



# Building Decarbonization in Multifamily Projects

April 12, 2023

# Outline

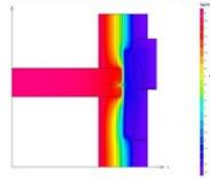
- Principles of low-carbon multifamily design
- Case study: Sendero Verde (East Harlem, NY)
- Building decarbonization in new codes
  - Massachusetts
  - New York

# Low Carbon Multifamily Design

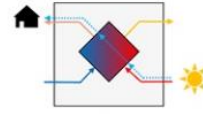
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CONTINUOUS INSULATION &  
THERMAL BRIDGE-FREE  
CONSTRUCTION



ENERGY RECOVERY VENTILATION



FRESH AIR

EXHAUST AIR

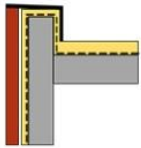
HIGH PERFORMANCE  
WINDOWS & DOORS



DOMESTIC HOT WATER



AIRTIGHT ENVELOPE



EFFICIENT LIGHTS &  
APPLIANCES



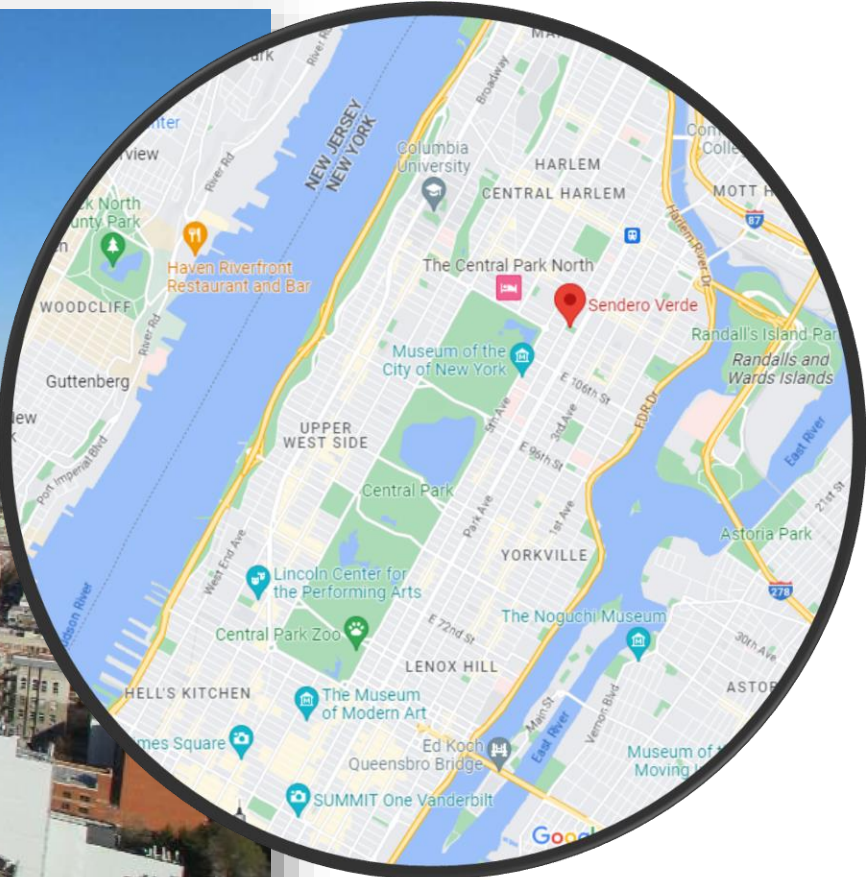
# Sendero Verde

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# Sendero Verde – East Harlem, New York, NY






# Passive House Certified in 2022 - B-North & B-South


## Certificate

Certified Passive House Classic



**Passive House**  
Passive House Institute

classic | plus | premium



**Passive House Institute**  
Dr. Wolfgang Feist  
64283 Darmstadt  
Germany

**Sendero Verde - Building B South**  
E 112th Street & Park Ave, 10029 New York City, USA

Clients	L+M Development 1865 Palmer Ave #203 10538 Larchmont, USA	Jonathan Rose Companies 551 5th Ave 23rd Floor 10176 New York, USA
Architect	Handel Architects 120 Broadway, 6th Floor 10271 New York City, USA	
Building Services	Cosentini Consulting Engineers 2 Pennsylvania Plaza 10121 New York City, USA	
Energy Consultant	Steven Winter Associates 307 7th Avenue, Suite 1701 10001 New York City, USA	


Passive House buildings offer excellent thermal comfort and very good air quality all year round. Due to their high energy efficiency, energy costs as well as greenhouse gas emissions are extremely low.

The design of the above-mentioned building meets the criteria defined by the Passive House Institute for the 'Passive House Classic' standard:

Building quality	This building	Criteria	Alternative criteria
<b>Heating</b>	Heating demand [kBTU/(ft <sup>2</sup> yr)]	4,1 ≤ 4,75	-
	Heating load [BTU/(hr,ft <sup>2</sup> )]	4,09 ≤ -	3,17
<b>Cooling</b>	Cooling + dehumidification demand [kBTU/(ft <sup>2</sup> yr)]	4,43 ≤ 6,66	6,66
	Cooling load [BTU/(hr,ft <sup>2</sup> )]	3,2 ≤ -	3,43
<b>Airtightness</b>	Pressurization test result (n <sub>50</sub> ) [1/h]	0,4 ≤ 0,6	-
<b>Non-renewable primary energy (PE)</b>	PE demand [kBTU/(ft <sup>2</sup> yr)]	46,13 ≤ 53,1	-

The associated certification booklet contains more characteristic values for this building.

Darmstadt  
25,08,2022



Certifier: Dragos Armutu, Passive House Institute


www.passivehouse.com

35884-35968\_PHI\_PH\_20220825\_DA




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Darmstadt  
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www.passivehouse.com

35884-35968\_PHI\_PH\_20220825\_DA



# Passive House Pre-Certified in 2023 - Building A

Passivhaus Institut GmbH | Rheinstr. 44-46 | 64283 Darmstadt | Germany

**Passive House Institute**

SV-A Owners LLC c/o Jonathan Rose Companies  
551 Fifth Avenue, 14<sup>th</sup> Floor,  
New York,  
NY 10176

Passivhaus Institut GmbH  
Rheinstraße 44/46  
64283 Darmstadt  
Germany

Tel. +49 (0)6151 82699 - 13  
Fax. +49 (0)6151 82699 - 11  
dragos.arnautu@passiv.de  
www.passivehouse.com  
Dragos Arnautu

Darmstadt, 24.03.2023

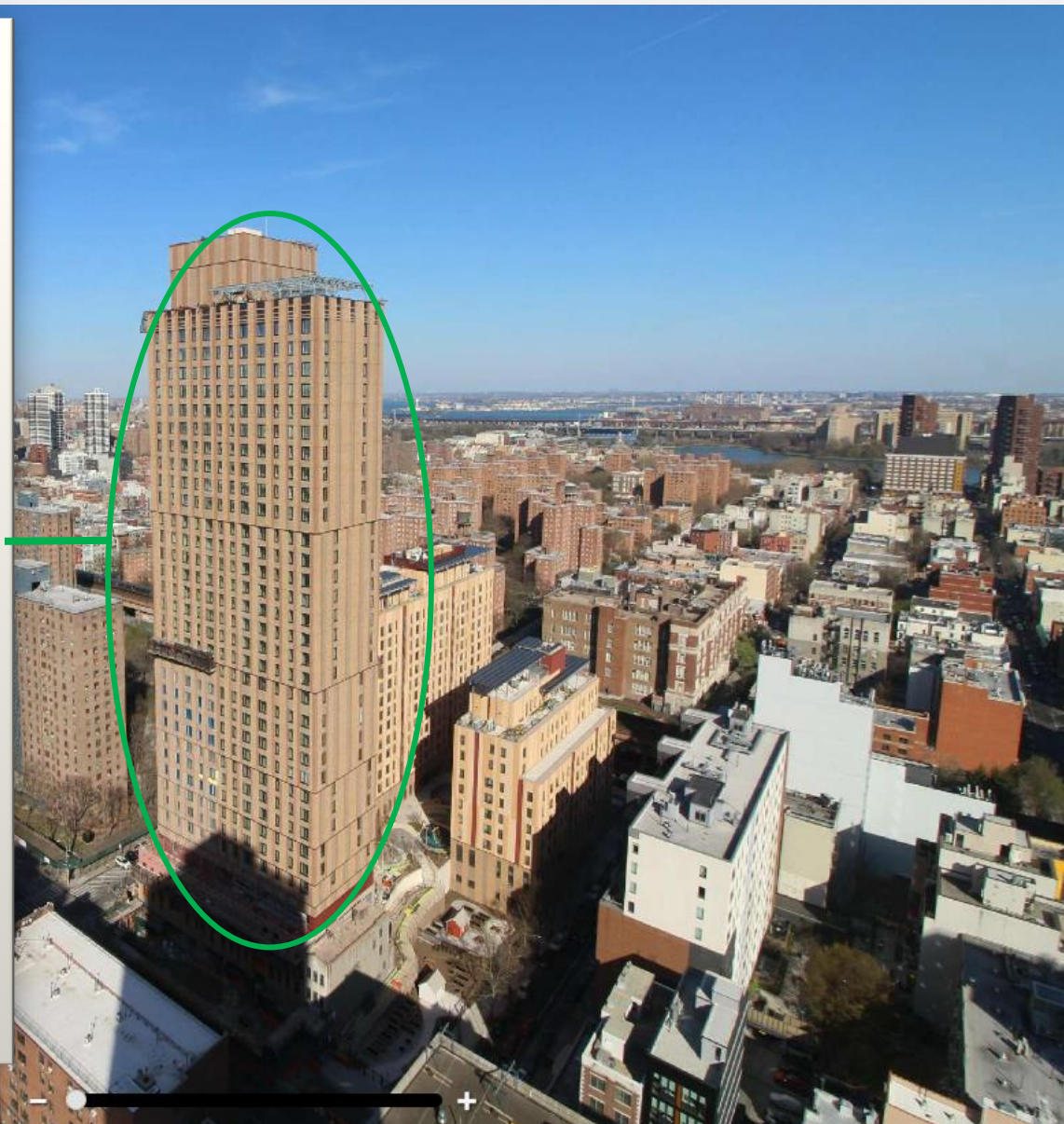
**PRE-certification statement**

**Project:** 0531\_BZ\_MFH\_Sendero\_Verde\_SVA\_NY\_USA\_DA  
**Design Institute:** Handel Architects, 120 Broadway, New York, NY 10271  
**Building Developer:** SV-A Owners LLC c/o Jonathan Rose Companies. 551 Fifth Avenue, 14th Floor, New York, NY 10176  
**Energy Consultant:** Steven Winter Associates, Inc. 307 Seventh Ave, Suite 1701 New York, NY 10001  
**Certification:** Passive House Institute, Rheinstrasse 44-46, 64283 Darmstadt, Germany

We are happy to inform you that the project **Sendero\_Verde\_SVA** located in **Manhattan, Block 1617, Lot 20** is currently designed to achieve the **Passive House** standard, as defined by the Passive House Institute from Darmstadt, Germany. This assessment is based on the project documentation submitted by **Steven Winter Associates** through our certification platform and through e-mail, during the period of 09.02.2018 to the 24.03.2023.

The final verification of the energy balance calculation PHPP (Passive House Planning Package) will be carried out based on all relevant drawings, documents, information, pictures of construction site and data provided from the energy consultant. The reports of the airtightness measurement and the ventilation system balancing remain of fundamental importance about the success of the definitely certification. Therefore, good quality and appropriate supervision on building site is necessary.

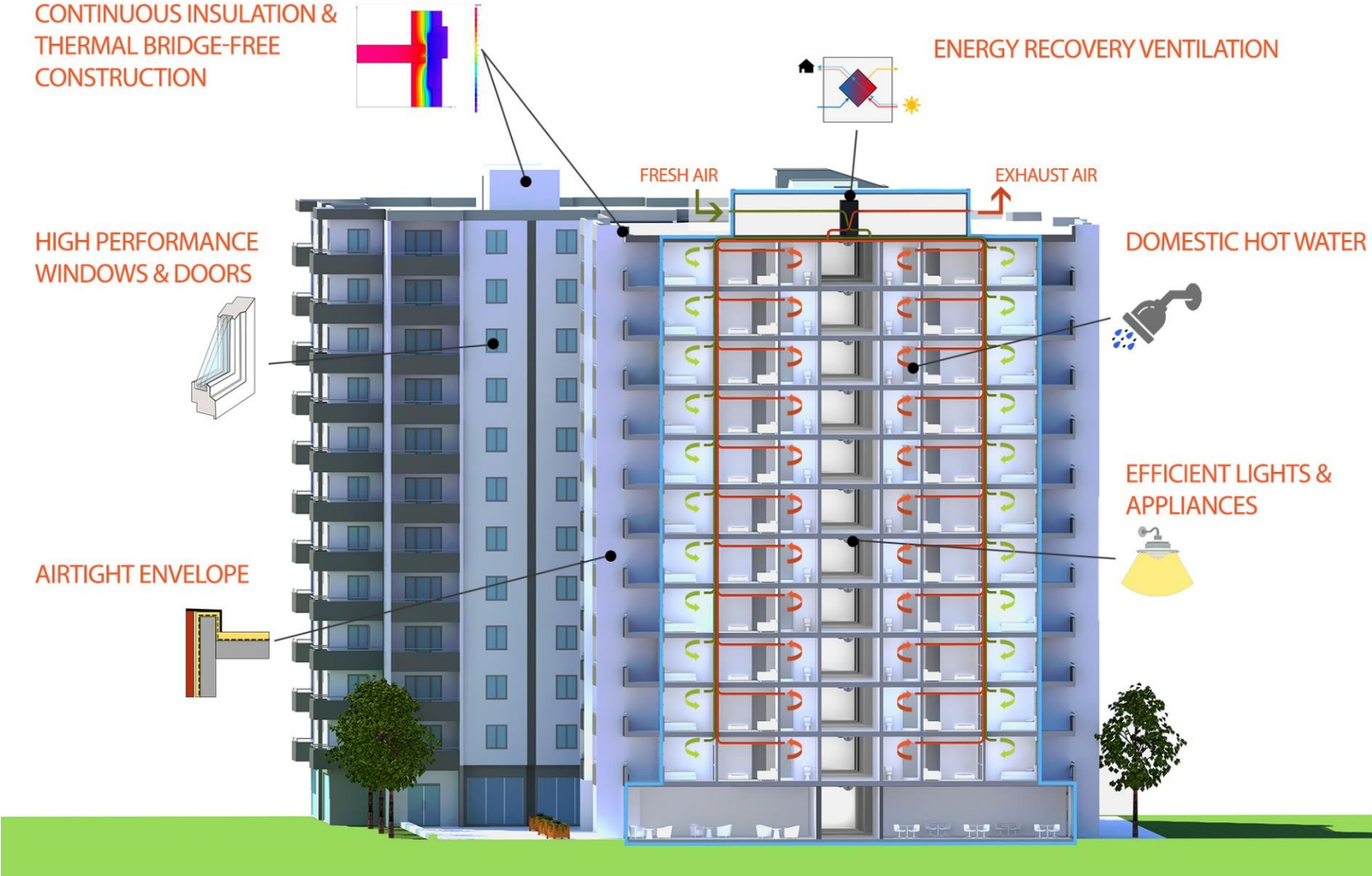
Page 1 of 4



Construction completion expected by end of 2023



# Sendero Verde – Passive House Design





# Sendero Verde – Passive House Design



CONTINUOUS INSULATION & THERMAL BRIDGE-FREE CONSTRUCTION



ENERGY RECOVERY VENTILATION



HIGH PERFORMANCE WINDOWS & DOORS



FRESH AIR

EXHAUST AIR

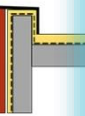
DOMESTIC HOT WATER



EFFICIENT LIGHTS & APPLIANCES



AIRTIGHT ENVELOPE



Bldg. B-North – 0.42 ACH50  
Bldg. B-South – 0.40 ACH50  
Bldg. A – not yet tested (0.60 ACH50 is target)





# Sendero Verde – Passive House Design



# Sendero Verde – Passive House Design



**CONTINUOUS INSULATION & THERMAL BRIDGE-FREE CONSTRUCTION**

Bldg. B North & South – EIFS (typ. ranging from 4-6" thickness)

Bldg. A – 3" exterior mineral wool, thermally broken brick shelf angles, interior mineral wool in stud cavity

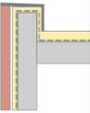
**HIGH PERFORMANCE WINDOWS & DOORS**



Bldg. B North & South - Triple pane uPVC

Bldg. A - Triple pane thermally broken aluminum

**AIRTIGHT ENVELOPE**



Bldg. B-North – 0.42 ACH50

Bldg. B-South – 0.40 ACH50

Bldg. A – not yet tested (0.60 ACH50 is target)

**ENERGY RECOVERY VENTILATION**



FRESH AIR

EXHAUST AIR

**DOMESTIC HOT WATER**



**EFFICIENT LIGHTS & APPLIANCES**





# Sendero Verde – Passive House Design



Central energy recovery ventilation system w/ continuous balanced ventilation.

~80% heat recovery efficiency

CONTINUOUS INSULATION & THERMAL BRIDGE-FREE CONSTRUCTION

Bldg. B North & South – EIFS (typ. ranging from 4-6" thickness)

Bldg. A – 3" exterior mineral wool, thermally broken brick shelf angles, interior mineral wool in stud cavity

ENERGY RECOVERY VENTILATION

HIGH PERFORMANCE WINDOWS & DOORS



Bldg. B North & South - Triple pane uPVC

Bldg. A - Triple pane thermally broken aluminum

FRESH AIR

EXHAUST AIR

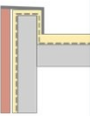
DOMESTIC HOT WATER



EFFICIENT LIGHTS & APPLIANCES



AIRTIGHT ENVELOPE



Bldg. B-North – 0.42 ACH50

Bldg. B-South – 0.40 ACH50

Bldg. A – not yet tested (0.60 ACH50 is target)





# Sendero Verde – Passive House Design



CONTINUOUS INSULATION & THERMAL BRIDGE-FREE CONSTRUCTION

Bldg. B North & South – EIFS (typ. ranging from 4-6" thickness)

Bldg. A – 3" exterior mineral wool, thermally broken brick shelf angles, interior mineral wool in stud cavity

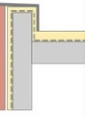
HIGH PERFORMANCE WINDOWS & DOORS



Bldg. B North & South - Triple pane uPVC

Bldg. A - Triple pane thermally broken aluminum

AIRTIGHT ENVELOPE



Bldg. B-North – 0.42 ACH50

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Bldg. A – not yet tested (0.60 ACH50 is target)

Central energy recovery ventilation system w/ continuous balanced ventilation.

~80% heat recovery efficiency

ENERGY RECOVERY VENTILATION



FRESH AIR

EXHAUST AIR

DOMESTIC HOT WATER

Central gas-fired condensing boilers.

Efficient pipe design layouts for circulation and in-unit piping.

EFFICIENT LIGHTS & APPLIANCES





# Sendero Verde – Passive House Design



CONTINUOUS INSULATION & THERMAL BRIDGE-FREE CONSTRUCTION

Bldg. B North & South – EIFS (typ. ranging from 4-6" thickness)

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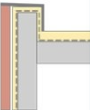
HIGH PERFORMANCE WINDOWS & DOORS



Bldg. B North & South - Triple pane uPVC

Bldg. A - Triple pane thermally broken aluminum

AIRTIGHT ENVELOPE



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Central energy recovery ventilation system w/ continuous balanced ventilation.

~80% heat recovery efficiency

ENERGY RECOVERY VENTILATION



FRESH AIR

EXHAUST AIR

DOMESTIC HOT WATER

Central gas-fired condensing boilers.

Efficient pipe design layouts for circulation and in-unit piping.

EFFICIENT LIGHTS & APPLIANCES

All ENERGY STAR appliances

All LED lighting. Accounting of all lighting energy use in building.



# Building Decarbonization in New Energy Codes

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# Building Decarbonization in New Energy Codes

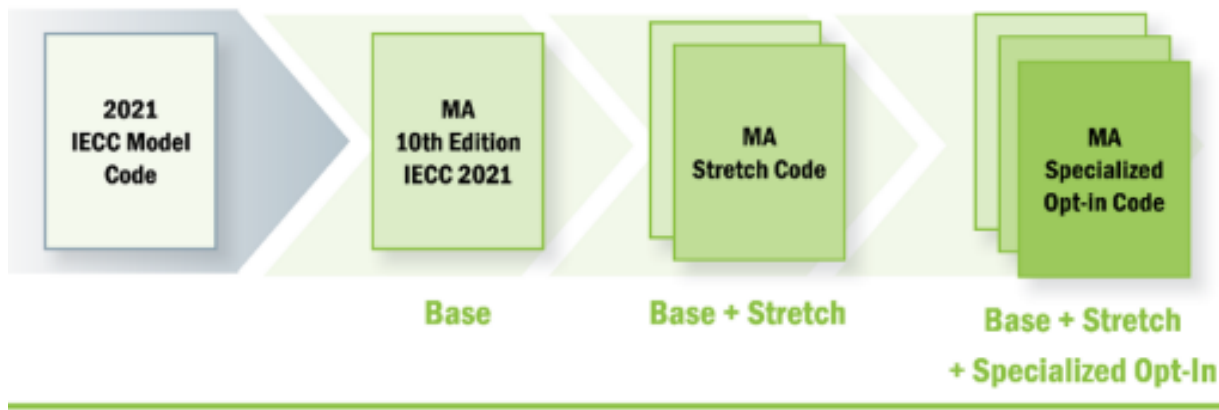
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## **Massachusetts**

CITY, NEWS

## Specialized opt-in energy code pushes Massachusetts towards a more sustainable future

January 25, 2023 10:13 pm by Macie Parker



The Department of Energy Resources updated its building energy code to include a new Specialized Opt-in Code for buildings as part of the Massachusetts 2050 Decarbonization Roadmap to reach net-zero carbon emissions by 2050.

According to the Massachusetts Municipal Association, the specialized energy code has three possible pathways: zero-energy, all-electric or mixed-fuel.

“The specialized energy code is meant to basically allow

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# PH in the MA Code Technical Guidelines

- Released on January 5, 2023

<https://www.mass.gov/info-details/stretch-energy-code-development-2022#new!-technical-guidance-documents-available-for-public-comment->

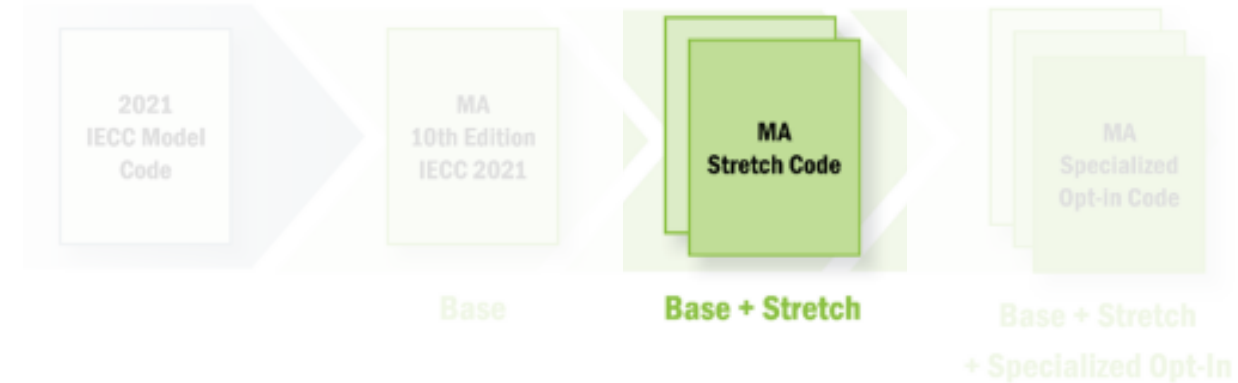
## 2023 TECHNICAL GUIDANCE

MASSACHUSETTS  
STRETCH ENERGY CODES



A reference and instructional guide for  
**Massachusetts Energy Stretch and  
Specialized Codes**

# PH in the MA Code Compliance Pathways



- **Prescriptive** (based on IECC 2021)
- **Targeted Performance (TEDI)**
- **Relative Performance** (based on ASHRAE 90.1 Appendix G)
- **Certified Performance** (Passive House or HERS)

<https://www.mass.gov/info-details/stretch-energy-code-development-2022#new!-technical-guidance-documents-available-for-public-comment-> (PAGE 14)



# PH in the MA Code Specialized Opt-In



- **Residential Buildings**

- Certified Performance (Passive House or HERS) Path essentially required for multifamily buildings over 12,000 sf.

- **Commercial Buildings** – must comply w/ base stretch code requirements plus overlay of 1 of the 3 paths below:

- Path 1 – Zero Energy
- Path 2 – All-Electric
- Path 3 – Mixed Fuel w/ electrification readiness + renewables

<https://www.mass.gov/info-details/stretch-energy-code-development-2022#new!-technical-guidance-documents-available-for-public-comment-> (PAGE 53-59)

# Building Decarbonization in New Energy Codes

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## **New York**



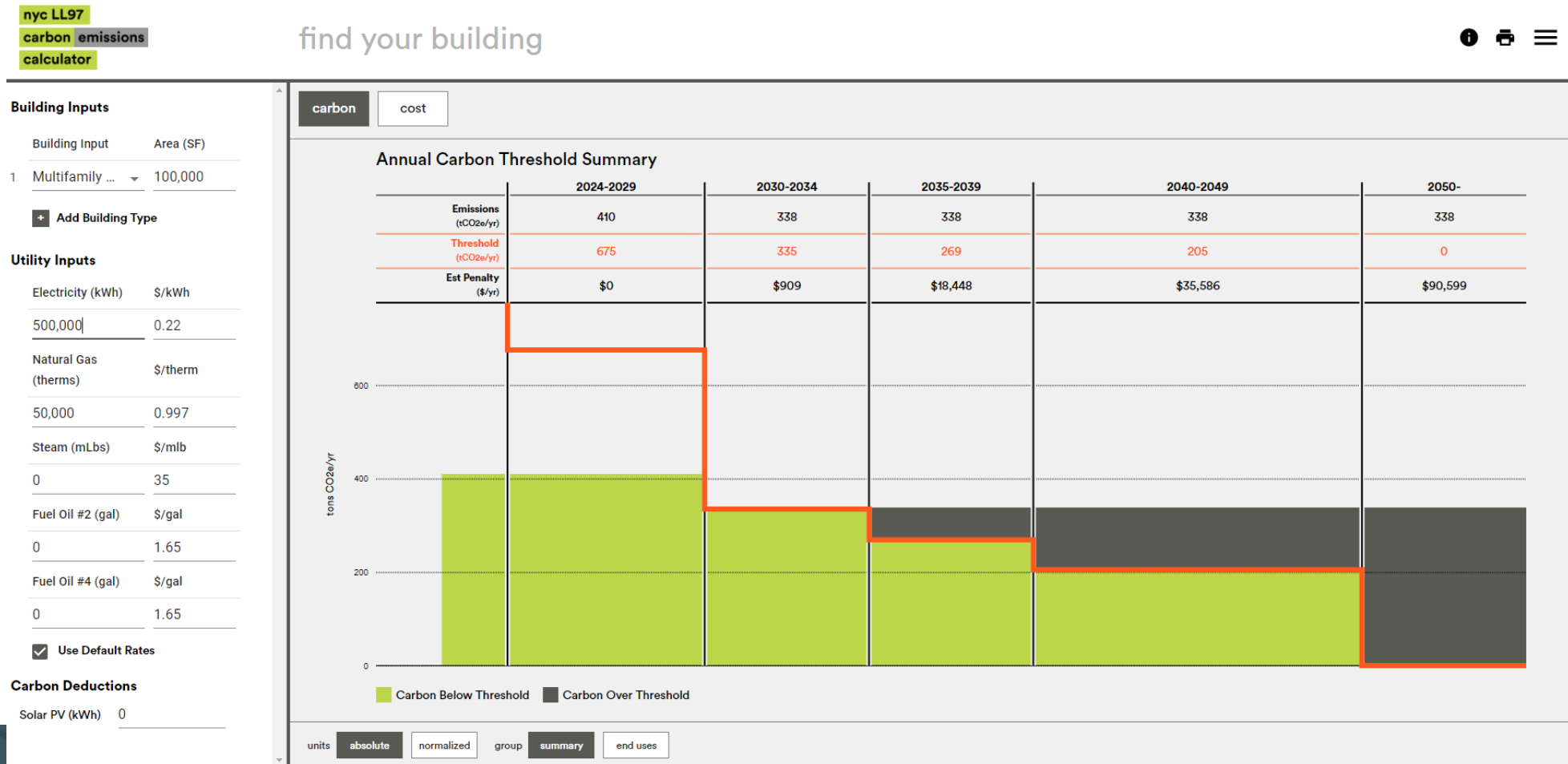
# New York City

- **Local Law 87** – Energy reporting required on buildings greater 50,000 sf.
- **Local Law 97** – Carbon emissions caps on buildings.
- **Local Law 32** – directive to NYC DOB Commissioner that NYC move to a performance-based energy code.
- **NYC 2317-A** – fossil fuel ban
  - **Buildings < 7 stories** – must have electric DHW by **end of 2023** (at time of permit filing)
  - **Buildings ≥ 7 stories** – must have electric DHW by **end of 2027** (at time of permit filing)
  - Some exemptions – ie. commercial kitchens, emergency use, labs, etc.

# New York City

- **Local Law 97** – Carbon emissions caps on buildings.

[NYC LL97 Calculator \(be-exchange.org\)](https://be-exchange.org)





# New York Code Updates & Stretch Code 2023

- **Base code in NY is getting more stringent.**
  - Thermal bridging accounting plus mitigation now required.
  - Improved envelope performance required
  - Air leakage thresholds have been reduced by ~50%.
  - Fossil fuel still allowed, however it requires much more efficiency trade-offs. **Essentially incentives all-electric design.**

# New York Code Updates & Stretch Code 2023

- **Stretch Code 2023** (All projects must meet requirements in base code plus...)
  - Site EUI targets by building type must be met
  - Timeline:
    - Current stretch code proposal is under review by NYC (climate zone 4)
    - Review by rest of NY state (climate zones 5 and 6) will be later this year.



Thank you

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**Questions?**



# Contact Us

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*Senior Building Systems Consultant*



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