California’s Zero Net Energy Building Goals
How Local Governments Can Get Involved!

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Energy Efficiency Branch
California Public Utilities Commission
California’s ZNE Building Goals

- All new residential construction and all new commercial construction in California will be zero net energy by 2020 and 2030, respectively
- 50% of existing commercial buildings will be retrofit to ZNE by 2030
- All new state buildings and major renovations shall be ZNE (2025)
  - 50% of existing state-owned building area by 2025 shall be ZNE
- IOUs shall launch and ramp a ZNE K-12 Schools and Community College Pilot Program in 2015-18
Energy Savings Potential
Commercial ZNE Bldgs

Commercial Electricity Consumption with Efficiency Scenarios
(GWH)

About seven 500 MW power plants

Rough assessment: zero’s out all load from all projected future new construction (2012)
Res New Construction similarly projected to require some six new 500 MW power plants to meet load
Zero Net Energy Programs and Activities

RESIDENTIAL NEW CONSTRUCTION
CA
Energy Efficiency
Strategic Plan

New Residential  Zero Net Energy
Action Plan  2014-2020

June 2015

California Energy Commission
Efficiency Division

California Public Utilities Commission
Energy Division
VISION
100% of all New Homes in California will be Zero Net Energy starting in 2020

GUIDING PRINCIPLES

Flexible, Leverage, Consistency, Measurable, Multiple Paths

ACTION PLAN GOALS

1. Create awareness of the value and benefits of ZNE and build demand
2. Increase participation and improve the quality of ZNE education and training
3. Ensure availability, effectiveness and efficiency of technical tools
4. Quantify value of ZNE, support robust financing and ensure affordability
5. Drive future grid infrastructure and technological improvements
6. Align regulations, policies, incentives and codes
## Overall Critical Path

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### Ongoing Agency (CEC/CPUC) Coordination and Collaboration to achieve ZNE Goals

1. Finalize ZNE Definition and Messaging
   - Roll Out Statewide Outreach and Awareness Campaign
   - Demonstration Projects: Single Homes and Community-scale/Subdivision
     - ZNE Builder Early Adopter Program Launched
     - ZNE New Residential Workforce Sector Strategy Adopted
   - Promote ZNE/EE Labeling/Score Third Party Verification
   - Highly Engaged Local Governments Support ZNE
     - Information Clearinghouse/Interactive Web Portal Launched
     - Technical Tools Needs Assessment Completed
     - Grid Impact Analysis Completed
     - Local Government Early Adopter Program Launched
     - ZNE Specific Financing Available
     - New ZNE Incentives and Tax Credits
     - Multifamily, Low Income Incentives Available
     - Local Government ZNE Reach Code Adoption and Support
       - Statewide ZNE Curriculum is Adopted
       - Integrated Suite of Technical Tools Available
       - Title 24 Requires all reasonable EE Measures
       - Energy-based Appraisal Standard Utilized
       - Standard Permitting Process Adopted
       - Title 24 pt 6, Title 20 promotes ZNE
What is Current ZNE Residential Home Market Size?

Approximately 1,100 ZNE-type homes
Mostly near ZNE, but includes 16 ZNE
About 0.2-0.4% of market since 2006, but ~1% in 2014

ZNE-type Homes as Percent of California Single-Family Housing Permits, by Year

*Not all data for 2014 was available at the time of this report. Data generally reflects 2014 Q1 and Q2.

ZNE-type = 30%> Title 24 (all)
Who is pursuing ZNE?

- 50+ builders have constructed ZNE-type homes in 130 CA cities
2015 Code Readiness Initiative

**IOU Support**

- **High Performance Attics and Ducts in Conditioned Space:**
  *Get the ducts out of hot, hot space*
- **High R-value Walls** ($\leq 0.050$ assembly U-Factor)
- **Dedicated design and construction assistance**
- **Builder Commitment**
  - Post-occupancy monitoring
  - Case studies
- **Financial Support**
  - Leverage CAHP incentives
  - Per project incentives ~ About $15,000 per key measure
- **Rollout**
  - 3 builders each, PG&E/ SCE by mid-2016; 25 lots/builder
IOU ZNE Pilot Projects

De Young ZNE Home, PG&E supported, Photo: Rob Hammon 2014

Honda House, PG&E Supported, Photo: Davis Energy Group (2014)

ABC Home, SCE supported. Photo: SCE

KB Home Zero House, SDG&E Supported. Photo: Ken Hilligoss
Zero Net Energy Programs and Activities

NON-RESIDENTIAL BUILDINGS
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

*Analysis performed by New Buildings Institute. Includes ZNE Ready and Near ZNE buildings. Not all verified.
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:

Developed by Wakeland Housing with Energy Commission support, Global Green USA, Walker Wells
Prop. 39 K-12 Schools and Community College Initiative

◆ **Five Elements to the Pilot- Target of 13-18 demo buildings**

<table>
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<th>Element 1:</th>
<th>IOU ZNE Demonstration School Retrofits</th>
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<td>Training Outreach and Recognition</td>
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<td>Institutional Training</td>
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<td>Element 4:</td>
<td>Codes and Standards</td>
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<td>Element 5:</td>
<td>Production Program Development</td>
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The ZNE Pilot will provide:

- Design assistance
- Trainings on how to socialize the ZNE concept with stakeholders (e.g. parents, teachers, students, board members)
- Ongoing commissioning and construction inspection
- Training on how to maintain ZNE operations
- Monitoring, verification

And the ZNE Pilot will require:

- Written commitment to the Pilot
- A willingness to design and retrofit a ZNE building
- A healthy budget
- A willingness to share experiences with other interested schools
Number of Demonstration Projects

Per Utility (Under development):
- PG&E: 5-7
- SCE/SoCalGas: 5-7
- SDG&E: 3-4
- Total: 13-18

Per School Type:
- CCC: 3-5
- K-12: 10-13
- Total: 13-18

• Prop39@EnergyDesignResources.com
Supporting Early Adopters

5 GREAT NEW TOOLS FOR ZNE BUILDINGS

1. ZNE Message Platform
   Key messages for target audiences on the what and why of ZNE.

2. "Intro to ZNE" Presentation
   Customizable powerpoint presentation provides an overview of California's goals and policies for ZNE, key strategies, and case study examples.

3. ZNE Companion Guide/Fact Sheets
   Collection of FAQs, resources, design strategies, and key messages for designers, commercial building owners, policymakers, and decision makers of schools and public buildings.

   Read about ZNE and ultra-low energy building examples, including design strategies, costs, and lessons learned.

5. ZNE Action Bulletin
   Sign up for our quarterly e-newsletter for updates on ZNE news, events, trainings, case studies, planning, policy, and research. To sign up, or to get more info about the toolkit, email heather@newbuilding.org.

www.newbuildings.org/zne-communications-toolkit
Support for Schools, Local Governments, Higher Ed & State Agencies
Zero Net Energy Programs and Activities

MOVING FORWARD TO ZNE
Distribution Planning and ZNE Bldgs

• Distribution Resource Planning Proceeding (R. 14-08-013)
  – Integration capacity Analysis
  – Optimal locational benefit analysis
  – Distributed Energy Resources growth scenarios
    1. Trajectory
    2. High Growth
    3. Very high potential growth, including ZNE Title 24

• CPUC Customer Distributed Energy Resources Grid Integration Study

• CPUC Study of Compliance Options for Offsite or Community Renewables and ZNE

• CPUC will adopt NEM successor tariff by end of 2015 (R.14-07-002)
Advancing California’s ZNE Goals: What Can Local Governments Do?

Recommendations from Center for Sustainable Energy report: “ZNE Buildings: How California’s Local Jurisdictions can Lead the Way. “

- Officially adopt ZNE goals
- Create a ZNE Task Force
- Enact “reach codes” or local ordinances exceeding Title 24, Part 6
- Transform municipal buildings into ZNE buildings
  - Libraries, Schools, Municipal Buildings
- Streamline permitting and interconnection for EE and renewables
- Establish benchmarking and disclosure policies
- Incentivize construction that exceeds Title 24, Part 6
- Enact PACE or other financing program(s) for commercial buildings
- Provide ZNE education and outreach to industry stakeholders

- Focus on building code training and compliance
- Partner to Create ZNE Pilots at Community or Sub-division Level
Thank you!

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