Process & Projects
NZE | Energy Use and Production

Annual net zero energy profile

Energy Used: -43,423 kWh
Energy Made: +44,543 kWh
Net Energy: +1,120 kWh
103%
COMMUNITY CENTERS

statistical analysis

From The Power of Zero: Optimizing Value for Next Generation Green
by Integral Group, BNIM, Davis Langdon
Draft May 2013
From *The Power of Zero: Optimizing Value for Next Generation Green* by Integral Group, BNIM, Davis Langdon, Draft May 2013
OFFICE BUILDINGS – LOW-RISE

statistical analysis

cost data

From *The Power of Zero: Optimizing Value for Next Generation Green* by Integral Group, BNIM, Davis Langdon
Draft May 2013
From *The Power of Zero: Optimizing Value for Next Generation Green* by Integral Group, BNIM, Davis Langdon
Draft May 2013
NZE Approach – Plug Loads

First Address:
- Building Envelope,
- Lighting, & then
- HVAC

Finally Address:
- Plug Loads

Typical Building
- HVAC 40%
- Lighting 35%
- Plug Loads 25%

Efficient HVAC & Lighting
- HVAC 30%
- Lighting 15%
- Plug Loads 55%

Net Zero Building
- HVAC 35%
- Lighting 20%
- Plug Loads 45%
NZE Approach – Plug Loads

Plug Load Inventory & Analysis
NZE Approach – Plug Loads
Reduce Plug Loads by 50%
NZE Case Study: Ideas Z-Squared Office

existing buildings can be re-purposed old branch bank to NZE Office
Better quality light, higher productivity, saves lighting energy
Needs to be designed and modeled to ensure quality strategies:
  • Courtyard brings daylighting to deep interior
  • Organize occupied spaces near courtyard
  • Toplighting
  • Small aperture skylights with wells to distribute
  • Side lighting—windows...placed with consideration for tilt up
David & Lucille Packard Foundation
Net Zero Energy Headquarters Building

49,000 sf Office Building
70% less energy use than ASHRAE 90.1-2007
18 kbtu/sf/yr
3D VIRTUAL BUILDING – “REVIT MODEL”
BUILDING MEP MODEL OVERLAY

- Dedicated Outdoor Air Systems
- Cooling Tower
- Chilled Beams
- Chilled Water Thermal Storage
Exterior Motorized Shades

Southwest Orientation

Blinds lower in afternoon

And rotate to maintain zero light penetration

While maintaining views to courtyard...
HIGH PERFORMANCE TRIPLE ELEMENT WINDOWS

$75,000 Premium for installed glazing

$150,000 Eliminate perimeter heating system

$75,000 first cost savings

plus $300,000 (35kW) in PV system downsizing
NET ZERO AFTER NINE MONTHS...

http://www.packard.org/about-the-foundation/our-green-headquarters/energy-reports/