

Keynote

Western Cooling Efficiency Center

2016 Affiliates Forum

California Energy Policy – Old and New

A Snap Shot

- Building Energy Efficiency – Past: Title 24, Appliance Standards and Present: AB 758, SB 350, AB 802
- Schools – Prop 39, SB/AB 39
- Renewable Energy – RPS then and now
- Transportation Electrification – SB 350
- Energy Storage – all of the above
- Integrated or stand alone?



NANCY SKINNER

Senior Policy Fellow, Energy and Transportation Cluster, UC Davis. Former State Assembly Member

- Author, AB 758: CEC Energy Efficiency Action Plan for Existing Buildings
- Co-Author 2011 SB1x, 33% Renewable Energy Portfolio Standard
- Led effort to direct \$2.5B Prop 39 funds to schools & community colleges to finance facility energy upgrades
- Author, AB 2514: CA Energy Storage Mandate
- Founder ICLEI Local Governments for Sustainability, Director Cities for Climate Protection

California has a History of Tackling Big Challenges

1972:

Rand Report: Electricity demand growing at 8% per year
Utilities predict **40** new nuclear power plants needed

1974:

Jerry Brown elected Governor
California Energy Commission
created to help CA lead on
energy efficiency and renewables



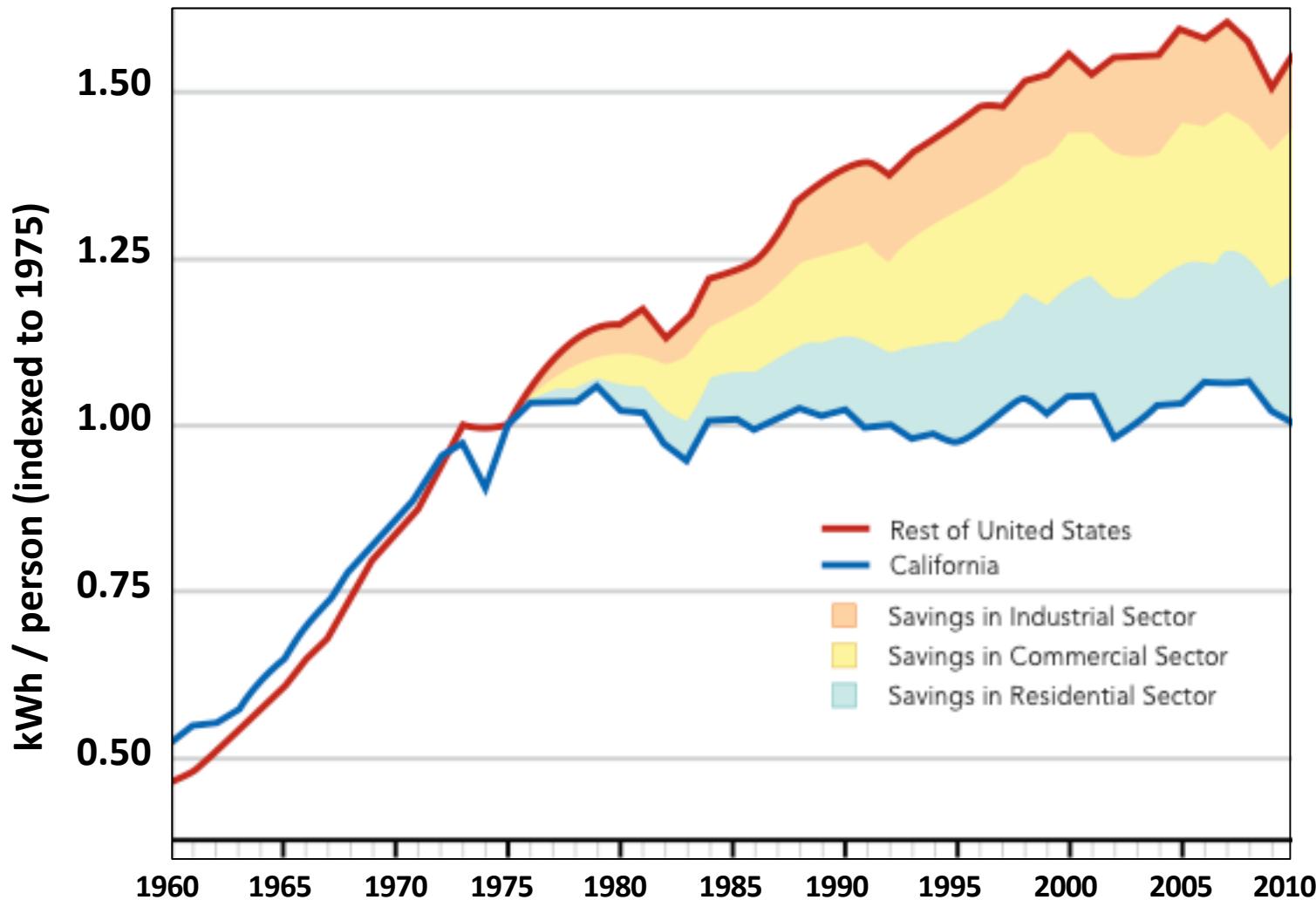
1975:

CA initiates first efficiency standards for buildings and appliances

1980's

CA initiates Title 24- Energy Efficiency Bldg Code

California Advancing Energy Efficiency





Energy Efficiency Standards Remain a Top Priority

**2009: The Energy Commission's
TV efficiency standards
take effect, saving Californians
\$1 billion / year**

**2012: The Commission's
plug-in charger
efficiency standards begin
saving Californians \$300M / year**



AB 758 - 2009

- Authored by Assemblymember Skinner, Speaker Karen Bass
- Directed California Energy Commission to develop comprehensive program to retrofit existing residential and commercial buildings to achieve energy savings and GHG reductions.
- First comprehensive statewide energy efficiency retrofit program for *existing* buildings in the US.
- CEC Released completed AB 758 Action Plan September 2015
“Existing Buildings Energy Efficiency Action Plan”
- Plan focused on increasing access to building energy use data to drive market transformation

Greenhouse Gas Emissions from Existing Buildings in California

- Existing buildings are relatively inefficient:
 - 72% of residential buildings & over 5 billion square feet of commercial space constructed prior to “Title 24” building efficiency standards
- GHG emissions are significant:
 - 14% of California's total GHG emissions attributable to Residential Buildings, 8% to Commercial Buildings.
 - 71% of residential building GHG emissions are attributable to homes built prior to implementation of Title 24.
- Reduction potential is also significant:
 - Full implementation of AB 758 can meet or exceed ARB's 2020 targets for energy and water use efficiency – representing 12 percent of the reductions identified in the AB 32 Scoping Plan, or 20.9 MMT CO2e.

A small house, 1000 ft², of white roof, replacing a colored roof, offsets the emission of
10 tonnes of CO₂



Cool roof technologies

Old



flat, white



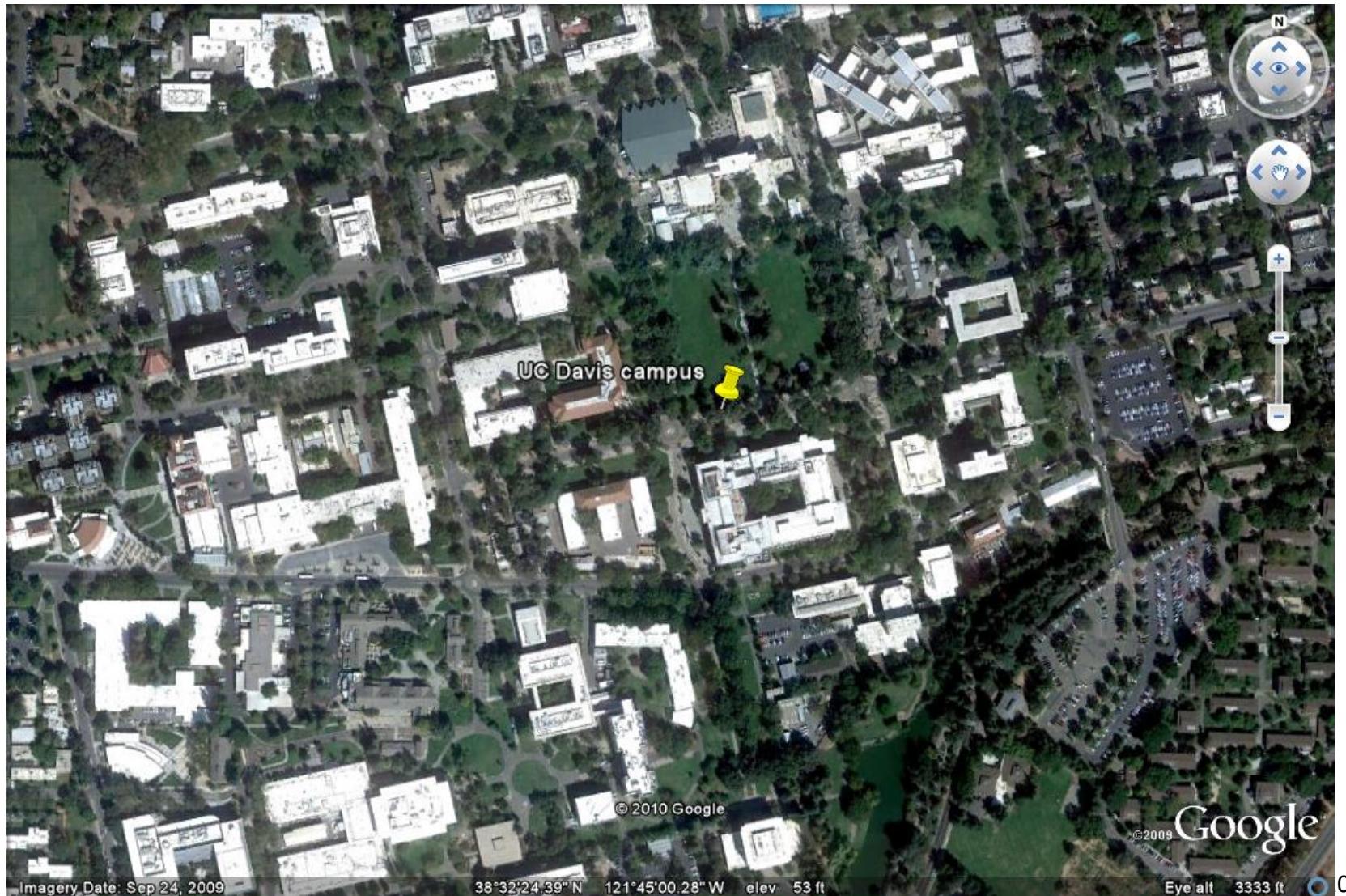
pitched, white

New



pitched, **cool & colored**

Congratulations to UC Davis



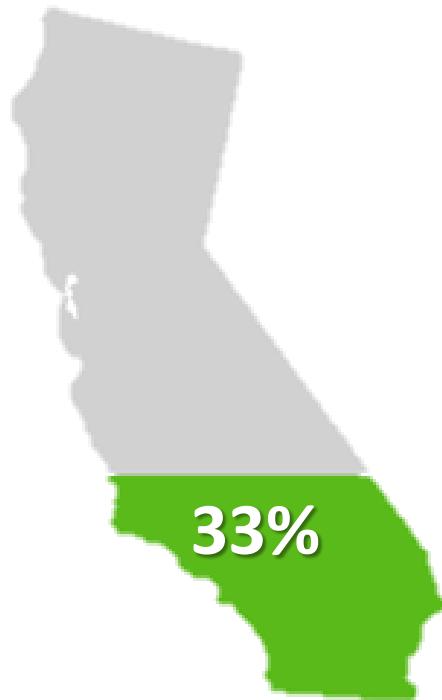
SB 350 - 2015

- Authored by Senate Pro Temp Kevin De Leon
- Set 3 new, ambitious goals:
 - 50% Renewable Energy by 2050
 - 50% increase in expected building energy efficiency
 - Goal to electrify transportation
- Goal to electrify transportation inserted when original goal to reduce transportation petroleum use by 50% was deleted
- CEC directed to develop regulations, implementation for building energy efficiency goal

CA Renewable Portfolio Standard



2013



2020



2030
SB 350

California Making Rapid Progress: 25% Powered by Renewables Today



AB 802 - 2015

- Authored by Assemblymember Das Williams
- Establishes statewide “benchmarking” and energy use disclosure program for large commercial, multi-family buildings (50,000 sq ft +)
- Replaces energy use disclosure provisions of AB 1103
- Requires Utilities to provide aggregated energy usage data to owner, owner’s agent, or tenant
- Benchmarking will enable comparison of energy consumption per square foot for comparable classes of buildings to help owners and tenants evaluate energy usage and identify efficiency projects

AB 802 - 2015

- CEC responsible for implementing, developing regs
- UC Davis Energy Efficiency Workshop identified key policy considerations:
 - focus disclosure on entity that pays utility bill
 - disclosure by occupants & owner needed, will increase benefits of data (sub-metering, plug load)
 - benchmarking packaged with streamlined incentive programs needed to spur change
 - occupants not objecting to energy use disclosure, reverse of privacy concerns expressed by IOUs

Prop 39, SB/AB 39

- Directed funds to every CA School District to fund energy upgrades to facilities & buildings
- Program now in third year
- School districts using funds to develop energy plans, conduct energy audits, implement efficiency and install DG, e.g.; rooftop solar
- UC Davis Energy Efficiency Center trained CA Conservations Corps members to conduct ASHRAE Level 1 audits, complied data from audits for submission to CEC

Manteca Unified



East Union High School | Manteca USD

Manteca Unified

- ~18 (out of 25) schools with solar installations
- District-wide Green Council
- Energy & water conservation, waste diversion, green cleaning, green purchasing, healthy food
- Reduced energy consumption by 31% and saved \$3.3 million/year in avoided costs through conservation and “energy education”
- District-wide Committee – L.O.G.I.C.
Leadership on Green Initiatives Committee

AB 2514 - 2010

- Energy Storage Mandate
- Required CPUC to determine how much storage IOUs should buy in combination with generation procurement
- First goal set in 2013 – required three IOUs to put 1.3 GW of storage on the grid by 2020
- As first step IOUs had to contract for 50 MW of storage by the end of 2014
- SCE purchased over 250 MW of energy storage — more than five times the amount CPUC required

Storage now and in the future

Storage is cost-competitive now

- » Southern California Edison chose to procure over 5x the amount of energy storage required by the CPUC.
- » 50 MW of energy storage required. 261 MW Procured.

Models of storage in the future reveal many benefits¹:

- » Energy storage reduces the need for natural gas ‘peaker plants’
- » Reduces need to cut-back renewables
- » Reduce costly and emission-intensive ‘starts’ of fossil plants.

“Within a few years, I don’t see the need to purchase a new gas peaker ever again”

Jim Avery, SVP San Diego Gas and Electric
11/17/14, NARUC Energy Storage Panel Discussion

1. “Modeling Energy Storage on the California Grid”, Strategen Consulting, May 11, 2015

Parker

Panasonic

**LightSail
Energy**

stem



GE Energy Storage

**FORESIGHT
RENEWABLE SOLUTIONS**

POWER

SolarCity

Christenson
ELECTRIC, INC.
DIRECT MANUFACTURER

EnerVault
DATE POSSIBLY COST-EFFECTIVE ENERGY STORAGE

**NEXTera
ENERGY**
RESOURCES

SUMITOMO ELECTRIC

EAST PENN
manufacturing co., inc.

BYD AUTO
Build Your Dreams

**LA
D
W
P**



**UniEnergy
Technologies**

SAMSUNG SDI

BrightSource
Limitless

FRFCO
THERMAL STORAGE SYSTEMS

BLACK & VEATCH

SMUD



Brookfield

HDR



MWH
 Geli



PRIMUS POWER

SEED

Deeya Energy

FLEXTRONICS
ENERGY

BOSCH

Gridtential

PDE
Total Energy Solutions
Electrical Contractors

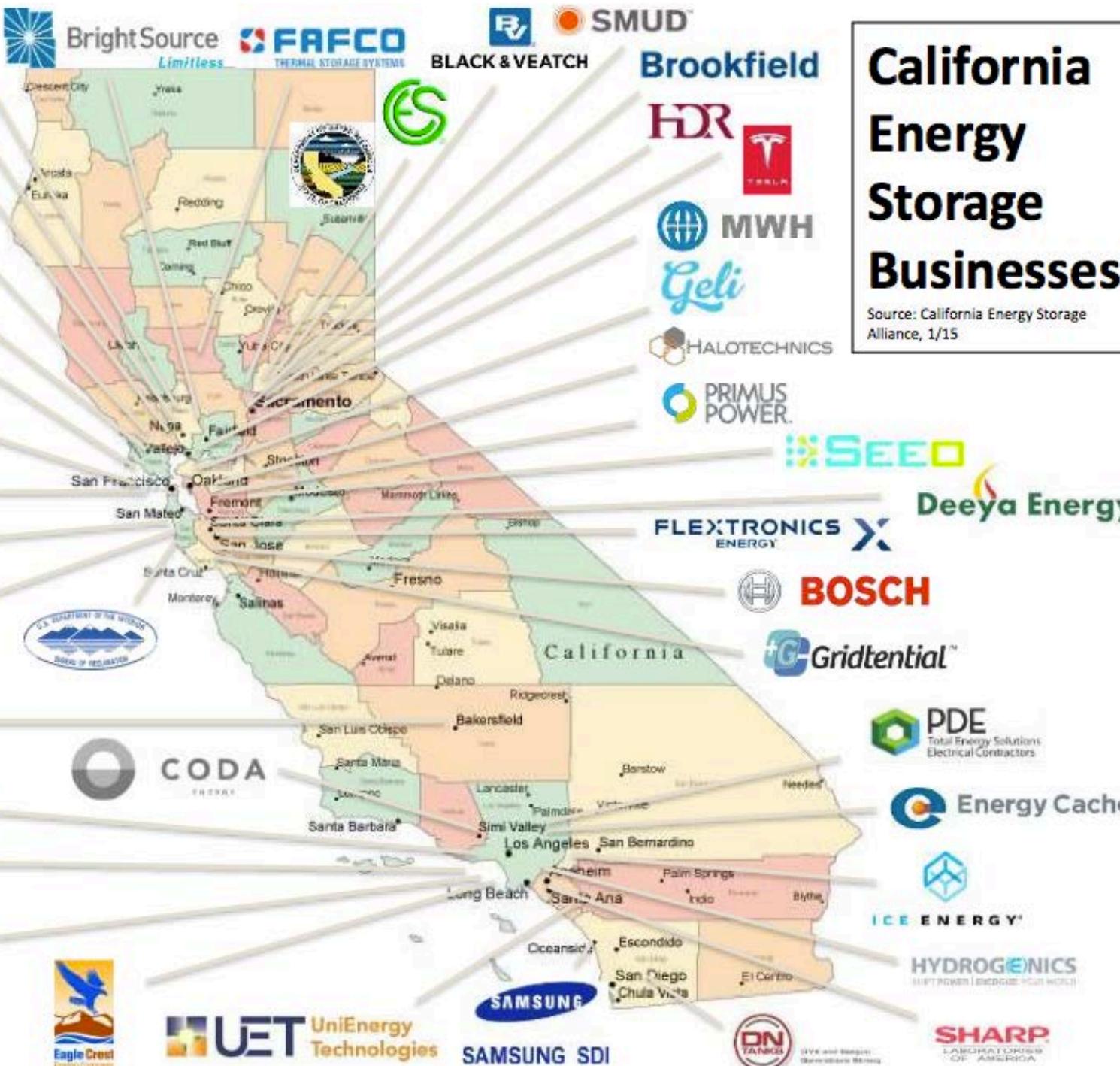
Energy Cache



ICE ENERGY

HYDROGENICS
SOFTPOWER | ENERGIZE YOUR WORLD

SHARP
LABORATORIES
OF AMERICA



California Energy Storage Businesses

Source: California Energy Storage Alliance, 1/15

The World's Largest Iron-Chromium Flow Battery

EnerVault Iron-Chromium Technology
1 MWh capacity at 250 kW (4 hour duration)
Turlock, CA





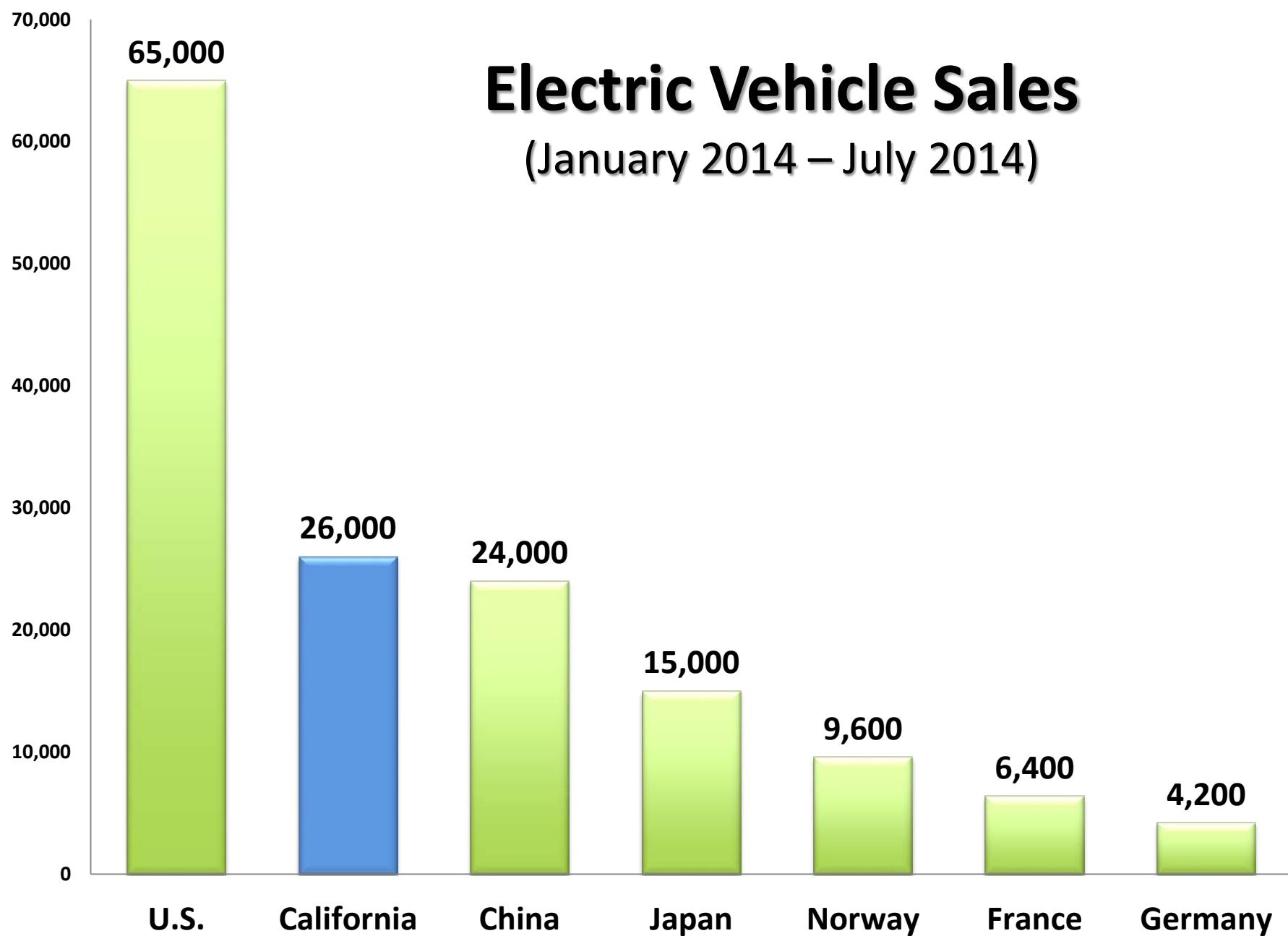
Energy Commission Funding: 60 Storage Projects in CA

- \$34 M Funded
- \$111M match funding leveraged

Coauthored Roadmap with CPUC and CAISO to guide activities

Electric Vehicle Sales

(January 2014 – July 2014)



Largest Manufacturing Plant in CA is Now Electric Vehicles

Tesla employs over
11,000 people



Tesla Factory
Fremont, CA



**MORE THAN 100,000
ELECTRIC VEHICLES
IN CALIFORNIA
TODAY**

Innovation in Electric Vehicles: 30 mile range, recharges in 10 minutes



Proterra Battery Electric Bus

CA Energy Policies

Integration or Stand Alone?

- Energy Storage integrated in RPS deployment?
- Will focus on buildings lead to reduction in energy use?
Load shifting? Self generation?
- Will EVs be deployed as storage?
- Will policies result in CA achieving maximum output per unit of energy input?
- Will policies result in carbon reduction?

