

California's Road to Decarbonization

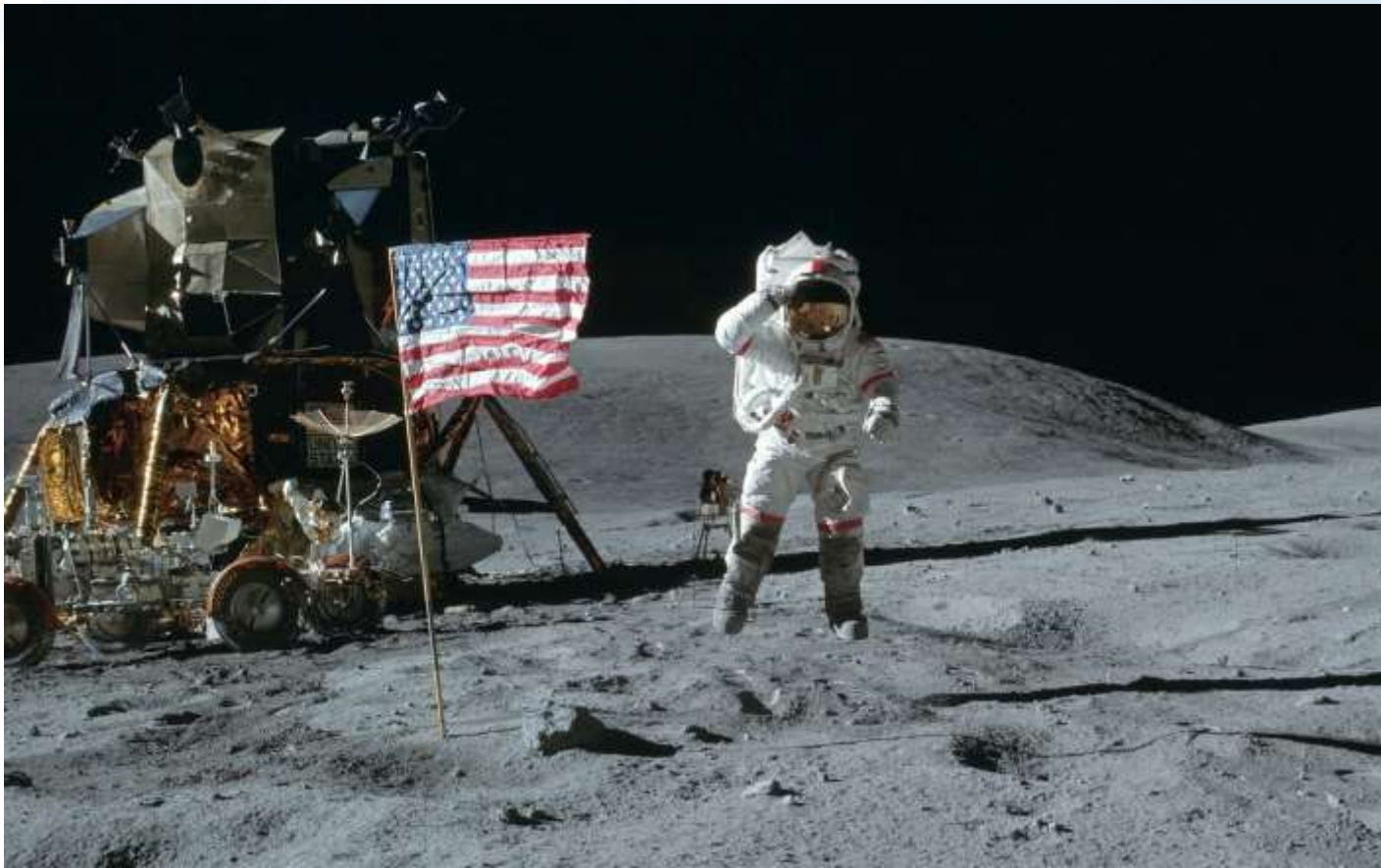
NASEO Energy Policy Outlook Conference &
Innovation Summit



Commissioner J Andrew McAllister, PhD
February 7, 2020
California Energy Commission



The New Moon Shot





Policy Drivers

- Double energy efficiency savings by 2030
- 60% renewable electricity by 2030;
 - 100% “Clean Electricity” by 2045
- Provide equitable low-carbon solutions for low-income residents & disadvantaged communities
- Electrify transportation
- Decarbonize buildings & industry

Carbon-free economy by 2045



Clean Energy Greatest Hits:

<https://ww2.energy.ca.gov/tour/>

The screenshot displays the California Energy Commission website. At the top left is the "CA.GOV" logo and the "CALIFORNIA ENERGY COMMISSION" name. A navigation menu includes "Home", "Proceedings", "Rules and Regulations", "Programs and Topics", "Funding", and "Data". A secondary menu at the top right lists "About", "Careers", "Contact", "Events", "Newsroom", and "Resources". The main content area features a large image of a solar farm with the text "California Clean Energy Tour". To the right, there is a smaller image of a white Proterra battery electric bus with "CALIFORNIA CLEAN ENERGY TOUR" and "BATTERY ELECTRIC" written on its side. Below the bus image is a smaller image of Playa Vista Elementary School with solar panels on its roof, captioned "CALIFORNIA CLEAN ENERGY TOUR PLAYA VISTA ELEMENTARY SCHOOL".



BA-level results: CAISO meeting clean energy goals while maintaining reliability

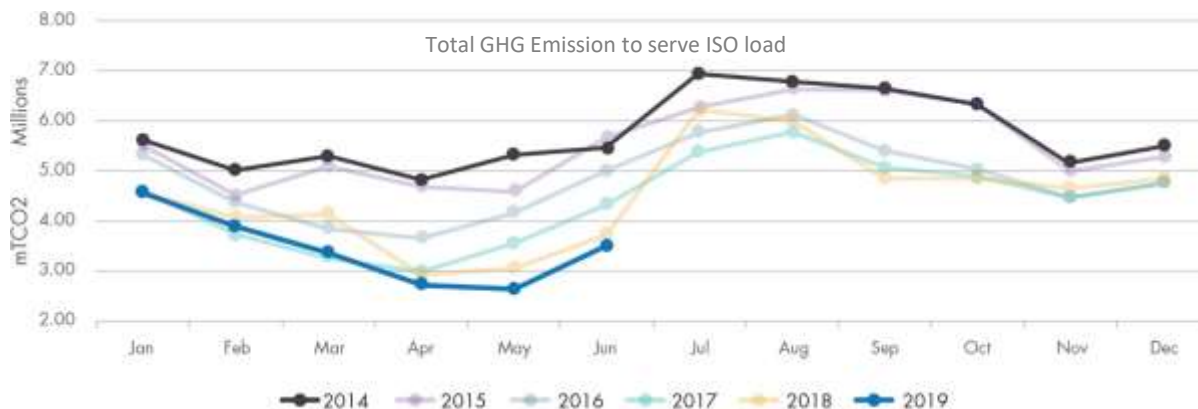
33% RPS
achieved ahead
of 2020 target

78%
highest load level served
by renewable energy

98.7%
highest load level served by
carbon-free resources

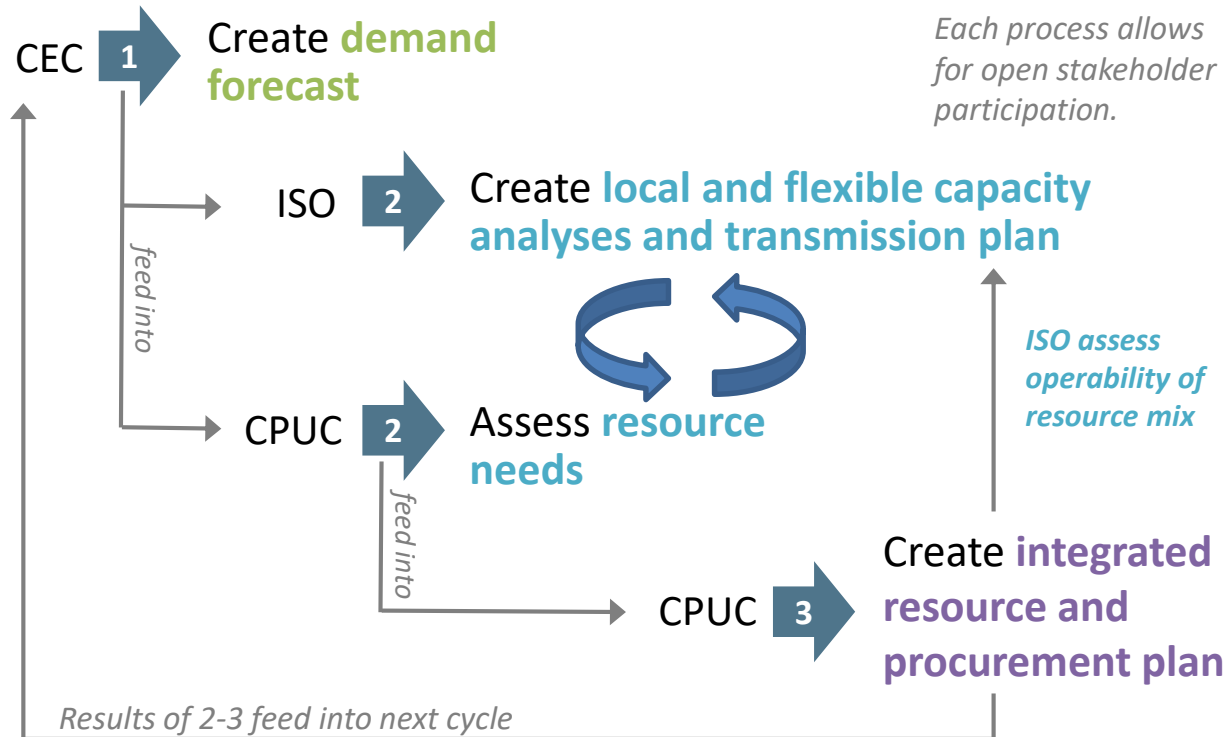
34% Reduction in GHG Emission associated with serving ISO since 2014

REPLACE





Reliability is Job 1: Agency collaboration undergirds planning, procurement and operation





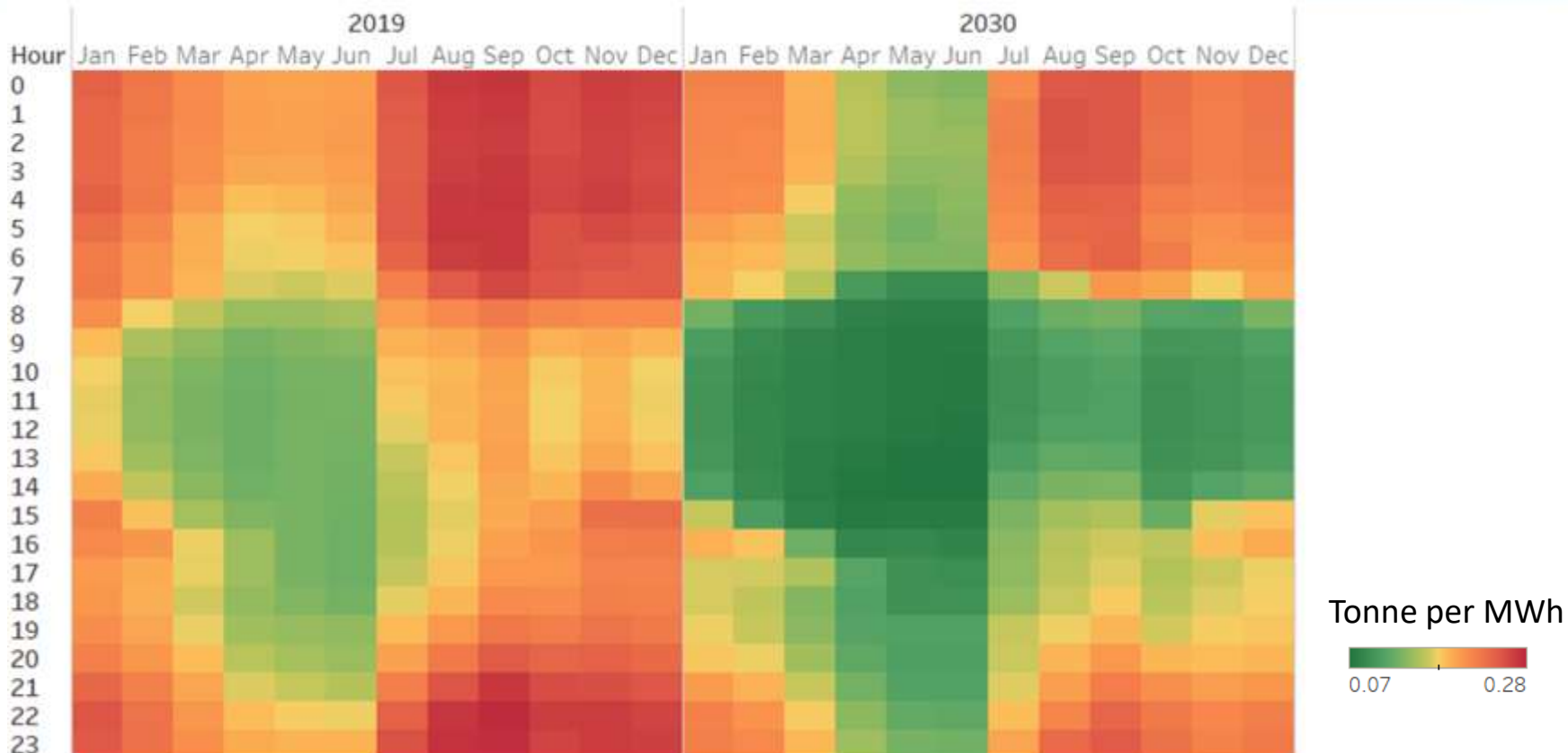
Enabling Policy Innovations

- Consistent signals to markets, expressed via programs
 - Energy Conservation Assistance Account: revolving fund dating to 1979; \$300M+ in circulation
 - RDD&D: Long-term, consistent commitment to energy-related innovation (\$150M+/year)
 - Utility Decoupling (1996)
 - Energy Efficiency Portfolio; (\$1.2B +/- annually)
 - Self-Generation Incentive Program (2004-present): Supports DER technologies
 - Million Solar Roofs/CA Solar Initiative: 10-year, \$3B, robust plan (2004-2016)
 - New Solar Homes Partnership: \$300M, 10-year (2006 – 2016)
 - Proposition 39 (2013 – present): \$1.75B pushed to 1000+ school districts
 - Clean Vehicle and Infrastructure incentive programs (\$100M+/year)
 - Cap & Trade; Low-Carbon Fuel Standard (Many \$B)
- Administrative competence
- Technical quality and relevance
- Program flexibility



New Challenges Requiring Innovation

Electricity CO₂ Emission Intensities



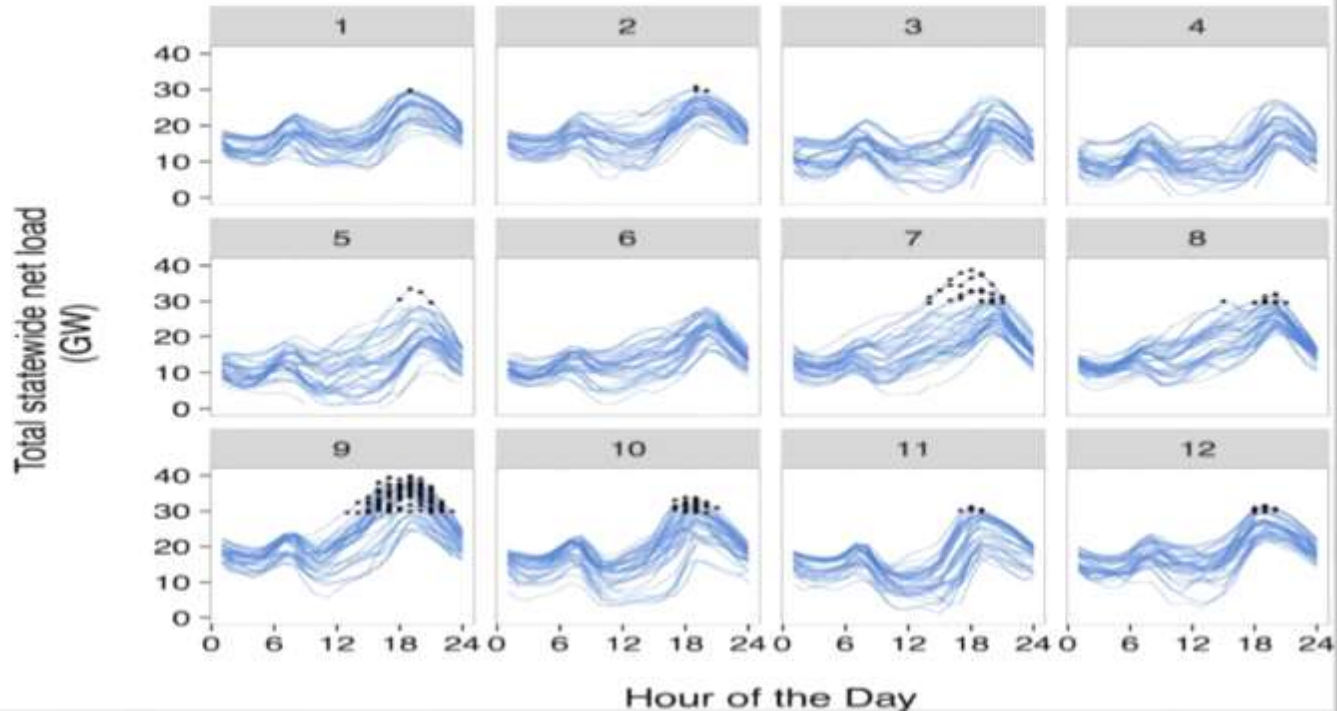


Focus on Flexibility

Ducks Every Month

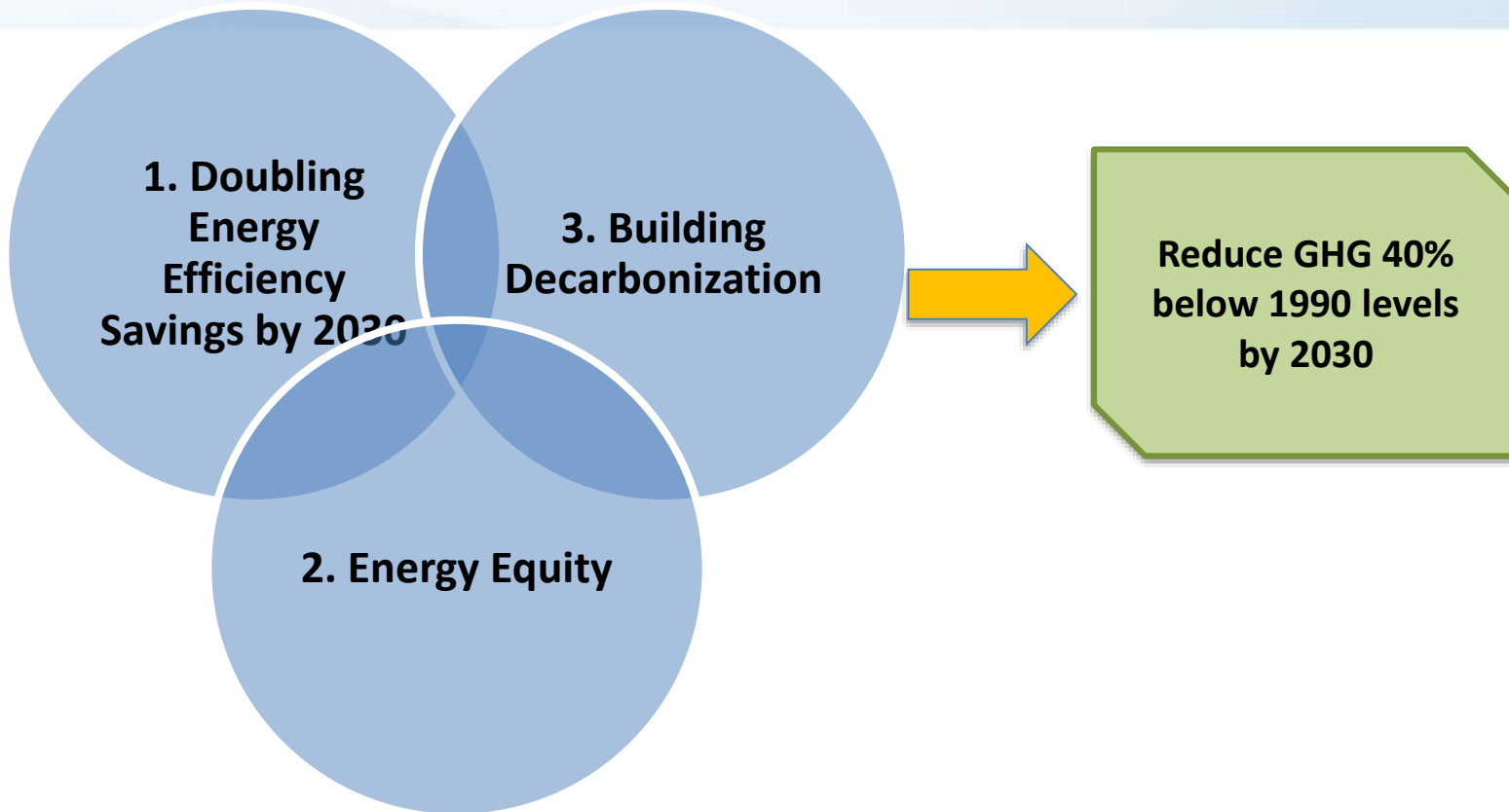
2025 Daily Net Load Profile

By Month | CEC Medium Growth Building Stock | 1in2 weather





CA EE Action Plan - December 2019





2019 Building Energy Code

- High performance envelopes
- On-site PV requirements to offset expected annual electricity
- All-electric performance baseline (optional) for low-rise residential & performance credits for high performance HPWHs





Load Management Standards

WAA (1974): “...the commission shall consider, **but need not be limited to**, the following load management techniques:

- (1) Adjustments in **rate structure** to encourage use of electrical energy at off-peak hours or to encourage control of daily electrical load....
- (2) End use **storage systems** which store energy during off-peak periods for use during peak periods.
- (3) Mechanical and **automatic devices** and systems for the control of daily and seasonal peak loads.”

Docket:



Decarbonization of Heating Energy

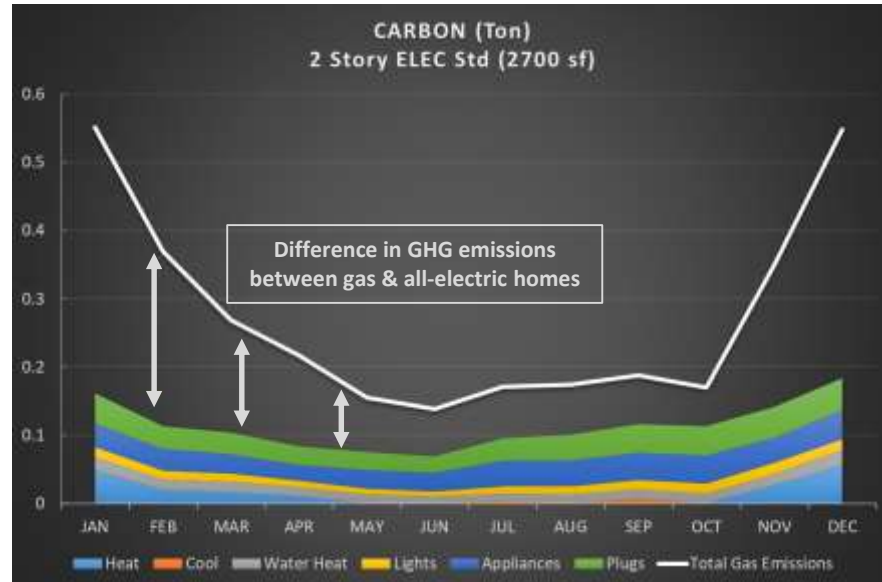
SB1477 allocates **\$200M over four years** to support new construction and retrofitting projects that **decarbonize California's building sector**.

BUILD

- Incentive program
- New residential buildings
- Low-income housing focus

TECH

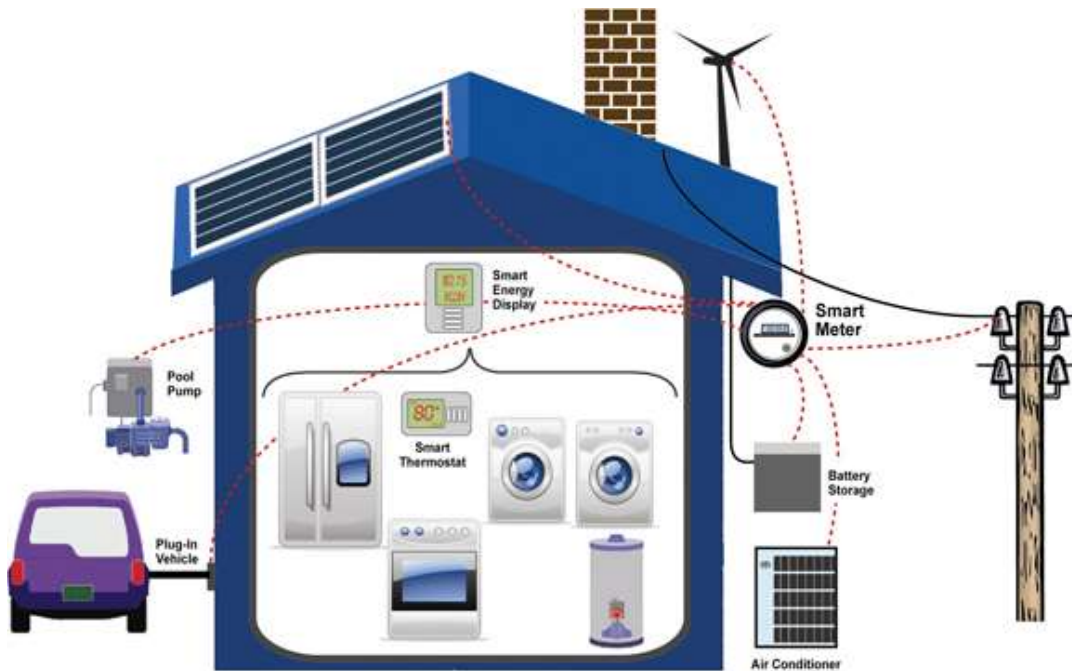
- Market transformation program
- Existing residential buildings
- Space and water heating focus





Appliance Standards for Demand Flexibility

SB 49 gives CEC authority to consider Demand Flexibility and GHG reductions in Appliance Energy Efficiency Standards





Local Government: critical innovators

Jurisdiction	Approach			Systems			Building Types								Add-Ons		
	Natural Gas Infrastructure Moratorium	All-Electric Reach	Electric-Preferred	Whole Building	Water Heating	Space Heating	Low Rise Residential	City-Owned Properties	High Rise Residential	Hotel	Retail	Office	Restaurant	Life Sciences	Additional Solar	Electric Vehicles	Natural Gas In Lieu Fee
Alameda	X			X				X									
Berkeley	X		X	X			X	X	X	X	X	X	X	X			
Brisbane*		X			X	X	X	X	X	X	X	X	X				
Carlsbad	X	X			X		X								X		
Cupertino		X		X			X	X	X	X	X	X	X				X
Davis			X	X			X										
Healdsburg		X			X	X	X	X	X	X	X	X	X	X			
Los Altos Hills		X			X	X	X	X	X	X	X	X	X				
Los Gatos		X		X			X										X
Marin County			X	X			X	X	X	X	X	X	X	X			X
Menlo Park*		X			X	X	X	X	X	X	X	X	X		X	X	
Mill Valley			X	X			X		X								X
Milpitas			X	X			X	X	X	X	X	X	X	X			
Morgan Hill	X			X			X	X	X	X	X	X	X	X			
Mountain View*		X		X			X	X	X	X	X	X	X		X	X	
Pacifica		X			X	X	X	X	X	X	X	X	X		X	X	
Palo Alto*		X	X	X			X	X	X	X	X	X	X	X			X
San Francisco	X		X				X	X	X	X	X	X	X		X	X	
San Jose*	X		X	X			X	X	X	X	X	X	X	X	X	X	
San Luis Obispo			X	X			X	X	X	X	X	X	X	X	X		X
San Mateo			X	X			X				X				X	X	
Santa Monica			X	X			X	X	X	X	X	X	X	X			
Santa Rosa		X		X			X										
Saratoga		X			X	X	X	X	X	X	X	X	X				X
Windsor		X		X			X										



New Challenges Requiring Innovation





Executive Order Directs Resilient Investment

Governor Newsom's September 20, 2019 Executive Order: "leverage state's \$700 billion pension investments, transportation systems, and purchasing power to strengthen resiliency."

Press release, Sept. 20, 2019:

<https://www.gov.ca.gov/2019/09/20/ahead-of-climate-week-governor-newsom-announces-executive-action-to-leverage-states-700-billion-pension-investments-transportation-systems-and-purchasing-power-to-strengthen-climate-resili/>

NOW, THEREFORE, I, GAVIN NEWSOM, Governor of the State of California, by virtue of the power and authority vested in me by the Constitution and the statutes of the State of California, do hereby issue the following Order to become effective immediately to require that every aspect of state government redouble its efforts to reduce greenhouse gas emissions and **mitigate the impacts of climate change** while building a sustainable, inclusive economy.

1. To leverage the state's \$700 billion investment portfolio to advance California's climate leadership, protect taxpayers, and support the creation of high-road jobs, the Department of Finance shall create a Climate Investment Framework.

a. The Framework shall include a proactive investment strategy for the state's pension funds that reflects the **increased risks to the economy and physical environment due to climate change**.

b. The Framework shall provide the timeline and criteria to shift investments to companies and industry sectors that have greater growth potential based on their focus of reducing carbon emissions and adapting to the impacts of climate change, including but not limited to investments in carbon-neutral, carbon-negative, **climate resilient**, and clean energy technologies.

Executive Order N-19-19. <https://www.gov.ca.gov/wp-content/uploads/2019/09/9.20.19-Climate-EO-N-19-19.pdf>

Microgrids on the Frontline of PSPS Resilience



Blue Lake Rancheria



Fremont Fire Station



**Kaiser Permanente
Richmond**



**Los Positas Community
College**



While the Fremont Fire Stations, Kaiser and Los Positas Microgrids were on alert, the Blue Lake Rancheria islanded to save lives and provide critically needed services to communities in Humboldt County.

Microgrids Demonstrate a Broad Portfolio of End Uses

Critical Facilities



Shelter



Medical Center



Fire Stations



City Hall, Police HQ, and
Community Centers



Waste Water
Plant



Airport

Ports



Military



Communities



Industrial



Digester



Distribution Center

Thank you and Onward!

