Mission Driven: We Design For Climate

We’ve been a national leader in sustainable design since our founding more than 70 years ago – it’s our passion and mission. We pioneered the Net Zero Energy concept over 15 years ago in response to climate change. Today we are leading the industry toward a Climate Positive future.

Our portfolio is outpacing the AIA 2030 Challenge, seeking a fully carbon-neutral built environment by 2030 with Net Zero Energy, Passive House, and LEED® certified projects. With the teamwork of our clients and partners, we firmly believe we will get there, together.
The David & Lucile Packard Foundation Headquarters
49,200 SF Office Building
LEED Platinum
ILFI NZE certified
EHDD, Integral Group
Optimizing Buildings for Electrification

+ $75,000  Premium for triple glazing
- $150,000  Eliminate perimeter heating

and reduce # of heat pumps

= $75,000  Net first cost savings

- $200,000  PV reduction to reach NZE
All Electric Buildings Reduce Emissions Over Time

Keith Dennis in The Electricity Journal [http://dx.doi.org/10.1016/j.tej.2015.09.019](http://dx.doi.org/10.1016/j.tej.2015.09.019)
Building Electrification as a Pathway to Zero Emissions

Annual Greenhouse Gas Emissions from Energy Use of Title 24 2019-Compliant Building

NRDC analysis, climate zone 6 (Los Angeles) with rooftop solar, including methane leakage
Are We Ready for All Electric Buildings?
Boulder Commons
100,000 SF mixed-use office
ILFI NZE certification expected
EHDD, Integral Group
The Exploratorium
200,000 SF science museum
ILFI NZE certification expected
Architect: EHDD
MEP: Integral Group
Mark Day School
14,574 SF
ILFI NZE certification expected
EHDD, Integral Group
Lick Wilmerding High School
55,000 SF
ILFI NZE certification expected
EHDD, Integral Group
Marin Country Day School Sciences
11,500 SF
ILFI NZE certification expected
EHDD, Integral Group
Sonoma Academy
19,500 SF
ZNE, LEED Platinum
Architect: WRNS
Mechanical: Interface Engineering
Electrical: Integral Group
Includes all electric dining facility
Claire Lilienthal Middle School
22,000 SF
SF Unified School District
Architect: Lionakis
SMUD Operations
Sacramento
361,000 SF
Office & Operations
Architect: Stantec
MEP: Guttmann & Blaevøet
500 Santana Row
San Jose
236,000 SF, Office
WRNS Architects
Interface Engineering
Adobe HQ
650,000 sf
San Jose
Architect: Gensler
SFO Admin
San Francisco
SF, Office
Cavagnero
LinkedIn
40,000 sf
Sunnyvale
Architect: Studios Architecture
MEP: Integral Group
435 Indio
Sunnyvale Office Renovation
31,000 SF Office Renovation
NZE, Zero Carbon
Architect: RMW
MEP: Integral Group
380 N. Pastoria
Mountain View
Office Renovation

42,000 SF Office Renovation
NZE, Zero Carbon
Architect: WRNS Studio
MEP: Integral Group
Edwina Benner Plaza, Sunnyvale
Affordable – 66 Units, Occupied

MidPen Housing, David Baker Architects, Emerald City Engineers, Association for Energy Affordability
Central Heat Pump Water Heating
2437 Eagle Ave, Alameda
Affordable – 20 Units, Occupied

Housing Authority of the City of Alameda, Anne Philips Architecture, Fard Engineers, Association for Energy Affordability
Casa Adelante, 2060 Folsom, San Francisco

127 Units, under construction

Developers: TNDC/CCDC, Architect: Mithun & YA Studio, Association for Energy Affordability
Central Heat Pump Water Heating

Mithun: “We have found first costs to be neutral going all electric”
Maceo May Veterans Apartments, Treasure Island
105 units, in permitting

Chinatown Community Development Center, Swords to Plowshares, Mithun, Association for Energy Affordability
Central Heat Pump Water Heating
681 Florida, San Francisco
136 units total, In Design Development

Developers: TNDC & MEDA, Architect: Mithun
Central Heat Pump Water Heating
Linda Vista, Mountain View
101 units, In bidding phase

Palo Alto Housing is Developer, architect is Van Meter Williams Pollack, Integral Group
Central Heat Pump Water Heating
Coliseum Place, 905 72nd Ave, Oakland
59 units, In Construction Documents

DBA:
"Construction cost is not an issue IF you can help subcontractors understand what you are asking them to price"

Developer Resources for Community Development, David Baker Architects, Energy Modeling by Redwood Energy, MEP by EDesignC
Quetzal Gardens, San Jose
71 Units

RCD Housing is Developer, SGPA Architects, Redwood Energy
St. Paul’s Commons, Walnut Creek
Affordable – 45 Units, Under construction

Pyatok:
“It is critical to share information about best practices and lessons learned”

RCD, Pyatok Architects, Fard Engineers, Association for Energy Affordability
Central Heat Pump Water Heating
2437 Eagle Ave, Alameda
Affordable – 20 Units, Occupied

Housing Authority of the City of Alameda, Anne Philips Architecture, Fard Engineers, Association for Energy Affordability
Altamira Family Apartments, Sonoma
Affordable, 48 units

Developer is SAHA, Pyatok Architects, Fard Engineers, Association for Energy Affordability
Stoddard Housing, Napa
Affordable – 50 Units, Under construction

Burbank Housing, Dahlin Group Architects, Emerald City Engineers, Association for Energy Affordability
Central Heat Pump Water Heating
California Universities Are Transitioning to All-Electric Buildings

The University of California system and Stanford University are making all-electric buildings the default in new construction.

“No new UC buildings or major renovations after June 2019, except in special circumstances, will use on-site fossil fuel combustion, such as natural gas, for space and water heating”

https://www.greentechmedia.com/articles/read/california-universities-are-transitioning-to-all-electric-buildings#gs.QUr5W_E
UC Davis Student Housing, Webster Hall Replacement

371 beds,

Design/Build, DPR GC, HKS Architects, Interface Engineering
Central Heat Pump Water Heating
UC San Francisco Minnesota Street Housing
595 Units

Skanska is GC, Kieran Timberlake Architects, Point Energy Innovations
Nyle Central Heat Pump Water Heating
UC Santa Cruz Student Housing West
750,000 sf, 3,000 beds, under construction

P3, Capstone is Developer, Sundt is GC, HED Architects, Interface Engineering
Central Heat Pump Water Heating
• LBNL Integrative Genomics Lab
  • 81,000 SF Research Lab
  • Architect: Smith Group
  • MEP: Integral Group
- LBNL BioEpic Lab
- 70,000 SF Research Lab
- Architect: Smithgroup
Kaiser Santa Rosa Medical Office

87,300 SF Medical Office

LEED Platinum, ZNE

Architect: HPS

MEP: Integral Group
Bradley Terminal, LAX
All Electric Restaurants at LAX
Bradley Terminal

Andre Salvador, So Cal Edison food service expert helped these tenants adapt to all electric, he's a great resource!
Sonoma Clean Power Headquarters
14,400 SF Renovated Office Building
All Electric
First “Grid Optimal” Pilot Project
EHDD with Guttman & Blaevoet
Carbon Intensity of the Grid Varies Over Time

Marginal Carbon Emissions on the Grid

Daily 15-Minute Intervals

Emissions Rate Relative to Average
-95% 41%

Low Carbon

High Carbon
Project Building Emissions Based on Time of Use

Marginal Building Carbon Emissions

Daily 15-Minute Intervals

Winter Spring Summer Fall
Design Measures Can Change Load Shape

Code Compliant, San Francisco, CA - September

Power [kW]

- Cooling (kW)
- Heating (kW)
- Plugs (kW)
- Lighting (kW)

171

Courtesy of NBI
Design Measures Can Change Load Shape

Building Measures Applied

Individual Measures

- Thermostat: Expanded Comfort
- Thermostat: Morning Preheating
- Thermostat: Afternoon Precooling
- Additional Thermal Mass (floors)
- Interior Automated Blinds
- Lighting Afternoon Demand Response (25% reduction)
- Grid Integrated Appliances Afternoon Response (25% reduction)

Code Compliant, San Francisco, CA - September

![Graph showing energy consumption]

Courtesy of NBI
Grid Optimal Strategy: Sunshading a Southwest Facade
Designing for Load Shape at Sonoma Clean Power

**Base Load Reduction Measures**
Upgraded envelope: All new windows, insulation, air sealing
Exceptional daylighting: add skylighting and increase north windows
Destratification fans for thermal comfort

**Peak Shifting and Shaving Measures**
Interoperable “smart” Thermafusers
Temperature Setback
Lighting Demand Response
Early winter warm-up
30 kW Photovoltaic Array paired with 150 kWh battery
150 kWh battery, no PV system: Almost 3 hours.
150 kWh battery, 30 kW PV system on a sunny day: Just over 6 hours.
1MWh battery, no PV system: Over 18 hours.
1MWh battery, 30kW PV system on a sunny day: About 40 hours.
Q: Is a single energy source smart with power shutoffs?
A: All new gas appliances require electricity