



# Local Governments and California's Zero Net Energy Buildings Goals

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## How Can Local Governments Get Involved?

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# Local Governments and Zero Net Energy Buildings

- California's ZNE Building Goals
- Defining ZNE- What is it?
- How Local Governments can help Advance CA's ZNE Goals



IBEW Zero Net Energy Center, San Leandro



# Local Governments and Zero Net Energy Buildings

## **PART 1: CALIFORNIA'S ZNE BUILDING GOALS**

# Big Bold Goals- Adopted 2007-08 by Energy, Utilities Commissions

- All new residential construction in California will be zero net energy by 2020
- All new commercial construction in California will be zero net energy by 2030
  - 50% of existing commercial buildings will be retrofit to ZNE by 2030



# State Buildings ZNE goals- Adopted by Executive Order in 2012

- All new state buildings and major renovations starting design in 2025 shall be ZNE; 50% at 2020
- State agencies shall strive towards ZNE for 50% of existing state-owned building area by 2025.
- ARB 2014 Scoping Plan Update:  
Consider Zero Carbon  
Building Pathways (2017)



# Why ZNE Buildings?

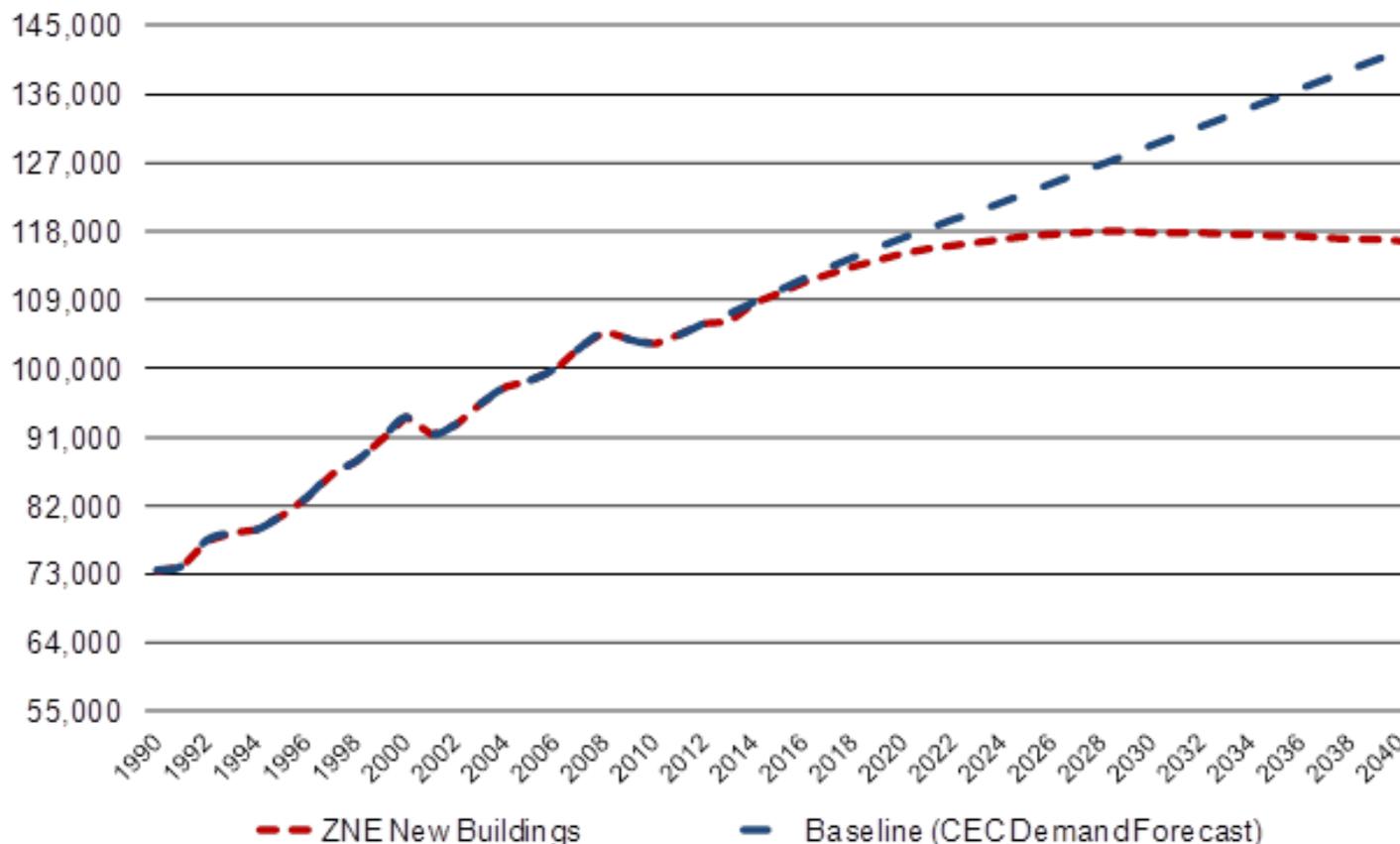
- Maximum long term energy savings
- Transform the market
- Incorporate gains into building code
- Ensure buildings are smart and efficient
- Re-engineer EE programs
- Achieve CA's GHG reduction goals



2010 Groundbreaking of IBEW Zero Net Energy Center, San Leandro

# Energy Savings Potential Commercial ZNE Bldgs

Commercial Electricity Consumption with Efficiency Scenarios  
(GWH)

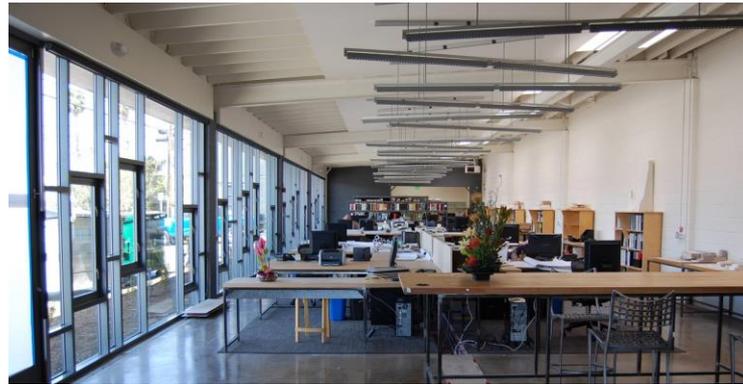


# Zero Net Energy Buildings in California: Commercial Buildings

60 ZNE commercial buildings since 2007\*



DPR Construction San  
Diego Corporate Office ,  
Chip Fox



Bacon St. Offices,  
SDG&E & Hanna  
Gabriel Wells  
Architects



SMUD East Campus Operations Center, Doug Norwood

# Zero Net Energy Buildings in California: Commercial Buildings

- Wide variety of building types and climate zones
  - Office & education
  - Multifamily
  - Military & public



David and Lucille Packard Foundation, Los Altos, CA



Chartwell School | Seaside, CA

# Zero Net Energy Buildings in California: Costs

- CA commercial ZNE buildings show little / no incremental cost\*
  - Res ZNE buildings \$2 - \$8 /ft<sup>2</sup> inc cost, EE only



Exploratorium | San Francisco, CA



IDeAsZ<sup>2</sup> Office Building San Jose, CA

# Zero Net Energy Buildings in California: Residential- DeYoung Properties

- Uses 64% less energy than Title 24 (2008)
- 18% IMC
- \$1,700 annual bill savings



# Zero Net Energy Buildings in California: Residential-Cottle House

- Produces 118% of home's energy consumption
- 87% including EV charging



Source: Alea German, Davis Energy Group

- Electric vehicle charging & plug loads contribute > 50% of total energy

# Zero Net Energy Buildings in California: SMUD- MF and Subdivisions



SMUD Energy Smart Community Project, with Pacific Housing and Sunverge Energy – zero peak, net zero, net zero carbon

Obadiah Bartholomy, SMUD



SMUD SolarSmart Program, Elliot Homes Subdivision, Mike Keese and Alex Araiza,

# Zero Net Energy Buildings in California: Los Vecinos Affordable Housing, Chula Vista



# Zero Net Energy Buildings in California: Residential- Irvine Smart Grid Demo Tract Home Retrofit Project



# Zero Net Energy Buildings in California Residential- ABC Greenhome (SCE)



# Local Governments and Zero Net Energy Buildings

## **PART 2: DEFINING ZERO NET ENERGY- WHAT IS IT?**

# 2013 IEPR ZNE Building Definition

*“A ZNE Code Building is one where the **net of the amount of energy produced by on-site renewable energy resources is equal to the value of the energy consumed annually by the building**, at the level of a single “project” seeking development entitlements and building code permits, measured using the California Energy Commission’s Time Dependent Valuation (TDV) metric. **A ZNE Code Building meets an Energy Use Intensity value** designated in the Building Energy Efficiency Standards by building type and climate zone that reflects best practices for highly efficient buildings.” (IEPR 2013).*

In other words... **A ZNE (Code) Building**

**Accomplishes deep Energy Efficiency (and DR) first**

**Then produces as much onsite renewable energy in the course of a year as it consumes** (measured using TDV).

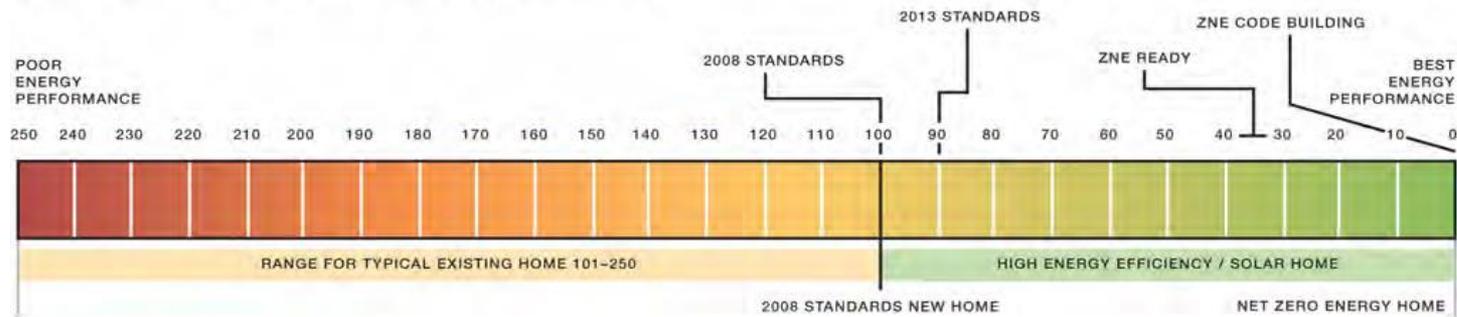
**Can go beyond this!** Net Positive, Site Energy, Zero Carbon, etc.

*Does not imply zero utility costs*

# ZNE Code: ZNE Ready as Basis? Include Off-site Renewables? (IEPR 2013)

- Recognizes that full onsite renewables for ZNE infeasible in some situations
  - Need for meaningful flexibility and specific exceptions
  - Need for development entitlements for off-site renewable energy resources
  - Must be enforceable by applicable enforcement agency and enable tracking and matching to specific buildings claiming offset

CALIFORNIA HOME ENERGY RATING CERTIFICATE



# ZNE Communities- What's an Ecodistrict?

- What's an EcoDistrict?
  - A new model of public-private partnership that emphasizes innovation and deployment of district-scale best practices to create the neighborhoods of the future - resilient, vibrant, resource efficient and just
  - The fastest way to create the neighborhoods of the future: resilient, healthy, prosperous, and just. Places where people love to live, work, play, and learn.
  - A framework to advance Zero Net Energy Building Goals
- Leading cities:
  - Los Angeles, San Francisco, Washington D.C., Seattle, Austin, Boston, Portland

# Local Governments and Zero Net Energy Buildings

## **PART 3: HOW LOCAL GOVERNMENTS CAN HELP ADVANCE CALIFORNIA'S ZNE GOALS**

# Advancing California's ZNE Goals: What Can Local Governments Do?

- Focus on building code training and compliance
- Adopt Reach Codes (and/or solar requirements)
- Be an Early Adopter: Build or Retrofit Public Buildings to ZNE Levels
  - Libraries, Schools, Municipal Buildings
- Partner to Create ZNE Pilots at Community or Sub-division Level
- Consider Becoming an EcoDistrict
  - Downtown area?
  - Corporate or Academic campus?

# Thank you!

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California Public Utilities Commission -  
[cpuc.ca.gov](http://cpuc.ca.gov)

CPUC ZNE Buildings Website

<http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Zero+Net+Energy+Buildings.htm>

ZNE Residential Action Plan Website

[www.CaliforniaZNEhomes.com](http://www.CaliforniaZNEhomes.com)

