

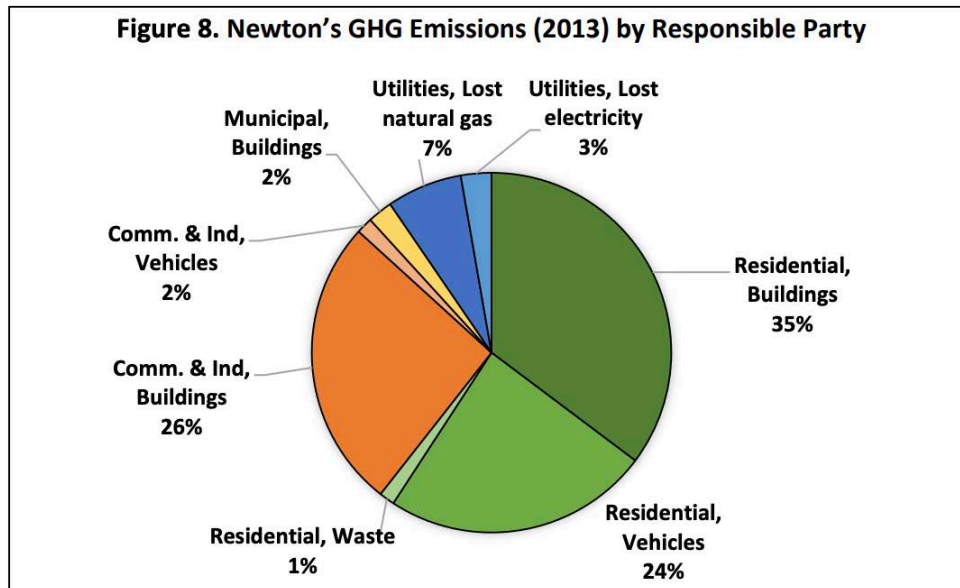
The climate case for encouraging reuse of existing homes

Zoning and Planning Committee Meeting presentation

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July 16, 2020

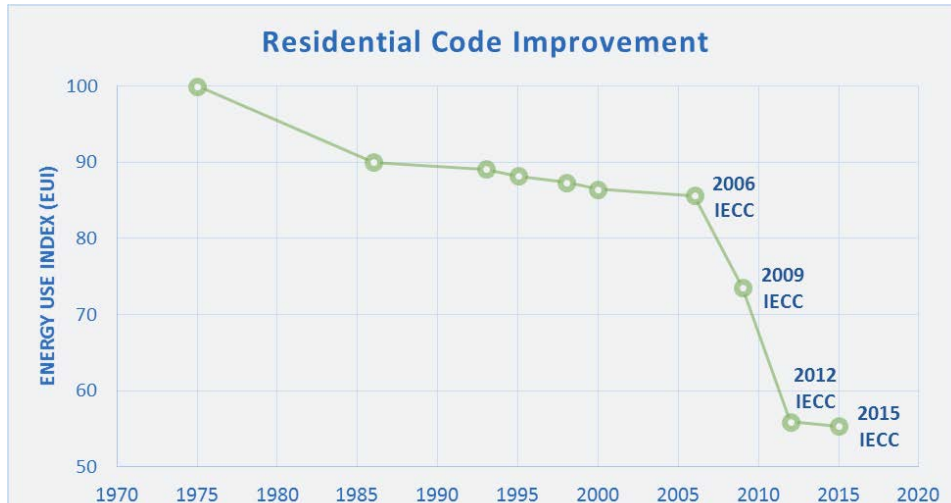
Residential sector carbon emissions



Common misconceptions about the pros and cons of retrofits v. new construction

1. New homes are better for the climate than existing homes
2. It isn't practical to retrofit existing homes to high performance energy standards
3. We need to focus on reducing emissions from operations (and can safely ignore upfront or embodied emissions)

Efficient new homes are not necessarily low energy or low emitting



Retrofits make sense for a wide variety of homes



Newton cape retrofit



- Built 1938
- Attic floor insulation
- No wall insulation
- Gas heat and hot water
- Central air conditioning

Newton cape retrofit

- Cellulose in walls
- Closed cell spray foam roof insulation
- Band joist air sealing
- Whole-house mini-split heat pumps
- Heat pump water heater
- 10.4 kw solar array (produces 84% of energy consumed)



Newton cape retrofit

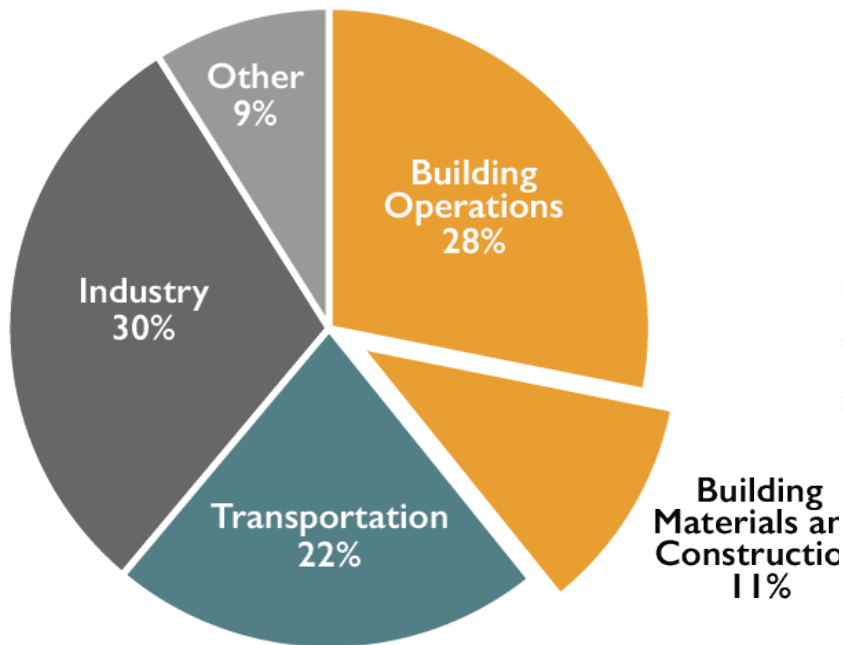
	Before	After	MA Average
Annual energy use (Mbtus)	150	47	109
Annual carbon emissions (Mt)	8.74	3.65*	6.65

- EUI = 25kbtu/sf
- HERS 47 not counting solar = more efficient than new home built to stretch code
- approx. 50% smaller than average new home in Newton

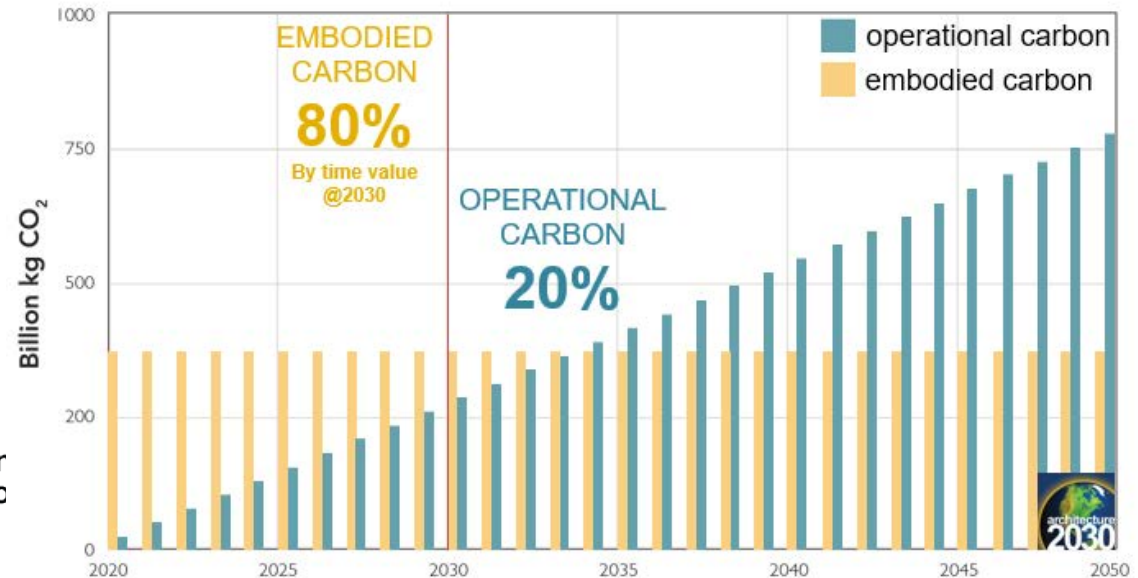
*Homeowner is signed up for 100% Newton Power Choice.
If electric emissions treated as 0, annual emissions would .21 metric tons

Embodied emissions are as important as operating emissions

Global CO₂ Emission by Sector



Total Carbon Emissions of **All Global New Construction** from 2020-2050
Business as Usual Projection



Source: © 2018 2030, Inc. / Architecture 2030. All Rights Reserved. Data Sources: UN Environment Global Status Report 2017; EIA International Energy Outlook 2017

<https://architecture2030.org/>
<https://buildingtransparency.org>

Summary

- In many cases a retrofit is better for the climate than building new
 - Esp. when we consider the time value of carbon emissions
- “Moderate” energy retrofits are practical for much of our existing housing stock
 - Modest air sealing and insulation upgrades
 - Conversions to heat pumps
 - On-site solar
- Efficient does not necessarily mean low operating energy or emissions

Take-aways for zoning redesign

- Increase fees for demolition permits for tear-downs (if legally permissible)
- Require embodied carbon off-sets for demolition
- Encourage accessory apartments in existing houses
- Encourage multi-unit conversions in existing houses
 - Reduce RU factor and establish bonus for higher performance