



## California Policies Driving Buildings Toward Zero

- ZNE** 1. Executive Order B-18-12
- ZNE for all new buildings and 50% of existing building area by 2025
2. State Administrative Manual (SAM) Chapter 1815.31
- ZNE for 100% of new buildings beginning design after 10/2017
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- ZNC** 3. SB 100
- 100% of electricity from non-carbon renewable energy by 2045
4. Executive Order B-55-18
- Achieve carbon neutrality by 2045
5. Executive Order N-19-19
- Reduce GHGe from state facilities, fleet and purchasing

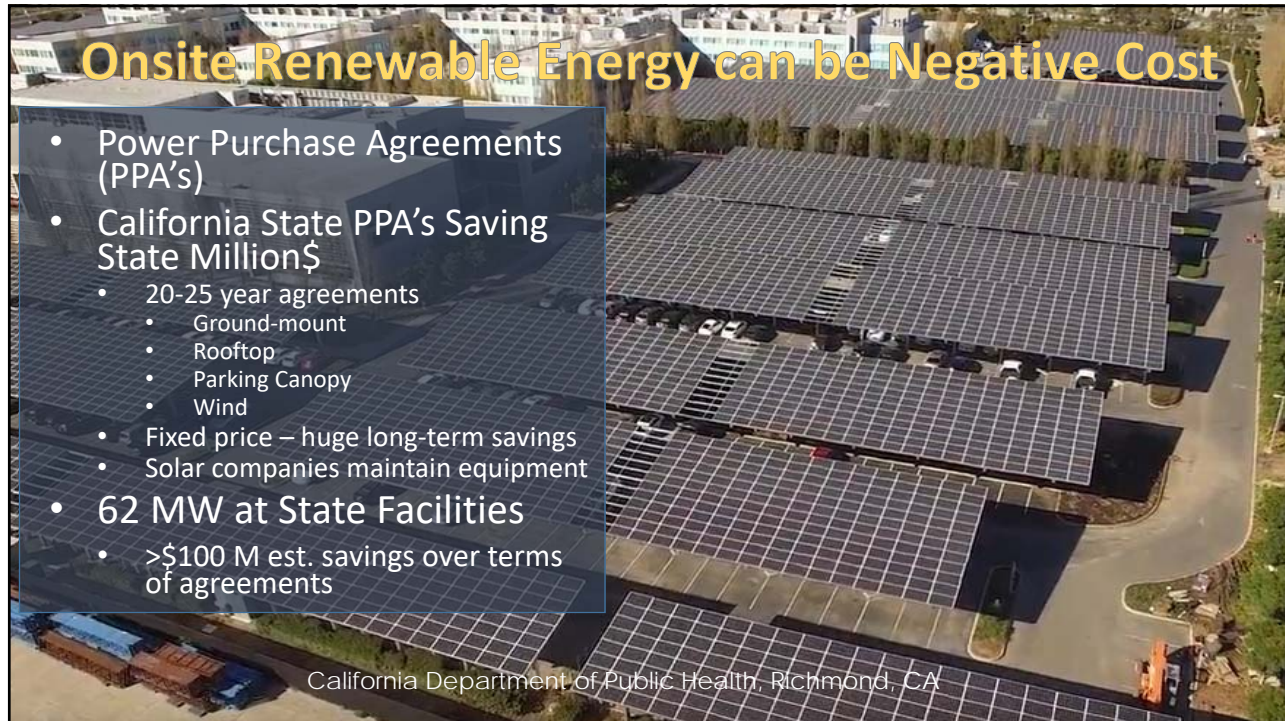


## Cost Effective Energy Efficient Buildings

- New Buildings & Major Renovations 15%+ >T-24
- Existing Buildings in top 25% of Efficiency
- No capital cost energy efficiency improvements
  - ESCO's
  - Retrofits within operating budgets
  - OBF and incentives







## Onsite Renewable Energy can be Negative Cost

- Power Purchase Agreements (PPA's)
- California State PPA's Saving State Million\$
  - 20-25 year agreements
    - Ground-mount
    - Rooftop
    - Parking Canopy
    - Wind
  - Fixed price – huge long-term savings
  - Solar companies maintain equipment
- 62 MW at State Facilities
  - >\$100 M est. savings over terms of agreements

California Department of Public Health, Richmond, CA



## Offsite Renewable Energy: Negative Cost + Zero Hassle

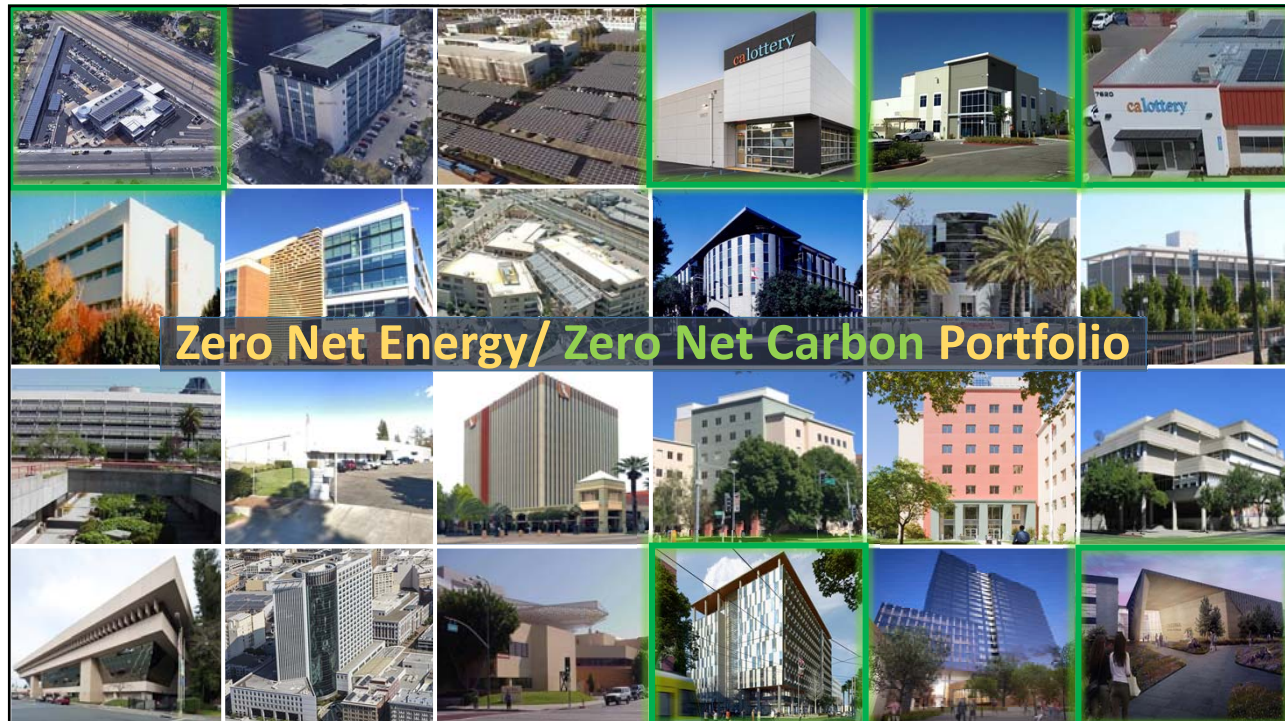
Decommissioned Nuclear Power Facility

### Community Solar/Renewables

- 20-year agreements
- REC's retired on state's behalf
- Fixed energy cost
  - Large Ground-mount off-site locations
- 39 MW saving ~\$37 Million

SMUD SolarShares, Rancho Seco, CA





## ZNE Portfolio Approach

California Department of General Services (DGS) ZNE Portfolio & Planning	Buildings	Building Area	% of Total Portfolio
Existing Building area ZNE (2018)	20	4,001,417 sq. ft.	22%
Existing Total Building Portfolio in 2018	68	18,376,490 sq. ft.	
Buildings in Design or Construction to be ZNE	4	2,171,730 sq. ft.	10%
Planned Addtl. Bldgs. by 2025 (not in design or const.)	2	2,200,000 sq. ft.	10%
Exist. Bldg. ZNE major renovations planned by 2025*	4	1,141,383 sq. ft.	5%
Addtl. Exist. Bldg. Area within 15% w/energy projects	14	6,049,943 sq. ft.	27%
Projected Total Building Portfolio by 2025	68	22,085,994 sq. ft.	
Potential Total ZNE by 2025 including new bldgs.	44	15,564,473 sq. ft.	70%

## Zero Net Carbon Concepts

1. Replace Aging Equipment & Infrastructure
  - Boilers, HVAC
2. Electrify Central Plants
  - Convert steam boilers to electric HW
3. Electrify Transportation
  - ZEV fleet and charging infrastructure
  - Mandatory renewable diesel contract
4. Environmentally Preferable Purchasing (EPP)
5. Increase Renewable Energy
6. Climate Responsible Investments

Central Plant, Sacramento, CA

## Renewable Energy Portfolio Approach

California Department of General Services (DGS) Renewable Energy Portfolio & Planning	Year Begun Gen.	MW Capacity	Renewable Energy Generation	% of Total Portfolio Energy
Franchise Tax Board, Sacramento	2017	3	5,320,767 kWh	2%
CalTrans District 3, Marysville	2018	0.8	1,418,871 kWh	1%
Dept. of Justice Bldg., Sacramento	2019	2.3	4,079,255 kWh	2%
SMUD 2016 SolarShares Agreement	2016	5	10,215,159 kWh	4%
SMUD 2018 SolarShares Agreement	2018	34	72,850,989 kWh	30%
<b>Total Current Renewable Energy Portfolio</b>		<b>43</b>	<b>89,049,754 kWh</b>	<b>39%</b>
Addtl Renewable Energy to Meet 50% by 2025		14	25,623,759 kWh	11%
Addtl Renewable Energy to Meet 70% by 2025		27	47,803,520 kWh	20%



## Zero Net Energy Certification/Verification Programs

Organiz.	International Living Future Institute	U.S. Green Building Council (USGBC)	State of California
Program	Zero Energy Certification	LEED Zero Energy	State of CA - ZNE
Reqmts	<a href="https://living-future.org/zero-energy/">https://living-future.org/zero-energy/</a>	<a href="https://www.usgbc.org/resources/leed-zero-program-guide">https://www.usgbc.org/resources/leed-zero-program-guide</a>	<a href="https://www.dgs.ca.gov/OS/Resources/Page-Content/Office-of-Sustainability-Resources-List-Folder/Zero-Net-Energy">https://www.dgs.ca.gov/OS/Resources/Page-Content/Office-of-Sustainability-Resources-List-Folder/Zero-Net-Energy</a>
• Energy Efficiency Targets	Based on actual performance	<ul style="list-style-type: none"> <li>1-time LEED certification required (New buildings = code + 15%) (Exist. bldgs. = Energy Star 75+)</li> </ul>	<ul style="list-style-type: none"> <li>New bldgs. and major renovations = CA T-24 +15%</li> <li>Existing buildings to meet top 25% source EUI targets</li> </ul>
• Combustion Allowed?	No nuclear or combustion except in commercial kitchens after alternatives explored	Combustion allowed, but all forms of energy need to be converted to Source kBtu and offset with renewable energy	Combustion allowed, but all forms of energy need to be converted to Source kBtu and offset with renewable energy
• Renewable Energy	On-site only except dense/high EUI buildings can have off-site PV if 75% of avail. solar is captured on-site first, or TI's or areas where grid cannot accommodate renewables	Renewable hierarchy: <ol style="list-style-type: none"> <li>1. On-site generation first</li> <li>2. Local generation (community solar/wind)</li> <li>3. Other off-site (i.e. PPA's)</li> <li>4. Energy Attribute Cert's (EAC's)</li> <li>5. Utilize carbon offsets</li> </ol>	On-site and/or off-site, incl. community renewables hierarchy: <ol style="list-style-type: none"> <li>1. On-site generation to extent possible</li> <li>2. Campus generation</li> <li>3. Generation within owner portfolio</li> <li>4. CA Community solar/renewable generation               <ul style="list-style-type: none"> <li>• Long-term purchase agreement (20+ yrs)</li> <li>• REC's retired (no short-term REC's)</li> </ul> </li> </ol>
• Data Reqmt	12 months performance data	12 months performance data	12 months performance data
Fees	<ul style="list-style-type: none"> <li>\$150 ILFI premium memb.</li> <li>\$250 registration</li> <li>\$2,000 comml., inst., m-fam res.</li> </ul>	<ul style="list-style-type: none"> <li>Free registration</li> <li>\$1,500 &lt; 500,000 sq. ft.</li> <li>\$2,500 ≥ 500,000 sq. ft.</li> </ul>	Free - self verified and reported to state
Valid for	2 years?	3 years	Requires annual verification through benchmarking data

## State ZNE Resources

### A. State ZNE Webpage

- <https://www.dgs.ca.gov/OS/Resources/Page-Content/Office-of-Sustainability-Resources-List-Folder/Zero-Net-Energy>
- [State of CA Zero Net Energy Calculator for State Buildings](#)
- [State of California Energy Efficiency Targets for Existing Buildings Pursuing ZNE](#)
- [ZNE Project Guide for State Buildings](#)

### B. California Sustainable Policy and Best Practices Manual

- <https://www.dgs.ca.gov/-/media/Divisions/OS/Policies/CASPBPM.ashx>

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