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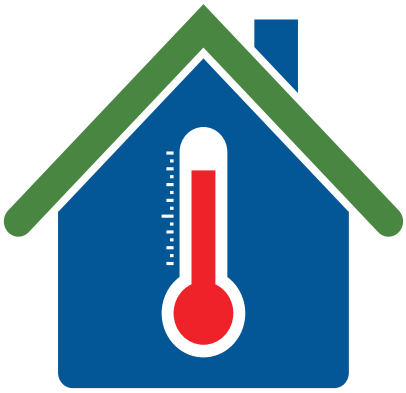
Extreme Heat Resilience for Affordable Multifamily Housing in New Jersey



Introduction

New Jersey is highly susceptible to the urban heat island (UHI) effect which intensifies already rising temperatures. Dense concentrations of concrete, asphalt, and buildings absorb and retain heat, making urban areas significantly warmer than surrounding rural regions. This phenomenon disproportionately affects residents of affordable housing, particularly older generations of affordable housing, which is often located in neighborhoods with limited green space, poor ventilation, and minimal tree cover. These communities frequently lack the resources to mitigate the impacts making them especially vulnerable during heatwaves. Extreme heat events can also cause energy blackouts or brownouts leaving multifamily buildings without power for air-conditioning or other vital utilities. Mitigating the effects of urban heat islands on our affordable housing stock is essential to promoting public health in our neighborhoods.

To better mitigate the effects of extreme heat and improve the energy efficiency of New Jersey's affordable housing stock, the agency requires a comprehensive Site Risk Assessment as part of its Qualified Allocation Plan. This assessment is an essential planning tool that evaluates the environmental, physical, and climate-related hazards that a development site may face over time. By identifying pertinent factors early in the planning process, the Site Risk Assessment allows developers, architects, engineers, and agency staff to prepare for and incorporate appropriate mitigation and adaptation strategies.

With extreme heat becoming a more frequent and intense threat, addressing heat-related vulnerabilities is crucial to effective Site Risk Assessment. Developers are implementing a range of strategies to reduce exposure to heat and improve long-term comfort, cost-effectiveness, and safety for residents. These strategies include the use of high-performance building materials, reflective roofing, energy-efficient cooling systems, expanded tree canopy, light-colored or permeable paving materials, and building orientations that maximize natural ventilation and shade.

This report highlights the measures developers are taking to reduce the impact of extreme heat on affordable housing developments, as documented in their Site Risk Assessment reports. It reflects a broader shift toward building housing that is not only affordable and sustainable, but also resilient to current and future threats.

Best Building Practices to Combat Extreme Heat

1

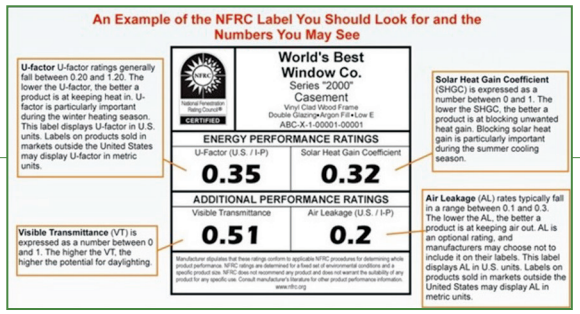
BUILDING ENVELOPE AND INSULATION

Insulation, Air Sealing, and Cladding

- Follow 2021 IECC standards for envelope insulation.
- Avoid installing impermeable vapor barriers on the interior side of walls.
- Use high-performance insulation materials such as mineral wool, spray foam, or rigid foam.
- Ensure continuous insulation and air barriers throughout the thermal envelope.
- Air seal all plumbing, electrical, and other penetrations in walls and floors.
- Seal ventilation ductwork and ensure a complete air barrier between the attic and conditioned spaces.
- Cover house wrap within two weeks of installation to maintain its performance.
- Use non-combustible, UV-stable cladding materials rated for high temperatures.
- Consider incorporating ventilated façade systems to manage heat buildup.
- Make certain that expansion joints and thermal breaks are properly designed.
- Select reflective or light-colored cladding finishes to reduce heat absorption.

Windows and Glazing

- Install Low-E windows and insulated glass with at least a 10-year warranty.
- Choose windows with a low Solar Heat Gain Coefficient (SHGC).
- Use internal shading devices such as blinds and curtains.
- Add exterior shading like awnings or shutters to block direct sunlight.
- Maintain reasonable window-to-wall ratios, especially on west-facing walls.
- Provide operable windows in all rooms to allow for passive night cooling.



Madison Family Apartments – Madison, New Jersey
Insulated Envelope and Low Solar Heat Gain Value Windows

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Best Building Practices to Combat Extreme Heat

2

VEGETATION AND LANDSCAPING

Site and Building Vegetation

- Preserve existing trees, shrubs, and landscaping during construction.
- Replant disturbed areas with native and climate-appropriate vegetation.
- Increase tree and vegetation cover to reduce ambient and surface temperatures through shade and evapotranspiration.
- Use deciduous trees near buildings to provide shade in summer and allow solar gain in winter.
- Install green roofs and green walls to enhance insulation and mitigate the urban heat island effect.
- Incorporate ground-level landscaping and shade trees in common areas and along building edges.

Concord Residences – Hillsborough, NJ
Minimal impervious surface and natural vegetation

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Best Building Practices to Combat Extreme Heat

3

ROOFING SYSTEMS

Cool Roofs

- Use roofing materials with a high solar reflectance and thermal emittance to reduce roof surface temperatures.
- Select products certified by ENERGY STAR or the Cool Roof Rating Council (CRRC).
- Consider reflective coatings, light-colored membranes, and metal roofing with high-reflectance paint.

Green Roofs

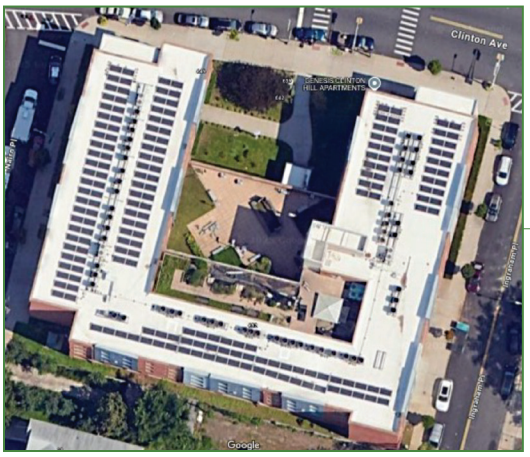
- Integrate vegetative roofing systems to provide insulation, reduce heat gain, and improve air quality.
- Ensure adequate structural support, waterproofing, and maintenance plans.

Roof Insulation and Ventilation

- Upgrade roof insulation using materials like polyisocyanurate or extruded polystyrene with high R-values.
- Install radiant barriers in attic spaces or under decking to reflect heat.
- Ensure proper attic and roof ventilation to prevent heat buildup and reduce cooling loads.

Photovoltaic Integration

- Use building-integrated photovoltaics (BIPV) to generate renewable energy while shading roof surfaces and reducing heat absorption.



Genesis Clinton Hill Apartments – Newark, New Jersey
White roof to reflect solar heat and solar panels for renewable energy

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Best Building Practices to Combat Extreme Heat

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MECHANICAL SYSTEMS AND HVAC RESILIENCE

HVAC Systems

- Install high-efficiency ENERGY STAR certified HVAC systems, preferably heat pumps.
- Provide at least a 15-year warranty on HVAC equipment.
- Ensure HVAC units are easily accessible for servicing, including condensate drain pans and traps.
- Keep spare filters and common parts on hand to minimize system downtime.
- Maintain refrigerant levels within 10 percent of manufacturer specifications to ensure optimal performance.

Backup Systems

- Include backup generators to power critical systems such as cooling in community rooms or senior housing units during outages.

Holmdel Family Apartments – Holmdel, New Jersey

High Efficiency Furnace

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Best Building Practices to Combat Extreme Heat

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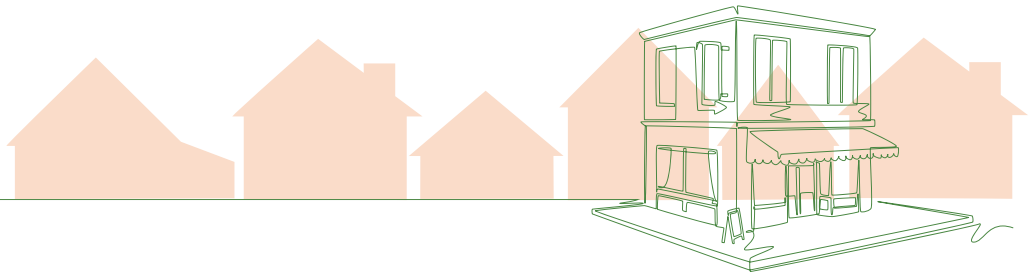
PASSIVE DESIGN AND SHADING

Shading Strategies

- Install overhangs to shade south-facing windows during the summer.
- Use awnings and shutters on east and west-facing windows to block low-angle sunlight.
- Consider roller shutters or shades that block sunlight before it enters the window glazing.
- During emergencies, temporary window coverings like aluminum foil or cardboard can block solar gain.

Night Cooling and Ventilation

- Provide operable windows to take advantage of cooler night air for passive ventilation.
- Choose building massing and orientation strategies that reduce direct solar exposure and promote self-shading.



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SURFACE AND SITE DESIGN

Cool Pavements

- Use light-colored or reflective paving materials that absorb less heat than conventional asphalt.
- Select materials that enhance water evaporation to cool the surface and surrounding air.
- Cool pavements can also reduce glare, stormwater runoff, and improve pedestrian comfort.

7

ENERGY EFFICIENCY AND APPLIANCES

- Upgrade appliances to ENERGY STAR-rated models to reduce internal heat output and lower overall energy consumption.
- Efficient appliances reduce the building's load on the electric grid during peak heat events, supporting broader resilience.

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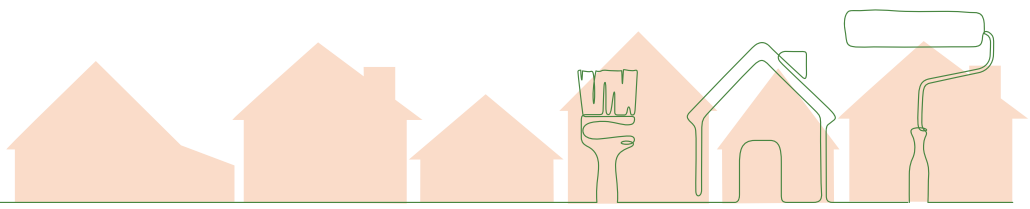
RESOURCES

- **Heat Hub NJ** - https://heat-hub-new-jersey-njdep.hub.arcgis.com/
- **CDC** - https://www.cdc.gov/climate-health/php/resources/protect-yourself-from-thedangers-of-extreme-heat.html
- **EPA** - https://www.epa.gov/heatislands/guide-reducing-heat-islands
- **AIA** - https://www.aia.org/aia-architect/article/home-where-resiliency
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