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Passive House

*Passive House on Cape Cod from the
Passive House website*

If you haven't heard of Passive House or Passive building yet you will hear it more as the Commonwealth and its municipalities journey toward the State's goal of Carbon Neutrality by 2050. Passive House is pretty cool as it focuses on keeping you warm or cool through a better designed and built structure that lowers energy demand.

Passive structures are quieter, more comfortable and they hold the heat much longer. This is a plus in a prolonged power outage (see Texas). Passive House has been one of the compliance pathways with the State's Stretch Energy portion of the Massachusetts state building code for six years. The technology is catching on fast all over.

According to Passive House Institute US: "Passive building principles can be applied to all building typologies – from single-family homes to multifamily apartment buildings, offices, and skyscrapers."

Passive House design:

- Employs high-performance windows (double or triple-paned windows depending on climate and building type) and doors - solar gain is managed to exploit the sun's energy for heating purposes in the heating season and to minimize overheating during the cooling season.
- Uses some form of balanced heat and moisture recovery ventilation.
- Uses a minimal heating and cooling system.
- Superinsulation and airtight construction provide unmatched comfort even in extreme weather conditions.

Passive design strategy carefully models and balances a comprehensive set of factors including heat emissions from appliances and occupants to keep the building at comfortable and consistent indoor temperatures throughout the heating and cooling seasons. As a result, passive buildings offer tremendous long-term benefits in addition to energy efficiency.

A comprehensive systems approach to modeling, design, and construction produces extremely resilient buildings. The building envelope is extremely airtight, preventing infiltration of outside air and loss of conditioned air. Continuous mechanical ventilation of fresh filtered air provides superb indoor air quality. Passive building principles offer the best path to Net Zero and Net Positive buildings by minimizing the load that renewables are required to provide.

A Net Zero building offsets the amount of energy needed for appliances, lighting, heating and cooling annually with renewable energy generated on site. A Net Positive building generates more renewable energy on site than the building uses.

Must be expensive, right? Maybe not.

Currently Passive structures cost from 0% to 10% more depending on the designer's and builder's experience. As teams become familiar with and more adept at, Passive Building costs will come down. Not only that, a factory-built passive building can cost less to build and run than a site built-to-code version.

Cape light Compact offers incentives to defray these costs. Cape Light Compact is Cape Cod's version of the state mandated MassSave program.

Engineers at the Massachusetts Department of Energy Resources estimate the payback of the upfront costs can be 8 to 15 years thanks to smaller energy bills.

A 2019 report titled Zero Energy Buildings in Massachusetts: Saving money from the start released by the Massachusetts chapter of the US Green Building Council states “The perception that zero energy buildings always cost more upfront and over the long term is a myth; the reality is that zero energy buildings are a smart investment”.

Question on climate change or energy efficiency email climateaction@truro-ma.gov