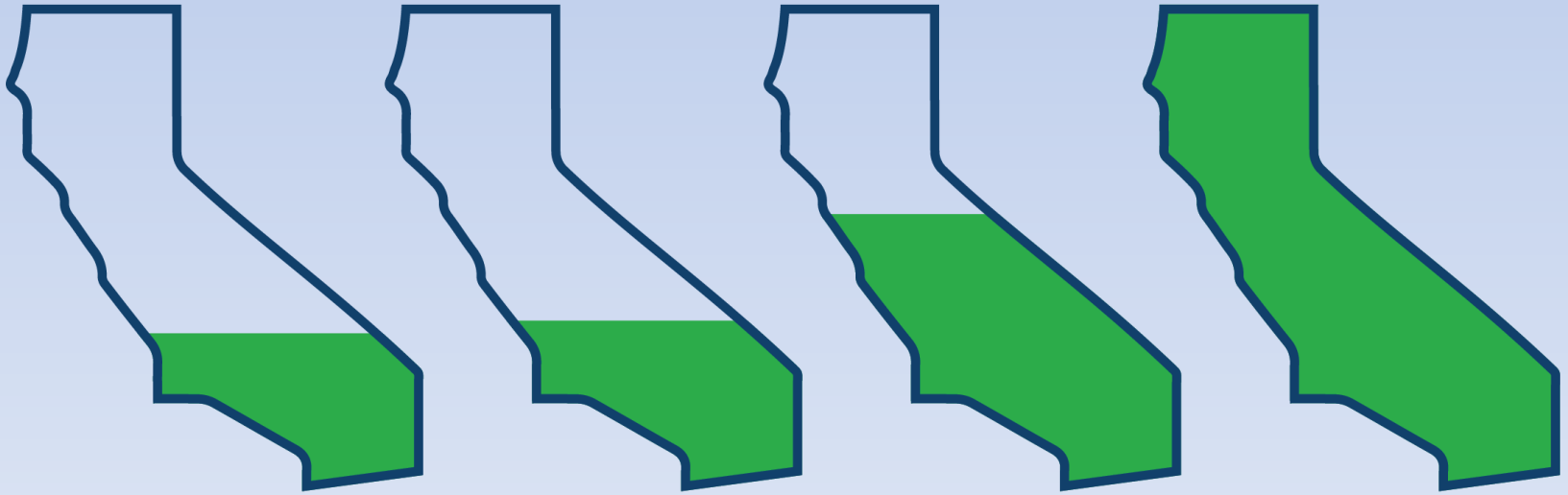
# SUNRISE FROM THE WEST:
## CALIFORNIA AND THE DAWN OF THE CLEAN ENERGY ERA




**David Hochschild**
**Commissioner**
**California Energy Commission**

# California Moves to 100% Clean Energy by 2045

| *TODAY* | *2020* | *2030* | *2045* |
| --- | --- | --- | --- |
| **32%** | **33%** | **60%** | **100%** |



# World's 5 Largest Companies Have Committed to 100% Renewable Energy













# Toward the Electrification of Almost Everything

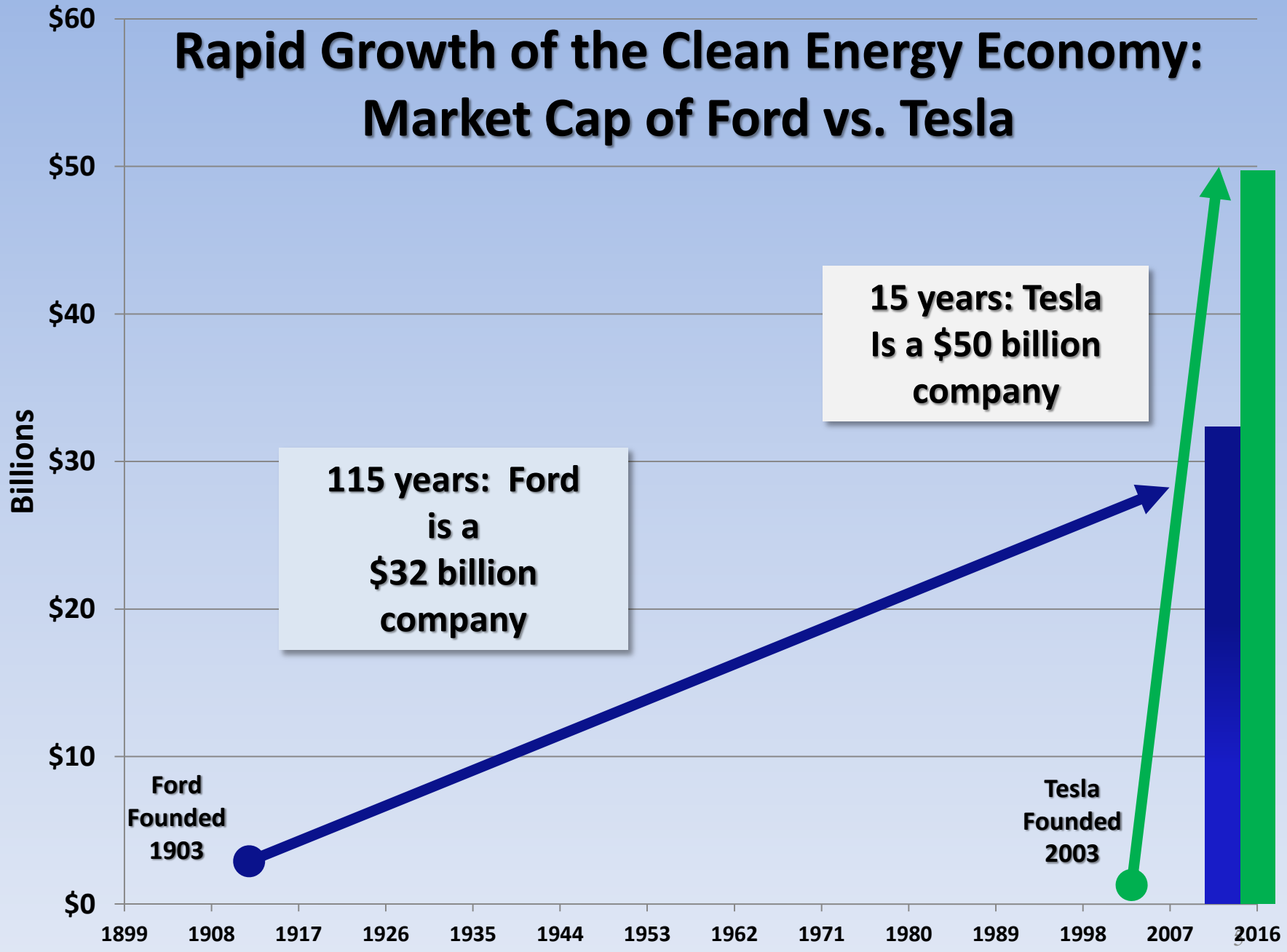




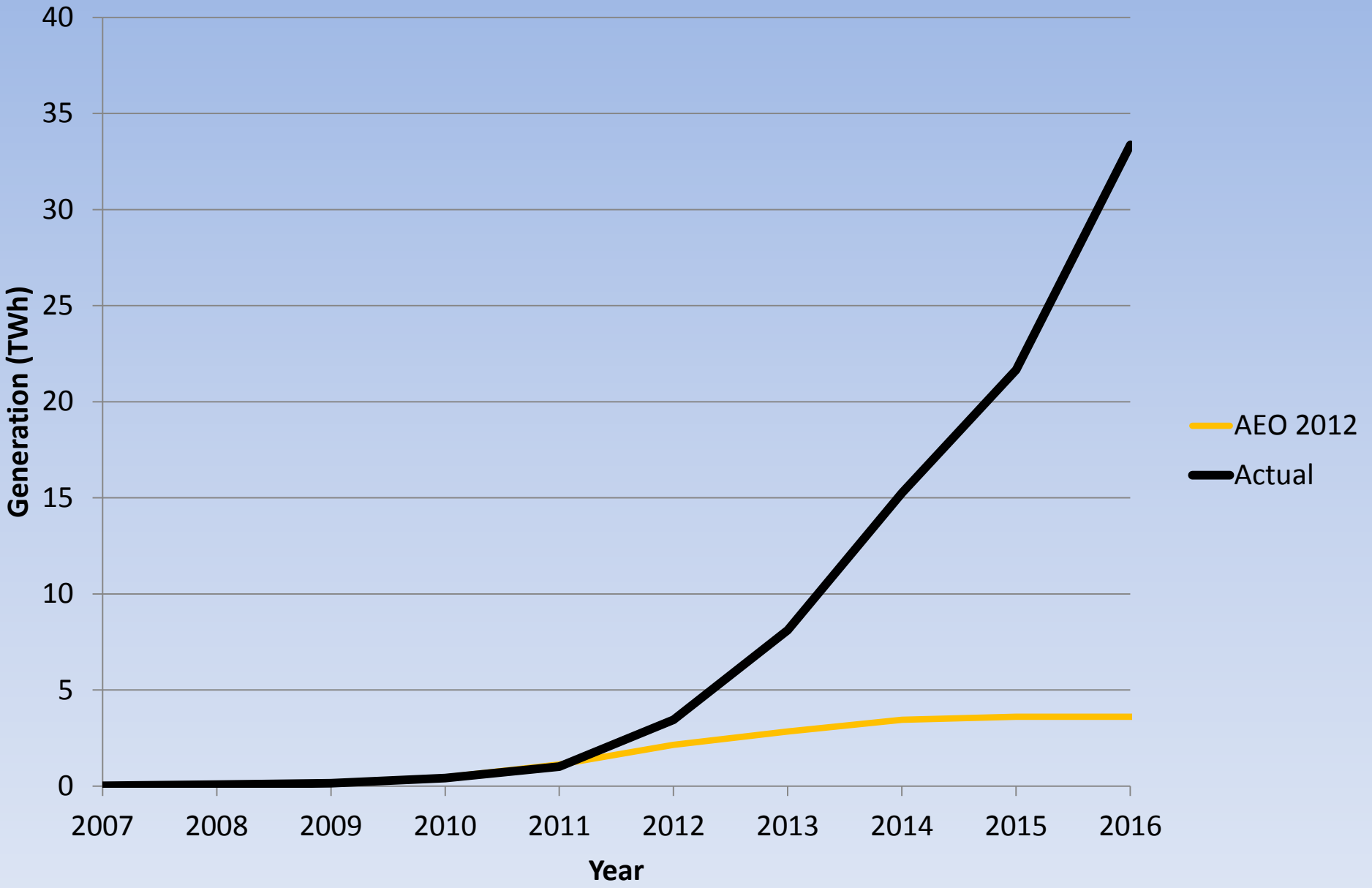







Rapid Growth of the Clean Energy Economy:
Market Cap of Ford vs. Tesla
Billions
$60
$50
$40
$30
$20
$10
$0
1899
1908
1917
1926
1935
1944
1953
1962
1971
1980
1989
1998
2007
2016
115 years: Ford is a $32 billion company
15 years: Tesla Is a $50 billion company
Ford Founded 1903
Tesla Founded 2003

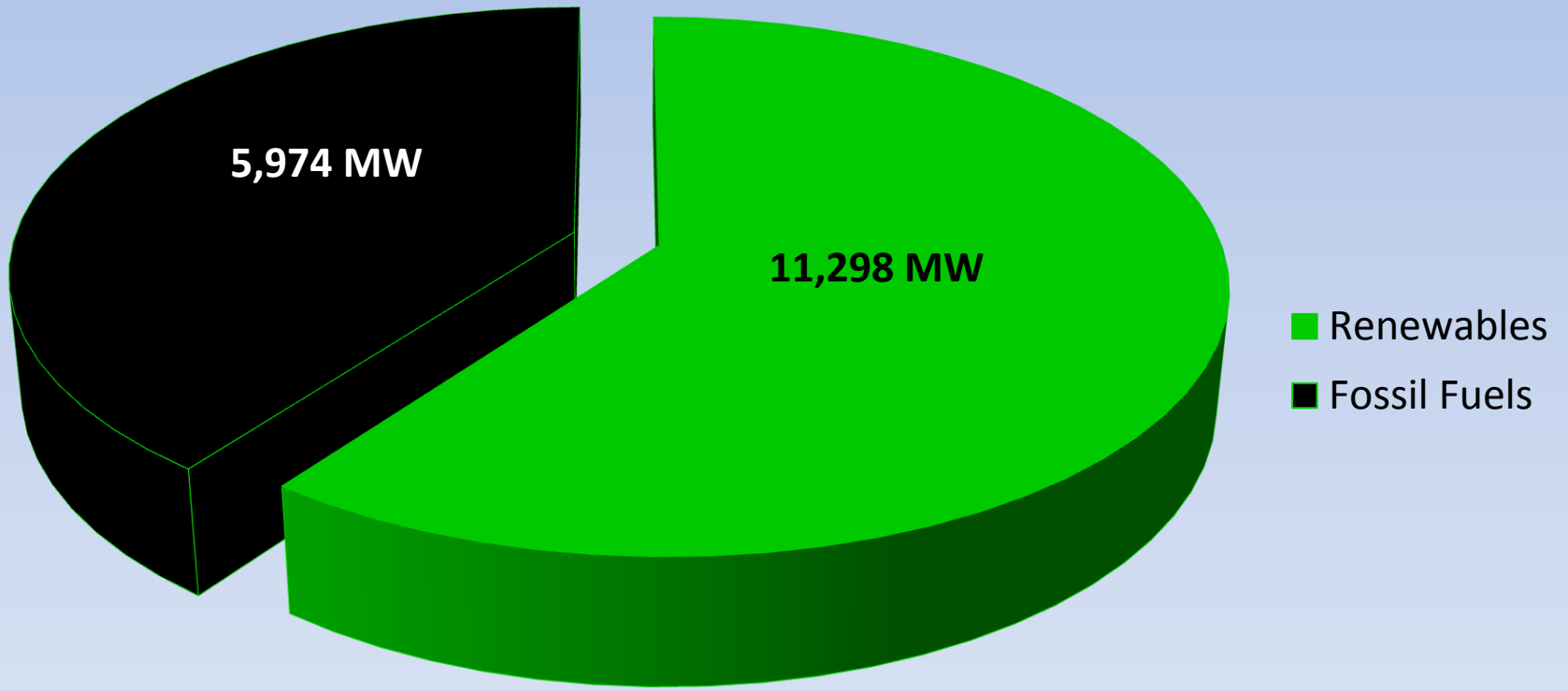
# US Solar PV Generation




Source: EIA *Annual Energy Outlook* 2004-2017, EIA *Electric Power Monthly* July 25, 2017

# Most of the New Generation Added to the Grid is Renewable Energy

## Renewables = 65% of New US Electric Generation Capacity in 2015

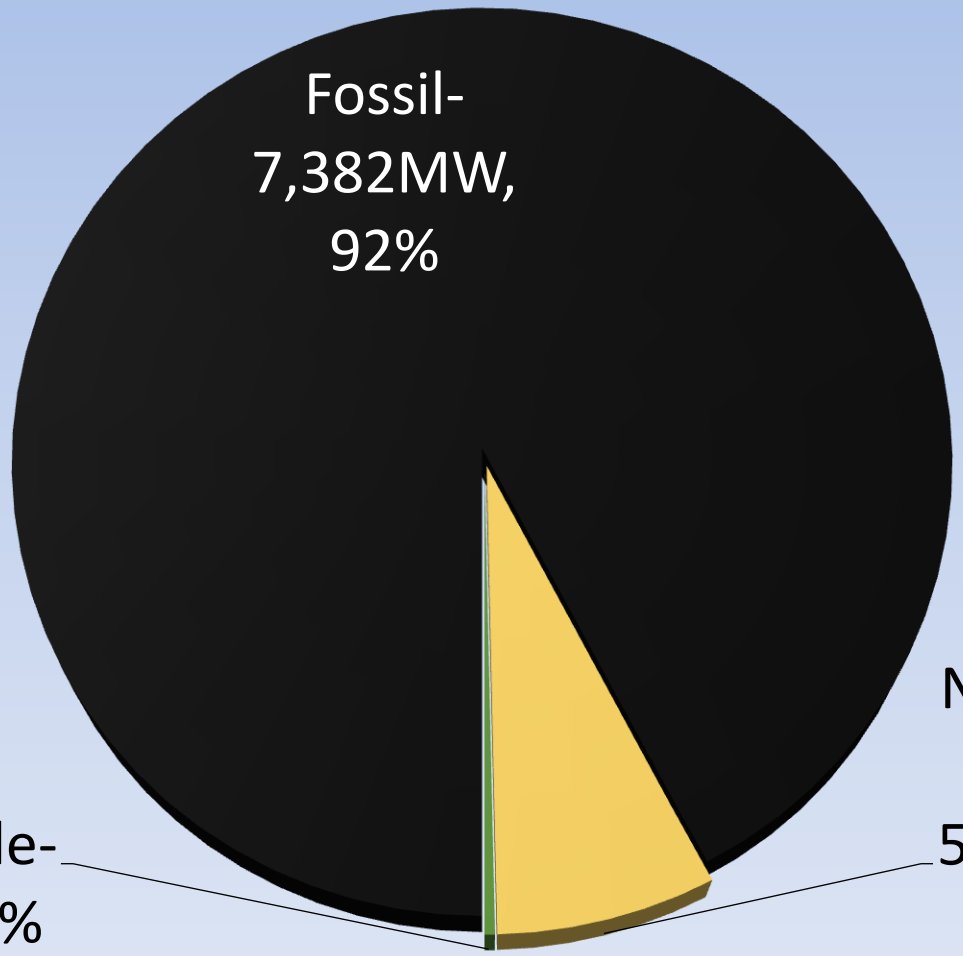



**Source**: FERC Energy Infrastructure Update, January-December 2015

# Most of the Retirements are Fossil Energy

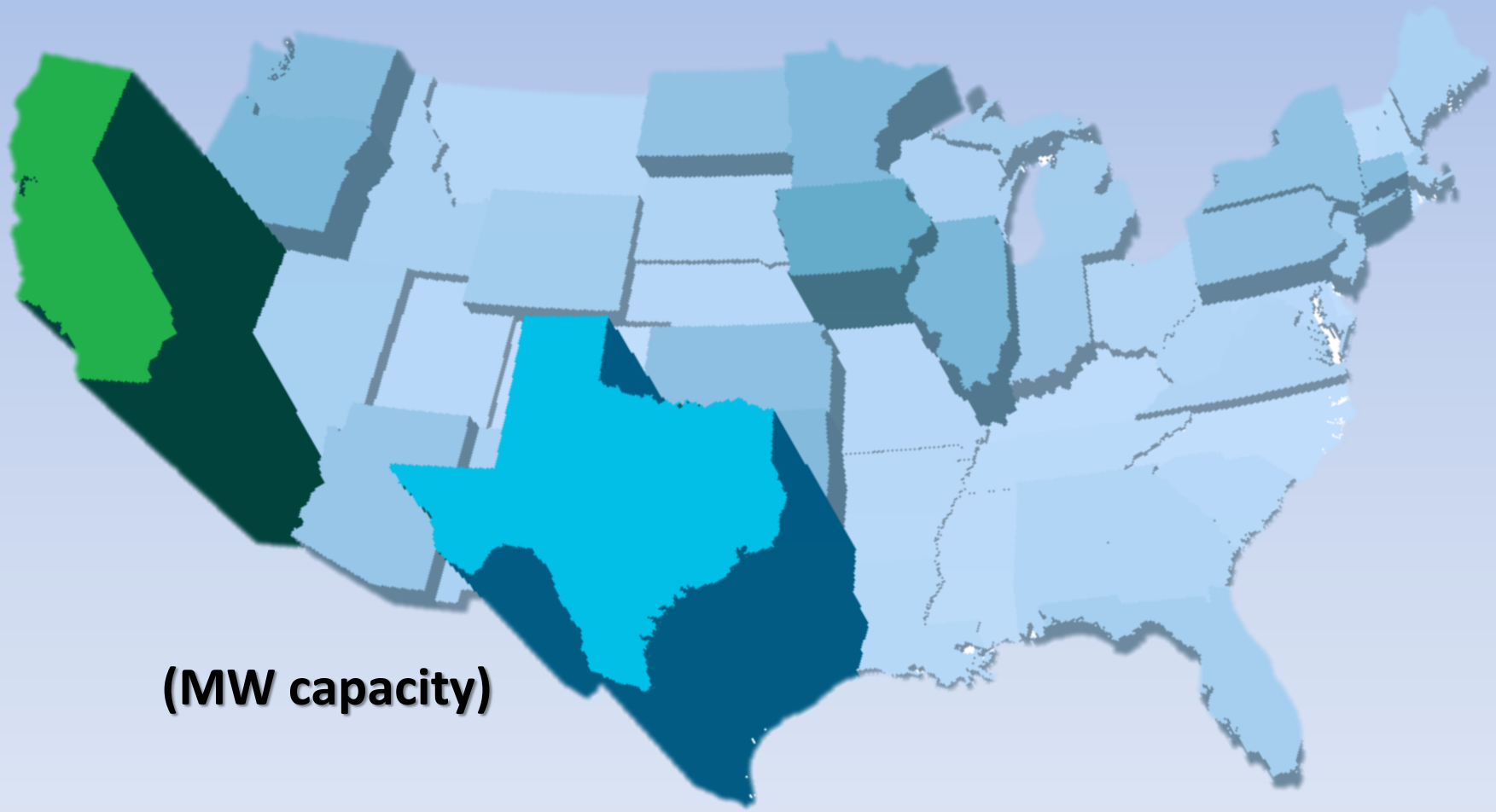
**Fossil fuels = 92% of Retired US Electric Generation Capacity in 2016***

*Data represents January 1, 2016 to November 29, 2016



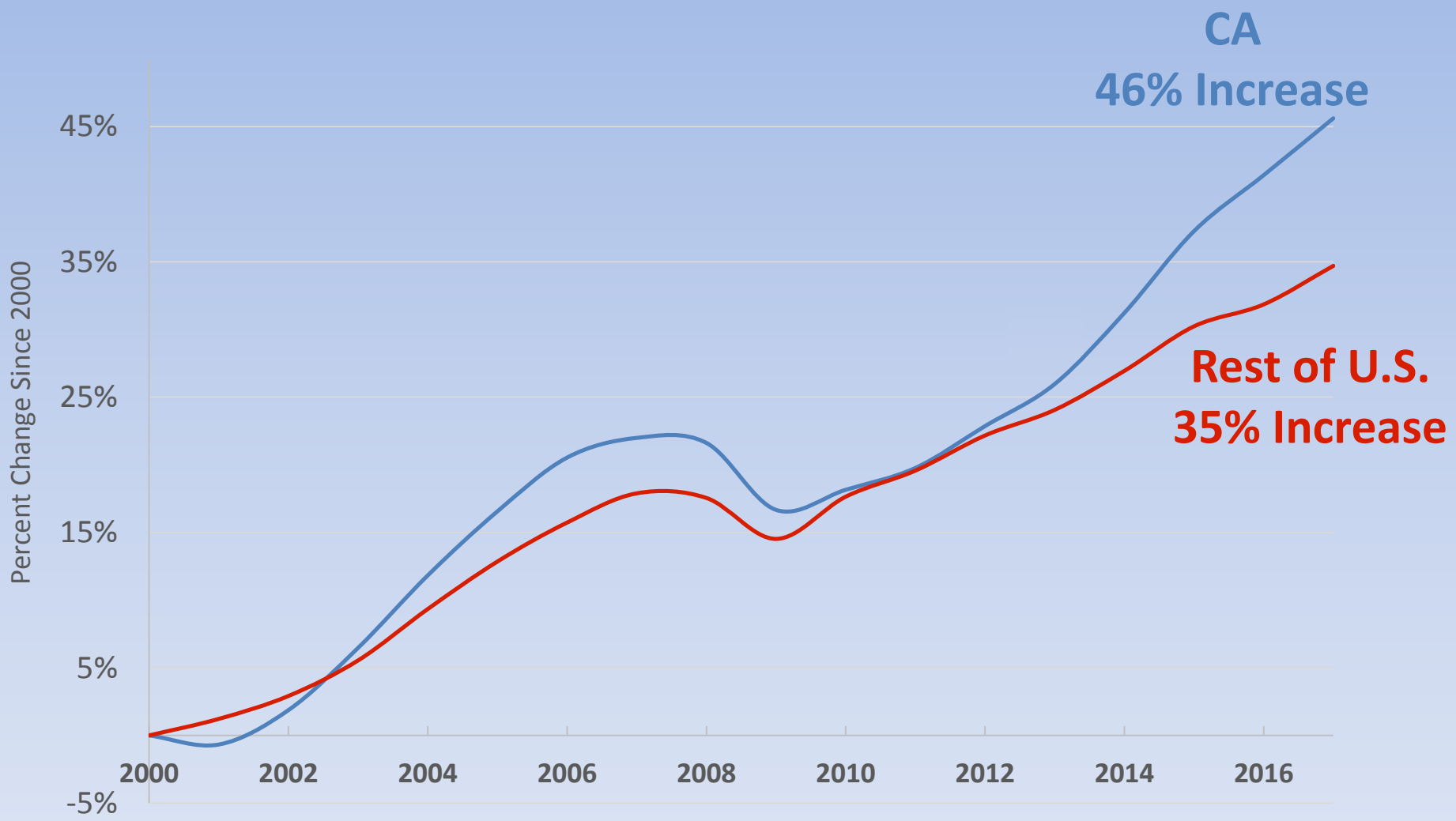

**Source**: EIA Electric Power Monthly, November 29, 2016. MW represent summer capacity.

# California Leads the US in Renewables Installed. What lessons have been learned?



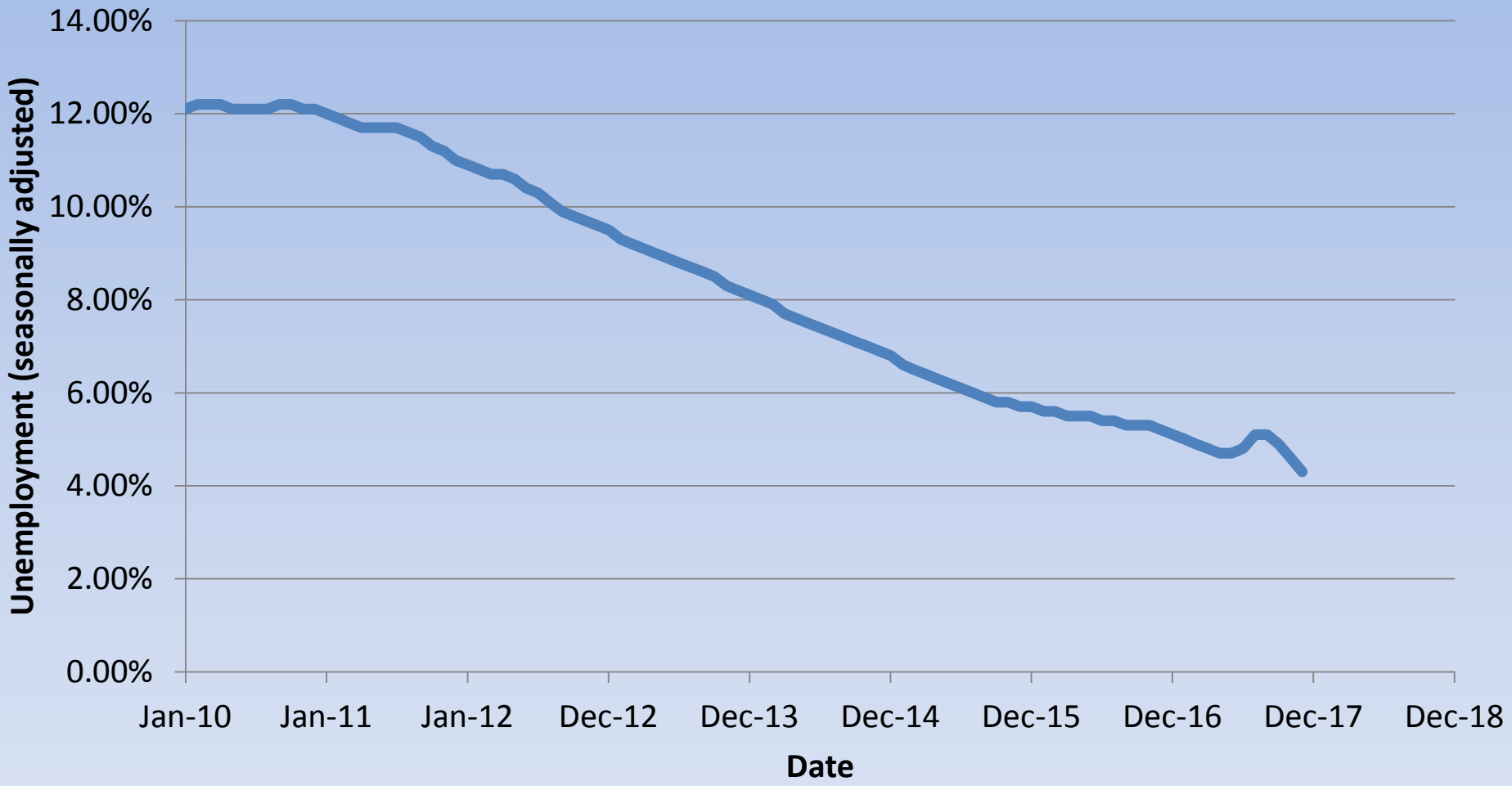

**Source**: Graphics based on data from the American Council On Renewable Energy (ACORE)
*Renewable Energy in the 50 States (2013/2014 Editions)*
http://www.acore.org/publications/50states/

# California's GDP is growing faster than the Nation's



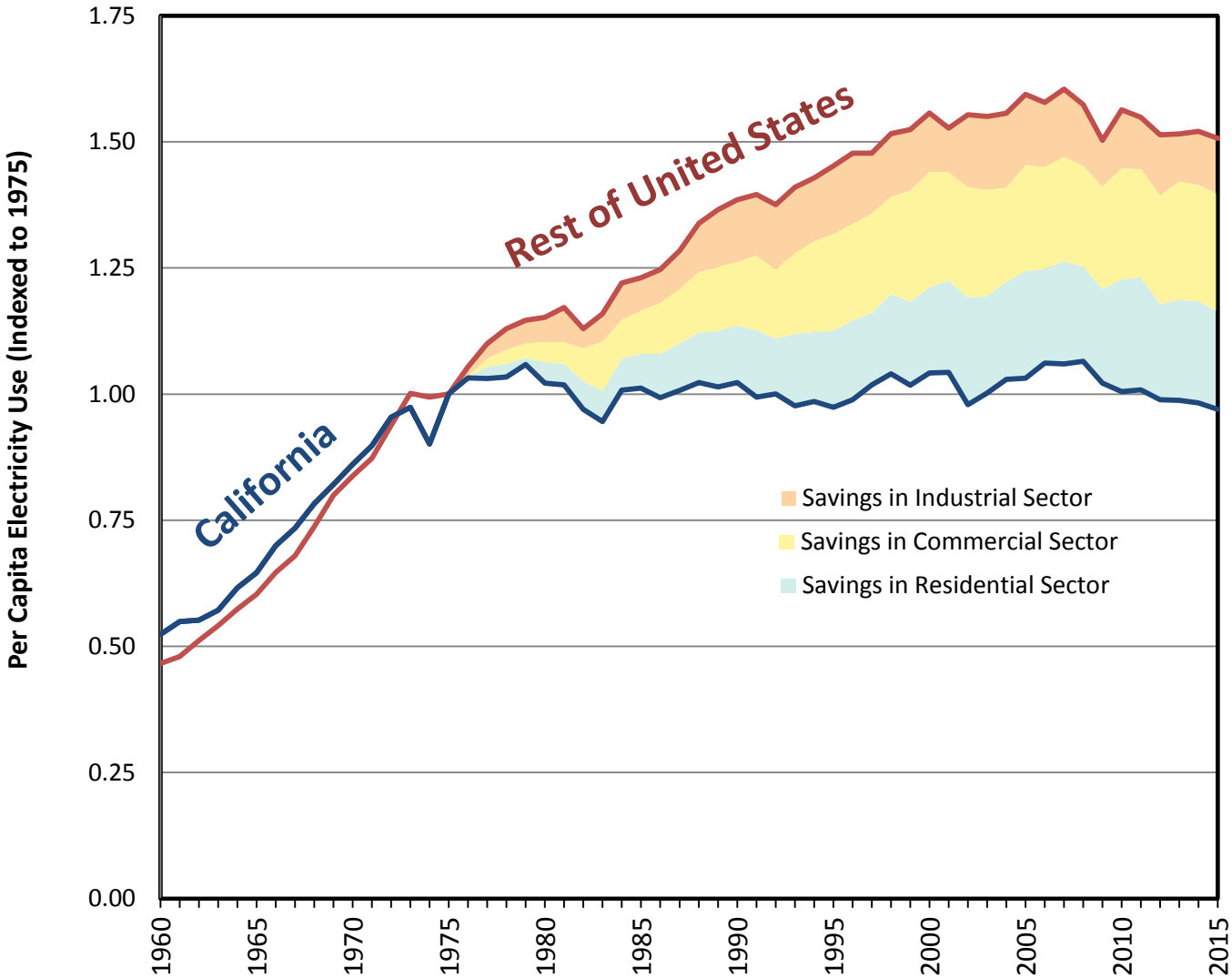

Source: U.S. Bureau of Economic Analysis, California Department of Finance, Real GDP by state (millions of chained 2009 dollars)

# California Unemployment Falls to 4.3%




Source: "Unemployment Rate and Labor Force Data Table," State of California Employment Development Department, Jan 22, 2018. http://www.labormarketinfo.edd.ca.gov/data/unemployment-and-labor-force.html

# California Advancing Energy Efficiency




Source: EIA, SEDS database (2017)

# Evolution of Lighting

Incandescent





CFL



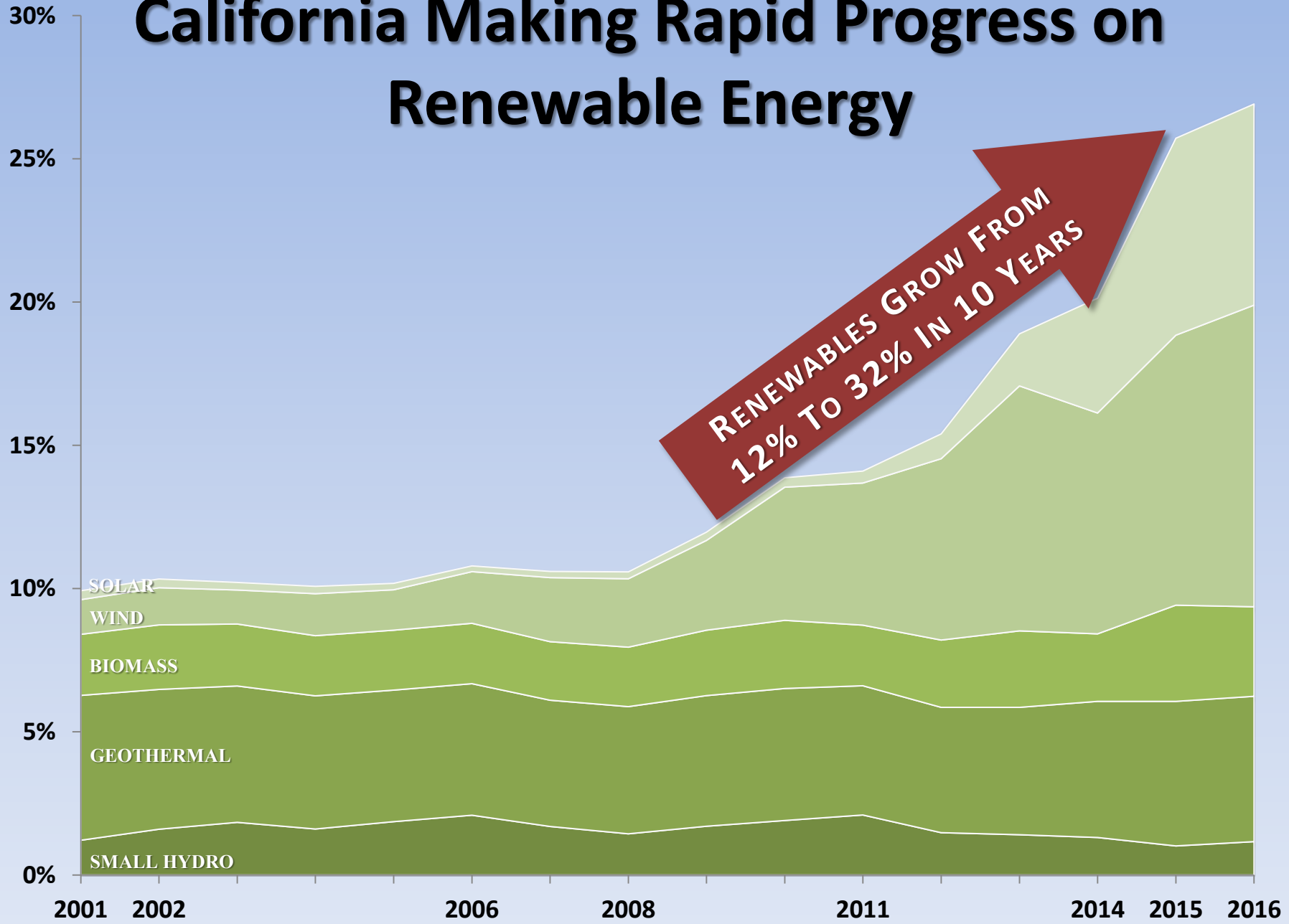


LED





# California Making Rapid Progress on Renewable Energy




**Source**: California Energy Commission, Tracking Progress Report

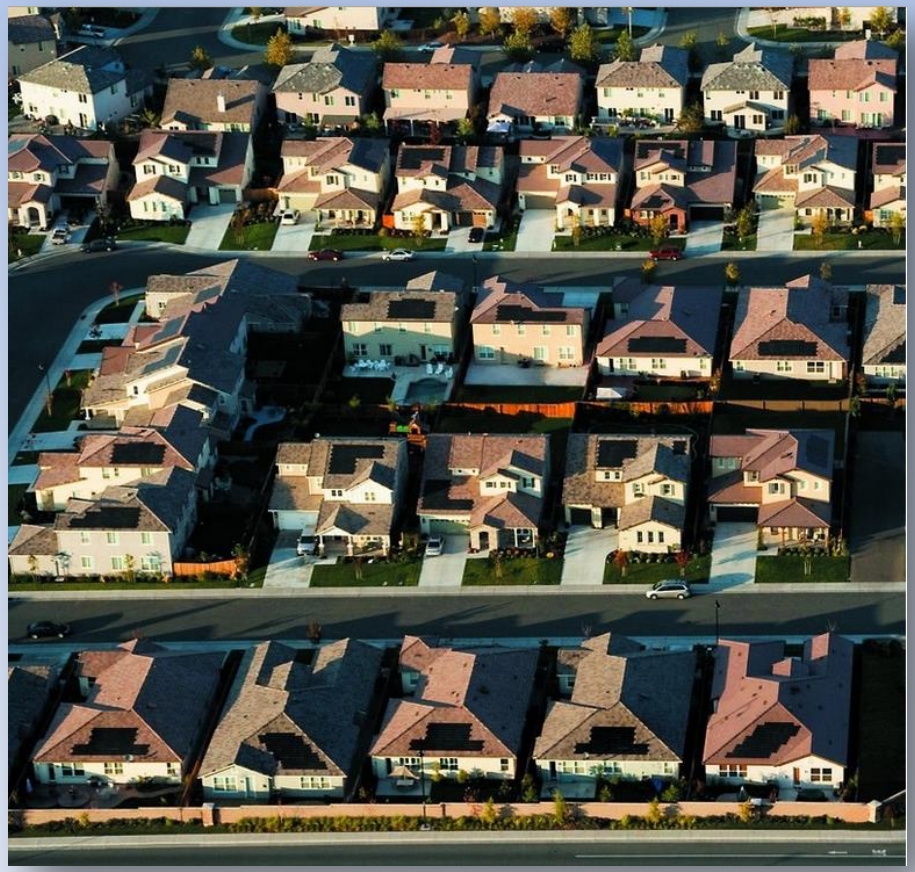
**“The people who say it can’t be done should get out of the way of the people who are doing it”**

**- Chinese proverb**

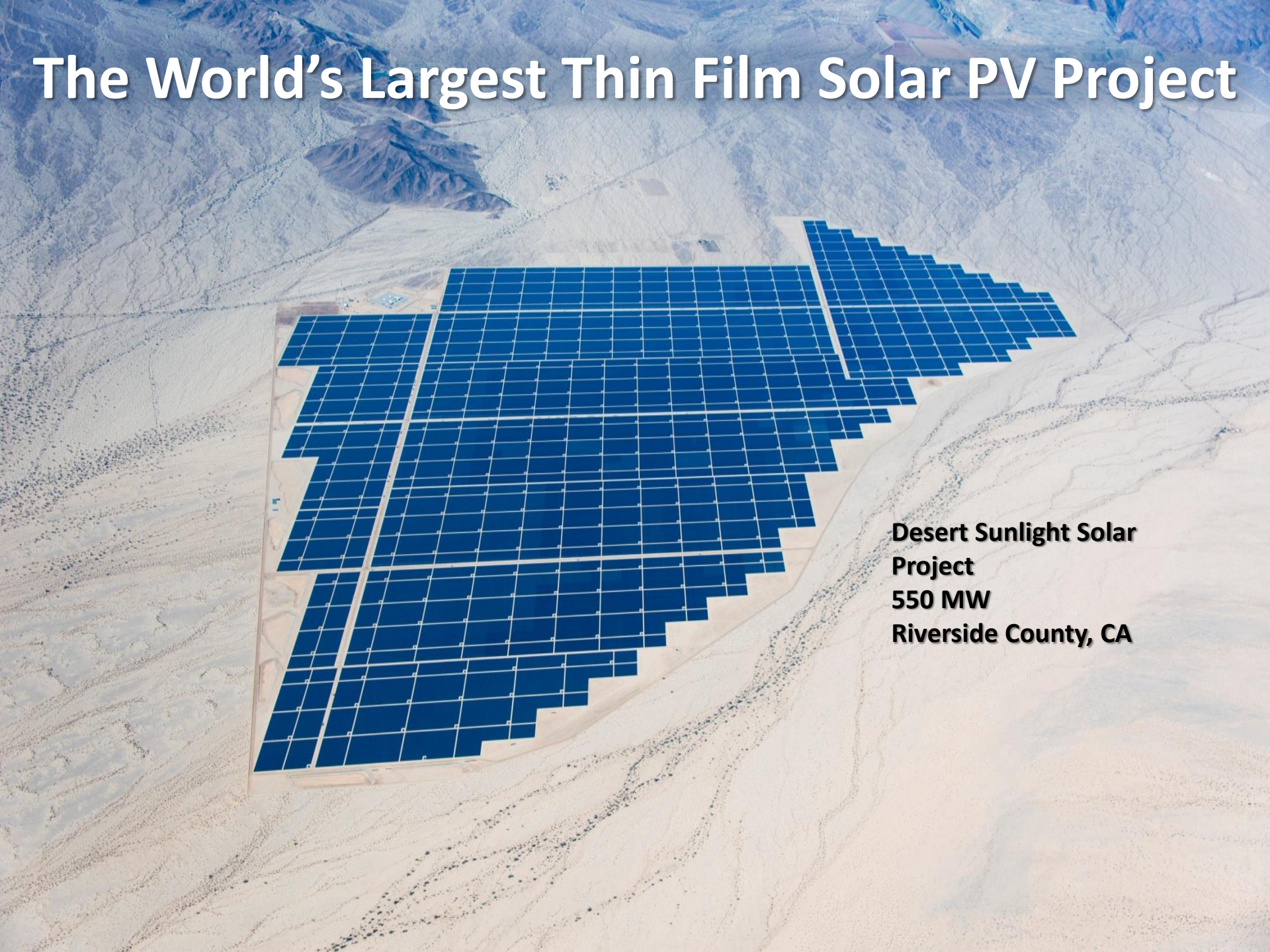
# California Requires Zero Net Electricity for all New Homes by Jan 1, 2020



**Zero Energy Community**
**Rocklin, CA**



# The World's Largest Thin Film Solar PV Project



**Desert Sunlight Solar Project**
**550 MW**
**Riverside County, CA**

# The World's Largest Solar Thermal Power Plant (Tower)



**Ivanpah Solar Thermal Project**
**393 MW**
**San Bernardino County, CA**

# The World's Largest Solar Thermal Power Plant (Trough)



**Solar Energy Generating System (SEGS)**
**354 MW**
**San Bernardino County, CA**

# The World's Largest Geothermal Power Plant



Geysers Geothermal Power Plant
955 MW
Lake County, CA

# The World's Largest Wind Project



**Alta Wind Energy Center**
**1550 MW**
**Kern County, CA**

# World’s Largest Solar Rooftop

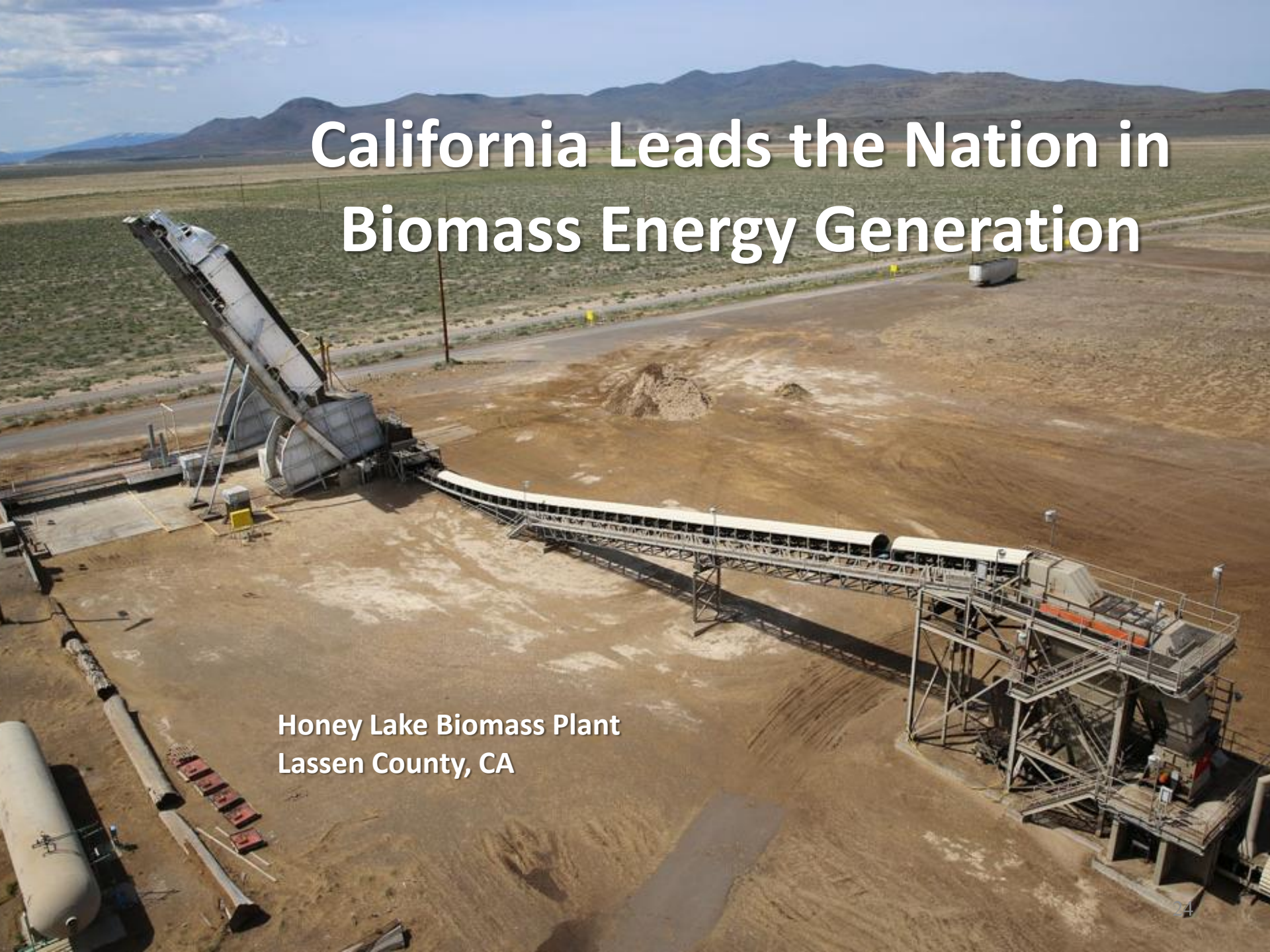


**Apple HQ**
**Cupertino, CA**
**17MW**

# World's 2nd Largest Lithium-Ion Battery Storage Project



# California Leads the Nation in Biomass Energy Generation



Honey Lake Biomass Plant
Lassen County, CA

# Offshore Wind: CA's New Renewable Resource?



**Rhode Island's 30MW Deepwater Wind Project is the first offshore wind project completed in the US.**

# Largest Manufacturing Plant in CA Produces Electric Vehicles

**Tesla employs 38,000 people**



Tesla Factory
Fremont, CA



**474,000 ELECTRIC VEHICLES IN CALIFORNIA TODAY**

# 1900. Where is the first car?



# 1913. Where is the last horse?



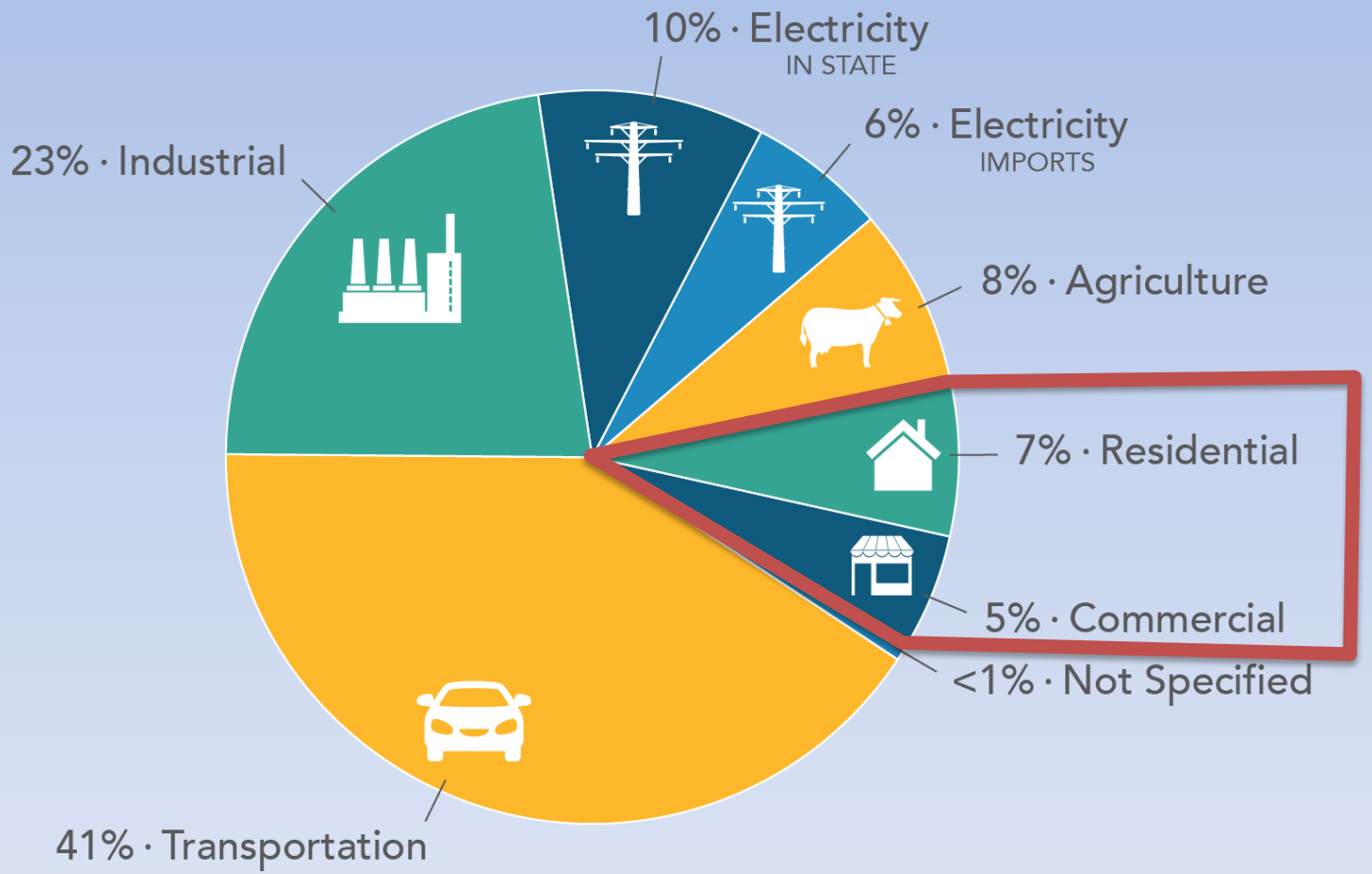

Electric
FOR
ALL

# Stanford University Converts Space and Water Heating from Natural Gas to Electricity



**Reduces water use and GHG emissions by 2/3 and annual energy bills by 1/3**

# California Greenhouse Gas Emissions




429.4 $MMTCO_2e$

2016 TOTAL CA EMISSIONS

# Now Selling: The All-Electric Home







CityVentures all-electric homes
Bellflower, CA

# High Speed Rail is Coming to California and it will be 100% Powered by Renewables…








# The Largest Tree in the World



**Sequoia National Park**
**California**

