Zero Carbon

SCP’s mission is to electrify everything and provide affordable, reliable renewable energy 24/7. This goes beyond California’s current “net zero” concept, and ensures that all energy is carbon free, without needing to be supported by natural gas power plants or other climate-harming sources. The design will reflect these values.

The David & Lucile Packard Foundation
Los Altos, California
Year Completed: 2012
Size: 49,000 SF
Certified Net Zero Energy Building (ILFI)
LEED Platinum certified (2009)
All Electric Building
Net Zero Energy (i.e. Using the Grid As a Battery)

Origin of Electricity over a 24 hour period

www.electricitymap.org/
Carbon Intensity of the Grid Varies Over Time

Impact on Design Process
Design for Net Zero Energy

Reduction in annual energy use

Efficiency measures that reduce energy cost

Design for Carbon Neutral & Grid Optimal

Building design evaluation to include load shape predictions over 24 hour and 265 day periods
Design Measures Can Change Load Shape

Code Compliant, San Francisco, CA - September

![Graph showing the impact of design measures on load shape.](image)

Efficiency Measures Applied

Summer Extreme Potential Package, SF

![Graph showing the impact of efficiency measures on load shape.](image)

Courtesy of NBI
Case Study: Sunshading a Southwest Facade

Occupant and Operator Engagement

Sonoma Clean Power Headquarters: A Case Study of the First Grid Optimal Pilot Project  |  10.10.19

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Sonoma Clean Power Headquarters
The First Grid Optimal Pilot Project

The GridOptimal™ Initiative
A New Rating System and Metric For Building-Grid Interactions
New Buildings Institute
U.S. Green Building Council

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**Fundamental Energy Efficiency Measures**

- All Electric: Remove all gas infrastructure
- Upgraded envelope: All new windows, insulation, air sealing
- Exceptional daylighting: add skylighting and increase north windows
- All electric heating, hot water with heat pumps
- Interoperable “smart” thermostats
- De stratification fans for thermal comfort
- Induction cooking
- 30 kW Photovoltaic Array
- 150 kW battery
- Car charging

**Carbon Intensity of the Grid Varies Over Time**

Marginal Carbon Emissions on the Grid

![Marginal Carbon Emissions Graph](image)
Project Building Emissions Based on Time of Use

Marginal Building Carbon Emissions

Winter  Spring  Summer  Fall

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