zero net energy

ZNE Definitions & Key Considerations

A ZNE building produces as much energy as it consumes over the course of a year

Examples of zero energy buildings are increasing in numbers and building types around the globe. California is leading the way with aggressive goals of achieving ZNE for all new residential by 2020 and for all new commercial by 2030. To understand the ZNE landscape, policymakers, advocates and others should consider the variety of terms, acronyms and descriptions circulating among stakeholders and understand how these distinctions impact policy, program and design decisions.

Describing ZNE in California

Below are some relevant terms and considerations to help define the emerging language of ZNE in California.

Zero-Net Energy (ZNE) building

A building that generates at least as much energy as it consumes over the course of a year with on-site renewable resources. This is sometimes referred to as "ZNE Site." In California, renewable energy resources for ZNE include photovoltaic (or solar), solar thermal, microhydro and wind generation.

There may be different energy use targets for specific building types, but generally for single-family residential buildings the energy use intensity (EUI) for ZNE performance is between 11-17 kBtus per square foot. For commerical structures, the range is between 20 and 30 kBtus per square foot.

Zero-Net Energy Equivalent (or Capable) Building

An ultra-efficient building with total energy use per square foot in range of ZNE buildings but without onsite or community renewable resources.

Zero Net Energy TDV

A building designed to meet the Time Dependent Valuation (TDV) based definition for ZNE as used by the California Energy Commission for codes and standards. This is sometimes referred to as "ZNE Code."

Key Considerations for ZNE

Site vs. source energy

In California, energy generation must occur on the building or at the building site to be considered ZNE. Offsetting the source of generation and delivery of the energy is not required.

Offsetting all fuels used by the building/site vs. electric use only

To meet the definition of a California ZNE building, all fuels—gas and electric—must be offset through renewables to be truly zero energy. Some definitions refer to ZNE electric buildings which do not offset direct use of gas or other fossil fuels.

Alternatively, other definitions preclude the use of any combustion fuel at all, but this is allowed by the California ZNE definition.

Energy vs. carbon emissions

In California, carbon reduction is not currently how policymakers define ZNE. However, the state Public Utilities Commission recognizes "that California's very ambitious energy efficiency and greenhouse gas reduction goals require long-term strategic planning to eliminate persistent market barriers and effect lasting transformation in the market for energy efficiency across the economy."

ZNE buildings vs. communities or districts

Some zero energy projects are addressing ZNE at a larger scale than a single building (e.g. UC Davis' ZNE Community), and working to generate as much energy over a larger dispersed area through a variety of renewable sources including district energy.

Solar thermal energy (photo courtesy of Southern California Edison)

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