



# Joint Action In California Markets



## Southern California Public Power Authority

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# What is SCPPA?

- Joint Powers Authority (JPA) formed in 1980
- Located in Glendora, CA
- Serves 12 Public Utility Members
- Over 2 million customers
- Member peak load >9200 MW
- Board comprised of Member General Managers

## SCPPA Public Utility Members

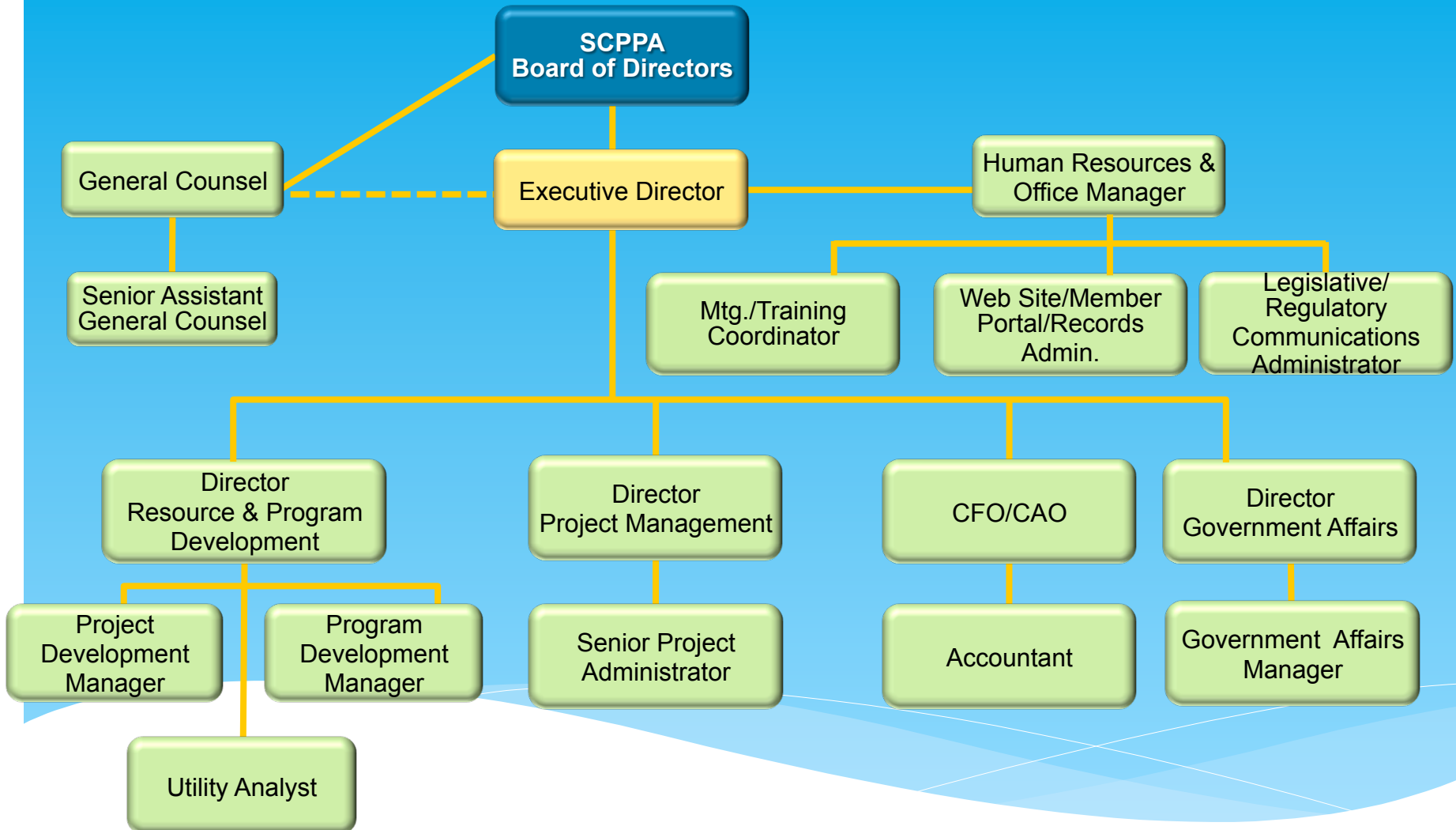
Anaheim	Azusa	Banning	Burbank
Cerritos	Colton	Glendale	Los Angeles
Pasadena	Riverside	Vernon	Imperial Irrigation District



# Benefits of SCPPA

- Utility Joint Action
  - Share Costs and Risks
  - Pool Resources
  - Avoid Duplication
  - Best Practices
- Nimble
- Expertise
- Cafeteria Style “Opt In”

# SCPPA





# SCPPA PROJECTS

## GAS RESERVES

- 17 Pinedale Natural Gas Reserves
- 20 Barnett Shale Natural Gas Reserves
- Prepaid Natural Gas Project (not pictured on map)

## GEOTHERMAL

- 5 Don A Campbell 1 & 2 Geothermal Projects
- 12 Imperial Valley Geothermal
  - Gould 2
  - Heber 1
  - Heber South
  - Ormesa

## HYDROPOWER

- 1 Tieton Small Hydro Project
- 9 MWD Small Hydro Projects
- 14 Hoover Large Hydro Project

## LANDFILL GAS

- 7 Chiquita Canyon Landfill Gas
- 10 Puente Hills Landfill Gas

## SOLAR

- 6 Antelope Valley Projects
  - Antelope Big Sky Ranch Solar Project
  - Antelope DSR 1 & 2 Solar Projects
  - Astoria 2
  - Columbia Two Solar Project
  - Kingbird B Solar Project
  - Springbok 1, 2 and 3 Solar Projects
  - Summer Solar Project
- 15 Copper Mountain Solar 3 Solar Project

## TRADITIONAL

- 8 Magnolia Power Plant
- 11 Canyon Power Project
- 13 Apex Power Project
- 18 Palo Verde Nuclear Generating Station
- 19 San Juan Unit 3 Generating Station

## TRANSMISSION

- Mead-Adelanto
- Mead-Phoenix
- Southern Transmission System

## WIND

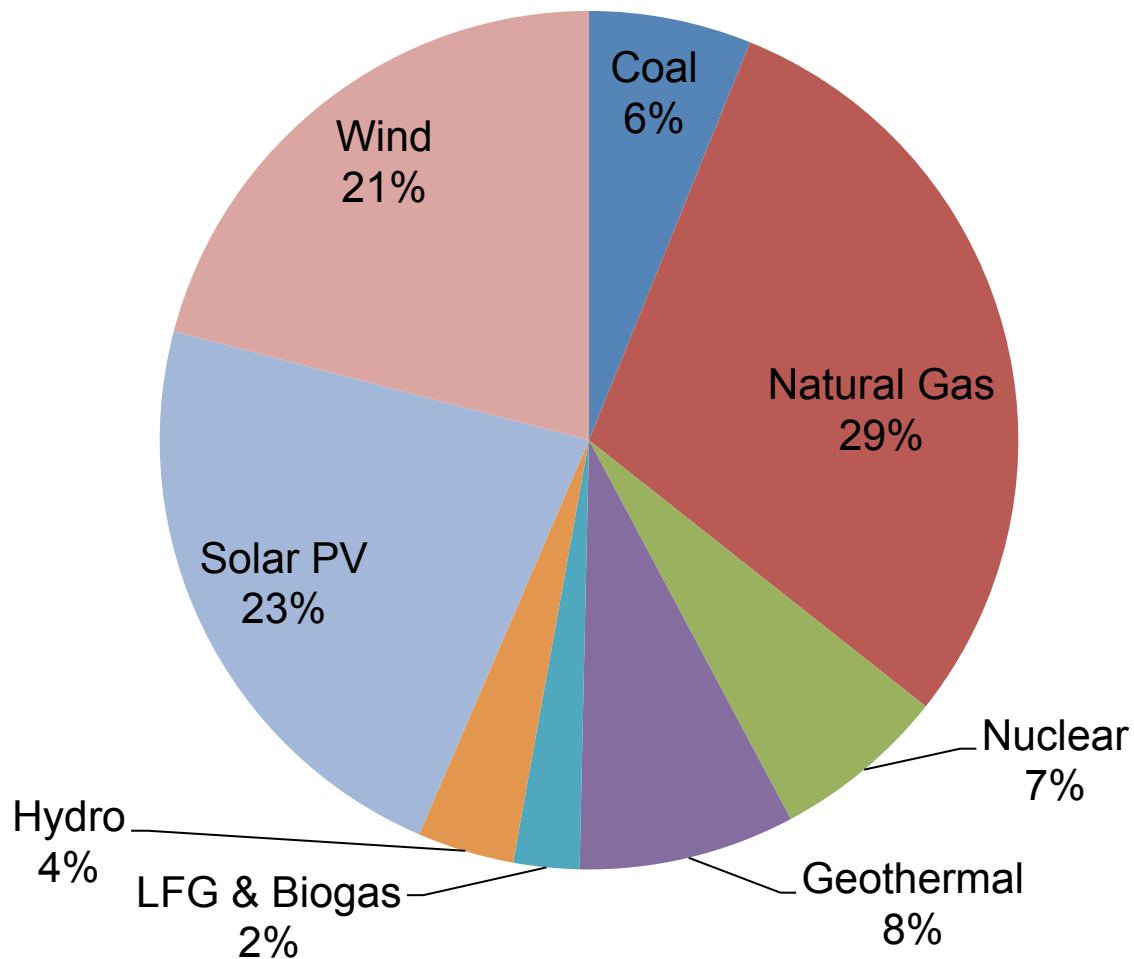
- 2 Windy Flats Wind Project
- 3 Linden Wind Project
- 4 Pebble Springs Wind Project
- 16 Milford I & II Wind Projects





# SCPPA Generation Portfolio

- Total Capacity: 3428 MW
- Renewables: 1887 MW





# SCPPA Focus Areas

- Facilitates member needs:
  - Development of Energy Resources
  - Implementation of Programs and Services
  - Finance and Manage Assets
  - Workforce Development
  - Utility Coordination through Working Groups
  - Collaboration on Regulatory/Legislative Issues



# Renewable Development

- 9 Projects over 300 MW in Development
- SCPPA Rolling Request for Proposals
  - 135 proposals yielding 13,200 MW in 2016



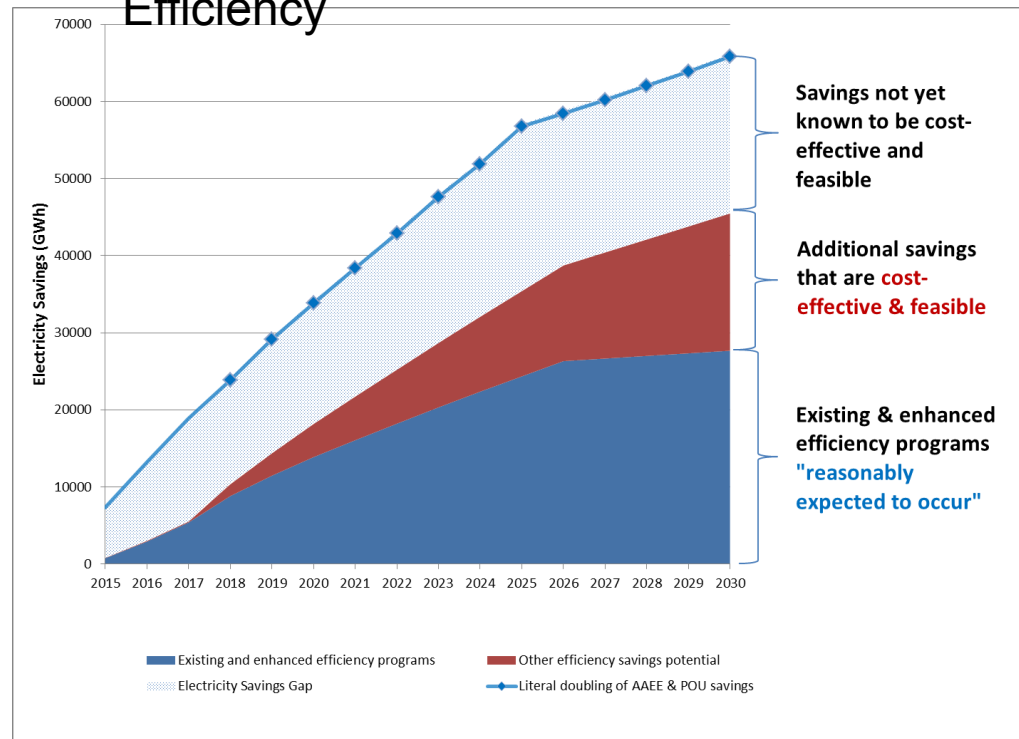




# Energy Programs

- Program Areas
  - Energy Efficiency
  - Low Income
  - RD&D
  - Renewables
- Cost Savings of 5-20% across 55 contracts

SB 850 Doubling of Energy Efficiency





# Asset Management

- Small staff manages diverse project portfolio
- \$855 million annual budget for 36 projects
- A&G Costs approximately 1% of annual budget
- No Operations and Maintenance Services



# Workforce Development

Training Metric	CY 2014	CY 2015	CY 2016	Percent Change from 2015
# of Training Events	15	21	29	+38%
# of Attendees	359	805	<b>1036</b>	+27%
# of Person Days	849	1251	1668	+33%
Member Cost	\$227,590	\$288,910	\$330,837	+15%
Avoided Cost	\$861,165	\$1,185,037	\$1,460,645	+23%
Net Savings	\$633,575	\$896,127	<b>\$1,129,808</b>	+26%



# Working Groups

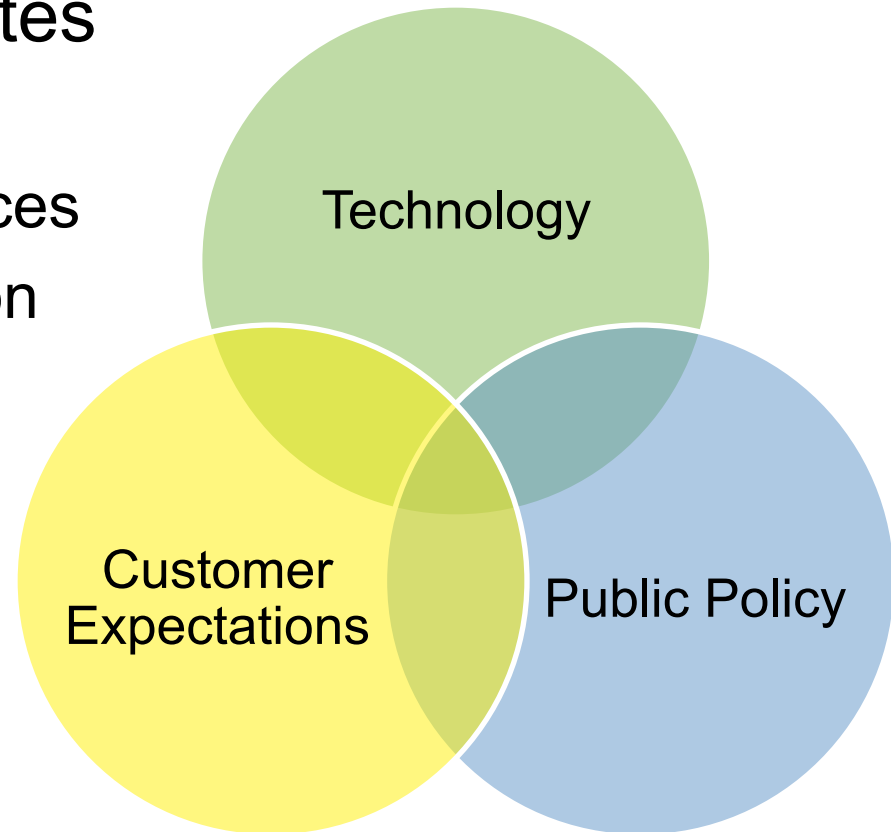
SCPPA Member Meetings	
1. Customer Engagement	12. Resource Planning
2. Key Accounts	13. Renewables
3. Electrification	14. Risk Management
4. Finance	15. T&D E&O
5. Audit	16. Mutual Assistance
6. Generation	17. Safety
7. Legislative	
8. Natural Gas Reserves	
9. Public Benefits	
10. Rate Design	





# Converging Forces: California Challenges

- Policy Initiatives & Mandates
  - Increasing RPS to 50%
  - Distributed Energy Resources
  - Transportation Electrification
  - Energy Storage
- Impacts to Rates
- Business Models

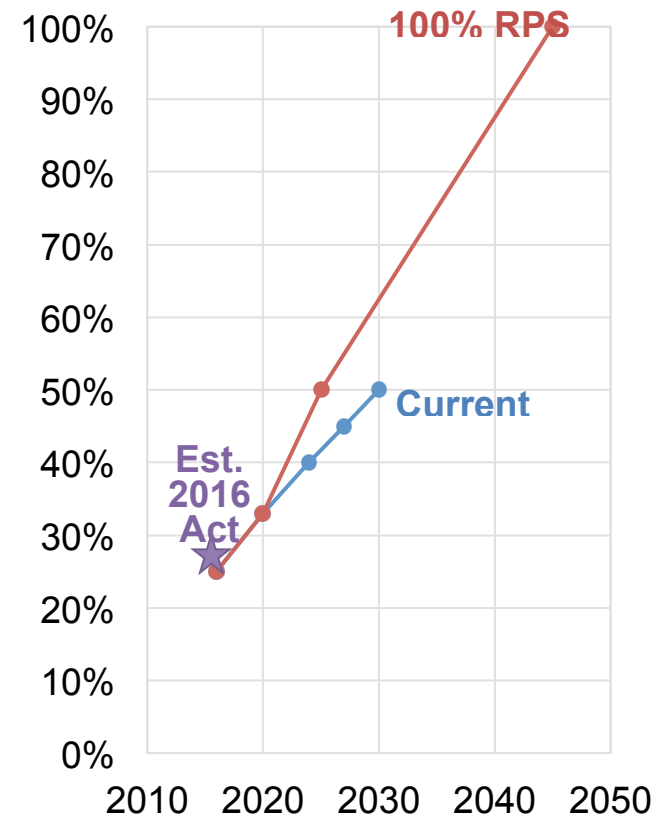






# Renewable Portfolio Standards (RPS)

- California SB350 passed in 2015
  - Targeting 50% RPS in 2030
  - Mostly solar since suitable wind sites are limited in California
- Surplus Energy
- SB100 100% renewables and zero carbon resources in 2045?





# Solar Development

- Lowest Cost Renewable
  - Low Cost of Capital
  - Reduced System Costs
  - Investment Tax Credit
  - Panel Efficiency
- Production Costs met DOE 2020 goal of \$1/watt 3 years early
- Capacity Factors Increasing
- Solar expanding to the Northwest

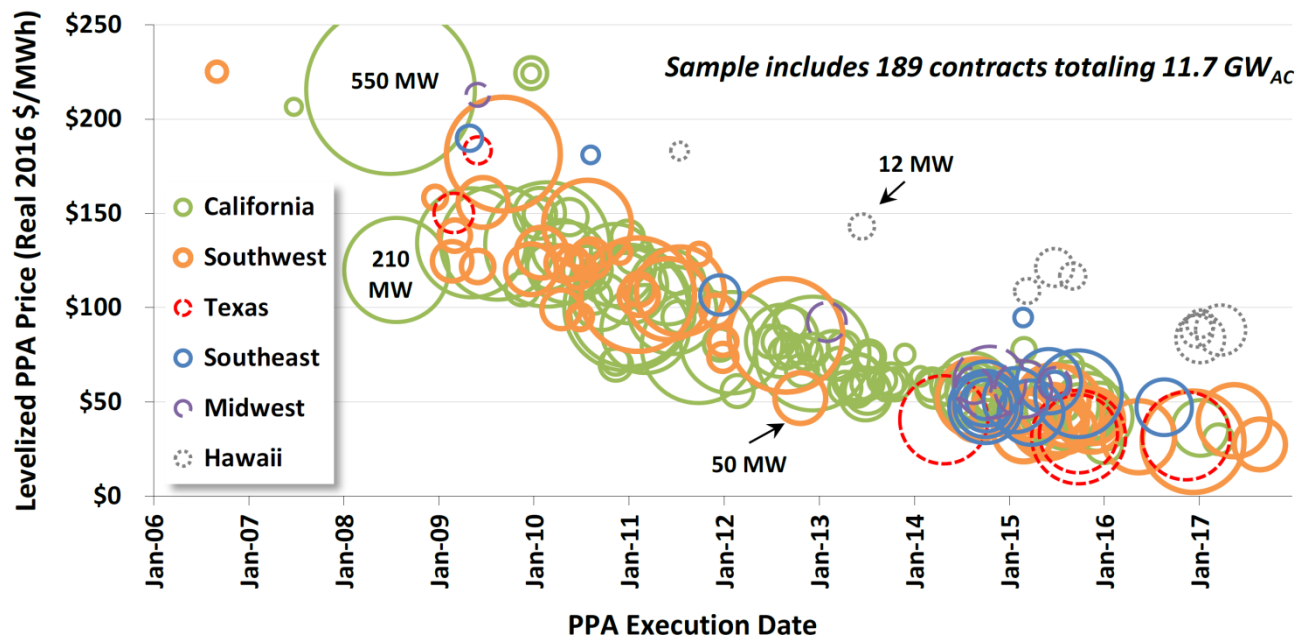


Copper Mountain Solar Project



# Solar Prices

- Solar PPA prices continue to drop



Source: Lawrence Berkeley Labs, Utility Scale Solar 2016





# Solar Deal Structures

- Fixed Price
- “Index +” Pricing
- Solar + Energy Storage
  - Solar PPA with energy storage feasibility
  - Energy storage options
  - Four hour duration and 50% of project capacity



# Impacts of Solar Growth

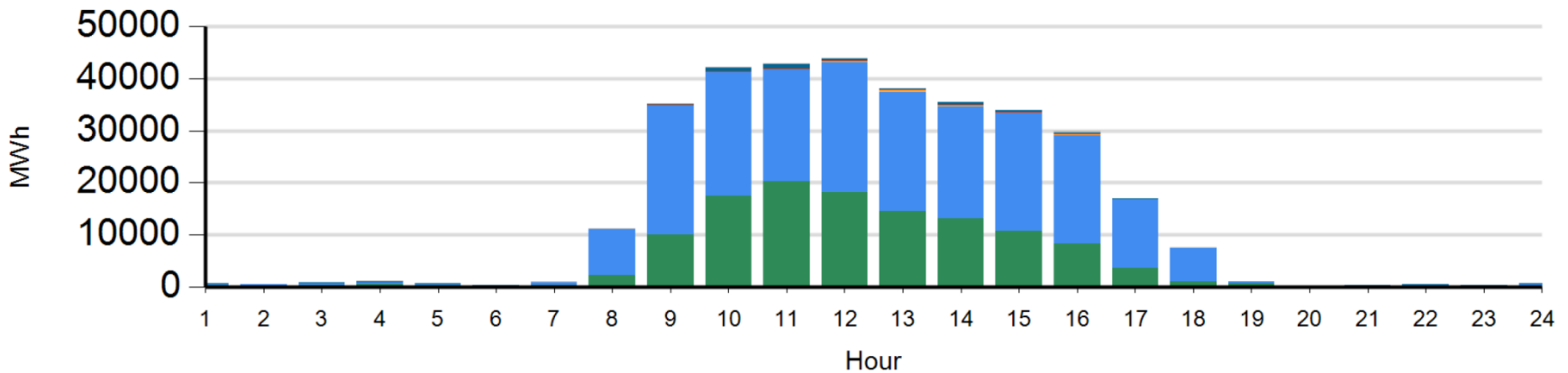
- Higher price volatility
- Increased curtailments due to negative prices
- Declining Energy and Capacity value
- Changing definition of Peak (Heavy Load) and Off-Peak (Light Load)
- California impacts migrate to the Northwest?



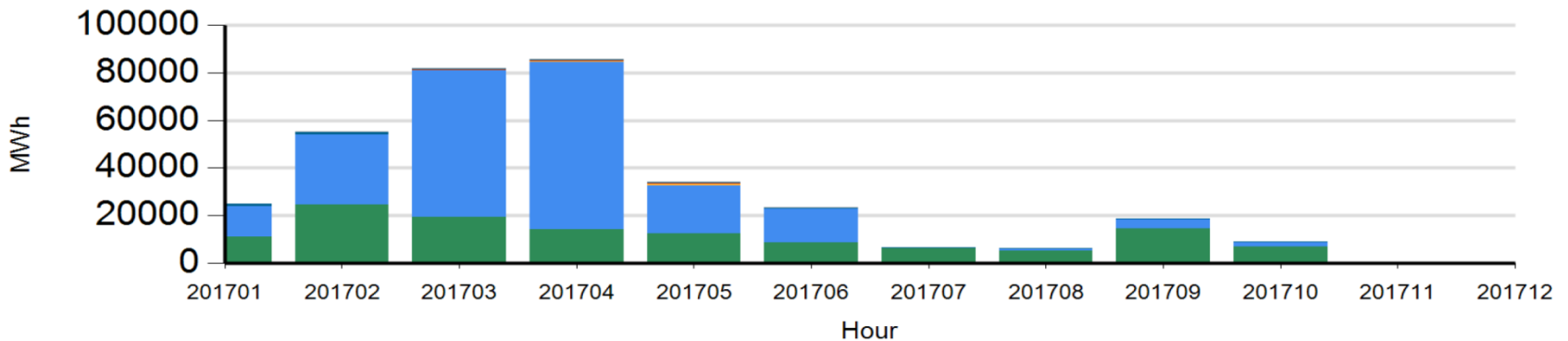


# CAISO Wind and Solar

## Curtailed MWh YTD



## Curtailed MWh YTD



SelfSchCut - System
  SelfSchCut - Local
  ExDispatch - System
  ExDispatch - Local
  Economic - System
  Economic - Local

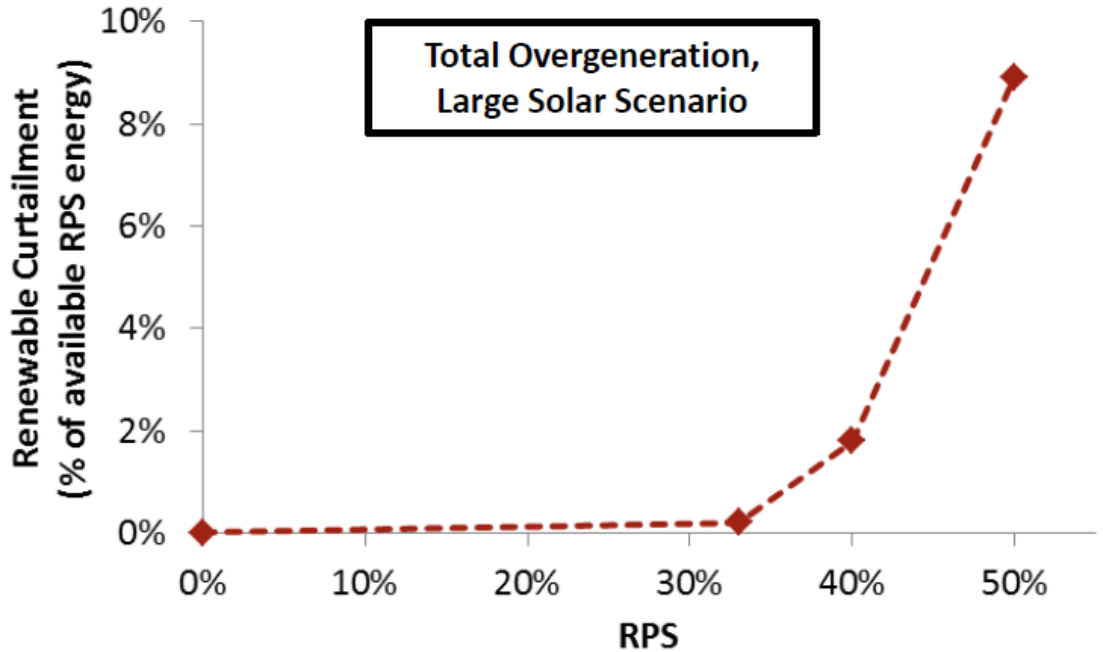


# Solar saturation is the dominant challenge at 50% RPS

## + Significant increase in solar PV installations under current policy

- 15-20 GW for RPS
- 12-21 GW of rooftops under NEM 2.0
- 15-20 GW of wind and geothermal

## + Curtailment of wind and solar will become commonplace



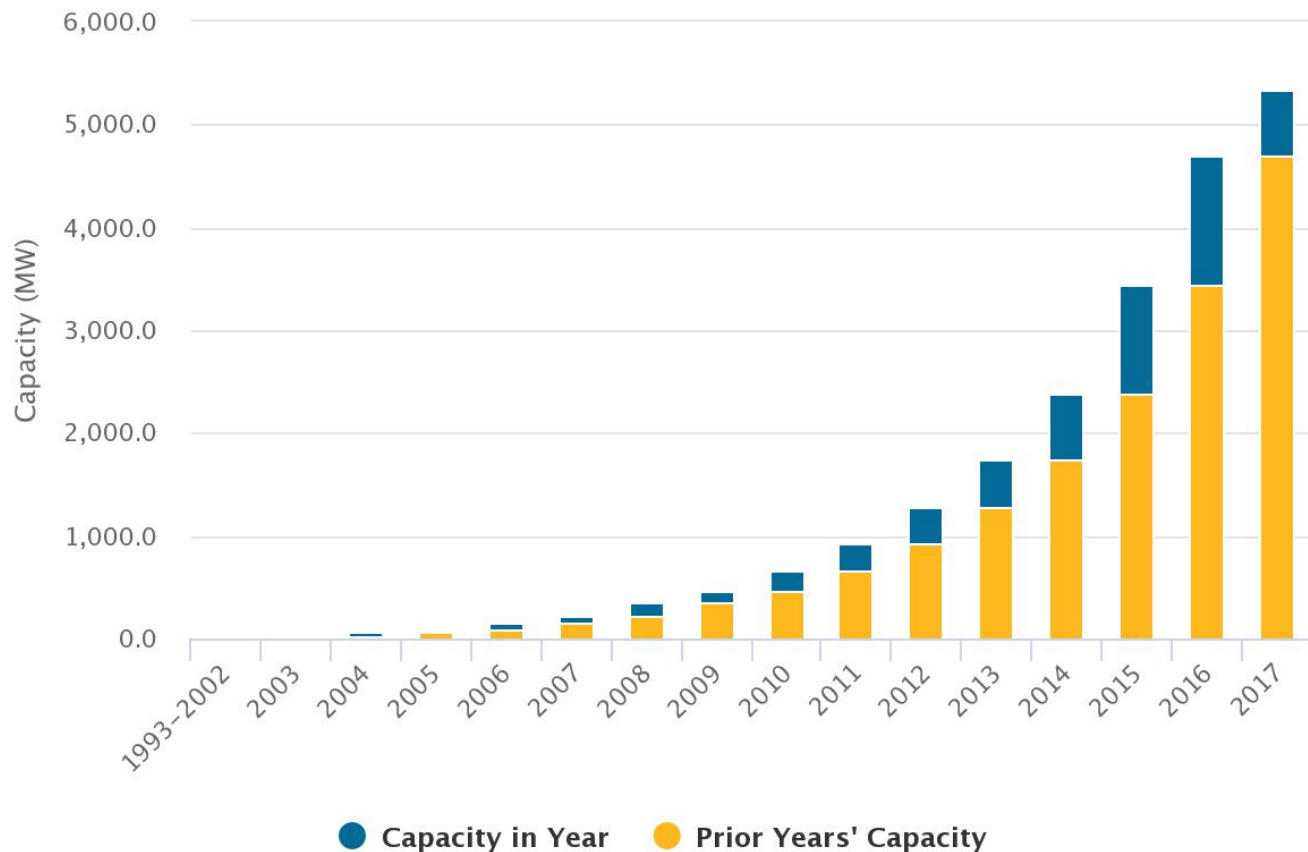
Marginal Overgeneration	33% RPS	40% RPS	50% RPS
Solar PV	5%	26%	65%
Wind & Geothermal	2%	12%	22%

Source: E3, Investigating a Higher Renewables Portfolio Standard for California



# Distributed Solar in California

- **726,791** Solar Projects
- **5,843** MW Installed



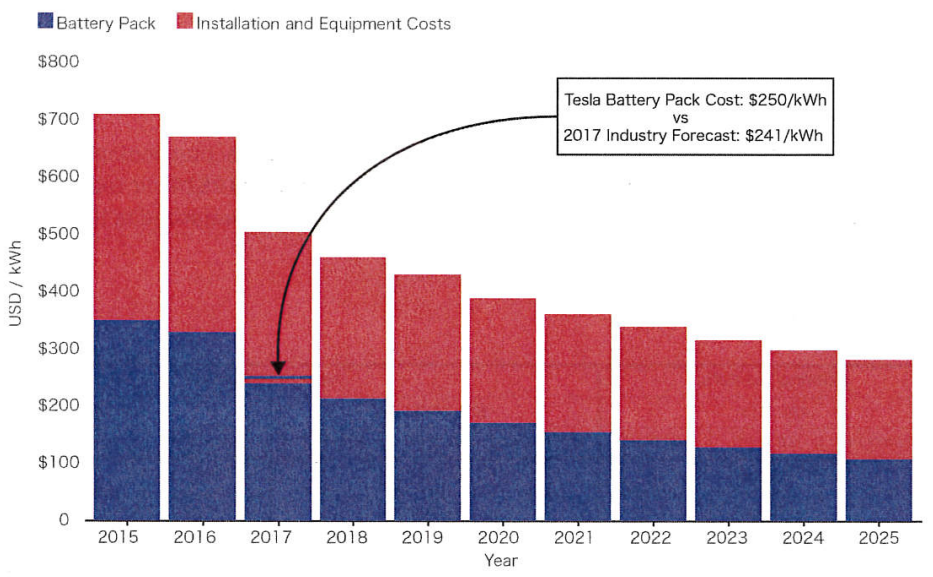
Source: [www.californiasolarstatistics.ca.gov](http://www.californiasolarstatistics.ca.gov) as of July 2017





# Energy Storage

- AB2514 requires IOUs to acquire 1,325 MW of energy storage by 2020
- SCPPA member target of 209 MW
- Energy storage cost trend similar to solar several years ago
- Solar plus energy storage PPAs
- ~~Promising but expensive~~



Sources: Bloomberg New Energy Finance, Tesla

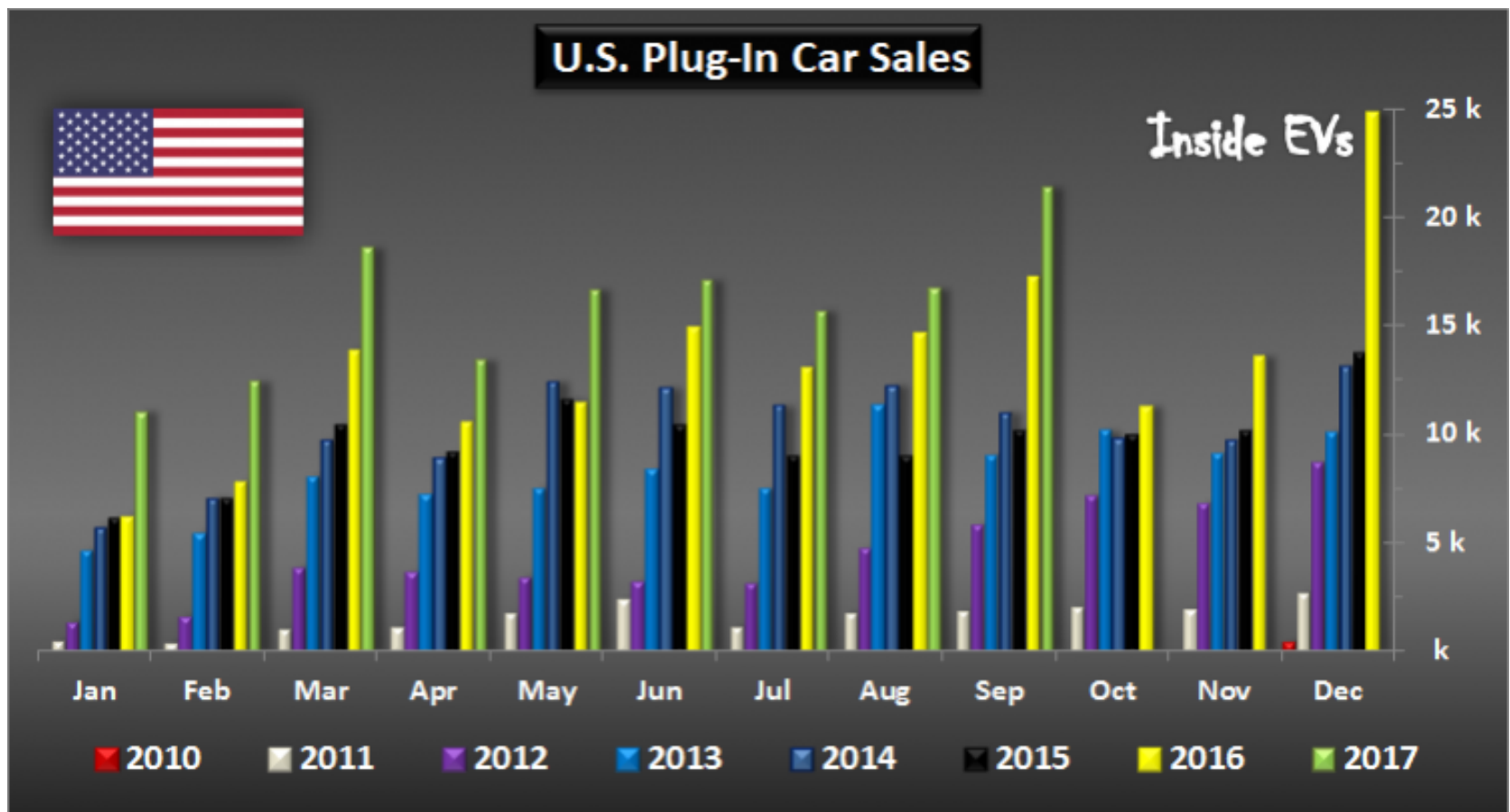
Bloomberg



Imperial Irrigation District's Battery Energy Storage System



# Transportation Electrification



Note: Sales through September 2017





# Electric Vehicle Sales Forecast

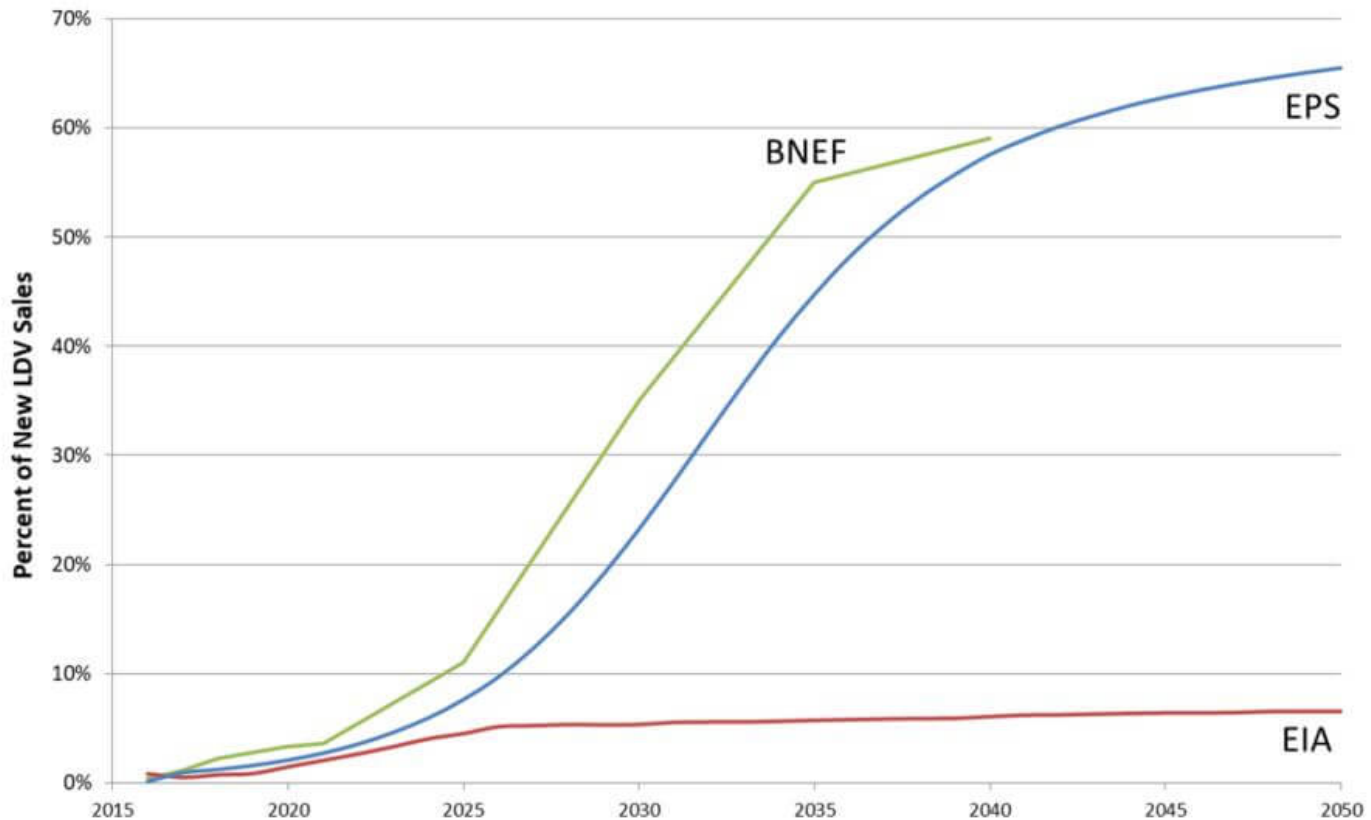
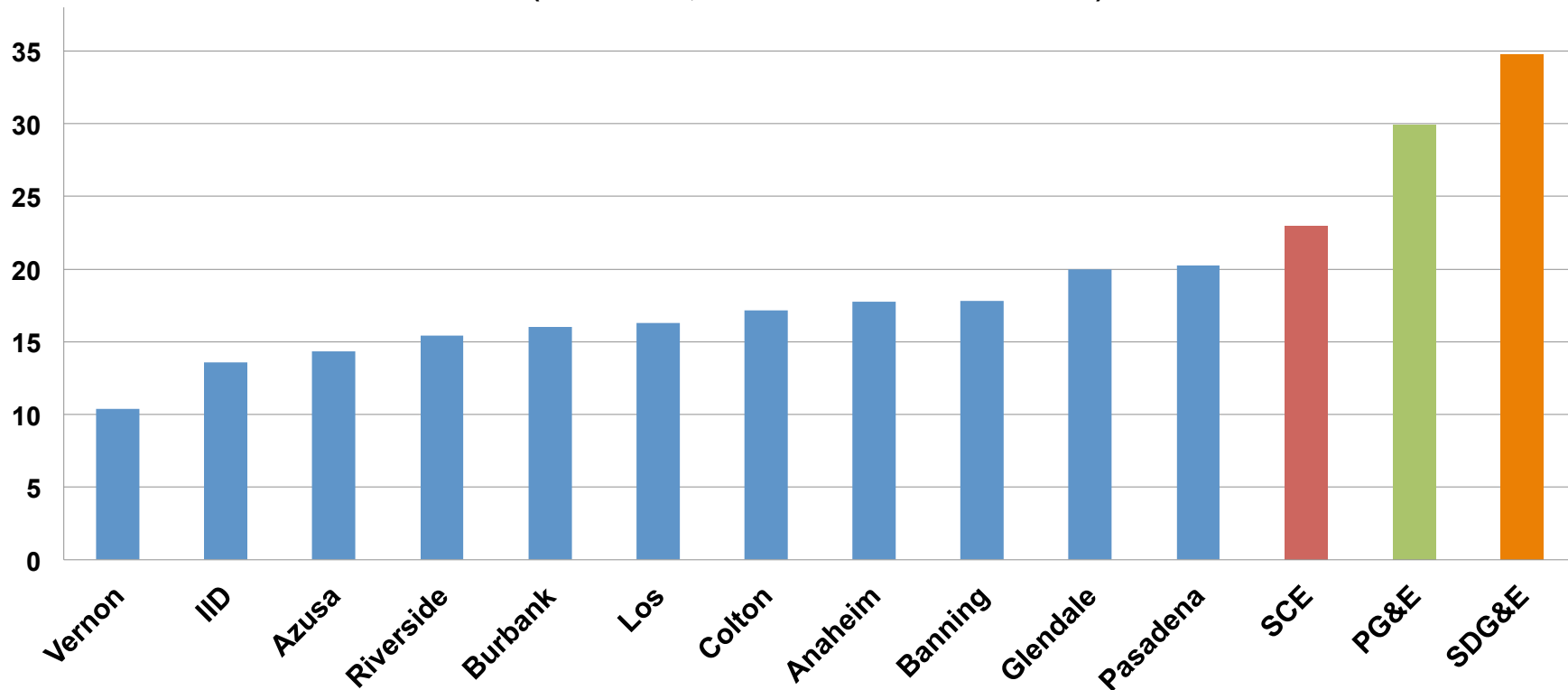


Figure 1. Projections of U.S. market share of EVs from three sources: the Energy Policy Simulator (EPS) 1.3.1 BAU case, the Energy Information Administration (EIA) Annual Energy Outlook 2017 "No Clean Power Plan" side case, and the Bloomberg New Energy Finance (BNEF) Electric Vehicle Outlook 2017.



# Utility Rates

**Average Residential Rates - 3/2017**  
(Cents/kWh, Measured at 750 kWh/month)

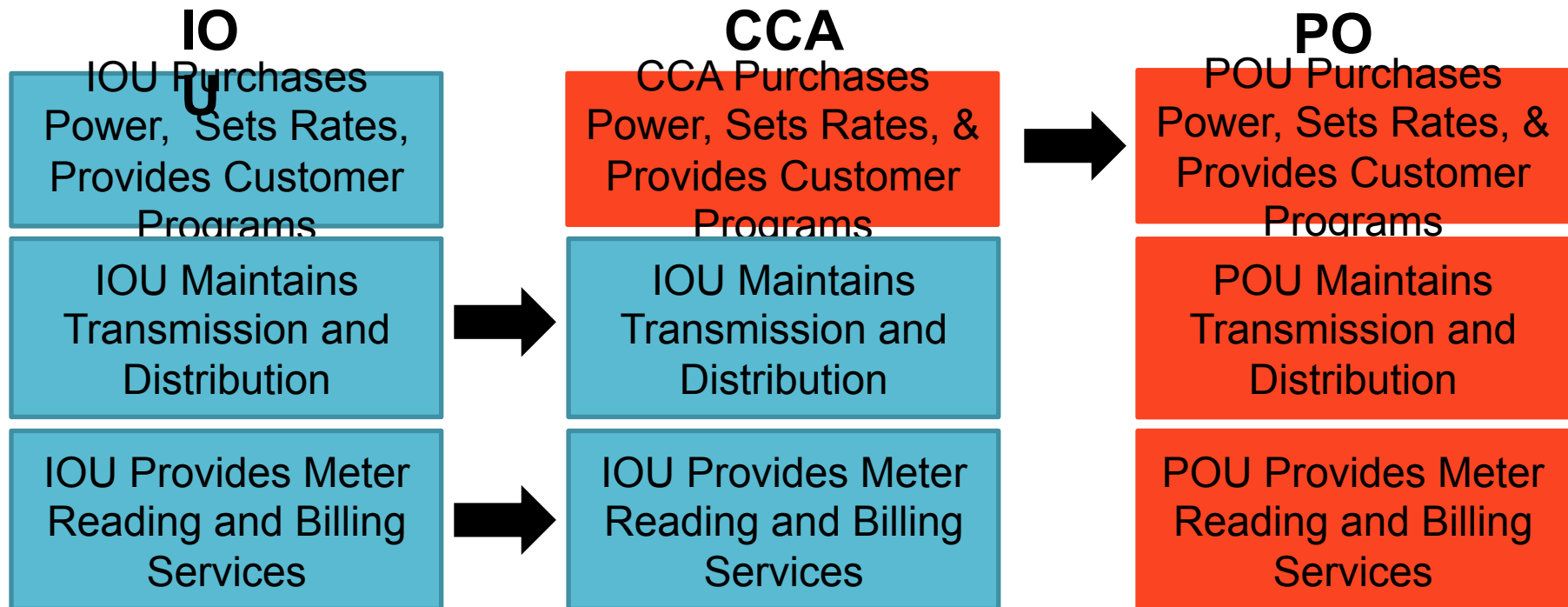


**SCPPA Average is 72% of SCE**



# Community Choice Aggregation (CCA) or Community Choice Energy (CCE)

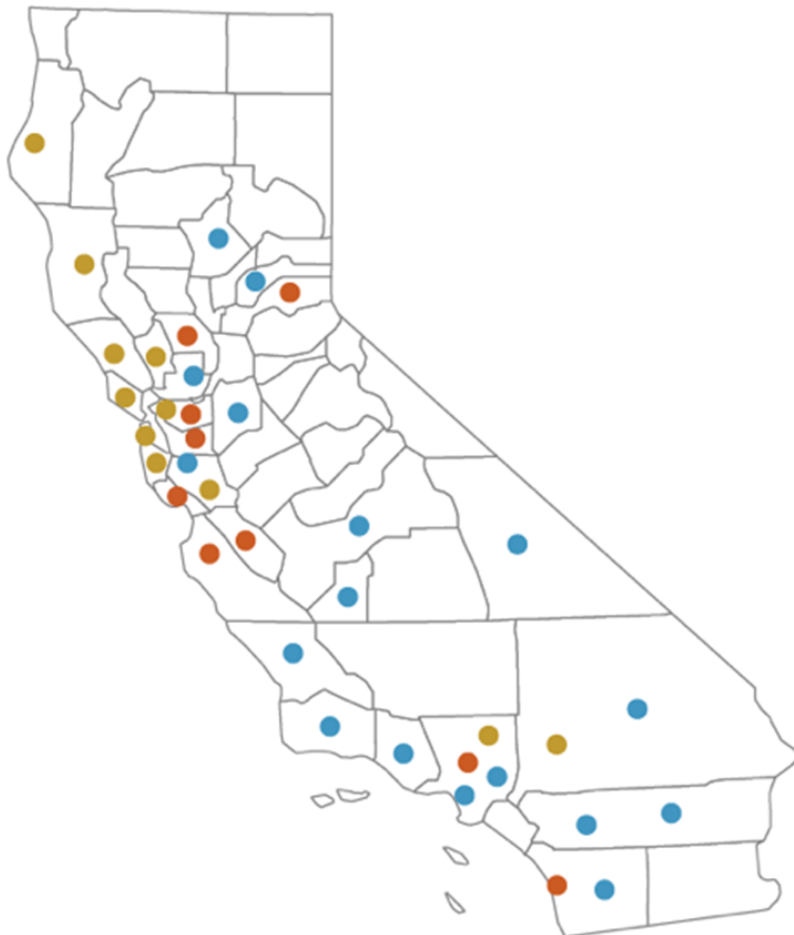
- Hybrid Business Model





# CCA Activity

- Substantial interest and growth in CCAs



- **Operational CCA/CCEs**

- MCE Clean Energy (*includes Marin and Napa Counties, parts of Contra Costa and Solano Counties*)
- Sonoma Clean Power (*includes Mendocino County in mid-2017*)
- Lancaster Choice Energy
- Clean Power San Francisco
- Peninsula Clean Energy (*San Mateo County*)
- Redwood Coast Energy Authority (*Humboldt County*)
- Silicon Valley Clean Energy (*Santa Clara County*)
- Town of Apple Valley

- **2018 Launch (anticipated)**

- City of Solana Beach
- Contra Costa County (*as part of MCE Clean Energy*)
- East Bay Community Energy (*Alameda County*)
- Los Angeles Community Choice Energy (*Los Angeles County*)
- Monterey Bay Community Power (*Monterey, Santa Cruz and San Benito Counties*)
- Sierra Valley Energy (*Placer County*)
- Valley Clean Energy Alliance (*Yolo County, Cities of Davis and Woodland*)

- **Exploring / In Process**

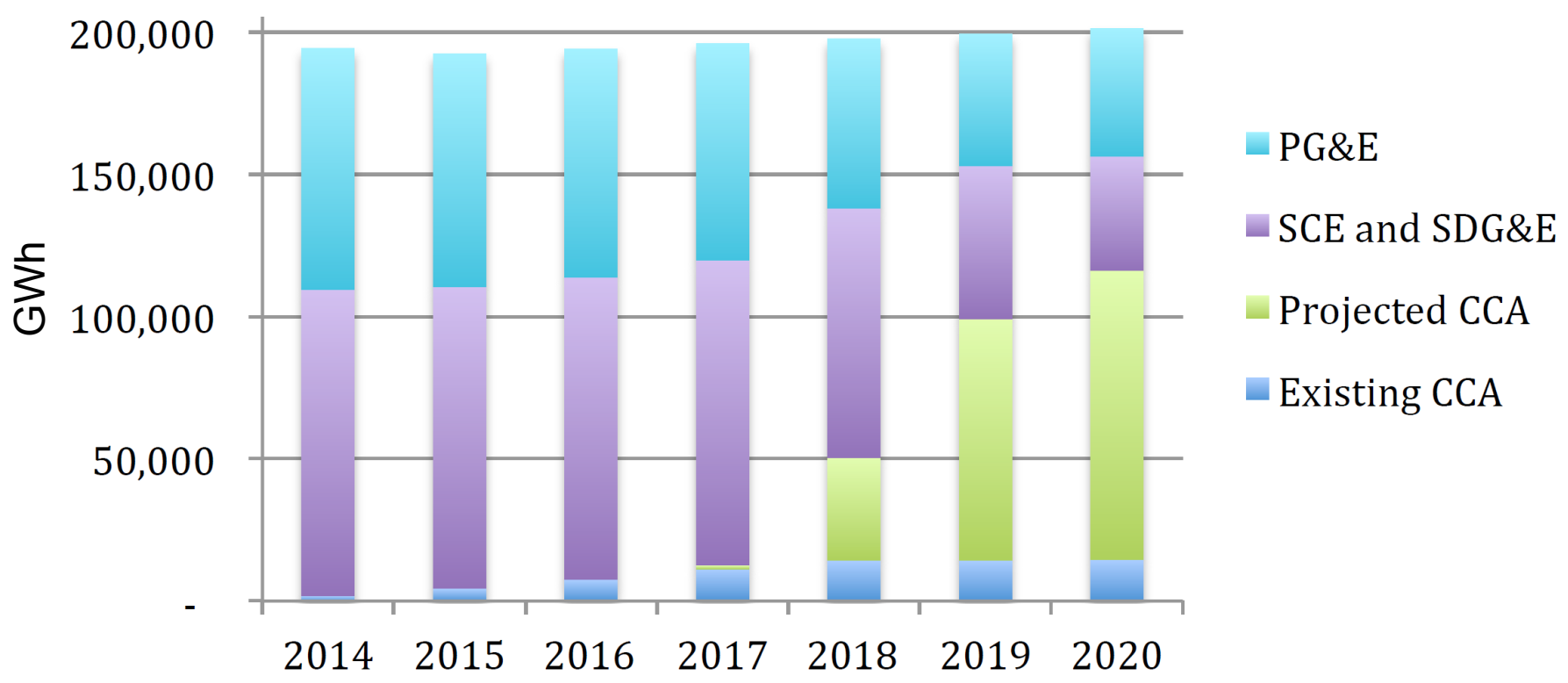
- Butte County
  - City of Hermosa Beach
  - City of Pico Rivera
  - City of San Jacinto
  - City of San Jose
  - Fresno County
  - Inyo County
  - Kings County
  - Nevada County
  - Riverside County
  - San Bernardino County
  - San Diego County
  - San Joaquin County
  - San Luis Obispo County\*
  - Santa Barbara County\*
  - Solano County
  - Ventura County\*
- \*Central Coast Tri-County*

[www.leanenergyus.org/cca-by-state/california/](http://www.leanenergyus.org/cca-by-state/california/)





# CCA Growth Projections



Source: Center for Climate Protection May 2017





# Key Takeaways

- Aggregation model reduces utility costs
- Utilities face converging forces and must adapt
- Market transformation can be fast
  - Use shorter planning horizons
- California's policy goals are challenging
  - Many are likely find their way to Washington State
- Customers are driving business model changes



# Questions?

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