

ZERO NET ENERGY FOR  
ARCHITECTURE & ENGINEERING

# Delivering on Top Shelf Design

The David and Lucile Packard  
Foundation Headquarters | Los Altos, CA  
Credit: Jeremy Bittermann

As sustainable design practices and goals are more commonly adopted by the architectural and engineering communities, designing for zero net energy (ZNE) goals offers firms and consultants an opportunity to distinguish themselves from the rest of the field.

Demonstrating the expertise needed to create ZNE-level and carbon neutral building performance signals proficiency in the advanced technology application and design strategies needed to achieve this goal. This capability sets firms apart from their peers and provides a high-value asset to clients.

Incorporating ZNE and carbon neutral expertise into the firm's practice also prepares it for future building requirements. More jurisdictions are taking legislative steps to limit energy use in buildings or considering all-electric building codes. California is on a code path and will continue to require energy efficiency and reduce building greenhouse gas (GHG) emissions until all new commercial construction is required to be ZNE in 2030. By committing to ZNE buildings now, firms will be better positioned to compete in the future.

## ZNE Costs Are in Line with Other Green Buildings

Commercial buildings cover a broad array of building types, and information on costs is based on a limited number of buildings in different markets. However, several commercial buildings have achieved ZNE within typical construction costs, including solar, for the building type. As a result, incremental costs for reported examples of ZNE buildings range from 0% to 15%.

## Benefits of Delivering a ZNE Project

1

### PROVIDE INCREASED

**VALUE** to clients and the local community by delivering a building that has less tenant turnover, lower bills for occupants, and provides more comfortable, healthy, and productive environments in which to live and work. Buildings designed for climate resiliency provide an opportunity for owners to continue to operate, limiting business disruption.

2

### ELEVATE DESIGN FIRM

above the rest by delivering buildings that combine the highest architectural, mechanical, and environmental performance.

3

### ESTABLISH FIRM EXPERTISE

and capacity for innovative design and development solutions that meet the highest standards for performance and energy savings.

4

### CONTRIBUTE TO SOCIAL

**EQUITY** and illustrate that your firm believes in improving communities. Show that your firm is serious about your role in contributing to all communities' social and cultural health through equitable design and practice.

5

### EMBRACE THE MARKET

**OPPORTUNITIES** presented by ZNE and push high performance, low-carbon design into the mainstream. The technologies and design strategies needed to create ZNE buildings are available today.

6

### FUTURE-PROOF BUSINESS

**SERVICES** illustrates that your firm has the design services to support clients through upcoming energy code and GHG emissions regulations.

## Integrated Design: Key to Designing a ZNE Building

Achieving a ZNE or low carbon goal for any new construction or deep renovation project requires a commitment by the design team to participate in the integrated design process. By engaging the entire team (owner, architect, engineers, consultants, contractors, operators, users, etc.) to collaborate on the project goals before design, it becomes possible for each member to understand the project vision and how their role contributes to the success.

This team-oriented, integrated design process will ensure the most appropriate design strategies are specified to integrate building systems. Integrated building system design encourages interactive efficiencies of readily available, high performance technologies to achieve the significant energy load and GHG emissions reductions critical to project outcomes.

### THE FOUR MAJOR COMPONENTS OF INTEGRATED DESIGN

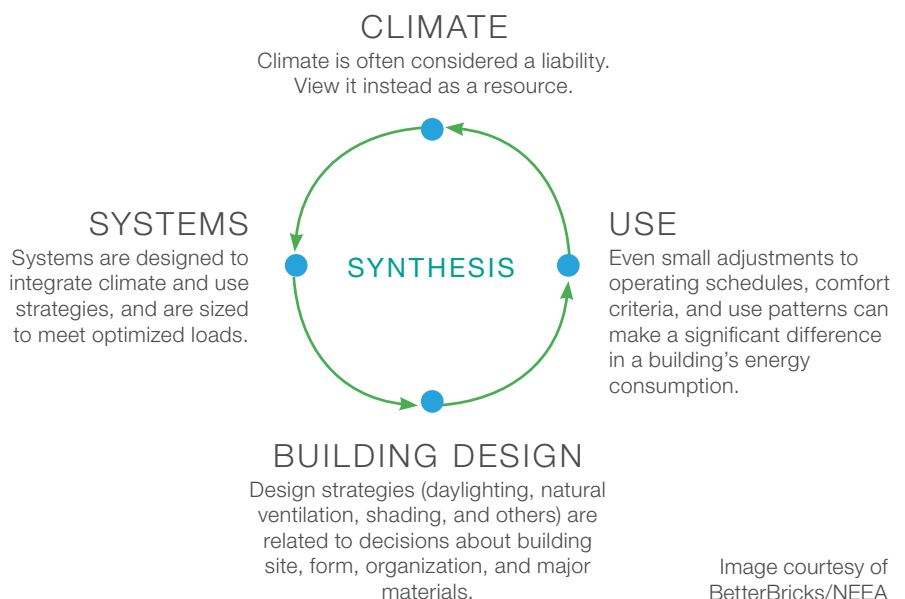


Image courtesy of BetterBricks/NEEA



Miller Hull Studio | San Diego, CA  
Credit: Chipper Hatter

## Project Profile

MILLER HULL  
SAN DIEGO STUDIO  
SAN DIEGO, CA

The renovated 4,600-square-foot building achieved ZNE performance through the Living Building Challenge's Petal Certification program presented by International Living Future Institute (ILFI). The Miller Hull Studio earned six of the seven Petals (Place, Energy, Health & Happiness, Materials, Equity, and Beauty).

As an existing building, the project drastically reduced embodied carbon by minimizing the need for new materials and focused on purchasing low embodied carbon materials that met the red list imperative. The building already offered ample daylighting through skylights and floor-to-ceiling windows. The project team added operable windows and doors around the office to give staff more control over their thermal comfort. The low-wattage LED lighting integrates with daylight levels for additional comfort. Because the project team focused on passive cooling methods, they fit a heat recovery ventilation unit with an electric heating coil for space heating and added electric radiators in conference rooms to support any additional heating needs. The 24kW photovoltaic rooftop system offsets the energy consumed with any excess power generated during peak times fed back to the electric grid.

To achieve carbon neutrality, the all-electric, refrigerant-free office's materials embodied carbon were offset through material reuse, and carbon offsets.



## Resources

NBI maintains a collection of ZNE resources, including case studies, research, and tools and guides for getting your project to ZNE. Visit [gettingtozeroforum.org](https://gettingtozeroforum.org).



New Buildings Institute (NBI) is a nonprofit organization driving better energy performance in commercial buildings. We work collaboratively with industry market players—governments, utilities, energy efficiency advocates and building professionals—to promote advanced design practices, innovative technologies, public policies and programs that improve energy efficiency. We also develop and offer guidance and tools to support the design and construction of energy efficient buildings.

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