



NEW YORK CITY COMPTROLLER
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Cap the Credits

Strong Implementation of Local
Law 97, NYC's Green New Deal
for Buildings

BUREAU OF POLICY AND RESEARCH

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Executive Summary

New York City's Local Law 97 (LL97), the most ambitious city-wide building energy law in the country, will go into effect in 2024, reducing greenhouse gas emissions (GHG) from the building sector 40 percent by 2030 and 80 percent by 2050 from the 2005 baseline. By making emissions reductions mandatory, LL97 will require property owners to invest in and complete building improvements to reduce emissions – fundamentally transforming NYC's building stock.

As LL97 goes into effect, the City must ensure that the law's implementation and associated rulemaking have fidelity to the law so that it can deliver on its promise. On October 6, 2022, the NYC Department of Buildings (DOB) proposed the first set of rules for LL97 implementation, which address emissions calculations and the use of Renewable Energy Credits (RECs).

To inform the City's rulemaking process, the Office of the New York City Comptroller reviewed how emissions calculations and the use of Renewable Energy Credits should be best structured to maximize LL97's climate, environmental, economic, and health benefits.

Key Findings

- Only 30% of buildings will be noncompliant in the initial 2024-2029 compliance period, but this number rises to over 70% in 2030, as standards rise at the start of the second compliance period.
- Large commercial buildings, which are responsible for the largest share of emissions and mostly located in Manhattan, will benefit most from statewide grid decarbonization without any action on their part to undertake the type of retrofit work envisioned in LL97.
- Residential buildings are disproportionately reliant on the onsite combustion of fossil fuel for heating, cooling, and cooking. Extensive retrofits of residential buildings will be capitally intensive and require significant financial and technical support.
- A large portion of buildings will need to complete large-scale retrofits to comply with the law by 2030. Retrofits present upfront costs to building owners but will result in significant savings over time while yielding the maximum benefits for New Yorkers. Rulemaking and implementation of LL97 must ensure that retrofits to improve efficiency or electrify buildings are incentivized and encouraged.
- An unanticipated supply of Renewable Energy Credits, as a result of projects prompted by the NYS Climate Leadership and Community Protection Act (CLCPA), which was adopted after LL97, threatens to weaken the impact of the law. DOB's rules must therefore limit the use of RECs to spur more building retrofits that reduce emissions and uphold the intent of LL97.

Recommendations

In the next 14 months before LL97 enters into force, the City will make critical decisions through both rulemaking and administrative actions. The following recommendations will begin to ensure the effective implementation of LL97 and will best support the reduction of building emissions in New York City:

1. **Limit the use of Renewable Energy Credits to no more than 30% of a building's electricity emissions above its limit:** Renewable Energy Credits (RECs) should be structured with appropriate guardrails that enable building owners to reap their benefits without weakening the implementation of LL97 or undercutting its emissions reductions goals. DOB's draft rules rightly limit REC applicability to electricity emissions. In addition, however, RECs should be available for use on no more than 30% of a building's electricity emissions in excess of its limit.
2. **Encourage Building Retrofits & Energy Efficiency by Aligning Incentives, Costs, and Penalties:** To maximize the benefits of LL97, the rules and enforcement measures should position retrofits as more economically attractive than penalties. Deductions, such as RECs, should be either costly or limited. The rules should incentivize early electrification. If needed, penalties and incentives should be adjusted over time.
3. **Establish a Green Affordable Housing Fund:** New York City should establish Green Affordable Housing Fund (GAHF), capitalized through payments from commercial buildings made in lieu of fees for excess emissions, and potentially through funding from the federal Inflation Reduction Act. The GAHF would be structured to finance the upfront cost of retrofits and energy efficiency in rent-stabilized and City-subsidized affordable housing.

The recommendations in this report are focused on ensuring that the proposed DOB rules and implementation effectively manage the impacts of grid decarbonization and put appropriate guardrails on Renewable Energy Credits. However, this analysis also makes clear that the residential sector will face a unique set of challenges that must be addressed through the expansion and creation of new financing programs for the residential sector that address affordability and include strong tenant protections. In the months to come, the Comptroller's office will continue to provide oversight of LL97 implementation and recommendations that support residential compliance without placing undue burden on low- and moderate-income New Yorkers.

Introduction

Over 70% of New York City’s greenhouse gas emissions come from buildings.¹ As the result of years-long advocacy and leadership by a strong and diverse coalition of grassroots climate advocates, former Council Member and Chair of the Environmental Protection Committee, Costa Constantinides, and then-City Council Member Brad Lander, the New York City Council passed into law the Climate Mobilization Act in April of 2019, including the landmark Local Law 97 (LL97),² providing a groundbreaking mandate to reduce emissions from the city’s building stock. As the most ambitious city-wide building energy law in the country, LL97 mandates the reduction of greenhouse gas emissions (GHG) from the building sector by 40 percent by 2030 and 80 percent by 2050 from the 2005 baseline. LL97 is poised to deliver enormous benefits for environmental justice by improving health of New Yorkers, and for the green economy by creating thousands of well-paying jobs.

To inform the City’s implementation of the law, the Office of the New York City Comptroller undertook a review of how LL97 can be best structured to maximize benefits to New Yorkers without placing undue burden to low- and moderate-income New Yorkers. Objectives included:

- Evaluate the impact of the law and the City’s proposed rules on specific building sectors in its first and second compliance period;
- Provide recommendations on how rules and implementation can be improved to maximize benefits; and
- Identify pathways to support building owners and residents in achieving mandated emissions reductions.

Recognizing that LL97 will have wide-ranging impacts on New York City for at least the next several decades, this report seeks to inform the City’s real-time decision making on implementation and identify future areas of research.

Maximizing Benefits for New Yorkers

LL97 is poised to massively expand the retrofit market in New York City, bringing with it wide-ranging, climate, environmental, economic, and health benefits:

- **Climate and environmental benefits:** Buildings are the number one source of greenhouse gas emissions in New York City. Reducing emissions of the City’s building stock is paramount to reaching our climate goals. LL97 is intended to drive rapid decarbonization of New York City’s buildings to address both the City’s contribution to global climate change and local air pollution through building retrofits and energy efficiency improvements. Retrofits could include a range of activities, such as upgrading insulation and replacing windows to improve the building envelope and improving the efficiency of lighting, water heating, heating, ventilation and air conditioning (HVAC)

systems. One study estimates that LL97 would reduce citywide carbon emissions by at least 14 million tons of CO₂ equivalent while improving air quality through the reduction of particulate matter by over 22,000 metric tons, nitrous gases by over 27,000 metric tons, and sodium gases by over 2,000 metric tons.³

- **Improving health outcomes:** The burning of fossil fuels in buildings for heating and cooking is linked with a wide range of short- and long-term poor health outcomes, including higher rates of asthma, lung and breast cancer, and neurological disorders that disproportionately burden communities of color and low-income residents.⁴ 2021 studies conducted by the Harvard T. H. Chan School of Public Health⁵ and the Rocky Mountain Institute (RMI) found that in 2017 air pollution from burning fuels in buildings led to an estimated 1,940 early deaths and \$21.7 billion in health impact costs in New York State.⁶ Three quarters of those deaths were related to fossil fuel use in residential buildings. Transitioning buildings away from fossil fuels through the implementation of LL97 and electrification will have wide ranging beneficial health impacts on communities across New York City.
- **Economic growth and job creation:** Retrofits associated with LL97 compliance have the potential to grow the retrofit market to \$20 billion in economic activity, 13 times larger than the retrofit market today.⁷ The job creation potential of LL97 is similarly large. An Urban Green Council analysis calculated that by 2030 LL97 could reasonably create as many as 141,000 local jobs in New York City.⁸ While upfront investment is often needed (and in some cases can be difficult for building owners to obtain), retrofits to meet LL97 emissions limits can result in substantial long-term cost savings for building owners. A study conducted by the Guarini Center at New York University School of Law also found that LL97 emissions limits will reduce building owners' costs, projecting that the total cost savings to owners in the years LL97 is in force (2024-2050) could total \$2 billion.⁹
- **Energy cost savings:** Improving a building's energy efficiency reduces operation costs resulting in significant savings for building owners and tenants. At scale, the savings potential is enormous. The MacArthur Foundation estimated that retrofitting the entire United States multifamily building housing stock could result in \$8 billion a year in energy savings.¹⁰ For an individual commercial building, comprehensive retrofits such as through the replacement of lighting and equipment or upgrading insulation, could result in savings greater than 49% each year.¹¹

Overview of Local Law 97

LL97 imposes emissions limits on “**covered buildings**,” defined as new and existing buildings over 25,000 square feet.ⁱ The buildings covered by LL97 comprise 27% of the total built square footage in New York City.¹² The law is structured to reduce emissions 40% by 2030 and 80% by 2050. To achieve these ambitious goals, LL97 establishes three **compliance periods**: 2024-2029, 2030-2034, and 2034-2050. In the first two compliance periods, a covered building is subject to an individual GHG **emissions limit**. Determined based on square footage and occupancy type, these limits become increasingly strict over time.ⁱⁱ This report focuses on the first two compliance periods. Beginning in 2035 at the start of the third compliance period LL97 establishes an emissions intensity target but provides the NYC Department of Buildings (DOB) flexibility in establishing rules for achievement.

To comply with the law, a building’s **annual emissions** must be less than its individual emissions limit. A building’s annual emissions is the sum of its emissions attributable to on-site fossil fuel consumption (e.g., from a gas boiler), plus emissions associated with electricity consumed in the building but produced offsite. Each fuel type is assigned a unique **carbon intensity factor** to convert units of energy consumed into tons of carbon dioxide equivalent (CO₂e).¹³ Each year, a covered building must calculate its annual GHG emissions and submit an emissions report certified by a registered design professional to the DOB. The emissions that exceed a building’s mandated limit is its **overage**. Buildings that emit more than their individual limit in a given calendar year are subject to a penalty, set at \$268 per CO₂e.

Buildings can comply with LL97 by reducing emissions proactively through energy efficiency improvements and/or building retrofits, including upgrading lighting, HVAC, and building envelope improvements. The range of activities and associated costs that can bring a building into compliance depends upon a building’s size, driver of emissions, overage, occupancy type, and other factors. Buildings may also partially achieve LL97 compliance through the purchase of **deductions** from overages, including **Renewable Energy Credits (RECs)**. RECs are credits for each megawatt of renewable energy delivered to the grid. In New York, New York State Energy Research and Development Authority (NYSERDA) is charged with pricing, selling, and tracking RECs. RECs used for LL97 compliance must be “Tier 4 RECs,” derived from renewable energy

ⁱ Eight types of buildings are excluded from coverage or subject to different requirements under LL97: power plants and steam plants, “garden apartments,” City-owned-or-leased properties, a housing development or building on land owned by the New York City Housing Authority (NYCHA), properties in which more than 35% of the units are rent regulated; houses of worship, properties owned by a housing developing fund, and properties that participate in a project-based federal housing program.

ⁱⁱ A building’s individual emissions limit is calculated based on its square footage and occupancy type. In the first two compliance periods, LL97 assigns a carbon intensity limit coefficient to each of the 75 occupancy types; that coefficient is then multiplied by the building’s square footage. For buildings with more than one occupancy type, the emissions limit is a sum of occupancy type by square footage for the top three uses of the building. Lower coefficients are assigned in later compliance periods to reduce the overall emission limit. After 2034, the law gives the DOB significant discretion to determine the pace of emissions limits decrease.

projects either located in the New York City region or that deliver power to the New York City electrical grid.

DOB is charged with implementation and enforcement of LL97. DOB is also charged with setting additional rules, including parameters for deductions. Over the last year as required by the law, DOB formed an **Advisory Committee** with subject-specific working groups to provide guidance on the rulemaking. The Committee's work will conclude at the end of 2022.

DOB's Proposed Rules

In 2019, after the passage of LL97, New York State passed the **Climate Leadership and Community Protection Act (CLCPA)**, one of the most ambitious statewide climate laws in the country. Among the legally mandated goals included in CLCPA is a zero-emissions electricity grid by 2040, including a mandate to reach 70% renewably generated power by 2030. Given the current state of the electricity grid, achieving these goals will require rapid decarbonization in the next eight years: historically, the vast majority of power for the downstate grid serving New York City came from fossil fuels.¹⁴

Because LL97 was passed into law prior to the CLCPA, LL97 did not initially account for grid decarbonization. DOB's proposed rules, issued in October 2022, seek to address grid decarbonization's major implications on implementation of LL97: 1) the impact of a cleaner grid on building emissions from electricity and 2) an unanticipated high supply of Renewable Energy Credits available for purchase as deductions.

The proposed rules include a new electricity carbon intensity factor for the 2030 compliance period that anticipates successful grid decarbonization in line with CLCPA goals. While it is difficult to predict the exact pace of the state's transition from fossil fuels to renewable power, decarbonization and the associated change in rules is projected to ease compliance with LL97 by reducing emissions without any action for the large subset of buildings that are primarily powered by electricity. A Guarini Center at NYU Law School study found that such an emissions factor would result in a 50% emissions reduction among covered buildings, relative to 2024 levels, without any investment onsite.¹⁵

DOB also proposed rules to govern compliance achieved through RECs. The DOB draft proposal:¹⁶

1. Limits RECs applicability to grid-purchased electricity only, requiring a building to manage 100% of its onsite fossil fuel emissions.
2. Allows RECs purchase to deduct 100% of a building's emissions from electricity.

LL97 was written based on the assumption that demand for RECs would be higher than supply, so REC would only be used for compliance in limited circumstances, and so that RECs would be a driver of grid decarbonization, rather than just a downstream beneficiary of projects already underway. Historically, the New York City electricity grid has been almost exclusively powered by fossil fuels, but with the passage of CLCPA the need to increase renewable energy's contribution to the power mix has opened the market for Tier 4 RECs. Decisions by New York

State entities after CLCPA have flipped this dynamic, such that REC supply will be abundantly available. Through the rulemaking process, DOB is seeking to define the sources and proportion of emissions that can be deducted through the purchase of RECs.

The Current State of Emissions in NYC’s Buildings Sector

To inform rulemaking and implementation, the Comptroller’s Office analyzed over 23,000 privately owned buildings covered by LL97.ⁱⁱⁱ This analysis relies on data from NYC’s benchmarking law, LL84, and is limited to buildings who reported in 2019, as the most recent year with typical energy use patterns. The “**analyzed buildings**” in this report include privately owned commercial and residential buildings, as the two largest sectors covered by LL97.^{iv} Publicly owned buildings, City-subsidized affordable housing, buildings in which more than 35% of units are rent regulated, and class one tax properties are governed by different emissions requirements¹⁷ and therefore are not included in this report’s analyzed buildings dataset. To provide an understanding of existing conditions, this section of the report compares analyzed buildings’ current GHG emissions to the limits imposed by the first and second compliance period. It also analyzes buildings’ current source of emissions, which significantly impact a building’s ability to comply with the law in each compliance period.

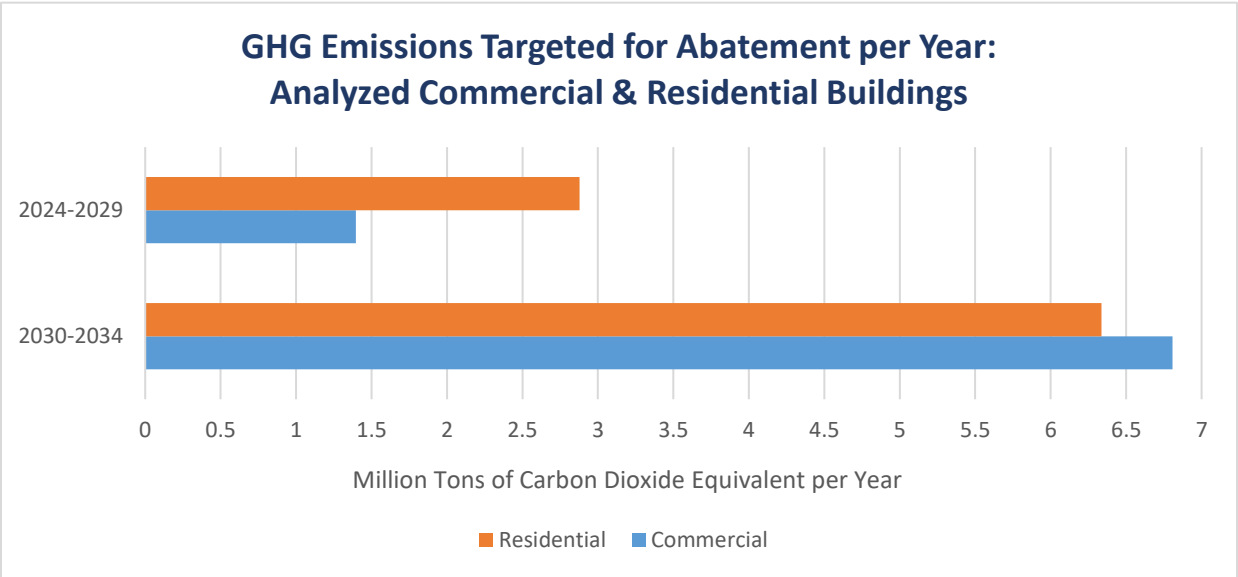
Characteristics of Analyzed Buildings

The residential sector comprised about 76% of analyzed buildings, totaling over 1.9 billion square feet. The commercial sector is about 15% of analyzed buildings, totaling over 730 million square feet of space. Even as the residential sector represents a much larger number of buildings, these sectors are comparable in terms of total emissions targeted for abatement by LL97. The sum total of each building’s overage can be considered the “**emissions targeted for abatement**” by the law. The average size of analyzed commercial building is more than twice the average size of analyzed residential buildings – about 211,000 square feet versus about 104,000 square feet respectively. New York City will need to ensure that LL97’s rules and associated supportive programs are calibrated to ensure that both highest-emitting sectors are appropriately supported and incentivized to reduce emissions in line with the law.

ⁱⁱⁱ This report does not address publicly owned buildings, which are subject to different requirements.

^{iv} The NYC Comptroller’s Office used a broad definition of each of these sectors. Commercial buildings as used in this report include those classified in Article 230 of the City’s Administrative Code as office buildings, bars and restaurants, retail locations, among others. Residential analyzed buildings include multifamily housing and residential care facilities. See “Methodology” for the full list of occupancy types included in each category.

Figure 1: Total Overage of Analyzed Buildings by Sector



Projected Compliance

The first compliance period is intended to address the highest emitting buildings and most buildings will need not take any action to comply: 70% of analyzed buildings are already in compliance for the 2024-2029 period. This includes 84% of commercial buildings and 70% of residential buildings. Of the 30% of buildings out of compliance for the first period, commercial buildings would need to reduce emissions by an average of 52% and residential buildings by 43%. As emissions limits become more aggressive in the second compliance period (2030-2034), only 30% of analyzed buildings will meet their individual emissions limits.

The relative amount of reductions vary across building sectors but on average, analyzed buildings will need to reduce emissions by 59% to meet the requirements of the second compliance period. Commercial buildings will need to reduce their emissions more significantly than residential buildings. Fewer than 13% of commercial buildings are currently meeting their 2030 limits, and about 72% of commercial buildings are currently emitting more than double their 2030 emissions limits.

Table 1: Percent of Buildings Not Meeting Emissions Limits

Compliance Period	All Analyzed Buildings	Commercial	Residential
2024-2029	30.1%	15.9%	30.2%
2030-2034	71.7%	87.4%	66.7%

The median reduction needed among commercial buildings is 70.9%. In real terms, such a building will be subject to an emissions limit of about 60 tons of CO₂e and is currently emitting about 206 tons of CO₂e. A typical commercial building can likely manage a 25% of its energy use with no- or low-cost measures.¹⁸ Reductions of more than 45% will require more comprehensive retrofits that take a whole-building approach that includes lighting, mechanical systems, and building envelope updates.¹⁹ Retrofits of commercial offices are often complicated by the split incentive between tenants and owners, whereby building owners are responsible for the cost of building retrofits and responsible for penalties, but tenants benefit from energy bill savings,²⁰ a challenge that many buildings will need to manage.

To achieve large-scale emissions reductions, it is critical for the City to design LL97 implementation to appropriately incentivize commercial building owners to meet their emissions targets through retrofits.

Sources of Building Emissions

The most significant item to consider is the source of a building's emissions, which informs the options a building will have to meet compliance. This analysis also looked at the fuel sources contributing to buildings' emissions, given that the expected decarbonization of the State's electricity grid will support compliance with LL97's mandates and variation in needed emissions reductions measures. Emissions among the buildings analyzed can be grouped into two overarching categories:

1. Onsite emissions from fossil fuels, such as through the burning of oil and gas for heating and cooking.
2. Emissions from electricity purchased from the electrical grid.

Residential buildings, which commonly use gas and fuel oil for home heating and cooking, are far more likely to be fossil fuel-powered by than commercial buildings, which tend to be more electrified. The difference between sectors in emissions profile among noncompliant buildings, especially in the second compliance period, is significant with a far higher portion of residential buildings deriving a significant portion of their emissions from onsite fossil fuel use.

Figure 2: Portion of Emissions Attributable to Electricity in Residential Buildings

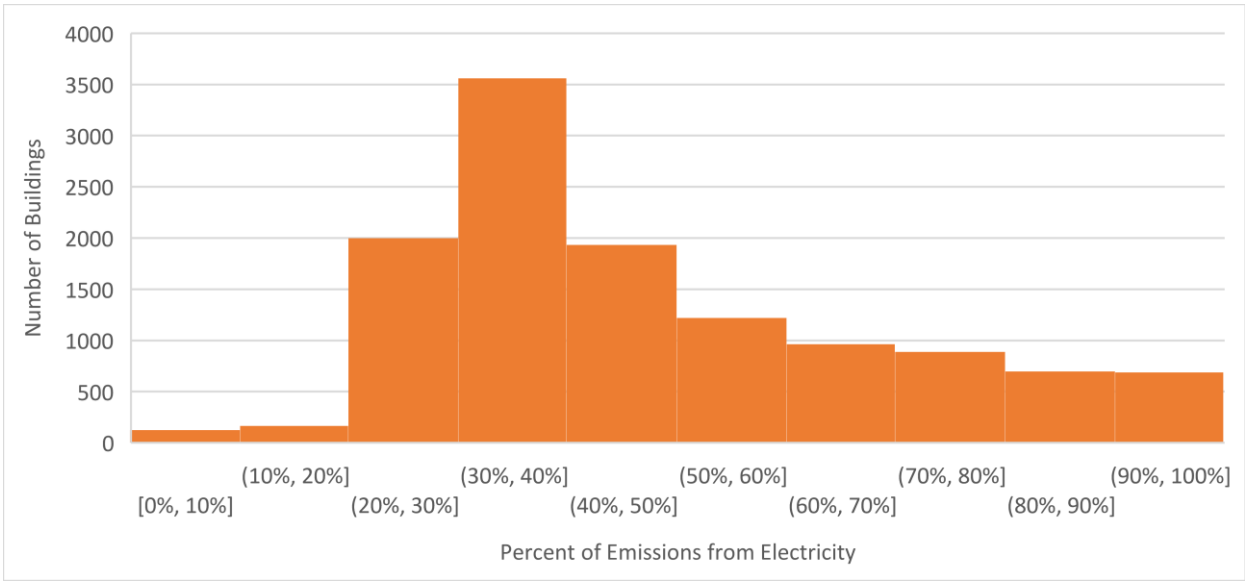
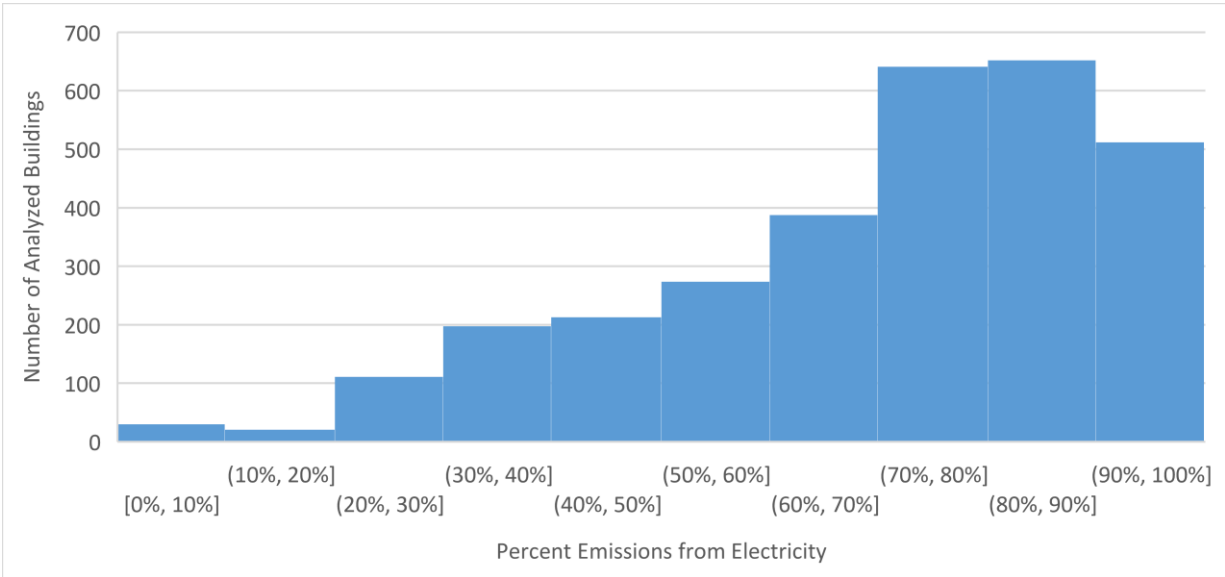


Figure 3: Portion of Emissions Attributable to Electricity in Commercial Buildings



Implications of DOB's Proposed Change for Electricity Emissions in 2030

Grid decarbonization will have an enormous impact on the total volume of emissions that need to be managed in the 2030-2034 compliance period. As the state decarbonizes its power mix, buildings that primarily purchase the energy they consume from the electrical grid (as opposed to onsite combustion of fossil fuels) would see their emissions reduced without taking any action whatsoever. As the data above indicate, grid decarbonization disproportionately benefits the commercial sector, which derives the majority of its emissions from electricity.

In contrast, a significant share of residential buildings will have to undertake the capital-intensive conversion of fossil fuel equipment for heating and cooling. However, the upfront costs of these measures may be high, with energy cost saving benefits accruing over time. Longer term emissions reductions may be delayed while the larger electricity grid decarbonizes. LL97's rules should address this reality to incentivize early electrification by allowing building owners who invest early in electrification to see benefits under the law. More details on this proposal are included in the recommendation section below.

This analysis additionally modeled building emissions if decarbonization of the grid was unsuccessful (i.e., if the percentage of renewables serving New York City remained relatively stagnant through the second compliance period). Results from this analysis indicate that if the grid continued to derive an overwhelming majority of its power from fossil fuels, 2.5 million tons of CO₂e each year from the commercial sector would go unabated and would not be subject to penalties, based on the proposed LL97 rules. That is equivalent to emissions from over 255 million gallons of gasoline.²¹ It would also equal over \$660 million in non-compliance fees that the commercial sector would be responsible for if those emissions go unmanaged.

Given the changing grid conditions and its significant impact on LL97, the City should commit to revisit the proposed carbon emissions factor for the second compliance period, based on the progress of grid decarbonization as 2030 approaches, to ensure that electricity emissions are appropriately accounted for and to balance costs of compliance.

Parameters for Renewable Energy Credits

LL97 rules permits property owners to purchase Renewable Energy Credits (RECs) and deduct the equivalent value from their emissions overage. RECs used for LL97 compliance must be derived from renewable energy projects either located in the New York City region or from projects that deliver power to the New York City electrical grid. The sale of RECs represents an important revenue stream for renewable energy developers, allowing purchasers to subsidize the decarbonization of the grid.

Through the rulemaking process, DOB is seeking to define the sources and proportion of emissions that can be deducted through the purchase of RECs.

LL97 allowed for RECs based on an assumption that there would be supply constraints. However, partially in response to LL97, in 2021 the New York State Public Service Commission and NYSERDA approved two large renewable energy projects – the Clean Path NY project (CPNY) and the Champlain Hudson Power Express project (CHPE) – to deliver renewable power to New York City. In addition, substantial new subsidies provided by the federal Inflation Reduction Act will hopefully further turbocharge investments in renewables. As a result, eligible RECs will be abundantly available for purchase beginning in 2030, but with this expanded supply likely lowering the cost, it is unclear that these RECs will meaningfully contribute to the creation of new renewable energy at anywhere near the diminished level of on-site improvements they would otherwise require. The now-abundant supply of RECs that will be available means that the City must reconsider limits on the use of RECs for LL97 compliance.

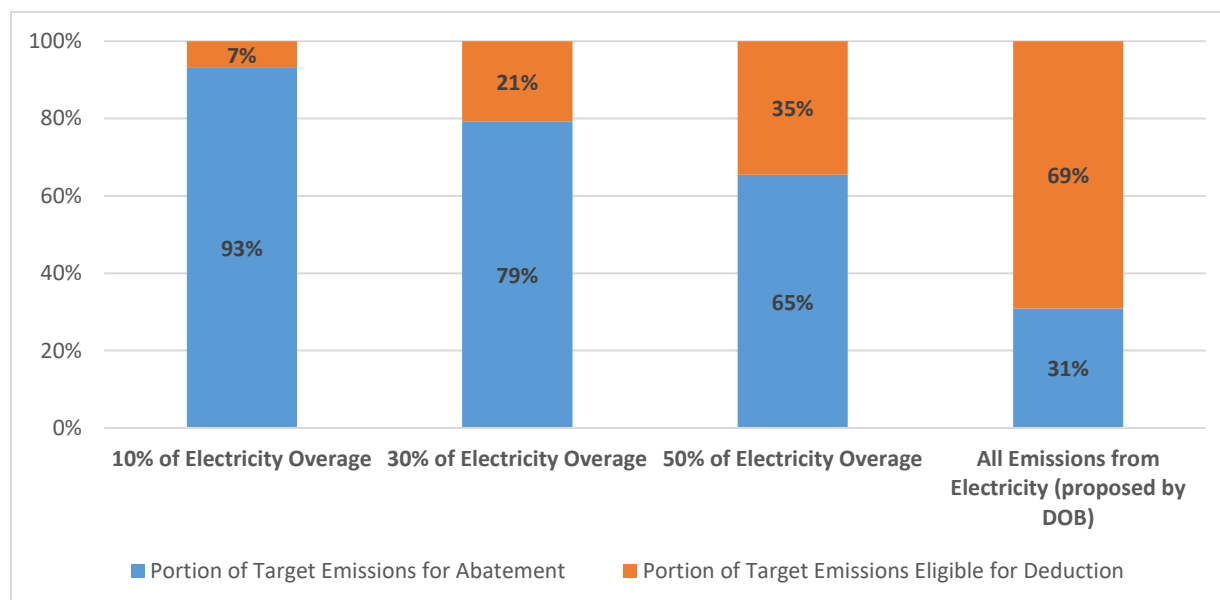
Allowing RECs to be used for a building's total electricity overage, as DOB proposes, would significantly reduce the impact of the law.^v The impacts of the proposed DOB rules present two main issues. First, allowing building owners to purchase RECs to deduct all electricity emissions would hamper meaningful emissions reductions and weaken the spirit of the law: 68% of total emissions targeted by LL97 would be eligible for deduction. In other words, buildings would be able to purchase RECs for two-thirds of all building emissions without making any on-site sustainability improvements. If buildings are allowed to purchase RECs for all electricity overage, 13 million tons – representing 68% of all commercial emissions and 47% of all residential CO₂e emissions – would still be emitted, falling far short of the stated goal of LL97 to reduce emissions by 40% percent by 2030.

^v This analysis is based on three key assumptions: 1) RECs would be the lowest cost option for building owners to comply with LL97, 2) Grid decarbonization will be successful so there will be abundant supply of RECs to meet the needs of the 2030 compliance period, and 3) RECs would only be applicable to electricity emissions.

Second, the proposal to limit RECs to electricity emissions largely benefits the commercial sector, where fewer buildings are noncompliant due to fossil fuel usage. Fossil fuels represent over half of the emissions for about 64% of noncompliant residential buildings and under 19% of noncompliant commercial buildings. However, though less reliant on fossil fuels, commercial buildings that exceed their 2030 limit are extremely emissions intense as compared to residential buildings.

One option for addressing this problem is to limit the percentage of a building’s electricity overage that can be offset by RECs. We evaluated three additional scenarios in which RECs would be limited to a variable percent of overage to demonstrate the portion of total targeted emissions that would still need to be managed by building owners.

Figure 4: Impact of REC Limits on Emission Reduction Potential (2030-2034 Compliance Period)



Under these scenarios:

- If RECs were applicable to only 10% of electricity overage, buildings would reduce 93% of emissions.
- If the limit was set at 30% of electricity overage, buildings would reduce 79% of emissions.
- If the limit was set at 50% of electricity overage, buildings would reduce 65% of emissions.
- If it remains the case, as proposed by DOB, that no limit applies, buildings would only reduce 31% of emissions.

These scenarios make clear that a restrained use of RECs for compliance would preserve the ability of LL97 to achieve its goal to significantly reduce emissions from New York City’s building sector and catalyze a green economy.

Recommendations

In the next year before LL97 goes into effect, New York City will face critical decisions through both rulemaking and administrative actions. This report is specifically focused on questions related to DOB rule design for electricity emissions and deductions from the purchase of Renewable Energy Credits. However, this review also makes clear that many buildings will need to undertake significant and potentially capital-intensive efficiency improvement measures in advance of the 2030-2034 compliance period. Currently, there is not a well-developed funding and financing ecosystem in New York City for the types of building retrofits and improvements needed for many buildings to achieve compliance. The Office of the NYC Comptroller recognizes that the residential sector, particularly multifamily housing, is especially undercapitalized. Included here is a proposal that would begin to address these challenges, the Green Affordable Housing Fund. This is just a start. In the next several years NYC will need to ensure that building owners are able to take advantage of a wide range of funding and financing to pay for requisite improvements. The federal Inflation Reduction Act (IRA) makes available new tax incentives and other financing tools to scale building improvements. The City should make sure that building owners are able to take advantage of these programs and build other financing and funding mechanisms for building owners. The Office of the NYC Comptroller will likewise continue to evaluate the efficacy of existing programs and advocate for new financing mechanisms that will ease the burden of compliance and ensure that LL97's ultimate goals are achieved. The following recommendations can help ensure the effective implementation of LL97 and will best support the reduction of building emissions in New York City:

1. Limit Use of Renewable Energy Credits to a Maximum of 30% of a Building's Electricity Overage

DOB must structure RECs with appropriate guardrails that allow for their benefits to be reaped without weakening LL97. RECs should be available for use on no more than 30% of a building's electricity overage.^{vi}

- **Electricity Only:** Given the health and emissions implications of fossil fuels, RECs should be limited to electricity (as DOB proposes), which will help incentivize building electrification improvements that can benefit from grid decarbonization and reduce reliance on on-site fossil fuels.
- **Limit RECs to 30% of Overage:** RECs should be designed to help building owners bridge a gap in their compliance rather than offered to building owners as a permanent solution. Setting a reasonable limit on the ability to use RECs will ensure that building owners are appropriately incentivized to comply through the implementation of on-site retrofits and

^{vi} Electricity's contribution to overage is calculated by multiplying the percentage of emissions derived from emissions by a building's total overage.

energy efficiency measures. As illustrated in this analysis, to reach an 80% reduction of building emissions by 2050 date, RECs should be limited to a maximum of 30% of electricity overage.

2. Encourage Building Retrofits & Energy Efficiency by Aligning Incentives, Costs, and Penalties

The implementation of LL97 should maximize the law's climate, job creation, and health benefits through the alignment of costs, fees, and penalties. As the City of New York has no control over the price of RECs, setting appropriate limits on REC use is a key component in aligning incentives and costs.

Beyond limits on RECs, thoughtfully structured penalties are essential for enforcement and fidelity to the law. Urban Green Council estimates that the average cost for emissions-reduction measures among noncompliant building (in the 2030 period) would be about \$9.80 per square foot.²² There is significant variation in this figure based on market segment, size, and fuel source. Citizen's Budget Commission estimated^{vii} that the average noncompliant building would face penalties of \$0.97 per square foot -the average commercial building penalty would be \$1.86 and the average residential building facing a penalty of \$0.47 per square foot.²³ It is important to note that retrofits and energy efficiency measures are a one-time, up-front cost, while penalties are recurring annual fees. Retrofits further result in significant cost savings for building owners over time.

New York City should continue to evaluate the costs to buildings for improving their emissions on-site and escalate penalties as needed to ensure they remain appropriately sized. To encourage buildings to invest in retrofits in advance of the 2030 compliance period, DOB should:

- Adjust LL97's rules and enforcement measures to continually reposition retrofits as more economically attractive than penalties.
- Continue to monitor the costs and behaviors of high-emitting buildings in the first compliance period to appropriately calibrate the fee in advance of 2030.
- Monitor the progress of expected grid decarbonization and adjust the carbon intensity factor for electricity if the pace of decarbonization is behind CLCPA goals.
- Draft a new rule that allows buildings to use a lower carbon intensity factor for electricity emissions if they can reasonably demonstrate the future-emission reduction potential

^{vii} Calculated by comparing the current building performance to legally established emissions limits and based on the proposed fee of \$268 per ton of CO₂e in excess of the limit. These estimates were calculated based on an electricity emissions factor that remains constant between the 2024 and 2030 compliance periods (i.e., not reflective of grid decarbonization or the October 2022 proposed rules).

from investment in electrification measures. This would acknowledge the upfront cost of electrification and the delayed impacts of grid decarbonization.

3. Establish a Fund for Green Affordable Housing

As discussed in this paper, fossil fuel-powered systems for heating and cooling are especially prevalent among residential buildings, which will have to bear the upfront costs of electrification. Increasing capital availability through more-readily available financing and funding will assist in managing operational challenges to the city's existing and future rent-stabilized and City-subsidized affordable housing stock. In recent years, there have been efforts to develop green building standards for the development and renovation of publicly financed housing projects (most notably the Enterprise Green Communities Criteria),²⁴ but in many cases there remains a discrepancy between the increased upfront construction costs and the amount of subsidy available. Because of these financial shortfalls, many projects have continued to install and maintain natural gas heating systems, do not insulate to the extent needed, or do not install solar panels. Especially coming at moments when the City is providing significant financial resources and has leverage over the scope of work, this represents a huge missed opportunity to directly reduce emissions.

While the vast majority of rent-stabilized and City-subsidized housing is outside the scope of this report's analysis, as these buildings are subject to different requirements under LL97 than those addressed by the recently proposed DOB rules, the NYC Comptroller's Office is cognizant of the growing capital availability needs in the housing sector and therefore recommends the establishment of a Green Affordable Housing Fund (GAHF) to fund emissions reductions for green affordable housing. Similar to an approach used in the City of Boston's Building Energy Reduction and Disclosure Ordinance (BERDO),²⁵ commercial and market-rate residential building owners would have the option to make payments into the fund to mitigate a modest portion of their overage. Because GAHF payments would be structured as a compliance payment rather than a penalty, the GAHF will be particularly attractive to the relatively emissions-intensive and well-capitalized commercial sector whose ability to attract and retain tenants may be dependent on compliance with local laws and ordinances. To appropriately reflect the value of compliance, payments to the GAHF could be marginally more expensive than a penalty.

With a fund in place, payments to the fund could be structured as an alternate compliance pathway in lieu of a penalty. Allowing for compliance for a modest portion of their overage through payments to the GAHF would be attractive to many commercial building owners, especially those seeking to attract and retain tenants with green building policies and who often have investors with environmental, social and governance (ESG) commitments. This approach would enable commercial building owners to manage year-over-year changes in their emissions in compliance with LL97 when it is not possible to complete other emissions reductions measures such as on-site retrofits or effectively incentivize energy consumption changes among commercial tenants.

New York City's Department of Housing Preservation and Development (HPD) would then oversee the distribution of funds to affordable housing projects seeking City financing. The GAHF

would act as a gap-filler to finance the upfront cost of retrofitting or developing new affordable housing that is maximally energy-efficient while the city continues a broader effort to require higher energy efficiency standards for all projects financed with City dollars. To ensure these funds are used for the exclusive use rent-stabilized and city-subsidized affordable housing, the revenues of the GAHF should be deposited into a separate segregated account for that exclusive purpose.

While the GAHF will support compliance among rent-stabilized and City-subsidized affordable housing, the entire residential sector – including market rate housing – will face barriers to reach compliance with LL97. The residential sector more broadly would benefit from new or expanded financing mechanisms for energy efficiency and electrification, including potentially from the federal Inflation Reduction Act. To support residential compliance without placing undue burden on low- and moderate-income New Yorkers, such funding mechanisms must require the landlord comply with additional tenant protections, such as good cause eviction protections. In the months to come, the Comptroller’s office will continue to provide oversight on LL97 implementation in the residential sector.

Methodology

To evaluate the characteristics, emissions, and performance of buildings under two LL97 compliance periods, the Comptroller’s Office used building-level data reported to the Department of Buildings, as mandated under NYC’s benchmarking law, Local Law 84 (LL84). COVID-19 created significant changes in building energy use, so the Comptroller’s Office opted to use 2019 LL84 benchmarking data as the representative and best available information for typical building energy usage and emissions. The LL84 data provided total emissions, energy usage by fuel source, occupancy type and square footage for each building over 25,000 square feet and covered under LL84. This dataset served as the foundation of the report’s analysis. The Comptroller’s Office did not include city-owned buildings as those buildings are subject to different requirements.

A buildings individual emissions limits and annual emissions were calculated using the occupancy codes codified in article 230 of the City’s Administrative Code.²⁶ We integrated the more detailed occupancy type coefficients and carbon intensity factors put forth in the draft rules put forth by the Department of Buildings in October 2022.²⁷

The universe of commercial and residential buildings analyzed in this report totaled 23,897 buildings. This analysis simplified the 73 occupancy types into six broad categories. We used a broad definition of each of these sectors to capture a wide range of buildings while remaining true to the ultimate definition of each of these sectors.

Commercial buildings included buildings that primarily house business and commercial activities and tenants with the following occupancy types:

- Automobile Dealership
- Bank Branch
- Bar/Nightclub
- Bowling Alley
- Convenience Store without Gas Station
- Convention Center
- Data Center
- Enclosed Mall
- Fast Food Restaurant
- Financial Office
- Fitness Center/Health Club/Gym
- Food Sales
- Food Service
- Indoor Arena
- Hotel
- Laboratory
- Lifestyle Center
- Mailing Center/Post Office
- Movie Theater
- Museum
- Office
- Other – Entertainment
- Other - Mall
- Other - Public Services
- Other - Recreation
- Other - Restaurant/Bar
- Other - Services
- Other - Tech/Science
- Personal Services (Health/Beauty, Dry Cleaning, etc.)
- Repair Services (Vehicle, Shoe, Locksmith, etc.)
- Restaurant
- Retail Store
- Social/Meeting Hall
- Stadium (Open)
- Strip Mall
- Supermarket/Grocery Store
- Wholesale Club/Supercenter

Residential buildings included permanent residential locations. Only buildings subject to LL84 are included in this analysis, which excludes regulated affordable housing. Multifamily buildings with

35% or more rent-regulated units are subject to different requirements under LL97 but may be included in the LL84 dataset, which does not identify rent-regulated buildings. This category included 18,345 buildings and included buildings in the following occupancy types:

- Multifamily Housing
- Residence Hall/Dormitory
- Residential Care Facility
- Other - Lodging/Residential
- Senior Care Community

The NYC Comptroller's office then modeled building emissions if decarbonization efforts were unsuccessful (i.e., if the grid continues to be powered by fossil fuel sources) in the 2030 compliance period. To establish annual emissions for each building in this scenario, this analysis used the calculation established for 2030 but used a carbon intensity factor that is roughly equivalent to current grid emissions in kilograms of British Thermal Units (kBtu).

To establish the impacts of different RECs limit scenarios, the Comptroller's Office summed the annual overage of all buildings in the 2030-2034 compliance period and the amount eligible for deduction – a variable percent of the overage derived from electricity – and compared the difference. The RECs analysis is based on three assumptions: 1) RECs would be the lowest cost option for building owners to comply with LL97, 2) grid decarbonization will be successful so there will be abundant supply of RECs to meet the needs of the 2030 compliance period, and 3) RECs would only be applicable to electricity emissions.

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