

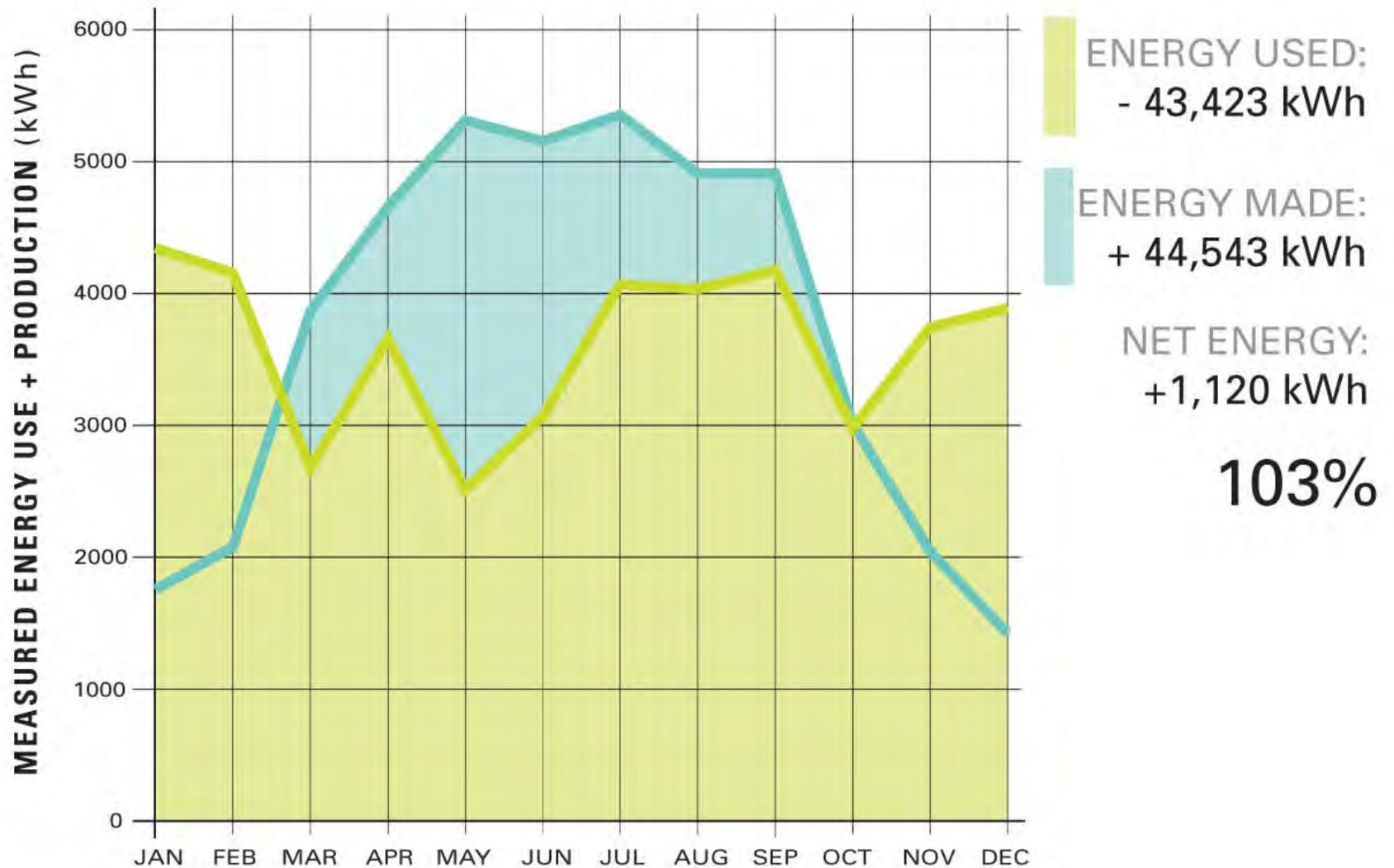
.....

Process & Projects



NZE | Energy Use and Production

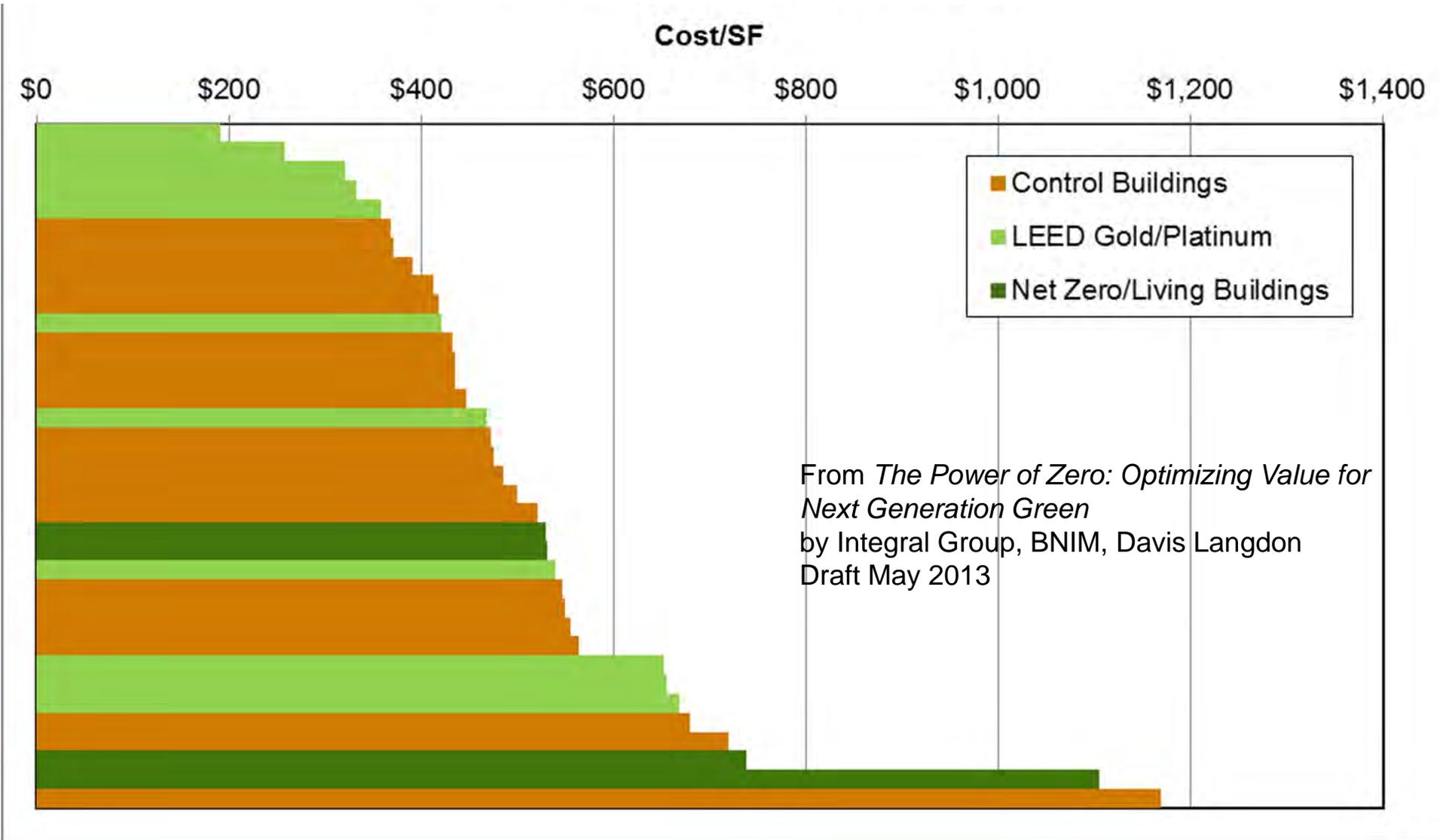
annual net zero energy profile



COMMUNITY CENTERS

statistical analysis

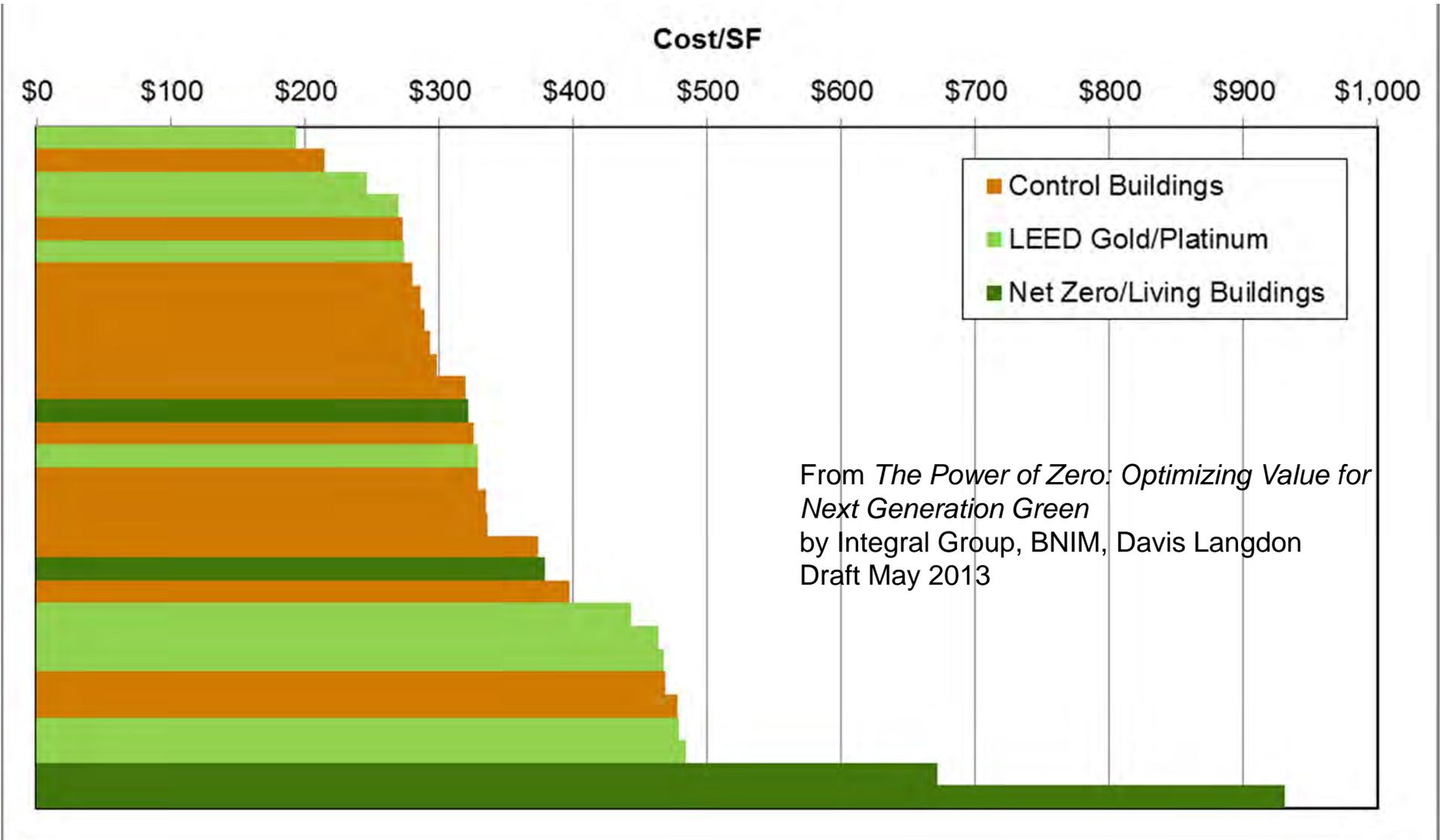
early data



K-12 SCHOOLS

statistical analysis

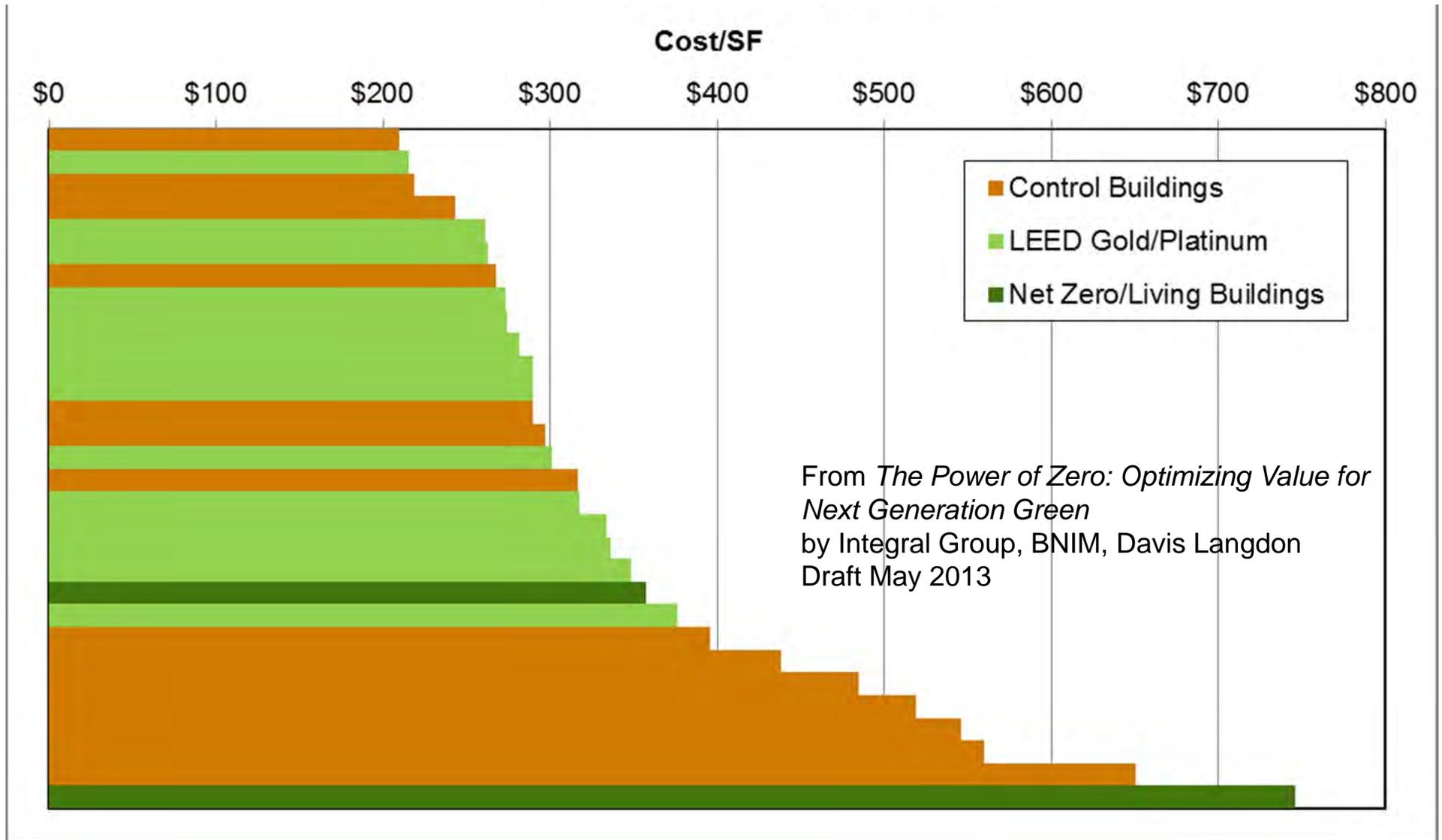
early data



OFFICE BUILDINGS – LOW-RISE

statistical analysis

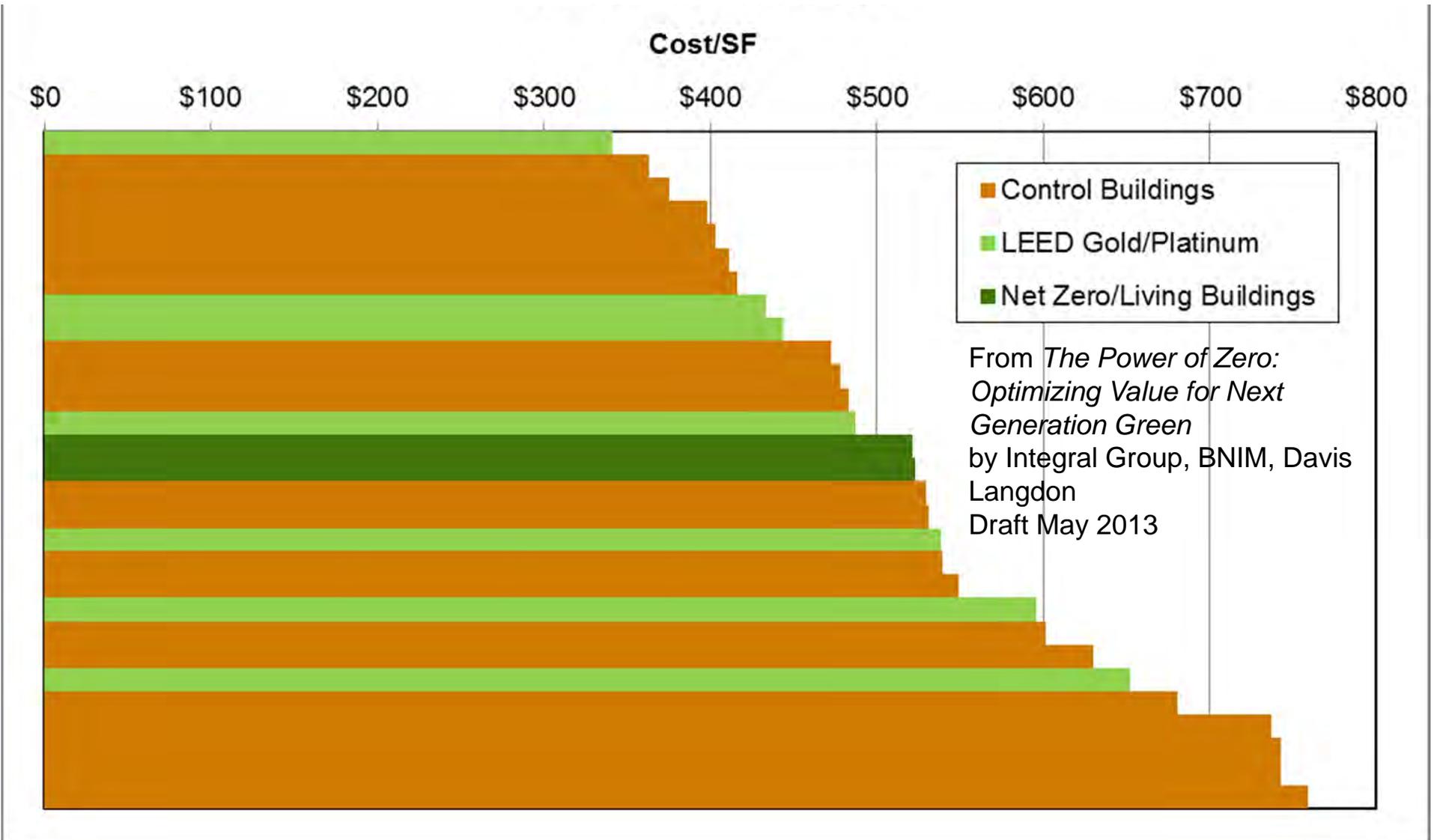
early data



WET LAB

statistical analysis

early data



NZE Approach – Plug Loads

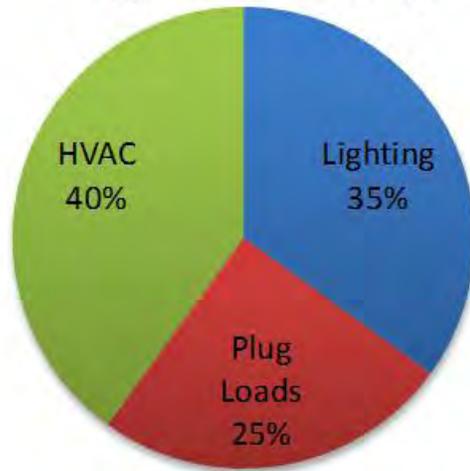
First Address:

- Building Envelope,
- Lighting, & then
- HVAC

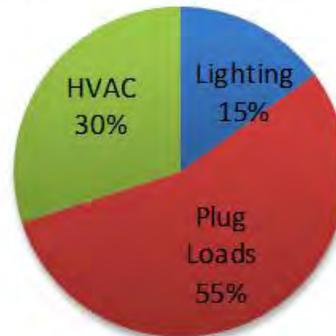
Finally Address:

- Plug Loads

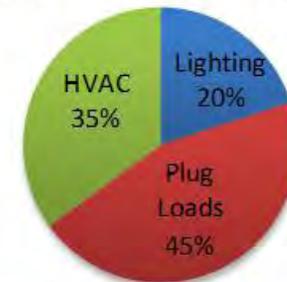
Typical Building



Efficient HVAC & Lighting



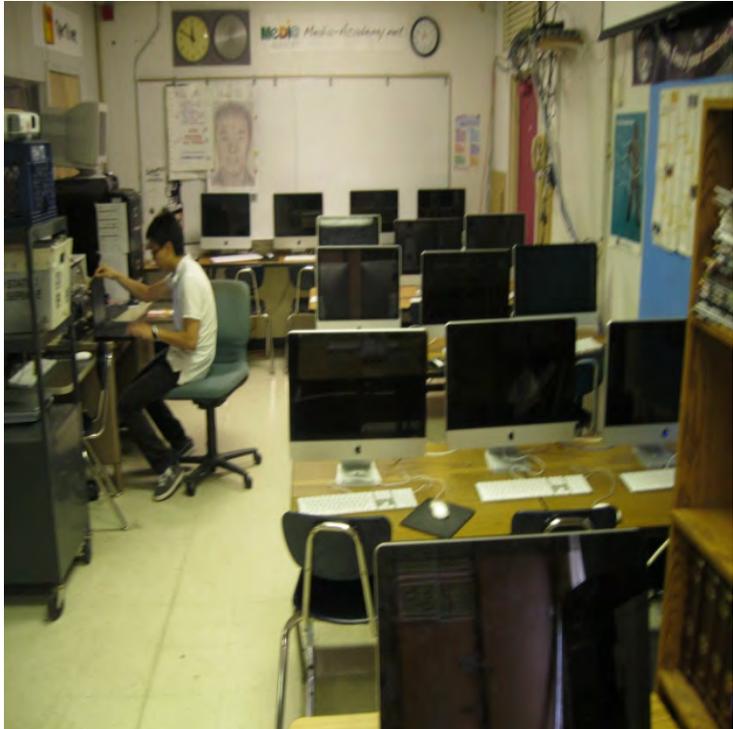
Net Zero Building



NZE Approach – Plug Loads



Plug Load Inventory & Analysis



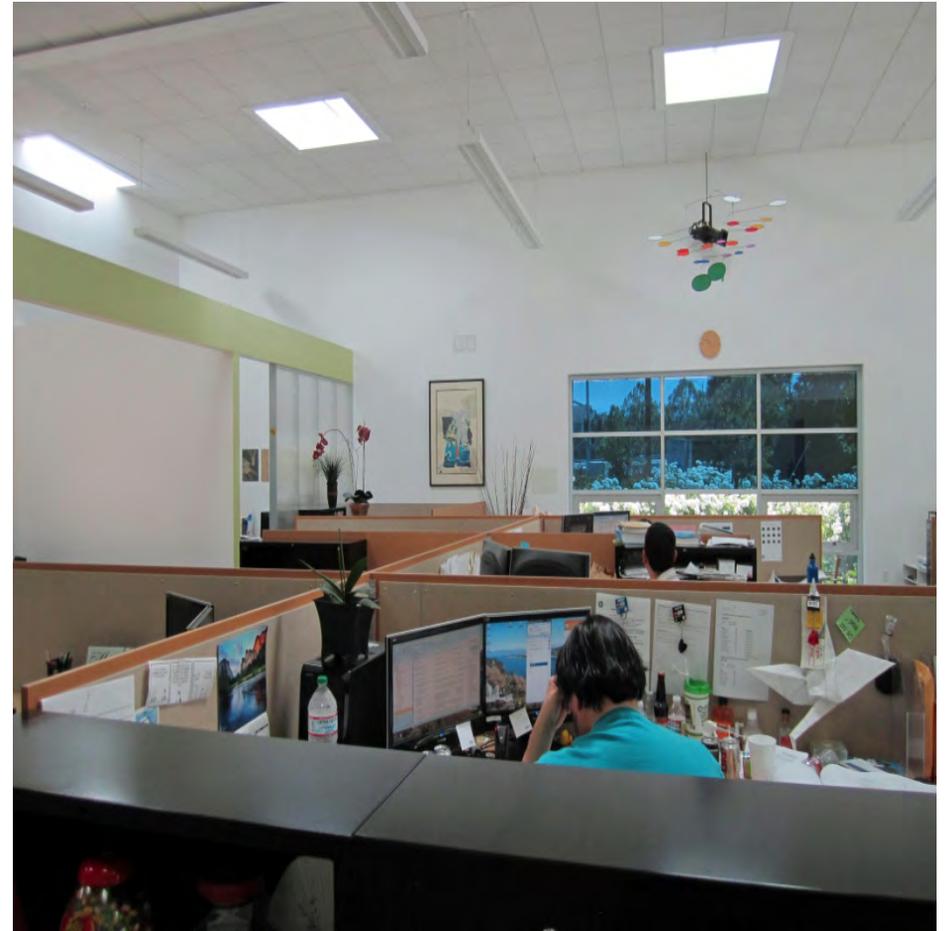
NZE Approach – Plug Loads



Reduce Plug Loads by 50%



NZE Case Study: Ideas Z-Squared Office



existing buildings can be re-purposed
old branch bank to NZE Office

NZE Case Study

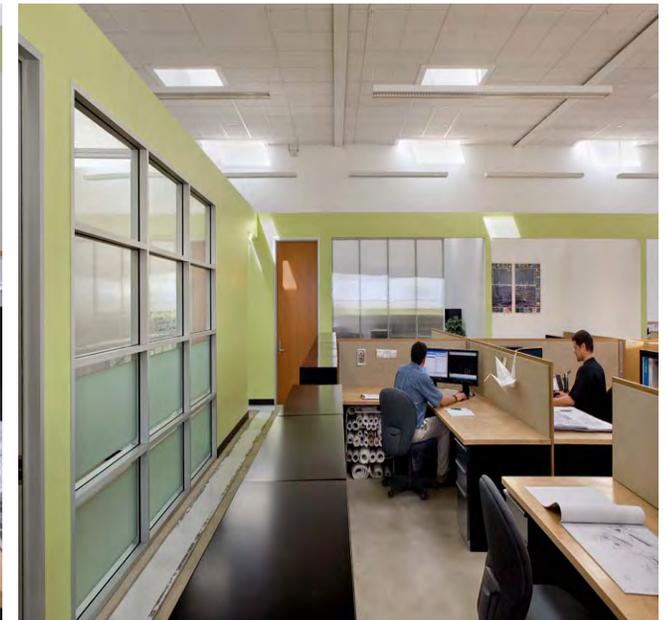
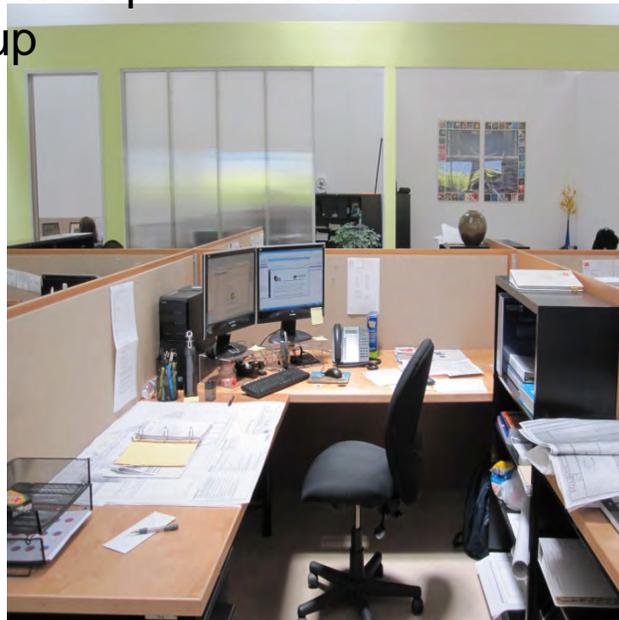


NZE Case Study: Ideas Z-Squared Office

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

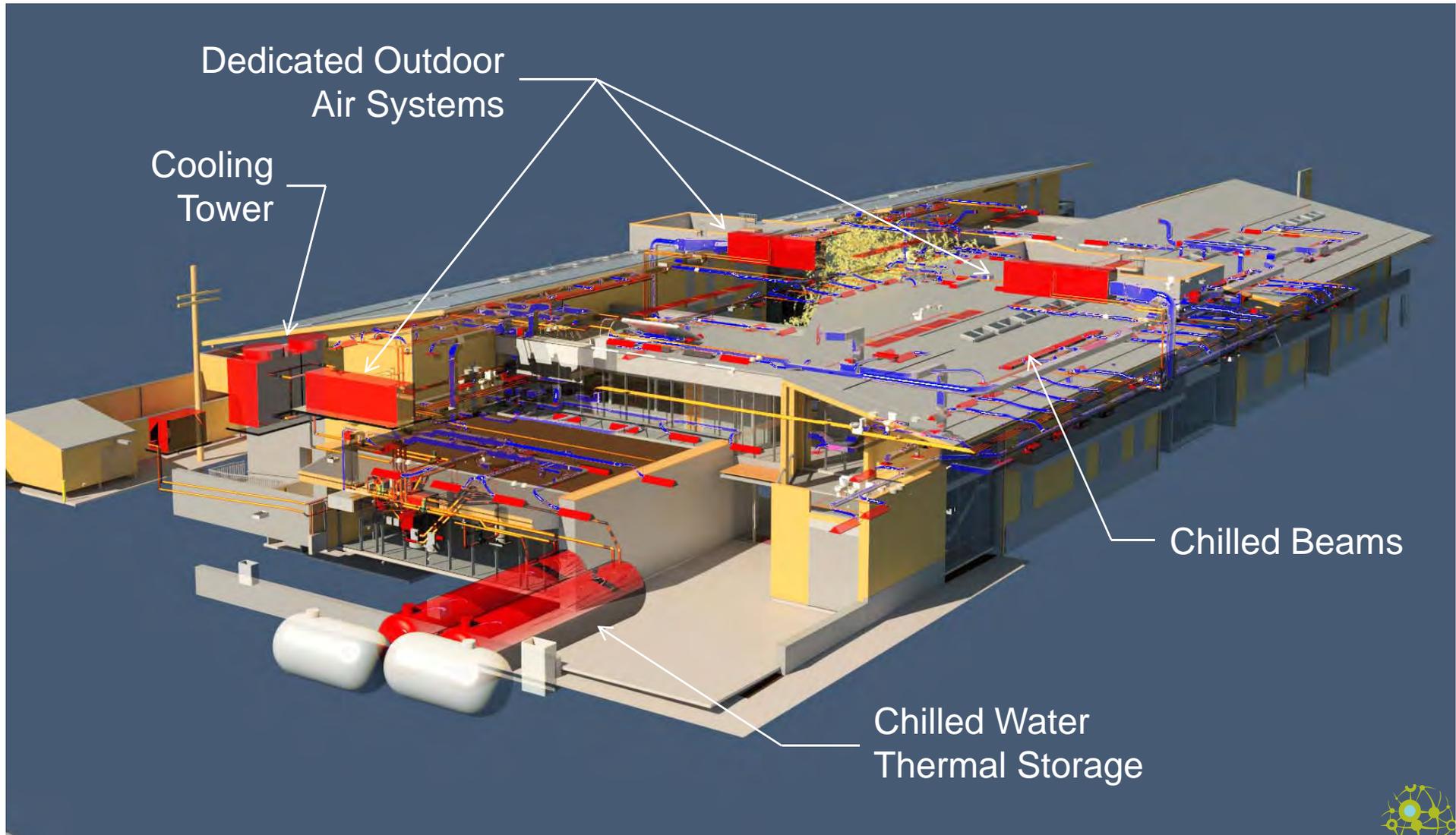


3D VIRTUAL BUILDING – “REVIT MODEL”



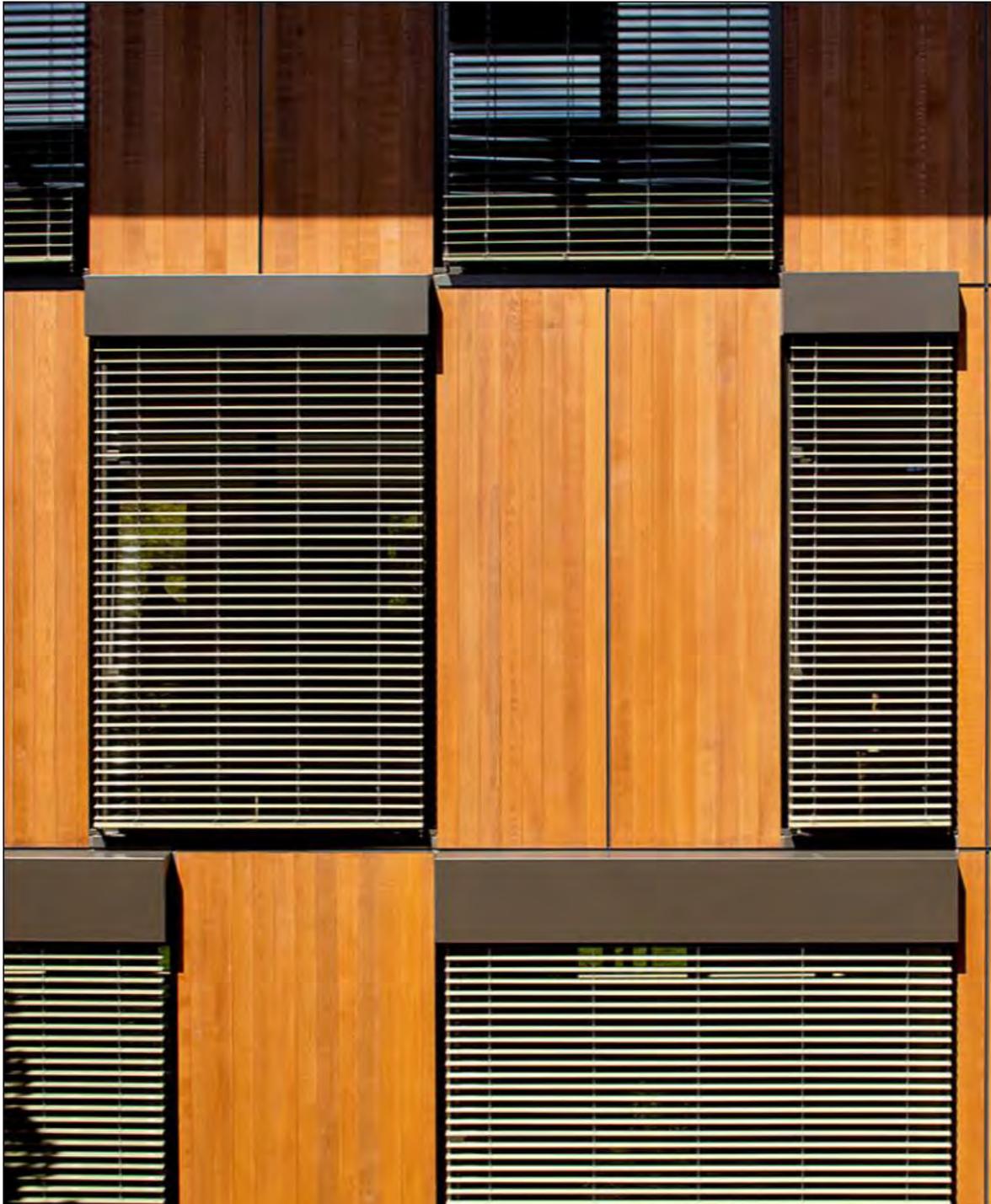
Trust | Nurture | Inspire

BUILDING MEP MODEL OVERLAY





Trust | Nurture | Inspire



Exterior Motorized Shades

Southwest
Orientation

Blinds lower in
afternoon

And rotate to
maintain zero light
penetration

While maintaining
views to courtyard...



Trust | Nurture | Inspire

HIGH PERFORMANCE TRIPLE ELEMENT WINDOWS



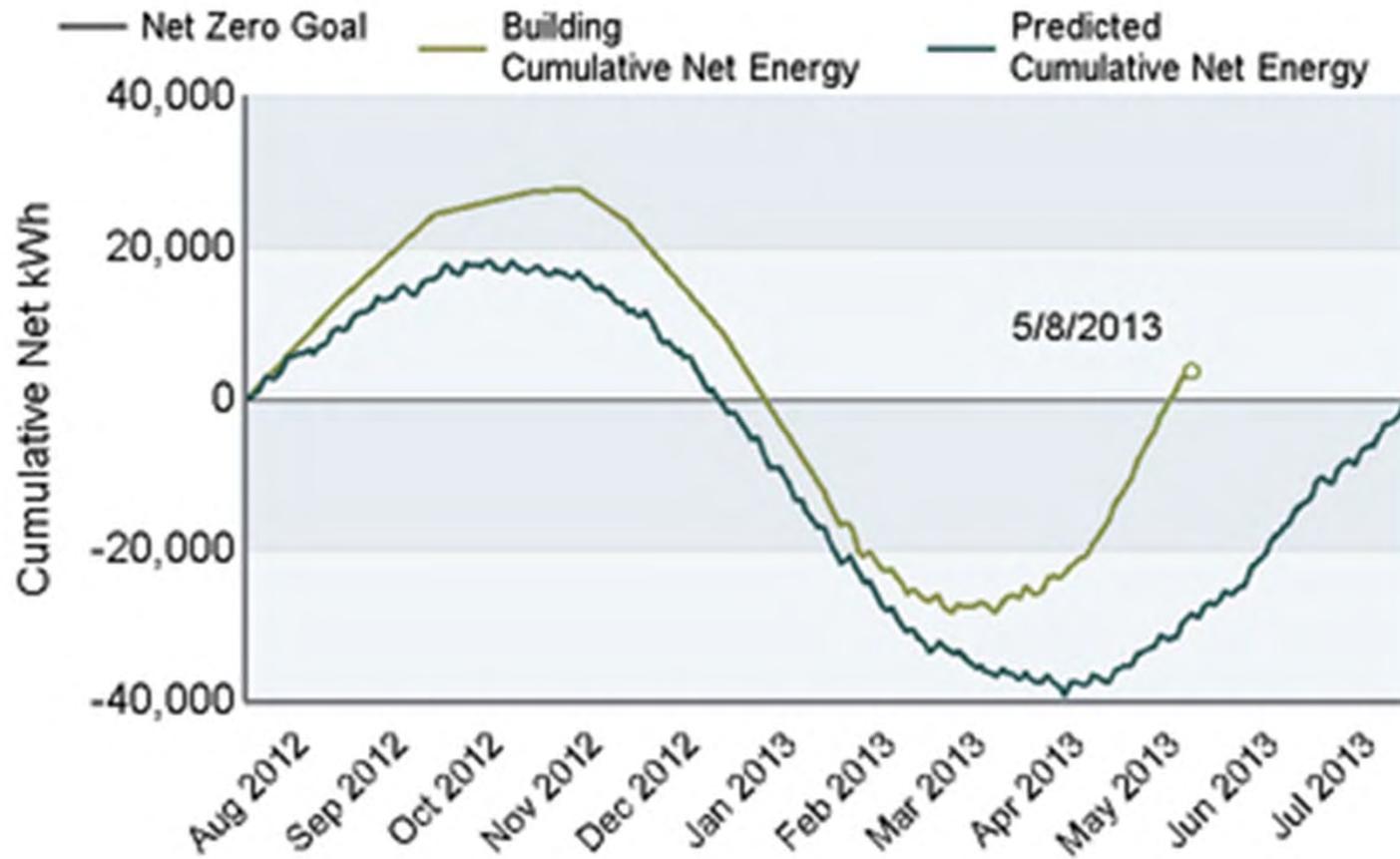
+ \$75,000 Premium for installed glazing

- \$150,000 Eliminate perimeter heating system

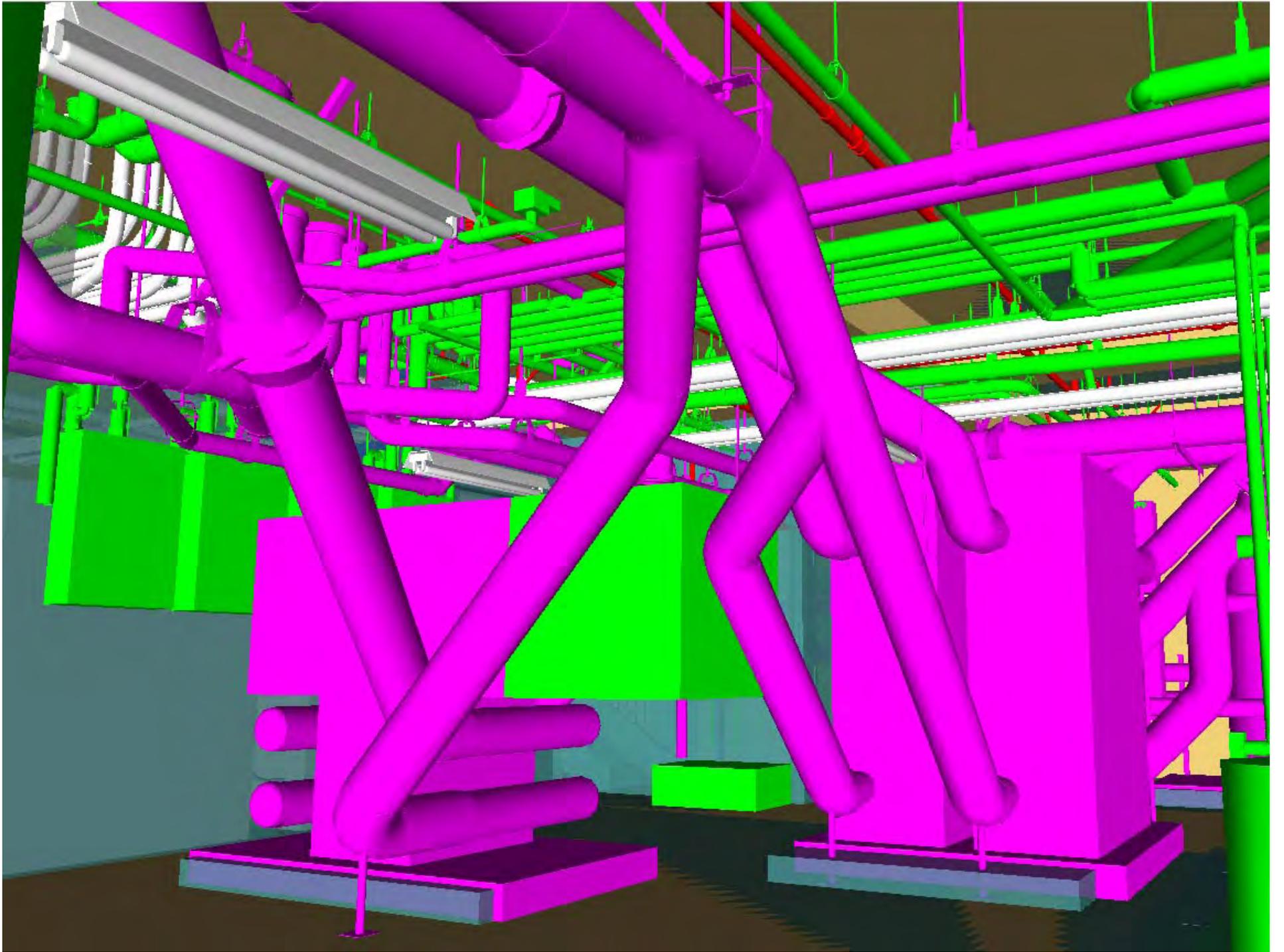
= \$75,000 first cost *savings*

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/>











Trust | Nurture | Inspire

INTEGRAL GROUP