

What Do Houses Have To Do with Climate Change?

A lot, it turns out ... Nearly 40% of all energy consumption and CO2 emissions in the U.S. can be attributed to building construction and operation. Dramatically reducing the CO2 emissions caused by building construction and operation is a necessary part of the changes we as a society must undertake in order to mitigate climate change.

Two existing programs offer pathways to achieve CO2 and energy reductions that align with the scale of reduction (IPCC emission reduction targets) needed within the next decade in order to avoid the most catastrophic effects of climate change. If all new building were to follow either of these paths, the design and building industries could be part of the solution instead of part of the problem.

Architecture 2030 is a non-profit organization with the objectives *to achieve a dramatic reduction in the energy consumption and greenhouse gas (GHG) emissions of the built environment; and, to advance the development of sustainable, resilient, equitable, and carbon-neutral buildings and communities*. The organization set targets for total building site energy consumption (in kBtu per ft²) with the ultimate goal that all new buildings be carbon neutral by the year 2030.

Passive House (U.S. standard) and Passivhaus (International standard) refer to stringent energy performance standards for buildings. The aim of these standards is to dramatically decrease building energy consumption and environmental impact, as buildings currently account for nearly 40% of global CO2 emissions.

To be certified, a U.S. Passive House must meet climate-specific targets for modeled space conditioning energy and whole house source energy consumption, and a universal standard for tested air tightness. The required energy consumption targets (for both space conditioning and total source energy use) are achieved with a detailed energy model of the design before construction, and with verification during construction of assembly methods and tested air tightness.

While design and construction methods vary considerably, new houses built to either of these standards should share certain key features:

- a well-insulated building enclosure (often to levels at least twice what code requires) with little to no thermal bridging
- high performance windows and doors
- very low building air leakage in the enclosure
- mechanical ventilation with heat recovery
- solar-optimized design
- very efficient mechanical, electrical and plumbing equipment and distribution systems
- minimal mechanical heating and cooling systems
- a renewable energy system on site, or be renewable energy-ready

For more information, visit:

<https://www.phius.org/what-is-passive-building/passive-house-principles>

https://passivehouse-international.org/index.php?page_id=227

https://architecture2030.org/buildings_problem_why/

<https://www.throughdesign.net/architecture-2030>