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All Electric Building Examples

There is a strong shift toward all electric buildings in California as shown in the attached slide deck. We are seeing this across the state and designed by many different architecture and engineering firms.

Additional submitted attachment is included below.
Clifford L. Allenby Building  
Sacramento, CA  
372,000 SF Government Office Building  
Designed to achieve Net Zero Energy

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.”

ROW DTLA  
Los Angeles, CA  
383,000 SF Mixed Use Development  
Existing Building full HVAC & domestic hot water retrofit

Orange County Sanitation District Administrative Headquarters  
109,000 SF  
ILFI NZE & LEED Platinum certification expected  
HDR Architecture + Engineering

Los Angeles Department of Water & Power Hoover Yard  
92,000 SF  
ILFI NZE & LEED Gold certification expected  
HDR Architecture + Engineering

Los Angeles Department of Water & Power West LA Yard  
92,000 SF  
ILFI NZE & LEED Gold certification expected  
HDR Architecture + Engineering
Almost all our projects are all-electric, I have only been using gas systems where required by the client. Electric is almost always less expensive or cost neutral. Very rarely is it more expensive. Often it is our value engineering option.

We are doing a 300,000 sf all electric office with major cost savings using heat pumps as a central plant. Bay Meadows our all-electric design for 1 million sf of development was significantly less expensive than a traditional rooftop package unit + boiler + reheate system. A huge benefit for heat pumps is reducing water use.

We’ve done several all-electric commercial food service projects that have been very successful. The Chef’s quite skeptical at the beginning, but now say they will never go back to cooking on gas.
SFO Admin
San Francisco
SF, Office
Cavagnero

30 Van Ness Avenue
120,000 SF
Concourse, Level 1
Architect: SCB
 MEP: Meyers+
Sustainability: Thornton Tomasetti

700 Santana Row
San Jose
825,000 SF, Office
WRNS Architects
Interface Engineering

Adobe HQ
630,000 sf
San Jose
Architect: Gensler
MEP: Taylor Engineering

100 Flatbush Ave, NY
38 Floors
Mixed Use: Residential, Office, Retail
Alloy Development
Architect: ARO
Sustainability: Thornton Tomasetti

Microsoft Puget Sound
2,500,000 SF
Zero Carbon, LEED Platinum
Architect: LMN, NBBJ, WRNS, ZGF

One De Haro Design Build Services
150,000 SF
Architect: Pfau Long / Perkins+BW
Mechanical: Interface Engineering
Electrical: Interface Engineering

Watsonville Water
16,000 SF
Architect: Studio Gang
MEP: Integral Group

Los Altos Community Center
24,000 SF
Architect: Noll & Tam
MEP: Integral Group

San Mateo County Government Center
180,000 SF
Architect: Studio Gang
MEP: Integral Group

Microsoft Puget Sound
2,500,000 SF
Zero Carbon, LEED Platinum
Architect: LMN, NBBJ, WRNS, ZGF
Microsoft Puget Sound
2,500,000 SF Zero Carbon, LEED Platinum
Architect: LMN, NBBJ, WRNS, ZGF

Universities
The University of California has committed to carbon neutrality by 2025. We are prioritizing all-electric new buildings (required starting June 2019), and then electrifying existing buildings & systems over time.

Our studies show that all-electric mechanical equipment capital costs are comparable for academic & lab buildings, and the costs are lower for residential buildings. Twenty year life cycle costs are comparable for Academic and lab buildings, and lower for residential buildings.

UC has many all-electric housing projects, office buildings, and laboratories now in place and many more in design.

UC's carbon neutrality strategies are pragmatic: don’t allow growth to increase carbon emissions, and then transition existing buildings and systems off fossil fuels over time.
Lick Wilmerding High School
55,000 SF
ILFI NZE certification expected
EHDD, Integral Group

Mark Day School
14,574 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

Sacred Heart School Library
6,800 SF
LEED Platinum
NZE Certified
Architect: WRNS
MEP: Interface Engineering

White Hill Campus Ross Valley USD
42,000 SF
Architect: WRNS
Engineer: Interface Engineering
Claire Lilienthal Middle School
22,000 SF
SF Unified School District
Architect: Lionakis
MEP: Integral Group

Sacred Heart Academic Arts
78,500,000 SF
ZNE
Architect: WRNS
Mechanical: Interface Engineering
Electrical: Integral Group

Waikoloa Classroom
15,000 SF, with DOE HI
Architect: WRNS
Mechanical: Interface Engineering
Electrical: Integral Group

CES Bishop O’Dowd
3,700 SF + 1,500 SF outdoor classroom
LEED Platinum Zero Energy
Architect: Siegel & Strain Architects
MEP: Integral Group

MLK Middle School
Architect: Haker Yamauchi Architects
MEP: Interface Engineering

Urban School Gym & Theatre Renovation
63,600 SF
Architect: Pfau Long Architecture
MEP: Interface Engineering
Sacred Heart Academic Building
100,000 SF
Architect: WRNS
Mechanical: Interface Engineering
Electrical: Integral Group

Ocean View Elementary School
25,000 SF (new); 17,000 (modernize)
Architect: Gould Evans
MEP: Interface Engineering Target CHIPS certified

SFUSD EED Kitchen at McAteer
9,000 SF
Architect: Gould Evans

Albany High School
10,500 SF
Zero Energy Ready
Architect: LCA Architects
MEP: Guttmann & Blaevoet

Nueva Middle School Expansion
40,000 SF LEED Platinum pending Zero Energy pending
Architect: LEDDY MAYTUM STACY MEP: Point Energy

Nueva Upper School West Wing
7,500 SF
LEED Platinum pending All Electric
Architect: LEDDY MAYTUM STACY MEP: PAE
There are great examples of all-electric buildings for virtually every building type that are cost effective. It is very easy for our firm to design these systems.

For Multifamily projects we are seeing a lot of developers use electric heating with high levels of insulation in apartments that don’t need cooling. All-electric air-cooled VRF heat pumps are very common on multifamily projects up to ten stories where cooling is needed; this is very cost effective.

The market for all-electric buildings and heat pumps has been making significant inroads in California, and this has gotten the attention of manufacturers. General Contractors and mechanical subcontractors are getting more familiar with this approach as well.
415 N. Mathilda Sunnyvale Office Renovation
33,750 SF Office Renovation
NZE, Zero Carbon
Architect: Studio G
MEP: Integral Group

AP+i Office Mountain View Office Renovation
14,300 SF Office Renovation
NZE, Zero Carbon
Architect: AP+I
MEP: Integral Group

380 N. Pastoria Mountain View Office Renovation
42,000 SF Office Renovation
NZE, Zero Carbon
Architect: WRNS Studio
MEP: Integral Group

IBEW Local 595 ZNE Center San Leandro, CA Renovation
46,000 SF Office Renovation
NZE
Architect: FCGA
MEP: ACCO

• Pier 70
  • San Francisco
  • MEP BOD: Point Energy Innovations

Multi-Family Housing
Walnut Park Apartments, Los Angeles County
Affordable – 64 Units
Hollywood Community Housing Corp, Koning Eizenberg Architecture, Green Engineering, VCA Green Energy Central Heat Pump Water Heating

UC Irvine Verano 8
UC Irvine Verano 8
1,050 beds
Architect: Mithun, MEP: Glumac. Central Heat Pump Hot Water

UC Irvine Student Housing West
UC Irvine Student Housing West
1,441 beds
P3, Developers: American Campus Communities, KTGY Architects

University of California Riverside - North District
University of California Riverside - North District
534,000 SF
Architect: Solomon Cordwell Buenz
Mechanical: Interface Engineering
Electrical: Interface Engineering

UC San Diego Nuevo Housing West
UC San Diego Nuevo Housing West
1,300 beds
Mithun Architects

San Pedro Lofts, San Pedro
San Pedro Lofts, San Pedro
Affordable – 91 Units, completion in 2022
Iris at San Ysidro, San Diego
Affordable – 100 Units, completion in 2022

3rd and Dangler, East Los Angeles
Affordable – 78 Units, completion in 2022
Developer: National Core, Architects: TSMR, MEP: Metrics Mechanical, Energy modeling: National Core, Central Heat Pump Hot Water (Sanden)

Legacy Square, Sana Ana
Affordable – 93 Units, completion 2022
Developer: National Core, SVA Architects, MEP: Metrics Mechanical, Energy modeling: National Core, Individual Heat pumps per unit

Vista Verde, Ontario
Affordable – 101 Units, completion in 2020
Developer: National Core, Onyx Architects, MEP: Southwest Engineering Group, Energy modeling: National Core, Individual Heat pumps per unit

Arrowhead Grove, San Bernardino
Affordable – 184 Units, completion February 2021

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
UC San Francisco Minnesota Street Housing
565 Units
Skanska is GC, Kieran Timberlake Architects, Point Energy Innovations
Nobe-Central Heat Pump Water Heating

Alameda Point Development
1,700+ Residential Units
Multiple projects including City Ventures Mulberry, Everett Commons, Alameda Landing
Residential site

UC Davis Student Housing, Webster Hall Replacement
371 beds,
Design/Build, DPR GC, HKS Architects, Interface Engineering
Central Heat Pump/Water Heating

Eureka Veterans Apartments, Eureka
51 Units
VHDC is Developer, Rowell Brokaw Architects, Redwood Energy

525 Harrison, San Francisco
200 Units
SCS Architecture, Interface Engineering

4101 3rd Street, SF
36,000 SF
Architect: Steinberg Hart
Mechanical: Interface Engineering
Electrical: Interface Engineering

UC San Francisco Minnesota Street Housing
565 Units
Skanska is GC, Kieran Timberlake Architects, Point Energy Innovations
Nobe-Central Heat Pump Water Heating

Alameda Point Development
1,700+ Residential Units
Multiple projects including City Ventures Mulberry, Everett Commons, Alameda Landing
Residential site

UC Davis Student Housing, Webster Hall Replacement
371 beds,
Design/Build, DPR GC, HKS Architects, Interface Engineering
Central Heat Pump/Water Heating

Eureka Veterans Apartments, Eureka
51 Units
VHDC is Developer, Rowell Brokaw Architects, Redwood Energy
All-electric construction consistently reduces construction costs and ongoing utility bills. It saves between $2,500 and $5,000 per residence for the developer to not plumb gas. When infrastructure and appliance costs are added up, a recent study done by Rocky Mountain Institute found a median increased cost of $8,800 more per house for gas infrastructure, piping, purchasing appliances and venting. Developers have been choosing all electric construction because it cost less to build and that trend has been going on for 24 years now.

**All Electric Construction Guides:**

https://www.redwoodenergy.tech/research/

Mithun: “We have found first costs to be neutral going all electric.”

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**California projects**

- Redwood Energy, Sean Armstrong
- Spring Lake in Woodland, by Mutual Housing
- King’s Station in King City, by King City Pacific
- Valley Glen at Dixon, by Dixon Pacific
- Plaza Point in Arcata by Danco Communities

**Lakeport Senior Apartments in Lakeport, by Lakeport Pacific**

**Heritage Square in Pasadena by BRIDGE Housing**

**Castroville, by Corporation for Better Housing**

**Quetzal Gardens in San Jose by RCD Housing**

**Depot Station Townhomes, Morgan Hill**

- 24 Units
- City Ventures, Hunt Hale Jones Architects

**2437 Eagle Ave, Alameda**

- Affordable - 20 Units, Occupied
- Housing Authority of the City of Alameda, Anne Phillips 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.”
Malcolm Harris, Principal

We have a number of all-electric multifamily projects and I’m a huge, huge fan of this change to all-electric multifamily housing. It is better in every way, a great simplification of the system. Less expensive, higher performance, less maintenance, more sustainable.

At Maceo May we saw big savings from eliminating gas fired hydronic heating, the gas connection, and the solar thermal which paid for continuous exterior insulation, energy recovery ventilators (eliminating Z-ducts), electric resistance heat, and PVs. With these upgrades we are beating Title 24 by 20%, getting more Green Points, and lower GHGs on a grid that’s getting cleaner. The occupants get better indoor air quality benefits from the energy recovery ventilators.

Balboa Upper Yard Family Apts, San Francisco
110 units, in design development

Maceo May Veterans Apartments, Treasure Island
105 units, in permitting

Hunters Point Shipyard Block 52, San Francisco
136 units total, in Design Development

Hunters Point Shipyard Block 54, San Francisco
136 units total, in Design Development

681 Florida, San Francisco
136 units total, in Design Development
Linda Vista, Mountain View
30 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 8DesignC

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

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
2437 Eagle Ave, Alameda  
Affordable – 20 Units, Occupied

Station House, Oakland  
171 Units, phase I completed

Ice House, Oakland  
Units?

UC Santa Cruz Student Housing West  
1,000,000 SF

UC Riverside Dundee Residence Hall  
600,000 sf, under construction

Interface:  
“We design almost all of our projects as electric only unless a client requires otherwise”

American Campus Communities is Developer, SCB Architects, Interface Engineering

© HED Design
Cascade Apartments, Seattle
230 Units, 44 Floors. At 95% Construction Docs.
Developer is Vulcan, Ankrom Mosian Architects, Engineering by Ecotope

4700 Brooklyn, Seattle
227 Units, 24 Floors. Under Construction
Developer is FH Brooklyn, NBBJ Architects, Engineering by Ecotope

1200 NE 45th, Seattle
230 Units, 44 Floors. At 50% Design Development
Developer is barrientos RYAN Runberg Architecture Group Engineering by Ecotope

1075 Nelson, Vancouver
435 Units, 60 Stories, Design Development

Hawaii projects
- Maile Tower
- Scenic Tower
- Waikiki Skytower
- Academy Towers

From Redwood Energy, Sean Armstrong’s powerpoint “All Electric Tall and Big Buildings”
Florida projects

From Redwood Energy, "A Zero Emission All-Electric Multifamily Guide"

International projects

From Redwood Energy, Sean Armstrong

Amenities

Electric fireplaces
Ethanol fireplaces
Electric outdoor
Propane firepits

Labs & Medical

J. Craig Venter Institute Laboratory
44,600 SF Research Lab
ZGF, Integral Group

LBNL Integrative Genomics Lab

- 81,000 SF Research Lab
- Architect: Smith Group
- MEP: Integral Group
We are seeing very little requirement for gas. We hardly every install central gas systems anymore. They use heat guns, they don’t use Bunsen burners anymore. Electric options are available for almost all equipment. Only question is steam for cage wash. I don’t think eliminating gas will have much impact at all. Currently working on Bioscience research stem cell lab in British Columbia and it has no gas. I’ve long advocated for eliminating central gas systems. Instead of expensive central systems, use portable or local distribution from cylinders. There is no technical issue; it’s only a people issue because some are used to doing it a certain way. Gas is used for heating or disinfecting. Other equipment is readily available. It doesn’t affect the science. Currently renovating the USC Hoffman vivarium, replacing large gas & steam autoclave with an electric model. A large tunnel washer may not be as cost effective w/o gas. Industry is changing, a lot more electric equipment.
Andre Salvador, So Cal Edison food service expert helped these tenants adapt to all electric, he’s a great resource!

All Electric Restaurants at LAX
Bradley Terminal

- Has one electric kitchen under construction, Claire Lilienthal Elementary
- Currently designing all electric kitchens at Claremont, Hillscrest, and West Portal schools as all electric.
- Worked with chef and staff to understand induction cooking
- Visiting Food Service Technology Center in San Ramon to give staff a hands-on look at the equipment
- Doing some training with staff to get them accustomed to induction
- Bids for electric equipment are coming in cheaper than gas
- Biggest energy hogs are the fryers and also make the least healthy food, so promoting other equipment is healthy!

Chatam University Dining Commons
All electric kitchen, 150 meals 3 times a day

- The chef was initially reluctant, and had never cooked on induction before
- It took some time to adjust to new kitchen
- But now he loves it and says he will never go back to gas

Sonoma Academy
19,500 SF
ZNE, LEED Platinum
Architect:  WRNS
Mechanical:  Interface Engineering
Electrical:  Integral Group

- 60% of full service restaurants in our territory are all electric
- We’ve had success selling Wendy’s and McDonald’s on electric cooking
- The new combi ovens, steam cabinets, holding cabinets and induction cooktops work great!
- All fast food chains have both gas and electric kitchen options
Resources
- All Electric Construction Guides: https://www.redwoodenergy.tech/research/
- California Cities Lead the Way: https://www.sierraclub.org/articles/2020/03/californias-cities-lead-way-gas-free-future
- The economics of electrifying buildings: https://rmi.org/insight/the-economics-of-electrifying-buildings/
- Are we ready for all electric buildings? https://tinyurl.com/y3unn3r4
- The smog in your kitchen: https://www.fresnobee.com/opinion/readers-opinion/article22278315.html