

Benefits of Net Zero Buildings: Comfort, Safety, Value, Climate

This Applied Economics Clinic policy brief presents a summary of the benefits of Net Zero buildings. A Net Zero building produces at least as much renewable energy in a year as it consumes, and the technology is currently ready for implementation. We find that the benefits of Net Zero buildings include enhanced health and comfort, building durability and safety, better value, and positive climate effects.

Figure 1. Characteristics of Net Zero buildings



Photo credit: [Sam Oberter](#). E+ Green Building Program Net Zero building, 226-232 Highland Street, Roxbury, Boston, Massachusetts.

What is a Net Zero building?

Net Zero buildings produce at least as much renewable energy as they consume over the course of a year by maximizing energy and resource efficiency, self-generating renewable solar and/or wind energy, and using heating and cooling systems that are powered by electricity, so that they can utilize the renewable energy

they generate. Other environmentally sustainable features that help buildings achieve Net Zero energy use include: solar water heating; electric vehicle charging stations; battery storage; energy efficient LED lighting, electronics and appliances; maximization of natural sunlight; and air tight insulation.

Net Zero buildings are a proven design concept in Massachusetts: Net Zero buildings available to potential homeowners, renters and businesses, and are being built today with no additional up-front costs and considerable lifetime savings. While Massachusetts currently leads the country in energy efficiency, California is the only state that requires new buildings to be Net Zero.

Benefits of Net Zero buildings

Not only do Net Zero buildings enhance sustainability by eliminating reliance on fossil fuel-powered energy, but they also provide numerous benefits for homeowners, renters and businesses, such as: increased health, safety and comfort, lower operating costs, and enhanced building durability and value.

Table 1. Benefits of Net Zero buildings

Health and Comfort	Savings
<ul style="list-style-type: none"> - Less indoor air pollution - Comfortable temperature - Less noise - More sunshine 	<ul style="list-style-type: none"> - Lower utility bills - Net energy producer - Less water use - Competitive purchase price - Enhanced resale value
Resiliency and Safety	Climate
<ul style="list-style-type: none"> - Weather resiliency - Better materials - No risk of explosion 	<ul style="list-style-type: none"> - Helps reach climate goals - Clean energy - Net-zero emissions

Bryndis Woods and Eliandro Tavares

January 13, 2020

Health and Comfort

Less indoor air pollution: Advanced ventilation systems mean cleaner air—free of outside pollutants and allergens.

Comfortable temperature: Airtight design results in less heat loss and more consistent, comfortable indoor temperatures.

Less noise: Thicker walls and windows reduce noise penetration.

More sunshine: Passive solar design makes the most of natural daylight.

Savings

Lower utility bills: The total cost to operate a Net Zero building is lower than a standard building because energy is self-generated (and sometimes stored), so it is not affected by rising energy prices and can enhance energy security in vulnerable communities.

Net energy producer: Net Zero buildings have the potential to generate more energy than they use, which can be sold back to the grid, stored in batteries for later use, and/or used to charge electric cars or other equipment.

Competitive purchase price: The cost to purchase a Net Zero building is competitive, especially in warm climates. In Boston, the price premium of a Net Zero building is \$21,000, which can be earned back via energy savings within 12 years (see Petersen et al., 2019, p.65).

Enhanced resale value: Durability, efficiency, and advanced technologies can garner a higher resale value.

Resiliency and Safety

Weather resiliency: Net Zero buildings provide greater reliability during power outage events and extreme heat and cold conditions, allowing people to shelter at home, remain comfortable, and continue to use potentially life-saving devices like oxygen.

Better materials: Thicker, more air-tight walls and advanced window technologies ensure that a Net Zero building is highly durable—providing increased safety and resilience against extreme conditions.

No risk of explosion: Since Net Zero buildings rely on renewable energy sources rather than fossil fuels, health and safety hazards like gas leaks and explosions are eliminated.

Climate

Clean energy and net zero emissions: Living in a Net Zero building eliminates the need to rely on polluting fossil fuels (and their price volatility). The combination of design, building techniques, and technologies that go into a Net Zero building result in a building that produces zero emissions.

Climate goals: Increasing the market penetration of Net Zero building helps towns and cities meet their climate goals, while building a more resilient and energy-secure building stock.

Works Cited

Amvic Building System. n/d. "The Five Essential Components of Net Zero Homes." Available at:

<https://www.amvicsystem.com/blog/the-five-essential-components-of-Net-Zero-homes/>.

Petersen A., et al. 2019. "The economics of zero-energy homes." *Rocky Mountain Institute*. Available at: https://rmi.org/wp-content/uploads/2018/10/RMI_Economics_of_Zero_Energy_Homes_2018.pdf.

Poppenheimer, L. 2019. "Demystifying All-Electric Homes and Buildings." SLO Climate Coalition. Available at: <https://carbonfreeslo.org/demystifying-all-electric-homes-and-buildings/>.

Rupp, S.E. February 4, 2019. "Most states pushing for efficiency standards, net-zero buildings." *MultiBriefs: Exclusive*. Available at:

<http://exclusive.multibriefs.com/content/most-states-pushing-for-efficiency-standards-net-zero-buildings/facilities-grounds>.

U.S. Green Building Council – MA Chapter. 2019. *Zero Energy Buildings in Massachusetts: Saving Money from the Start*. Available at: <https://usgbcma.org/wp-content/uploads/2019/09/ZeroEnergyBldgMA2019.pdf>.

Zero Energy Project. n/d. "20 advantages of a zero-energy home." Available at: <https://zeroenergyproject.org/buy/20-advantages-living-zero-energy-home/>.

Zero Energy Project. n/d. "What are zero energy homes?" Available at: <https://zeroenergyproject.org/buy/zero-energy-homes/>.