# HPD GUIDELINES

for

# REPAIRS & MAINTENANCE

Version 1.02

## DISCLAIMER

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## SPECIAL THANKS

This document is the product of internal evaluations and community feedback and would not have been possible without the help of numerous individuals and organizations. In particular, HPD would like to thank the New York City Accelerator (NYCA), the New York City Housing Development Corporation (HDC), New York State Homes and Community Renewal (HCR) the New York State Energy Research & Development Authority (NYSERDA), New York State Association for Affordable Housing (NYSAFAH), Kinetic Communities Consulting, Taitem Engineering, Steven Winter Associates, and our key sister city agencies including the Mayor's Office of Climate and Environmental Justice (MOCEJ).

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# INTENT & STRUCTURE OF THE GUIDELINES

New York City is already experiencing the impacts of climate change, including higher temperatures, increased precipitation, and rising sea levels of more than a foot since 1900.
New York City is committed to reducing carbon emissions to help mitigate the impacts of climate change. Buildings are the City's largest source of emissions and a critical sector that must be addressed to reach our goal of carbon neutrality by 2050.
In 2016, New York City set an ambitious goal to reduce carbon emissions by 80% by 2050. In 2019, New York City passed the landmark Climate Mobilization Act (the "CMA") that requires building owners to drastically reduce greenhouse gas emissions from building operations and will help NYC meet the 80% reduction by 2050.
Although some laws treat affordable housing and small buildings differently, all buildings will ultimately need to consider how to address climate issues. Doing so will protect owners and residents from rising energy costs, increase resident health and safety, and ensure that buildings are poised to respond to New York City's increasingly ambitious climate legislation and are safe from climate impacts.

## INTENT OF THE GUIDELINES

The Guidelines intend to guide Owners and Operators on how they can align repairs and maintenance projects with HPD and NYC's goals and laws to reduce carbon emissions, reduce energy costs, and improve occupant health and safety.

The Guidelines should be used as a guide for any property under regulation with an HPD program looking to utilize replacement reserves or make any capital investments in those properties.
It is crucial to note that the applicability of these Guidelines extends solely to the planned improvements to the property at the time of reference. In other words, the recommendations and principles outlined in the Guidelines are intended to guide and inform decisions related to property enhancements and capital expenditures within the context of the designated program requirements.

Additionally, it is essential to utilize the Guidelines to help ensure enhancements comply with the short-term and long-term requirements of Local Law 97 and other climate laws in NYC as they apply to buildings. Considering that the ongoing repairs may not suffice to achieve full compliance, it is crucial to ensure that the building makes informed choices in implementing retrofits, always keeping the broader long-term goal in mind. This will help ensure that a building reduces the number of emergency repairs and can help put the building on a path to meet NYC's ambitious climate goals and laws while reducing energy costs and improving the comfort of residents in the near term.

HPD recognizes that these Guidelines cannot address all scenarios. Pertinent laws, rules, regulations, and codes take precedence over the Guidelines in the event of a conflict. When unique or special circumstances, extraordinary market conditions, or special community

characteristics necessitate deviation from any aspect of the Guidelines, discuss this with APM staff.

## STRUCTURE OF THE GUIDELINES

HPD has established a minimum performance for its buildings to meet in order to align them with NYC's laws and HPD's goals. Where guidelines exist for individual building systems, equipment, or other components throughout the text, users will find **Baseline** and **Reach** criteria.

- **Baseline** criteria should be utilized as a minimum standard of practice when projects are undertaking repair or replacement work. The Baseline standards in this document should be complied with as a best practice for operations and repair/replacement. Users should coordinate with their asset manager on the scope of work and oversight as required per their regulatory agreement.
- **Reach** criteria are optional but represent best practices for the specific criteria area. Building owners should aspire to implement reach criteria where feasible to maximize building performance.

HPD intends to periodically update the Guidelines and to release new versions every 3-5 years or as needed.

HAVE QUESTIONS?
Reach out to HPD's Sustainability Team at sustainability@hpd.nyc.gov if you have questions about the Guidelines. Please include "Repair Guidelines Questions" in the subject line of the e-mail.

# PLANNING & SCOPING

HPD encourages building owners to use this guidebook as a tool to aid in proactively identifying the needs of a property through long-term capital planning. When undertaking long-term planning for a building, users should perform the following steps.

1. **Assessing & Planning for Flood Risk**
   Consider how current and future coastal flood risk, as well as stormwater flooding, will inform decisions when replacing critical equipment. Section 1 outlines how owners can identify a building's flood risk and provides planning guidance.

2. **Planning for Local Laws**
   Evaluate the applicability of Local Laws to help inform decisions. This includes Local Law 97 (GHG emissions reductions) and Local Law 87 (audits and retro-commissioning) as well as Local Law 32 (no.4 oil phase-out), among others. Owners should also consider leveraging other local laws as opportunities to integrate building decarbonization (e.g., air-sealing a building during a LL11 project or electrifying cooking if gas lines require repairs per LL152). Section 2 will help owners understand which laws are applicable and how to integrate decarbonization into building repairs and capital plans.

3. **Implementing Forward-Looking Building Repairs and Upgrades**
   Evaluate current and upcoming repair needs within the context of a comprehensive plan that addresses a building's climate risk and NYC's current and future climate regulations. The plan will help improve resident comfort and reduce utility costs in the near term while ensuring that the building will reduce the risk of penalties or fines. Ensure that the building anticipates future electrification needs during property upgrades, providing adequate space and electrical service where possible.

4. **Developing an Operations & Maintenance Plan**
   Develop and implement an Operational and Maintenance Plan for the building. The plan should include routine and preventative maintenance, including training and resources for staff and residents. The plan should also include a service record of the project's equipment (HVAC, lighting, and appliances) and finishes, including the age/remaining useful life, specifications, and model and manufacturer information, and an expected replacement schedule to help inform future decisions and future plans.

5. **Identifying Technical & Financial Resources**
   Identify existing Technical and Financial Resources available to building owners to offset the cost of planning and implementation. Among others, NYSERDA, Con Edison, National Grid, and DEP offer a diverse array of grants, loans, and incentives to fund studies and implement efficiency work to improve the climate resilience of affordable housing properties at low or no cost. In addition, New York City provides free technical advisory support through its NYC Accelerator.

Each of the steps above is further discussed in the following sections.

## SECTION 1 / ASSESSING & PLANNING FOR FLOOD RISK

If a project is replacing building systems or components in buildings defined as "flood-prone," it is essential to implement the recommendations below. For the purposes of this document, a "flood-prone" building is defined as a building located on a site meeting any of the following:

- Sites defined as being within the Preliminary Flood Insurance Rate Map 2015 Special Flood Hazard Area, which includes both the 1% and 0.2% annual chance floodplain.
- Sites defined as being within the 2050s 1% annual chance coastal floodplain per NYC's Flood Hazard Mapper.
- Sites shown as flooded in the extreme stormwater flooding (100-year storm with 2080s SLR) scenario in the NYC Stormwater Flood Map.
- Sites with a known history of flooding from high tides or heavy rainfall, based on institutional knowledge, history of 311 service requests, or qualifies as "Repetitive Loss" property by FEMA

To identify a building's flood and heat risk, refer to the building's IPNA Flood and Heat Exposure Tab (available on IPNAs after 2022) use the standalone tab for projects predating the 2022 IPNA release, which can be found on the NYSERDA's IPNA webpage.

Ensure that all projects adhere to the applicable provisions of NYC Building Code, Appendix G. In some cases, proposed actions may constitute Substantial Improvements or could increase the degree of non-compliance with Appendix G, requiring buildings not previously subject to Appendix G to have to newly comply. The Guidelines are designed to be applied in conjunction with the fundamental requirements outlined in the Code, and are based on NYC's Climate Resiliency Design Guidelines.

### Baseline

- Elevate new HVAC and critical equipment where the system lifespan will extend through 2050 above the 2050s SLR-adjusted DFE or to the building's roof where subject to coastal flooding, or, at minimum, above grade if prone to stormwater flooding.
- For equipment that cannot be elevated, encapsulate equipment and/or dry flood-proof the flood-prone space to or above the level of the appropriate SLR-adjusted DFE, based on the system's lifespan.
- New residential units should not be located below the 2050s SLR-adjusted DFE where subject to coastal flooding or below grade where prone to stormwater flooding.
- When replacing finishes in flood-prone spaces (e.g., spaces below the SLR-adjusted DFE or below grade), use flood-resistant construction and materials that can withstand flooding.
- Provide resources to residents, including: permanent signage in buildings; flood disclosure information on tenant leases notifying tenants of potential flood risk; building's emergency plan; encourage to enroll in Notify NYC (New York City's official source for information about emergency alerts and important City services); encourage to procure renters' insurance.
- Procure flood insurance for the property.

### Reach

- Install backwater valves with containment tanks and/or ejector pumps in the lowest level.
- Install flood sensors in all below-grade residential units and in any flood-prone spaces.

## SECTION 2 / PLANNING FOR LOCAL LAWS

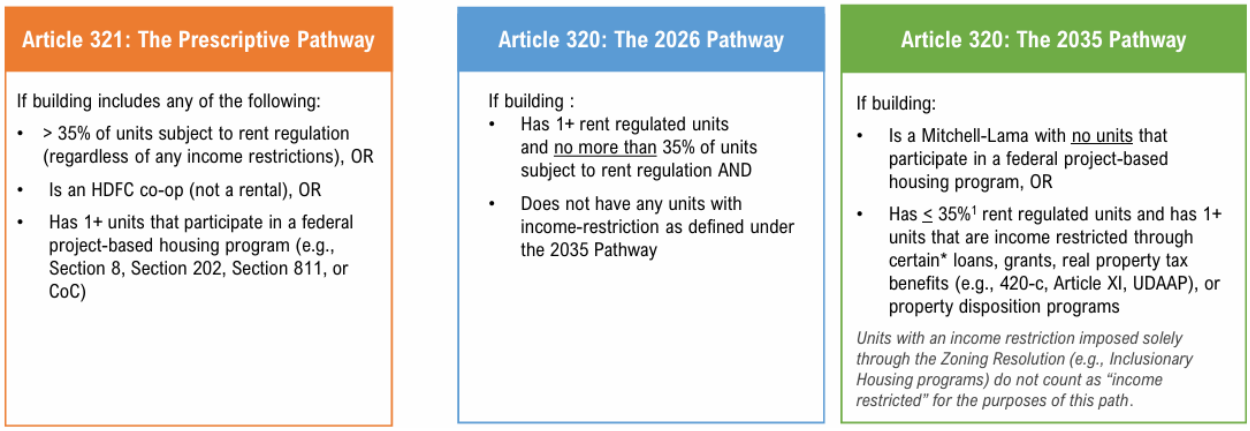
To ensure that the City can meet its long-term commitment to achieve carbon neutrality by 2050, all buildings will need to decarbonize over time. In addition to Local Law 97 of 2019, which is going to be discussed in further detail in the following pages, the below climate Local Laws (LL) should be taken into consideration when making repairs or creating long-term capital plans to ensure that buildings comply now and in the future:

- **LL 92 and LL 94 of 2019 /** Requires solar panels or green roofs on all new roofs and roof assemblies on the building's "sustainable roof zone." HPD's Solar Where Feasible Policy adapts Local Laws 92/94 to Affordable Housing.
- **LL 87 of 2009 /** Requires buildings over 50,000 GSF to undergo energy audit and retro-commissioning (RCx) measures and file an Energy Efficiency Report (EER) every ten years.
- **LL 88 of 2009, LL 132, and LL 134 of 2016 /** Require all buildings exceeding 25,000 GSF to upgrade all lighting in commercial buildings and common areas of residential buildings by 2024. Sub-meters must be installed in all non-residential tenant space exceeding 5,000 GSF. These requirements overlap with the LL97 Prescriptive Measures.
- **LL 11 of "Façade Inspection and Safety Program (FISP)" /** States that owners of buildings of more than six stories must have exterior walls and appurtenances inspected every five years.
- **LL 152 of 2016 /** Requires that gas piping systems in all buildings, except for buildings classified in occupancy group R-3, must be inspected by a Licensed Master Plumber (LMP) or a qualified individual working under the direct and continuing supervision of an LMP, at least once every four years according to the schedule set out in 1 RCNY §103-10.
- **LL 55 of 2018 /** Requires that all multiple-dwelling property owners in NYC investigate and remove all indoor health hazards that trigger asthma, like mold, rodents, and cockroaches. Landlords must also apply safe and successful measures to ensure that their properties remain free of indoor health hazards.
- **LL 32 of 2023 /** No. 4 fuel oil will be banned after July 1, 2027. Buildings will no longer be able to renew permits for No. 4 fuel oil after January 1, 2024.
- **LL 41 of 2021 /** Helps ensure new City buildings are prepared for the worsening impacts of climate change, including flooding and extreme heat for public projects. By 2026, all City projects must meet a stringent set of requirements that will certify their preparedness for extreme weather threats.

Review more information about Building Energy Laws through the NYCAccelerator website.

## Local Law 97 of 2019

The keystone of NYC's Climate Mobilization Act of 2019 is Local Law 97 (LL97), which sets increasingly stringent caps on greenhouse gas emissions for buildings over 25,000 SF starting in 2024 with a goal of carbon neutrality by 2050. Buildings that contain affordable and rent-regulated housing are treated somewhat differently and must follow one of the pathways below:




HPD projects typically fall under Article 321: The Prescriptive Pathway or Article 320: The 2035 Pathway. See the below information on compliance, penalty mitigation, and available resources.

**Article 321: The Prescriptive Pathway /** These buildings must:

- Demonstrate that emissions are below the applicable 2030 limits, OR
- Show that all the applicable 13 Prescriptive Energy Conservation Measures (PECMs) outlined in the law have been fully implemented, AND.
- File a one-time report by May 1st, 2025, or within the 60-day grace period. Buildings may also request an Extension through August.
- Penalties are $10,000 per building for failure to report and $10,000 for failure to comply.

While Article 321 doesn't mandate building electrification, certain buildings opting to meet the 2030 limits may choose to implement partial electrification (e.g., by replacing a failing hot water heating system with heat pump water heaters) to meet the 2030 limits.

**Article 321 Penalty Mitigation**:

DOB rules describe a number of penalty mitigation pathways for Article 321. See below information on the most common mitigation options:

- Article 321 buildings that received an agency commitment between November 2019 and May 1st 2025 are eligible for the **Eligible Energy Conservation Projects** (EECP) compliance Pathway. See the EECP resource for more guidance.
- Owners who will not be ready to submit their reports during the reporting window (May through the Summer), should seek **Adjustments** for Financial Constraints or pursue a **Mediated Resolution**, which provides owners with additional time to comply with the

Prescriptive or Performance Pathway.

**Article 320: The 2026 Pathway /** These buildings must:

- Meet emission limits starting in 2026 or face penalties for exceeding the limits,
- File annual reports starting May 2027.

**Article 320: The 2035 Pathway /** These buildings must:

- Meet increasingly strict emission limits starting in 2035 and becoming carbon neutral by 2050, or face penalties for exceeding the limits,
- File annual reports starting May 2036.

Buildings subject to Article 320 will likely need to implement partial electrification to meet their 2035 or 2040 limits and will need to be fully electric by 2050 to avoid penalties. See Appendix E for a Case Study illustrating how these buildings can comply over time.

**Free Scoping and Compliance Planning tools:**

- **Building Energy Exchange LL97 Calculator**.
- **Council of New York Cooperatives & Condominiums** LL97 Decarbonization Planning Tool
- **321Go!** software and program for HPD and HDC asset managed properties.

# SECTION 3 / IMPLEMENTING FORWARD-LOOKING BUILDING REPAIRS & UPGRADES

When contemplating repairs, a well-conceived plan will ensure that new equipment aligns with the project's expected risks and local law compliance – reducing the risk of penalties and the risk of investing money into new equipment or systems that will need to be replaced before the end of their useful life. Identifying systems that are approaching the end of their useful life will ensure that there is adequate time to choose the best system for long-term benefits and avoid the issue of emergency repairs. A few concepts should be kept in mind:

- Waiting until a system fails often means replacing systems "in kind" rather than with a more efficient system to help the building meet future laws and goals.
- When performing upgrades to a property, consider how future electrification will be implemented. See Appendix B for further guidelines on "Electric Readiness".
- Consider system interactivity – e.g., if a building repair necessitates electrical upgrades, it may provide an opportunity to electrify other systems.
- Include a timeline for upgrading each system based on current systems' end-of-useful-life, capital costs, refinancing cycles, and tenant impacts.

Finally, all buildings, regardless of whether they are subject to LL97, should maximize efficiency and minimize energy consumption in the near term. Reducing energy use is a key step toward decarbonization. Optimizing building envelopes, offsetting loads with solar, and reducing energy use with efficient fixtures will improve occupant comfort, reduce energy costs, and put buildings on a path to meet long-term decarbonization goals.

✓ Local Law 97 Prescriptive Energy Conservation Measures (PECMs) will be highlighted in orange text throughout this section.

PECMs are mandatory for buildings subject to LL97 Article 321 "Prescriptive Pathway" but should be implemented in all buildings to the extent possible.

Further information, including guidance for how to implement and report on these measures, can be found here.

## 3.1 Heating Systems

### Baseline

- **Heating System Maintenance:** Implement the following to ensure heating systems function correctly and efficiently:
  - ✓ Adjust temperature set points for heat and hot water to reflect appropriate space occupancy and facility requirements (PECM#1).
  - ✓ Maintain the heating system, including but not limited to ensuring that system component parts are clean and in good operating condition (PECM#3).

- **Heating System Repairs:**
  - Heating equipment should be repaired to meet the performance requirements outlined in Appendix A.2.
  - ✓ Repair all [visible] heating system leaks (PECM#2).
  - ✓ Insulate all [visible/ exposed] pipes for heating and/or hot water (PECM#5).
  - ✓ Insulate the steam system condensate tank or water tank (PECM#6).
  - ✓ Replace or repair all steam traps such that all are in working order (PECM#8).
  - ✓ Install or upgrade steam system master venting at the ends of mains, large horizontal pipes, and tops of risers, and vertical pipes branching off a main (PECM#9).
  - ✓ Install radiant barriers behind all radiators (PECM#13).
- **Heating Equipment Replacement:** If the heating system needs repair and has less than seven years of expected useful life remaining, contemplate a replacement plan that aligns with the City's decarbonization goals.
  - Heating systems and equipment that are being replaced must meet or exceed the Efficiencies and Performance standards in Appendix A.2.
  - New boilers must be right-sized using a Cold-Start or Equivalent Direct Radiation (EDR) method, including modulating linkage-less burners.
  - Certain heating systems may be strong candidates for electrification. See "Reach" below.

**Reach**

- The following heating systems may be strong candidates for electrification using high-efficiency heat pumps meeting the performance standards in Appendix A.1, including:
  a. Heating systems using electric resistance or oil (particularly No.4 oil);
  b. Heating systems located in basements/cellars of flood-prone buildings where flooding is expected within the lifetime of the equipment;
  c. Heating systems in buildings subject to Article 320 of Local Law 97 (the "2035 Pathway") as part of a long-term compliance strategy.
- When replacing systems and electrification is not feasible, consider how the system can be "Electric Ready." See Appendix B for further guidance on "Electric Readiness".

If the building will electrify heating, ensure building envelope upgrades are also being implemented to ensure that energy costs do not increase with electrification.
Electrification of heating systems must comply with HPD's Electric Heating Policy.

## 3.2 Thermostats and Controls

**Baseline**

- Implement the following controls to ensure the system functions correctly and efficiently:
  - ✓ Install indoor and outdoor heating system sensors and boiler controls to allow for proper set-points (PECM#7).

- ✓ Install individual temperature controls or insulated radiator enclosures with temperature controls on all radiators (PECM#4):
  - 1-pipe systems: Thermostatic Radiator Valves (TRVs) or insulated radiator enclosures are not mandatory for 1-pipe systems where the distribution piping has proper system-wide venting and where wireless sensors have been installed in at least 25% of the dwelling units.
  - 2-pipe systems: install TRVs or Thermostatic Radiator Enclosures (TREs). TREs may be installed for radiators in lieu of TRVs where records indicate overheating.
  - Electric radiators: confirm a functioning thermostat is installed.
  - Hydronic radiators: confirm that controls are functioning where present.
- Provide easily accessible instructions in multiple languages and/or videos for tenants about thermostat use.

**Reach**

- If existing thermostats are not being replaced but do not properly control the indoor air temperature based on settings or are not programmable, consider replacement in accordance with the specifications above.
- Provide control capabilities for all new equipment and set points through Building Automation and Control Networks (BACnet) or equivalent infrastructure.
- Provide smart thermostats that enable tenants and building owners to participate in demand response programs where available.

## 3.3 Domestic Hot Water System (DHW)

**Baseline**

- **DHW System Maintenance:** Implement the following to ensure the DHW system functions correctly and efficiently:
  - ✓ Adjust temperature set points for heat and hot water to reflect appropriate space occupancy and facility requirements (PECM#1).
  - ✓ Insulate all [exposed or accessible] pipes for hot water (PECM#5).
- **DHW Equipment Repairs:**
  - Gas DHW Systems: Perform a Steady State Efficiency (SSE) test before completing repairs to fossil fuel burning equipment.
    - If the SSE test is above 85%, evaluate if the repair scope will improve the system's efficiency; see the AMEEP Program Manual for details. Perform the scheduled repair work and a post-repair SSE test. Include a clean and tune of the burner and retro-commissioning of the system once repair work is completed.
    - If the existing equipment is below an AFUE of 85%, consider a full DHW replacement, as the necessary efficiency will not likely be achieved.
  - Electric resistance DHW systems:
    - If the tank is at the end of its useful life, consider replacement with an electric heat pump system meeting the performance standards outlined in Appendix B.
    - Minor repair work should be completed as feasible when replacement is not required.

- **DHW Equipment Replacement:** When equipment is at the end of its life or cannot achieve a minimum AFUE of 85%, the system shall be replaced as follows:
  - Install a system meeting the performance standards outlined in Appendix B
  - Certain DHW systems may be strong candidates for electrification, see "Reach" below.

**Reach**

- The efficiency of a building's heating system can be greatly improved by decoupling DHW systems. To the extent feasible, decouple all DHW systems that are part of building heating systems and replace them with a high-performance electric or non-electric DHW system meeting the performance standards outlined in Appendix A.3.
- Certain DHW systems may be strong candidates for electrification, including:
  a. DHW systems using electric resistance or oil (particularly No.4 oil);
  b. DHW systems located in basements/cellars of flood-prone buildings where flooding is expected within the lifetime of the existing equipment
  c. DHW systems in buildings subject to Article 320 of Local Law 97 (the "2035 Pathway") as part of a long-term compliance strategy.

If electrifying DHW, insulate pipes and install low-flow fixtures to ensure that energy costs do not increase. Electrification must comply with HPD's Electric Heating Policy.

## 3.4 Ventilation

**Baseline**

- **Ventilation System Maintenance:** Implement the following to ensure the existing system functions correctly and efficiently:
  - ✓ Install timers on [intermittent] exhaust fans. This may include timers, occupancy sensors or humidistats. Refer to Article 321 Filing Guide (nyc.gov) for guidance.
  - Clean and seal existing ductwork and grilles at least once every 10-15 years
  - Ensure all windows required for ventilation are fully operable, window balances are functional, and window screens are in place without holes.
- **Ventilation System Repairs:**
  - If central rooftop exhaust fans are being replaced, fans must be right-sized. Fans should be direct-drive, with variable speed EC motor and timers.
  - If the ventilation system is being addressed, test and balance the existing system to evaluate performance and troubleshoot any key issues that affect performance and use the opportunity to clean and seal ductwork and grilles.
- Provide residents with the "Ensuring Healthy Air in Your Home" flyer.

**Reach**

- If replacing the ventilation system, consider installing an Energy Recovery Ventilation (ERV) in lieu of exhaust-only strategies.

## 3.5 System Commissioning

**Baseline**

- All HVAC and DHW systems repaired or installed during rehab should be commissioned per the functional testing via the National HVAC Functional Testing Checklist, using the most current Energy Star Multifamily New Construction version available.

## 3.6 Building Envelope

**Baseline**

- **Envelope Repairs:**
  - ✓ Weatherize and air seal where appropriate, including windows and ductwork, with focus on whole-building insulation (PECM#11). See DOB's Article 321 Guidance.
  - If a building is replacing windows, exterior doors, skylights, or roofing, all new installations must meet or exceed the applicable NYC Energy Conservation Code (NYCECC) requirements.
  - All new windows, doors, and skylights must be properly air-sealed upon completion.
  - If a project's scope includes façade or roof repair (including LL11/FISP work) or replacement of through-wall equipment, affected areas should be air-sealed upon completion of the repair.

**Reach**

- Add insulation to all exposed and/or accessible exterior wall and ceiling/roof cavities to meet the applicable NYCECC requirements or to the extent that space allows.
- Where the roof is not being replaced, install a cool roof coating to reduce heat gain.

## 3.6 Solar

**Baseline**

- Local Laws 92 and 94 may be triggered when a building undertakes a replacement of the full roof assembly. Where applicable, the laws require solar panels or green roofs on the building's "sustainable roof zone." Further information can be found here.

**Reach**

- Optionally, any buildings doing roof work of any scope are encouraged to perform a solar feasibility analysis and install solar if it makes economic sense.

Free technical consultations with HPD's non-profit solar partner Solar One are available for buildings needing or wishing to assess for solar. Further information, including contact information, can be found on HPD's Solar Where Feasible webpage.

## 3.7 Appliances

**Baseline**

- When replacing refrigerators, dishwashers, and clothes washers, new appliances should meet or exceed Energy Star or CEE Tier 1 certification or equivalent, where applicable.

**Reach**

- Where feasible, install high-performance electric appliances when replacing refrigerators, dishwashers, cooktops, ranges, and clothes dryers.
- Specify Energy Star Most Efficient or CEE Tiers 2, 3, 4, or Advanced to the extent possible.

## 3.8 Lighting

**Baseline**

- ✓ Upgrade [common area] lighting to comply with the standards for new systems set forth in section C405 of the New York City Energy Conservation Code and/or applicable standards referenced in such energy code on or prior to December 31, 2024. This provision is subject to exception 1 in section 28-310.3 (PECM#10).
- Per Local Law 132, sub-meters must be installed in all non-residential tenant spaces exceeding 5,000 square feet by 2024
- All new lighting must be ENERGY STAR certified LED or equivalent
- All new exterior lighting shall have either motion sensor controls, photocells, or astronomic time-clock operation (or any combination of the above) to limit lighting when there is adequate daylight and be Dark Sky-approved or equivalent. Further information can be found here: Local Law 134 of 2016 and Darksky.org

**Reach**

- Where new lighting fixtures are not installed, replace existing fixtures' bulbs with LED, or ENERGY STAR certified or equivalent efficacy.
- Install dimmers/sensors to the extent feasible in all in-unit lighting fixtures.
- Install integrated photovoltaic cells lighting on all exterior lighting fixtures.

## 3.9 Water Use and Conservation

**Baseline**

- Test for and repair all visible or known leaks or leaks identified by testing.
- All new plumbing fixtures to be Low Flow and WaterSense certified:
  - Toilet: 1.28 gpf max or Dual Flush (1.28 gpf max; 1.0 gpf min)
  - Showerheads and Handshowers: 1.75 gpm max
  - Lavatory Faucet: 1.0 gpm max
  - Kitchen Faucet: 1.5 gpm (no WaterSense certification available)

### Reach

- For existing faucets, add aerators and replace showerheads with low-flow alternatives.
- Where the project includes landscaping, use native/drought-tolerant plant species to reduce water consumption for irrigation.
- Install an advanced water monitoring and leak detection system or a monitoring device to monitor water consumption.

For additional information regarding water conservation, refer to resources available through the Water Section of the 2020 Enterprise Green Communities Criteria.

## 3.10 Healthy and Safe Building Materials

### Baseline

- All interior paints, coatings, and primers used on a project should have a VOC content less than the thresholds provided by the most recent versions of SCAQMD 1113 and VOC emissions verified as compliant with the California Department of Public Health (CDPH) Standard Method.
- All interior adhesives and sealants used on the project have VOC content less than or equal to the thresholds provided by the most recent version of SCAQMD 1168.
- New flooring must comply with CDPH emission requirements. Flexible PVC with phthalates is not allowed.
- New insulation must be formaldehyde-free.
- Composite Wood used on the project must have formaldehyde emissions less than or equal to thresholds provided by CARB Phase 2 and/or TSCA Title IV. For interior products not covered by this baseline, products must have no added urea formaldehyde (NAUF).
- When replacing materials in bathrooms, kitchens, and laundry areas, use moisture-resistant finishes and backing materials, such as ceramic or porcelain tiles, and avoid unsealed grout. Carpet is not allowed in building entryways, wet areas, or utility rooms.
- Minimize new hardscaping in favor of native species/drought-tolerant planted areas or open grid pavement to reduce flooding and urban heat island effect.

### Reach

- Specify and install products with Health Product Declarations or Declare labels.
- Specify materials that are on the International Living Future Institute's Red List Free Products List or listed in the Healthy Building Network's HomeFree Product Selection Guide.

For additional information regarding water conservation, refer to resources available through the Materials Section of the 2020 Enterprise Green Communities Criteria.

# SECTION 4 / DEVELOPING AN OPERATIONS & MAINTENANCE PLAN

It is vital to regularly inspect and maintain all building systems to anticipate needs before failures occur. Proactive maintenance and periodic retro-commissioning allow for the consideration of energy-efficient and eco-friendly options, aligning with New York City's sustainability objectives and ensuring compliance with upcoming regulations.
Regular building Operations & Maintenance (O&M) practices minimize building repair needs and utility consumption and ensure a healthy, safe, and durable living environment for residents.

## System Retro-Commissioning

### Baseline

- Buildings over 50,000 are subject to LL87 and must submit an Energy Efficiency Report (EER) every ten years. The report shall include results from an Energy Audit and Retro-Commissioning measures, to validate the operations of the energy-consumption systems.

### Reach

- All buildings should implement periodic retro-commissioning to identify and resolve operational and maintenance issues and bring the systems (including HVAC, lighting, controls, etc.) back to optimal performance.

## Project Manuals and Records

### Baseline

- All buildings should have an up-to-date Operations and Maintenance Manual. The manual should include O&M guidance and specifications for all key Mechanical, Electrical, and Plumbing equipment, including O&M schedules, the location of all equipment shut-offs, flood panels or other floodproofing systems, and safe cleaning and pest protocols.
- When new equipment and systems are installed, the building should update the Operations and Maintenance Manual for all relevant improvements.
- All buildings should have a Resident Manual that provides easy-to-read instructions for residents about tenant-controlled systems and appliances. The Resident Manual should include tips for saving energy for resident-paid equipment and information about the Home Energy Assistance Program (HEAP) and other low-income energy assistance programs. The manual should also include instructions for tenants to report leaks and maintenance issues and be provided in multiple languages.
- When systems or appliances are replaced, update the Manual and distribute information via flyers or other means.
- Maintain a record of the building's equipment (HVAC, lighting, and appliances), which is updated at the time of servicing or assessing capital needs. This should include remaining useful life, specification, and model/manufacturing information.

- Maintain a schedule of in-unit, exterior, and common area finishes such as counters, cabinets, doors and hardware, flooring, etc. The schedule should show the age of materials and the expected replacement schedule based on expected useful life.
    - When manuals are developed for Operations and Maintenance or for Residents, provide digital copies to HPD.
- Provide an Emergency Management Manual or document for staff and residents that includes a building evacuation plan, location of backup power and broadband on the property (if any), and a means to locate outside emergency resources (e.g., Emergency Shelters and Cooling Centers, Public Wi-Fi, and Hurricane Resources).
- Provide permanent signage in buildings and flood disclosure information on tenant leases, notifying tenants of potential flood risk and providing resources to residents, including encouraging them to enroll in NotifyNYC and creating an emergency plan.
- Provide videos on equipment use and maintenance for staff and residents in multiple languages. Ensure that the resource is easily found and is kept up to date.

## Staff and Resident Training

**Baseline**

- Require staff to be present for the start-up of new mechanical systems.
- Provide periodic training on system use to building staff, including when onboarding new staff. Free courses like CUNY BPL's free Building Operator Training and Building Re-Tuning and Urban Green Council's GPRO O&M courses can help building owners save energy and money.
- Provide training to residents on in-unit system use and optimal equipment settings for heating, cooling, ventilation, and appliances within 30 days of move-in or upon installation of new systems. Provide additional periodic training as needed, including at tenant turnover or upon tenant request.
- Where deployable floodproofing systems are employed, ensure staff are trained to maintain and install flood panels or other floodproofing systems. The City Building Code requires annual inspections and triennial deployment of dry floodproofing systems.

## Waste Management

**Baseline:**

- Allocate space for collection of organics in all waste collection areas to the extent feasible or in an alternative space, due to the mandatory separation guidelines, see DSNY webpage.
- Post signage about recycling in common waste collection areas.

**Reach:**

- Enroll eligible projects in DSNY's free ecycleNYC and refashionNYC programs for buildings with ten or more units.

## Moisture, Mold, and Pest Management

**Baseline:**

- Per Local Law 55 of 2018, all multiple-dwelling owners must investigate and remove all indoor health hazards that trigger asthma, including mold, and ensure that properties remain free of such hazards.
- For mold removal > 10 square feet in buildings with ten or more units, a licensed remediator must be used.

**Reach:**

- Seal all wall, floor, and joint penetrations with low-VOC caulking or other appropriate nontoxic methods (window screens, pest-resistant door sweeps, escutcheon plates, and elastomeric sealants) to prevent pest entry.
- Use rodent- and corrosion-proof screens (e.g., copper or stainless-steel mesh or rigid metal cloth) for openings greater than ¼-inch. Pay close attention to sealing off entry points under kitchen and bathroom sinks. Note that this can be done in conjunction with air sealing.
- Speak with building staff and residents to identify areas of potential or historic pest entry and address those areas in a Pest Management Plan.
- Provide a service contract with a licensed pest management professional (PMP) or environmentally friendly pest management provider.

Further information can be found at NYC DOH Pest Control, NYC DOH Rat Prevention, and DOHMH: Mold.

# SECTION 5 / IDENTIFYING TECHNICAL & FINANCIAL RESOURCES

The Guidelines have been designed to align with current incentive program requirements.

**NYC Accelerator**
NYC Accelerator provides technical resources, training, and one-on-one expert guidance to help building owners and industry professionals improve energy efficiency and reduce carbon emissions from buildings in New York City. Additionally, NYC Accelerator offers free technical assistance and information about financing, incentives and providers.

**NYSERDA – Multifamily Programs**
The New York State Energy Research and Development Authority (NYSERDA) works to promote energy efficiency, renewable energy, and emissions reduction across NYC's economy and energy system. Current programs includes: The Multifamily Buildings Low-Carbon Pathways Program; FlexTech: The FlexTech program; FlexTech Consultant; NY-Sun

**Affordable Multifamily Energy Efficiency Program (AMEEP)**
A joint statewide energy efficiency program offered by a coalition of energy utilities operating across NYS and NYSERDA. AMEEP offers incentives for multi-family affordable housing in the form of rebates for installing energy-efficient equipment and technologies.

**J-51 Reform (J-51R)**
J-51R offers an as-of-right real property tax abatement for residential rehabilitation of Class A multiple dwellings. J-51 R Program benefits are available to projects completing work after June 29, 2022, and on or before June 29, 2026. The benefit is an abatement of existing real property taxes by up to 8 1/3 percent of the total certified reasonable cost of the work each year for up to 20 years, up to a total of 70 percent of such approved certified reasonable costs. The CRC includes scopes items that will help with LL97 compliance.

**Clean Heat Program – Multifamily**
The NYS Clean Heat Program offers incentives for buildings with 5+ dwelling units in the form of rebates for Air Source Heat Pumps (ASHPs) and Ground Source Heat Pumps (GSHPs) for both space heating and cooling and Heat Pump Water Heaters (HPWHs) for water heating. Envelope improvements, heat pump controls, and an Energy Recovery Ventilator (ERV)/ Heat Recovery Ventilator (HRV) may also be eligible for incentives when paired with a heat pump system.

**New York City Energy Efficiency Corporation (NYCEEC)**
NYCEEC is a New York City-based organization that provides multiple loan products that cover a spectrum of building energy efficiency and electrification projects for multifamily, industrial, and commercial, as well as institutional owners. Loan sizes vary, and a range of energy efficiency and clean energy measures are financed, including predevelopment financing.

**Solar One**

Solar One's Here Comes Solar (HCS) program seeks to expand access to the benefits of solar power to all New Yorkers through solar technical assistance, with a focus on affordable housing, low-income renters, and non-profit organizations.

HPD has partnered with Solar One to create tools and provide free technical assistance to identify and optimize solar projects across HPD's portfolio. The Solar Consent resource provides guidance for owners seeking HPD or HDC Consent for standalone solar projects. See the HPD's Solar Where Feasible webpage for more information.

Further information and other resource can be found on the NYC Accelerator webpage.

# APPENDICES

# APPENDIX A / PERFORMANCE REQUIREMENTS FOR HEATING & DOMESTIC HOT WATER

## Appendix A.1: Electric Heating Equipment

Newly installed electric Heating Equipment must comply with the following requirements:

- VRF Multi-Split must meet NEEP's cold climate COP requirements @47°F, 17°F, 5°F based on outdoor unit capacity and must be certified by AHRI Standard 1230. Further information can be found at NEEP Cold Climate Air Source Heat Pump Specification, NEEP Cold-Climate Product List, ENERGY STAR Water Heater Key Product Criteria
- Packaged Terminal Heat Pump (PTHP) & Single Package Vertical Heat Pump (SPVHP) must have a compressor with variable capacity (3 or more distinct operating speeds or continuously variable), have a COP @5°F ≥ 1.5 (at maximum capacity operation), and be certified by AHRI Standard 310/380.
- Electric Resistance backup is not permitted.
- Central Equipment must be BAC-net capable.
- VRF systems that do not include Heat Recovery (2-pipe systems) shall be zoned appropriately to ensure that all spaces on the same system have similar requirements.
- All equipment must be installed per HPD's Technical Requirements for Heat Pumps (Heat Pumps for Space Heating, Heat Pumps Water Heater, and Room Heat Pumps) and should follow the guidelines outlined in HPD's Best Practices Documents.
- All loads must be calculated according to ACCA Manual J 8th Edition or according to the Residential Cooling and Heating Load Calculations chapter of ASHRAE Handbook of Fundamentals and ANSI/ASHRAE Standard 183-2007.
- All new equipment must be sized according to ACCA Manual S.
- Lower efficiency equipment (using electric resistance) may be used in limited quantities as necessary in bathrooms, common stairwells, and vestibules where heat pumps may not be appropriate. Units located in limited occupancy areas (e.g., bathrooms) must have timer controls, and equipment used for freeze protection must be set at 50 degrees maximum.
- All electric heating equipment must comply with HPD's Electric Heating Policy.

## Appendix A.2: Non-Electric Heating Equipment

Heating Equipment must meet or exceed the following requirements:

- Condensing Boilers must have a minimum AFUE of 90% for boilers < 2,500 kBtu/h or 93% for boilers > 2,500 kBtu/h.
- Hydronic Boilers must have a minimum AFUE of 85% for boilers < 2,500 kBtu/h or 88% for boilers > 2,500 kBtu/h.
- Steam boilers must have a minimum AFUE of 82%.
- Installation of new oil-fired equipment is prohibited, and under no conditions may #4 oil be used as a primary or backup fuel.
- All loads must be calculated according to ACCA Manual J 8th Edition or according to the Residential Cooling and Heating Load Calculations chapter of ASHRAE Handbook of Fundamentals and ANSI/ASHRAE Standard 183-2007.
- All equipment must be sized according to ACCA Manual S or to NYC mechanical code.

## Appendix A.3: Electric Domestic Hot Water Equipment

New DHW Equipment must meet or exceed the following requirements:

- System must comply with applicable Energy Star Water Heater requirements.
- Residential Heat Pump Water heating equipment must have a UEF ≥ 3.3, and Commercial Heat Pump Water heating equipment must have a COP ≥ 3.0 and have an AHRI Certificate if applicable.
- Central Systems must be capable of producing and storing a minimum of 140-degree water at 5-degree outdoor air temperature.
- All Heat Pump Water Heating equipment must be installed per HPD's Technical Requirements for Heat Pump Water Heaters and should follow the guidelines outlined in HPD's Best Practices Documents.
- All electric heating equipment must comply with HPD's Electric Heating Policy

# APPENDIX B / ELECTRIC READINESS

HVAC equipment and appliances installed today will be in service for many years. Installing fossil-fueled equipment today will prevent a building from meeting long-term carbon emissions limits, including the 2050s GHG emissions limits required by Local Law 97 for many buildings. Where electrification of a system is not currently required or planned, buildings can incorporate "electric-ready" solutions that can lower the heavy lift of future electrification work. The following strategies will help buildings become electric-ready:

- Reduce overall electric demand by improving building envelope and consider how future equipment may affect decisions on windows, ventilation, and roof use being made today.
- Consider how future systems will be metered and billed, noting that not all billing arrangements are suitable or allowable for all building populations.
- Leave additional access and space for future mechanical equipment, especially on rooftops and in mechanical spaces - electrification of space heating and hot water often requires significant outdoor space for large equipment.
- Provide adequate space in the switchgear room and plan for future feeders serving the areas where future outdoor heat pumps may be located.
- If the building requires electrical service upgrades, size upgrades to accommodate future electrical loads, to the extent feasible or allowed by code.
- Install sufficiently rated individual branch circuit outlets for future equipment to the extent feasible for future electric appliances (e.g., induction stovetop ranges) and heat pumps within apartments and for future electric equipment and appliances in common areas, mechanical spaces, and in exterior locations as may be needed.
- Reserve space in new panels for future equipment. The circuits must be labeled as "spare," and loads must be included in the load calculations of the original panel box installation.
- For buildings implementing hydronic heating upgrades, design the system so that the heating plant can be converted without requiring additional changes to the distribution and terminal units (i.e., size terminal units for supply water temperatures commonly provided by air-to-water heat pumps, approximately 140°F at design conditions, where feasible).

# APPENDIX C / CASE STUDY: MEETING LL97 GHG EMISSIONS LIMITS

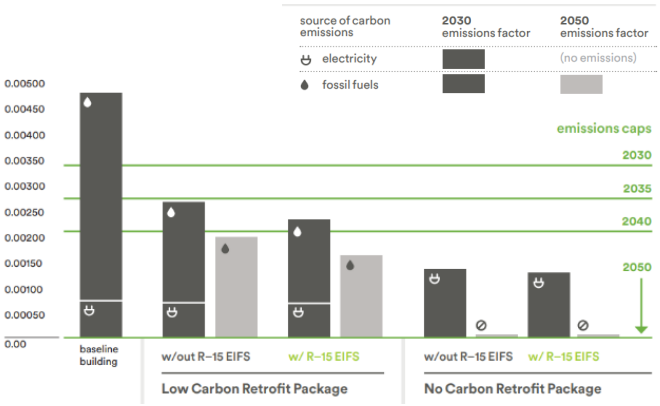
In 2023, HPD released the Decarbonization Roadmap for Affordable Housing to help building owners develop long-term capital plans to comply with Local Law 97's short and long-term limits. Two retrofit packages were modeled for five typical affordable housing typologies: a Low Carbon Package focusing on efficiency and partial electrification and a No Carbon Package that focused on full electrification to meet the 2050 emissions limits.

**Case Study #2: Postwar High Rise.** This 182-unit post-war high-rise building is typical of many buildings subject to the 2035 Pathway. The building has a brick masonry facade, balconies, and no wall insulation. The building is heated via a gas two-pipe steam heating system, has through-wall AC for cooling, and exhaust-only ventilation. The building was modeled with Central VRF for heating, although other options would be possible. The building's current GHG emissions are ~0.00475 mtCO2e/sf, which is well above the building's LL97 2035 limits.

**For this Case Study, the following Packages were proposed and modeled:**

| Scope | Low Carbon Retrofit Package | No Carbon Package |
|---|---|---|
| Envelope | Roof Insulation, new windows, air-sealing | Higher performance windows |
| Heating/ Cooling | New steam boilers, controls, RTEM | Central VRF system |
| Ventilation | Clean/ Seal Balance + efficient Rooftop Fans | Central ERV |
| DHW | Electric Heat Pump DHW + pipe insulation | no additional scope |
| Lighting | LED throughout | no additional scope |
| Appliances | ENERGY STAR ranges and washers | Electric cooking & dryers |
| Other | 65kW solar | no additional scope |
| Optional: | R-15 EIFS over-cladding | R-15 EIFS over-cladding |
| **GHG Reductions:** | **46%/ 54% (with EIFS)** | **100%/ 100% (with EIFS)** |

**Results and Key Takeaways:**
A retrofit similar to the Low Carbon Retrofit Package will enable the building to avoid penalties through 2049 (assuming a clean energy grid), after which the building would need to be fully electrified to meet the 2050 GHG emissions limits. A scope like this would also reduce the building's energy costs and significantly improve the comfort and health of its occupants.




**Additional information about this Case Study – including estimated scope costs and savings** - as well as other case studies, can be found here: Decarbonization Roadmap for Multifamily Affordable Housing - Building Energy Exchange (be-exchange.org)