Energy Cohort
June 11, 2024

Energy Code in Massachusetts

Learning Objectives

- Quick History Lesson
- How Many Energy Codes Are There?
- How do Energy Codes work in Mass?
- Stretch Code
- Specialized Opt-In Code
- Existing Buildings Code
- MassSave Incentives
- Highlights

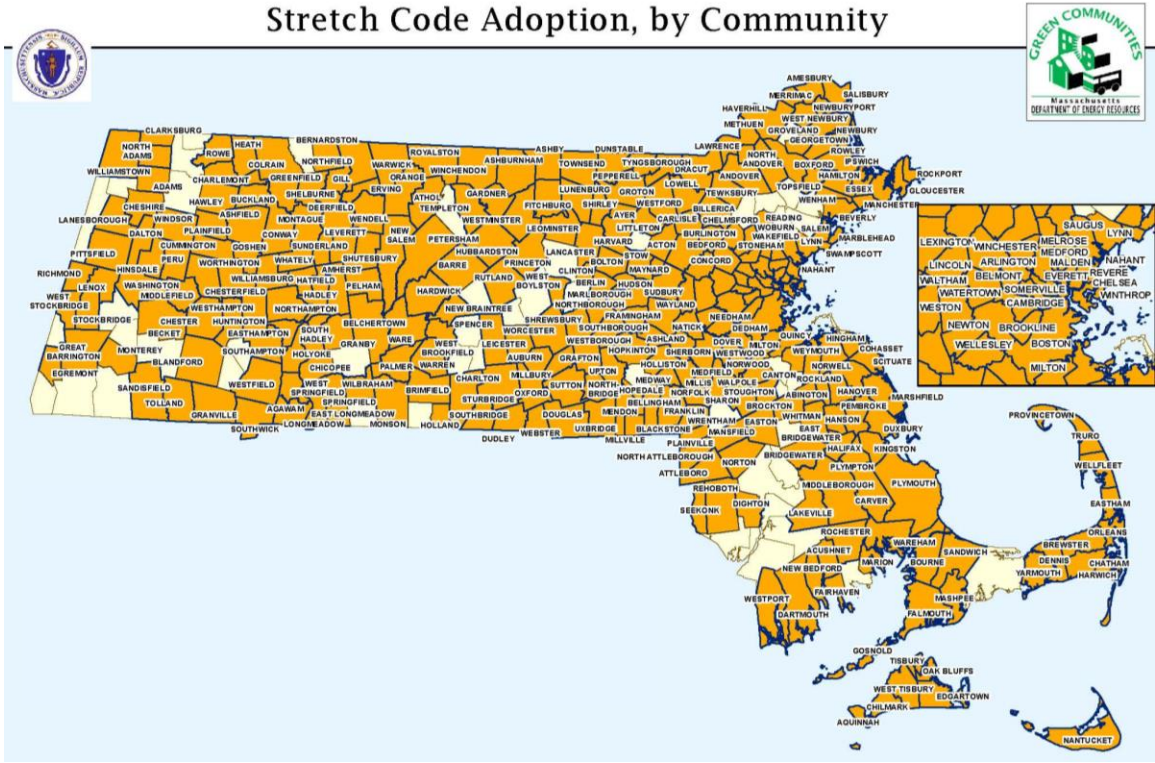
New Ecology addresses global environmental issues by bringing the benefits of sustainable development to the community level with a concerted emphasis on equity. We make the built environment more efficient, healthy, and resilient by advancing sustainable practices, ensuring accessible, affordable, and healthy environments in which to live and work.

New Ecology envisions a world in which all people have access to affordable, healthy, sustainable housing and communities in which to grow and thrive.

Quick History Lesson

Green Communities Act of 2008

- Requires the State Board of Building Regulations and Standards (BBRS) to adopt the latest edition of the International Energy Conservation Code as part of the State Building Code
- Creates a pathway for local jurisdictions to increase energy code thresholds by becoming Green Communities: ~300 out of 351 are now GCs: Stretch Code



How Many Energy Codes Are There?

Climate Act of 2021

- A net zer
  2050; re
- Shifted r
  and add
- Focus on

	Energy Codes in MA
	appendices

While Stretch Energy Code is updated automatically, the Specialized Code must be voted in during town meetings, therefore these numbers will continue to change.

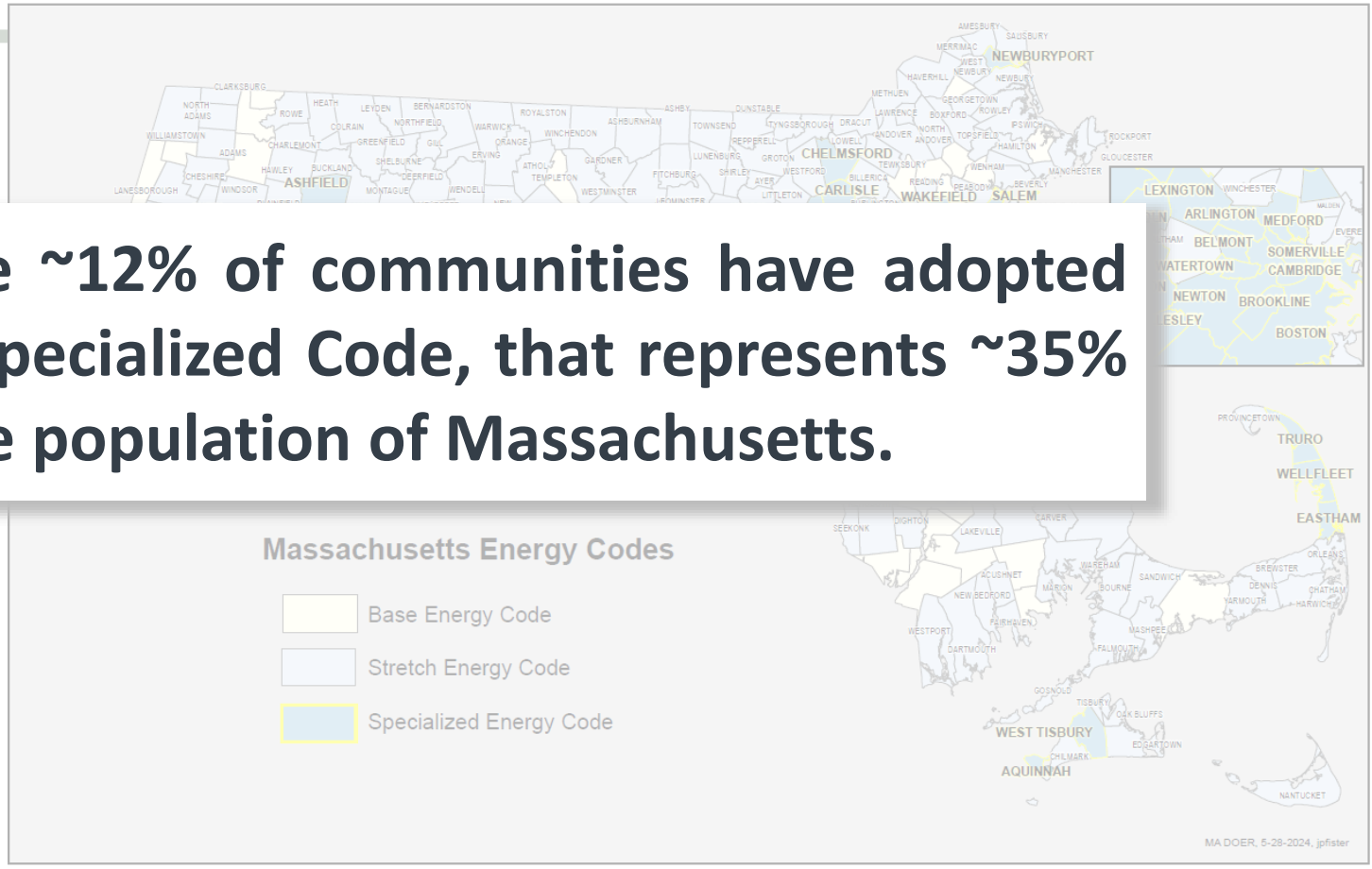
BBRS = Board of Building Regulations and Standards
DOER = Department of Energy Resources

How Many Energy Codes Are There?

Communities that have adopted the Specialized code:

Acton, Amherst, Aquin
Arlington, Ashfield, Ash
Bedford, Belmont, Bos
Brookline, Cambridge,
Chelmsford, Concord,
Eastham, Hopkinton, L
Lincoln, Maynard, Med
Melrose, Milton, Natic
Newburyport, Newton,
Northampton, Norwood, Salem,
Sharon, Sherborn, Somerville, Stow,
Swampscott, Truro, Wakefield,
Watertown, Wayland, Wellesley,
Wellfleet, West Tisbury, Weston,
Worcester

While ~12% of communities have adopted the Specialized Code, that represents ~35% of the population of Massachusetts.



NEW ECOLOGY
Community-Based Sustainable Development

How Do Codes Work in Massachuse

CC101.2 *Replace Section CC101.2 as follows:*

CC101.2 Scope. This appendix applies to new buildings that are addressed by the Municipal Opt-in Specialized Code. The Specialized Code maintains the energy efficiency requirements of the Stretch Code for all building types except multi-family. CC103 lays out the additional clean energy requirements for all building types.

Residential buildings and *dwelling units* within mixed use buildings shall comply as follows:

1) New *dwelling units* over 4,000 square feet in conditioned floor area in *Mixed Fuel Buildings* shall comply with the Zero Energy pathway and Section CC103 or with residential code Section RC102.
2) New R-use buildings over 12,000 square feet in conditioned floor area shall comply in accordance with Table CC101.2.
3) New R-use buildings less than or equal to 12,000 square feet in conditioned floor area shall comply with Residential Appendix RC.

TABLE CC101.2 MULTI-FAMILY AND R-USE COMPLIANCE

R-Use buildings over 12,000 sf, or R-Use portions over 12,000 sf in mixed-use buildings	Compliance Path options by permit submittal date		
	C407.3 Passive House	C407.1 Targeted Performance	C407.4 HERS Index
Up to 5 stories	Required from Jan 1, 2023		
6 stories and higher	Required from Jan 1, 2024	Optional until Jan 1, 2024	Optional until Jan 1, 2024

C401.2 Application. Commercial buildings shall comply with either Section C401.2.1 or C401.2.2. When constructed for the first time, all requirements imposed on the building housing a *tenant space fit out zone* shall also apply to the *tenant space fit out zone*. Commercial buildings containing multiple use type classifications (mixed-use buildings) shall comply with C401.2.4

C401.2.1 Prescriptive and Performance Compliance. Commercial buildings shall comply with one of the following:

Prescriptive Compliance: This pathway may only be used for any nonresidential building, or portions thereof when following C401.2.4, up to 20,000-sf. The Prescriptive Compliance pathway requires compliance with Sections C401.3, C402 through C406, and Section C408.

Targeted Performance Compliance: This pathway shall be used for dormitory, fire station, library, office, school, police station, post office, and town hall buildings, or portions thereof when following C401.2.4, over 20,000-sf which have average ventilation at full occupancy of 0.5 cfm/sf or less. This pathway can also be used for any building of any size. After 1 July 2024, this pathway shall be used for residential buildings, or portions thereof when following C401.2.4, over 12,000-sf, or the building may comply with Section C401.2.2. The Targeted Performance Compliance pathway requires compliance with Section C401.3, Sections C402 through C406, Section C407.1, Section 408, and select sections of ANSI/ASHRAE/IESNA 90.1-2019 Appendix G as described in Section 407.1.

Relative Performance Compliance: This pathway may be used by buildings not required to use Option 2. The Relative Performance Compliance pathway requires that the Proposed building complies with Sections C401.3, C402.1.5, C402.2.8, C402.3, C402.4, C402.5, C402.6, C402.7, C403.5, C403.7, C405, C406, C407.2, C408, and ANSI/ASHRAE/IESNA 90.1-2019 using the Appendix G compliance pathway as modified in Section C407.2.

tion: Additions, alterations, repairs and changes of occupancy to existing buildings lying with Chapter 5. This exception does not include *tenant space fit out zones* constructed for the first time.

.2.2 Certified Performance Standard Compliance. Commercial buildings or ns thereof when following C401.2.4 shall comply with one of the following ed performance standards:

- **Passive House Compliance:** This pathway can be used for any building of any size. The Passive House Compliance pathway requires compliance with Sections C401.3, C402.3, C405, C407.3 and C408.
- **HERS Compliance:** This pathway can be used for any Group R building with multiple individual *dwelling units*. The HERS pathway requires compliance with Section C401.3, C402.3, C405, C407.4 and C408.

How Do Codes Work in Massachusetts?

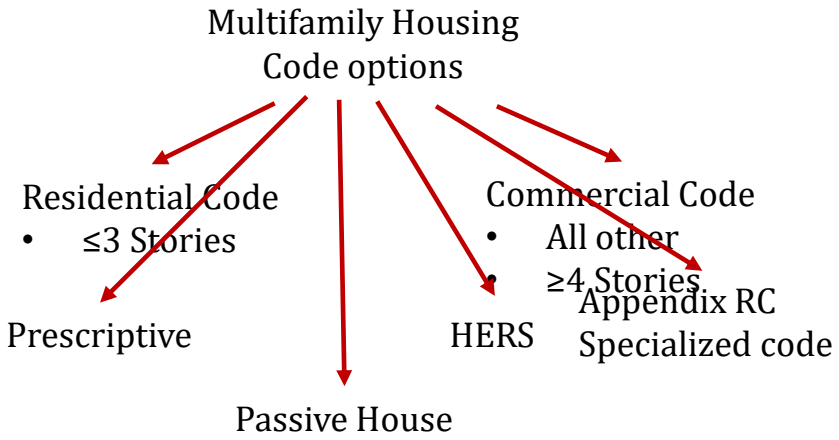
Base, Stretch, Specialized – 3 options

Base code	2021 IECC / ASHRAE 90.1-2019	Modest modifications			EV ready
Stretch code	2021 IECC / ASHRAE 90.1- 2019	Key modifications			EV ready Solar ready
Specialized code	2021 IECC / ASHRAE 90.1- 2019	Key modifications	Passivehouse Multifamily	All Electric OR Net Zero OR electric ready + solar	EV ready Solar ready

Stretch Code – Residential - Multifamily

Residential code:

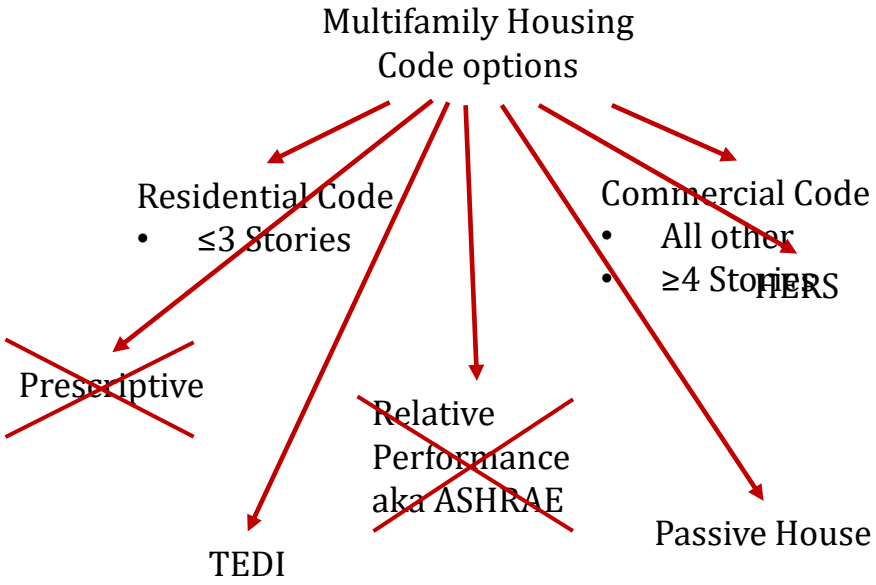
- Prescriptive
- Passive House
- HERS Index Reduction
  - Mixed Fuel and MF & Solar: HERS 42
  - All-Electric and AE & Solar: HERS 45
- Specialized Opt-in code
- New Ventilation Requirements
  - Energy Recovery Ventilator (ERV) or Heat Recovery Ventilator (HRV) are required to meet whole home ventilation requirements of the code
- Electric Vehicle Readiness:
  - Buildings shall be wired as follows:
    - Single family: one spot
    - Multifamily: 20% of parking spots



Stretch Code – Commercial - Multifamily

Commercial code:

- No Prescriptive Option for Group R buildings
- Targeted Performance aka Thermal Energy Demand Intensity (TEDI)
  - Dormitories, fire and police stations, libraries, offices, schools, post offices, and town halls
- Relative Performance aka ASHRAE 90.1-2019 is available only for high ventilation buildings or for buildings not required to use TEDI
- Passive House is available to all building typologies
- HERS can be used for Group R buildings with multiple individual dwelling units.
- Tenant spaces must meet new construction



Specialized Opt-in Code

Residential code (Appendix RC) Commercial code (Appendix CC) offer 3 pathways:

1. Zero Energy pathway
2. All-Electric pathway
3. Mixed-Fuel pathway

Multifamily >12k sf requires PH

Mixed-fuel >4k sf requires:

- PH, or
- HERS 0

Building Size	Fuel Type	Minimum Efficiency	Electrification	Min. EV wiring	Renewable Generation
Dwelling units up to 4,000 sf	All Electric	HERS 45 or Phius CORE or PHI	Full	1 parking space	Optional
Dwelling units up to 4,000 sf	Mixed-fuel	HERS 42 or Phius CORE or PHI	Pre-wiring	1 parking space	Solar PV (except shaded sites)
Dwelling units > 4,000 sf	All Electric	HERS 45 or Phius CORE or PHI	Full	1 parking space	Optional
Dwelling units > 4,000 sf	Mixed-fuel	HERS 0 or Phius ZERO	Pre-wiring	1 parking space	Solar PV or other renewables
Multi-family >12,000 sf	All Electric	Phius CORE or PHI	Full	20% of spaces	Optional
Multi-family >12,000 sf	Mixed-fuel	Phius CORE or PHI	Pre-wiring	20% of spaces	Optional

NEW ECOLOGY
Community-Based Sustainable Development

Existing Buildings - Residential

Large Additions

- Requires additions to dwelling unit exceeding 1,000 sq. ft. or exceeding 100% of the existing conditioned floor area, to comply with the maximum HERS ratings for additions in table R406.5.

Level 3 Alterations or Change of Use

- Requires dwelling units with Level 3 alterations exceeding 1,000 sq ft or 100% of existing conditioned floor area to comply with max HERS ratings for alterations in Table R406.5.

TABLE R406.5 MAXIMUM ENERGY RATING INDEX

Clean Energy Application	Major Alterations, additional, or change of use
Mixed-Fuel	52
Solar Electric Generation	55
All-Electric	55
Solar Electric and All-Electric	58

2021 IEBC 604.1: Level 3 Alterations apply where the work area exceeds 50% of the building area.

Existing Buildings - Commercial

Additions

- Additions to an existing building where the addition is up to 100% of the size of the existing building and less than 20,000-sf shall comply with Sections C401.3, C402 through C406, and Section C408. Additions which exceed either of these limits shall comply with the applicable pathway for new construction in C401.2

Alterations or Change of Use

- Alterations to any building or structure shall comply with the requirements of Sections C503, C402, C403, C404, and C405
- Exception 3 now states: Where the component performance alternative in Section 402.1.5 is used to comply with this section, the proposed UA shall not be greater than 110 percent of the target UA.

Prescriptive

New Construction

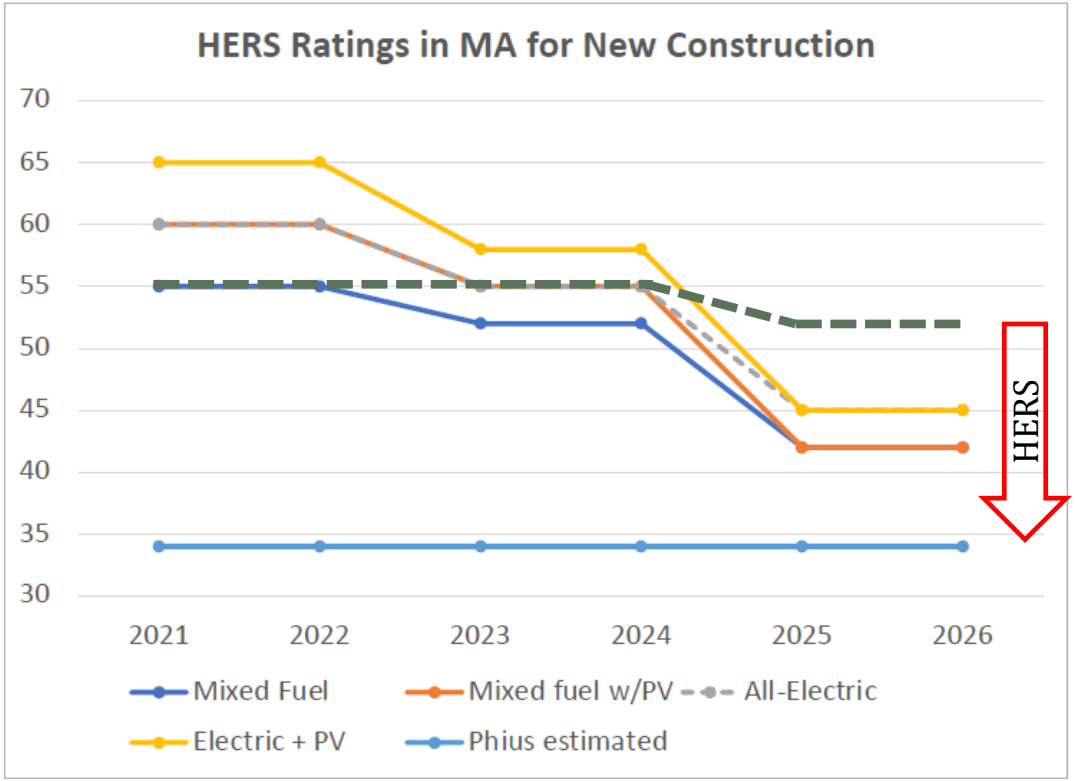
Prescriptive

Where cavities are opened during construction, 'filling' them is not sufficient

TABLE R406.5 MAXIMUM ENERGY RATING INDEX

Clean Energy Application	Major Alterations, additional, or change of use
Mixed-Fuel	42
Solar Electric and M-F	42
All-Electric	45
Solar Electric and A-E	45

Code Performance



MassSave Incentives – 1-4 Units

- No payment for new fossil fuel equipment after Dec 31, 2024 – this is a state law
- There is no ‘grandfathering’ of projects

SINGLE FAMILY (1-4 UNITS)			
Tier	**Base**	**Energy Star**	**Passive House**
Overview	All-electric heating, water heating, cooking and clothes drying	ENERGY STAR™ NextGen	Passive House
Performance Specifications	15% savings above baseline	30% savings or HERS: 45 Infiltration: 1.5 ACH50 Ventilation: ERV/HRV	Passive House Certification Infiltration: Passive House Ventilation: Passive House
Certifications	None	ENERGY STAR SFNH v3.2 + NextGen	Phius or PHI
Incentives	Single Fam: $7,500 2-unit: $8,750 3-unit: $10,000 4-unit: $11,250	Single Fam: $15,000 2-unit: $17,500 3-unit: $20,000 4-unit: $22,500	Single Fam: $25,000 2-unit: $30,000 3-unit: $35,000 4-unit: $40,000

Incentives - Multifamily

Multifamily (5+ Units)			
Tier	**Base**	**Energy Star**	**Passive House**
Overview	All-electric heating, cooking & clothes drying. FF DHW is allowable	ENERGY STAR™ Multi-Family New Construction (MFNC) V1.2	Passive House
Performance Specifications	Low-Rise: 15% savings above baseline or HERS 45 High-Rise: Exceed baseline	ENERGY STAR™ MFNC v1.2	Passive House Certification
Certifications	none	ENERGY STAR™ MFNC v1.2	Phius or PHI
Incentives	Low-Rise: $1,500/Unit High-Rise: $1,000/Unit	Low-Rise: $2,500/Unit High-Rise: $1,750/Unit	Both: $3,750/unit ($750 Pre-Cert, $3,000 Final Cert)
Passive House Adders	$5,000 Feasibility Study Incentive Up to 75% Energy Modeling Costs ($500/Unit or $20,000/Project Max)		

Highlights

Electrification:
- Heating, Cooling, and Ventilation
- Domestic Hot Water
- Electric Vehicle Charging
- Solar PV Requirements

Certifications:
- No EnergyStar option
- Passive House certification required for MF in Opt-In Communities
- HERS Index performance tightened (42/45)

New homes over 4000 sf must use All-Electric or NZE

Mixed Fuel homes must be pre-wired for electrification and must install Solar PV

Thank You.

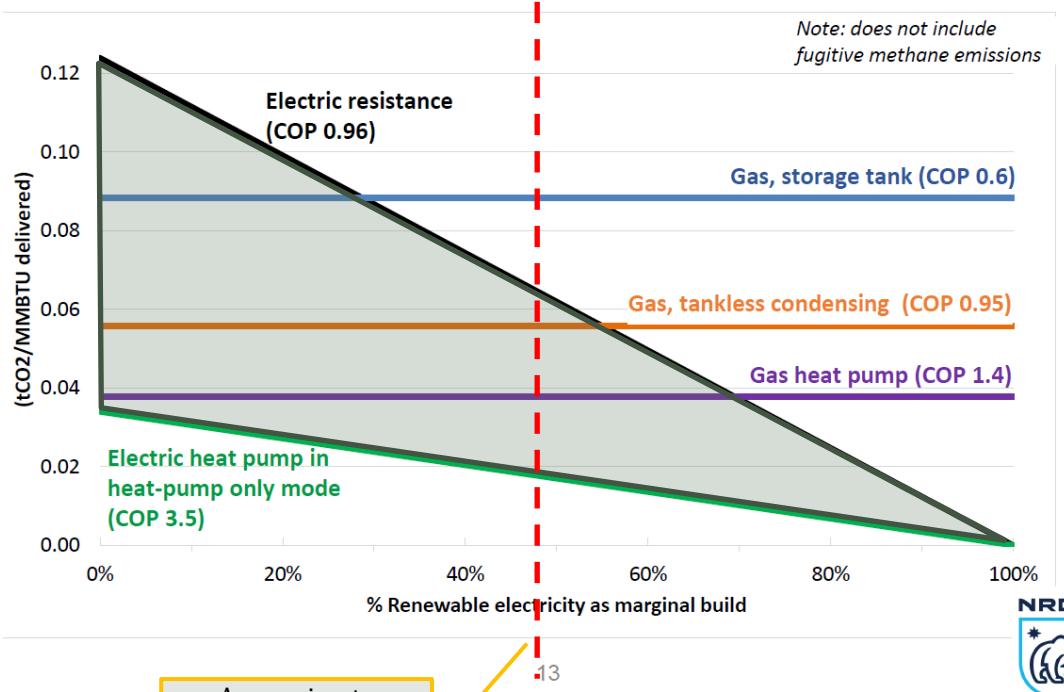
Maciej Konieczny
CPHC/B, CEM, LEED AP BD+C, Homes
Director of Building Technologies
konieczny@newecology.org
617-557-1700 x7024

Why Electrification?

2050

Why Electrify?

- As the electric grid becomes cleaner (increase in % of renewable sources), electric emissions improve.
- Example
  - Electric resistance vs gas fired water heater
  - Fossil fuel vs electric



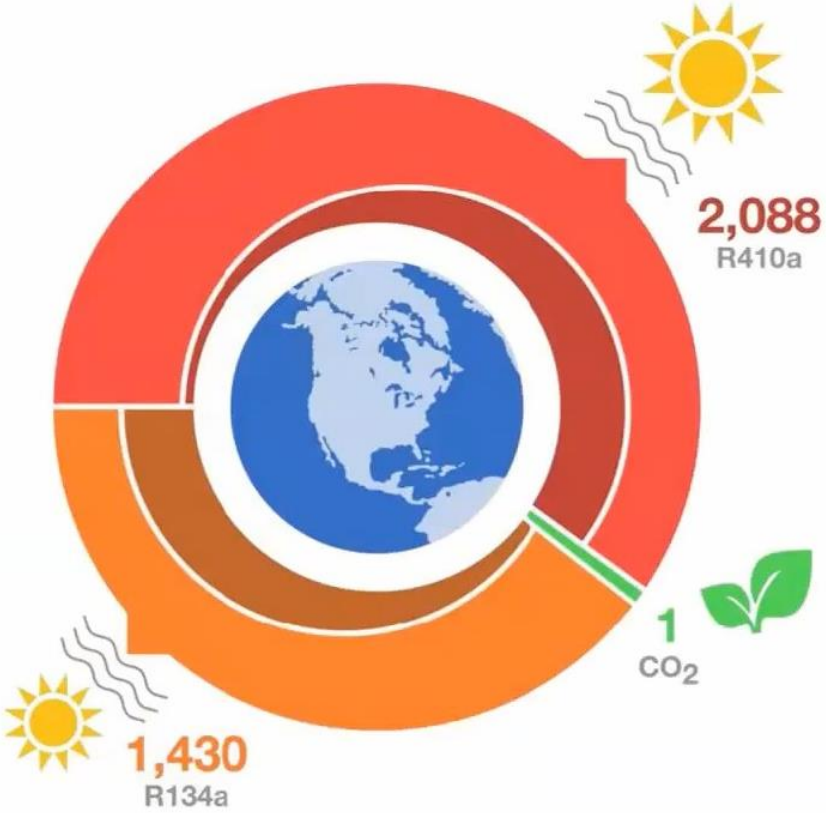
Approximate annual emissions in Mass

NEW ECOLOGY
Community-Based Sustainable Development

Why CO_2 Refrigerants?

Why CO_2 refrigerant?

- GWP = 1
- ODP = 0
- Non-flammable
- Non-toxic
- Excellent low ambient performance
- Highly efficient
- Can heat water up to 180°F



* Mitsubishi presentation

NEW ECOLOGY
Community-Based Sustainable Development