



Net-Zero Building & Energy Efficiency

What Does Net-Zero Mean?

*A **net-zero-carbon** building is a building whose energy is supplied or offset by 100% renewable sources and, thus, does not add to greenhouse gas emissions.*

Supplied: Generated on-site and used for building operations

Offset: generated off-site in order to match buildings annual load

- Generally buildings of 5 stories or taller will need to offset their energy load with off-site renewable energy sources and the purchase of RECs

Why is Net-Zero So Important?

HOMES AND BUILDINGS IN INDUSTRIALIZED COUNTRIES REPRESENT*



40% OF
ENERGY
CONSUMPTION



12% OF
DRINKING WATER
CONSUMPTION



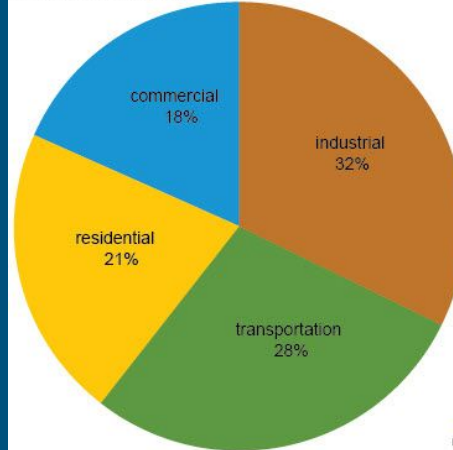
38% OF
GREENHOUSE GAS
EMISSIONS



40% OF
SOLID WASTE

Share of total U.S. energy consumed by end-use sector
in the United States, 2015

Total = 97.7 quadrillion British thermal units (Btu)



Note: Sum of individual percentages may not equal 100 because of independent rounding.

Source: U.S. Energy Information Administration, *Monthly Energy Review*, Table 2.1 (April 2016), preliminary data

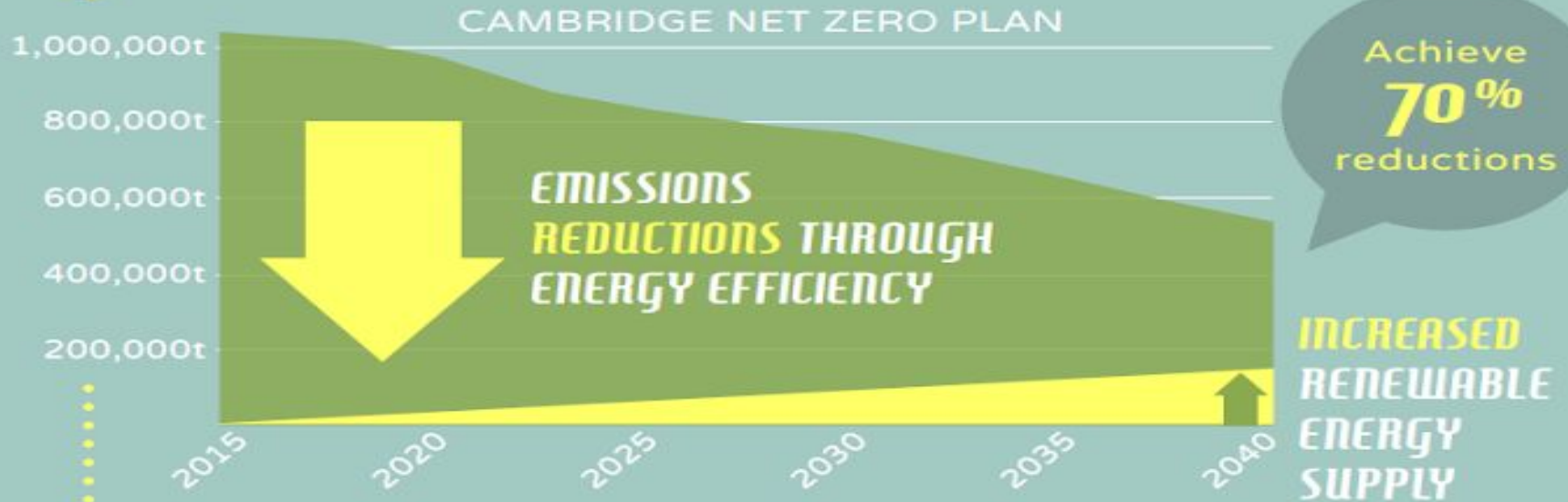
**The Northeast's unique climate increases the energy consumption for Residential and Commercial buildings*

How do we achieve Net-Zero?

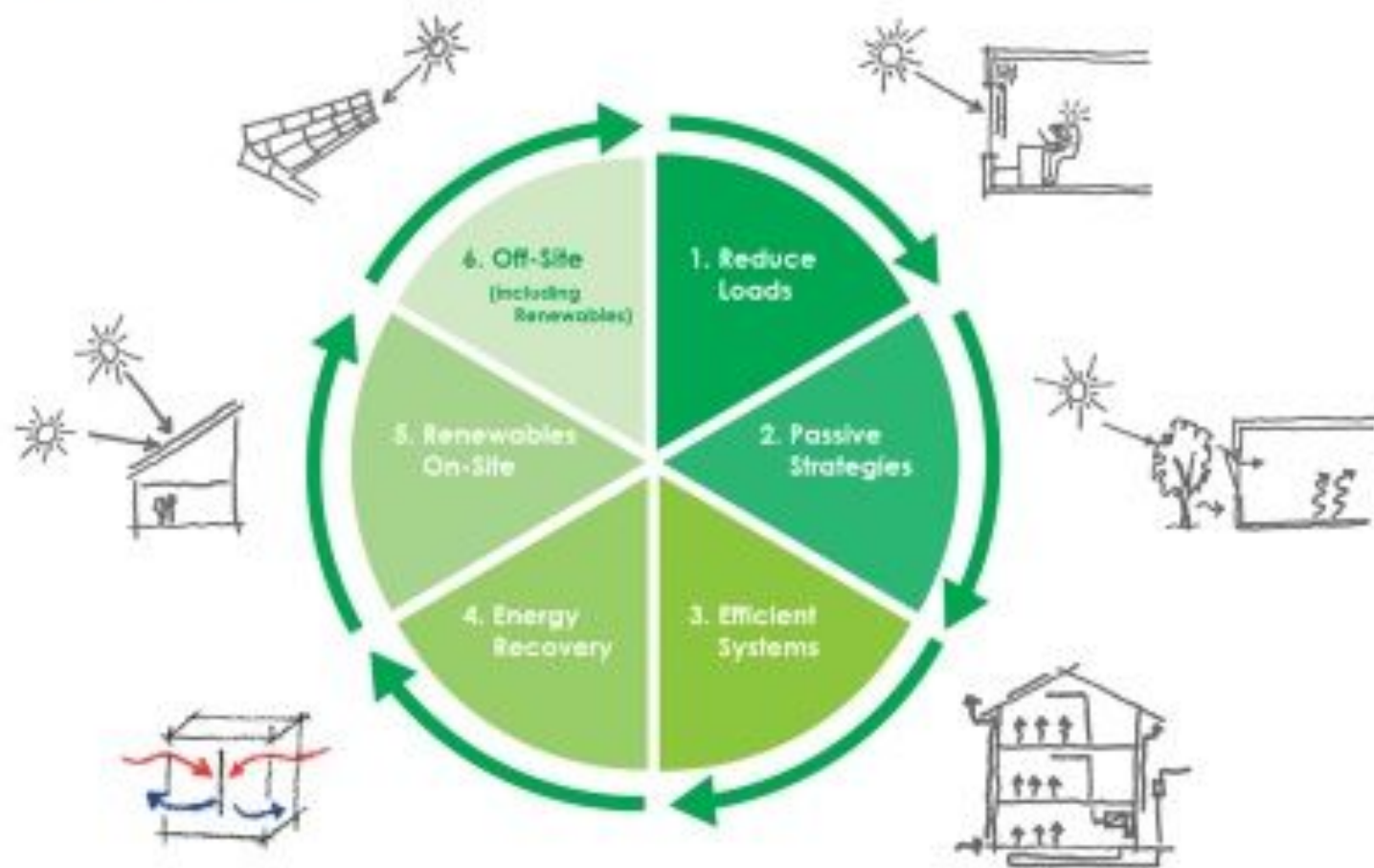
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THE 25-YEAR NET ZERO STRATEGY

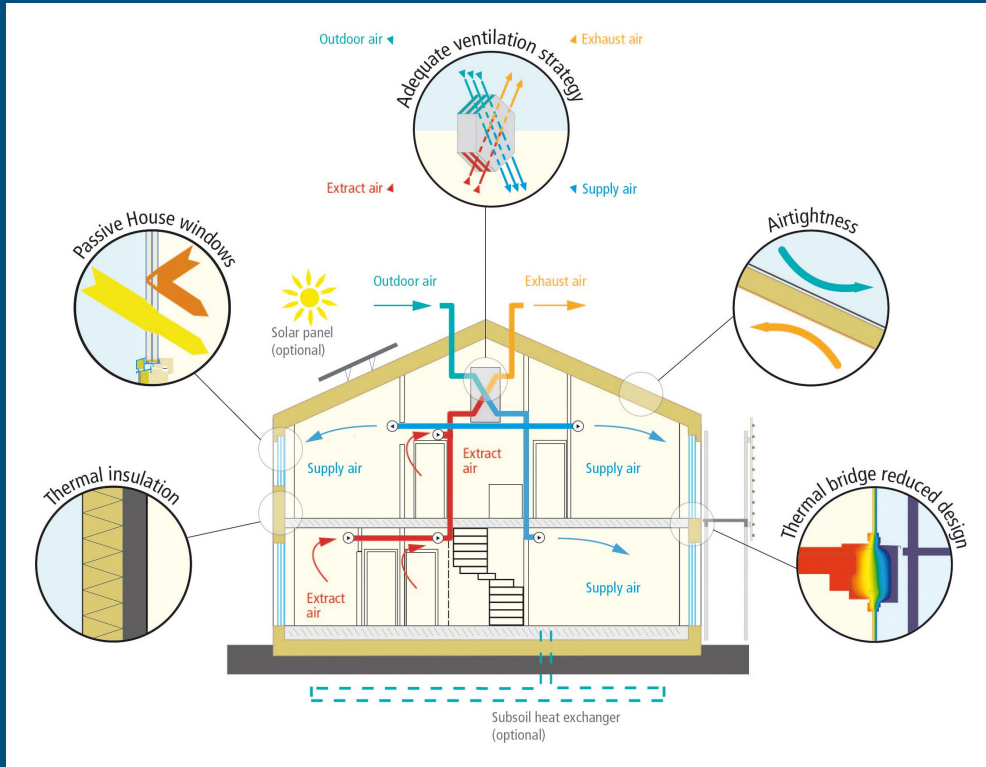
The net zero action plan aims to cut energy demand significantly, and replace fossil fuels with renewable energy.



6 Steps to Net Zero



Passive House



Passive Building comprises a set of design principles used to attain a quantifiable and rigorous level of energy efficiency within a specific quantifiable comfort level.

- Airtightness
- Balanced ventilation strategy
- High performance windows
- Insulation
- Minimal space conditioning

PHIUS+ 2015 : Passive Building Standard-NA

Most effective building standard available in order achieve Net-Zero and net-positive

Requires architects and contractors to be trained and certified in Passive Building

Uniquely optimized for climate variances in North America

- Can be used in an Arizona or New England climate and achieve same goals

Lexington's Net-Zero Plan

One of only a few municipalities to implement a net-zero plan in MA

25 year Net-Zero goal achieved through:

- Reporting
- Reduction
- Producing
- Purchasing

However, the MA state building code **does not require buildings to be Net-Zero or Net-Zero ready*

2017 Massachusetts Stretch Code

MA Base Energy Code is updated every three years.

Stretch code adjusted periodically to reach the next Base Code iteration early.

- Performance based on Home Energy Rating system (HERS)
- New construction must achieve a HERS rating of 55 through non-specific energy efficiency measures
- Does not require or come close to achieving Net-Zero for buildings

Pushing for Net-Zero Building Code Statewide

Building better building means a better code.... 3 options:

- Board of Building Regulations and Standards (BBRS): ask them to develop NZ code
- Legislature: ask them to direct BBRS develop NZ code
- NZ towns: communities like Lexington and Cambridge tell BBRS they want to get an exemption to develop a required NZ code

AND - 2019 vote by code officials to make the code better. MA officials can tip the balance