

By Rick Duncan, Spray Polyurethane Foam

# Spray polyurethane foam answers call for ZNE

**M**ANY LEADING builders now employ and promote significant eco-conscious building practices. Energy efficiency, energy generation, water conservation, resilient materials, life cycle measurements and recyclability are just some of the considerations of today's builders. Additionally, major U.S. corporations have established green standards for the real estate they inhabit, while end-

users have come to expect and demand energy saving homes and workspaces.

These stakeholders, along with states and municipalities, have begun to push sustainable building practices even further, fueling the zero net energy (ZNE) movement. The movement describes a move toward buildings with zero net energy consumption. The energy consumed by a zero net energy structure is roughly equivalent to the amount of renewable energy generated on the same site.

With buildings traditionally consuming a major amount of the total fossil fuel in the United States, they are significant greenhouse gas contributors. Thus zero net energy structures are viewed as an important step in the reduction of carbon emissions as well as our overall dependence on fossil fuels.

In July 2014, California began the revision process to the 2016 version of Title 24, the state's energy efficiency building codes. These codes are designed to move all new residential construction to ZNE by 2020, and all new commercial construction to ZNE by 2030. Though aggressive in nature, these goals are achievable with proper design implementations and accessibility to high performance building products.

Because of California's proven ability to influence the other 49 states to enact environmental regulations, it is widely believed the same trend will occur with ZNE. Thus it is likely that the ZNE movement will sweep the nation, eventually becoming a mandatory building practice in many regions.

## Achieving ZNE with Design and High Performance Materials

Because the design of a ZNE building focuses as much on energy efficiency as it does on energy generation, insulation and air-sealing is an all-important piece of the total solution. With ZNE structures, you simply cannot afford to provide less than a total seal of the envelope. While there are a handful of product options available for sealing the structure, most are multi-product solutions.

An alternative, spray polyurethane foam, or "SPF," is a single-source solution whose ability to insulate, air and water seal, as well as control moisture throughout the structure, is increasing its role in the ZNE movement. SPF



**ZNE:** Because the design of a zero net energy building focuses on energy efficiency, insulation and air-sealing and becoming an all-important piece of the total solution.  
(All photos courtesy SPFA)

works well as a solution for unvented attics, roofing, walls, ceilings and floors, providing high performance in energy efficiency while reducing the need for multiple products.

High-performance attics and wall systems are a key focus of energy efficiency, as they make significant impact in the reduction of peak cooling and heating demands in the building. As a thermal insulator, SPF forms in place and fully adheres, almost completely eliminating the cracks and gaps that encourage the escape of conditioned air. The material may be installed in a continuous layer, eliminating thermal bypasses typically found with cavity insulations and has one of the highest R values of all insulation options available in the marketplace today.

As a roofing solution, SPF acts as both a protective roofing solution as well as an insulator for low-slope roofs. The performance of insulation is measured through a variety of key factors—moisture control, air leakage, health, safety, durability, comfort and energy efficiency—and SPF scores exceptional marks in all categories.

While other combined product solutions may also achieve zero net

energy and have been included in some ZNE projects, spray polyurethane foam has continued to grow in its role in ZNE structures. SPF's combined attributes and performance make it ideal for use in ZNE construc-

tion and will likely influence its use in a majority of ZNE projects.

— Rick Duncan is technical director of the Spray Polyurethane Foam Alliance. Reach him via [www.sprayfoam.org](http://www.sprayfoam.org).



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