FEDERAL RESERVE BANK *of* NEW YORK

SUSTAINABLE AFFORDABLE HOUSING

Strategies for Financing an Inclusive Energy Transition

AUTHORS
Claire Kramer Mills
Jacob Scott

Published October 2022

Acknowledgments

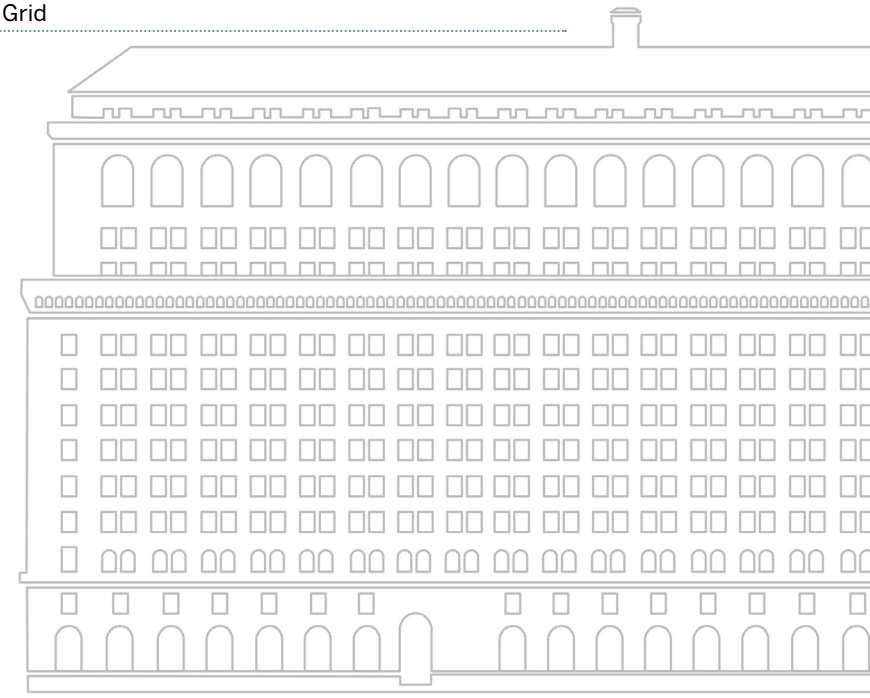
This paper presents the consensus recommendations from housing and finance experts that were discussed during nine working sessions hosted by the Federal Reserve Bank of New York, in partnership with the New York State Energy Research and Development Authority (NYSERDA) and the Community Preservation Corporation (CPC), in the spring of 2022.* Thanks go to the work group members for sharing insights and solutions. All comments are anonymous unless expressly authorized by work group members. Specific proposals are not necessarily endorsed by participating individuals or institutions. The recommendations in the report should not be imputed as formal recommendations from the Federal Reserve Bank of New York or Federal Reserve System, NYSERDA, or other New York state or city agencies.

PARTICIPANT	ORGANIZATION
Farrah Andersen	Cadmus
Beth Bafford	Calvert Impact Capital
Bill Balter	Wilder Balter
Kelly Biscuso	RiseBoro
Jason Block	Steven Winter Associates
Eric Bluestone	Bluestone Organization
Amy Brusiloff	Bank of America
Daniel Coates	Federal Housing Finance Agency
Eric Darmanin	United Nations Federal Credit Union
David Davenport	New York Green Bank
Jared Della Valle	Alloy LLC
Susanne DesRoches	NYSERDA
Danielle Donnelly	Community Preservation Corporation
Kim Erle	New York Green Bank (left August 2022)
Bret Garwood	Home Leasing
Edward Gengler	Goldman Sachs
Elizabeth Genovese	Appraisal Institute
James Geppner	NYSERDA
Greg Hale	NYSERDA
Atalia Howe	Community Preservation Corporation
Laura Humphrey	L+M Development Partners, LLC
Spencer Hunsberger	Credit Suisse
Thomas Iadanza	Valley Bank
Katia Izyumova	Enterprise Community Partners
Janet Joseph	NYSERDA (retired May 2022)
John Joshi	NYSERDA

* We thank the following individuals for their significant intellectual contributions to the deliberations and the report:
Greg Hale
Atalia Howe
Sadie McKeown
Esther Toporovsky

We also thank our New York Fed colleagues:
David Erickson
Janis Frenchak
Stanley Hardy
Connor Munsch
Michael Nelson
Shelley-Ann Pitterson
Javier Silva
Ellen Simon

PARTICIPANT	ORGANIZATION
Andrew Kessler	New York Green Bank
Matthew Ketschke	Con Edison
Luba Kim-Reynolds	Freddie Mac
Rebecca Koepnick	New York State Department of Homes and Community Renewal
Andrea Kretchmer	Xenolith Partners
Fred Lee	Bayview Asset Management
Jennifer Leone	NYC Department of Housing Preservation and Development
Keith Libolt	Affordable Housing Concepts
Brenda Loya	Amalgamated Bank
James McIntyre	Inclusive Prosperity Capital
Sadie McKeown	Community Preservation Corporation
Maygen Moore	Low Income Investment Fund
Sarah Osgood	NYSERDA
Samantha Pearce	New York State Department of Homes and Community Renewal
Curtis Probst	NYCEEC
Christine Retzlaff-O'Connell	LISC
Robert Riggs	Community Preservation Corporation
Bruce Schlein	NYCEEC (Board Member)
Molly Simpson	Fannie Mae
Serena Sowers	JPMorgan Chase
Karyn Sper	Fannie Mae
Kim Stevenson	Inclusive Prosperity Capital
Thomas Tener	KTR Real Estate Advisors LLC
Esther Toporovsky	NYC Housing Partnership
David Walsh	JPMorgan Chase
Joe Weishar	L+M Fund Management, LLC
Rudy Wynter	National Grid



Executive Summary

The Issue in Brief

New York State and New York City have recently passed legislation mandating significant climate action. New York State's Climate Leadership and Community Protection Act (CLCPA) and New York City's Local Law 97 (LL97) set ambitious energy efficiency and greenhouse gas (GHG) reduction targets, with important implications for the housing sector and its stakeholders—including owners, developers, renters, and financiers.[1] New York's goals coincide with GHG reduction targets adopted by twenty-four states and the District of Columbia[2] and policies enacted by eighty jurisdictions across the U.S. that encourage or require a transition from fossil fuels to all-electric homes and buildings.[3]

Compliance with New York's laws will require significant investments during the next two decades, particularly in low energy efficiency and high GHG-emitting buildings.[4] For market-rate properties, financing the necessary upgrades is feasible, either through operating income or additional debt. For buildings housing low- and moderate-income New Yorkers, the laws pose material financial trade-offs. Compliance may be cost-prohibitive and unfinanceable given rent restrictions on affordable properties, yet failure to comply would mean escalating fines that threaten the financial viability of the buildings. Nearly half of New Yorkers are low- and moderate-income (LMI), making resolution of these issues central to achieving New York's climate goals. This paper raises recommendations to make compliance with the laws easier and more affordable for households, government agencies, nonprofits, and private operators. It focuses specifically on strategies for encouraging early adoption and developing financial tools that accelerate the transition of decarbonization from the exception into business as usual.

Building Retrofits Are Critical to Climate Goals

Buildings are key sources of carbon emissions, with direct emissions contributing 33 percent of GHG emissions statewide and about 60 percent of emissions in cities.[5] Reducing emissions from the *existing building stock* is the linchpin to achieving broad carbon reduction goals in this

1 See https://www.nytimes.com/2022/08/16/business/new-york-real-estate-climate-change.html.

2 Center for Climate and Energy Solutions: https://www.c2es.org/content/state-climate-policy/.

3 Eighty cities and counties have adopted policies that require or encourage the move from fossil fuels to all-electric homes and buildings. As of August 2022, nearly 28 million people across eleven states live in these jurisdictions. See https://rmi.org/taking-action-to-get-fossil-fuels-out-of-buildings/.

4 The New York Times: New York Developers Rush to Reduce Emissions as Hefty Fines Looms (nytimes.com).

5 Buildings are responsible for 67 percent of New York City's total emissions. See https://climatesmart.ny.gov/fileadmin/csc/documents/GHG_Inventories/nycghg.pdf.

sector[6] since most existing buildings will still be here in 2050.[7,8] As a 2021 report from McKinsey notes, "Given typical asset lifetimes of 30 to 130 years, we cannot wait to replace [buildings] at the end of their life cycle if we are to meet climate-change-mitigation targets by 2050…[T]here is a huge need—and opportunity—to retrofit existing assets."[9]

Electrification is a central component of building retrofits. It entails converting building energy sources from fossil fuels to clean electricity for heating, cooling, and cooking. The objective of electrification, and the reason it is vital to state-level climate goals, is to enable all-electric buildings to take advantage of a clean power grid when New York and other states transition to sources of zero-carbon electricity (mandated in the CLCPA by 2040).

Affordable Housing Is Critical to Climate Goals, Yet Lacks Sufficient Financing Tools

The challenge is that retrofits require sizable up-front capital expenditures and can be disruptive to residents. Affordable housing— i.e., the diverse set of housing stock, both subsidized and unsubsidized, serving low- and moderate-income New Yorkers—is particularly financially limited due to restricted cash flows. The commitment to keep rents affordable, a requirement for projects receiving subsidy, restricts the rental income available to cover the full cost—or leverage the debt necessary—for renovations that include both energy efficiency and clean-energy systems upgrades (i.e., all-electric systems).

Despite the challenges, affordable housing retrofits are essential to achieve the specified equity goals[10] of New York State's CLCPA, New York City's Climate Mobilization Act,[11] and Governor Hochul's plan to complete a minimum of 1 million electrified homes and up to 1 million electrification-ready homes by 2030.[12] Nearly half of New Yorkers are low- or moderate-income.[13] Decarbonizing the housing stock serving these New Yorkers is critical to meet the state's carbon

6 The Economist: "The Construction Industry Remains Horribly Climate-Unfriendly," June 15,2022.

7 Property Week: "80% of the buildings that will exist in 2050 already exist," June 17, 2021, https://www.propertyweek.com/analysis-resi-and-data/80-of-the-buildings-that-will-exist-in-2050-already-exist-bringingnet-zero-to-the-masses/5114832.article.

8 Moreover, new construction itself results in sizable emissions costs, as cement, steel, aluminum, and plastics produce significant levels of emissions. See "The Construction Industry Remains Horribly Climate-Unfriendly."

9 Blanco, Jose Luis, Hauke Engel, Focko Imhorst, Maria João Ribeirinho, and Erik Sjödin, Call for action: Seizing the decarbonization opportunity in construction, McKinsey and Company, July 14, 2021.

10 CLCPA mandates that at least 35 percent—with a target of 40 percent —of overall benefits of spending on clean energy and energy efficiency programs, projects, or investments accrue to disadvantaged communities. See CLCPA §2, amending ECL §75-0117.

11 Buildings that include affordable and rent-regulated housing are not exempt from the requirements of Local Law 97 but may be treated differently under the two articles that make up the law as outlined in Title 28 of the NYC administrative Code. See https://www1.nyc.gov/assets/hpd/downloads/pdfs/services/ll97-guidance-for-affordable-housing.pdf.

12 NYSERDA: Governor Hochul Announces Plan to Achieve 2 Million Climate-Friendly Homes By 2030.

13 NYSERDA LMI report: https://www.nyserda.ny.gov/About/Publications/Evaluation-Contractor-Reports/Low--to-Moderate-Income. NYSERDA "defines low-income households as those with incomes at or below 60% of the State Median Income (SMI) and defines moderate-income households as those with incomes above 60% of SMI but at or below the greater of 80% of State Median Income (SMI) and 80% of Area Median Income (AMI)."

Nearly half of New Yorkers are low- or moderate-income according to a NYSERDA calculation. Decarbonizing the housing stock serving these New Yorkers is therefore critical to meeting the state's carbon reduction goals.

reduction goals. From an equity standpoint, if LMI customers are not included in the clean energy transition, they will be left to bear a larger percentage of the cost of maintaining fossil fuel infrastructure serving a declining number of customers, exacerbating unsustainable energy and health burdens.[14]

Building Investment Needs Are Large but Achievable

It is important to note that although building retrofits are costly, so too is the status quo. New York's Climate Action Council (CAC) estimates that annual investment costs of energy upgrades will grow from roughly $5 billion in 2030 to $30 billion in 2050, based on the incremental costs of building electrification and shell improvements.[15] However costly, these investments are a fraction of annual business-as-usual building-related expenditures in New York, which include $60 billion in building investments and more than $30 billion in energy costs across the residential and commercial buildings sectors.[16] Moreover, the incremental costs of retrofits will be substantially if not entirely offset by societal benefits from reduced GHG emissions, including lower health care costs and improved climate resilience.[16]

Funding the energy transition will require both public tools and private capital. The Inflation Reduction Act, enacted into law in August 2022, provides a jump-start by allocating billions of dollars for states to issue rebates to homeowners for whole-home retrofits and efficient heat pumps, heat-pump water heaters, and other electrical equipment. Most of those funds will be for low- and moderate-income households. The bill also provides billions more in loans and grants for upgrades to subsidized apartments.[17] These funds have the potential to catalyze action at scale, especially when paired with other public incentives and private capital. Financial institutions can play a role by devising new financial products to fund the transition and by helping to align incentives among stakeholders.

Work Group Goals and Recommendations

Given the timeline and scale of the issue, the New York State Energy Research and Development Authority (NYSERDA) and the Federal Reserve Bank of New York (NY Fed), in partnership with

14 See Jessel, S., Sawyer, S., and Hernández, D. (2019). Energy, Poverty, and Health in Climate Change: A Comprehensive Review of an Emerging Literature. *Frontiers in public health*, 7, 357. Available at https://doi.org/10.3389/fpubh.2019.00357.

15 See New York State Climate Action Council Draft Scoping Plan, p. 141. Available at: https://climate.ny.gov/Our-Climate-Act/Draft-Scoping-Plan.

16 The Climate Action Council integration analysis projects net benefits would total approximately $90 billion. See https://climate.ny.gov/Our-Climate-Act/Draft-Scoping-Plan.

17 See https://rmi.org/four-ways-the-inflation-reduction-act-speeds-the-shift-to-a-cleaner-more-affordable-energy-future/.

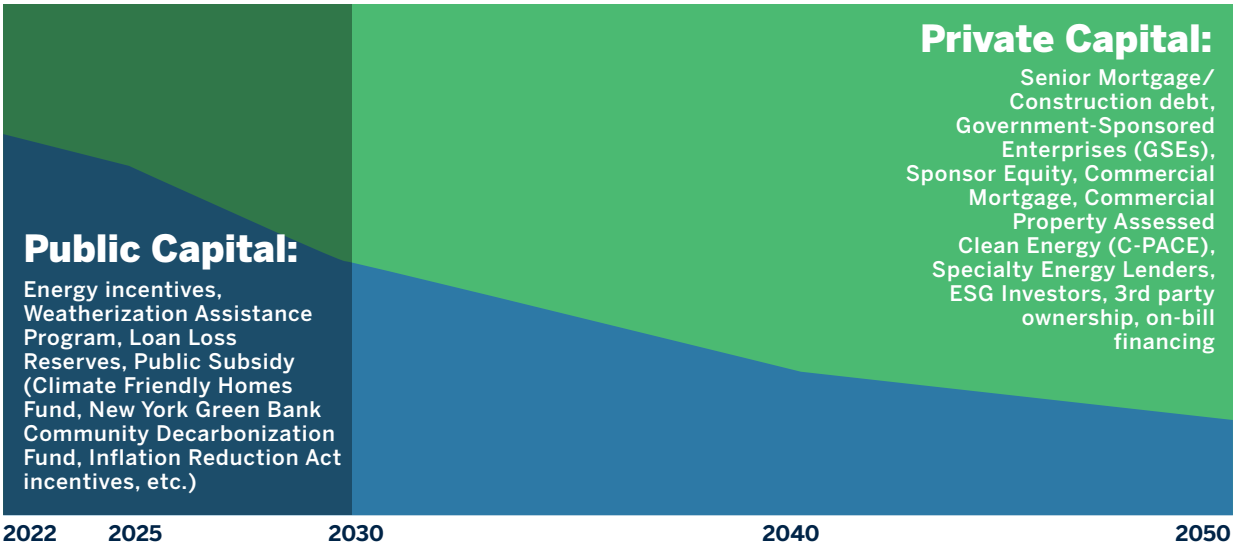
the Community Preservation Corporation (CPC), convened a series of working group sessions[18] to help lenders understand the financial risks of new climate-related requirements for their portfolios, and to identify public and private financing mechanisms for decarbonizing the affordable housing stock in New York.

Based on input from participating housing and finance experts, this paper puts forth solutions for financing decarbonization at the scale that New York State's and New York City's legal requirements necessitate.[19] These recommendations from external housing and finance experts are aimed at transitioning the decarbonization of all buildings, and specifically affordable housing, from publicly funded and mission-driven to privately financed and business as usual. Figure 1 displays a potential capital road map that evolves from reliance on public capital to a market where private capital is the major source of decarbonization funding.

FIGURE 1

Potential capital stack to achieve climate goals for affordable housing

Public funding and support will be important for early adopters (shaded area); **private** financing will be critical for a new "business as usual"



The work group's recommendations to address key challenges and foster this transition, including identification of the relevant stakeholders and actors, are summarized below and discussed in detail in the report.

18 See the Acknowledgments for a complete list of participants. A series of nine meetings was held between late March and late May of 2022.

19 Comments are anonymous unless expressly authorized by participants. Specific proposals are not necessarily endorsed by participating individuals or institutions.

CHALLENGE #1

High Costs of Decarbonization and Access to Capital

RECOMMENDATIONS TO ADDRESS COSTS

1 LOWER THE COST OF FINANCING DECARBONIZATION BY ADJUSTING UNDERWRITING:

- **"Sustainability-linked pricing" or pricing for risk reduction** for loans to decarbonized buildings and projects meeting minimum energy performance standards or achieving energy efficiency certifications. Provide financial "rewards" to owners for reducing lenders' climate-related financial risks.
- **Longer amortization** for loans used in decarbonization. This would lower the debt service and improve the coverage ratio.
- **Create transparency about the costs of noncompliance in underwriting.** Demonstrate the cost to the building owner of not undertaking measures to decarbonize and upgrade energy efficiency – e.g. non-compliance penalties under New York City's Local Law 97 and the reduced debt that can be leveraged as a result.
- **Bring forward increased future value of carbon neutral buildings with appraiser recognition** and present **documentable evidence** of **improved cash flow** from these investments (e.g., lower insurance premiums).
- **Simplify the process of obtaining mortgage holder consent**, have **first mortgage lenders become PACE lenders**, or **create supplemental products** that specifically address decarbonization and which are fully subordinate to the first mortgage.

2 PROVIDE TAX INCENTIVES AND REGULATORY RELIEF, PARTICULARLY TO EARLY ADOPTERS:

- **Create property tax abatement for electrified buildings.**
- **Provide tax relief to utility companies** to induce them to **reduce electricity rates charged to decarbonized buildings,** especially early adopters and affordable housing rental properties. This will lower the ongoing operational costs for all-electric projects and address the disincentive to electrify due to higher rates for electricity compared to natural gas.
- **Leverage tax credit allocations on the state and local agency level, including Low Income Housing Tax Credits, Historic Preservation Tax Credits, New Markets, and Brownfield.** For example, amend the New York State Low Income Housing Tax Credit (LIHTC) Qualified Allocation Plan (QAP) to incentivize all-electric, high-performance design, or exclude buildings that are not decarbonizing or compliant with CLCPA.
- Where viable, give **density bonuses** or **increased floor area ratio (FAR) limits as an incentive** for the decarbonation of new housing developments and the preservation of existing buildings.

3 LEVERAGE POLICY- AND MISSION-MOTIVATED INVESTMENTS TO INCREASE SUPPLY OF CAPITAL:

- **Require disclosure of carbon emissions** in loan portfolios and securitized assets.
- **Create report cards for lenders** based on the carbon intensity of their loan portfolios.
- **Provide additional Community Reinvestment Act (CRA) credit to regulated institutions** for investing in buildings that are affordable and undertaking decarbonization projects, or in those that are already decarbonized.
- **Require decarbonization of the underlying assets as a condition of sale for distressed single and multifamily loan portfolios** sold by HUD and GSEs to large investors and nonprofits.
- **Establish loan loss reserves and/or credit enhancement mechanisms.** For example**,** use SONYMA's mortgage guarantee/insurance for buildings that meet State-defined energy requirements. Banks participating in the program could get top loss protection for a modest rate premium. SONYMA would pay claims for buildings that default because of energy cost burdens.
- **Layer Medicare/Medicaid funding into investments in decarbonization of affordable buildings** to create healthier homes and monetize the health benefits of decarbonization.[20]
- **Tap the carbon offset market** to introduce another funding stream.

CHALLENGE #2 Perceived Project Risk Is Too High

RECOMMENDATIONS TO ADDRESS PROJECT RISK:

4 LEVERAGE GOVERNMENT POLICY AND REGULATION:

- **Simplify and align incentive programs.**
- **Expedite and standardize the local approval** process for decarbonization projects.
- **Pass local building and energy codes calling for decarbonization.**
- **Increase Section 8 base rents for decarbonized buildings** to increase cash flow while not increasing low-income renters' cost of living. Building owners would be able to borrow money to do the work up front and have higher rents to pay the debt service. This could begin with increasing housing assistance payment (HAP) contracts of Project-Based Section 8 Rental Assistance for multifamily-properties.

20 See New York State's Climate Action Plan for estimated health benefits of decarbonization. https://climate.ny.gov/Our-Climate-Act/Draft-Scoping-Plan.

5 AGGREGATE EVIDENCE OF IMPROVED CASH FLOW:

- **Present documentable evidence of improved cash flow from these investments** (e.g. lower insurance premiums, lower maintenance costs, improved occupancy and tenant satisfaction, etc.).

6 STANDARDIZE UTILITY PRICING AND LEVERAGE UTILITY LENDING MODELS:

- **Reduce variability in utility rates across localities within the same region.**
- **Reduce utility penalties/surge pricing** in clean energy buildings that rely on the grid during evening hours.
- **Leverage tariff-based financing models.**
- **Model commodity cost escalation scenarios** to assess the relative costs of natural gas and electricity over time.

7 DEVELOP AND SCALE DIRECT-TO-CONSUMER MODELS:

- **Develop DTC financing options**, including mortgage-like products to assist building- and homeowners with financing up-front costs of retrofits.

CHALLENGE #3 Lack of Clear Measurement and Standards

RECOMMENDATIONS TO ADVANCE MEASUREMENT AND STANDARDS

8 DEVELOP (OR EVOLVE EXISTING) CERTIFICATION STANDARDS, INCLUDING A COMMON SET OF METRICS, TO COVER DECARBONIZED BUILDINGS

9 TREAT CARBON EMISSIONS LIKE A POLLUTANT:

- **Include carbon in property Benchmarking Reports and Integrated Physical Needs Assessments (IPNA)**, which provide a holistic assessment of a property's physical conditions, or equivalent property assessment tools such as the Phase One Environmental Assessment.[21]

21 This would come through in the Phase One Environmental Assessment if carbon were classified by the Environmental Protection Agency as a pollutant that required remediation like asbestos or radon.

CHALLENGE

#4

Lack of Awareness and Education

RECOMMENDATION TO PROMOTE AWARENESS AND EDUCATION

10 **Launch awareness and education campaign** for government, the finance industry, trade groups, building owners, homeowners, renters, architects, engineers, construction contractors, and installers and **engage advertising agencies to produce clean home campaigns** modeled after ad campaigns for electric vehicles (EVs).

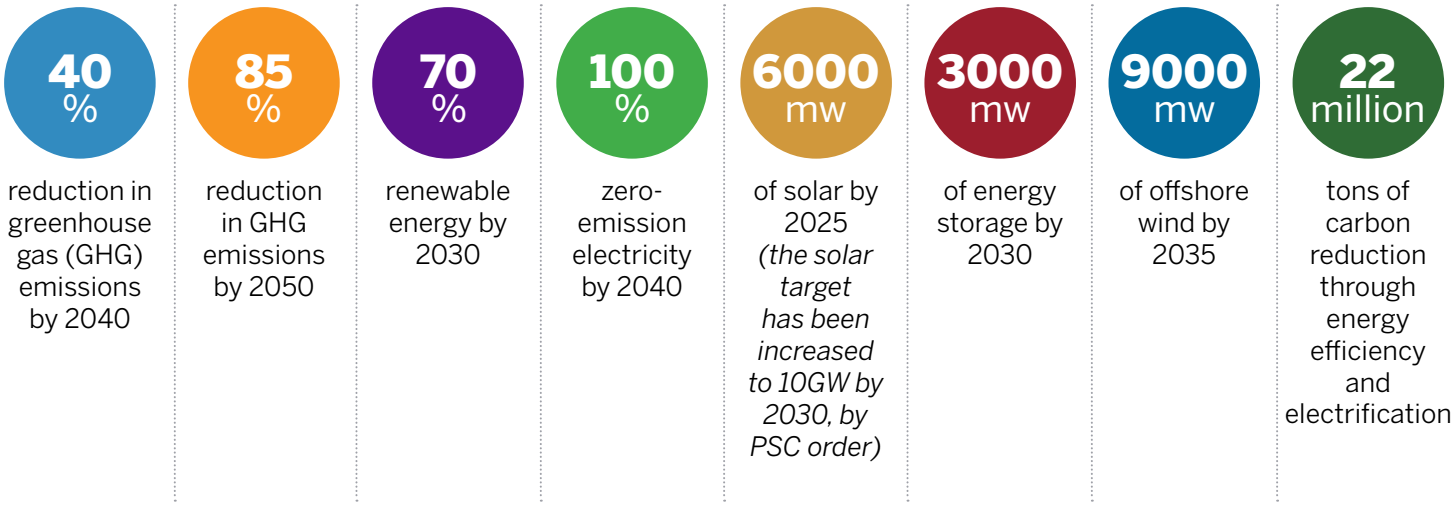
The paper is organized as follows. Section 1 explains the legal imperative behind decarbonization efforts in New York State. Section 2 addresses the scale of the issue, assessing the size of the affordable housing market in New York. Section 3 highlights the challenges to making decarbonization business as usual. Sections 4 and 5 examine two case studies in detail, looking at the financial challenges of decarbonizing affordable housing properties and how developers are making it work. Section 6 outlines a capital roadmap—*a comprehensive set of public and private finance mechanisms*—for how to bring decarbonization to scale. Finally, Section 7 highlights a series of specific recommendations to spark the evolution of decarbonization into a new business as usual.

SECTION 1
New York's Decarbonization Laws: *Background on CLCPA and LL97*

CLIMATE LEADERSHIP AND COMMUNITY PROTECTION ACT

In July 2019, the Climate Leadership and Community Projection Act (CLCPA) was signed into law, which established a series of goals and requirements[22] for the State of New York, including the following:

FIGURE 2



The law also mandates that at least 35 percent[23] of the benefits go toward historically disadvantaged communities, meaning that achieving these goals must involve the affordable housing sector.

To meet these targets, the legislation established a Climate Action Council (CAC), which is tasked with writing a scoping plan. A draft of this plan was released on December 31, 2021,[24] and a final version is due December 31, 2022 (subject to a super-majority vote by at least 15 of the 22 CAC members). While not final, the CAC made a series of recommendations in this draft scoping plan. The council recommends the following: 1) statewide benchmarking for large buildings; 2) all-electric high-performance new construction requirements effective 2024 or 2027 (depending on building typology); 3) efficiency-oriented building performance standards for large buildings

22 See https://climate.ny.gov/Our-Progress.
23 With a target of 40 percent.
24 See https://climate.ny.gov/Our-Climate-Act/Draft-Scoping-Plan.

(>25,000 square feet) effective 2030; 4) a phase-out of like-kind replacement of fossil fuel heating, cooking, and drying equipment in 2030 or 2035 (depending on building typology); and 5) an equitable transition off the natural gas system.

These provisions are not final until the final scoping plan is submitted and voted on, but they highlight what the CAC views as priority measures to meet the goals laid out by CLCPA.

NEW YORK CITY CLIMATE MOBILIZATION ACT AND LOCAL LAW 97

New York City passed its own climate legislation in 2019, the Climate Mobilization Act.[25] The centerpiece of this legislative package was Local Law 97 (LL97).

LL97 aims to reduce carbon emissions in the NYC buildings sector by 40 percent by 2030 and contribute to an 80 percent reduction in overall citywide emissions by 2050.[26] It does so by capping carbon emissions on "covered buildings." With some exceptions for regulated affordable housing discussed below, the buildings covered under this law include:

- **Buildings that exceed 25,000 gross square feet**
- **Two or more buildings on the same tax lot that together exceed 50,000 gross square feet**
- **Two or more buildings held in the condominium form of ownership that are governed by the same board of managers and that together exceed 50,000 gross square feet**

There are around 50,000 such covered buildings, which account for 60 percent of the city's building area.[27]

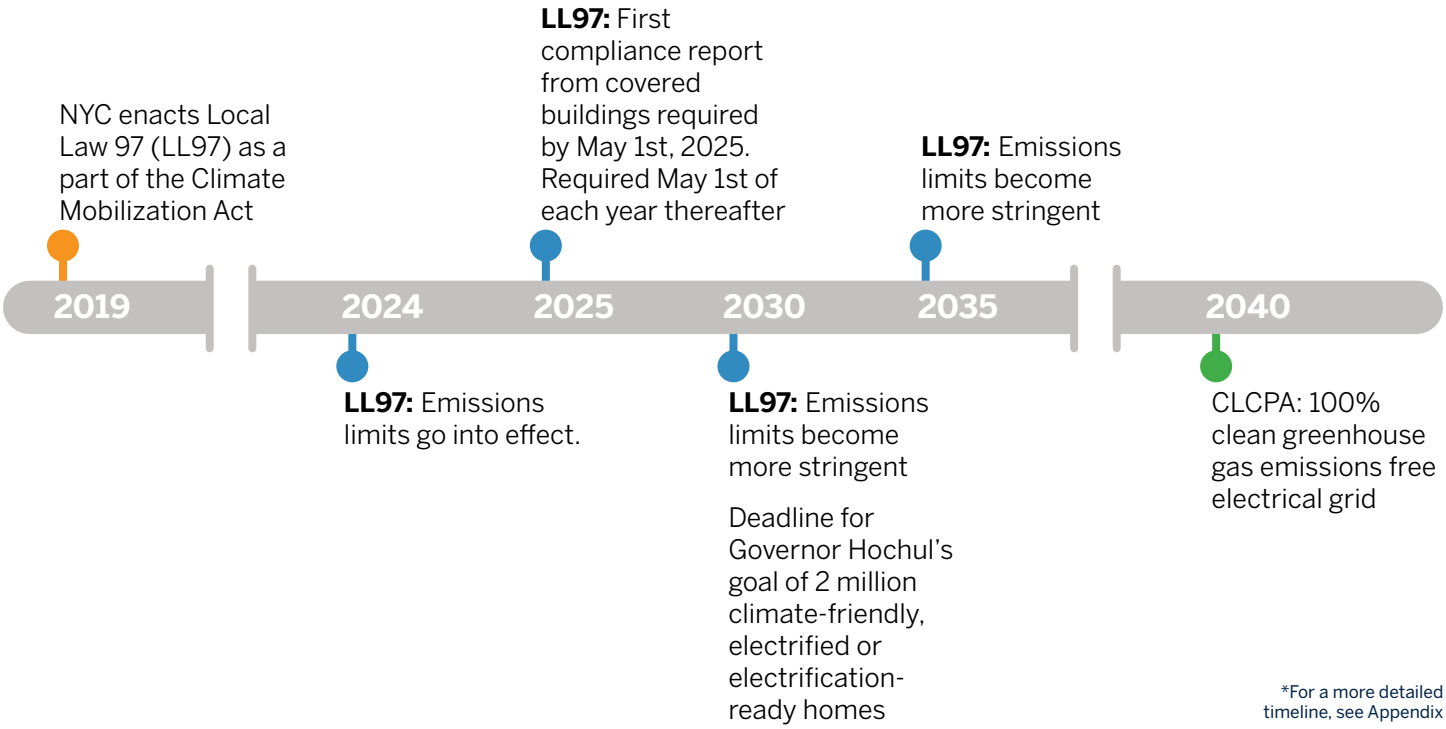
Under the law, covered buildings are subject to emissions intensity limits. The carbon dioxide equivalent (CO_2) per square foot they can emit on a yearly basis is capped based on the building code occupancy group they fall into; buildings exceeding these limits will be subject to fines up to $268 per ton of CO_2 over the established limit.

These emissions limits begin in 2024. The first compliance report, outlining buildings' carbon emissions, will be due May 1, 2025,[28] and subsequent reports will be required in May every year thereafter. The emissions limits are consistent from 2024 to 2029, and then become more stringent in 2030 and every five years thereafter.

25 See https://www1.nyc.gov/site/sustainability/legislation/climate-mobilization-act-2019.page.
26 See https://www1.nyc.gov/site/buildings/codes/greenhouse-gas-emission-reporting.page.
27 See https://www.urbangreencouncil.org/sites/default/files/2020.07.09_urban_green_building_emissions_law_summary_revised_11.17.2020.pdf.
28 Ibid.

FIGURE 3

Implementation Timeline and Other Key Dates*



*For a more detailed timeline, see Appendix

FIGURE 4

As the market deepens and regulations come into effect, costs will fall and demand will rise

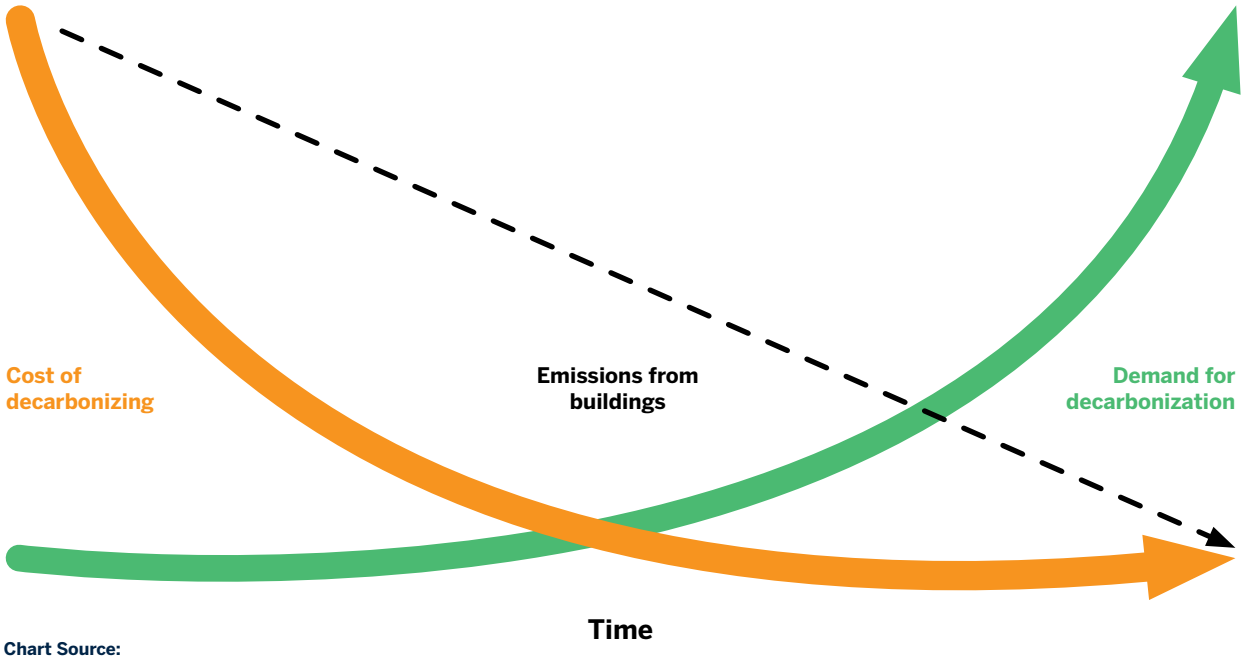


Chart Source:
Urban Green Council

Affordable housing is not exempt from LL97. However, it is treated slightly differently.[29] For example:

- Buildings on land owned by the New York City Housing Authority (NYCHA) are not covered, though NYCHA is required to make efforts to reduce greenhouse gas emissions, on a portfolio-wide basis, by **40 percent by 2030** and by **80 percent by 2050**, relative to the emissions for 2005.[30]
- Buildings in which more than 35 percent of units are rent regulated, Housing Development Fund Cooperatives (HDFC cooperatives), and buildings that have HUD project-based assistance must demonstrate that, for 2024, either their emissions are below the applicable 2030 limits or that applicable **"Prescriptive Energy Conservation Measures"** have been implemented.
- Buildings with at least one rent-regulated unit and where up to 35 percent of units are rent regulated may delay compliance with Article 320 emissions limits until 2026 and then must meet subsequent limits starting in 2030.
- Certain income-restricted housing is exempted from Article 320 emissions limits until 2035, and then must meet subsequent limits.

Even with this nuance, all affordable properties are still required to take steps toward reducing their carbon emissions, and many are eventually subject to the same or similar caps as standard market-rate developments. Given the limited exceptions for affordable developments and the mandate for equity in the CLCPA, it is critical to understand the scope of the affordable housing stock, the challenges owners and tenants of affordable housing will face, and the opportunities that exist to address carbon emissions.

29 See https://www1.nyc.gov/assets/hpd/downloads/pdfs/services/ll97-guidance-for-affordable-housing.pdf.

30 To this end, Governor Hochul and Mayor Adams recently announced an investment to decarbonize NYCHA properties. See City of New York, Office of the Mayor, "Mayor Adams, Governor Hochul Announce $70 Million Initial Investment to Decarbonize NYCHA Buildings."

SECTION 2

Sizing the Issue: *Current State of Affordable Housing Stock (Energy Use, Cost, and Emissions)*

To understand the scale of the transformation, it is important to examine the scale and variety of housing, the considerable share of the housing stock occupied by low- and moderate-income households (a majority of whom live in multifamily buildings), and the current lack of widespread electrification.

TABLE 1[A]

New York State Housing Stock and Energy Usage

	Overall	NYC	Non-NYC	LMI	Non-LMI
Total occupied units/ households (millions)	7.4 (100%)	3.2 (43%)	4.2 (57%)	3.6 (49%)	3.8 (51%)
Ownership status (%)					
Renter-occupied/ renting household	46% (3.40[B])	67% (2.14)	30% (1.26)	63%[C] (2.27)	31%[C] (1.18)
Building type[D]					
Single family	47% (3.94)	16% (0.57)	70% (3.47)	34%[E] (1.22)	59% (2.24)
2 to 4 units	17% (1.42)	22% (0.78)	13% (0.64)	22% (0.79)	14% (0.53)
Multifamily (5+ units)	34% (2.81)	61% (2.16)	13% (0.65)	41% (1.48)	26% (0.99)
Other	2% (0.19)	0.2% (0.00)	4% (0.19)	3% (0.11)	1% (0.03)
Heating fuel				[F]	[F]
Utility gas	59% (4.40)	65% (2.08)	55% (2.32)	56%	58%
Fuel oil and propane	24% (1.77)	18% (0.57)	28% (1.20)	21%	21%
Electricity[G]	13% (0.93)	13% (0.41)	12% (0.51)	22%	18%
Other	4% (0.32)	4% (0.13)	5% (0.19)	2%	3%

*Includes vacant units

Notes:

A Percentages may not sum to 100 due to rounding.

B Millions of units.

C NYSERDA LMI Report.

D Includes vacant units.

E NYSERDA LMI Report. LMI and non-LMI counts (in parentheses) for each building type do not sum to the count of that type in the overall column, since the overall column for building type includes vacant units.

F Estimates from 2020 Residential Energy Consumption Survey (RECS) (numbers of units/ households are omitted because the total number of households estimated by RECS differs from the American Community Survey). Respondents classified as LMI if household income is below 80 percent of state median income as defined by HHS in 2022, adjusting for household size.

G Most of the current electric heating customers use electric resistance heat, rather than heat pumps.

SCALE AND VARIETY OF HOUSING IN NEW YORK

There are some 7.4 million occupied housing units in New York State, which span varied geographies, climate regions, and building types. In terms of ownership, 54 percent of New Yorkers own their home and 46 percent are renters. Similarly, in terms of building type, 47 percent of the housing stock is made up of detached single-family homes, while 50 percent consists of buildings with two or more units.[31]

As one might expect, there are important differences between the housing stock in New York City and the rest of the state. Within NYC, nearly 70 percent of units are occupied by renters. Outside of NYC, the situation is flipped, with more than 70 percent of units occupied by the owner. Similarly, within NYC, over 65 percent of units are multifamily, whereas in the rest of the state, 70 percent of units are single-family homes.

SCALE OF LOW- AND MODERATE-INCOME HOUSEHOLDS

Nearly half of all households in New York State are considered low- or moderate income. This includes almost 2.4 million classified as low-income, as well as 1.2 million considered moderate-income.[31]

The typical housing experience differs meaningfully for LMI and non-LMI households. Non-LMI households typically live in single-family homes (59 percent) and own their property (69 percent). On the flip side, a considerable majority of LMI households live in properties with two or more units (66 percent) and only about a third are owners. LMI households are also concentrated in, though by no means exclusive to, New York City.

ENERGY USE

According to the Census Bureau's 2020 American Community Survey (ACS), a vast majority of households in New York use either natural gas (59 percent) or fuel oil/propane (24 percent) to heat their homes. Just over a tenth (13 percent) use electricity for heating.[32] Of those 925,000 households that use electricity for heating, NYSERDA estimates that fewer than 200,000 use heat pumps—the rest use electric resistance heat, which is less efficient and more costly.[33] Together, these statistics imply that over 6 million households in New York would need to tran-

31 The remainder are single-family detached homes, mobile homes, boats, RVs, vans, and other miscellaneous categories.

32 See NYSERDA LMI report: https://www.nyserda.ny.gov/About/Publications/Evaluation-Contractor-Reports/Low--to-Moderate-Income. NYSERDA "defines low-income households as those with incomes at or below 60% of the State Median Income (SMI) and defines moderate-income households as those with incomes above 60% of SMI but at or below the greater of 80% of State Median Income (SMI) and 80% of Area Median Income (AMI)." According to participants, the definition is stricter for existing utility incentive programs.

33 The 2020 Residential Energy Consumption Survey from the U.S. Energy Information Administration puts the number of units using electricity for heating a bit higher, at about 20 percent.

34 Heat pumps are preferable to electric resistance heat in most climates, as they easily cut electricity use by 50 percent when compared with electric resistance heating. See U.S. Department of Energy: https://www.energy.gov/energysaver/electric-resistance-heating.

sition to electric heating or low-carbon fuels to decarbonize, and over 700,000 would need to transition from electric resistance heat to heat pumps.[34]

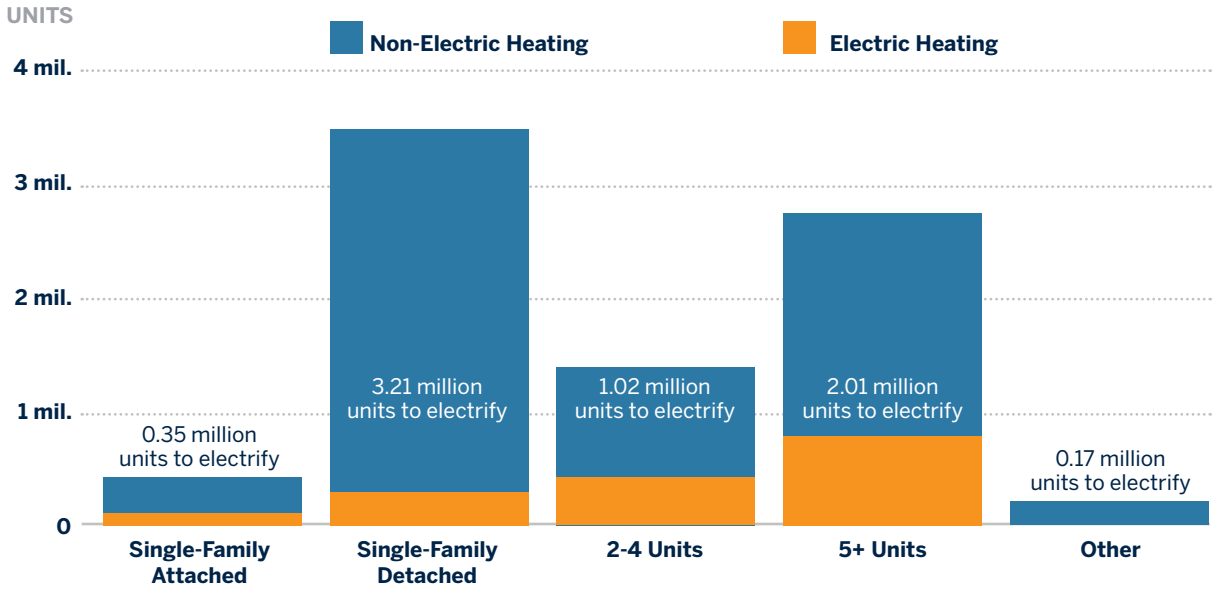
This need for electrification is great across housing type and income level. While multifamily properties are more likely than single-family properties to use electricity for heating, the considerable majority still rely on natural gas. Similarly, although LMI households are slightly more likely to live in units heated by electricity, most rely on natural gas.

There are therefore millions of single-family (3.56 million) and multifamily (3.03 million) units that need to transition to electric heating to decarbonize. Importantly, there are as many as 1 million LMI households in multifamily buildings (more than five units) in NYC, which will be some of the first affected by energy mandates.[36] Figure 5 below presents the different housing types and the number of units within each that will need to convert to electric energy.

FIGURE 5

To reach full electrification, millions of units across all housing types will need to switch to electric heating

Number of units by housing type and electric versus non-electric heating in New York State



35 It is worth noting that for the most difficult building-related systems to decarbonize (e.g., industrial processes, existing district steam systems like the one in NYC), low-carbon fuels could play a role in the future; however, there is significant uncertainty regarding availability and cost of supply, as well as how a potentially limited supply should be prioritized across buildings and other sectors economy-wide.

36 Using NYSERDA's estimate of the percent of LMI households that live in five-or-more-unit multifamily properties (41 percent) , and given the number of LMI households overall, there are approximately 1,476,000 LMI-occupied units in buildings with five or more units. Assuming 28.5 percent of multifamily units are electrified, and assuming that rate is roughly equivalent across LMI and non-LMI households, then there are around **1 million LMI units to electrify in five-or-more-unit multifamily buildings** in the state, the vast majority of which would be in NYC (since both LMI households and multifamily properties are concentrated in NYC).

SECTION 3
Financial Challenges to Legally Required Decarbonization

Despite the new statutory requirements and the scale of the need, building decarbonization faces several challenges. Table 2 outlines the complex set of actors that play important roles in decarbonizing affordable housing and the barriers they face. Understanding the concerns, obstacles, and incentives facing these stakeholders is critical to devising effective solutions.

TABLE 2

Building Decarbonization:
Key Actors in the Ecosystem and the Challenges They Face

Stakeholders	Chief Barriers to Promoting Clean Buildings
Appraisers	• Lack of comps (especially for decarbonized properties at scale) • Lack of information and awareness about value of new technology
Contractors	• Transition costs (training, equipment, recruitment, etc.) • Capacity constraints
Developers	• Costs • Complexity • Lack of requirements from building code or lenders
Financers	• Returns too low for high perceived risk • Lack of awareness of municipal regulations (e.g. LL97) that will impose noncompliance penalties on buildings exceeding emissions limits • Lack of state and/or federal regulation requiring decarbonization to be included in the IPNA or Phase One Environmental Report and dealt with at time of transaction or over time as systems need replacing
GSEs	• Lack of scale and/or insufficient volume of decarbonized units • Competing priorities from more local or immediate issues • Lack of specific call for decarbonization in their green mandates • Lack of demand for decarbonization from their customer base
Homeowners	• Costs • Complexity • Lack of awareness of importance and benefits
Home Inspectors	• Lack of measurement standards and disclosure templates • Lack of a standard to call out climate impacts and GHG impacts

TABLE 2
(continued)

Stakeholders	Chief Barriers to Promoting Clean Buildings
Insurers	• Have not priced in cost of fossil fuel dependence beyond statutory mandates
	• Lack of transparency about connection between rising insurance rates and adverse climate events and costs to rebuild
Local Government	• Loss of property tax revenue, if solutions include abatement of real estate taxes or requirements that carbon improvements do not trigger increases in property tax assessments
	• Capacity constraints
Real estate brokers	• Lack of awareness
	• Resistance to increased complexity in real estate transactions
Tenants	• Costs
	• Disruption during upgrades
	• Lack of awareness of benefits
	• Lack of decision-making power
Utilities	• Demand management
	• Costs
	• Opposition from gas utilities
	• No alignment with the CLCPA in support of owners who build all-electric

Broadly speaking, the challenges facing these key actors fall into four main categories: 1) high costs of decarbonization and access to capital, 2) uncertainty and risk, 3) lack of common reporting methodologies, and 4) lack of awareness and education.

CHALLENGE #1

High Costs of Decarbonization and Access to Capital

In the work group meetings, experts consistently cited the difficulty of financing decarbonization, both in terms of dealing with rising costs at every stage of the process and accessing the necessary capital. This is not for lack of capital overall—trillions of dollars are invested in real estate each year. Instead, the issue is that an inadequate proportion of this money flows toward decarbonization.

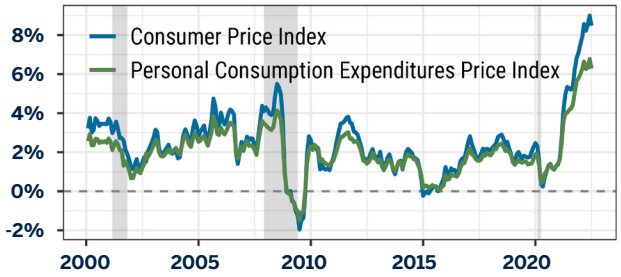
UNFAVORABLE ECONOMIC ENVIRONMENT AND RISING COSTS

Participants from both the housing and finance groups stressed that the current economic environment, which is characterized by rising costs, tighter credit conditions, and supply shortages, makes investments in decarbonization more challenging. However, participants also acknowl-

edged that these are cyclical trends that will ebb and flow over time, and that waning inflation, easing supply constraints, and macroeconomic policies such as the Inflation Reduction Act would create opportunities for decarbonization .

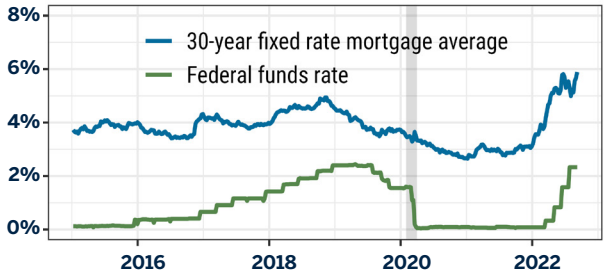
FIGURE 6

Inflation is elevated



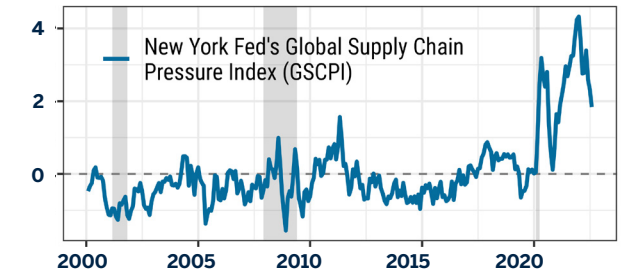
Source: Bureau of Economic Analysis / Bureau of Labor Statistics

Interest rates are rising



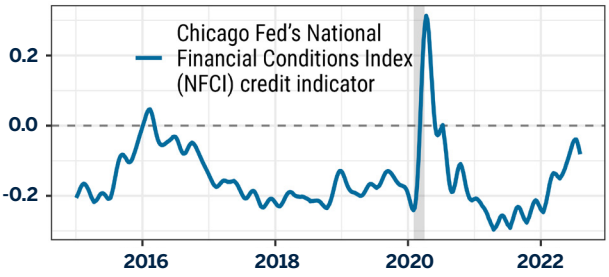
Source: Freddie Mac / Federal Reserve Bank of New York

Supply chain pressure is elevated



Source: Federal Reserve Bank of New York

Financial conditions are tightening



Source: Federal Reserve Bank of Chicago

SHIFT TO "DEEP GREEN" INVESTMENTS

It is not just the macroeconomic environment that is challenging. On a microeconomic level, most available light-touch retrofits and relatively straightforward energy efficiency improvements have already been completed. The next step is to start making investments in "deep green" improvements that also reduce a building's GHG emissions. This is more expensive, often more disruptive to residents, and requires more technical expertise than simple energy efficiency upgrades.

RETURNS ARE LOW COMPARED TO PERCEIVED RISK AND UNFAMILIARITY WITH NEW SYSTEMS

Regarding these more expensive and challenging "deep green" investments, participants repeatedly raised the point that the return on many decarbonization investments is simply not sufficient to cover the perceived additional risk the new systems pose. Unlike with many energy

efficiency upgrades, electrification measures do not always lead to operational expense savings that can offset the initial project capital cost.

COMPETING DEMANDS FOR CAPITAL

Participants also stressed the breadth of competing demands for capital and noted that investments in decarbonization may be getting crowded out. On the finance side, asset managers have a suite of projects in which they can invest their marginal dollar, and many of these projects offer higher returns and greater familiarity compared to decarbonizing buildings. On the housing side, especially for affordable housing, capital is often scarce to begin with; allocating these scarce dollars to decarbonization can become contentious if it limits the amount of affordability in a given project, or if there are more pressing concerns, including deferred maintenance and repairs.

DEARTH OF EARLY-STAGE CAPITAL

For any construction project there are predevelopment costs. These can include legal, engineering, and architectural fees, as well as feasibility studies, consults, and permitting and application fees. Early-stage predevelopment capital is typically used to finance this preliminary stage of development. However, participants explained that this early-stage capital is largely absent in the context of decarbonization, which stifles projects before they even begin.

BUILDINGS TOO LEVERAGED TO FINANCE DECARBONIZATION

Attracting new capital investment is not the only issue. A property must also generate enough income to support any additional debt the owner takes out for building improvements, including but not limited to decarbonization. However, many affordable developments are not able to take on new debt because their net operating income is too low relative to their existing debt service. In the case of regulated affordable housing, owners are unable to raise rents to cover the additional debt service. Thus, without adjustments to underwriting standards, many buildings are fully leveraged based on their existing cash flow, and are therefore unable to supplement an existing loan, even in scenarios where decarbonization measures would increase property value and/or create higher cash flow in the long term.

MORTGAGE HOLDER CONSENT FOR SUPPLEMENTAL FINANCING IS OFTEN REQUIRED AND NOT ALWAYS PERMITTED

Even if capital for decarbonization is available, making use of it presents its own challenges. Supplemental sources of capital often require consent from the existing mortgage holder, and mortgage holders are not always keen to provide this consent, particularly if the new source of capital is senior to the existing mortgage. An example of this conundrum is Property Assessed Clean Energy (PACE) financing. PACE enables property owners to finance up-front costs of energy upgrades and pay the costs back over time through their property tax bill. Despite the

abundance of PACE lenders, and the clear alignment of the approved uses of this financing with the clean energy transition, PACE has barely been used in the multifamily market due to restrictions from senior debt providers. For this source of capital to make its way to decarbonization projects, this issue must be resolved.

Beyond the hesitancy of the mortgage holders, there are several additional reasons why obtaining consent is so challenging. Rarely is a well-designed process in place at financial institutions dictating who gives consent, when they give it, and how they do so. Further, loans are often securitized, which means the originating lender lacks the discretion to provide consent.

INCREASED OPERATING EXPENSES

Even once electrification investments have been made, another impediment is the lack of incentives available to support the ongoing operation of all-electric systems associated with high-performance buildings (i.e., heat pumps/VRF, energy recovery ventilation, etc.). Most available green incentives help cover the installation cost; however, there are very few incentives designed to lower the ongoing operational expenses associated with operating and maintaining these systems. For example, under current commodity prices, electricity is more expensive per unit of heat than natural gas (in some regions, such as downstate, the price can be two to three times higher). herefore, for many buildings currently heating with natural gas, electrification can lead to higher utility prices, even while reducing overall energy consumption. For affordable housing, this burden can become untenable, regardless of who is paying for the heating and cooling.

CHALLENGE #2

Perceptions of Project Risk and Complexity Are Too High

Uncertain returns and perceived risk associated with electrification investments present another major challenge.

NEWNESS

Some of these fears stem from the relative novelty of such investments. Participants noted that when money is on the line, it is easier to go with what is known than to try something new that has an uncertain outcome. For example, owners and lenders are often more inclined to "replace with same" than to invest in newer technologies, such as electric heat pumps, despite growing evidence about their performance for both heating and cooling.[37]

37 McKinsey notes that "electric heat pumps have become an increasingly effective way for buildings to decarbonize due to operating, equipment, and installation costs becoming more competitive in certain markets, as well as developments in heat-pump technology. Today's models are 2.2 to 4.5 times more efficient than gas furnaces."

REGULATIONS, FEES, AND TAXES

Participants stressed that even for projects where the developer is willing to make investments in decarbonization, issues around regulation, fees, and taxes generate considerable uncertainty. Experts highlighted three specific examples, though the issue is widespread.

First, *variability in utility costs* across county lines means that an identical project may pencil out economically in one area but not in another. This uncertainty around where and when investments will work presents a major hurdle to the standardization and economies of scale that are necessary to make decarbonization a widespread practice.

Second, *decarbonization incentives can become diluted by fees that are not aligned with decarbonization, such as utility demand charges*. A participant shared an example of a net-zero energy building they own. Even though solar energy is generated during the day from rooftop solar photovoltaic panels, the building owner gets hit with onerous demand surcharges at night. This utility fee structure means that the overall utility cost to the owner is almost the same as it would be if the property had not invested in solar panels in the first place.

Finally, participants noted that high-performance measures can lead to higher property assessments and, in turn, higher property taxes. Like the fees described above, higher taxes dilute the savings generated by the energy efficiency and electrification investments, increasing the payback period and weakening the overall economics of decarbonization. At the same time, *while the assessment of the property for tax purposes is often higher following these improvements, the appraisal, used for lending and calculating fair market value, is frequently unchanged*. This is a double negative: the taxes on the property rise, but the appraised market value of the property does not.

COMPLEXITY OF INCENTIVES

Another considerable hurdle discussed by participants is the wide-ranging and disparate requirements of incentive sources. Financing an all-electric, energy-efficient multifamily affordable housing development requires stitching together a host of disparate programs and capital sources. Developers often must go to one place to secure financing for an affordable housing project and another place to obtain capital or incentives to cover the energy efficiency or low-carbon measures. This negatively affects the scalability of such solutions and presents risk; for if one of the programs falls through, the entire project can become financially infeasible.[38]

Additionally, the various capital sources have a diverse set of requirements and terms, and not all of them are available during construction, limiting their ability to be used in conjunction with construction lending debt.

38 New York State agencies are aware of and attempting to address the issue of complex incentive programs. For example, HCR and NYSERDA run a Clean Energy Initiative Program that injects NYSERDA Clean Energy Fund dollars directly into HCR's financing sources. This creates one application and source of payment for developers.

CHALLENGE

#3

Lack of Clear Measurements and Standards

To achieve scale, stakeholders must be able to easily measure GHG emissions, quantify the impacts of efficiency improvements and carbon reduction measures, and define what successful decarbonization looks like. Further, investors must have a clear sense of the carbon impacts of their investments. However, at this stage, there is a lack of well-understood and broadly agreed upon measurements, standards, and disclosures.

INEXPERIENCE WITH MEASURING CARBON EMISSIONS

It would be incorrect to say there are no tools or blueprints that lenders and building owners can use to measure their carbon emissions. Dozens of such tools and calculators are accessible online. However, participants noted that compared to easily visible pollutants like asbestos, which are tangible and have been measured and addressed for decades, carbon is more challenging to measure accurately, given the dearth of experience.

NO AGREED-UPON DEFINITION OR MEASURE OF DECARBONIZATION

Similarly, participants repeatedly stressed that "decarbonization" is not as well understood as other concrete and well-known processes such as removing lead and asbestos. It is not as common in the lexicon, and while several definitions exist,[39] there is no universally accepted metric—or certification—for a decarbonized building.

INEXPERIENCE WITH CONSISTENTLY QUANTIFYING EFFECTS OF RETROFITS

While electrification and investment in high-performance buildings is becoming more common, it is still a relatively new process. As a result, standardized methods of calculating these potential effects are not widespread. For building owners considering electrifying, for lenders looking to invest in retrofits, and for appraisers valuing newly electrified buildings, methods to measure these impacts easily and consistently are critical to achieving scale.

LACK OF STANDARDIZED DISCLOSURES

Although certain financial institutions are beginning to consider "financed emissions" as they originate loans and an SEC climate disclosure rule has been proposed, there is currently no industry-wide and uniform disclosure standard for carbon and GHG emissions. This presents a challenge for investors, including Environmental, Social, and Governance (ESG) investors focused on the environment, who want to invest in climate-resilient and low- to no-carbon assets.

39 NYSERDA defines a carbon-neutral building as one where "the design, construction, and operations do not contribute to emissions of greenhouse gases that cause climate change."

CHALLENGE

#4

Lack of Awareness and Education

While access to capital, risk and uncertainty, and lack of clear and standardized measurements present barriers to decarbonization investments, another fundamental issue is lack of awareness about the need for and benefits of decarbonization.

LACK OF AWARENESS OF LOCAL LAW 97 AND CLIMATE LEADERSHIP AND COMMUNITY PROTECTION ACT

While legislation like LL97 is clear, concrete, and has well-defined penalties, participants explained that many property owners are simply not aware of the timeline of such regulation, the size of the fines, or what they need to do to comply. In particular, work group members emphasized that the financial community has not internalized the climate-related regulatory and financial risks that they face as a result of the loans in their portfolios.

LACK OF AWARENESS OF VALUE STREAMS

Not only are developers and owners insufficiently aware of "sticks" like LL97 fines, but they also fail to fully internalize the potential "carrots" of increased value streams, the participants noted. While decarbonization does not always lead to commensurate energy cost savings in the short or medium term, participants explained that it nonetheless generates a range of value streams that owners are often unaware of or unable to monetize. The most obvious of these value streams is fine-avoidance. By complying with Local Law 97, building owners can avoid thousands of dollars' worth of annual fines, which would directly increase their net operating income (NOI).

INABILITY TO MONETIZE POSITIVE EXTERNALITIES AND LACK OF AWARENESS ABOUT BENEFITS

In addition to value generated from fine-avoidance and efficiency savings, participants noted decarbonization can also lead to improvements in health, safety, comfort, and productivity. However, these are difficult for owners and developers to monetize. On the other side of the equation, tenants lack awareness about these benefits, which mutes the increased consumer demand one would expect if these benefits were well understood.

LACK OF AWARENESS ON HOW TO GET FROM POINT A TO POINT B

Even for those developers and owners who do have a sense of what decarbonization looks like for their respective buildings, there is still deep unfamiliarity with implementation. Uncertainty remains about which technologies need to be used, what type of contractors need to be hired, and which financing options are available.[40]

40 Decarbonization guides do exist. NYSERDA offers technical assistance through its FlexTech program and also published the Empire Building Playbook, which provides a process guide for owners of large buildings who are interested in low-carbon retrofits. There is opportunity for resource awareness campaigns tied to these guides.

LACK OF AWARENESS AMONG TRADES AND CONTRACTOR BASE

Even if the other challenges to decarbonization were addressed, work group members cited insufficient awareness and experience among contractors and other workers in the trades. They explained that if buildings began to retrofit at the pace that climate legislation demands, the limited supply of installers and workers would likely be a serious bottleneck.

SECTION 4
Financing Retrofitting
(costs + capital stack / financing)

To help clarify the overall challenge of decarbonizing an existing affordable property from the perspective of an owner, participants shared a case study involving an affordable multifamily rental property.

CASE STUDY: RETROFITTING AN AFFORDABLE PROPERTY

The building highlighted in the case study was a thirty- to forty-unit affordable multifamily rental property. The rent in the building averages between $1,000 and $1,500, and the property is 100 percent rent stabilized.[41] In this case study, rents are assumed to rise at a 2 percent annual rate[42] and expenses at a 3 percent annual rate.

The building is financially healthy. In the starting period (2022), revenue is $520,000, expenses are $350,000, and the NOI is thus $170,000. Debt service, on the other hand, is only $120,000. This comes from two layers of debt: senior private debt fully amortizing at a market rate, and subordinate debt from a government source on favorable terms.[43]

With a NOI of $170,000 and a debt service of $120,000, the building generates sufficient income to pay its operating expenses and finance its debt. Its debt service coverage ratio (DSCR) is a healthy 1.42.[44]

Were this building subject to Local Law 97, the owners would have two options: They could choose to bear the fines, or they could borrow money to electrify. Which option the property owners choose would depend on the relative impacts on net operating income and annual debt service.

41 Given that this property has a regulatory agreement tied to an Article XI tax abatement, it is not subject to LL97 in the same way as market rate properties are. It is exempted from limits until 2035, but must comply thereafter.

42 In practice, rents would rise subject to an annual cap set by the Rent Stabilization Board.

43 Servicing two loans in this way is not unusual for a regulated affordable property. While public support often includes tax credits and abatements, there is also usually some amount of direct capital subsidy, almost always in the form of a loan to the project. That loan is subordinate to any private debt and might require little or no paid debt service.

44 Some of the affordable housing developers in the work group noted that this is a meaningfully healthier DSCR than the typical affordable housing property.

COST TO BEAR FINES

To determine the impact of the fines, it is first necessary to calculate the whole-building carbon emissions based on the existing energy source and annual whole-building consumption. Next, one must calculate if the whole-building emissions are over the established emissions caps (as laid out in the local law) and by how much. That amount is then multiplied by the annual fine to determine the building penalty. Once this number is calculated, the NOI of the building is reduced directly by that amount.

For this property, the fines would amount to about $50,000 per year in the first compliance period (2024-29). Factoring in unrelated increases in rent and expenses, the NOI would fall from $170,000 in 2022 to $117,000 by 2029. The DSCR would fall from 1.42 to 0.97.

In the second compliance period, the fines would total $70,000 a year. Again, factoring in unrelated rent and expense increases, this would reduce the NOI further to $89,000 and the DSCR to 0.74. In both compliance periods, the building would be financially unviable—the post-fine income would be insufficient to make the $120,000 debt service payments. In this case, the existing capital reserves held by the lender would need to be tapped, the owners would need to contribute their own equity, or the owners would need to sell the property at a loss.

TABLE 3

		Fines				
Current Status			**2029** **Projection with Fines[A]**			**2035** **Projection with Fines[A]**
Revenue	$520	→ +$77 (rent increases) →	$597	→ +$76 (rent increases) →		$673
Expenses	$350	→ +$50 (fines) +$80 (expense inflation) →	$480	→ +$20 (fines, $70 total) +$84 (expense inflation) →		$584
NOI	$170		$117			$89
Debt Service	$120[B]		$120			$120
DSCR	1.42		0.97			0.74

Notes:

A Rent and expense increases are calculated to 2029, rent at 2 percent and expenses at 3 percent annually.

B The total debt service comes from a senior private loan of $1.3 million and a subordinate loan of $4 million from a government source. The former has a rate of 4.59 percent, and the latter has a rate of 0.25 percent. Both have an original amortization term of thirty years and a remaining amortization term of twenty years. The debt service is based on the original amortization. However, the subordinated debt was underwritten based on available cash flow to service it; it will require a substantial balloon payment at maturity.

COST TO ELECTRIFY

The impact of electrification on the property's finances depends on the cost of implementation, the terms of the supplemental debt necessary for the capital improvements, and the impact on operating expenses.

For this building, the total cost of electrification was estimated to be $30,000 per unit, which aggregates to around $1.1 million total (accounting for soft costs). For almost all properties, such mid-cycle capital improvements are financed via debt, either through refinancing if rates are lower than existing debt or a supplemental loan otherwise. In this case, the property is assumed to take on a supplemental loan with a 5 percent interest rate. To coordinate with the existing loan maturities, this new debt would need to amortize in the twenty years remaining on them. Given these terms and the $1.1 million size of the loan, the annual debt service for the building would increase by $90,000 a year, which would bring the total from $120,000 to $210,000.

In addition to this increase in debt service, operating expenses would also likely increase. Even accounting for a decrease in maintenance expenses due to replacing out-of-date gas boilers, it was estimated that operating expenses would nonetheless increase by almost $7,000 following electrification.

Thus, the impact on the debt service coverage ratio in this scenario comes from both directions. First, annual debt service for the property would increase by $90,000 due to the supplemental loan financing the electrification retrofit. Second, NOI would be reduced by $7,000 due to increased operating expenses. Together, these shifts would increase annual debt service to $210,000 and reduce NOI to $163,000. The DSCR would fall to 0.78 and the building would become financially unsustainable. Even if there were lenders willing to make a loan for decarbonization, underwriters would not approve the loan in this case because the building could not service the debt.

TABLE 4

Current Status		Electrification	Electrification Without Incentives
Revenue	$520		$520
Expenses	$350	→ +$7 (increased operating expenses) →	$357
NOI	$170		$163
Debt Service	$120	→ +$90[A] (supplemental debt) →	$210
DSCR	1.42		0.78

Notes:

A Based on a $1.1 million loan at a 5 percent rate and twenty-year amortization, which is set to match the remaining amortization on the existing private and government agency loans.

TAKEAWAYS

For this affordable multifamily rental building, the cash flow simply could not support the supplemental debt necessary to finance electrification, nor could it bear the fines. Existing capital reserves held by the lender would need to be tapped, the owner would need to contribute his/her own equity, or the property would need to be sold at a loss.

However, work group participants did note levers that could be pulled to make such a deal work. These include the following:

- **Reducing the cost of new capital improvements through incentives;**
- **Easing the terms of debt service with lower rates or longer amortizations, which may require renegotiating the terms of the subordinate debt;**
- **Reducing the impact on operating expenses through efficiency measures, utility caps, or tax abatements[45] and/or;**
- **Postponing until near the end of the useful life of existing equipment so that the building would only deal with the incremental cost as discussed above.**

MAKING THE NUMBERS PENCIL

The first and perhaps most straightforward means by which the numbers could be made to work would be to bring down implementation costs. For example, participants estimated that incentives could be used to drop implementation costs down from $30,000 a unit to $20,000. This would reduce implementation costs from $1.1 million to around $750,000. This in turn would reduce the annual increase in debt service due to electrification from $90,000 to around $60,000.

Another way to make electrification more feasible would be to lower the interest rate on the supplemental debt itself. If one could get a concessionary rate of 3 percent rather than 5 percent, for example, that would further reduce the incremental increase in debt service from $60,000 to $50,000. Participants stressed, however, that this low-cost source of capital does not currently exist.

The third way to make the numbers pencil would be to reduce operating expenses. Along with electrification itself, the building owner could implement efficiency measures that reduce energy usage by 25 percent. This would lead to a $15,000 reduction in post-upgrade operating expenses, which is a net $22,000 savings from the above business-as-usual scenario (expenses went from increasing by $7,000 to decreasing by $15,000).

45 Participants suggested that such abatements could be similar to expired programs such as J-51 in New York City.

These improvements would need to be financed, however. Including incentives, such upgrades would raise implementation costs back to $900,000 and increase the annual debt service by about $10,000, bringing the total electrification-driven increase in debt service to $60,000. This $10,000 increase is nonetheless still lower than the $22,000 in net savings from decreased operating expenses.[46]

This example demonstrates how challenging the numbers can be and the wide range of policies, tools, and programs that are necessary to electrify affordable properties, particularly in the early phases of building electrification.

With these incentives in place, the NOI for the building post-electrification would rise from $163,000 to $185,000 and the annual debt service would fall from $210,000 to around $180,000. Together, these shifts would lead to a DSCR of around 1.03. The property would still not be completely healthy; depending on the underwritten DSCR, which is typically around 1.20, it could still be in technical default. However, the building would now be electrified, compliant with LL97, and able to make its debt service payments on time. Additionally, the DSCR, when just considering the private debt, would be closer to 1.30, a healthy number.

This example demonstrates how challenging the numbers can be and the wide range of policies, tools, and programs that are necessary to electrify affordable properties, particularly in the early phases of building electrification.

TABLE 5

	Current Status		Electrification		Electrification
			Without Incentives		With Incentives
Revenue	$520		$520		$520
Expenses	$350	+$7 (increased operating expenses)	$357	-$22 (efficiency upgrades)	$335
NOI	$170		$163		$185
Debt Service	$120[B]	+$90 (supplemental debt)	$210	-$30 (reduced implementation costs) -$10 (concessionary interest rate) +$10 (debt from efficiency upgrade)	$180
DSCR	1.42		0.78		1.03

46 Additional options could be used that are not explicitly considered here. In a taxed building, a tax abatement could directly increase NOI. Alternatively, operating expenses could be held in check via utility caps or concessions.

SECTION 5
Making Retrofits Work

Despite the considerable challenges associated with financing decarbonization retrofits, especially for affordable developments, certain organizations have made such projects work.

CASE STUDY: L+M DEVELOPMENT PARTNERS

During the working groups, Laura Humphrey, Director of Sustainability at L+M, provided insight into how the company has managed to decarbonize some of its affordable housing stock.

There were three key takeaways from her discussion:

1. Aligning large-scale retrofits with major capital events, such as acquisitions or refinancing, allows for more efficient funding and maximizes the benefit of lowered utility costs.
2. Funding these retrofits, especially for affordable properties, requires working with a series of disparate programs, which can be a long and demanding process that costs both time and money.
3. Many of the programs incentivize energy efficiency rather than carbon reduction, which can put electrification measures out of reach.[47] Some highlighted programs and incentives are described below.

> ***Aligning large-scale retrofits with major capital events, such as acquisitions or refinancing, allows for more efficient funding and maximizes the benefit of lowered utility costs.***

LOW INCOME TAX CREDIT FINANCING

Tax credit equity, and particularly the Low-Income Housing Tax Credit (LIHTC), is critical for L+M's affordable housing developments. Without these tools, Humphrey emphasized, few of L+M's deals would pencil out. While LIHTC is not specifically used to obtain the funds needed to decarbonize, without the capital that such programs unlock, there would be far fewer affordable developments to decarbonize in the first place. So LIHTC could become a powerful lever.

FEDERAL INCENTIVES

Humphrey emphasized that federal incentives have been fundamental when financing L+M's projects, with the company using both the solar and geothermal heat-pump federal investment tax credits (ITCs).[48] L+M uses

47 NYSERDA's Low Carbon Pathways program was highlighted as a step in the right direction of helping fund carbon reduction.
48 New York State passed a geothermal tax credit program in 2022.

these credits in the capital stack of their buildings by installing solar panels and/or geothermal heat pumps and selling the resulting tax credits to investors interested in providing equity capital and reducing their tax liability. This practice creates a source of equity for L+M, much like its use of LIHTC. Humphrey emphasized the considerable potential of this tax credit model to help scale carbon reduction.

STATE INCENTIVES

State-level incentive programs such as the Empire Building Challenge[49] and NYS Clean Heat are other essential components of making the finances work.

The Empire Building Challenge (EBC) is a $50 million NYSERDA program that competitively awards funding to owners of high-rise building portfolios. These funds are used to overcome the high up-front costs of innovative retrofits that reduce carbon emissions, with the priority being to encourage owners to pilot new technologies. Besides the funding, the program also provides participants with technical resources and promotes collaboration with industry thought leaders and other leading real estate companies.

L+M was a part of the 2021 cohort of EBC partners and used each aspect of the program to begin decarbonizing the Heritage, a three-building, 680,000-square-foot mixed-use development with 600 mixed-income residential units in East Harlem. Without the funding and assistance, the finances would not have worked and the technical costs would have been prohibitive.

Participants noted that the Empire Building Challenge, while critical for this project, is not a generalizable solution at this stage. The EBC is specifically tailored as a competitive program to motivate large portfolio owners to participate, with the goal of demonstrating cutting-edge electrification projects. As such, EBC incentive payments are not something that the general market can rely upon to make projects pencil out.

The other key state incentive has been NYS Clean Heat, which is a collaborative effort between New York's electric utilities and NYSERDA. It includes a range of initiatives that share a common aim of advancing the adoption of electric heat pump systems in New York. While L+M has primarily used this program to fund geothermal heat pumps and air-source heat pumps in new construction, the funding can also be used in retrofits. L+M had hoped to use it to finance packaged terminal heat pumps (PTHP) in the Heritage development described above, but this became impossible when the Clean Heat program was paused in Con Ed territory as of mid-2022 due to greater-than-anticipated demand for its incentive funding. However, in early August, New York State's Public Service Commission approved the program's resumption. It also allocated an additional $100 million for the program, which brought total funding to $518 million, and created

49 Another important state incentive that L+M highlighted is the Buildings of Excellence competition, which distributes a total of $40 million in awards to eligible developers who design, construct, and operate carbon-neutral multifamily buildings. While the focus of this report is on retrofitting the existing housing stock, Buildings of Excellence is important for developers constructing new buildings.

a continuity funding mechanism.[50] The temporary pause, however, highlights the risks associated with relying on public programs and incentives.

POSITIVE AND NEGATIVE INCENTIVES

Applying for these programs, ensuring compliance, and dealing with other related logistical hurdles takes time, effort, and money. Without proper motivation, there is little incentive to go through such a process. But Humphrey explained that L+M was able and willing to do so given the positive motivation of a social mission and the negative motivation of uncertainty around natural gas access.

On the positive motivation side, a foundational principle for L+M has always been that "affordable housing goes hand in hand with social responsibility," a view that extends to sustainability. L+M's commitment to sustainability drives the company to invest in initiatives such as decarbonization, even if it is not the easiest or most cost-effective path in the short term.

On the negative motivation side, Humphrey highlighted the uncertainty created by the natural gas moratoriums from Con Edison and National Grid in 2019. These moratoriums and the uncertainty they generated around natural gas in New York sent a powerful signal that many in L+M felt altered the business case for electrification and justified investment in all-electric buildings. While the direct effect was on new construction, continued uncertainty made it easier to gain traction on all-electric retrofits as well.

KEY TAKEAWAYS FROM THE L+M CASE

The L+M Development Partners case shows that, in certain contexts and using specific programs, it is possible to make these investments work on a project level, at least for well-capitalized and sophisticated developers like themselves. Three lessons stood out from this example.

First, such investments require proper timing. By aligning large-scale retrofits with major capital events, one can efficiently fund the project and maximize the benefit of lowered utility costs by reflecting them in the loan underwriting process.

Second, retrofits require a series of programs working in tandem: tax credit equity, federal incentives, and competitive state funding. During the major capital events, such incentive programs can be layered in to reduce overall costs and make projects with longer payback periods more palatable. It is noteworthy, however, that some of these programs are one-time funding sources that are not universally available, which makes the decarbonization proposition that much harder. Further, many of them focus on energy efficiency rather than carbon reduction, which can put full electrification out of reach.

50 The PSC approved the reinstatement of the program in Con Ed territory as of August 11, 2022, with newly authorized funding set at $10 million per month. See https://dailyenergyinsider.com/news/36255-new-york-state-psc-approves-518m-for-resumption-of-con-edison-clean-heat-program/.

Finally, developers and owners need the motivation to deal with and bring together these disparate and sometimes conflicting programs. This motivation can come from 1) the positive side, such as a long-standing commitment to sustainability; 2) the negative side, such as uncertainty driven by natural gas moratoriums; or 3) a mix of both. If a project does not have access to even just one of these programs, or if an owner or developer lacks the proper motivation to navigate the programs and handle the challenges, decarbonization becomes exponentially more challenging.

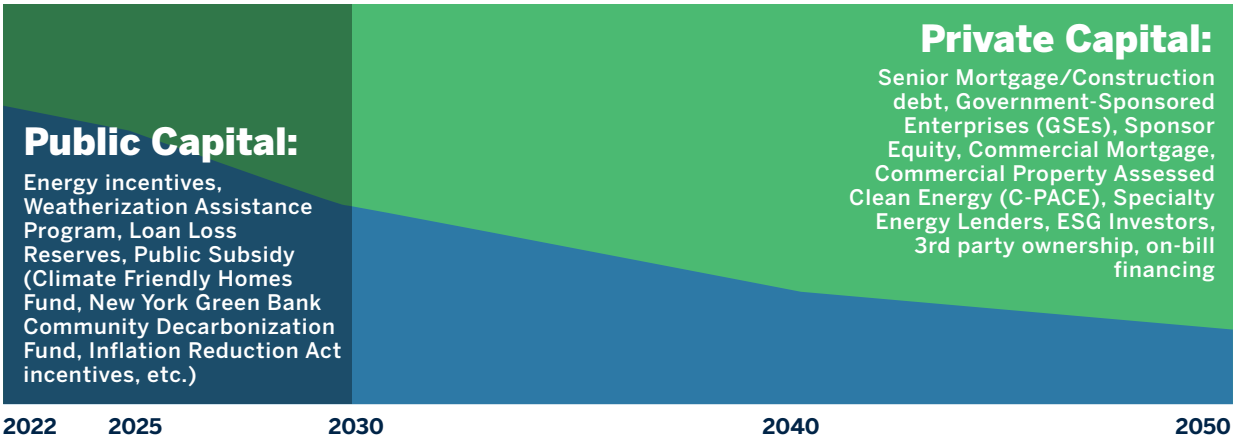
SECTION 6
Capital Road Map

Despite the challenges highlighted in these examples, New York's ambitious climate goals and its large scale of affordable housing coincide to create a critical need for decarbonization investments. In the current market, there are substantial barriers to such investments, making retrofits relatively difficult to finance. At this stage, decarbonization retrofits are typically only undertaken by sophisticated, experienced, and well-capitalized entities with strong social missions. Inexperienced teams seeking to complete decarbonization retrofits require significant public subsidy and energy incentive dollars to make projects financially feasible. For example, owners today are unable to access first-mortgage capital and therefore must turn to higher-cost shorter-term financing options. Many affordable-housing owners cannot afford this without public support, such as NYSERDA incentives, tax abatements, and tax credits (depicted in blue on the chart).

FIGURE 7

Potential capital stack to achieve climate goals for affordable housing

Public funding and support will be important for early adopters (shaded area); **private** financing will be critical for a new "business as usual"



> ***To reach the scale necessary to meet climate goals, decarbonization will need to become "business as usual" for all rehab projects. The market will need to shift from one in which affordable housing is decarbonized on a piecemeal basis, mainly through public financing, to one in which it is done at scale, with owners, financers, mortgage markets, and other key players making investments with minimal public incentive.***

To reach the scale necessary to meet climate goals, decarbonization will need to become "business as usual" for all rehab projects. The market will need to shift from one in which affordable housing is decarbonized on a piecemeal basis, mainly through public financing, to one in which it is done at scale, with owners, financers, mortgage markets, and other key players making investments with minimal public incentive. To continue the example above, rather than relying on public support, owners in the future must be able to access private-sector sources such as green supplemental loans.

This transition to high-efficiency decarbonization can be seen in more detail in the table below, which compares the capital stack, motivating factors, and developer experience typical of decarbonization projects today, to hypothetical projects in the future when electrification and weatherization have become business as usual.

Work group participants noted the potential for a

TABLE 6

Decarbonization Today Versus in Future

Decarbonization Today	Decarbonization in the Future
Capital stack Some private investment backed by significant public support, such as • Federal ITC • NYS Clean Heat • Climate Friendly Homes Fund	***Capital stack*** Primarily private capital routinely invested during major capital events, including • Senior mortgage/construction debt • Commercial mortgage • Sponsor equity
Motivation • ESG goals • Credit enhancement/loan loss reserves • Physical and transitional climate risk	***Motivation*** • Business as usual • Building codes • Direct regulatory requirements • Physical and transitional climate risk
Developer • Well-capitalized and sophisticated affordable-housing developer	***Developer*** • Representative affordable-housing developer

positive self-reinforcing cycle that could lead to this transition. As more investments in decarbonization are made, awareness of new technologies and performance standards will spread, stakeholders will gain experience in these practices, and the costs of electrification will come down relative to today. This cycle will encourage additional investment, which will further deepen the market, and the process will continue. As this occurs, public programs such as the New York Green Bank's Community Decarbonization Fund, HCR's Climate Friendly Homes Fund, and loan loss reserve funds like those run by NYSERDA will sunset and the capital "slack" will be picked up by private lenders.

While this process will have to happen for all housing typologies, the timeline will vary. For example, while market-rate housing is already transitioning via private funding, incentives and public support will be necessary for an extended time for subsidized affordable housing and small unregulated buildings.

The question is, what will serve as the spark? How will investments in decarbonization kick-start and begin this positive feedback loop? Climate legislation on the federal, state, and city level, such as the Inflation Reduction Act and CLCPA, provides both direct public resources and rebate-based incentives to begin mobilizing private markets during this early-adoption phase. In addition to this, the working group participants made a series of recommendations to catalyze the change and make decarbonization the norm rather than the exception.

SECTION 7
Recommendations from Housing Developers and Financiers

The developers and financiers convened by NYSERDA and the NY Fed, in partnership with CPC, put forth a series of recommendations for jump-starting decarbonization investments in affordable housing and eventually making it the new "business as usual." These proposals are wide-ranging and detailed, though given rapid technological process and potential policy changes, more solutions are likely.

Similar to discussions about challenges, the conversation around recommendations naturally requires a discussion about recommendations *for whom.* Table 7 below organizes the recommended solutions by the actors most responsible for them. Naturally, not all recommendations fit so neatly into the box of a single stakeholder, but the actions do often lend themselves to association with particular actors.

Aside from being related to key actors in the ecosystem, each of these recommendations is also aimed at addressing one or more of the identified challenges. These proposals are outlined below, associated with the challenge they most directly (though not exclusively) address.

TABLE 7

Stakeholders	Recommendations
Federal/ State Government	• Simplify and align incentive programs • Leverage tax credits such as LIHTC, Historic Preservation Tax Credits, NMTC, and brownfield tax credits • Establish loan loss reserves and/or credit enhancement mechanisms—for example, by leveraging the State of New York Mortgage Agency (SONYMA) • Require decarbonization of the underlying assets as a condition of sale for distressed loan portfolios • Treat carbon emissions like a pollutant • Require disclosure of GHG emissions from lenders' loan portfolios (for public companies) • Provide CRA credit to regulated institutions for investing in affordable decarbonized or decarbonizing buildings • Increase Section 8 base rents for decarbonized buildings • Layer Medicare/Medicaid funding into investments in decarbonization of affordable buildings
Local Government	**For decarbonized buildings:** • Create property tax abatement • Lower/remove taxes on increased value attributable to decarbonization • Increase FAR or density limits • Standardize permitting and approval • Provide tax relief to utilities to lower prices charged to decarbonized affordable properties
Appraisers	• Value decarbonized buildings more highly, like assessors do
Financial Sectors	• First-lenders grant consent to PACE financing, become PACE lenders, or create supplemental products • Adjust first-mortgage lenders' documents to acknowledge regulatory requirement to electrify and explicitly note that they will provide necessary consent and/or additional debt • Create scorecard for lenders based on carbon impact of loans
Health Care Institutions	• Invest in affordable decarbonized housing as a social determinant of health
Industry	• Develop (or evolve existing) certification standards, including a common set of metrics, to cover decarbonized buildings • Launch awareness and education campaign, including engaging advertising agencies to produce clean home campaigns • Aggregate evidence of increased cash flow and real estate value • Tap into the carbon offset market • Develop direct-to-consumer models
Real Estate Tax Assessors	•Do not overtax electrified properties because of perceived higher values
Underwriters	**For loans to decarbonization projects:** • Implement "sustainability-linked pricing" or pricing for risk reduction • Offer longer amortization schedules • Create transparency about the costs of noncompliance in underwriting • Bring forward increased future value of carbon-neutral buildings • Implement reasonable commodity cost escalation assumptions
Utilities	• Reduce variability of rates across localities within the same region • Reduce utility penalties/surge pricing • Utility-funded, tariff-based financing models

ADDRESSING CHALLENGE #1

High Costs of Decarbonization and Access to Capital

One of the principal barriers to meeting legal requirements for decarbonization and electrification of affordable properties is difficulty in accessing low-cost capital amid already high and rising costs. Work group members raised three broad possibilities to address this issue: adjusting underwriting, using tax concessions and relief, and leveraging policy-motivated investments.

RECOMMENDATION 1: LOWER THE COST OF FINANCING DECARBONIZATION BY ADJUSTING UNDERWRITING

Offer sustainability-linked pricing or pricing for risk reduction

The most obvious underwriting adjustment that would lower decarbonization costs would be to provide lower interest rates on debt used to finance qualified decarbonization projects. This could be a version of "sustainability-linked pricing/financing," whereby borrowers who achieve sustainability goals receive a reduction in the interest rate they pay on the loan. In this case, borrowers would receive the reduction for decarbonizing their property, which would make it cheaper to finance such deals directly. A related incentive would be to provide lower-cost capital on an ongoing basis to decarbonized buildings. For example, buildings certified as decarbonized through a LEED-like process could unlock access to lower-cost capital for future refinancing, offering a clear incentive for buildings to decarbonize. These incentives would engineer a win-win by providing a financial reward to owners and reducing lenders' climate-related financial risk.

Extend amortizations

A second straightforward adjustment would be to extend the amortization schedule on supplemental debt used to finance energy efficiency and electrification improvements. Extending the amortization schedule would expand access to capital and reduce the regular interest and principal payments for buildings.

Create transparency about the costs of noncompliance in underwriting

While the previous two proposals would lower the *cost* of capital, one way to improve *access* to capital for electrification is known as "price for risk/risk reduction." The underwriting process could incorporate estimates for buildings' income and expenses with and without energy efficiency upgrades. This would promote transparency around the cost of not taking measures to upgrade energy efficiency. In practice, underwriters would run the income and expense numbers (discounted cash flow over fifteen years) of a building without energy-efficiency upgrades. Expenses would include not just the higher energy costs (when compared with the numbers for post-energy efficiency upgrades) but also any fines under Local Law 97 or other relevant laws. The underwriter could then compare how the numbers look with and without energy-efficiency upgrades.

Bring forward increased future value of carbon-neutral buildings and present documentable evidence of improved cash flow

Another method to increase access to capital would be to bring forward the increased future value of carbon-neutral buildings and to aggregate evidence of improved cash flow from these investments (e.g., lower insurance premiums, increased resident satisfaction resulting in improved occupancy, etc.). The electrification of buildings generates future value directly by reducing the fines and fees that owners will need to pay based on statutory requirements like those in LL97, as well as through efficiency savings. It also does so indirectly, through improvements in health, safety, and comfort. The challenge is to transform this future benefit into present value. For the direct value improvements, the appraisal industry should recognize the increased future property value of decarbonized assets, allowing decarbonized properties to access more capital through the expectation that they will trade at a premium.

For the indirect value improvements, such as those related to health, concretizing the future benefit into present value is more challenging. However, there is movement here, and some models are forming. For example, health care institutions such as UnitedHealth Group are beginning to invest hundreds of millions of dollars in healthy affordable housing, understanding that this investment will increase housing security for their workers and improve health outcomes for residents.[51] Encouraging and facilitating such developments and tying them to decarbonization is another way to expand capital access.

Simplify the process of obtaining mortgage holder consent, have first-mortgage lenders become PACE lenders, or create supplemental products that are fully subordinate to the first mortgage

Obtaining mortgage holder consent was identified as another key constraint and a source of risk and complexity in decarbonization projects. When an owner tries to get mid-cycle capital from a source other than their existing first-mortgage lender, the first-mortgage lender needs to sign a consent form agreeing to allow the owner to collateralize the property with additional debt. The first-mortgage lender underwrites the new debt to ensure it will not impair the debt coverage ratio for the first mortgage and the proposed additional financing. This process would be simplified substantially if lenders' mortgage documents acknowledged the requirement to electrify the property because of the CLCPA and LL97 and explicitly noted that they will provide consent to new debt under given underwriting parameters or provide that additional debt at a future date when compliance requirements and penalties kick in.

Alternatively, if a building's existing leverage level is low enough, owners can turn to out-

51 See UnitedHealth Group, "Additional $100 Million Investment in Housing Bolsters UnitedHealth Group's Efforts to Address Social Determinants and Achieve Better Health Outcomes," April 7, 2022.

side capital sources to finance the building's decarbonization work, with first-mortgage lenders consenting to Commercial Property Accessed Clean Energy (PACE) financing. However, due to concerns over the lien priority and lack of control of the underwriting process of mid-cycle debt, first-mortgage lenders are typically skeptical of such financing. One way to overcome these challenges would be for first-mortgage lenders themselves to become PACE lenders. If they did not want to become PACE lenders, and if they refused to consent to PACE financing, experts emphasized that first-mortgage lenders must take responsibility for providing mid-cycle capital to property owners needing to comply with LL97 and the CLCPA. First-mortgage lenders could create supplemental products that would be pari-passu with existing first-mortgage debt or make supplementals fully subordinate.

RECOMMENDATION 2: PROVIDE TAX INCENTIVES AND REGULATORY RELIEF, ESPECIALLY TO EARLY ADOPTERS

Create property tax abatement for electrified buildings

The most straightforward way to leverage taxation to make more electrification projects pencil out would be to provide a tax abatement for decarbonized buildings. An exemption like J-51 would directly reduce expenses and free up money for financing electrification investments. However, the scope of this proposal is limited by the fact that many affordable properties already have tax relief measures in place.

Another proposal made in the working sessions was to avoid taxing the increased value of properties that directly results from decarbonization. This would allow the owner to capture a larger portion of the increased value caused by investments in electrification.

Provide tax relief to utilities so they can reduce electricity prices charged to decarbonized buildings

The relatively high cost of electricity itself presents a challenge to decarbonization. Concessionary utility rates for affordable decarbonized buildings could reduce the impact of electrification on operating expenses and make more investments pencil out.[52] This could be accomplished in a variety of ways, but the main method discussed by participants would be through local taxes. For a given utility bill, one-third of the cost is the electricity itself, one-third is delivery, and one-third is taxes and fees paid to the government (with local New York City taxes being particularly impactful). There is scope for using taxes and fees as leverage. Utility companies could provide electricity at preferential rates to electrified buildings in return for tax and fee relief. This would be

52 Participants noted that for any such incentive, there would need to be a wider band for what qualifies as low income compared to what is used for existing utility programs.

especially effective if targeted toward early adopters and naturally occurring affordable housing. However, participants noted that such tax revenue often funds other green initiatives, and therefore it would involve trade-offs.

Leverage tax credits

Tax credits are used to drive private capital into developments that would otherwise be infeasible because market economics alone will not support redevelopment. Low Income Housing Tax Credits support affordability, Historic Tax Credits support architectural integrity and preservation, Brownfield Tax Credits support environmental remediation, and so on. Developments using these sources of capital would not be economically viable without the equity infused through these programs. While new tax credit programs like those created in the Inflation Reduction Act will help, existing credit programs could be enhanced to include a decarbonization boost.[53] For example, the state-level Qualified Allocation Plan (QAP) for LIHTC could be amended to incentivize all-electric, high-performance design. Over time, agencies could simply impose a requirement that credits will be available only for decarbonized or decarbonizing properties.

Give density bonuses or increased floor area ratio (FAR) limits

For a given plot of land, an increase in the maximum allowable density and/or in the FAR limit increases the value of the property for the developer. This increase in value could be tied to developing all-electric buildings; where such bonuses are viable, if developers commit to building decarbonized properties, they could be awarded density bonuses and/or increased FAR limits. It is worth noting that this would primarily influence new construction, rather than decarbonization of the existing building stock.

RECOMMENDATION 3: LEVERAGE POLICY- AND MISSION-MOTIVATED INVESTMENTS

Require disclosure of carbon emissions

While access to capital is a major challenge when decarbonizing the affordable housing stock, there is a considerable supply of mission-driven or otherwise socially responsible investment capital in the market. Broadly defined, the ESG market's assets under management were estimated at $38 trillion in 2021 and are projected to surpass $50 trillion by 2025.[54] However, despite the size and growth of the ESG and impact investing world, there has been relatively little attention paid to decarbonization, energy efficiency, and climate resilience in buildings. One way

53 Participants stressed that it would be a simple and elegant solution that aligns with the current aims of such credits. For example, given the environmental goals of the program, it seems counterproductive for a developer using a Brownfield Tax Credit to remediate environmental contamination and then connect the brand-new building to a heating source powered by carbon-emitting fossil fuel.

54 See Bloomberg: "ESG assets may hit $53 trillion by 2025, a third of global AUM," February 23, 2021.

to potentially draw investors would be to disclose the carbon emissions, efficiency standards, and climate resilience of the buildings underlying securitized assets. There are investors who would be drawn to pools of securitized assets that rate highly on climate metrics.

Create report cards for lenders

Similarly, a trusted third party could create a scorecard for lenders based on the carbon impacts of their loans. Assuming sufficient competition—insufficient competition being a drawback raised by participants—this would drive lenders to make more low-carbon investments or to invest in carbon reduction projects. This would increase the supply of capital for building owners looking to electrify.

Provide additional Community Reinvestment Act (CRA) credit for investing in buildings that are affordable and undertaking decarbonization projects

Billions of dollars of community development investments receive CRA consideration annually. For example, banks and other insured depository institutions routinely work with or through CDFIs to invest in LMI communities. Participants noted that one way to increase capital access for decarbonization would be to award CRA credit to institutions for up front investments in decarbonization projects, similar to the credit those institutions now receive for making investments after a climate-related disaster.

Require decarbonization of underlying assets as a condition for sale of distressed-loan portfolios

Direct government requirements could also be employed. GSEs like Freddie Mac and Fannie Mae, federal agencies like HUD, and state agencies like SONYMA routinely sell discounted mortgage pools to investors and nonprofits so that those assets can be repositioned. The pools are purchased at a discount by the buyers, but few restrictions are placed on the outcomes of the assets. The discounted pools could come with a requirement to decarbonize the assets, with a mortgage discount being partially used as the subsidy for electrifying the homes.

Establish loan loss reserves and/or credit enhancement mechanisms

One way to coax otherwise hesitant lenders off the sidelines would be to provide some degree of protection for potential losses. This could come in the form of loan loss reserve programs, of the sort NYSERDA already has for clean energy lending. Alternatively, SONYMA could be leveraged in its current capacity as a credit enhancement for private debt. Banks and other first-mortgage lenders participating in a new decarbonization program could get top loss protection of, for example, 20 percent, for a modest rate premium. SONYMA would then pay claims for buildings that default because of energy cost burdens. To do this with consistency, the agency would need to directly recognize the benefits of decarbonization and deep energy retrofits and properly un-

derwrite the operations of high-performance buildings. Using expense standards from buildings heated by fossil fuels creates unnecessary challenges for lenders trying to support decarbonization where they rely on SONYMA insurance.

Layer Medicare/Medicaid funding into investments in decarbonization of affordable buildings

Similar to how private health care institutions are investing in housing insofar as it is a key social determinant of health, public health care dollars could also pair with energy efficiency funding. This would increase available capital and monetize the health co-benefits of decarbonization. As an example, NYSERDA and the New York State Department of Health are currently undertaking the NYS Healthy Homes Value-Based Payment Pilot. This pilot is focused on developing a framework that allows New York's managed-care organizations to fund residential "healthy homes" interventions as part of their value-based payment arrangements with health care providers within the Medicaid health care delivery system. Residential improvements combine energy efficiency/weatherization measures (including electrification measures in certain circumstances) with in-unit measures aimed at addressing respiratory conditions such as asthma. When implemented together, these interventions can improve occupant health, reduce energy bills and health care costs, and improve the comfort and safety of homes.

Tap the carbon offset market

While neither New York State nor New York City have mandatory carbon offset regulation, many firms and other investors purchase carbon offsets to meet self-imposed goals. To the extent that such dollars could be directed towards decarbonization investments it would represent a win-win: firms and investors would meet their carbon offset goals while property owners would gain access to another funding stream.

ADDRESSING CHALLENGE #2

Perceived Project Risk Is Too High

RECOMMENDATION 4: LEVERAGE GOVERNMENT POLICY AND REGULATION

Simplify and align incentive programs

On the government side, a major way to reduce perceived risk and complexity would be to simplify and align incentives, especially in the early stages of the transition and for early adopters of decarbonization technologies. As the L+M example demonstrated, navigating the various programs can be a time and cost burden and could introduce risk into the project. Removing that hurdle by simplifying the process would help both lenders and developers to invest in decarbon-

ization. In New York, HCR and NYSERDA are aware of this challenge and have partnered to jointly subsize affordable all-electric, high-performance housing construction.

Expedite and standardize the local approval

Similarly, localities could standardize permitting and approvals for decarbonized buildings. One of the biggest costs for new developments in terms of both time and resources is going through the often-labyrinthian local approval process. Getting proper approvals is onerous, causes uncertainty and delays, and introduces risk. Providing an expedited approval process would be a direct way to generate value for developers that commit to the construction of all-electric, high-performance properties. Participants were careful to note, however, that this would mostly incent new construction rather than the decarbonization of existing affordable properties.

Pass local building and energy codes calling for decarbonization

New York should also accelerate the passage of building and energy codes that call for decarbonization and high-performance buildings. The CAC's draft scoping plan calls for an all-electric new construction requirement for all buildings by 2027 (earlier for single-family homes and low-rise buildings). This would directly influence new construction, and over time additional energy code revisions would, after a certain date (2030 to 2035, depending on building type), preclude like-kind replacement of fossil fuel heating and cooking appliances at the end of their useful lives. Localities could also opt-in to the NYStretch energy code, which is a supplement to the statewide energy code that improves its efficiency outcomes by around 10 percent.

Increase Section 8 base rents for decarbonized buildings

Work group members also highlighted the importance of subsidy programs. Specifically, Section 8 base rents could be increased for electrified buildings to offset the higher cost of electricity. This would also increase cash flow, allowing the buildings to borrow more to do the work up front, using the higher rents to pay the debt service. Participants suggested this could begin with increasing housing assistance payment (HAP) contracts of Project-Based Section 8 Rental Assistance for multifamily properties.

RECOMMENDATION 5: AGGREGATE EVIDENCE OF IMPROVED CASH FLOW

While electrification and decarbonization, compared to simple energy-efficiency investments, are not necessarily new, they are sufficiently novel to justify some perceptions of elevated risk and complexity. Uncertainty around future cash flow is one such perceived risk. A straightforward way to address this risk would be to aggregate evidence of improved cash flow from these investments. Such cash flow improvements could result from lower insurance premiums, lower

maintenance costs, and other avenues. Incentivizing first-movers and collecting data from them is critical for this step. In a similar way, aggregating evidence of real estate value appreciation due to energy upgrades could diminish the perception of risk that may otherwise keep investors and developers on the sidelines.

RECOMMENDATION 6: STANDARDIZE UTILITY PRICING AND LEVERAGE UTILITY LENDING MODELS

Reduce variability in utility rates

Utilities are another major driver of risk and complexity for decarbonization projects. Participants highlighted a series of steps to address this. Utility companies could reduce variability in utility rates across localities within the same region and minimize utility penalties/surge pricing in clean energy buildings that rely on the grid during evening hours.[55] On the underwriting side, underwriters could model commodity cost escalation scenarios to assess the relative costs of natural gas and electricity over time. Participants noted that current commodity cost escalation assumptions are neither conducive to decarbonization investments, nor are they necessarily realistic, given that they potentially overstate increases in electric costs and understate increases in natural gas costs.

Utility tariff-backed financing

This financing method enables utilities to finance clean energy upgrades for LMI households without restrictions based on credit scores or income levels. Utilities provide the capital for the clean energy upgrade, which customers pay back through a tariff added to their utility bill. Ideally, the reduced electricity usage leads to a lower utility bill, even with the additional tariff. Because customers repay the investment through a tariff, it is not technically a loan.

RECOMMENDATION 7: DEVELOP AND SCALE DIRECT-TO-CONSUMER FINANCING MODELS

Direct-to-consumer financing models

In recent years, direct-to-consumer (DTC) companies have piloted financing solutions that enable small and medium-sized building owners to bring energy efficiency improvements to their properties. These companies use lease-to-own platforms, offering landlords and homeowners green heating and cooling systems. DTC companies conduct the energy assessment, install the equipment, and manage upkeep of clean energy systems. Reductions in building energy costs (estimates range from 30 to 50 percent on average) help to fund the leases extended to landlords and offer returns to investors.

55 Participants noted that while there are demand management benefits to such pricing, insofar as technologies like household solar reduce the strain on the grid, such pricing can increase demand and stress in the long term by preventing the transition to such technologies.

ADDRESSING CHALLENGE #3

Lack of Clear Measurement and Standards

RECOMMENDATION 8: DEVELOP (OR EVOLVE EXISTING) CERTIFICATION STANDARDS, INCLUDING A COMMON SET OF METRICS, TO COVER DECARBONIZED BUILDINGS

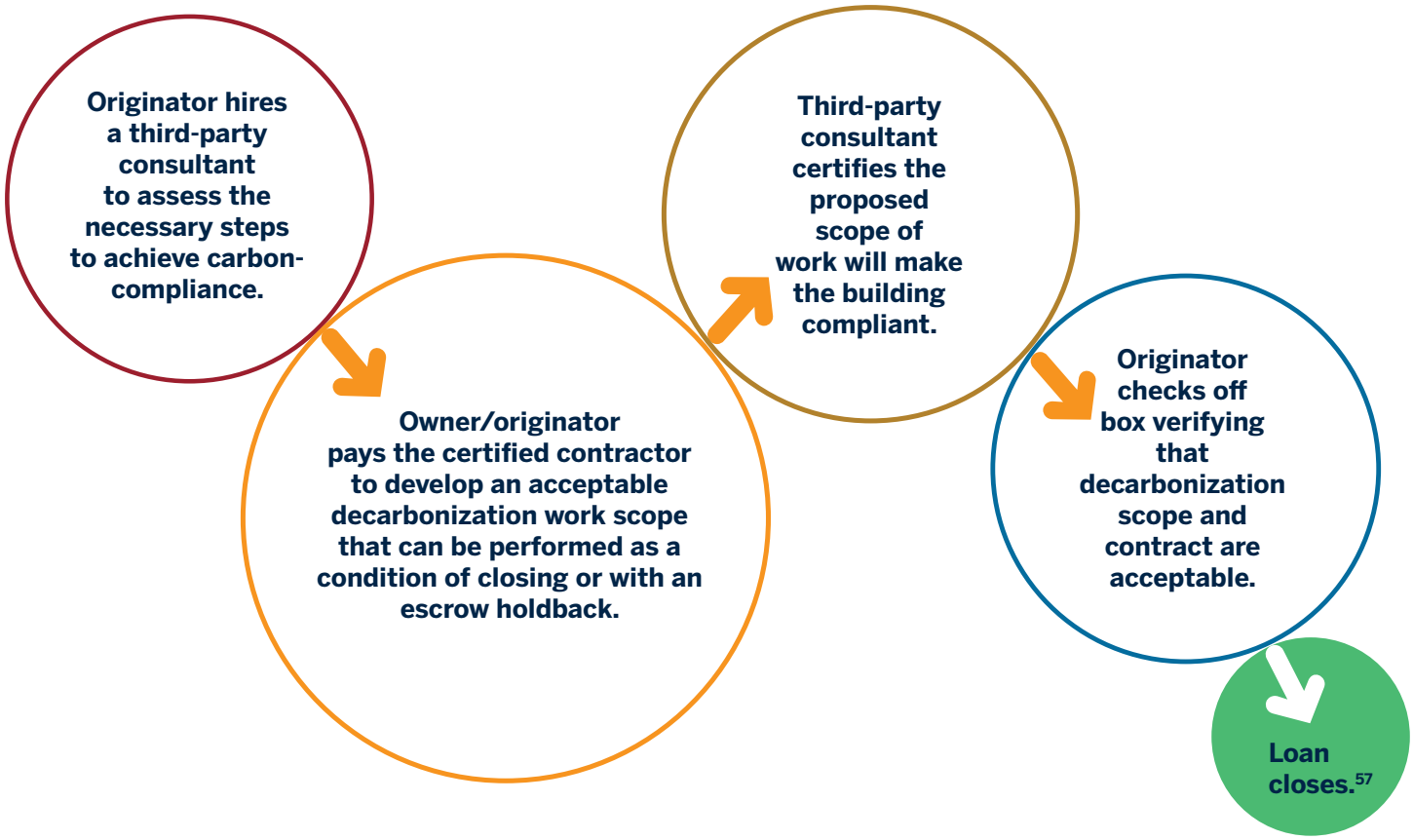
A theme that surfaced repeatedly in the working group was the need for a common set of standards and metrics for decarbonization. For scale to be achieved, participants emphasized the need for both key indicators that can be consistently measured as well as widely accepted definitions for which properties can be certified as decarbonized, or at least as carbon-neutral ready. For metrics, there has been some industry-led movement. For example, leading general and limited partners in the private investing sector worldwide have partnered to form the ESG Data Convergence Initiative. These partners have agreed to collect firm-level common metrics on six core ESG categories, including greenhouse gas emissions and renewable energy. For definitions and certification, there are standards that are beginning to gain traction. "All-electric, high-performance" means that a building has all-electric appliances and a better-than-code envelope. "Carbon neutral" means a building is highly efficient, burns no fossil fuel on site, has capacity for load flexibility, and is powered by clean electricity. "Carbon-neutral ready" means that a building will qualify as carbon neutral once the grid is fully emission-free (by 2040, per CLCPA requirements). More widespread acceptance and dissemination of such metrics and standards is an important step toward business-as-usual decarbonization.

RECOMMENDATION 9: TREAT CARBON EMISSIONS LIKE A POLLUTANT

To achieve scale and make decarbonization business as usual, mortgage markets will need to adapt. Originators are key actors in this market, and their top priority is closing loans. Thus, creating a standard whereby loan closings are tied to decarbonization and electrification could serve as a powerful lever. For example, carbon could be included in the Integrated Physical Needs Assessment (IPNA) or it could be classified as a pollutant and put into Phase I Environmental Assessments. In essence, a standard box that had to be checked to verify that the building is either decarbonized or on the path to it before the loan could close would serve as a powerful incentive. This is how the process works for lead, radon, asbestos, and other pollutants.

Along with this classification, a key step would be to establish a clear and uniform process for decarbonization. For asbestos, there is an agency[56] that tells stakeholders what to do, there are contractors who know exactly how to do it, and there are certifications verifying that it was completed. Something similar would need to be done for decarbonization. The process could look something like the following:

56 The Asbestos Control Bureau in New York State's Department of Labor oversees the abatement of toxic hazards associated with asbestos.



ADDRESSING CHALLENGE #4

Lack of Awareness and Education

RECOMMENDATION 10: LAUNCH AWARENESS AND EDUCATION CAMPAIGN

Beyond high costs, perceived risk, and a lack of clear standards, there is also a simple lack of awareness of both the need to electrify the built environment overall and the specific consequences of legislation like LL97. For example, many owners and the banks that lend to them do not appear to have internalized the potential for a dramatic reduction in building values when LL97 fines come into effect. More broadly, there is a lack of clarity about the direction stakeholders need to take, why they need to take it, and how they will get there.

To ameliorate this, homebuilder associations, the real estate industry, and advertising agencies at large could support an awareness campaign around decarbonization and electrification, similar to how the auto industry has invested in making people aware of electric vehicles and

57 For buildings with newer systems or greater economic challenges, there could be a requirement for decarbonization over time with capital reserves to pay for it. Reserves could be capitalized partially up front and then contributed monthly over time.

their benefits. This campaign could include both the private sector and philanthropy. Boosting awareness would advance electrification in several ways. It would increase demand for retrofits and the requisite technologies, which could bring down costs as perceived risk falls and economies of scale are achieved. It could also help define the market. For example, if LL97 lines are clear and well understood, institutional investors will be reluctant to invest in noncompliant buildings.

Beyond a traditional advertising and awareness campaign, suppliers and sales representatives could also be encouraged to sell all-electric solutions. On an individual level, consumers often fail to see the worth in educating themselves about conceivable options for heating. They will frequently default to purchasing whatever they are sold. Thus, if representatives were selling heat pumps as the first option, many more consumers would purchase them and have them installed.

Finally, participants stressed that a considerable expansion of the workforce will be necessary to complete the decarbonization projects necessary to meet the state's climate goals. Educating and training both workers and students to fill this need will be critical.

Conclusion and Next Steps

Proposing solutions is a first step toward finding and directing the investment capital into clean, affordable housing that New York law necessitates. We recognize that not all the proposed solutions will be viable, but the Inflation Reduction Act will drive additional resources to kickstart the market, making more of these recommendations attainable. We also know that to achieve the best outcomes, some proposed solutions will need to be undertaken in combination with efforts that are already underway.

Financing clean, affordable housing is a cross-sector undertaking and will depend on both public and private innovation—as illustrated by the Capital Roadmap depicted in this report. Government and industry actors, including NYSERDA, HCR, CPC, and others—with possible future convening and analytic contributions from the New York Fed—should create a Clean Housing Capital Committee to estimate the potential impact of this report's recommendations and determine which actors should take the lead on specific proposals. Collaborative work across the financial sector, in partnership with various public sector departments, could lead to evaluation and prioritization of solutions by their potential impact and feasibility. Members of a cross-sector committee, partnering with other relevant actors, could then assign implementation resources to the highest priority ideas. The objective would be to offer feasible, high-impact ideas to stimulate both demand and supply, in support of New York's legislated climate goals.

Appendix

FIGURE 3

Sustainable Affordable Housing Work Group Timeline—Spring 2022

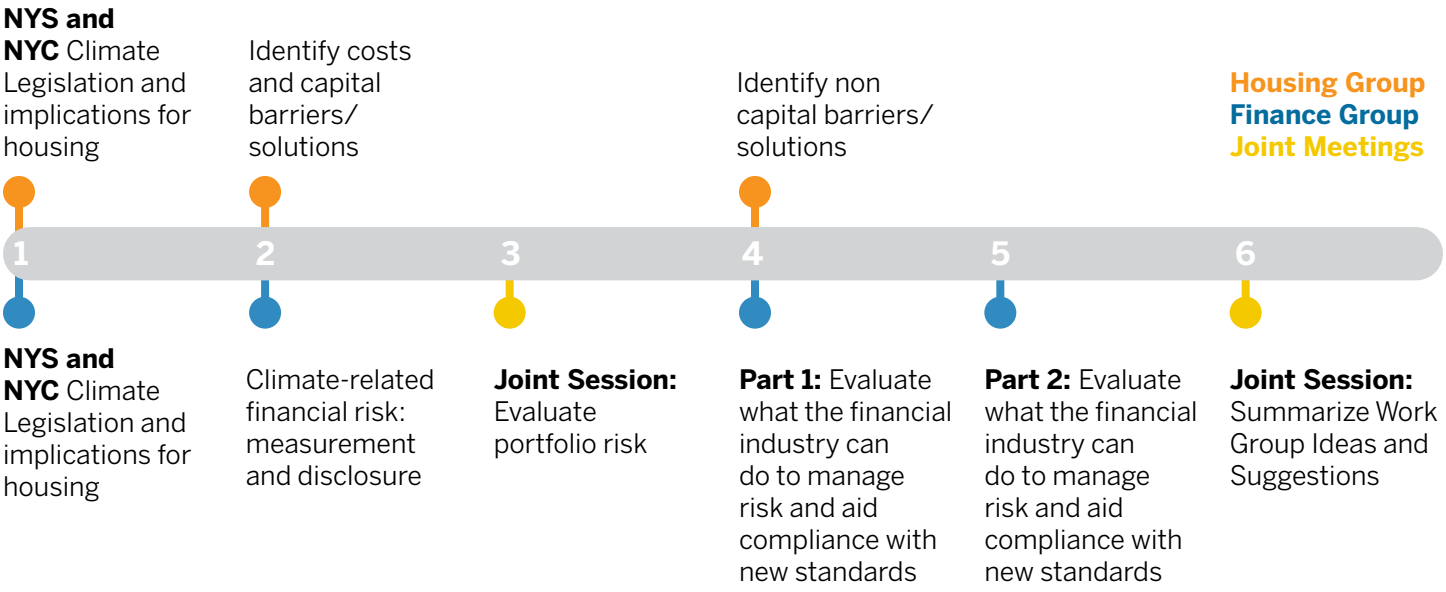
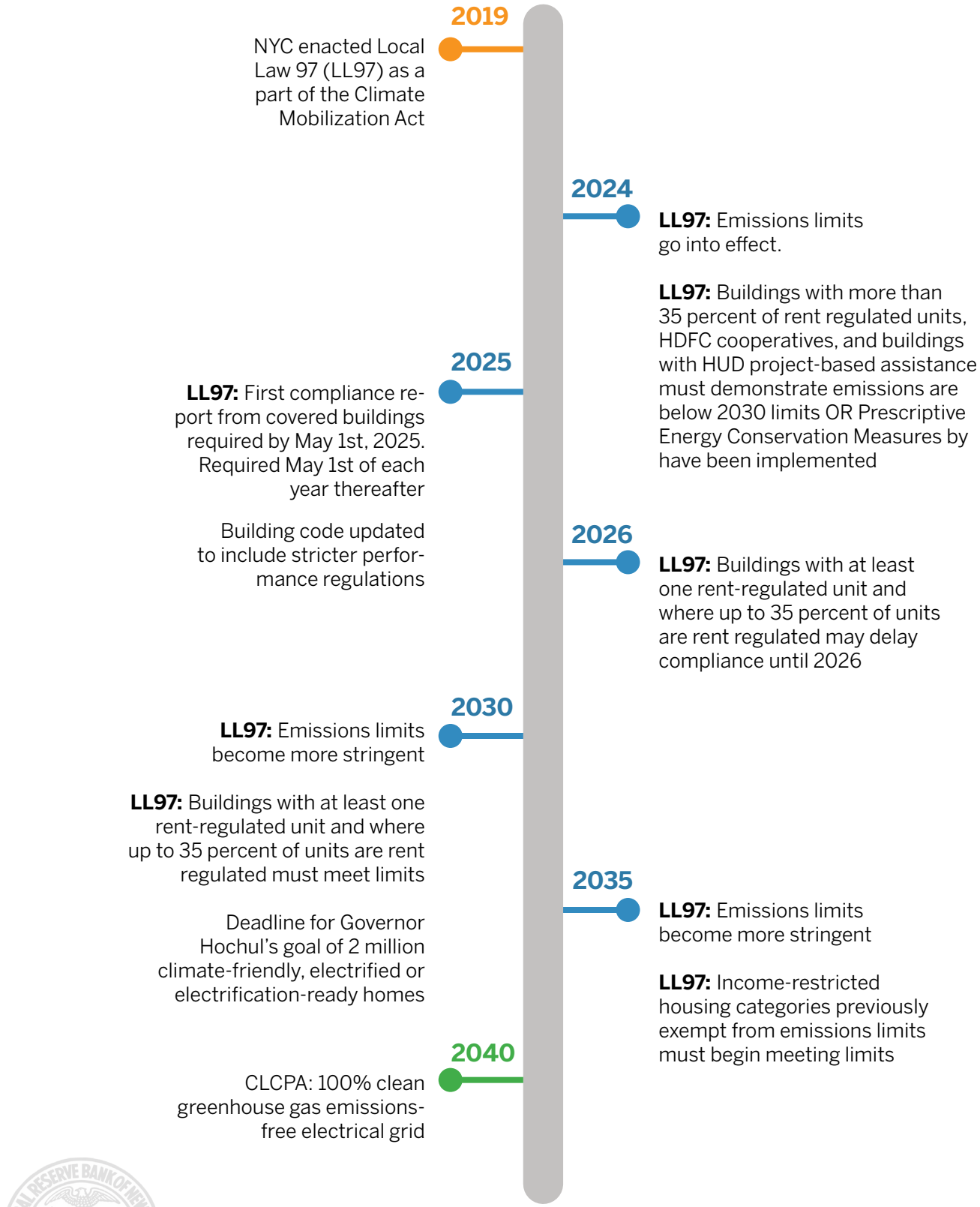


FIGURE 3

New York Climate Law Implementation Timeline and Other Key Dates *(Detailed)*



CLCPA Implementation Timeline

BEGINNING OF 2020
The CLCPA comes into effect

END OF 2020
23% increase in energy efficiency in state owned facilities

BEGINNING OF 2021
Deadline for the Department of environmental Conservation to establish a greenhouse gas emissions limit and a social cost of carbon

BEGINNING OF 2022
The New York State Climate Action Council will prepare and approve a scoping plan outlining recommendations to achieve emissions targets

BEGINNING OF 2023
The council must submit its final scoping plan

BEGINNING OF 2024
The Department of Environmental Conservation will create rules and regulations to ensure compliance with statewide emissions reductions and limits

DECEMBER 31ST, 2025
Develop 6,000 MW of distributed solar and a reduction of 185 trillion Btu through energy efficency

BEGINNING OF 2024
End of 2030
Develop 3,000 MW of energy storage and a 40% reduction in emissions form the 1990 baseline

END OF 2035
Develop 9,000 MW of offshore wind

END OF 2040
100% clean greenhouse gas emissions free electrical grid in New York State

END OF 2050
85% reduction in statewide emissions with 15% reduction from state created offsets for a net 100% reduction in emissions

Chart Source:
https://www.suny.edu/sustainability/goals/clcpa/