Zero Net Energy Buildings Workshop

June 18, 2015

- Introduction, Purpose, Agenda
- State of Policy
- ZNE Tools and Resources
- Group Activity
  - Case Studies
    - Discussion and Q&A

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Session Agenda

1:30 – 1:55 (25 min) **Introduction/State of Policy Presentation**

- Welcome, Participant Introductions & Agenda, Goals of Session - Ralph DiNola, NBI
- State update - Cathy Fogel, CPUC
- State of policy/ZNE buildings - CA & nationally - Ralph DiNola, NBI

1:55 - 2:20 (25 min) **ZNE Tools & Resources Presentation**

- ZNE Communication Toolkit, Case Studies, Registry, Getting to Zero database, Watchlist - Ralph DiNola, NBI

2:20 - 2:50 (30 min) **Activity**

- ZNE Planning Workbook - Ralph DiNola, NBI
- Backcasting & ZNE Activity Planning

2:50 - 3:15 (25 min) **Retrofits Case Study**

- Case Study: 435 Indio ZNE Retrofit, Sunnyvale - Kevin Bates, Sharp Development Co.
- Q&A

3:15 - 3:40 (25 min) **Policy LG Case Study**

- Case Study: Santa Barbara County ZNE Policies - Roy Hapeman
- Q&A

3:40 - 4:00 (20 min) **Q&A and Closing Remarks**

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New Buildings Institute

NBI's mission:

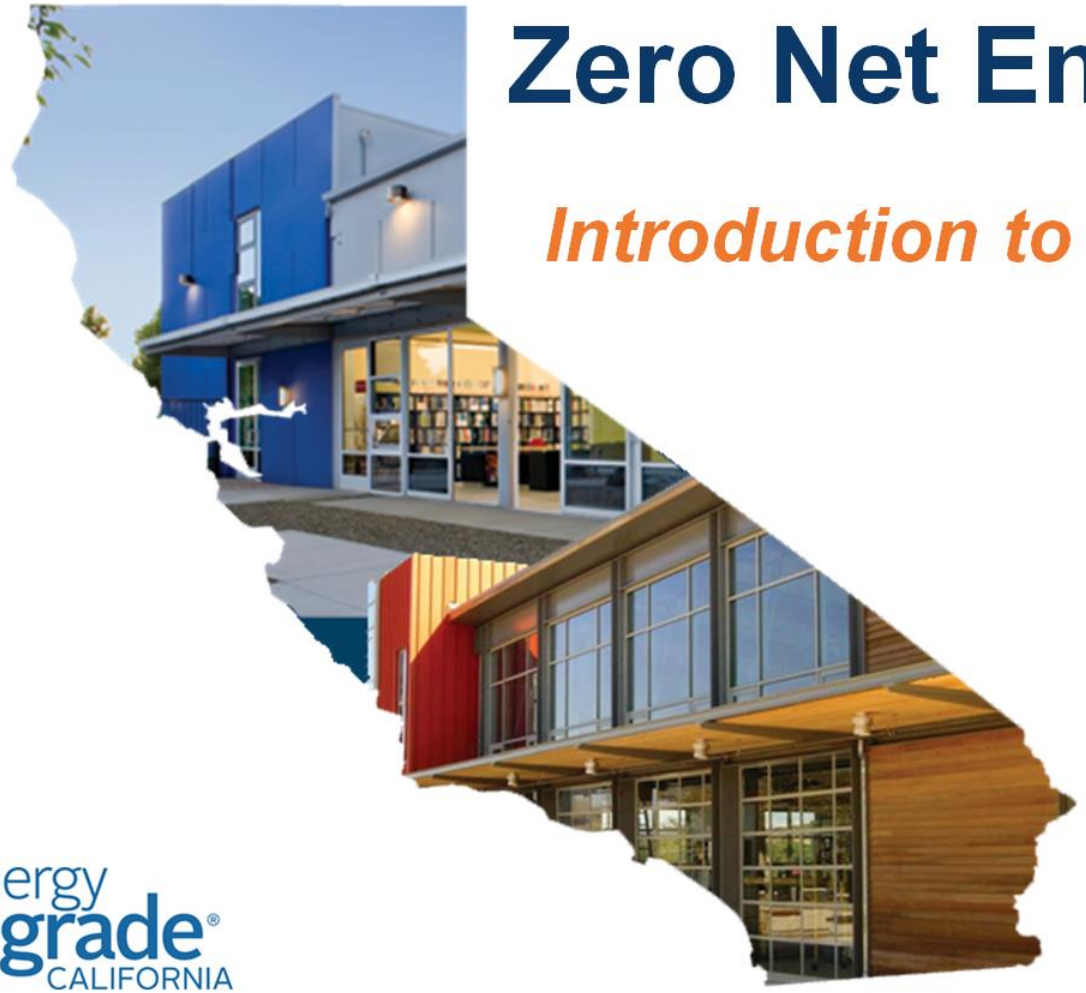
To promote and accelerate the adoption of next practices for improving energy performance throughout the built environment

NBI…

the virtuous cycle

Zero Net Energy in CA

Introduction to ZNE



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Zero Net Energy – What is it?

A ZNE building is a highly energy efficient building that produces as much energy as it consumes through clean, renewable resources over the course of a year. Also known as Net Zero Energy.

Marin Country Day School (Photo: Michael David Rose)

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Why ZNE?

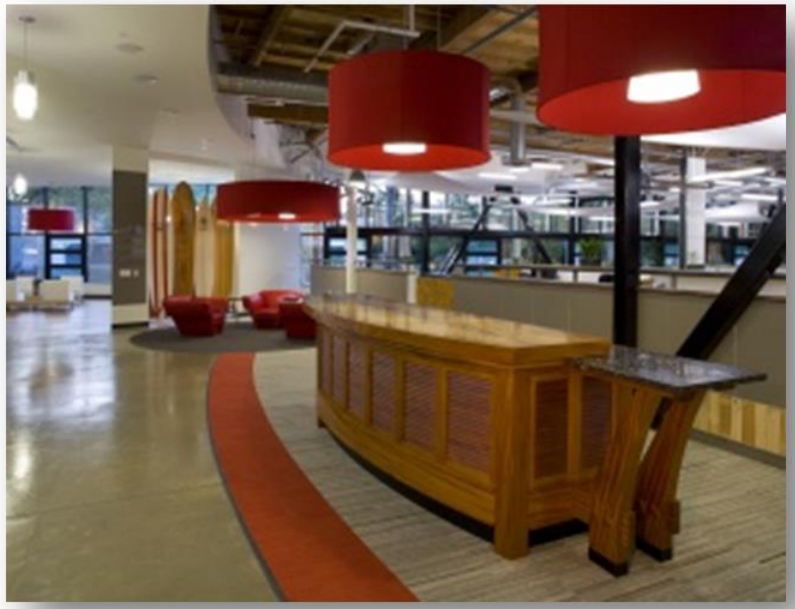
Makes communities stronger, resilient and energy independent

Comfortable and productive environment for working, learning and living

Optimized building performance

Highest architectural, mechanical, and environmental leadership

Lower net energy costs and higher asset value



DPR Construction | San Diego, CA

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Getting to ZNE

1 INTEGRATED PROCESS

Addressing systems through integrated design.

Chartwell School | Seaside, CA

2 TECHNOLOGIES and DESIGN STRATEGIES

Daylighting	Heat Recovery
Lighting	Cool Roof
Hi R-value Glazing	Radiant
Natural Ventilation	Ground Source Heat Pump
HVAC	Underfloor Air Distribution
Renewable Energy	/Displacement

Efficient Envelope: maximum insulation, super efficient windows, etc.

Best performing HVAC & water heating systems. Efficient lighting & lighting controls and appliances.

Monitor and control power consumption

Use sunlight to illuminate the building

Install onsite renewables

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Leading by Example

Packard Foundation

LEED PLATINUM

49,000 SQUARE FEET

ZNE PERFORMANCE

David and Lucille Packard Foundation | Los Altos, CA

- Energy use can be reduced by 65% through integrated building design and aggressive reductions in plug loads
- Innovative use of roof-mounted photovoltaic panels will offset any energy used

- Two daylit office wings with blinds and shades to control solar heat gain and glare
- Rainwater collected for toilet flushing, irrigation; stormwater is retained on-site.
- 95% of construction waste recycled/salvaged

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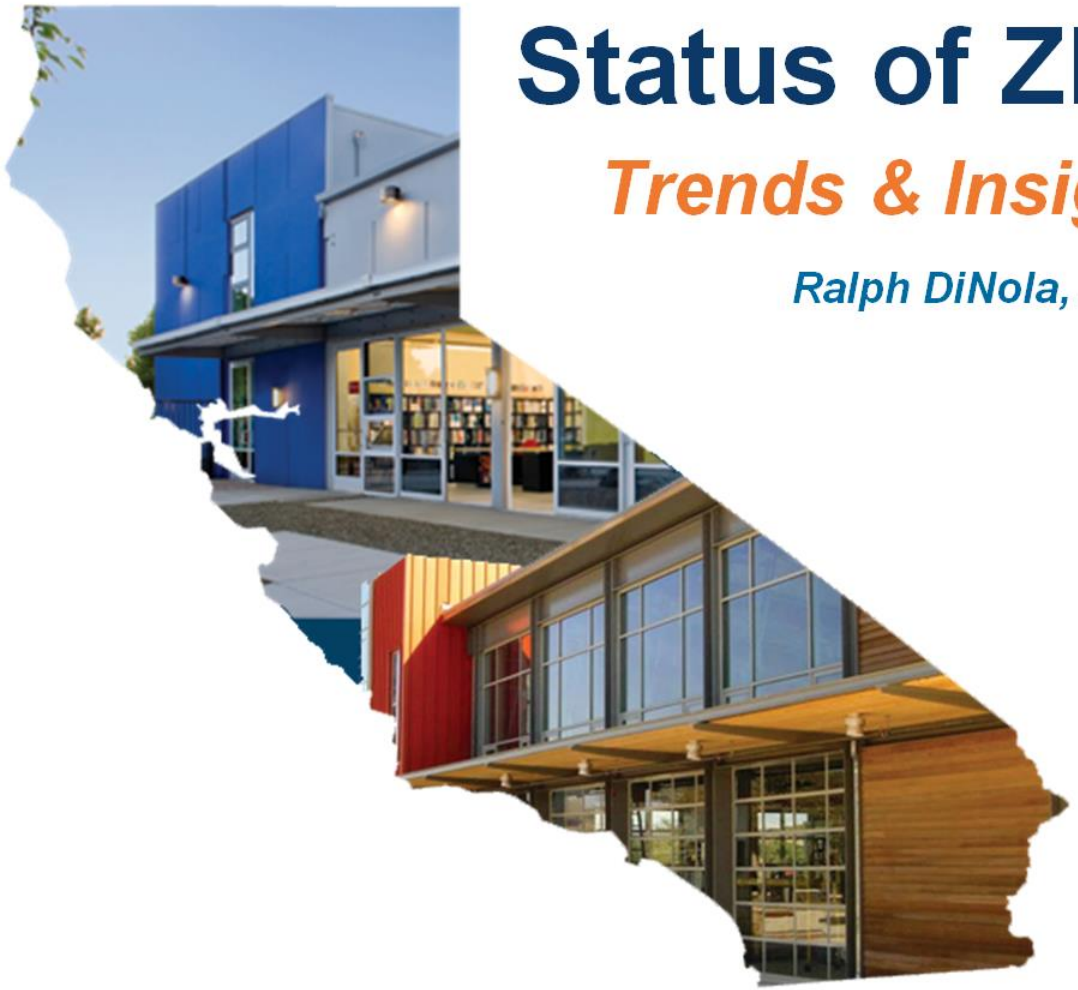

Status of ZNE: US & CA

Trends & Insights

Ralph DiNola, New Buildings Institute

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Forbes

New Posts

Most Popular
Snapchat's Future

Lists
The 2014 30 Under 30

ENERGY | 6/05/2013 @ 5:36PM | 4,986 views

Building The Capacity To Increase Net Zero Construction

4 comments, 2 called-out + Comment Now + Follow Comments

The net zero building movement (where buildings produce as much or more energy than they co
remains a nascent phenom
As of this time last year, th
Buildings Institute – the
organization that tracks s
– had recognized only 2
as net zero structures.
these exceeded 15,000
The concept of net zer

The New York Times

WORLD | U.S. | N.Y. / REGION | BUSINESS | TECHNOLOGY | SCIENCE | HEALTH | SPORTS | OPINION
NEIGHBORHOODS | GREAT HOMES AND DESTINATIONS | COMMERCIAL

Commercial

SQUARE FEET

Close to Its Home, Walgreen Tests Energy-Saving Ideas

h of Chicago includes its sloping roof, which is to contain

Camburas & Theodore.

FAST COMPANY

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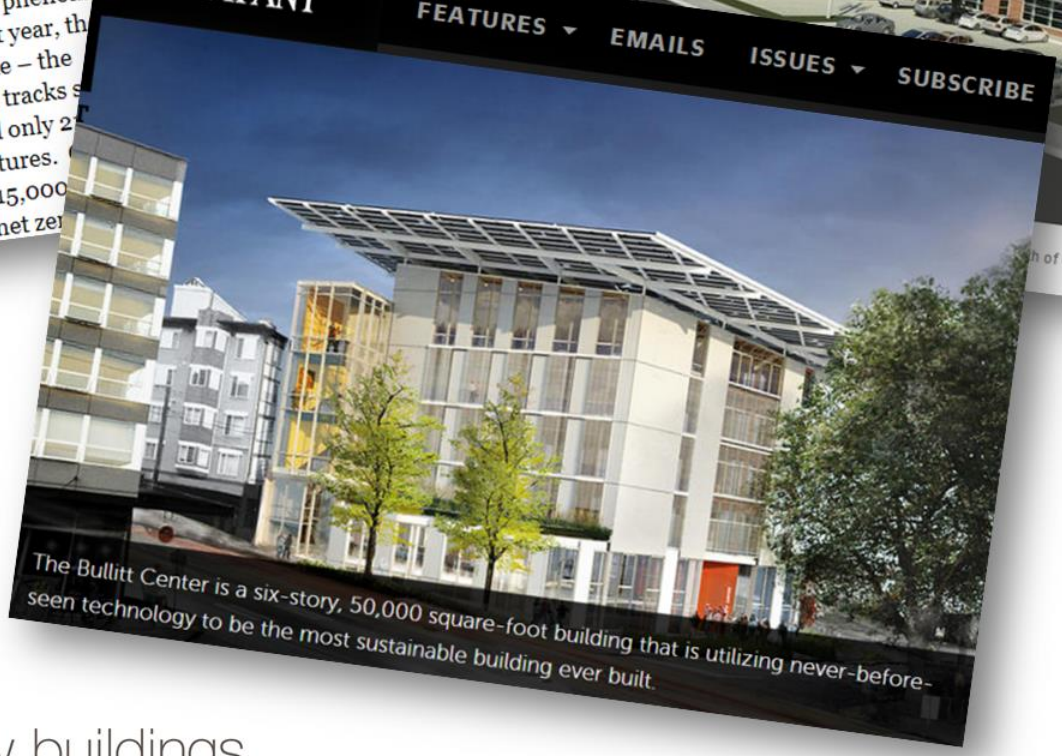

The Bullitt Center is a six-story, 50,000 square-foot building that is utilizing never-before-seen technology to be the most sustainable building ever built.

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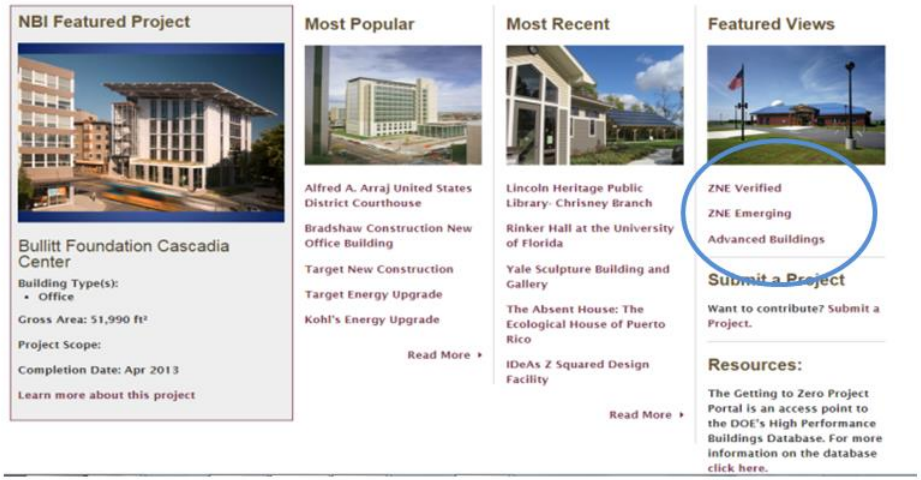
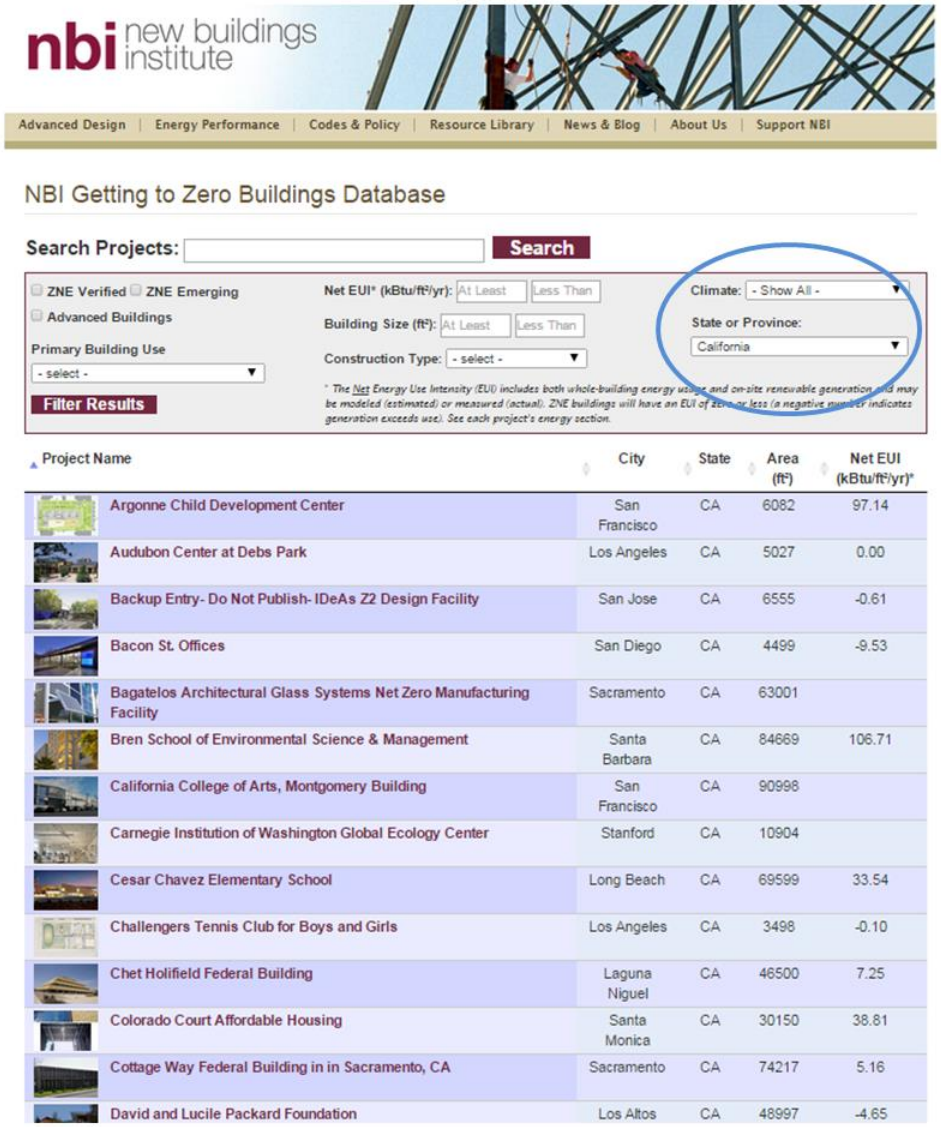
GETTING TO zero BUILDINGS DATABASE

New Buildings Institute is proud to introduce our Getting to Zero Buildings Database.

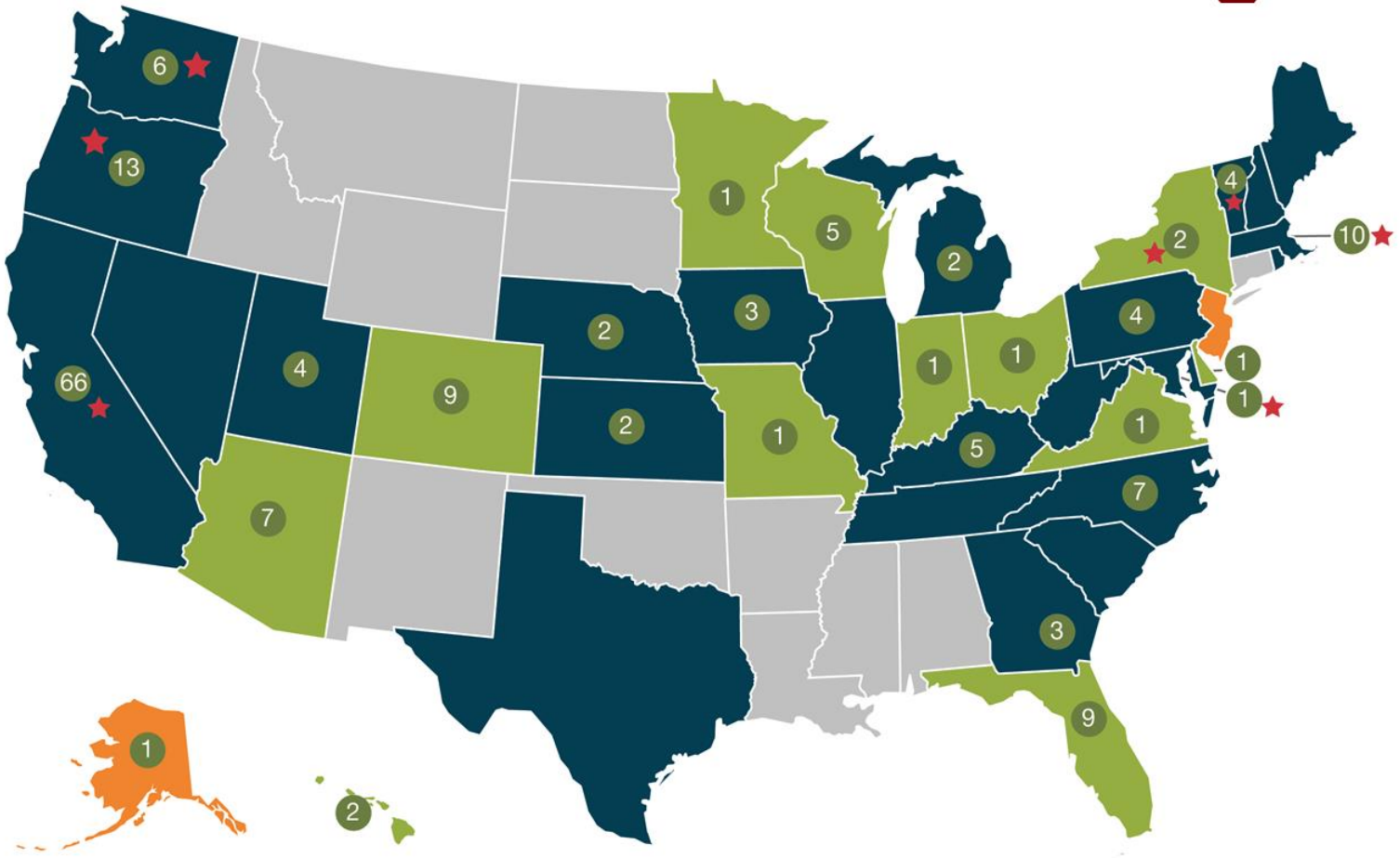




The largest database on ZNE buildings in North America and the only database searchable by ZNE Status & Energy Performance

http://newbuildings.org/getting-to-zero-buildings-database

40 States with ZNE Buildings



States with ZNE Verified Buildings

States with ZNE Emerging Buildings

States with only Ultra-low Energy Verified Buildings

States with Reach Code Adopted or in Development

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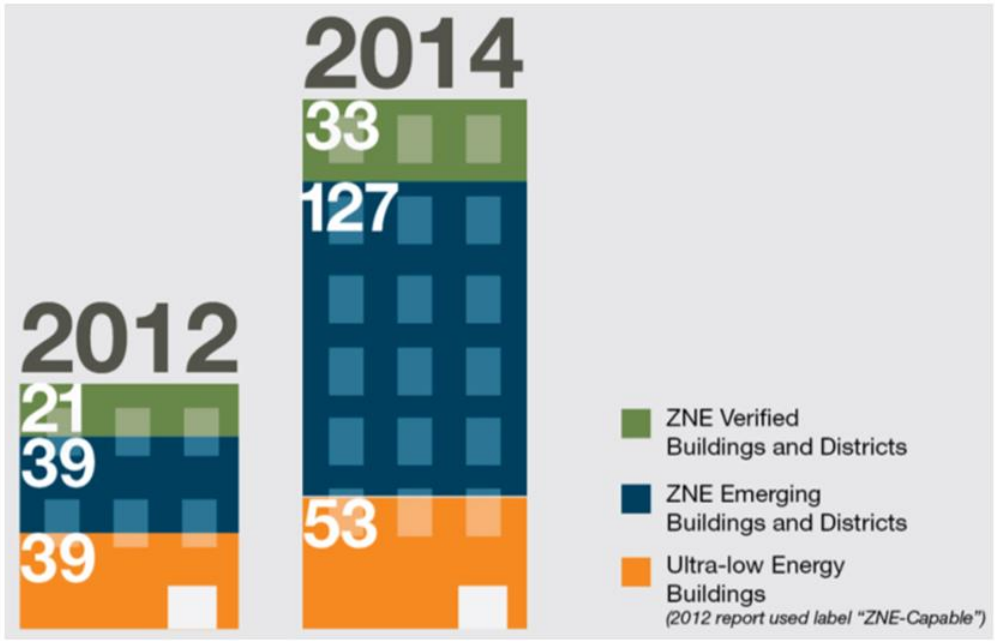
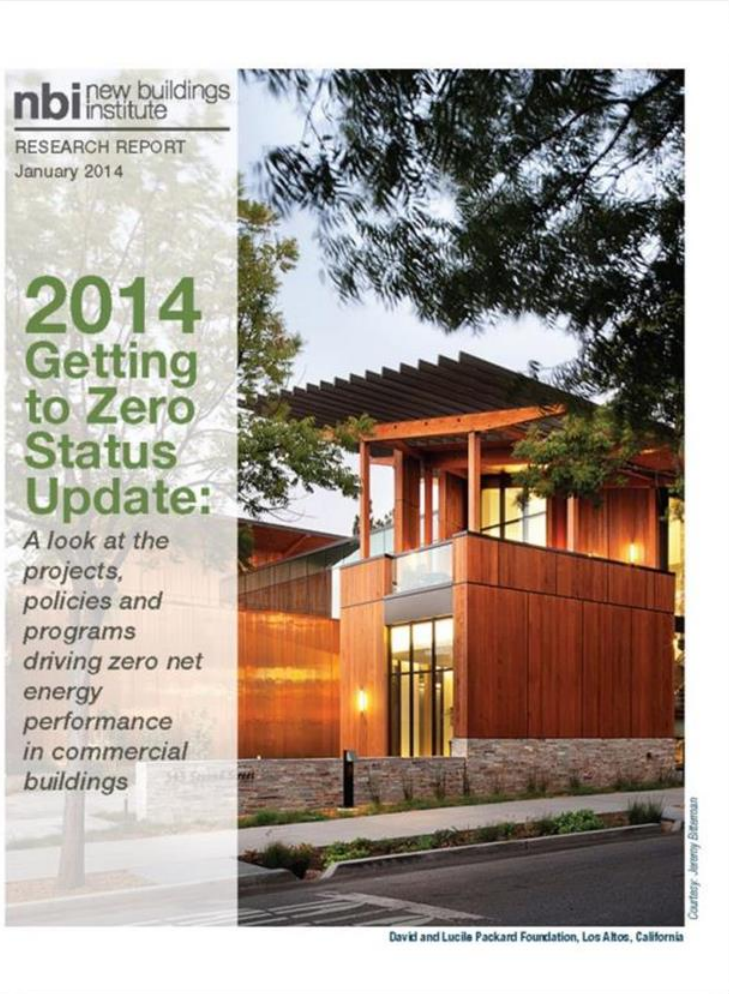
National Status of ZNE Buildings





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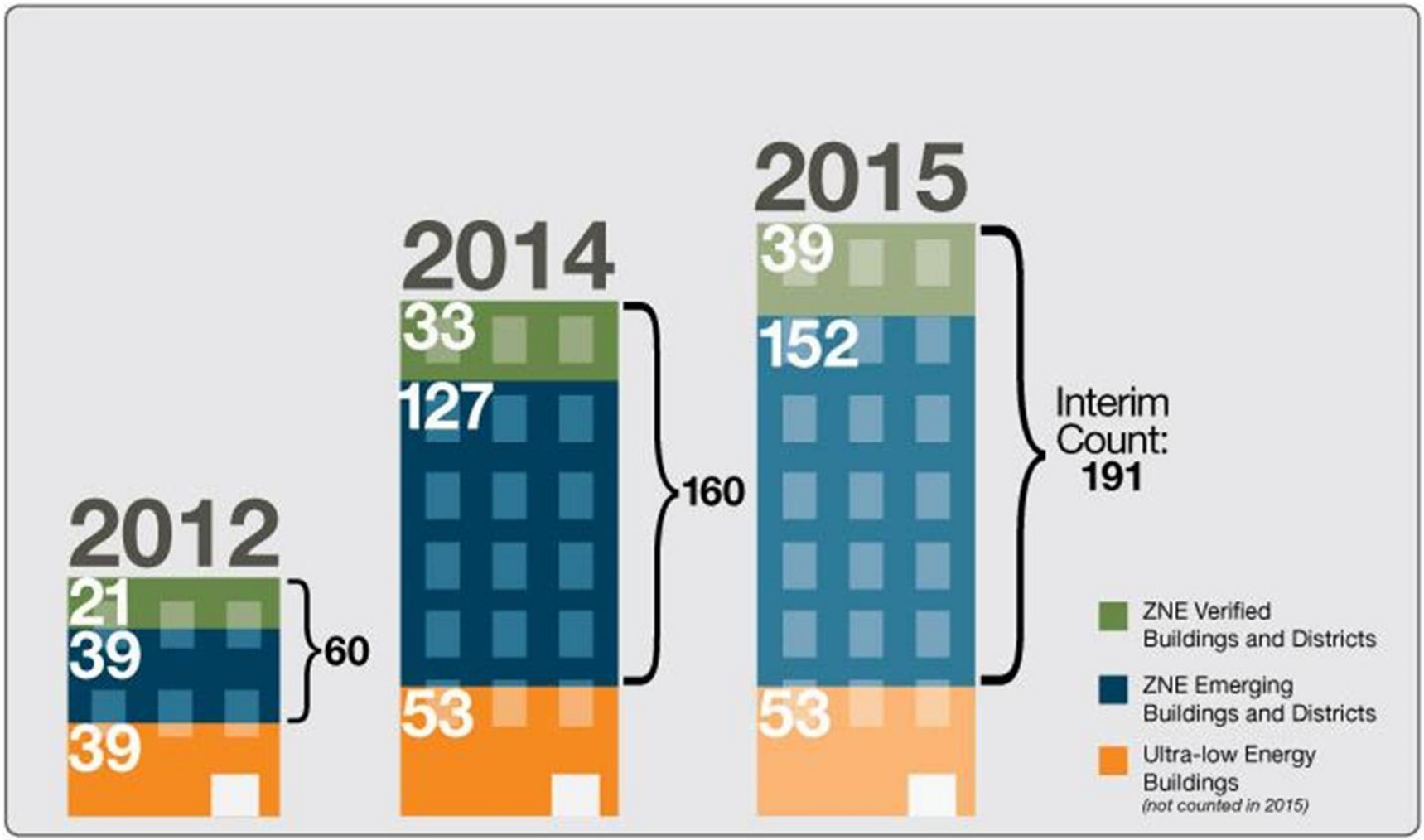
Zero Energy Buildings



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2015 List of Zero Energy Buildings

In 2011 and 2013 NBI conducted research to identify buildings with targets or actual outcomes of net zero energy. These results were published in "ZNE Status Reports" by NBI in early 2012 and 2014. NBI continues to track and document buildings with low and zero energy to support the market and policy interest in this data. This 2015 list of buildings is an interim count based on this ongoing work.

Verified Zero Energy Buildings (or Districts) are those with greatly reduced energy loads that have been documented to have met, over the course of a year, all net energy use through onsite renewable sources of energy. The energy use of all fuels (electric, natural gas, steam, etc.) is counted and offset. ***Buildings new to the list are in bold italics.***

Verified Zero Energy Buildings

Year Completed	Name	Location	State	Building Type	Size (sf)	Total Building Actual EUI	Site Renewable EUI	Net Building EUI*
2000	Oberlin College Lewis Center	Oberlin	OH	Education- higher	13,600	32	36	-4
2001	Environmental Technology Center Sonoma State	Rohnert Park	CA	Education- higher	2,200	3	4	-1
2002	Challengers Tennis Club	Los Angeles	CA	Other	3,500	9	9	0
	Leslie Shao-Ming Sun Field Station	Woodside	CA	Education- higher	13,200	4	6	-2
2003	Audubon Center at Debs Park	E Los Angeles	CA	Other	5,020	17	17	0
	Science House	St. Paul	MN	Other	1,532	18	18	0
2005	Hawaii Gateway Energy Center	Kailua-Kona	HI	Other	5,600	28	31	-3
2007	Aldo Leopold Legacy Center	Baraboo	WI	Office	11,884	16	18	-2
	IDeAs Z2 Design Facility[L]	San Jose	CA	Office[R]	6,557	21	25	-4
2008	Camden Friends Meeting Social Hall	Camden	DE	Public Assembly	2,864	18	20	-2
	Environmental Nature Center	Newport Beach	CA	Other	8,535	18	28	-10
	Hudson Valley Clean Energy Headquarters	Rhinebeck	NY	Other	5,470	13	13	0
2009	Bacon Street Offices	San Diego	CA	Office[R]	4,500	13	22	-9
	Chrisney Library	Chrisney	IN	Library	2,400	15	18	-3
	Living Learning Center at Tyson Research Center[L]	Eureka	MO	Education- higher	2,968	24	24	0
	Omega Center for Sustainable Living[L]	Rhinebeck	NY	Laboratory	6,200	13	21	-8
	Pringle Creek Painter's Hall[L]	Salem	OR	Public Assembly[R]	3,600	21	21	0

R - Indicates a building renovation project
L - Building is ZNE certified by the International Living Future Institute
*The Net Energy Use Intensity (EUI) includes both whole-building measured energy usage and on-site renewable generation. Buildings will have an EUI of zero or less, with a negative number indicating generation exceeds use.

zero net energy

California ZNE Watchlist

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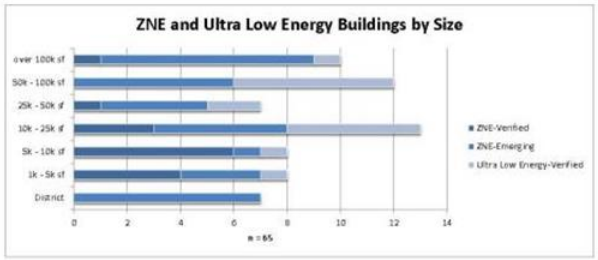
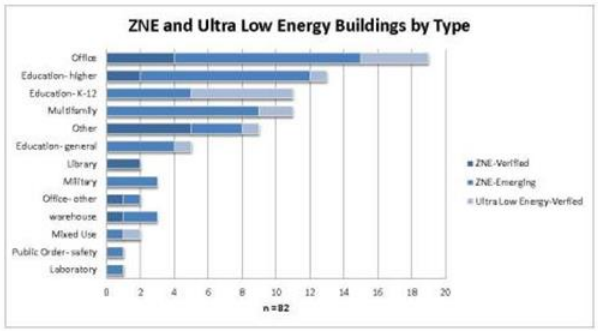
California leads the country in both policy and projects that are laying the path to a zero net energy (ZNE) future. California state agencies have adopted goals for 100% of new and 50% of existing commercial buildings to be ZNE by 2030. Leading design firms and owners have already recognized the real estate and occupancy advantages of these high performance buildings and today California has over 50 commercial buildings either verified (15) as ZNE or emerging (34) toward that target.

This CA ZNE Watchlist tracks commercial buildings (including multi-family) based on information gathered by New Buildings Institute (NBI) from multiple sources including designers, owners, utility programs, private and public organizations, articles, e-news, research, and commercial real estate professionals. It serves, along with other available ZNE resources[1], to support the awareness, acceptance and adoption of ZNE goals and outcomes throughout California and the nation. Buildings with ultra-low energy performance comparable to ZNE are also included.

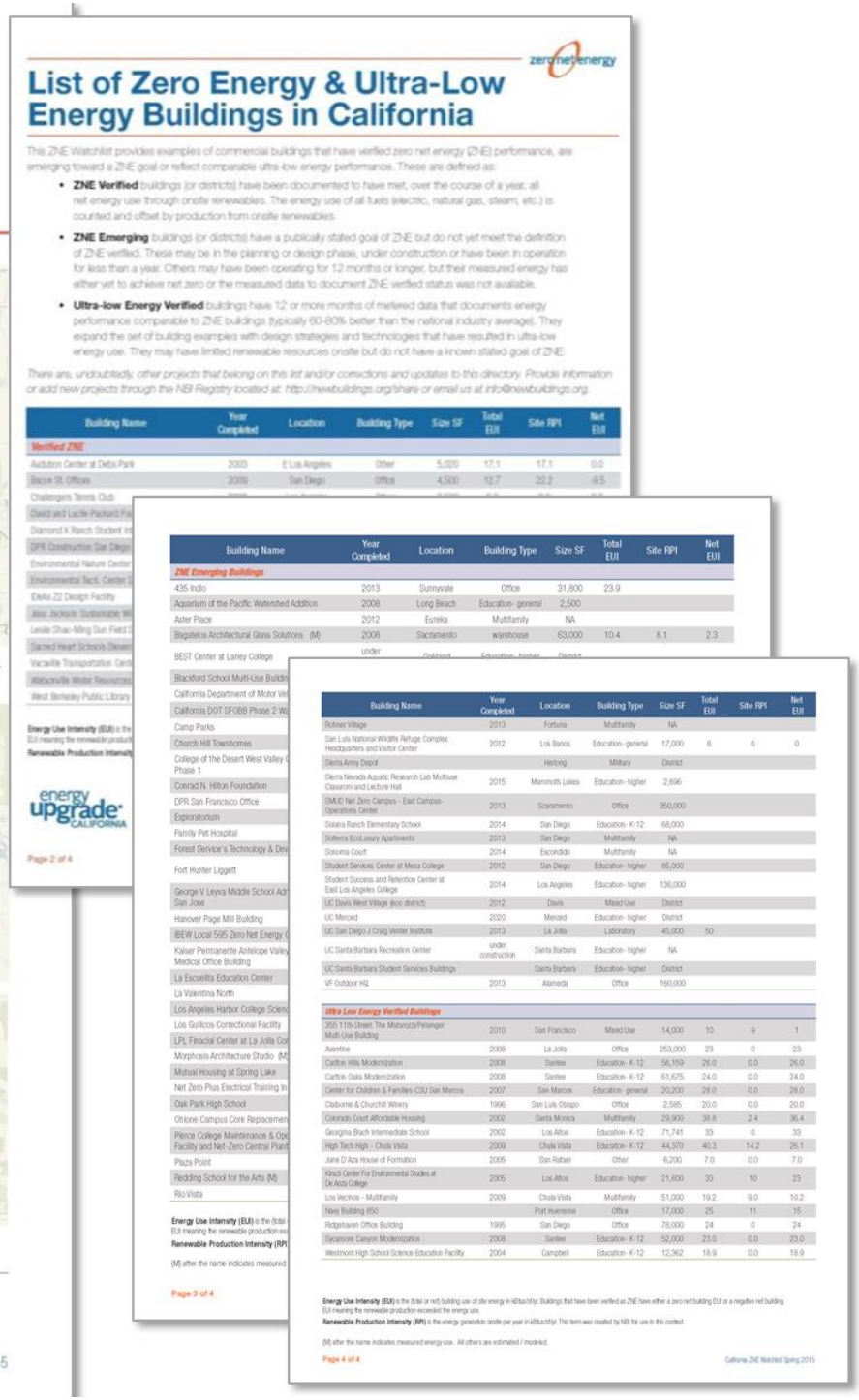
The graphics below show the trends in location, type and size of the ZNE buildings in California.





Locations of CA ZNE Verified and Emerging ZNE Building. Dot size represents volume of buildings.

[1] **For more resources:** CPUC (http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Zero+Net+Energy+Buildings.htm) and NBI (www.newbuildings.org/zero-energy)



List of Zero Energy & Ultra-Low Energy Buildings in California

This ZNE Watchlist provides examples of commercial buildings that have verified zero net energy (ZNE) performance, are emerging toward a ZNE goal or reflect comparable ultra-low energy performance. These are defined as:

- **ZNE Verified** buildings (or districts) have been documented to have met, over the course of a year, all net energy use through onsite renewables. The energy use of all fuels (electric, natural gas, steam, etc.) is counted and offset by production from onsite renewables.
- **ZNE Emerging** buildings (or districts) have a publically stated goal of ZNE but do not yet meet the definition of ZNE verified. These may be in the planning or design phase, under construction or have been in operation for less than a year. Others may have been operating for 12 months or longer, but their measured energy has either yet to achieve net zero or the measured data to document ZNE verified status was not available.
- **Ultra-low Energy Verified** buildings have 12 or more months of metered data that documents energy performance comparable to ZNE buildings (typically 60-80% better than the national industry average). They expand the set of building examples with design strategies and technologies that have resulted in ultra-low energy use. They may have limited renewable resources onsite but do not have a known stated goal of ZNE.

There are, undoubtedly, other projects that belong on this list and/or corrections and updates to this directory. Provide information or add new projects through the NBI Registry located at: http://newbuildings.org/share or email us at info@newbuildings.org.

Building Name	Year Completed	Location	Building Type	Size SF	Total EUI	Site RPI	Net EUI
Verified ZNE							
Audubon Center at Debs Park	2003	E Los Angeles	Other	5,000	17.1	17.1	0.0
Bacon St. Offices	2009	San Diego	Office	4,500	12.7	22.2	9.5
Challengers Tennis Club							
David and Lucile Packard Fo							
Diamond X Ranch Student In							
DPR Construction Site Diego							
Environmental Nature Center							
Environmental Tech. Center							
Ekeka ZZ Design Facility							
Jesse Jackson Sustainable Bl							
Leslie Shao-Ming Sun Field S							
Sacred Heart Schools Steven							
Vacaville Transportation Cent							
Watsonville Water Resources							
West Berkeley Public Library							

Energy Use Intensity (EUI) is the
EUI meaning the renewable product
Renewable Production Intensity

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Building Name	Year Completed	Location	Building Type	Size SF	Total EUI	Site RPI	Net EUI
ZNE Emerging Buildings							
435 Indio	2013	Sunnyvale	Office	31,800	23.9		
Aquarium of the Pacific Watershed Addition	2008	Long Beach	Education- general	2,500			
Aster Place	2012	Eureka	Multifamily	NA			
Bigelelos Architectural Glass Solutions (M)	2008	Sacramento	warehouse	63,000	10.4	8.1	2.3
BEST Center at Laney College	under construction	Oakland	Education- higher	District			
Blackford School Multi-Use Buildin							
California Department of Motor Ve							
California DOT SFOBB Phase 2 We							
Camp Parks							
Church Hill Townhomes							
College of the Desert West Valley Phase 1							
Conrad N. Hilton Foundation							
DPR San Francisco Office							
Exploratorium							
Family Pet Hospital							
Forest Service's Technology & Dev							
Fort Hunter Liggett							
George V Leyva Middle School Act San Jose							
Hanover Page Mill Building							
IBEW Local 595 Zero Net Energy (							
Kaiser Permanente Antelope Valley Medical Office Building							
La Escuelita Education Center							
La Valentina North							
Los Angeles Harbor College Scien							
Los Gullicos Correctional Facility							
LPL Financial Center at La Jolla Co							
Morphosis Architecture Studio (M							
Mutual Housing at Spring Lake							
Net Zero Plus Electrical Training In							
Oak Park High School							
Ohlone Campus Core Replacemen							
Pierce College Maintenance & Ope Facility and Net-Zero Central Plant							
Plaza Point							
Redding School for the Arts (M)							
Rio Vista							

Energy Use Intensity (EUI) is the (total
EUI meaning the renewable production ex
Renewable Production Intensity (RPI

(M) after the name indicates measured

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Building Name	Year Completed	Location	Building Type	Size SF	Total EUI	Site RPI	Net EUI
Rohner Village	2013	Fortuna	Multifamily	NA			
San Luis National Wildlife Refuge Complex Headquarters and Visitor Center	2012	Los Banos	Education- general	17,000	6	6	0
Sierra Army Depot		Herlong	Military	District			
Sierra Nevada Aquatic Research Lab Multiuse Classroom and Lecture Hall	2015	Mammoth Lakes	Education- higher	2,696			
SMUD Net Zero Campus - East Campus- Operations Center	2013	Scaramento	Office	350,000			
Solana Ranch Elementary School	2014	San Diego	Education- K-12	68,000			
Solterra EcoLuxury Apartments	2013	San Diego	Multifamily	NA			
Sonoma Court	2014	Escondido	Multifamily	NA			
Student Services Center at Mesa College	2012	San Diego	Education- higher	85,000			
Student Success and Retention Center at East Los Angeles College	2014	Los Angeles	Education- higher	136,000			
UC Davis West Village (eco district)	2012	Davis	Mixed Use	District			
UC Merced	2020	Merced	Education- higher	District			
UC San Diego J Craig Venter Institute	2013	La Jolla	Laboratory	45,000	50		
UC Santa Barbara Recreation Center	under construction	Santa Barbara	Education- higher	NA			
UC Santa Barbara Student Services Buildings		Santa Barbara	Education- higher	District			
VF Outdoor HQ	2013	Alameda	Office	160,000			
Ultra Low Energy Verified Buildings							
355 11th Street, The Maturozzi/Pelsinger Multi-Use Building	2010	San Francisco	Mixed Use	14,000	10	9	1
Aventine	2008	La Jolla	Office	253,000	23	0	23
Carlton Hills Modernization	2008	Santee	Education- K-12	56,159	26.0	0.0	26.0
Carlton Oaks Modernization	2008	Santee	Education- K-12	61,675	24.0	0.0	24.0
Center for Children & Families-CSU San Marcos	2007	San Marcos	Education- general	20,200	26.0	0.0	26.0
Claiborne & Churchill Winery	1996	San Luis Obispo	Office	2,585	20.0	0.0	20.0
Colorado Court Affordable Housing	2002	Santa Monica	Multifamily	29,900	38.8	2.4	36.4
Georgina Bloch Intermediate School	2002	Los Altos	Education- K-12	71,741	33	0	33
High Tech High - Chula Vista	2009	Chula Vista	Education- K-12	44,370	40.3	14.2	26.1
Jane D'Arcy House of Formation	2005	San Rafael	Other	6,200	7.0	0.0	7.0
Kirsch Center For Environmental Studies at De Anza College	2005	Los Altos	Education- higher	21,600	33	10	23
Los Vecinos - Multifamily	2009	Chula Vista	Multifamily	51,000	19.2	9.0	10.2
Navy Building 650		Port Hueneme	Office	17,000	25	11	15
Ridgehaven Office Building	1995	San Diego	Office	78,000	24	0	24
Sycamore Canyon Modernization	2008	Santee	Education- K-12	52,000	23.0	0.0	23.0
Westmont High School Science Education Facility	2004	Campbell	Education- K-12	12,362	18.9	0.0	18.9

Energy Use Intensity (EUI) is the (total or net) building use of site energy in kBtu/sf/yr. Buildings that have been verified as ZNE have either a zero net building EUI or a negative net building EUI meaning the renewable production exceeded the energy use.
Renewable Production Intensity (RPI) is the energy generation onsite per year in kBtu/sf/yr. This term was created by NBI for use in this context.

(M) after the name indicates measured energy use. All others are estimated / modeled.

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California ZNE Watchlist Spring 2015

TERMINOLOGY

- **ZNE Buildings:**
  - ***ZNE-Verified*** *- 1 year or more of measured energy data at ZNE performance (renewable energy generated onsite equals other energy); reviewed by a third party*
  - ***ZNE-Emerging*** *– net zero targets but early in design, operations or data not yet reviewed*
- **Ultra-low Energy**
  - ***Low-energy building*** *compared to peer energy use.* ***Not currently targeting net-zero*** *performance through onsite renewables. May be pursuing ZNE through district or renewable energy credits.*

ZNE and Ultra-Low Buildings are Possible in Many Building Types Across the US

Small-Med Commercial Offices

K-12 Schools

Large Office Facilities

Environmental Centers

Higher Education Institutions

Government Offices

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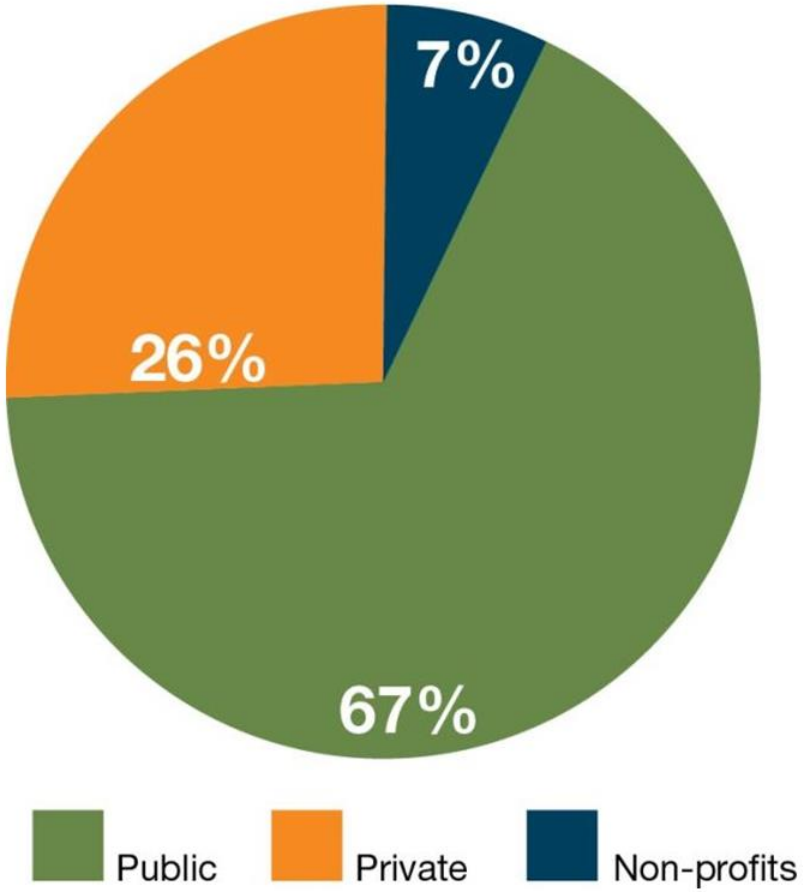
Ownership Type



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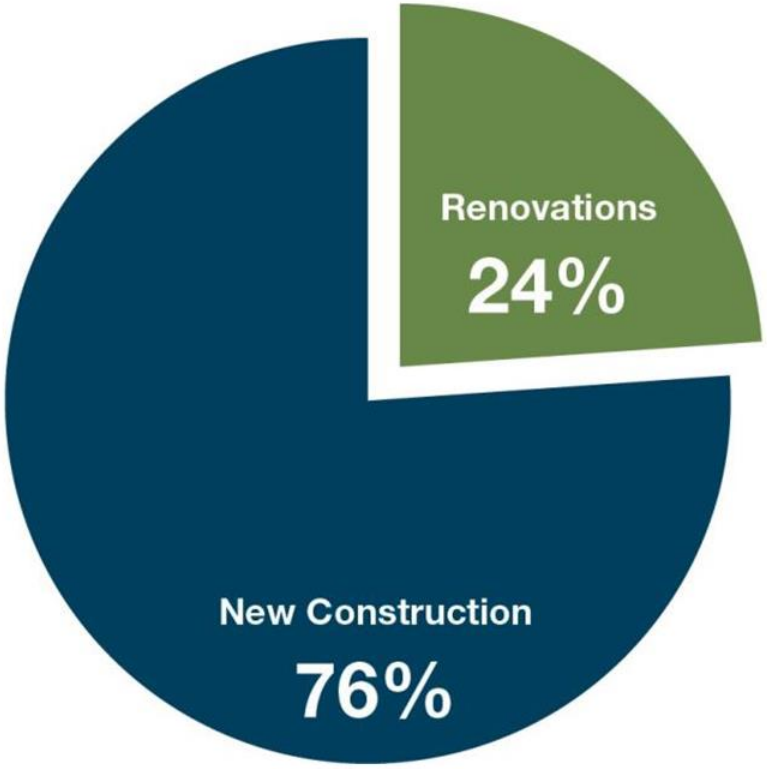
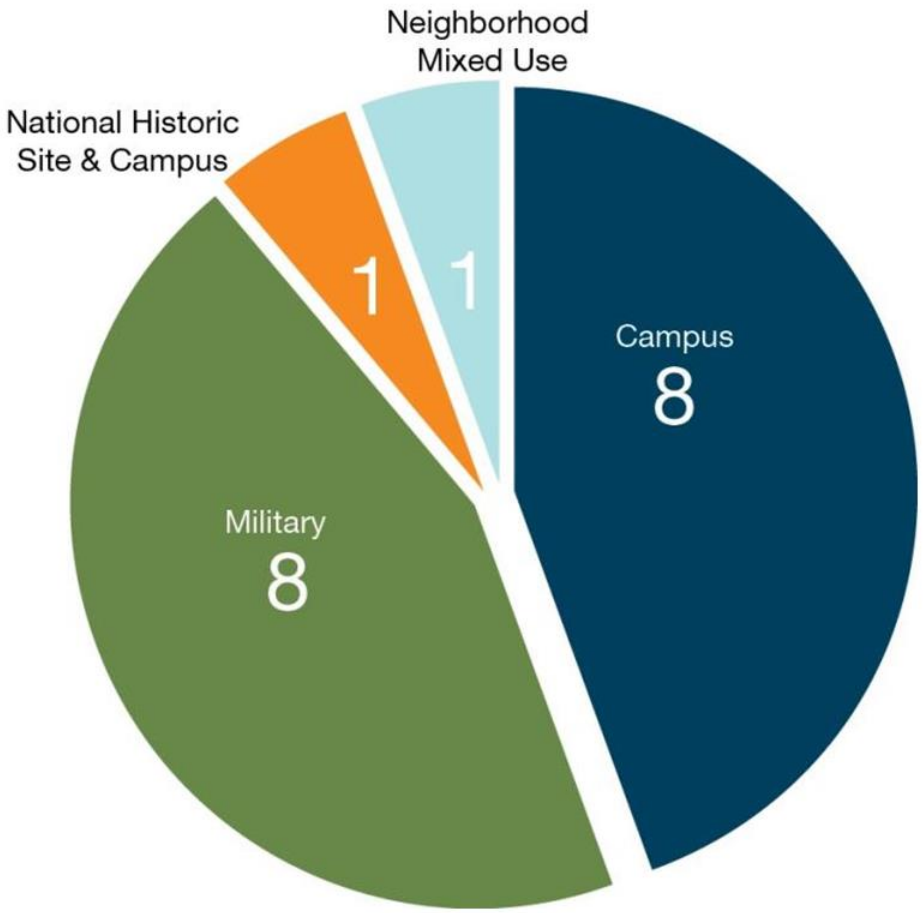
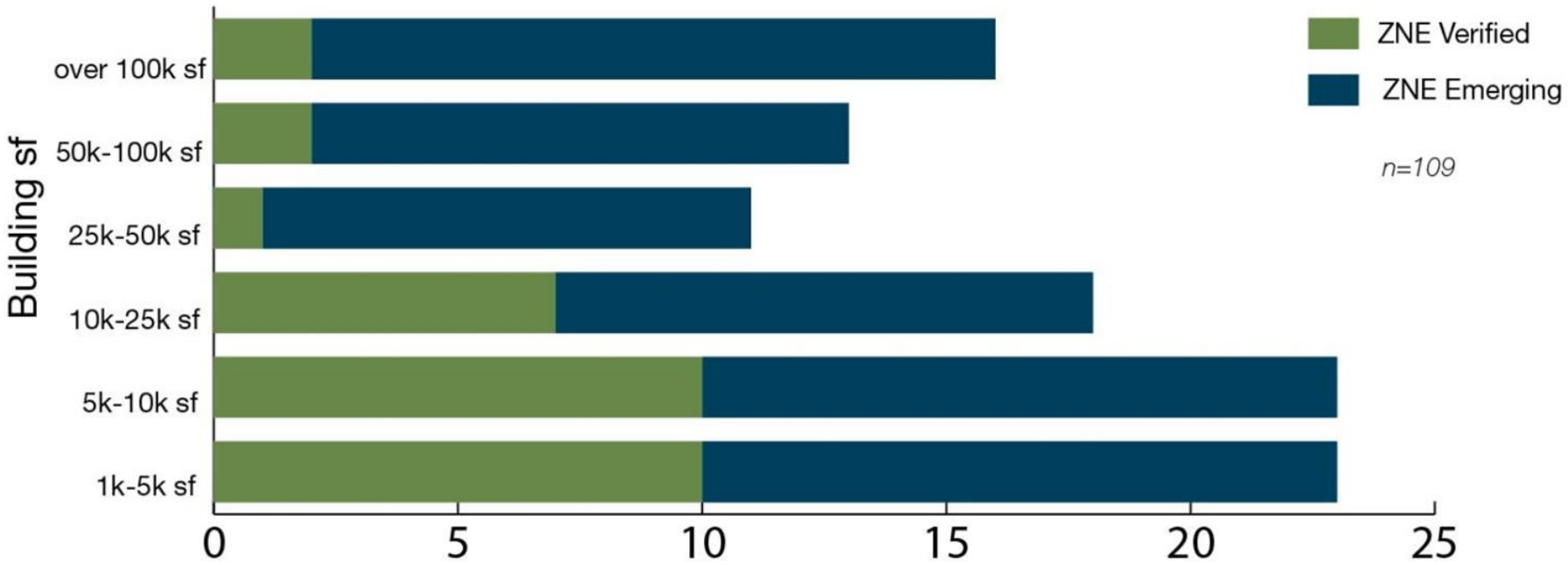
Existing Building Renovation



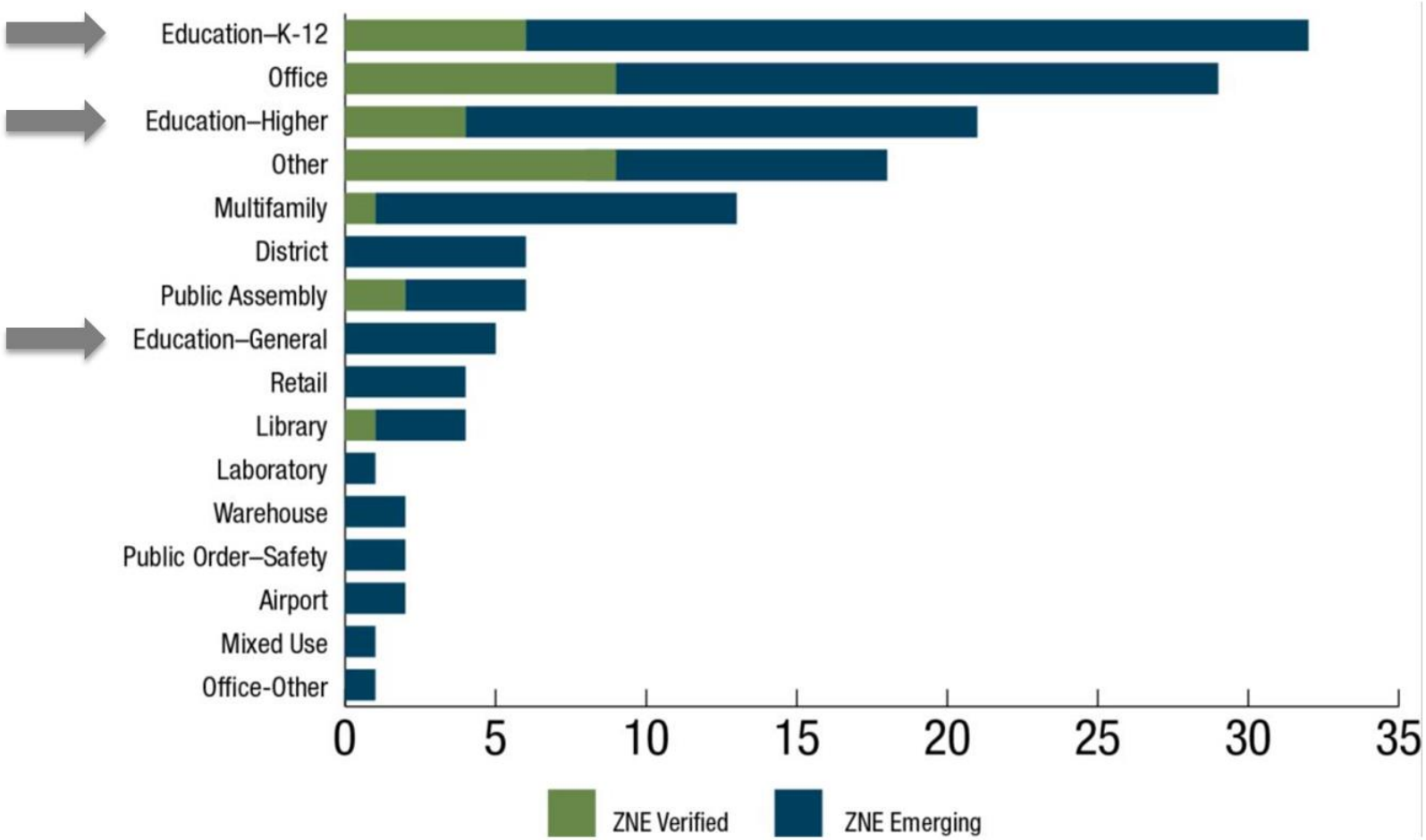
18 ZNE Districts



Building Size



Building Types



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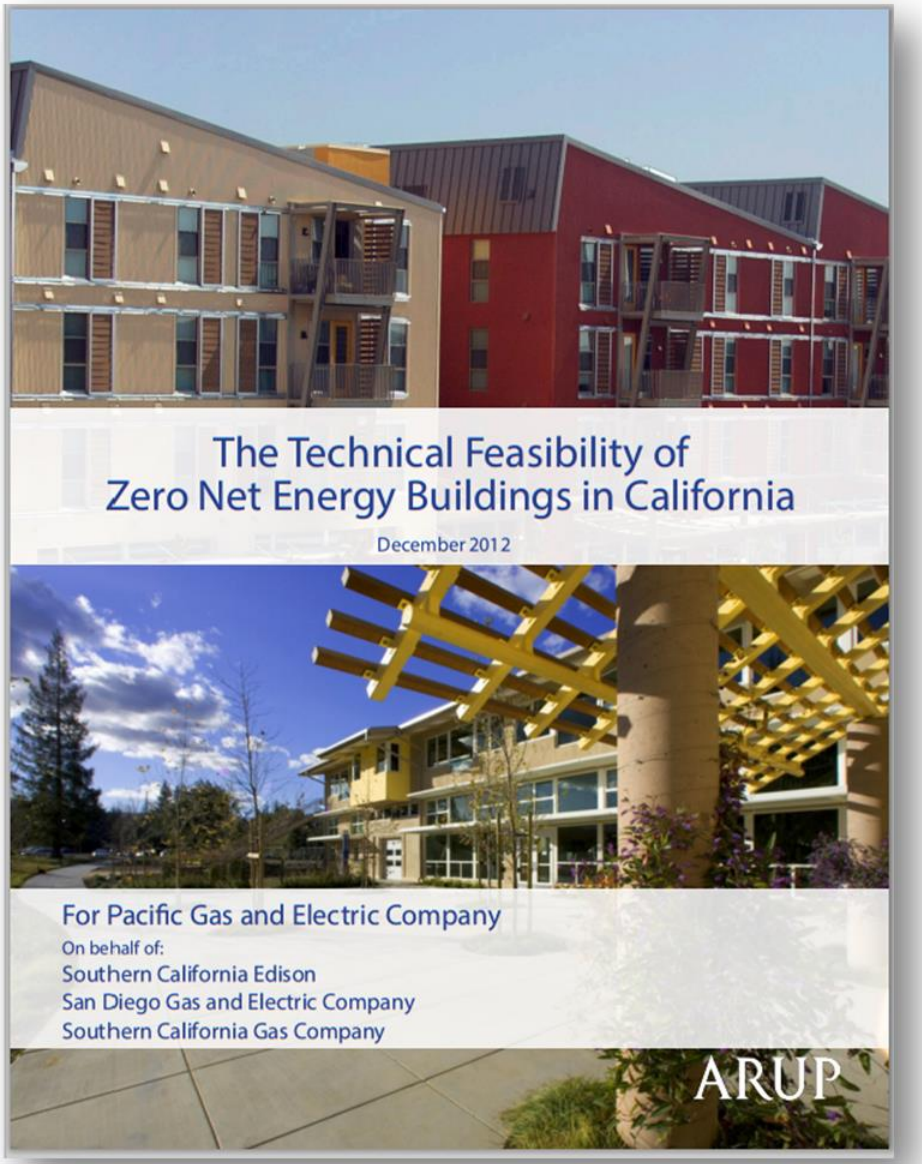
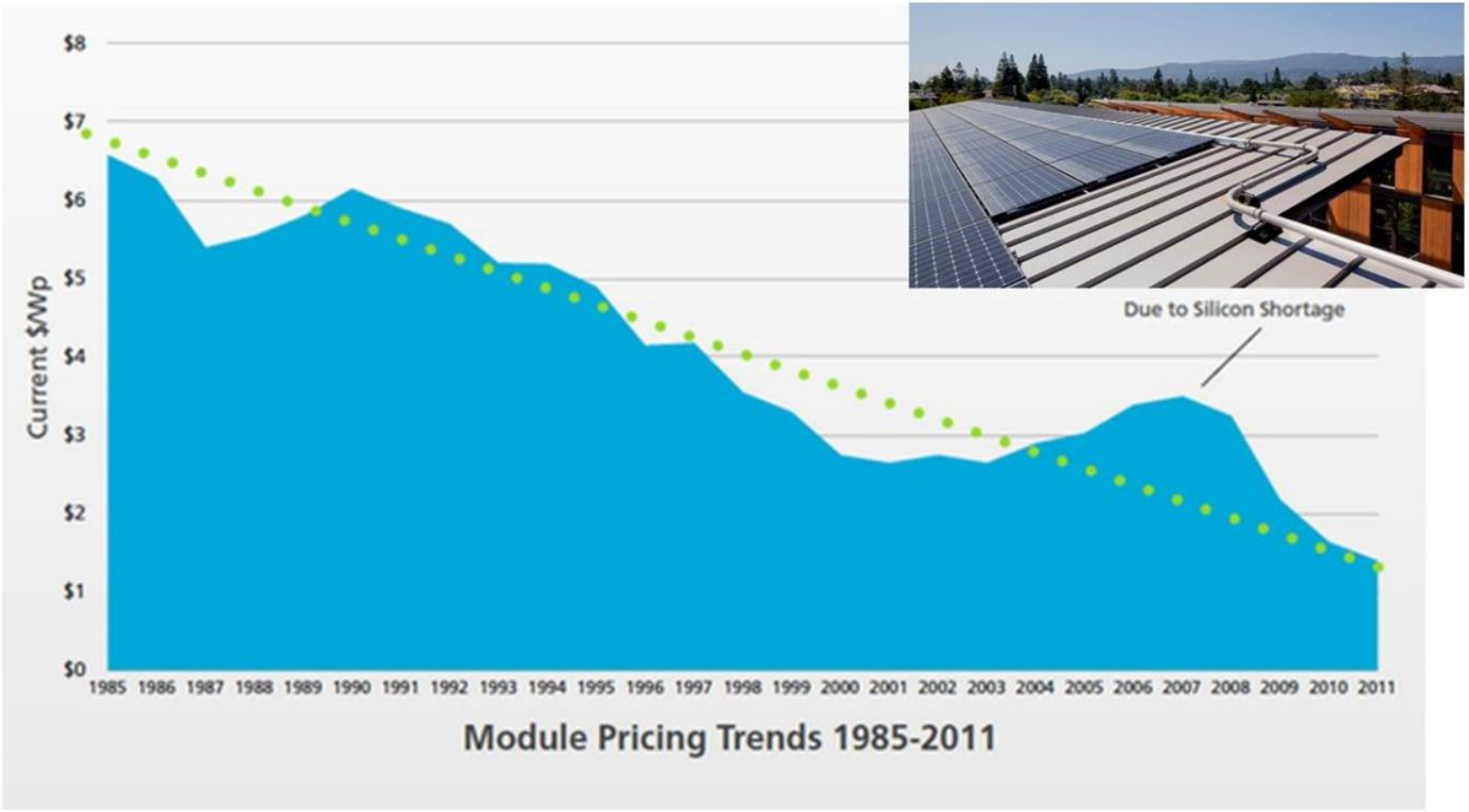
"The study's central finding is that ZNE buildings will be technically feasible for much of California's new construction market in 2020."

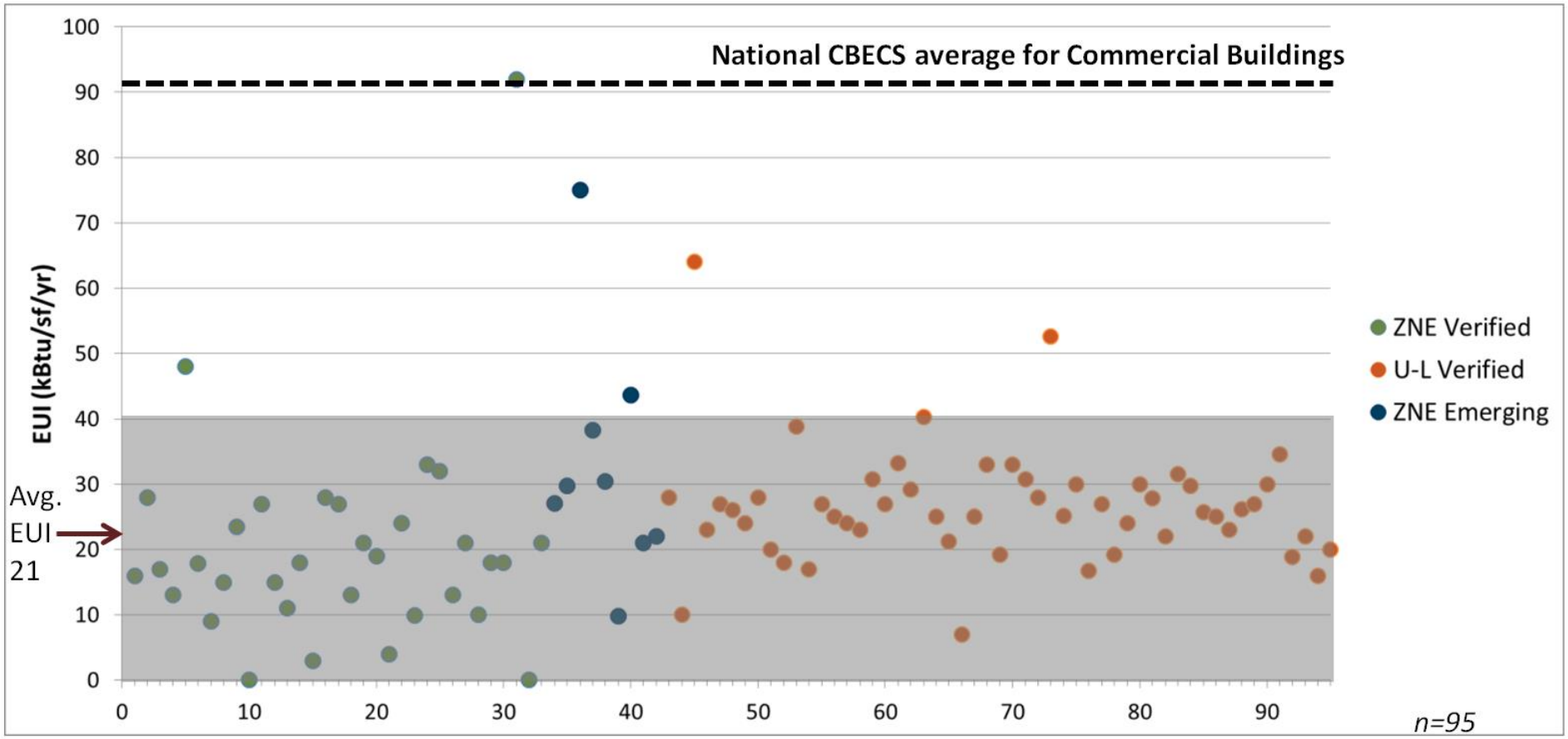


PV cost trend makes ZNE accessible



Source: P. Mints, Navigant Solar Services Program, 2011

Performance Range
(all projects w/ measured performance data)



Richardsville Elementary School

- Bowling Green, KY
- 72,300 SF
- Education K-12
- Completed in 2010
- LEED Gold
- $206/SF
- Warren County Public Schools
- Sherman Carter Barnhart, Architect
- CMTA, Mechanical and Electrical

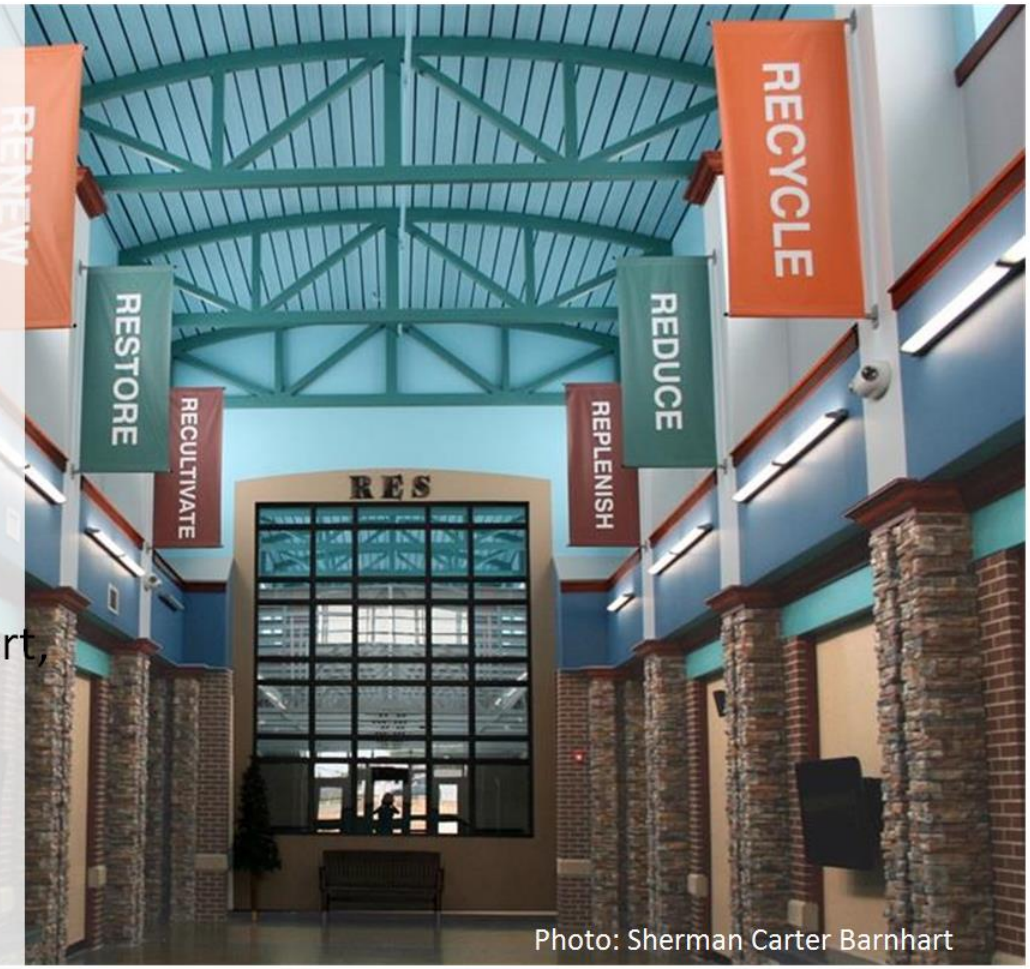
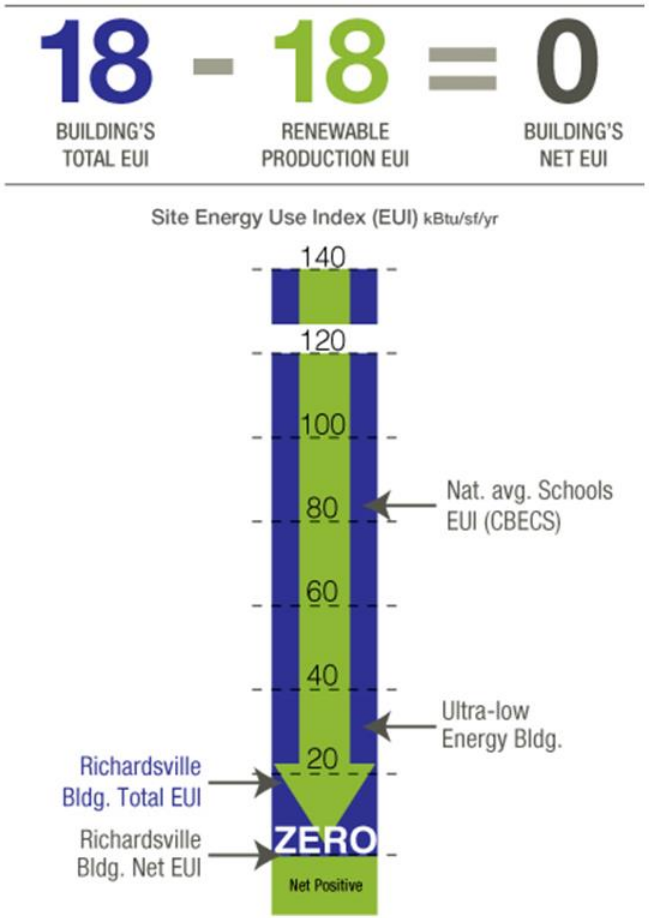


Photo: Sherman Carter Barnhart

Richardsville Elementary School

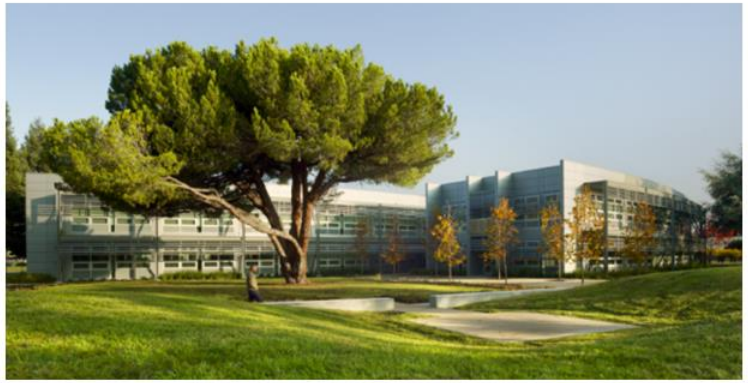


Efficiency Measures:

- Ground source heat pump
- DOAS
- CO2 sensors
- Daylighting
- High performance lighting system with controls
- EMS & Energy Dashboard

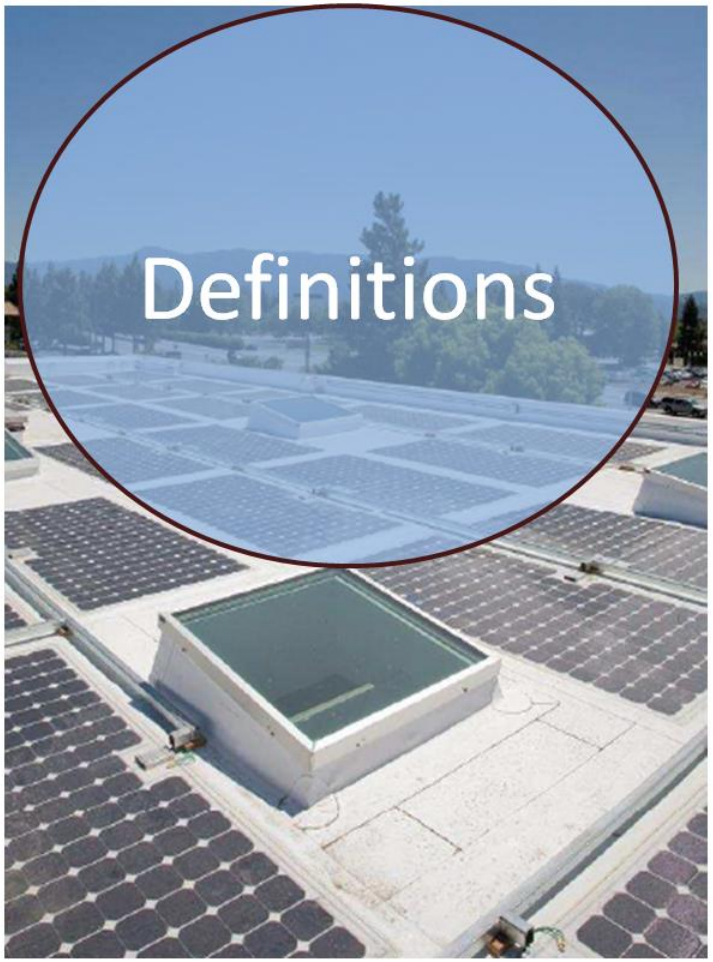
Ultra-low Energy Technologies and Strategies

- Ground Source Heat Pumps
- Ventilation: Natural, Dedicated Outdoor Air Systems (DOAS), Demand Control Ventilation (DCV)
- Highly Efficient Thermal Envelope
- Building Orientation & Glazing ratio
- Solar Control - shading
- Daylighting Access and Controls
- Energy Management Systems
- Building Dashboards
- Radiant Heating / Cooling & Chilled Beams
- Plug load Reductions
- Energy Recover Systems



NASA Sustainability Base, CA
Courtesy: Cesar Rubio Photography, McDonough & Partners

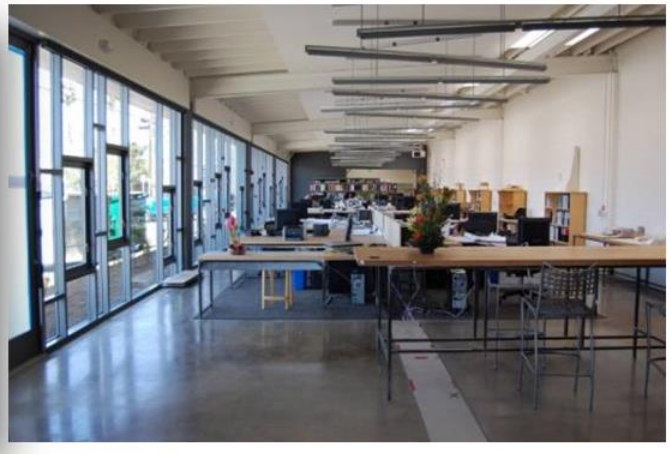
Challenges



- Data Gathering
- PV delayed due to cost
- Projects not occupied or operated as modeled
- Getting the metering right
- Commissioning – new form of ZNE Cx
- Fear of disclosure - ZNE seen as an end-all

ZERO NET ENERGY BUILDINGS IN CALIFORNIA: COMMERCIAL BUILDINGS

DPR Construction San Diego Corporate Office



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

SMUD East Campus Operations Center

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ZERO NET ENERGY BUILDINGS IN CALIFORNIA:

Exploratorium | San Francisco, CA

IDeAsZ² Office Building San Jose, CA

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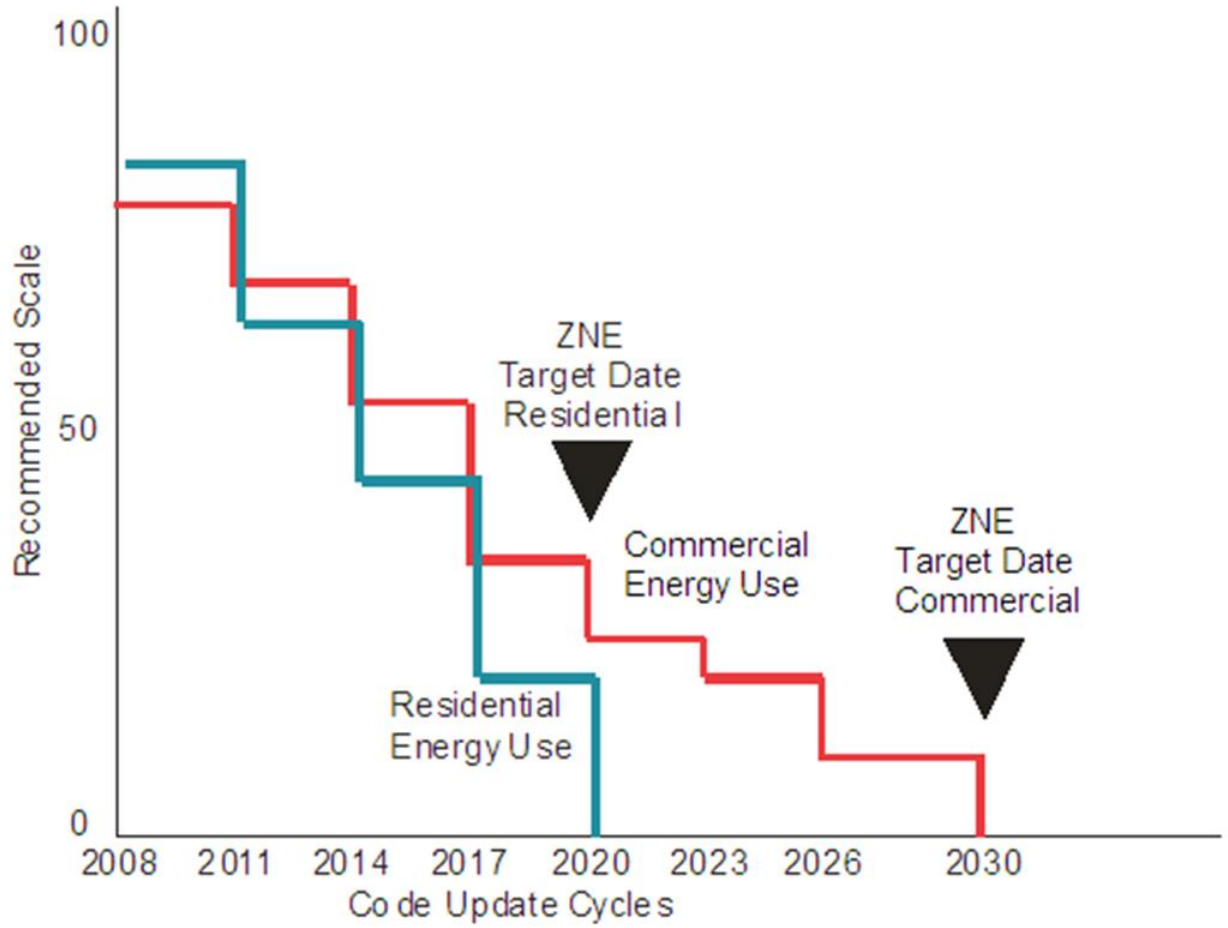
ZERO NET ENERGY BUILDINGS IN CALIFORNIA:

David and Lucille Packard Foundation | Los Altos, CA

Chartwell School | Seaside, CA

Code Cycles to Net Zero in CA



Code Cycles to ZNE, Source: SCE & AEC, 2009

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ZNE Tools & Resources

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ZNE for Local Government

WHY: When government leads, the people will follow…

- **Innovation & Leadership** - Zero energy buildings present important leadership and commitment to the public, as well as responsibility in wise use of energy resources, and innovation of what can be done in the built environment.
- **Resiliency** – Government facilities often serve as community centers for refuge in times of emergency;
- **Long Term Savings** in efficiency, cost, operations, climate
- **Alignment with Policy Goals** – Local Climate Action Plans, State Energy Efficiency Strategic Plan goals

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What Local Gov Buildings Make Sense for ZNE?

Most Building Types are Feasible - including:

- Low-Mid-Rise Office Buildings
- Service Buildings
- Warehouses
- City Hall
- Recreation & Environmental Centers
- Libraries
- Low Occupancy Buildings/Facilities
- Buildings needing major replacement, big energy hogs, buildings where systems are needing major retrofits

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How are Local Gov doing ZNE?

Strategies:

- Piloting ZNE projects
- Community building renewal (assessing existing local building stock to find opportunities).
- Look at what is coming up for capital improvement projects and pilot or upgrade systems and structures to get to ZNE.
- Consider DMV's approach to pursue ZNE on all new projects now and skip the pilots.
- Resiliency Planning - Identify "critical facilities" as priority projects; pair up with FEMA or other hazard mitigation funding
- Efficient use of resources – efficient use of tax payer dollars for long term value
- Demonstration of leadership in building technologies

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ZNE Early Adopters Leadership Network

Support for Schools, Local Governments, Higher Ed & State Agencies

Getting to Zero Workshops for ZNE Early Adopters

- Give participants an overview of California ZNE policy goals
- Foster peer to peer learning networks
- Showcase project case studies
- Provide customized tools and resources necessary to help support education and advocacy efforts
- Help participants develop policy targets
- Provide support for programs or projects with ZNE performance goals

ZNE Building Tours

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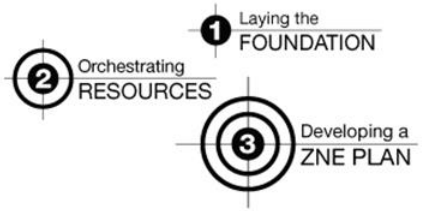
ASSEMBLING THE BUILDING BLOCKS TO DEVELOP YOUR ZNE PLANS & POLICIES



BUILDING BLOCKS FOR ZNE PLANNING

ZNE Communication Toolkit

ZNE Messaging Platform—Provides strong, overarching core messages and supplemental supporting message targeting key audiences.

Intro to ZNE Presentation Template—A basic slide deck introducing the core messages and activities in California.

ZNE Companion Guide/Fact Sheets—Provides an overview of the ZNE Communications Toolkit and contains the complete set of factsheets. The following fact sheets provide broad information about ZNE and audience-specific content

Planning Templates & Worksheets

STEP 1 - Laying the Foundation

- Vision & Target Setting (Worksheet 1A & Instructions)
- Backcasting to ZNE - Portfolio Scale & Building Scale (Worksheet 1B)

STEP 2 - Orchestrating Resources

- Stakeholder Communication Goals (Worksheet 2A & Sample)
- Stakeholder Mapping (Worksheets 2B)
- ZNE Communications Planning Strategies for Internal & External Stakeholders

STEP 3 - Developing your ZNE Plans

- ZNE Gap Analysis (Sample Considerations & Worksheet 3A)
- Alignment Plan for Addressing Gaps (Sample Strategies & Worksheet 3B)
- Integrating ZNE Into your Delivery Model (Sample & Worksheet 4)

Education & Training Presentations

1. **Introduction to ZNE** (Part of the ZNE Communications Toolkit)

2. **Assembling the Building Blocks to Develop your ZNE Plans & Policies**
   - Vision & target Setting & Backcasting
   - Developing your Communication & Outreach Plans: ZNE Toolkit, Message Platform & Stakeholder Mapping
   - Gap Analysis & Alignment
   - Delivery Methods

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Learn more at:

www.newbuildings.org/zne-communications-toolkit or visit www. newbuildings.org/zero-energy

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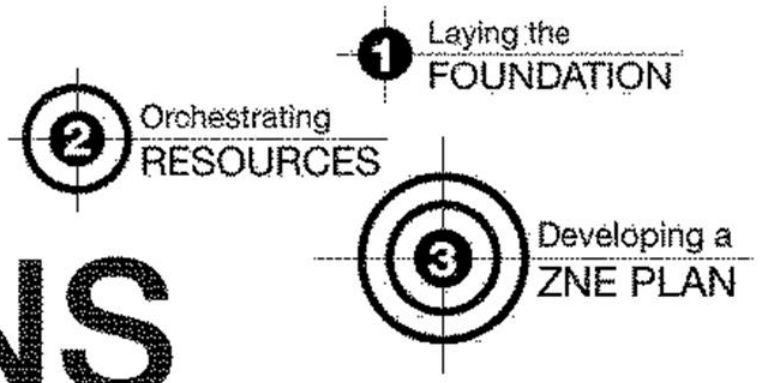
EARLY ADOPTERS NETWORK

TOOLS & RESOURCES FOR ZNE PLANS



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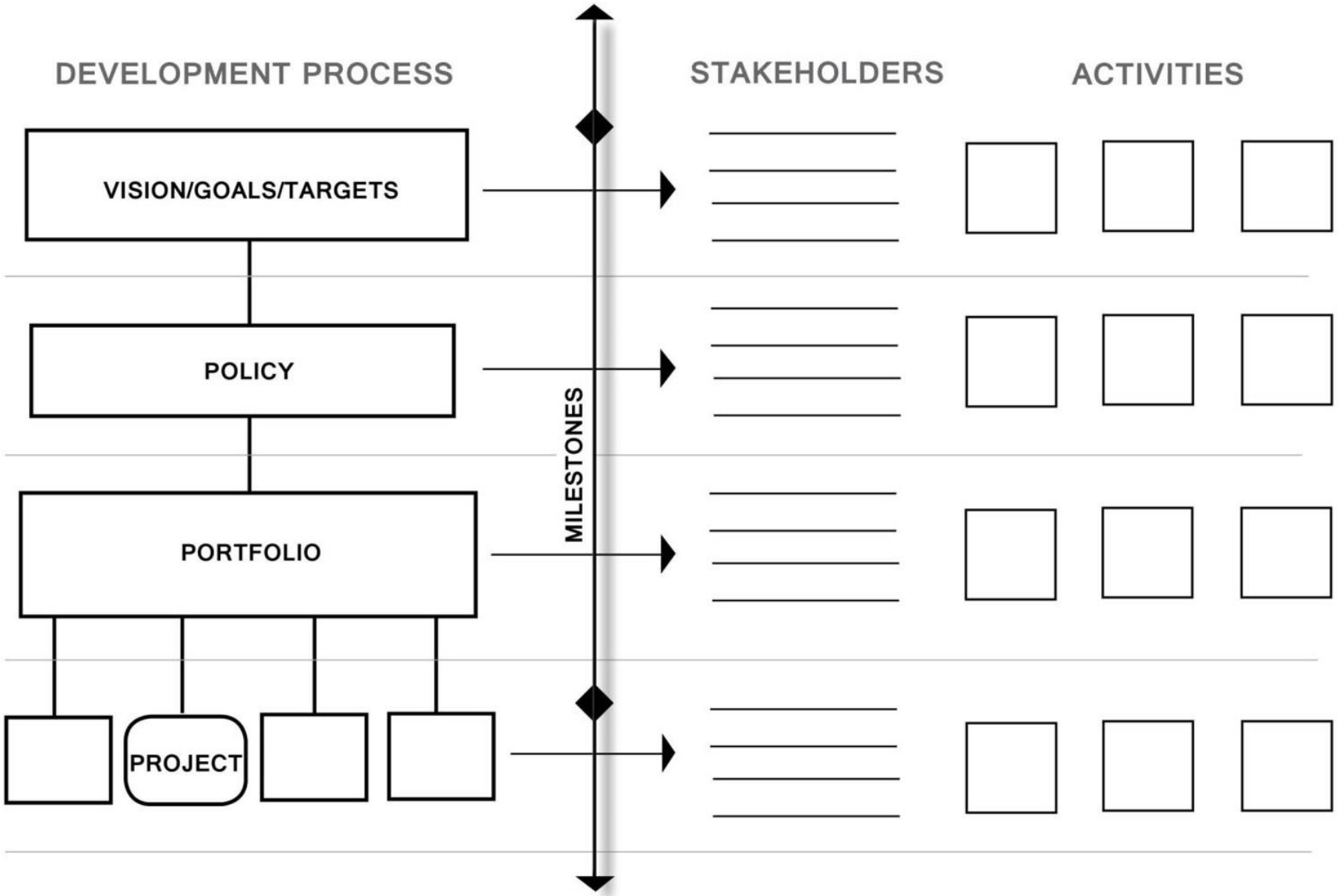
BUILDING BLOCKS FOR ZNE PLANNING



Assembling the Building Blocks of your ZNE Plan

1. **Set your goals** & milestones (Worksheet)
2. **Backcast** how you will get to ZNE (Worksheet)
3. I**dentify your key stakeholders and communication goals**, then map stakeholder interaction (Worksheet)
4. **Develop your Communication & Outreach Plan**, then engage stakeholders
5. **Conduct a gap analysis** & create a plan for alignment (Worksheets)
6. **Review your current/future building & retrofit plans** for ZNE opportunities and develop criteria for prioritizing
7. Identify & conduct any **special research/studies** needed
8. **Select a pilot project**
9. **Evaluate available delivery method options** for best likely ZNE result (Worksheet)
10. **Explore alternative financing approaches** to help offset costs
11. **Create RFQ/RFP that sets clear owner requirements and targets for ZNE**
12. Conduct an **integrated design process** and **use proven technologies & design** strategies

ZERO NET ENERGY BUILDINGS
VISION + GOALS + TARGETS

1. Vision: **Articulate your vision for what you would like to create - is it a policy, a single building, a set of buildings or a large portfolio?**

2. Success: **Describe what success would look like, including process**

3. Targets/Milestones: **How do we get there? Think about what key steps will be. How will you know when you have made progress? Note milestones and targets.**

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ZERO NET ENERGY BUILDINGS
BACKCASTING TIMELINE

1 Laying the FOUNDATION | 2 Orchestrating RESOURCES | 3 Developing a ZNE PLAN

BUILDING SCALE

Begin with the End in Mind

2014 | 1 Year | 2015 | 2017 | 5 Year | 2020 | 2025 | 10 Year | 2030 ZNE

- *Envelope*
- *HVAC*
- *Lighting*
- *Space Planning*
- *Finance - Strategies + Opportunities*
- *Process - Planning, Contracting, Design*
- *People - Stakeholder Engagement, Education + Outreach*

2015 GOALS	2020 GOALS	2030 GOALS

SCHOOLS SAMPLE - ZNE STAKEHOLDERS

Identify your project goals, audiences, stakeholders and decision makers.

1 Laying the FOUNDATION
2 Orchestrating RESOURCES
3 Developing a ZNE PLAN

Project Goals: *ZNE Campus By 2025*

1 yr – Engage stakeholders in learning about ZNE; 2 yr - benchmark all school buildings; 5 yr – Install dashboards for visitor and user to learn from; 10 yr – ZNE Campus

Communication Goals:

- Engage leadership to set ZNE targets
- Establish a ZNE task force to develop ZNE plans and a key education and outreach strategy
- Help internal operations and planning staff learn about opportunities for ZNE in upgrades and new buildings
- Integrate ZNE into curriculum
- Communicate key role of behavior and operations in achieving goals for ZNE

Key Communication Messages:

- Leadership opportunity
- Living learning classrooms
- Science-based curriculum for innovation and environmental sustainability
- Resources are available to help schools achieve high levels of energy efficiency

Key Audiences:

Facilities Manager*

Vice-Superintendent*

School Board

Science Teachers

Grant Funders

Utilities

* **Key Decision Makers:**

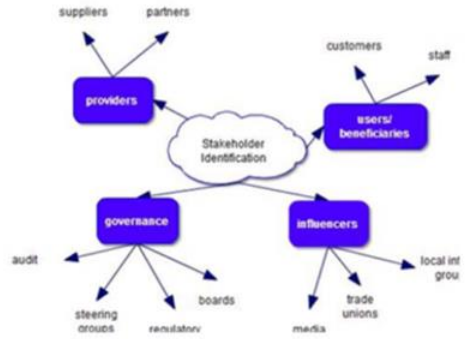
Internal Stakeholders:

- Administration
- Teachers
- Students
- PTAs

External Stakeholders:

Architecture & Design Consultants

Stakeholders Map–*create your own Stakeholder Map on the following page using the illustration below as inspiration*



Activities for Engagement

- Note needed activities to engage each stakeholder group - form of communication & frequency

- *outreach*
- *education*
- *research*
- *planning*

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ZNE Gap Analysis - Considerations

Evaluate the following with ZNE in mind. Where are the interventions or assessment needs? Where are there missing pieces? Are special studies needed? Are any in progress?

New construction plans: *[Review of capital projects planned for any possible ZNE or ultra-low energy opportunities]*

- Do you have any new building construction plans?
- Have you established energy performance goals/targets yet?

Renovation Plans:

- Do a design review of any plans for possible compatibility with ZNE (controls, systems, envelope)
- Can you leverage other natural cycles of improvements at the same time as a renovation/upgrade?

Building upgrade plans: *[Review of existing buildings and any planned or needed upgrades]*

- Do you have any major system upgrades anticipated? Have you benchmarked your buildings/portfolio yet?
- Which buildings are chronic under-performers, either in energy use or comfort? Which buildings might be a priority for energy upgrades?

Monitoring data:

- Do you have a way to compare energy performance of your buildings? Is it presented in a way that is understandable to a non-technical audience? Is the feedback loop to the users complete (i.e dashboards, data method/presentation is actionable)?

Policy: *[Review of policies that support/hinder ability to implement solar or other renewables]*

- Do you have a green building policy?
- Have you set 2030 goals? Do you have a climate or carbon policy?
- Do you have a data collection and benchmarking policy?
- Do you have a policy for actively managing building energy?

Financing:

- Does your building valuation reflect the impact of energy performance ($ savings, comfort, productivity, reflection of organization mission).
- Tie performance to which buildings to buy or lease.
- If you are paying to certify your building are you prioritizing energy performance?

Operations:

- Have your buildings been commissioned?
- Facilities, building managers training
- Do you have a mechanism to identify operational issues
- Do you have a technology or policy that allows you to monitor

Occupant Training & Education:

- Do the occupants have the opportunity for actionable feedback?
- Do you have a training program for building operations both for facilities staff and users?

Staffing:

- Have you evaluated or done a schedule/system integration study? I.e. reviewed employee schedules for impacts on energy performance? Do you have the funding or person-power to manage an energy reduction program

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PLAN TO ADDRESS IDENTIFIED GAPS

Consider strategies to align goals and plans to overcome any gaps identified.

GAP	ALIGNMENT STRATEGY
Policy	• Assess gaps and create a summary to brief leadership • Identify any champions and leads • Set up task force to evaluate internal/external building policy barriers and strategies.
Design	• Work with capital projects staff to pursue/require and integrated design process (IDP) on any new high performance building projects

Financing	• Explore creative financing strategies:
	  ○ Utility incentives
	  ○ Upgradeable design - renewables added in annual phases
	  ○ Prototypical building types that allow for inexpensive replication
	  ○ Technology innovation pilots or demonstration funding

Building Plans	• Work with capital project staff to prioritize projects • Meet with operations staff to review building/campus/portfolio energy performance • Identify new construction/renovation projects might support ZNE • Evaluate which system upgrades will have the biggest value (cost, efficiency, innovation/demonstration) • Identify special studies needed. Determine if these can be done in-house or requires external consultant support. If external support is needed, develop a scope of work and RFP.
Data Monitoring	• Benchmark all building energy use • Establish a standardized metric for energy performance (e.g. zEPI)
Operations Training & Education	• Ensure building delivery includes a full set of plans and quick start guide • Review and establish meaningful and actionable feedback loops
Staffing & Training	• Develop user training for both new and current staff, as well as ongoing training and education

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Integrating ZNE into your Delivery Method

1 Laying the FOUNDATION
2 Orchestrating RESOURCES
3 Developing a ZNE PLAN

Visioning/Planning

- Engage Stakeholders
- Backcast to ZNE
- Set ZNE goals and milestones
- Map stakeholders
- Develop Communication Plan
- Educate leadership
- Develop training & education plan for planning through -ongoing operation

RFP

- Write contractor requirements and design specs for ZNE
- Consider how integrated design process (IDP) is part of a design firm's regular practice as a proposal evaluation criteria

Design

- Model building performance
- Conduct integrated design process (IDP)
- Set owners project requirements
- Establish basis of design
- Include design requirements to maximizing building performance before integration of

Bid

- Write contractor and construction specifications
- Select contract method – design-bid-build, CMGC, design-build, guaranteed max. price.
- Consider various contract delivery methods will support or hinder an integrated design process – a

Finance

- Choose a lender that values energy performance
- Clearly make valuation argument including benefits of long-terms savings, energy independence, leadership, carbon/climate impacts, marketing, etc.

Build

- Establish quality control mechanism related to energy system calibration, commissioning, and proper installation.

Operate

- Establish actionable feedback loop
- Commissioning/Re-commissioning plan
- Ensure proper handoff of the building includes providing operators and occupants with resources and documentation to operate building including: copy of CD's to building
- Written description of systems and

Educate/Train

- Develop user manual for operators and occupants
- Conduct trainings for operators and users
- Establish training process for new occupants and regular maintenance

Measure/Monitor

- Establish data collection protocols
- Share your data with others
- Provide visible dashboards

Certify/Market/Promote

- Verify/certify performance
- Share your data with others
- Tell your story, case studies, news media, websites

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Outreach & Communication Plans

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ZNE COMMUNICATIONS & OUTREACH PLANNING

INTERNAL STAKEHOLDER ENGAGEMENT

Use the following form to outline how you will engage stakeholders throughout the planning process. Identify specific Staff on the lines below.

Internal Stakeholders	Strategies for Engagement	Actions, Timing
Leadership. Decision makers, those who can provide input on priorities, timelines, goals, financing, etc. _____ _____ _____ _____ _____ _____ _____	□ Work with leadership to secure commitment to ZNE goals and identify opportunities where they can provide ongoing support □ Identify opportunities and challenges that need to be addressed in organizational/ governmental planning □ Plan for opportunities to put leadership representatives before other stakeholders □ Regularly communicate to keep the issue top of mind; provide feedback/updates from facilities group	□ Conduct an introductory workshop with leaders that will introduce ZNE concepts; share proposed goals and targets from backcasting exercise, engage discussion of short term priorities and long-term vision; share gap analysis and recommendations for alignment □ Report out on the workshop with shared vision and commitments □ Conduct annual meetings to verify progress □ Create a calendar with priorities for leadership input □ Provide quarterly progress updates and at key milestones
Facilities & Operations Staff. Leader for planning, develops project timelines, RFPs for special studies/other needed consultant's work plans _____ _____ _____ _____ _____	□ Create a cadre of advocates who understand the ZNE goals and concepts and can share with others □ Provide resources that advocates can tap into to advance ZNE projects and goals (RFP guidelines, messaging, etc.) □ Facilitate communications that keep advocates up up-to-date on progress; share and learn from each other	□ Identify critical staff and bring them together for initial meeting that reports on outcomes of leadership workshop □ Identify initial inventory of resources; ask for gaps and prioritize □ Hold monthly/bi-monthly internal operations planning meetings with one of these each quarter including occupant champions □ Provide quarterly updates to leadership on advocate activities/progress
Occupants/users. Provides feedback on schedules, comfort, aesthetics, acoustics, usability, needed education _____ _____ _____ _____ _____ _____	□ Educate occupants so they can understand ZNE goals and better support implementation □ Create champions within staff to act as a point of contact for occupants and work with operations to provide resources and carry feedback □ Facilitate communications that keep champions up up-to-date on progress; share and learn from each other	□ Identify and tap possible champions to be point of contact for staff □ Create an introductory package of information about behavior impacts on ZNE building performance and share in a staff event (perhaps over two events) □ Survey users regarding needs, comfort levels, priorities □ Provide monthly communications with champions on resources, performance metrics (are we on target?) and key milestones that they can share □ Hold quarterly meeting with champions and facilities advocates

ZNE COMMUNICATIONS & OUTREACH PLANNING

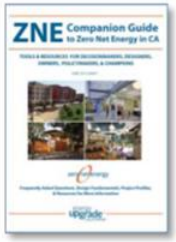
EXTERNAL STAKEHOLDER ENGAGEMENT

1 Laying the FOUNDATION
2 Orchestrating RESOURCES
3 Developing a ZNE PLAN

Use the following form to outline how you will engage stakeholders throughout the planning process. Identify specific Staff on the lines below.

External Stakeholders	Strategies for Engagement	Actions, Timing
A&E Consultants. Support for planning and design recommendations, special studies, etc. _____ _____ _____ _____ _____ _____	☐ Tap A&E consultants as a resource and as possible educators for facilities and staff ☐ Create mechanisms that ensure the design teams vision is manifested in the building operations (i.e., assumptions match reality or are appropriately adjusted) ☐ Create engagement opportunities between key parties throughout the design, construction and commissioning process	☐ Conduct a ZNE design charrette for projects that includes leadership, facilities and occupant representatives ☐ Allow A&E consultant to attend staff event to answer questions and report on charrette outcomes ☐ Publish monthly communication between project manager/A&E consultants and facilities/occupant contacts on progress of design, construction and commissioning ☐ Create opportunities for champions/advocates to provide feedback
External Partners/Audiences. Entities that can help support and broaden knowledge and understanding of ZNE goals • Utilities • Other Agencies • Nonprofits • Medias • General Public	☐ Ensure that targeted external partners are aware of the project and ZNE goals ☐ Connect with local utility to gain access to technical support and incentives as well as possible opportunities to help communicate the project more broadly ☐ Prepare a messaging platform of key ZNE messages specific to your audiences (use ZNE toolkit resources) and distribute to all champions/advocates who can speak about the entities ZNE plans and goals	☐ Identify key external audiences and categorize as partners or general stakeholders ☐ Reach out to partners who can further support communications efforts (utilities, nonprofits, etc.) ☐ Identify and integrate information about the ZNE efforts into regular communications to stakeholders and general public; this could be direct, through agencies or via media outlets

Key Communication Tools



ZNE Communications Tools& Resources – www.newbuildings.org/zero-energy

- ☐ **ZNE Action Bulletin-** News, case studies, policy, research, events and trainings
- ☐ **Message Platform -** Key target audience messages
- ☐ **Intro to ZNE Presentation -** ZNE what, why & how
- ☐ **Case Studies -** California project examples, including design strategies, planning, cost, and lessons learned
- ☐ **ZNE Companion Guide/Fact Sheets -** General info, key audiences messages

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 decisionmakers of schools and public buildings.

4 **Case Studies: ZNE & Ultra-Low Energy 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.

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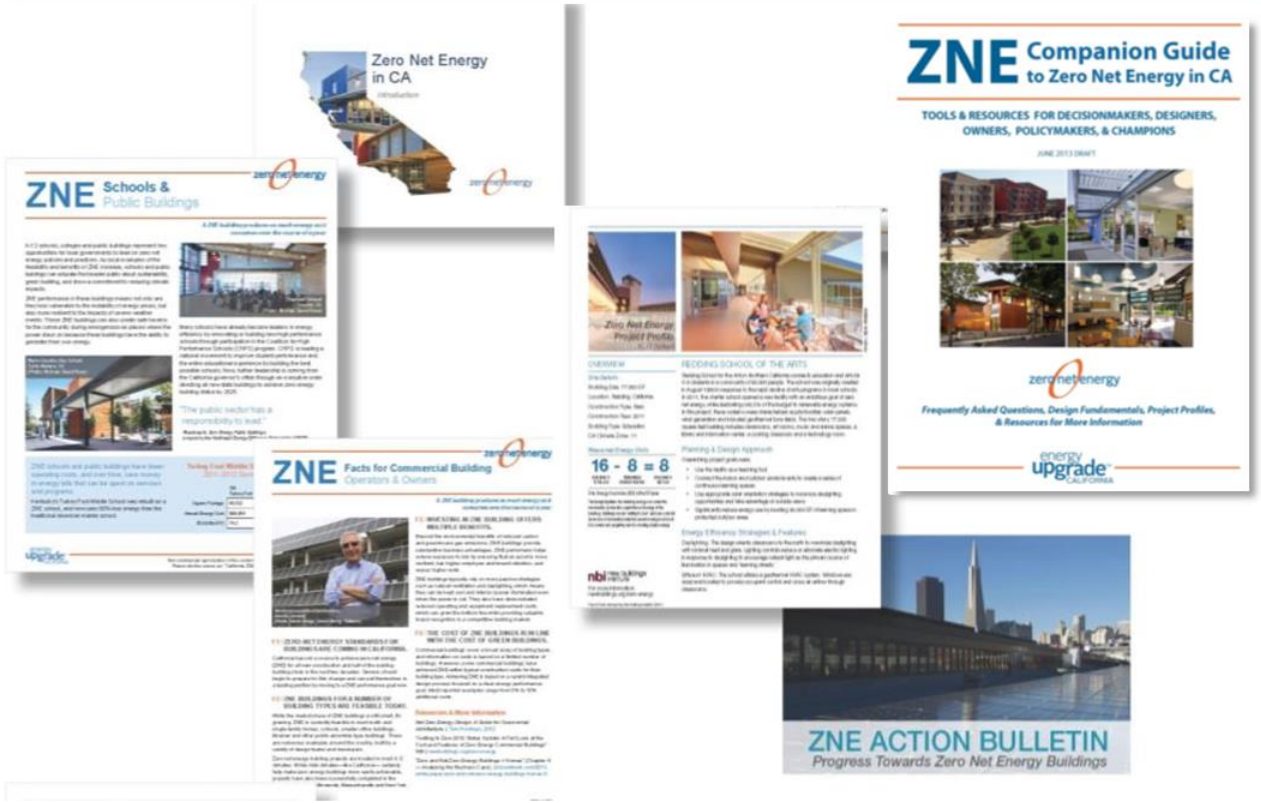
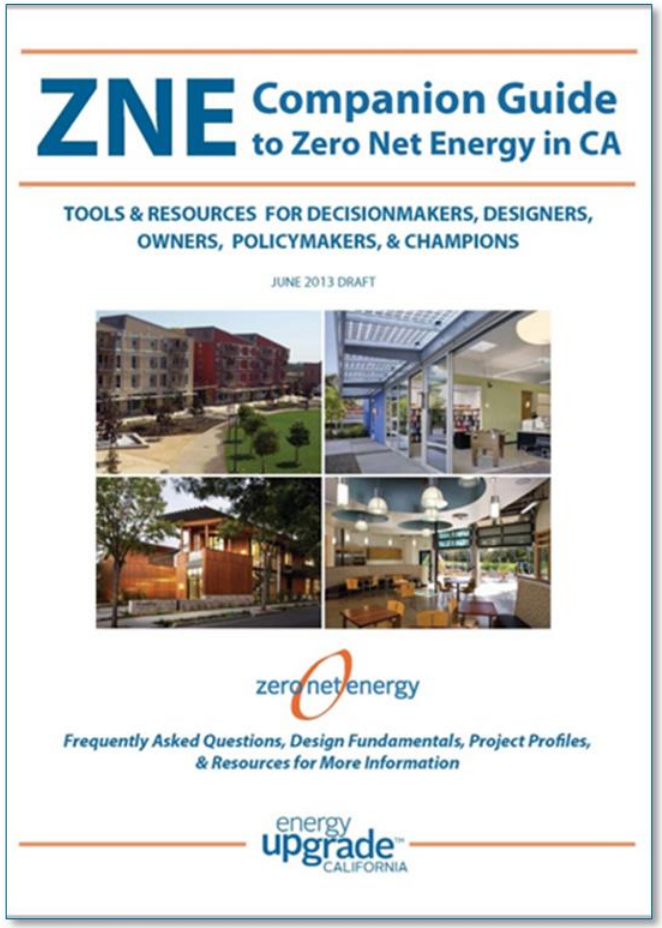
ZNE Communications Toolkit



www.newbuildings.org/zne-communications-toolkit

ZNE Communication Toolkit Contents

1. **Message Platform**
   Key target audience messages
2. **ZNE Companion Guide/Fact Sheets**
   General info, key audiences messages
3. **ZNE Action Bulletin**
   News, case studies, policy, research, events and trainings
4. **Case Studies**
   California project examples, including design strategies, planning, cost, and lessons learned
5. **Intro to ZNE Presentation**
   ZNE What, Why & How



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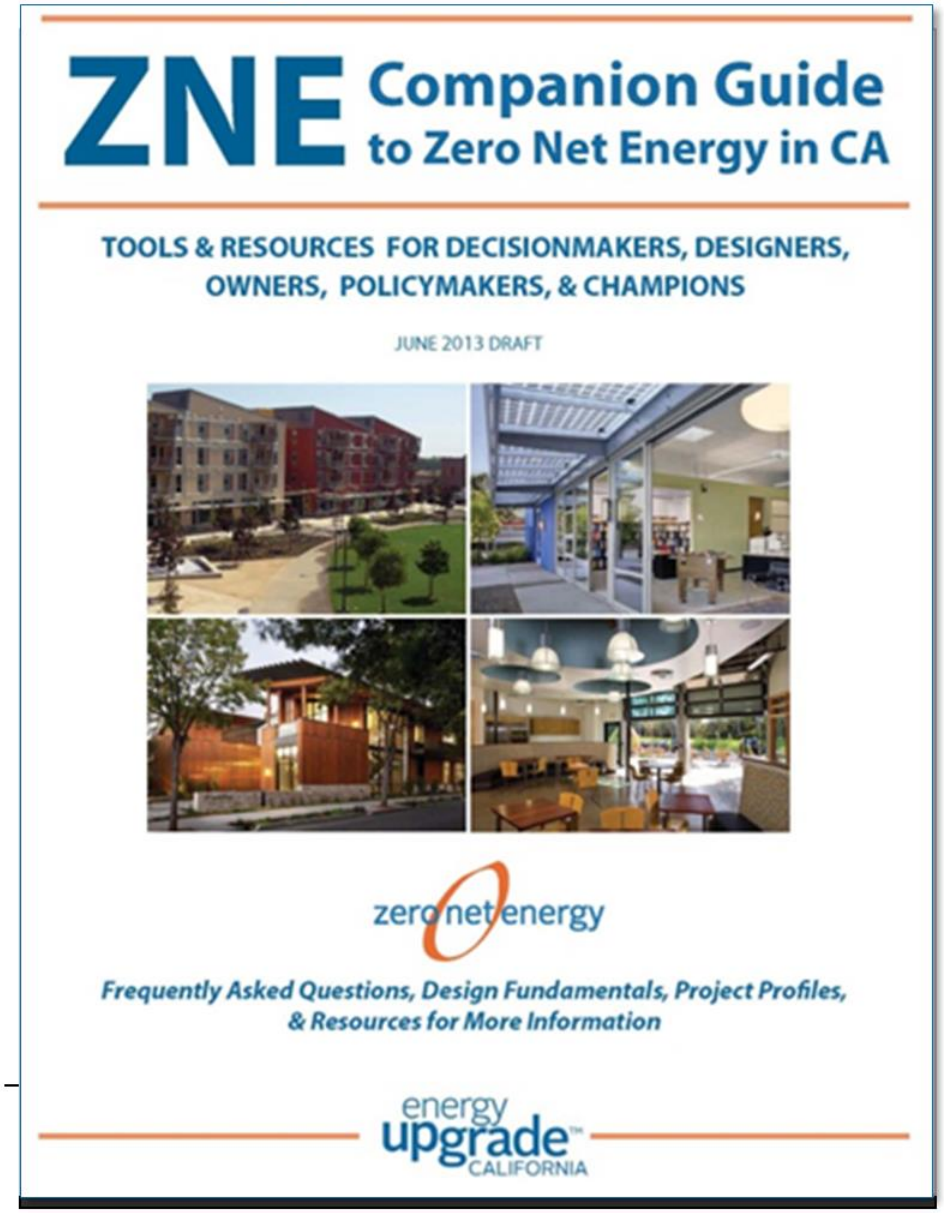
Fact Sheets/ZNE Companion Guide

- Policymakers
- Decisionmakers of Schools & Public Buildings
- Architecture & Engineering
- Commercial Owners
- FAQ's



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ZNE Message Platform

Marketing Definition

A ZNE building is highly energy efficient and produces as much energy as it consumes over the course of a year through clean, renewable resources.

The future for buildings in California

Zero Net Energy in California

Value Proposition

- Highest level, "new finish line"
- Lower net monthly costs, higher resale value
- Better performing in use and operations, reliable
- Comfortable and productive environment for working, learning and living
- Makes communities stronger, resilient and energy independent
- Helps meet climate goals through lower emissions-less energy and more renewables

Communication Goals

- Accelerate market adoption
- Educate key audiences
- Support champions and early adopters
- Establish CA leadership nationally
- Mitigate market barriers and opposition

Internal Stakeholders

- Champion Groups
- CPUC, CEC
- CARB, Governor's Office, CalEPA
- Funders
- Regulators
- EE/ Environmental Advocates
- Clean technology/EE industry
- Utilities

Key Audiences

- Building Owners and Operators
- Architects and Developers
- Local Government Officials and Staff
- School and Public Building Decisionmakers
- Real Estate Brokers and Managers
- Foundations/funders

Zero Net Energy

MESSAGE PLATFORM

Zero net energy (ZNE) buildings are becoming the new standard for achieving significant energy savings and reducing emissions in the built environment. California set an aggressive course for a new "zero finish line" knowing it will lead to the highest levels of efficiency in buildings, more renewable energy generation, and less carbon emissions. Yet agencies understand that regulation alone will not get the state to its goals by 2020 and 2030. To advance ZNE adoption, effective communications are essential to help catalyze voluntary investment and innovation, and motivate building owners, buyers and developers to prioritize ZNE while mandatory codes and standards evolve.

"The two words information and communication are often used interchangeably, but they signify quite different things. Information is giving out; communication is getting through."

- Sydney Harris

ZNE Communications

This Message Platform presents strong, overarching core messages and supplemental supporting messages targeting key audiences. It will create the basis of how stakeholders talk about ZNE and is designed to help define ZNE buildings and demonstrate that ZNE is a tangible, achievable benchmark and the future of buildings in California.

DPR Construction Corporate Office | San Diego, CA

This near-obsolete 1984 office building was transformed into a vibrant, Zero Net Energy, and sustainable "learning lab" and a great place to work. (Photo courtesy of SDG&E)

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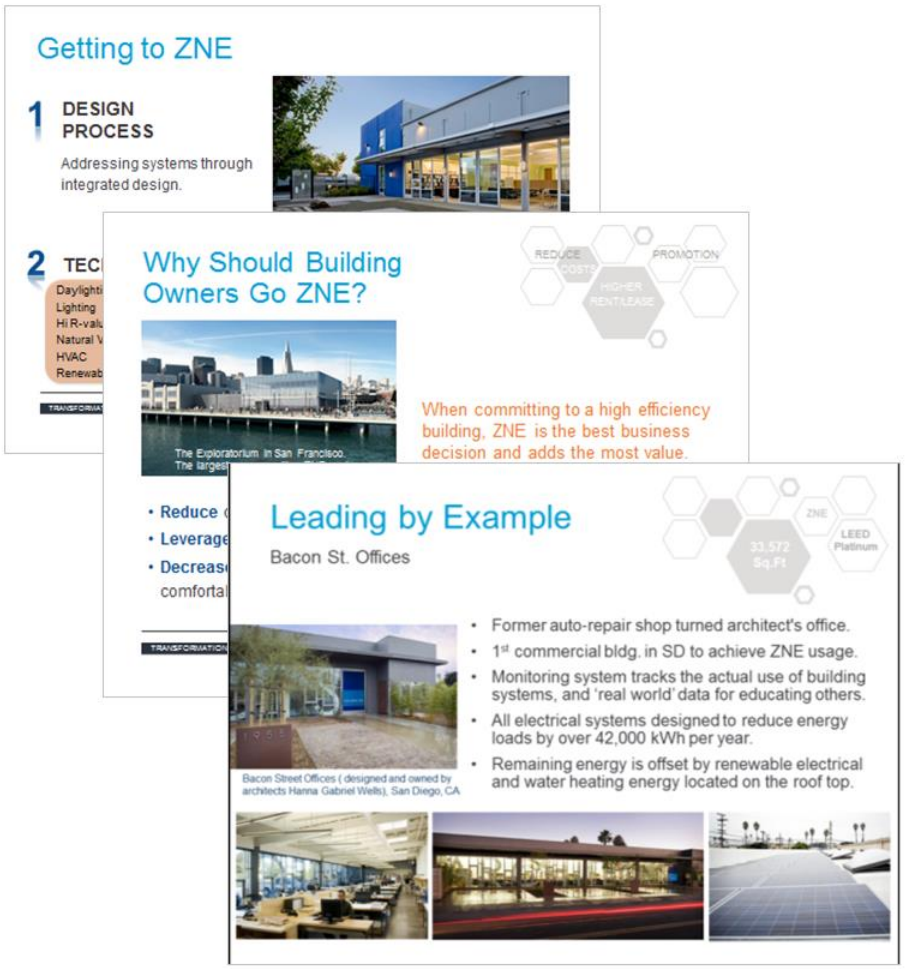
ZNE Presentation Templates

- Primarily commercial
- Carries general messages
- CA Goals for ZNE
- ZNE building examples
- Open source platform! Slide collection will grow as champions and others develop their own ZNE presentations

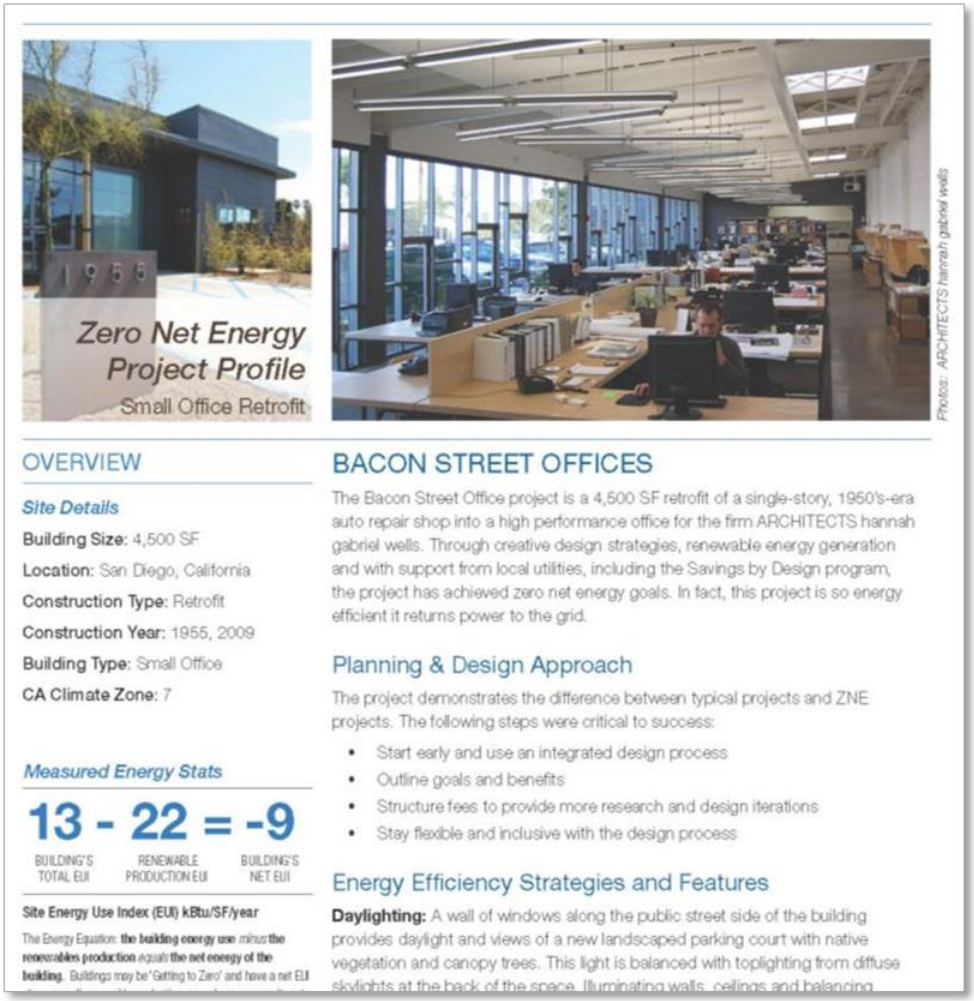
Users of the Presentation:

- Champions & Early Adopters
- Utilities
- Communications staff



ZNE & Ultra-Low Energy Case Studies

- CPUC Case Study Briefs & NBI ZNE Case Studies
  http://newbuildings.org/case-studies-zne-projects
- PG&E Case Studies
  http://energydesignresources.com/resources/publications/case-studies/case-studies-zne-non-residential-buildings.aspx
- NBI Registry
  http://newbuildings.org/share
- Getting to Zero Database
  http://newbuildings.org/getting-to-zero-buildings-database



1955

Zero Net Energy Project Profile

Small Office Retrofit

Photos: ARCHITECTS hannah gabriel wells

OVERVIEW

Site Details

Building Size: 4,500 SF

Location: San Diego, California

Construction Type: Retrofit

Construction Year: 1955, 2009

Building Type: Small Office

CA Climate Zone: 7

Measured Energy Stats

13 - 22 = -9

BUILDING'S TOTAL EUI | RENEWABLE PRODUCTION EUI | BUILDING'S NET EUI

Site Energy Use Index (EUI) kBtu/SF/year

The Energy Equation: **the building energy use** *minus* **the renewables production** *equals* **the net energy of the building**. Buildings may be 'Getting to Zero' and have a net EUI

BACON STREET OFFICES

The Bacon Street Office project is a 4,500 SF retrofit of a single-story, 1950's-era auto repair shop into a high performance office for the firm ARCHITECTS hannah gabriel wells. Through creative design strategies, renewable energy generation and with support from local utilities, including the Savings by Design program, the project has achieved zero net energy goals. In fact, this project is so energy efficient it returns power to the grid.

Planning & Design Approach

The project demonstrates the difference between typical projects and ZNE projects. The following steps were critical to success:

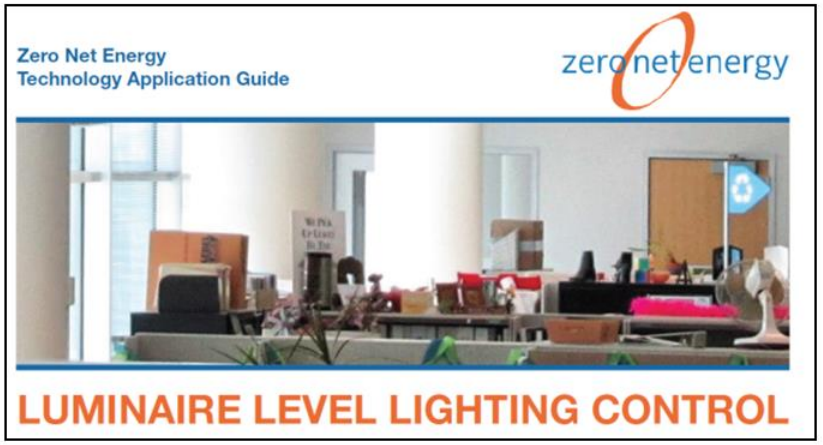
- Start early and use an integrated design process
- Outline goals and benefits
- Structure fees to provide more research and design iterations
- Stay flexible and inclusive with the design process

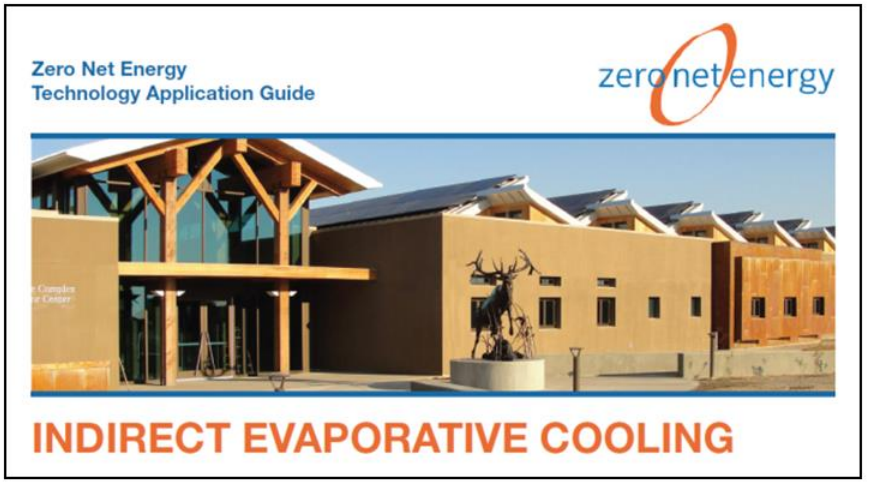
Energy Efficiency Strategies and Features

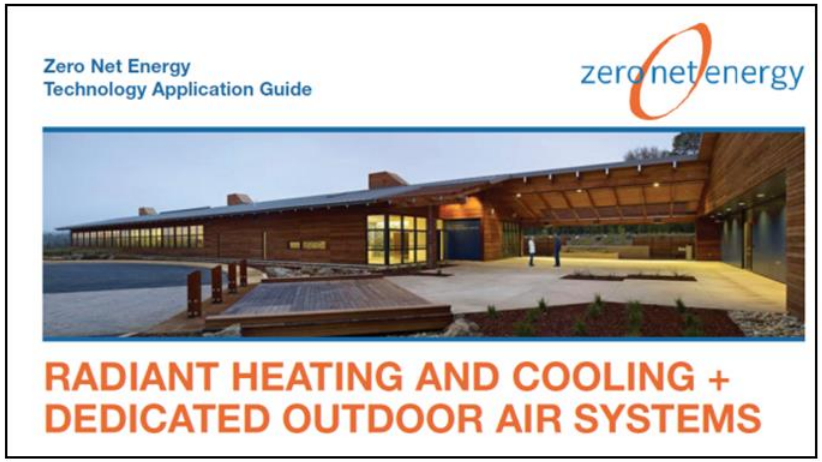
Daylighting: A wall of windows along the public street side of the building provides daylight and views of a new landscaped parking court with native vegetation and canopy trees. This light is balanced with toplighting from diffuse skylights at the back of the space. Illuminating walls, ceilings and balancing

Email heather@newbuildings.org to sign up

3 New: ZNE Technology Application Guides







http://newbuildings.org/zero-energy

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SavingsByDesign

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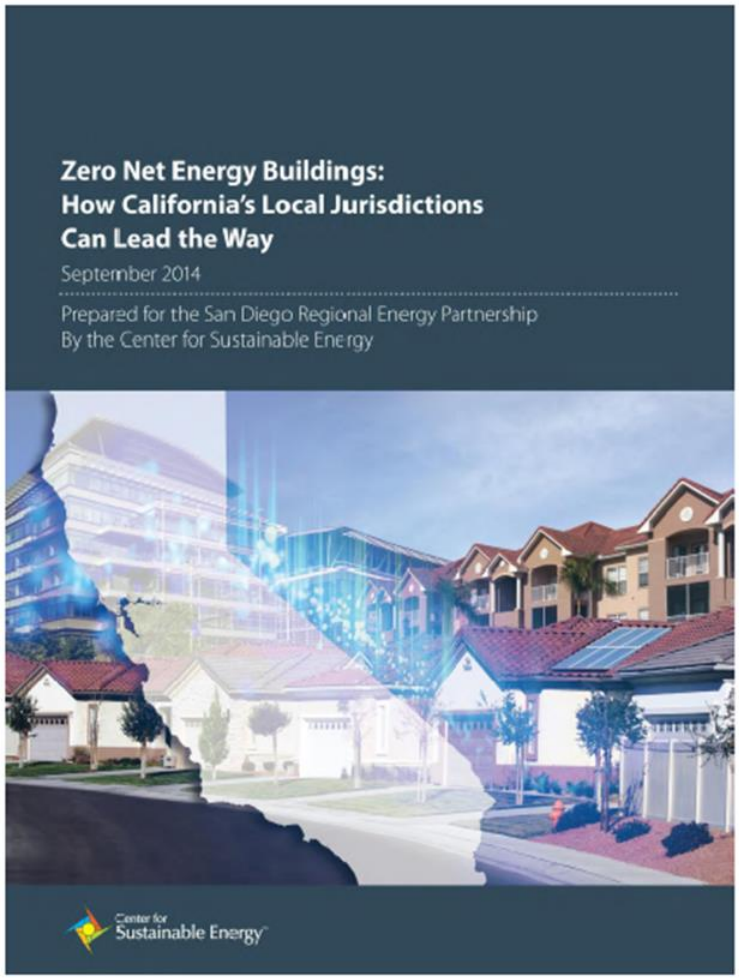
New Resources to Support Local Governments



Policy Templates

- **Santa Barbara Resolution for Zero Energy Buildings in County Owned Facilities**
- **ZNE Incentive Track embedded in Green Building Programs**
  SmartBuildSB2 website

New Resources

- **ZNE Report by Center for Sustainable Energy & Online Tool**
  https://energycenter.org/zne
- **NBI Top 10 Policies for Getting to Zero Energy Buildings**
  http://newbuildings.org/ten-selected-policies-support-progress-toward-net-zero-building-sector

Incorporating ZNE into your Policies & Delivery Process

Delivery Approaches

Ralph DiNola, New Buildings Institute

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Integrating ZNE into your Delivery Method

1 Laying the FOUNDATION
2 Orchestrating RESOURCES
3 Developing a ZNE PLAN

Visioning/Planning

- Engage Stakeholders
- Backcast to ZNE
- Set ZNE goals and milestones
- Map stakeholders
- Develop Communication Plan
- Educate leadership
- Develop training & education plan for planning through -ongoing operation

RFP

- Write contractor requirements and design specs for ZNE
- Consider how integrated design process (IDP) is part of a design firm's regular practice as a proposal evaluation criteria

Design

- Model building performance
- Conduct integrated design process (IDP)
- Set owners project requirements
- Establish basis of design
- Include design requirements to maximizing building performance before integration of

Bid

- Write contractor and construction specifications
- Select contract method – design-bid-build, CMGC, design-build, guaranteed max. price.
- Consider various contract delivery methods will support or hinder an integrated design process – a

Finance

- Choose a lender that values energy performance
- Clearly make valuation argument including benefits of long-terms savings, energy independence, leadership, carbon/climate impacts, marketing, etc.

Build

- Establish quality control mechanism related to energy system calibration, commissioning, and proper installation.

Operate

- Establish actionable feedback loop
- Commissioning/Re-commissioning plan
- Ensure proper handoff of the building includes providing operators and occupants with resources and documentation to operate building including: copy of CD's to building
- Written description of systems and

Educate/Train

- Develop user manual for operators and occupants
- Conduct trainings for operators and users
- Establish training process for new occupants and regular maintenance

Measure/Monitor

- Establish data collection protocols
- Share your data with others
- Provide visible dashboards

Certify/Market/Promote

- Verify/certify performance
- Share your data with others
- Tell your story, case studies, news media, websites

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ZNE Design & Contracting

RFP's & RFQs

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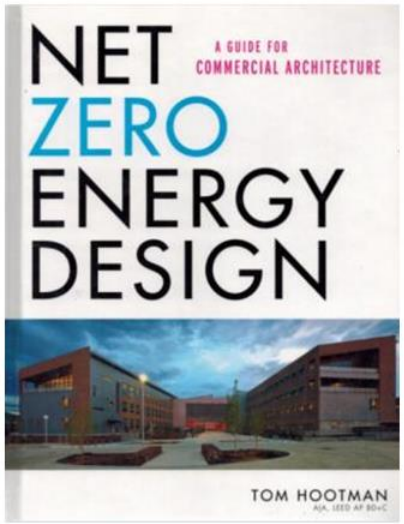
Budget Guidelines for ZNE

Budget Guidelines for Net Zero Energy Projects

- **Life-cycle value:** Seek long-term, life-cycle value and budget for quality and performance, keeping in mind that net zero energy buildings are all about exemplary energy performance and value.
- **Selection and pricing:** Project team selection and pricing methods used for the project are as important as the budget for overall cost control. (The pros and cons of selection and pricing methods are addressed later in this chapter.)
- **Soft costs:** It is important to budget for additional soft costs, which include the effort and investment in smart design required during the front end of the design phase. Along with the investment in smart design comes the investment in a more rigorous energy modeling process. The additional soft costs also fund participation of all project delivery team members, to ensure an integrated project delivery.
- **Renewable energy:** Consider the cost of renewable energy systems as a separate investment from the construction cost. They can be a sizable investment, but one that virtually buys the future energy for the building up front. In this sense, it is also a financial investment and should be analyzed as such. (Refer to Chapter 9 for more on financial analysis of renewable energy systems.)



Net Zero Energy Design: Tom Hootman

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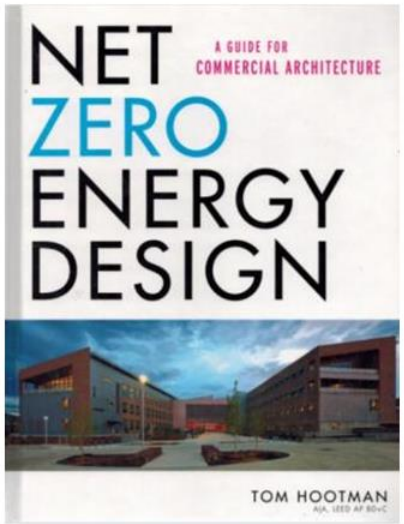
Schedule Guidelines for ZNE

Schedule Guidelines for Net Zero Energy Projects

- **Front-load design:** Integrated design requires an innovative and iterative process that invests design effort up front in order to derive cost-effective and integrated solutions.
- **Team continuity:** With front-loaded design, the multidisciplinary delivery team needs to be present from the very beginning of the project. Entire team continuity during the entire delivery process ensures retention of integrated project knowledge through to project completion.
- **Energy modeling:** Energy modeling is a more intense and iterative process in a net zero energy project and must be planned accordingly. In addition, energy modeling is one of the primary means to evaluate the delivery team's progress toward meeting the net zero energy objective; therefore, energy modeling review milestones should be added to the schedule.
- **Continuous design and construction:** In an integrated delivery process, design and construction become one fluid process. This enables design and construction activities to happen synchronously, which can free up more time for design, and allow construction to start and, therefore, finish earlier.



Net Zero Energy Design: Tom Hootman

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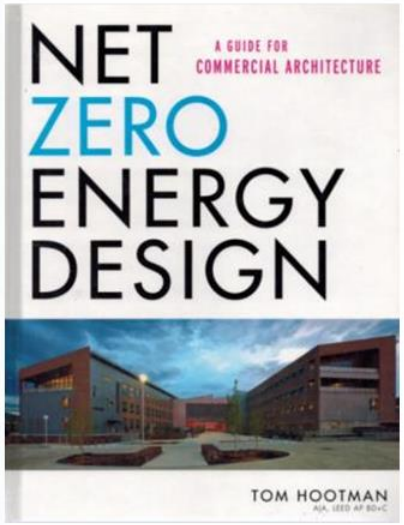
Request for Proposals & Qualifications (RFPs & RFQs)

RFP Guidelines for Net Zero Energy Projects

- Establish net zero energy as one of the key project objectives.
- Set an annual energy use target appropriate for the net zero energy objective.
- Clarify whether or not on-site renewable energy systems will be part of the RFP; in either case, consider how they will be coordinated with building design and construction.
- Provide a well-crafted project definition, one that takes into account the opportunities and challenges of net zero energy.
- If a separate RFQ is not used prior to the RFP, integrate the guidelines for RFQs stated in the previous RFQ section.
- Establish the selection process and delivery method in support of forming a trust-based, integrated delivery team, whose members are aligned with the project objectives.



Net Zero Energy Design: Tom Hootman

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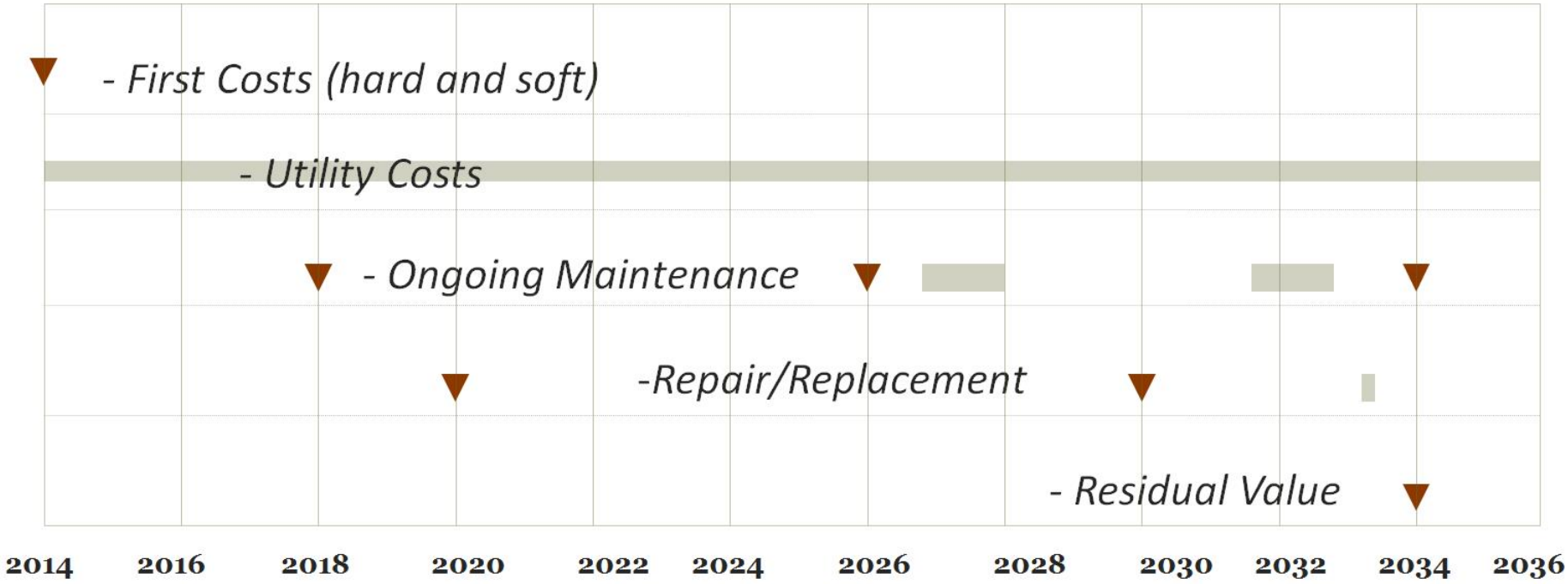
Life Cycle Cost Analysis - LCCA

What is the full price of a building?

Life Cycle Cost =
Net Present Value of:



Design Process Strategies

- Team Integration meeting to set Performance Goals
- Design Intent/Owners Project Requirements
- Building Configuration Alternatives
- System Selection and Appropriate Sizing

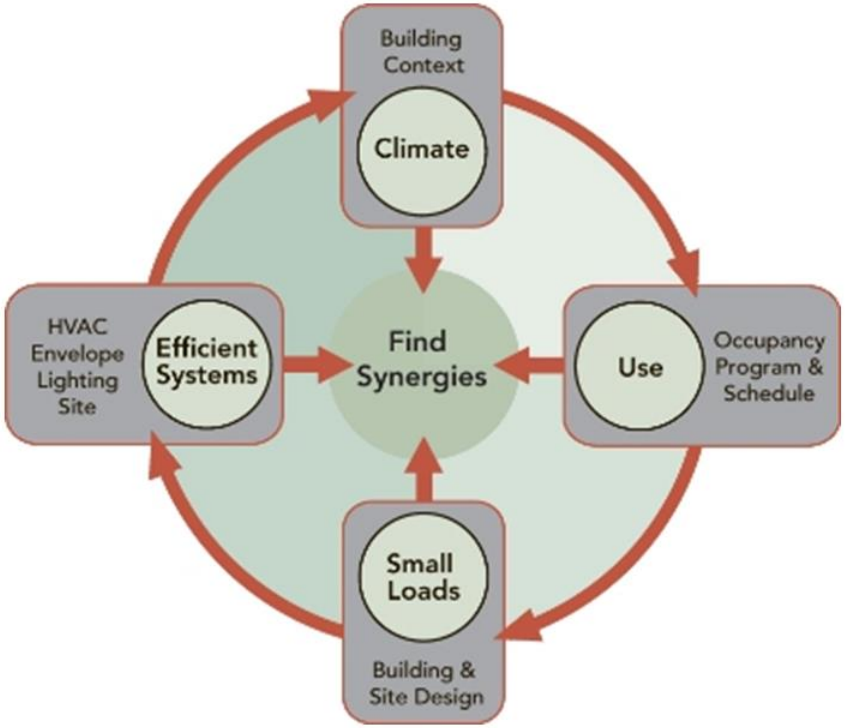


Diagram: Betterbricks

OVERCOMING THE COST BARRIER

"The prevailing industry perception is that zero energy is cost prohibitive and suitable only for showcase projects with atypical, large budgets; however, ***there is mounting evidence that zero energy can, in many cases, be achieved within typical construction budgets****."*

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Fundraising & Financing Strategies

1. **Utility Program Support -** Savings By Design
2. **Pilot Research Program**
3. **Technology Demonstrations**
4. **Use an Upgradable Design Strategy** (e.g. Redding School for the Arts)
5. **External Grant Funding**
6. **District Approach to Energy** (FortZED)
7. **Solar Financing District** (e.g PACE)
8. **Prop 39 funding for schools**

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Fundraising & Financing Strategies

9. **Prototypical Design for replication of standard buildings** (Campbell School District's 8 new schools)
10. **Reduction of operation costs = increased capital project budgets**
11. **Power purchase agreements** (PPAs)
12. **Energy Service Companies** (ESCo)
13. **Emerging Tech programs** through utilities
14. **Urban development tools** (if they are in local government redevelopment area)
15. **FEMA or hazard mitigation financing** for resiliency planning and critical building upgrades

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Ways to Share ZNE

- ✓ Train key staff on ZNE Toolkit and other resources
- ✓ Incorporate Toolkit content and links into program website
- ✓ Reuse content for ZNE stories in newsletters and other communications vehicles/announcements
- ✓ Offer materials to stakeholders and members to disseminate
- ✓ Share the ZNE factsheets & case studies as handouts in personal meetings and at events

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Ways to Share ZNE

- ✓ Incorporate the "Intro to ZNE" slides into presentations
- ✓ Share with local contacts and trade groups to help disseminate
- ✓ Co-brand materials to make them your own and encourage others to do the same

Sample content and details:

www.newbuildings.org/shareZNE

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What you can do today to get started

1. Develop your ZNE Plan
2. Create the supporting policy
3. Get & Use the ZNE Communication Tools & Planning Workbook
4. Build capacity through education, collaboration, and convening

PHOTO: SF PUC, Low Energy Building, San Francisco

Questions?

PHOTO: Chartwell School | Seaside, CA
(photo: Michael David Rose)

Group Exercise

Backcasting and ZNE Activity Planning

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ZERO NET ENERGY BUILDINGS
VISION + GOALS + TARGETS

1. Vision: Articulate your vision for what you would like to create - is it a policy, a single building, a set of buildings or a large portfolio?

2. Success: Describe what success would look like, including process

3. Targets/Milestones: How do we get there? Think about what key steps will be. How will you know when you have made progress? Note milestones and targets.

Path to Zero Communications

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ZERO NET ENERGY BUILDINGS
BACKCASTING TIMELINE

1 Laying the FOUNDATION | 2 Orchestrating RESOURCES | 3 Developing a ZNE PLAN

BUILDING SCALE

Begin with the End in Mind

2014 | 1 Year | 2015 | 2017 | 5 Year | 2020 | 2025 | 10 Year | 2030 | ZNE

- *Envelope*
- *HVAC*
- *Lighting*
- *Space Planning*
- *Finance - Strategies + Opportunities*
- *Process - Planning, Contracting, Design*
- *People - Stakeholder Engagement, Education + Outreach*

2015 GOALS	2020 GOALS	2030 GOALS

BACKCASTING GROUP EXERCISE

For your organization / project:

1. Begin with the end in mind: Set your vision & goals
2. Backcast to today
3. Plan each component for your building/portfolio
4. Define your targets and milestones
5. Determine measures of success

Thank You!

For more information and resources visit: www.newbuildings.org/zero-energy

ZNE Communications Toolkit:
www.newbuildings.org/zne-communications-toolkit

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