



# HCR PRESERVATION SUSTAINABILITY GUIDEBOOK:

FOR SUSTAINABLE OPERATIONS,  
REPAIRS, AND RENOVATIONS

HCR.NY.GOV  
2022



Homes and  
Community Renewal

Kathy Hochul, Governor  
RuthAnne Visnuskas, Commissioner/CEO



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# INTENT OF GUIDELINES

The intent of this Preservation Sustainability Guidebook is to provide guidance<sup>1</sup> to Owners and operators on how they can align multi-family properties in HCR's existing portfolio with the State's goals to reduce carbon emissions, improve indoor air quality, and decrease the building's energy burden.

The HCR Preservation Sustainability Guidebook should be used as a performance and sustainability guide for any property under regulation with HFA, HTFC, Mitchell Lama, or other Homes and Community Renewal issued program that is looking to utilize replacement reserves or make any capital investments to properties. The Guidebook is applicable only to intended improvements of the property at the time of reference.

**For example:** We encourage a developer/owner who has a heating system approaching the end of its useful life to review this document for planning purposes in Section 1 and then to reference Section 2 HVAC for specific guidance on recommended replacement for the heating equipment. In this use case, we would not expect the property to comply with the building envelope section, as an example.



**IMPORTANT KEY:** This icon is specific support for Owners.

<sup>1</sup>The Preservation Guidebook should be used as supplemental advanced sustainability guidance where all NYS Building Codes and Standards shall be adhered to as required.



**New York State's goals  
for Greenhouse Gas  
Emissions Reductions**

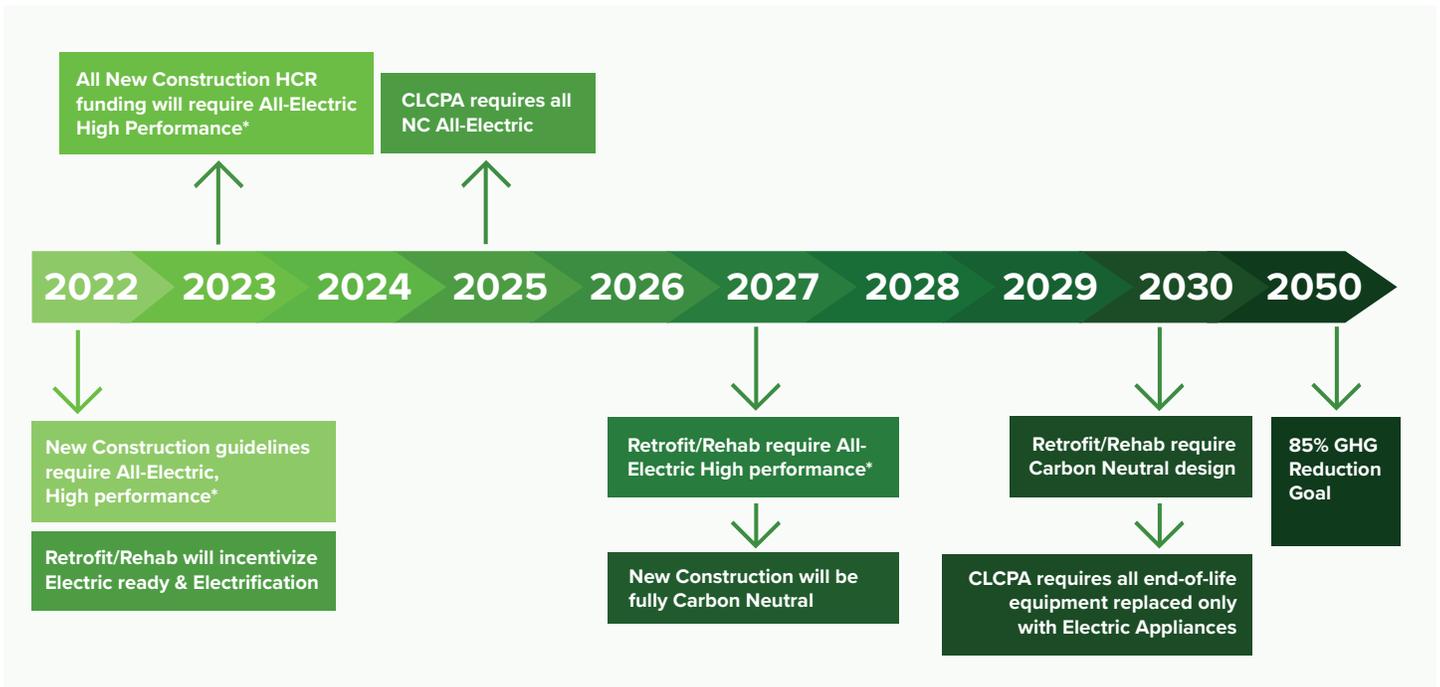
**40% by 2030**  
**85% by 2050**

# SUSTAINABILITY & PRESERVATION

When component replacements are being considered, project teams must consider the useful life of the existing equipment and evaluate whether a repair or replacement will be most effective. Replacements require an integrated system approach that considers the interactions and synergies between building systems. HCR is committed to decarbonization over time, illustrated by the Sustainability Standards Roadmap below.



## SUSTAINABILITY STANDARDS ROADMAP



**IMPLEMENTATION OF NEW YORK'S CLIMATE ACT IS ON TRACK AND MOVING FORWARD EXPEDITIOUSLY.**

# APPLICATION OF SUSTAINABILITY GUIDELINES

The **HCR Sustainability Guidelines** are applicable to certain projects applying for financing through HCR. The list of **Applicable Financing Programs** are outlined in this section. Projects shall follow the Sustainability Guideline section(s) that apply to their project based on the financing and construction type outlined in the Application Matrix below.

## APPLICATION MATRIX

### Applicable Financing Programs:

- Multifamily Finance 9% LIHTC RFP
- Multifamily Finance 4% HFA Tax-exempt Bond and Subsidy Financing
- Multifamily Finance Open Window CIF Stand-alone Financing

Project Type		New Construction Sustainability Guidelines	Existing Buildings Sustainability Guidelines	Preservation Sustainability Guidebook: For Sustainable, Operations, Repairs and Preparations
Project applying for financing with HCR through <b>Applicable Financing Programs</b>	Residential New Construction			
	Residential Adaptive Reuse Rehabilitation			
	Residential Substantial/Gut Rehabilitation			
	Residential Moderate Rehabilitation			
	Mix of Residential New Construction and Residential Rehabilitation Buildings in Project	 Note 1	 Note 1	
	Mix of Residential New Construction and Residential Rehabilitation in a Single Building		 Note 2	
	Commercial and/or Community Service Facility	 Note 3	 Note 3	
Projects under regulation with HCR	Rehabilitation and/or Replacement work			

### Footnotes

**Note 1:** Utilize Guidelines matching building scope for each building

**Note 2:** Follow Adaptive Reuse Guidelines

**Note 3:** Incorporate comparable energy efficiency strategies as those required for residential projects to achieve similar energy savings

# STRUCTURE

# SUSTAINABILITY

# GUIDELINE REQUIREMENTS

This booklet is divided into three sections:

**Section 1: General Project Planning & Scoping**

**Section 2: Building System Guidelines**

**Section 3: Operations & Other Sustainable Considerations**

Each section addresses and includes a specific set of goals or standards that HCR has established as “**Baseline**” or minimum best practice. When pursuing a specific scope of work, in addition to the **Baseline**, each section also contains “**Stretch**” goals which all projects are encouraged to select or reach towards, when feasible. **Stretch** criteria sets the precedent for future baseline criteria and aligns with the State’s overall energy and decarbonization goals to reduce onsite carbon emissions by at least 40% by 2030 and 85% by 2050.

## Terminology: Baseline and Stretch

BASELINE REQUIREMENTS	STRETCH GOALS
<p>The Baseline outlines the agency’s recommended best practices for repair, replacement, and renovation.</p> <p>When accessing HCR <b>supervised accounts</b> identified below, or as stated in a project’s regulatory agreement, any scopes of work that a project is undertaking shall comply with this standard.</p>	<p>Stretch criteria go beyond the agency’s best practices for repair, replacement, and renovation. These criteria should be considered where feasible, and will help properties reach deeper levels of decarbonization.</p> <p>As New York State is prioritizing carbon emissions reduction through the Climate Leadership and Community Protection Act (“CLCPA”) of 2019, HCR would like to encourage developers, owners, and managers to align replacements and repairs with the high-performance electrification goals, outlined as <i>Stretch</i>.</p>

## STRUCTURE *Continued*

### BASELINE REQUIREMENTS

HCR waiver approval is required prior to proceeding with any work that cannot feasibly meet these **Baseline** requirements.

### STRETCH GOALS

Additionally, funding by way of incentives can be secured to assist in covering the cost increase. Please refer to each section for funding sources and your asset manager for recommendations.

## SPECIFIC REQUIRED COMPLIANCE WITH THIS DOCUMENT:

**HTFC Mortgage Requirements:** State projects must receive written consent for any alterations, and per the regulatory agreement the project must follow policies and procedures of the corporation (as may be amended from time to time), as such all projects subject to these standards must follow the requirements outlined in this document.

**HFA:** The baseline standards in this document should be complied with as a best practice for operations and repair/replacement. Projects must receive written consent for any substantial alterations as outlined the in the reserve for replacement guidelines in the regulatory agreement. Coordinate with your asset manager on scope of work and oversight as required per your regulatory agreement.

**Mitchell Lama:** The baseline standards in this document should be complied with the PHFL which governs your housing company and as best practice for operations and repair/replacement. Please coordinate with your assigned housing representative on scope of work and oversight per your regulatory agreement.



## SECTION 1

# GENERAL PROJECT PLANNING AND SCOPING

This section provides guidance for owners to proactively identify the needs of a property through long-term capital needs planning. All projects should follow the **Baseline** outlined in this section when establishing a capital needs/repair plan for their properties. Although not required, projects should consider the **Stretch**, where feasible.

## Baseline Requirements:



Owners can develop the following baseline requirement documents, for deliverables like creating reports or capital needs planning.

- A. Capital Needs Planning:** Create a property specific roadmap for replacement and repairs over time which will help reduce the number of emergency repair needs during those time periods.
1. Maintain, and make readily available, service records of the project's equipment (HVAC, lighting, and appliances) including the remaining useful life, specifications, and model/manufacture information.
  2. Maintain an installation schedule of in-unit and common area finishes such as counters, cabinets, doors and hardware, and flooring. The schedule should clearly show age of material and the expected replacement schedule based on expected useful life.
  3. Develop a replacement plan to address equipment failures or as equipment/finishes reach the end of useful life.
  4. Phase out aging equipment with more efficient replacements, using the guidance in Section 2 and Section 3 of this booklet.
- B. IPNA:** Every ten years, procure an IPNA for the project to identify improvements and/or replacement needs related to performance from a qualified third-party contractor. All existing conditions, components and systems shall be evaluated utilizing the Integrated Physical Needs Assessment (IPNA) standard linked on the HCR Sustainability Guidelines website. <https://hcr.ny.gov/sustainability-guidelines>

NOTES: Qualified contractors can be found on this list: <https://www.nyserda.ny.gov/>

## Stretch Goals:



Owners should engage a consultant to discuss and develop the following stretch goals when applicable:

## SECTION 1 *Continued*

- A. Path to Electrification:** Create a “Path to Electrification” for the project, via an electrification roadmap. The roadmap should represent future needs to enhance the property at various instances over time or all repairs and/or replacements being completed at a future time. The electrification roadmap should include:
1. A detailed list of all necessary technology and equipment upgrades needed to reach an all-electric high performance design standard, as detailed and explained in the Existing Buildings Sustainability Guidelines booklet under Section 2, Stretch Goals for building envelope and HVAC.
  2. Associated cost estimates and potential timeline of when anticipated equipment and technology would be available and how it will be implemented and/or installed.
    - i. Future electrification capital costs should be included in the property’s reserve account sizing or demonstrate where future sources of funding to support electrification will be secured.
  3. Details on any phasing that would be proposed, where the cost and scope should be detailed for each potential phase.
  4. A tenant impact plan, including a relocation plan if deemed necessary, highlighting in-unit work scopes and their potential impact and timeframe of completion by unit.
- B. Electrification ready:** Perform upgrades to the property that will allow for future electrification to occur. Scopes of work should be focused on providing adequate space and electrical service for future equipment. Areas of focus should include ranges/cooking appliances, heating and cooling equipment, water heating, and building electrical systems.



Contact your Asset Manager or Housing Manager to discuss and plan for electrification impacts to your housing operating budget such as a change request for utility allowance structure or a request for a change in services before finalizing or performing an electrification switch.

### Notes/ Resources:

- All projects are encouraged to apply for [New York State Affordable Multifamily Energy Efficiency Program \(AMEEP\)](#) administered by a coalition of New York State utilities
- Projects are also encouraged to explore the [New York State Clean Heat program](#) when performing electrification upgrades.
- Projects pursuing an audit or IPNA should consider applying for [NYSERDA’s Flextech funding](#), which will cover some or all of the soft costs associated with audit/IPNA.

## SECTION 2

# BUILDING SYSTEM GUIDELINES

The following guidelines are applicable to any proposed scope of work or site-specific needs identified for the project. Not all sections will be applicable to every project. The project team should follow the **Baseline** guidance for scopes or work relevant to their property. Although not required, projects should consider **Stretch** criteria when the measure applies to the proposed scope of work.

### A. APPLIANCES

This section applies to all in-unit and common area appliances for use in the performance of domestic chores. This does not include HVAC systems, please see section D below for HVAC criteria.



Owners should utilize the following baseline requirements as specifications for appliance replacements and/or backstock. This section is applicable to kitchen and laundry appliances only, and does not include HVAC systems. When considering replacing fossil fuel-based appliances with electric appliances as outlined in the stretch goals below, engage a consultant to determine the load feasibility of the existing panels.

**Baseline Requirements:** Projects should meet the following criteria when replacing appliances in dwelling units or in common interior spaces:

1. All refrigerators, dishwashers, and clothes washers being replaced should meet or exceed EnergyStar or CEE Tier 1 certification or equivalent, where available.

**Stretch Goals:** To be considered for any project replacing appliances:

1. All ranges, cooktops, ovens, and clothes dryers being replaced in the project should be all-electric, where feasible. This stretch goal should also be considered for any commercial or community facility kitchens.
2. Utilize appliances that are EnergyStar Most Efficient or CEE Tiers 2,3,4 or Advanced.



## SECTION 2 *Continued*

### B. LIGHTING

Any fixture and bulb system that illuminates either common area, exterior, or interior spaces.



Owners should utilize the following baseline requirements as specifications for lighting replacements and/or backstock of their existing inventory. When a consultant or contractor is engaged, these baseline requirement specifications should be given to the consultant for reference.

**Baseline Requirements:** Projects should meet all the following criteria when replacing light fixture in dwelling units or in common interior or exterior spaces:

1. All interior and exterior lighting should be Energy Star Certified LED or provide the equivalent in energy savings and quality.
2. All exterior lighting fixtures should be DarkSky approved or equal.
3. All exterior lighting should have either motion sensor controls, photosensors, or astronomic time-clock operation to limit lighting when there is adequate daylight.

**Stretch Goals:** Projects are encouraged to consider incorporating the following into the project when replacing light fixtures, which can yield additional operational savings:

1. Lighting inside the building, but not in a dwelling unit, should be controlled by occupancy sensors or automatic bi-level lighting controls,
  - a. Exemptions:
    - i. If 24-hour consistent light levels are required by code
    - ii. Mechanical and utility rooms are exempt.
2. Utilize integrated PV cells on exterior light fixtures

### C. BUILDING ENVELOPE

This section applies to the project's envelope, or the physical barrier between the conditioned and unconditioned environment of a building. A well designed and performing building envelope can improve the building's indoor air quality, energy performance, and thermal comfort while reducing the opportunity for pests and rain penetration.



When engaging an Architect, Engineer or Contractor to complete any scopes of work applicable to the building envelope, the Owner shall share the following baseline requirement specification.

## SECTION 2 *Continued*

**Baseline Requirements:** Projects should meet the following requirements when performing work on the building envelope as it applies to the project's scope of work:

- 1. Replacement or Upgrade of Building Insulation:** Insulation improvements should meet or exceed the 2020 Energy Conservation Construction Code of New York State (ECC). Air sealing (item 4 below) should be conducted on all exterior walls in conjunction with insulation repair/replacement/additions. Note: improvements to existing envelope assemblies must be carefully studied to mitigate the risk of moisture damage and material degradation. When feasible, modeling to assess moisture risk and heat transfer should be used to inform decisions regarding insulation placement, type, and thickness.
- 2. Replacement of Exterior Windows:** All windows shall meet the prescriptive requirements for Building Envelope Fenestration Maximum U-Factor and Solar Heat Gain Coefficient (SHGC) Requirements of the 2020 Energy Conservation Construction Code for New York State (ECC) where commercial energy provisions are required and the prescriptive requirements for Fenestration U-factor and Glazed Fenestration SHGC where residential energy provisions apply. Noise mitigation should be considered when replacing all windows, especially when the property is adjacent to a rail/road/or high-density street. All window installations should include adequate weatherstripping and air sealing.
- 3. Replacing Siding:** Add at least 1" rigid insulation behind the siding or utilize insulated siding with a minimum R-value of R-2.
- 4. Air Sealing:** To the greatest extent feasible, perform air sealing and weatherstripping in existing buildings; It is critical to mitigate unwanted infiltration and improve thermal performance. Scopes of work should address all major areas for potential air leakage, including but not limited to existing door and window frames, exterior and demising walls, wall-to-floor intersections, joints, and penetrations such as electrical, mechanical, and plumbing equipment.
- 5. Façade Repair:** Exterior walls must be air sealed upon completion of façade repair, additional insulation should be added, when possible, to meet or exceed New York State Energy Code standards.
6. When projects are performing repair work, such as in accordance with LL11 (in NYC), or similar local law work to a building envelope, these baselines should be met in any scope of work





**New York State is a leader in adopting clean heat and energy efficiency measures, committing more than \$6.8 billion to reduce the carbon footprint of New York's building stock.**

## SECTION 2 *Continued*

item that is being addressed as part of the local law compliance. Projects performing repair work in conformance with LL11 in NYC should submit their work scope plans from a licensed Architect or Engineer to the assigned HCR Asset Manager confirming baseline compliance is met.

### Stretch Goals:

A well-sealed building envelope can significantly reduce heat gains and losses to the buildings conditioned spaces, leading to improved energy performance and reduced operational costs. Projects looking to achieve high performance standards now or in the future should consider complying with the stretch standards below.



When engaging an Architect, Engineer or Contractor to complete any scopes of work applicable to the building envelope, the Owner shall share any of the following stretch goal specifications that they would like to achieve.

Projects should consider some, or all, of the following strategies into the scope of work, especially when doing whole-building façade improvements, such as LL11 in NYC:

1. When replacing existing windows, specify and install new windows with a maximum assembly U-value of 0.25 Btu/hr-ft<sup>2</sup>-°F.
2. For any façade improvements, mitigate thermal bridging to the greatest extent possible by incorporating new assembly details during the installation at any fenestration or building façade.
3. For any facade improvement, demonstrate the applicable envelope component assembly U-value is at least 15% more efficient than the prescriptive thermal performance requirements listed in the NY State Energy Conservation Construction Code 2020 Table R402.1.4.

**For deep decarbonization:** Use the Passive House U.S. (PHIUS) standard as a reference when performing envelope upgrades.<sup>2</sup> Passive House provides standard specifications for existing building retrofits. Key envelope performance criteria include:

- a. Annual Heating Demand: [kWh(m<sup>2</sup>a)] ≤ 15
- b. Heating Load: [W/m<sup>2</sup>] ≤ 10
- c. Air Tightness: Pressurization test result n50: [1/h] ≤ 0.6

NOTE: For potential funding to support decarbonization work, described here, please visit the NYSERDA's RetroFitNY or BOE program, or New York State's AMEEP program.

<sup>2</sup> Passive House Standard for building envelope design: <https://www.phius.org/passive-building/what-passive-building>

## SECTION 2 *Continued*

Projects should include a detailed description of how they will ensure adequate ventilation of the building as airtightness increases. The installation of balanced ventilation systems like energy recovery ventilation (ERV) and heat recovery ventilation (HRV) systems should be explored.

### D. HVAC

A building's Heating, Ventilation, and Air Conditioning (HVAC) systems are critical components to provide heat in the winter and cooling in the summer. These systems, when designed efficiently and operated correctly, can ensure comfort to the occupants of the space in all climates. As the State works to decarbonize or reduce carbon emissions, also known as greenhouse gas emissions, it is critical we improve existing efficiency in these systems and where possible and feasible, upgrade to high performance all-electric systems.



When engaging an Engineer, Contractor or Technician to complete any scopes of work applicable to the existing heating and cooling systems, the Owner shall share the baseline requirement specifications. Owners should remain cognizant of the remaining useful life of their heating and cooling systems and proactively engage a consultant to develop a plan for replacement before equipment reaches failure.

### Heating and Cooling

**Baseline Requirements:** Projects should follow the guidance below based on the applicable system repairs/replacement and based on the preferred scope of work outlined in the project's Capital Needs Plan, IPNA or Path to Electrification Plan:

#### 1. HVAC Repair:

Projects should consider repair of HVAC equipment if the system has more than 7 years left in expected useful life according to the IPNA, taking into account existing performance.

- a. Process for evaluating existing Fossil Fuel Based Heating/Cooling Equipment with an AFUE rated above 85%\*:

## HEATING & COOLING TERMINOLOGY

### COP (Coefficient of Performance):

*Coefficient of Performance* is the relationship between the power (kW) that is drawn out of the heat pump (cooling or heat), and the power(kW) that is supplied to the compressor.

### Cold Climate Air-Source Heat Pumps

**(ccASHP):** *Air-Source Heat Pumps* extract heat from the air (even cold air) and transfer that energy to indoor space through a reverse air-conditioning process.

### Ground Source Heat Pump (GSHP):

*Ground Source Heat Pumps* transfer heat from the ground, by making use of the relatively constant ground temperature throughout the year.

## SECTION 2 *Continued*

- i. Perform a Steady State Efficiency (SSE) test before repair work is completed, typically performed during an IPNA. If the SSE test is above 85% proceed to step “ii” below. If the SSE test is below 85%, proceed to step “iii” below.
- ii. Perform necessary repair work, including a clean and tune where appropriate, and perform a post-repair/work SSE test. If the results do not meet or exceed 85%, and the rated AFUE is above 90%, perform additional commissioning and or balancing work to improve performance or consider near-term future replacement following the replacement guidance below.
- iii. If the rated AFUE of the existing equipment is below 85%, consider a full replacement of the applicable HVAC equipment before equipment reaches the end of its useful life, as desired efficiency will likely not be achieved.

\*If the rated AFUE of the existing equipment is above 85%, evaluate if the prescribed repair scope will improve the necessary efficiency of the system with a qualified third party; include a clean and tune of the burner and retro commissioning of the system once the repair work is completed.

### 2. HVAC Replacement:

As equipment reaches the end of its useful life and begins to fail performance tests for efficiency based on guidance above, properties should strongly consider and plan for replacement that is aligned with the State’s goals for decarbonization. Specifically, existing fuel oil burning appliances should be considered for replacement along with properties that are receiving benchmarking scores that fall in the bottom quartile, an EnergyStar score below 50. Properties should consult with the HCR Asset Manager to discuss their annual benchmarking report when a property is over 50,000 SF and submitting annual utility data as part of their regulatory agreement requirements.

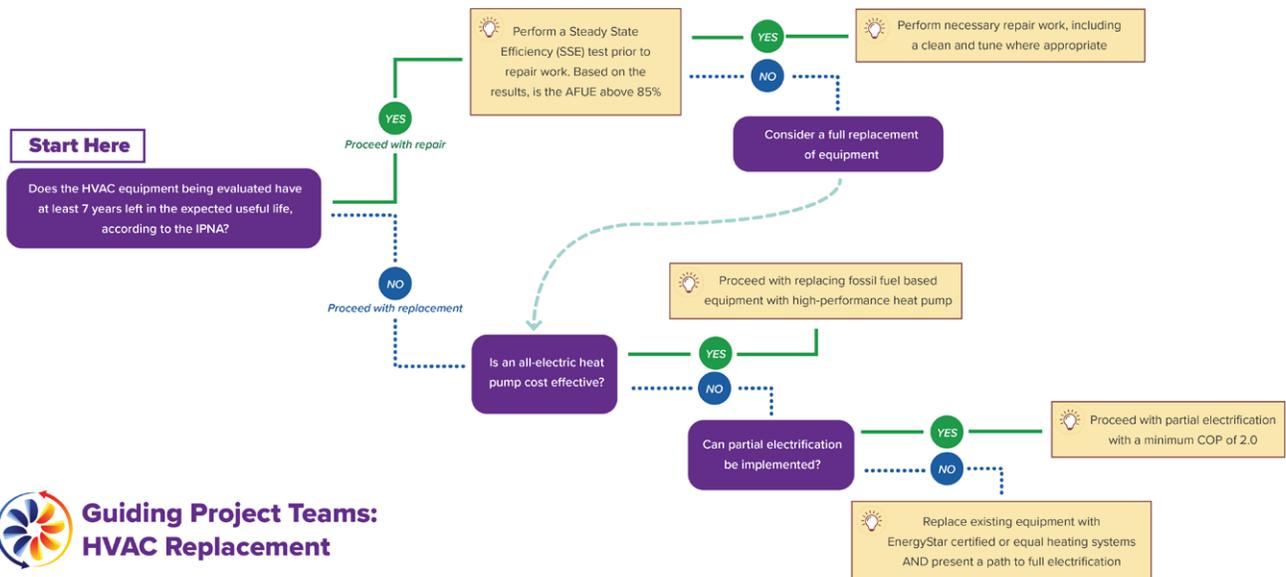
Properties should be prepared to replace all HVAC equipment with all-electric high efficiency equipment. It is strongly recommended that properties take steps to plan for these upgrades before the point of equipment failure.

- a. Fossil Fuel Based Heating/Cooling Equipment should follow the new equipment design guidance below:
  - i. **Full Replacement:** High performance all-electric cold climate heat pump(s) or equal must be evaluated and prioritized if cost effective before replacement with fossil-fuel based equipment.

**SECTION 2** *Continued*

1. Additional funding may be available for eligible projects through NYS Clean Heat Program, please check with HCR Sustainability Team for incentive and funding opportunities: <https://hcr.ny.gov/sustainability>
2. See Stretch Goals below for further guidance on all-electric systems.
3. Where full electrification is capitially or operationally cost prohibitive, first consider partial electrification of HVAC systems to cover base loads. A suggested minimum electric heating capacity of 5 btu/h is recommended, with a minimum COP of 2.0 -- precluding use of electric resistance heating elements.
4. If partial electrification is infeasible, the team can consider replacement of existing equipment with EnergyStar certified or equal heating systems where the project can demonstrate high efficiency AND present a path to full electrification based on Section 1 “Stretch” above.
5. If a boiler is being replaced, condensing boilers with a UFAE of at least 90% in combination with variable speed pumps should be reviewed for feasibility within the existing hot water system. To maximize operating efficiencies, the return water temperature should remain below 130°F for the majority of the year.

**ii. Partial System Replacement (one of several heating units serving a property for example):** Replace with high efficiency EnergyStar certified or equivalent heating systems where the project can demonstrate high efficiency AND present a path to full electrification based on Section 1 “Stretch” above.



## SECTION 2 *Continued*

- 3. General Design Considerations for all projects replacing equipment:** Heating and cooling systems shall meet the following design considerations, as applicable:
- a. Ducted systems should be used to the greatest extent feasible.
  - b. Surface mounted units with exterior condensers, when used, are to be located in an inconspicuous area, out of primary sightlines in the dwelling unit.
  - c. Exterior mounted condensers shall be placed in a suitable inconspicuous location that does not interfere with exiting path used by the residents and is not directly visible through windows of dwelling units. If the condensers are roof mounted, the installation shall be such that it does not damage the roofing system nor detract from the exterior view of the building.

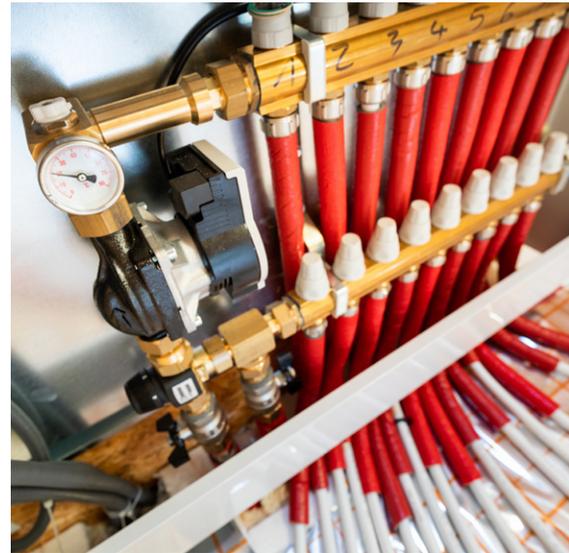
**Stretch Goals:** Projects should consider incorporating the following into the project when replacing heating and cooling systems:

1. All HVAC equipment should be high-efficiency, all-electric, and carry an EnergyStar certification or provide the equivalent in energy savings, quality and operational costs.
2. Equipment should be either cold climate heat pumps with a heating average COP of 3.5 or higher OR ground-source heat pumps. Project teams are encouraged to reference the Northeast Energy Efficiency Partnerships (NEEP) Heat Pump List for potential products: <https://ashp.neep.org/>.
3. Projects teams must assess the project specific existing conditions when determining with their consultants the most effective equipment replacement strategy. Some acceptable equipment includes equal to or better efficiency than the following (either ducted or ductless distribution): <https://ashp.neep.org/>
  - a. Cold Climate Air Sourced Heat Pumps (ccASHP) including:
    - i. Variable Refrigerant Flow (VRF)
      1. Projects considering VRF systems must address the increased risk of refrigerant leakage to minimize GHG emissions including considering alternative solutions to distributed refrigerant systems. Recommended strategies include minimizing the total volume of refrigerant through system design (i.e. reducing the length of refrigerant piping), specifying low GWP refrigerants, quality installation, leak detection, and considering alternative solutions to distributed refrigerant systems.
      2. Should include Heat Recovery (3-pipe system) when there are interior habitable rooms (with no exterior wall exposure).
      3. When heat recovery (3-pipe) is not feasible, provide 2-pipe system with distinct zones for climate variations (e.g., North zone and South zone). Design of zones shall include analysis of unbalanced solar heat gains and internal heat gains considering

## SECTION 2 *Continued*

on exposure and potential occupant load to verify that conditions where simultaneous heating and cooling in a single zone would not be probable.

- ii. Mini-split units
  - b. Cold Climate Water Source Heat Pumps (WSHP)
  - c. Packaged terminal heat pumps (PTHPs) provided that they are well sealed during installation and meets the minimum efficiency requirements listed in Table C403.3.2(3) in the NY Energy Code 2020.
  - d. Other solutions or combinations of solutions, at NYS HCR's sole discretion, may be considered if demonstrated to provide adequate performance and not use any fossil fuel in its operation.
5. HVAC systems should meet the following requirements as applicable:
- a. Utilize compressor inverter technology efficiently at temperatures at/ or above 0 degrees Fahrenheit, without reliance on electric resistance heat.
  - b. Electric resistance (within the heat pump unit) required at temperatures below 0 degrees Fahrenheit shall be tied to the VRF-HR system to limit operation above 0 degrees Fahrenheit.
  - c. Distribution systems must be designed to provide adequate conditioned heating/cooling to each habitable space within the dwelling unit.
  - d. VRF Multi-Split Air Conditioner and Heat Pump equipment must meet the Air Conditioning, Heating and Refrigeration Institute (AHRI) standard 1230 - 2021 with the AHRI label affixed to the equipment.
  - e. Central VRF-type systems, provide BACnet connection between the heating distribution systems to allow for monitoring capability of the temperature setpoints within units (control capability of in unit set points is not required unless desired to satisfy this stretch goal)



### NOTES:

- Alternate high-performance decarbonized solutions may be acceptable, at the sole discretion of HCR, if a proposer provides a waiver request and substantial justification to support an alternative HVAC system or design that supports decarbonization.
- Areas such as stair towers, and vestibules with no access to a central system can use lower efficiency electric heating components, such as electric resistance heating units, which should only be considered in limited quantities.

## SECTION 2 *Continued*

### Controls/Thermostats

**Baseline Requirements:** Projects should follow the guidance below, as applicable.

- 1. Thermostat Improvements (Commissioning):** Projects not undergoing a full replacement of thermostats but looking to assess function and condition of existing thermostats should:
  - a. Commission the existing thermostats (not less than 20% sample size) to ensure they provide the ability to program nighttime setbacks and properly distribute space conditioning in accordance with the system setpoints.
  - b. If existing thermostats do not properly condition the indoor air temperature based on settings or are not programmable, consider replacement in accordance with the specifications below for thermostat replacement.
- 2. Thermostat Replacement:** Projects planning to replace existing thermostats (or adding new where none existed in the existing building) should follow the guidelines below:
  - a. All apartments shall be treated as individual heating zones controlled by a wall-mounted thermostat in each apartment.
  - b. For individual dwelling unit heating systems, provide a programmable thermostat capable of maintaining different temperature set points at different times of the day.
  - c. In common areas remote wall thermostats accessible to the public should be in a locked enclosure and set by the operations team.
  - d. In buildings with common heating systems, provide either programmable thermostats in each apartment or building system set-back controls, as allowable by the applicable building codes.
- 3. Steam Control through Thermostatic Radiator Valves (TRV):** For projects that are not replacing their existing steam distribution the following guidance should be followed to ensure the existing system is balanced, operates as efficiently as possible, and ensures proper heat distribution to all floors. HCR encourages properties to develop a plan for steam replacement as part of capital planning:
  - a. When you are not sure how your system is performing, test at least 20% of the steam traps throughout various locations in the property. Include documentation of the testing



## SECTION 2 *Continued*

completed including testing type, sample size, testing results, and recommendations. It is recommended that infrared thermography testing is performed when possible.

**NOTES:** If the steam traps have failed in more than 40% of the sample size, follow the steam trap replacement plan below.

- b. **Steam Trap Replacements:** When more than 40% of the tested steam traps have failed, the property shall replace the steam traps. If information about the existing system is unknown, replace existing steam traps in kind. If existing system information is available appropriate resizing may be implemented. Consider replacing 100% of the steam traps with orifice plates. Consult with a design engineer or qualified contractor to ensure the proper orifice plate sizing throughout the property.
- c. **Steam Trap Repair:** Where minimal steam traps fail, less than 40% of those tested, the property can replace only the failed steam traps.



**Stretch Goals:** Projects should consider incorporating the following into the project:

1. Provide central control capabilities of heating setpoints through BACnet infrastructure or other equal.

### Domestic Hot Water

**Baseline Standards:** Projects should follow the guidance below, based on their desired scope of work.

#### 1. Domestic Hot Water Repair:

- a. Fossil fuel based domestic hot water considering system repair should:
  - i. Perform a Steady State Efficiency (SSE) test before repair work is completed on all fossil fuel burning heating equipment. If the SSE test is above 85% proceed to step ii below. If the SSE test is below 85%, proceed to step iii below.
  - ii. Perform the scheduled repair work and perform a post-repair/work SSE test. If the results do not meet or exceed 85%, perform a clean and tune then retest.
  - iii. If the existing equipment is below an AFUE below 85%, consider full domestic hot water replacement (per methods described below), as desired efficiency will likely not be

## SECTION 2 *Continued*

achieved. If the rated AFUE of the existing equipment is above 85%, evaluate if the repair scope will improve the necessary efficiency of the system with a third party, include a clean and tune of the burner and retro commissioning of the system once repair work is completed.

- iv. For existing Electric resistance tanks: If the tank is at the end of its useful life, consider replacement with a heat pump system where feasible. Minor repair work should be completed where feasible when full replacement is not required.

### 2. Domestic Hot Water Replacement:

- a. Fossil Fuel Based Heating/Cooling Equipment should follow the guidance below:
  - i. Full Replacement: High performance all-electric domestic hot water systems should be considered first, including:
    - 1. Heat pump water heaters
    - 2. Sub-central electric water heaters with plants that provide distribution on a floor-by-floor basis, where possible.
    - 3. In-unit electric instantaneous water heaters. Electric resistance water heaters are only recommended for decentralized configurations where piping distance, and resulting efficiency losses, are minimal.

Additional funding may be available for eligible projects through NYS Clean Heat Program, or other, please check with HCR Sustainability for incentive opportunities

- ii. Partial System Replacement (one of several DHW units serving a property for example) Replace with high efficiency EnergyStar certified or equivalent domestic hot water systems where the project can demonstrate high efficiency AND present a path to full electrification based on Section 1 “Stretch” above.

**Stretch Goals:** Projects should consider incorporating the following into the project:

#### For deep decarbonization:

- a. Pair the Domestic Hot Water system with a solar thermal system, designed to pre-heat domestic hot water and reduce the amount of energy needed.
  - i. Provide an indirect storage tank in solar thermal systems – ensure the tank is sized by a licensed Engineer
  - ii. Install proper bypass loops at each major heating component.
- b. Utilize ground source heat pumps in your domestic hot water system, especially if they are being utilized/installed in your space heating system.

## SECTION 2 *Continued*

### Ventilation:

#### Baseline Standards:

##### 1. Repair

- a. Mechanical: Clean, seal, and balance vertical exhaust shafts at least once every ten or fifteen years. This process will ensure all debris is removed from blocking or causing hazardous conditions with their the duct work, seal any wholes cause by vibration, balance the exhaust fan to ensure equal or adequate pressure is supplied to all floors.
- b. Natural: Ensure window balances are functional and window screens are in place without holes, repair as necessary.

##### 2. Replacement of Ventilation Systems:

- a. For central exhaust systems (single mechanical/whole building system serving more than one unit or common space), clean and seal the ductwork to 5 CFM50/ register + 5 CFM50/floor leakage and provide adjustable constant airflow regulator (CAR) to provide code-compliant mechanical exhaust at each terminal.
- b. For unitized exhaust systems (every unit has its own system), provide code-compliant mechanical exhaust of 25 CFM continuous or 100 CFM intermittent ventilation for each kitchen. Provide code-compliant 20 CFM continuous or 50 CFM intermittent ventilation for each bathroom.
- c. For natural ventilation (via windows), ensure the new windows meets the natural ventilation requirements per applicable code.



#### Stretch Goals: Projects should consider incorporating the following into the project:

1. Projects with existing natural ventilation systems should consider providing a unitized through-wall exhaust fan in each kitchen and bathroom and provide code compliant mechanical ventilation.
2. Utilize Energy Recovery Ventilation (ERV) or Heat Recovery Ventilation (HRV) equipment that increases indoor air quality and efficiency in tenant and/or public spaces.
3. Utilize proper passive ventilation. Design the project to account for building mass, pressure

## SECTION 2 *Continued*

differentials, and fresh air/natural ventilation (not just operable windows) to generate sufficient natural ventilation flows to reduce energy consumption and operate in whole or in part even during power outages. Advanced designed should consider directing natural air flows through filtration systems.

### E. WATER EFFICIENCY

**Baseline Standards:** Projects planning retrofits or replacements of existing water fixtures should follow the following standards:

1. All fixtures listed below should be WaterSense certified or equal and no more than the following water flow rates by fixture type:
  - a. Toilets – 1.28 GPF, or dual flush (1.28 GPF max, 0.8 GPF min)
  - b. Showerheads – 2.0 GPM
  - c. Kitchen Faucets – 1.5 GPM, or dual flow (2.2 GPM max, 1.0 GPM min)
  - d. Bathroom lavatory faucets and all other fixtures in dwelling units – 1.0 GPM

**Stretch Goals:** Projects should consider incorporating the following into the project:

1. Utilize water fixtures that are more efficient than the baseline requirements listed above.
2. Incorporate grey water systems such as on-site filtration, grey water reuse for non-potable uses, and water cisterns, where appropriate.



## SECTION 3

# OPERATIONAL AND OTHER SUSTAINABILITY CONSIDERATIONS

**Baseline Standards:** The topics and criteria below represent industry best practices; HCR encourages all properties to incorporate these strategies into their standard operations:

- 1. Energy and Water Benchmarking:** Track the property's energy and water consumption on a whole-building basis. Utilize benchmarking data to make decisions at the property, including tracking performance of equipment and identifying opportunities for efficiency improvements. If required to do so, upload whole building (owner and tenant paid) energy and water performance data into online utility benchmarking platform annually and share with HCR. For details on HCR Benchmarking requirements see: <https://hcr.ny.gov/steps-hcr-benchmarking-program>
- 2. Weatherization:** Work with your local weatherization provider to receive improvements to air sealing, efficiency upgrades and ventilation and health and safety measures through the Department of Energy Weatherization Assistance Program network. For more details on DOE WAP see: <https://hcr.ny.gov/weatherization>.
- 3. Back-Stock:** Materials and equipment stored in maintenance/storage rooms at the property should be compliant with the specifications listed in this booklet. Existing non-compliant materials/ equipment should be phased out and replaced with compliant materials/ equipment.
- 4. Indoor Air Quality:** Properties pursuing new work, repair or replacement work, or purchasing materials for back-stock or storage should utilize the standards listed below for low VOC materials. Any existing materials that do not comply with the standards listed below should be phased out and replaced with materials meeting these standards:
  - a.** All interior paints, coatings and primers shall have a VOC content less than or equal to the thresholds provided by the most recent version of SCAQMD 1113 available at time of product specification. VOC emissions shall be verified as compliant with CDPH Standard Method for all wall finish paints. All wallpaper shall be phthalate free.
  - b.** All interior adhesives and sealants shall have a VOC content less than or equal to the thresholds provided by the most recent version of SCAQMD 1168 available



## SECTION 3 *Continued*

at time of product specification for all interior adhesives and sealants.

- c. All flooring products must comply with CDPH emission requirements, including carpeting and hard surfaces. Flexible PVC with phthalates is prohibited, regardless of whether the phthalates were intentionally added or added via recycled content.
- d. Fiberglass or mineral wool batt insulation must be formaldehyde-free.
- e. Spray foam insulation shall be applied by applicators certified by the manufacturer, the American Chemistry Council, or other recognized industry standards. The application of spray foam shall be in accordance with such certification to limit harmful off-gassing after the curing period. Scheduling of spray foam applications shall be done in a manner that allows sufficient ventilation to occur to dissipate any residual off-gassing prior to the spray foam insulation becoming enclosed by other materials.
- f. Composite Wood in products such as cabinets and doors shall have formaldehyde emissions less than or equal to the thresholds provided by CARB Phase 2 and/or TSCA Title IV for plywood, particleboard and MDF. For any other composite wood products not covered by CARB/TSCA requirements, but used in interior spaces, these must at minimum be NAUF (have no added urea formaldehyde).

### **5. Integrated Pest Management:**

- a. All projects should consider pest management contracts with scheduled service that incorporate environmentally friendly pest management strategies and extermination practices that are safe for the health of the residents and the environment. Projects should also audit current responses to pest problems and, if applicable, propose improvements to resident housekeeping and expedited response times to reported pest problems to mitigate declining conditions.
- b. Properties should also consider sealing all openings, cracks and joints to prevent the infestation of insect and animal pests from entering the building(s) or migrating from one apartment to another.

### **6. Operations and Maintenance:** Building Operations and Maintenance: Develop an Operations and Maintenance (O&M) manual for all existing mechanical equipment at the property and all new mechanical equipment installed moving forward. O&M manuals should include the following: Overview of how mechanical systems are operated, including:

- i. Ideal set points
- ii. Summarized warranty information
- iii. Retro commissioning reports
- iv. Summarized mechanical systems manufacturers information



**New Yorkers  
consume less total  
energy per capita  
than the residents  
of all but two other  
states, California and  
Rhode Island.**

## SECTION 3 *Continued*

- v. Please reach out to HCR Sustainability Team if you require a sample document.

### 7. Resiliency

As a best practice, properties should conduct a resiliency analysis and create a plan to ensure there are proper operational protocols in place in the event of an extreme weather event. This might include, but not limited to, extreme heat, severe wind and water, or severe cold all resulting in loss of power or creating the need to shelter in place. A property should communicate their protocol with residents and operators. See the Stretch goals section below for additional best practices and improvement suggestions.

**Stretch Goals:** Existing properties should consider the following strategies to align with HCR’s stretch sustainability goals and the State’s CLCPA goals:

#### 1. Operations and Maintenance:

- a. **Emergency manual:** Develop an emergency management manual for residents if one does not already exist for the property. The plan should include evacuation plans with specific instructions for a flood event, if applicable.
- b. **Monitoring:** Install/enable live system monitoring (RTEM) on key mechanical equipment in order to monitor operational efficiency.



## SECTION 3 *Continued*

### 2. Site:

- a. **Electric Vehicle Chargers:** When doing site work or parking lot repairs, consider installing Level 2 electric vehicle (EV) charging station(s). Ideally, sites would include at least one Level 2 EV charging station for every twenty parking spaces at a property. EV charging stations should be equitably distributed throughout the property to allow residents equal convenience in access.

Projects with individual driveways for dwelling units should consider providing a dedicated branch circuit that is not less than 40-ampere and 208/240-volt assigned for electric vehicle supply equipment terminating in a receptacle located adjacent to the driveway for EV charging capabilities.

### 3. Solar:

- a. If the property does not already include on-site solar, evaluate the property for solar feasibility. A feasibility study should include proposals for the potential location(s) such as rooftops and other locations throughout the site, identification of preliminary solar components and basic electricity production estimates. The study should include a cost benefit analysis, including the estimated payment period for the solar install.
- b. When installing a heat pump, or high efficiency all-electric heating system, install solar panels to offset the operational cost of the system. Resources through the NYSERDA NY-Sun program can support design and installation where needed and available.

### 4. Resiliency:

- a. Consider installing stormwater best management practices (BMPs) in key areas across the property that are designed to capture and store/slowly release stormwater runoff into the local stormwater management system. BMPs reduce the likelihood of flooding and property damage to the property.
- b. Conduct a resiliency assessment at the property that describes the applicable hazards to the project as identified on FEMA's National Risk Index map (<https://hazards.fema.gov/nri/map>) and determine steps the project can take



### SECTION 3 *Continued*

to mitigate the identified risks.

- c. Disaster Recovery: Create a shelter-in-place location within the property that includes as many of the following as possible:
    - i. Adequate back up power generation to:
      1. At least one elevator in the building (if applicable) that incorporates resilient design features, and
      2. The building's water pump system to provide residents with potable water in the event of a power outage.
    - ii. A community room at least 15 square feet per unit in size that could serve as a shelter in place location for residents. The community room should include back up power generation to the following:
      1. Electrical outlets,
      2. At least one refrigerator, kitchen sink and microwave or range,
      3. At least one accessible bathroom,
      4. Heating and cooling, and
      5. Domestic hot water
  - d. When performing major repair or replacement to building mechanical systems, consider elevating equipment above potential flood levels or create physical barriers to protect mechanical equipment in the event of a flood, as applicable.
- Additional residential common areas may be utilized for the required area to shelter-in-place so long as they include back-up power generation as described above.
- e. Perform flood/waterproofing of below-grade spaces across the property.
  - f. Install sump pumps in the lowest levels of the basement floor, where applicable.

SUMMER 2022





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