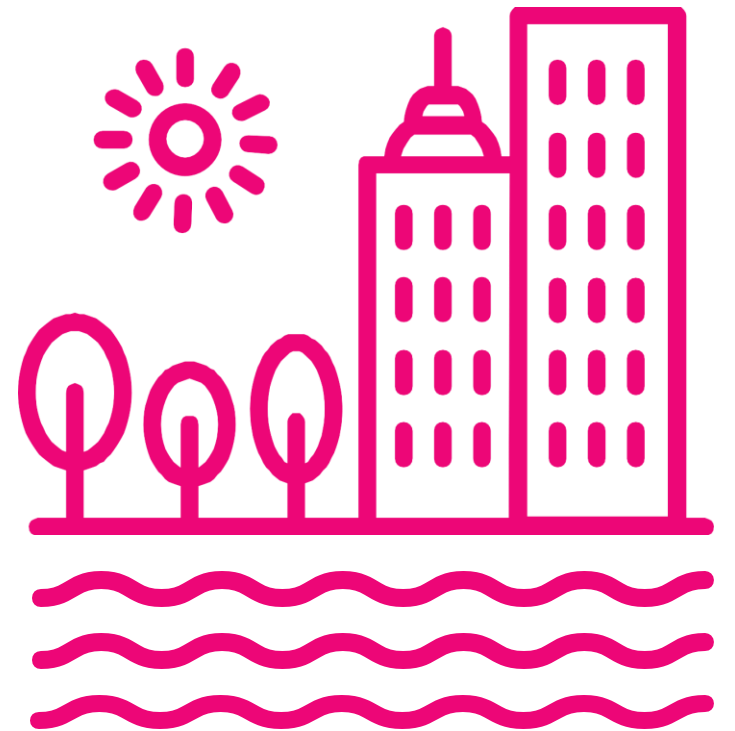
COASTAL SURGE FLOODING

We're advancing policies to reduce the city's carbon emissions, with a goal of net zero by 2050



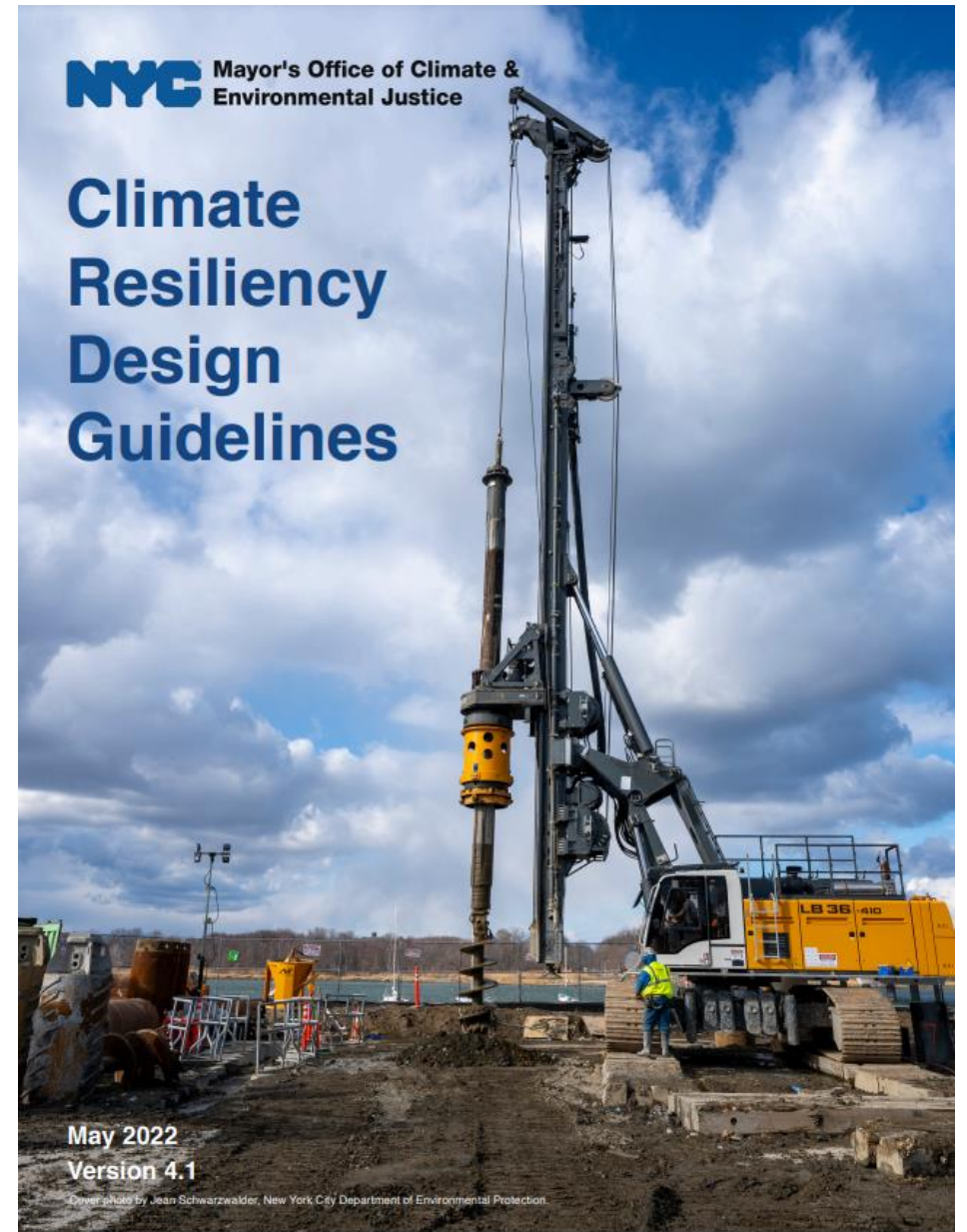
Adaptation: Designing Resilient Buildings & Infrastructure

Local Law 41 (2021): Climate Resiliency Design Guidelines



Climate change data used in design improves the performance of capital projects

- **Goal of the Climate Resiliency Design Guidelines:** establish consistent approach for using forward-looking climate change data across the City capital plan
- **Addresses multiple hazards:** 1) extreme heat, 2) extreme rainfall, 3) tidal inundation with sea level rise, and 4) coastal storms.
- **For City of New York capital projects,** including new builds and substantial improvements
- **All types of capital projects:** buildings, infrastructure, and landscapes



The Guidelines differentiate between short and long-lived facilities and components

Table 1 – Facilities and components and associated climate change projections	
Climate change projections (time period covered)	Examples of building, infrastructure, landscape, and components grouped by typical useful life
2020s (through to 2039)	<p><i>Temporary or rapidly replaced components and finishings</i></p> <ul style="list-style-type: none"> • Interim and deployable flood protection measures • Asphalt pavement, pavers, and other ROW finishings • Green infrastructure • Street furniture • Temporary building structures • Storage facilities • Developing technology components (e.g., telecommunications equipment, batteries, solar photovoltaics, fuel cells)
2050s (2040-2069)	<p><i>Facility improvements, and components on a regular replacement cycle</i></p> <ul style="list-style-type: none"> • Electrical, HVAC, and mechanical components • Most building retrofits (substantial improvements) • Concrete paving • Infrastructural mechanical components (e.g., compressors, lifts, pumps) • Outdoor recreational facilities • At-site energy equipment (e.g., fuel tanks, conduit, emergency generators) • Stormwater detention systems
2080s (2070-2099)	<p><i>Long-lived buildings and infrastructure</i></p> <ul style="list-style-type: none"> • Most buildings (e.g., public, office, residential) • Piers, wharfs, and bulkheads • Plazas • Retaining walls • Culverts • On-site energy generation/co-generation plants
2100+	<p><i>Assets that cannot be relocated</i></p> <ul style="list-style-type: none"> • Major infrastructure (e.g., tunnels, bridges, wastewater treatment plants) • Monumental buildings • Road reconstruction • Subgrade sewer infrastructure (e.g., sewers, catch basins, outfalls)

Climate Hazard Exposure Informs the Basis of Design

- Identify and assess climate change-related hazards and risks **early in scoping/planning**
- Simple point system based on **yes/no questions**
- Determine if using the CRDG is necessary for your project
- **Understand high-level severity** of exposure to climate risk

Exposure Screening Tool											
Risk Screening Question	Directions	Answers and Score	Total Score and Heat Steps								
Does the facility include new construction or substantial improvements to the landscape, hardscape, roof, HVAC, building envelope, ventilation system, or façade?	All parts of NYC are required to adhere to the "New Construction or Substantial Improvements" (NCSI) code change to the landscape, hardscape, roof, HVAC, building envelope, ventilation system or façade used after the material completion of the building envelope components.	Yes = 1 No = 0	<table border="1"> <thead> <tr> <th>Total Score</th> <th>Exposure Rating</th> </tr> </thead> <tbody> <tr> <td>0-5</td> <td>Low</td> </tr> <tr> <td>6-8</td> <td>Medium</td> </tr> <tr> <td>9-10</td> <td>High</td> </tr> </tbody> </table>	Total Score	Exposure Rating	0-5	Low	6-8	Medium	9-10	High
Total Score	Exposure Rating										
0-5	Low										
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9-10	High										
Is the facility in a community district with high heat vulnerability?	Identify the community district your facility is located in using the Community District Heat Vulnerability Index (CDHVI) tool on the Department of City Planning website. Select the community district.	Heat Vulnerability Score: Low = 1 Moderate = 2 High = 3	<table border="1"> <thead> <tr> <th>Total Score</th> <th>Exposure Rating</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Low</td> </tr> <tr> <td>1</td> <td>Medium</td> </tr> <tr> <td>2</td> <td>High</td> </tr> </tbody> </table>	Total Score	Exposure Rating	0	Low	1	Medium	2	High
Total Score	Exposure Rating										
0	Low										
1	Medium										
2	High										
How many annual heat waves are projected to occur during the facility's useful life?	See Section 4.4 of the Guidelines and use the number of days of the facility. Select the corresponding answer.	# of heat waves: 2 days = 1 4 days = 2 7 days = 3 9 days = 4	<table border="1"> <thead> <tr> <th>Total Score</th> <th>Exposure Rating</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low</td> </tr> <tr> <td>2</td> <td>Medium</td> </tr> <tr> <td>3</td> <td>High</td> </tr> </tbody> </table>	Total Score	Exposure Rating	1	Low	2	Medium	3	High
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2	Medium										
3	High										
Does the facility require a new CRDG with connection, or a modification to the existing connection plan?	Use intensity and frequency of precipitation events and projected to increase above 40 inches per year, among other criteria, to the local government's plan. The local government's plan should include a risk assessment for the facility and a connection plan to the sewer system. If a project is a new construction, the CRDG for the project is a new construction. If a project is a substantial improvement, the CRDG for the project is a substantial improvement. The CRDG for the project is a substantial improvement. The CRDG for the project is a substantial improvement.	Yes = 1 No = 0	<table border="1"> <thead> <tr> <th>Total Score</th> <th>Exposure Rating</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low</td> </tr> <tr> <td>2</td> <td>Medium</td> </tr> <tr> <td>3</td> <td>High</td> </tr> </tbody> </table>	Total Score	Exposure Rating	1	Low	2	Medium	3	High
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Does the site have a history of flooding during precipitation events?	Consult historical knowledge of the area. If the site flooded during historic events, or if it is adjacent to a water body, the site has a history of flooding. If the site has a history of flooding, the site has a history of flooding.	Yes = 1 No = 0	<table border="1"> <thead> <tr> <th>Total Score</th> <th>Exposure Rating</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low</td> </tr> <tr> <td>2</td> <td>Medium</td> </tr> <tr> <td>3</td> <td>High</td> </tr> </tbody> </table>	Total Score	Exposure Rating	1	Low	2	Medium	3	High
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Has there been a 100-year flood in the area as a result of the project?	Refer to community maps of 100-year flood events on the Department of City Planning website. If the project is located in a 100-year flood event, the project is located in a 100-year flood event.	Yes = 1 No = 0	<table border="1"> <thead> <tr> <th>Total Score</th> <th>Exposure Rating</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low</td> </tr> <tr> <td>2</td> <td>Medium</td> </tr> <tr> <td>3</td> <td>High</td> </tr> </tbody> </table>	Total Score	Exposure Rating	1	Low	2	Medium	3	High
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Does the facility include new construction of, or substantial improvements to, the landscape, hardscape, roof, HVAC, building envelope, ventilation system, or façade?

- Yes = 1 or No = 0

Is the facility in a census tract with high heat vulnerability?

- 1-5 HVI

How many annual heat waves are projected to occur during the facility's useful life?

- 2 days = 1
- 4 days = 2
- 7 days = 3
- 9 days = 4

NYC Flood Hazard Mapper

NYC Department of City Planning

Click to Change Map Layer

Layers

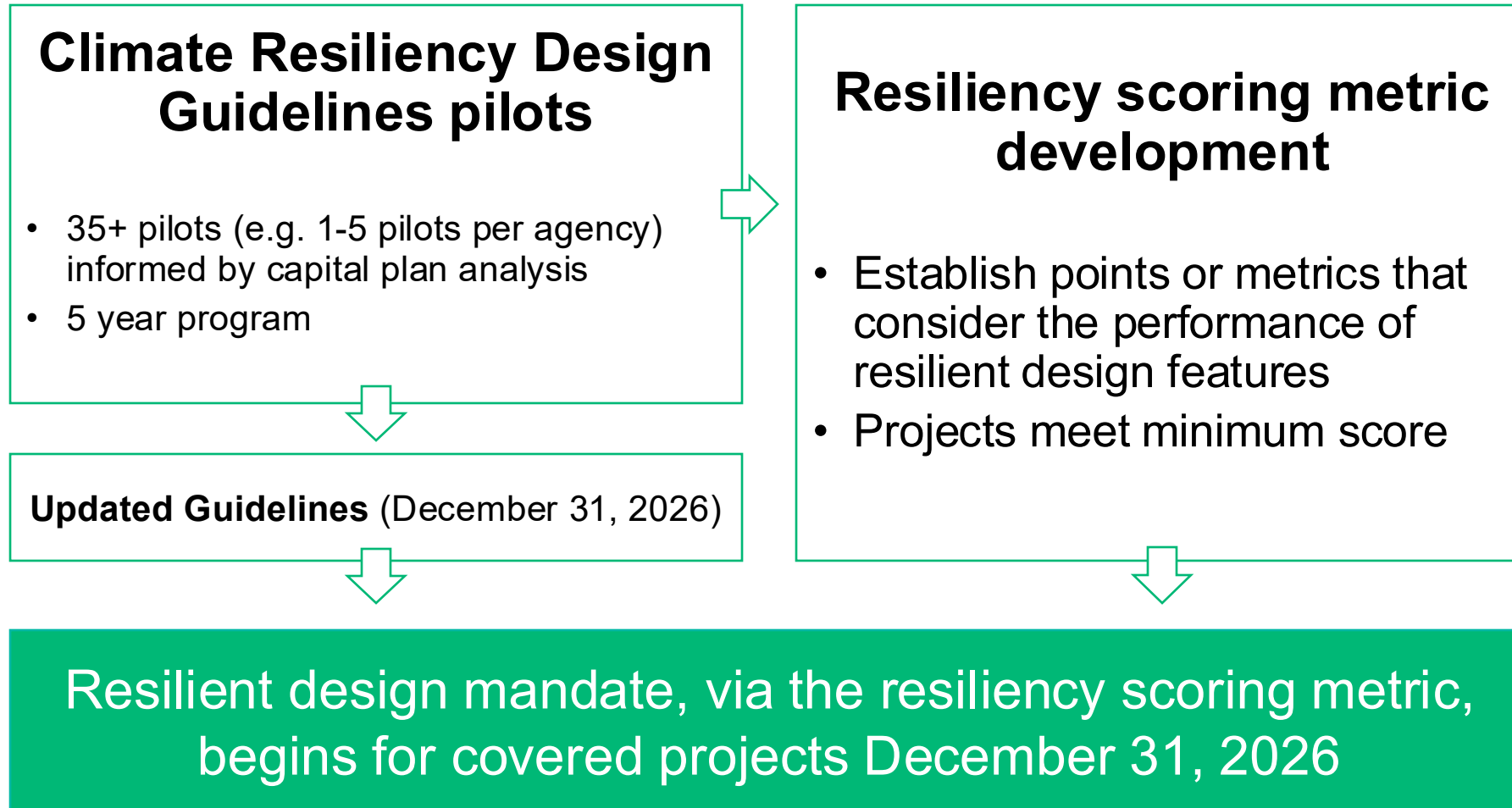
- Preliminary Flood Insurance
- Effective Flood Insurance Rate
- Limit of Moderate Wave Act
- Base Flood Elevation (2015)
- High Tide 2020s
- High Tide 2050s
- High Tide 2080s
- High Tide 2100
- Future Floodplain 2020s

Total Score	Exposure Rating
2-5	Low
6-8	Medium
9-10	High

The Guidelines offer multiple strategies for addressing climate risks

Climate Stressor	Example Design Strategy
Heat	Improve solar reflectance
	Add trees and shading canopies
	Maximize green space
	Upsize and improve HVAC redundancy
	Add energy recovery ventilation
Precipitation	Rain gardens
	Permeable pavements
	Infiltration trenches
	Green roofs
	Cloudburst design
Sea Level Rise	Elevate
	Wet floodproof
	Dry floodproof
	Protect critical equipment
	Deployable flood barriers

From Pilot to Local Law 41 Implementation



CRDG Pilot Cohort

Participating Agencies	
1. ACS	13. EDC
2. BPL	14. FDNY
3. CUNY	15. HHC
4. DCAS	16. HPD
5. DCLA	17. HRA
6. DDC	18. NYCHA
7. DEP	19. NYPD
8. DFTA	20. NYPL
9. DOC	21. Parks
10. DOHMH	22. QPL
11. DOT	23. SCA
12. DSNY	

Partnering with additional agencies, including: DOB, DCP, NYCEM, OEC, OMB, and begin a process to engage **external stakeholders**



Conceptual rendering taken from *Rainproof NYC*

CRDG Pilot Project Characteristics

Mandated Criteria in LL41 (2021)	Current Pilot Cohort Characteristics
At least 35 pilots	37 pilots
Variety of capital costs	Highest: \$1B (New Manhattan Detention Facility) Lowest: \$6M (Jefferson Houses Playground)
At least four projects per borough	4 Bronx 9 Brooklyn 9 Manhattan 9 Queens 2 Staten Island 4 Other (Upstate/Pending)
New Construction & Substantial Improvement	40% New Construction 35% Substantial Improvements 16% Improvements to Existing Infrastructure
Range of Useful Lives	0 pilots have a useful life under 10 years 66% of pilots have a useful life 10 to 50 years 34% of pilots have a useful life over 50 years
Criticality	45% Critical 55% Non-Critical
35% in Environmental Justice Areas	46% of pilots

Applying CRDG Guidance: Jackson Heights Library Expansion (QPL)

Climate Hazard Exposure: Increasing Heat and Precipitation

CRDG Design Solutions		
Climate Exposure	Site Design	Building Design
Increasing Heat	<ul style="list-style-type: none"> Maximize shade, vegetated surfaces, tree planting Light colored pavements 	<ul style="list-style-type: none"> Increased insulation and airtightness with high performance glazing Max energy efficiency of building and site systems Passive solar cooling and ventilation Climate informed HVAC designed to 2050 heat projections (space layout optimization, system scalability, improved controls) Solar + storage <p><i>*Community cooling center</i></p>
Increasing Precipitation	<ul style="list-style-type: none"> Green infrastructure; permeable pavements Climate-informed on-site stormwater detention sizing Rainwater harvest 	<ul style="list-style-type: none"> Elevation of critical equipment and assets Perimeter flood mitigation for flash flooding Roof drainage designed for future precip (loading, green roof sizing) Deployable floodwater pumps Back-up power redundancy for critical systems

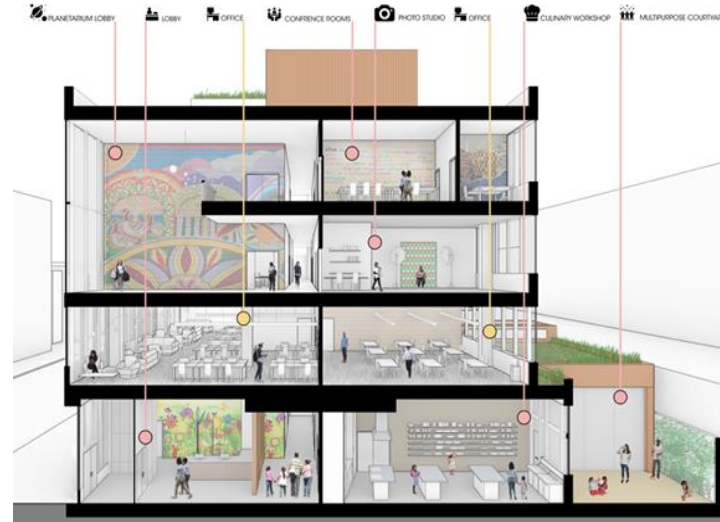


Select CRDG Projects in Development



HPD: "Powerhouse Apartments," Mott Haven

- Meets multiple City goals: CRDG and Passive House criteria; MEA "24 in 24" housing plan
- From parking lot to fully- electric, deeply affordable homes, including for highly vulnerable populations
- Includes a hub for community gatherings, cultural events, and workforce dev.



DDC/HRA : Brownsville Girls Empowerment Center & Community Hub

- Applying CRDG to protect from threats of extreme heat and precipitation; incorporating sustainable electric power
- Center offers year-round STEAM programs to empower young women and youth of color; also includes community gardens and meeting space



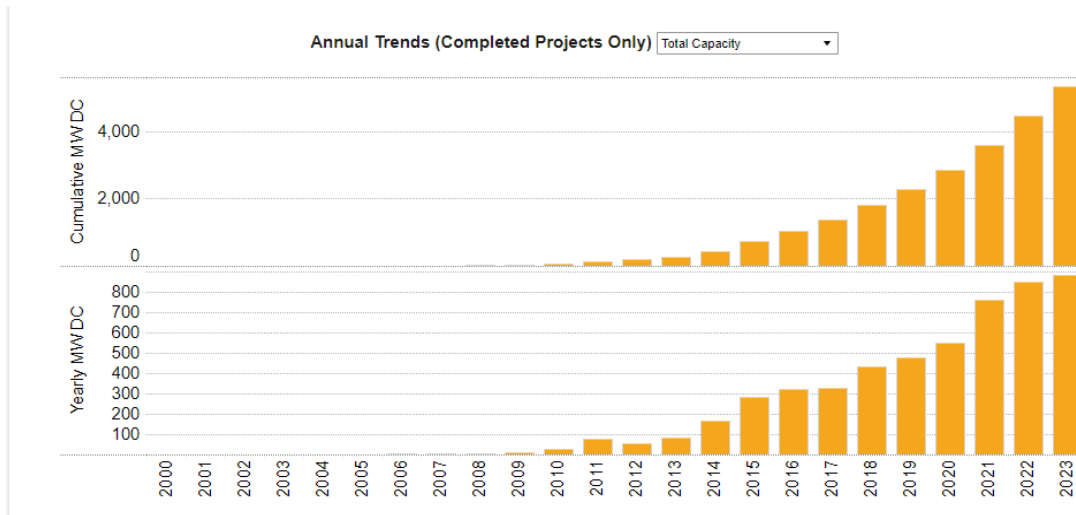
DDC/DEP/DOT: SI Mid-Island Bluebelt, Storm Sewer & Watermain Upgrade

- Pairing grey and green infra approaches
- Pairing CRDG asset-specific solutions with broader neighborhood-scale initiatives
- Crossing jurisdiction of 3+ agencies – elevating bridges, upgrading landscapes to mitigate heat and retain stormwater – pilot as test bed to streamline collaboration

Sustainability: Electrification, Efficiency, and Decarbonization

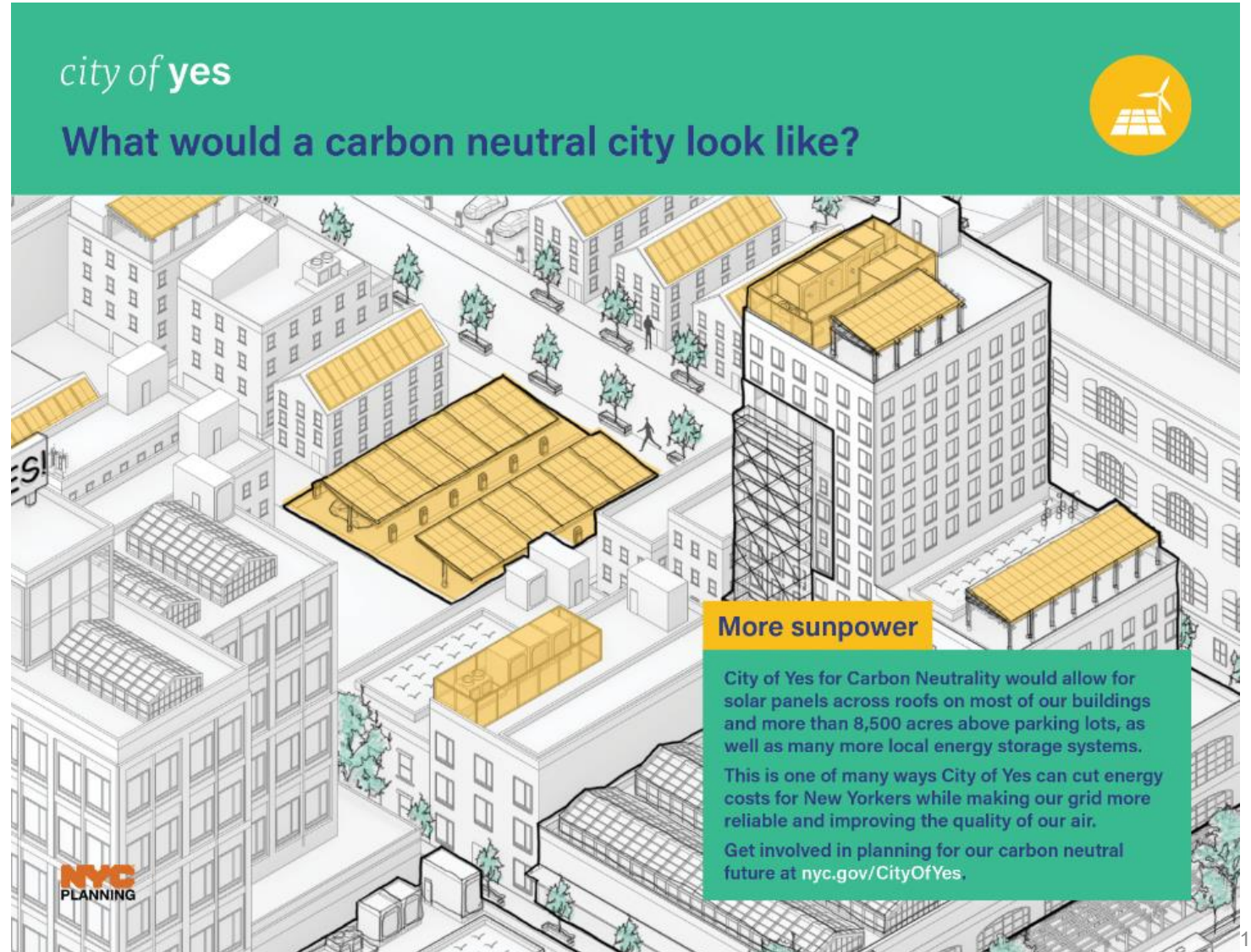
Distributed Energy Resources

- Solar PV capacity significantly ramping up in New York
 - Solar and Storage Property Tax Abatement
 - 30% for solar and storage over a 4-year period
 - Inflation Reduction Act incentives
 - 30% federal tax credit
 - NYSERDA state incentives
 - 25% tax credit, various adders



City of Yes for Carbon Neutrality

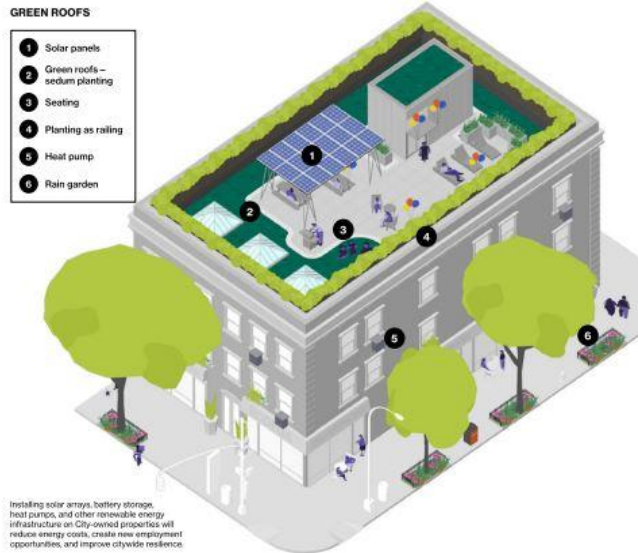
- Solar and Energy Storage are becoming feasible in more locations
 - City of Yes for Carbon Neutrality
 - New guidelines, rules, and resources within DOB and FDNY



PlaNYC 2023: Getting Sustainability Done

Protecting Us From Climate Threats

Maximize climate infrastructure on City-owned property



Evaluate all City roofs undergoing repair work for climate infrastructure installation by 2025

Local Law 24 of 2016 requires the City to evaluate roofs for "solar readiness", which among other things requires a less than 10-year old roof.

Beyond this, roofs undergoing repair work will be evaluated for solar, storage, green roofs, and other climate infrastructure.

Install solar energy, electric building infrastructure, green roofs, or other renewable energy on all viable City-owned property by 2035

This includes vacant space, rooftops, and underutilized City-owned space to optimize and co-locate climate infrastructure.

PowerUp NYC: 2023

Sustainable Buildings

Phase Out Use of Fossil Fuels in Existing Buildings and Equipment



Mayor Eric Adams launches the "Leading the Charge" plan at PS 5 in the Bedford-Stuyvesant neighborhood of Brooklyn. The plan will phase out fossil fuel boilers at 100 schools. Photo Source: Mayor's Office of Climate & Environmental Justice

Phase out Capital Spending in Fossil Fuel Infrastructure: At equipment replacement is the most cost effective and feasible time to electrify building systems. The City will work to ensure replacements phase out fossil fuels and transition to sustainable solutions.

We will undertake an analysis to identify building typology specific electrification solutions and identify the hardest-to-electrify buildings and systems.

This will lead to a phase-out implementation schedule and drive innovative strategies to address hardest-to-electrify systems on a timeline that aligns with our GHG reduction goals.

Climate Strong Communities: The Next Generation of Community-Led Resiliency Projects

Climate Strong Communities (CSC) is a new community-centered planning process that:

- Identifies opportunities to invest in neighborhoods left unaddressed by limited Hurricane Sandy recovery funding.
- Maximizes grant funding opportunities.
- Leverages existing resiliency and sustainability planning and capital commitments.
- Centers the needs, voices, and perspectives of local community members.

CSC is now in 15 neighborhoods across New York City; in 2024, we've applied for \$110M in federal and state grants, which has so far led two grant awards: studying the Flatlands/Fairfield IBZ and Harlem Meer project



Thank you!