California Overview
Anti-Nuclear Policies Result in Less Clean Power, Higher Emissions

Last Updated: January 18, 2017
Clean Power Down, Emissions Up

**Clean California Power Declined**

- 1990: 51%
- 2015: 46%

- **Percent of In-State Power that is Clean**

**California Emissions Trend**

- 1990: 431
- 2014: 442

**Environmental Progress**
The Hype

1. California in clean energy revolution

2. California is climate change leader

3. Nuclear not needed to reduce emissions
The Reality

1. Clean power in all measures is on the decline

2. California emissions declined less than national average since 2000

3. Loss of nuclear main factor in flattening and declining clean power
1. Clean Power in Decline
Clean California Power Declined

Source: California Almanac, “In-state System Power,” 2016; Rooftop Solar Added; https://docs.google.com/spreadsheets/d/1uXuqaEBBvdNLnmuUic5mmhCkqO0U0VTunn3meS_dAU/edit?usp=sharing

Percent of In-State Power that is Clean
No long-term trend in California per capita electricity consumption

Source: EIA, 2016
2. Emissions Rising
California Emissions Trend

California Emissions have declined since 2000…

Source: EIA, State Energy Emissions Data, 2016
California Emissions Declined Less than National Average, 2000 - 2013

United States
-9.6

California
-7.5

Source: EIA, State Energy Emissions Data, 2016
California Power Sector Emissions Declined 3.7x Faster Before Passage of Climate Legislation (AB 32)

Before Passage of Climate Legislation (AB 32)

California Power Sector Emissions Rose since 2011

Decline in Emissions from Out-of-State Power Canceled Out by Rise of In-State Power Emissions

California Clean Power Under Governors

Source: California Almanac, “In State Power,” 2016
California Must Reduce Emissions 7x Faster to Meet 2030 Target

California Emissions Actual & Target

California Actual Change in Emissions (1990-2014) Compared to Official Target (2015 - 2030) (MMT)

3. Nuclear abandonments behind clean energy decline & emissions increase
California Nuclear Abandonments

- **Diablo Canyon Units 3-5 (halted, late 1970s)**
- **Rancho Seco (closed, 1989)**
- **San Onofre (closed, 2013)**
- **Diablo Canyon (closure proposal, 2016)**
- **San Joaquin/Wasco (halted, 1978)**
- **Sundesert (halted, 1978)**

**Installed Capacity (MW):**
- Diablo Canyon: 3,380 MW
- San Onofre: 2,254 MW
- San Joaquin/Wasco: 2,200 MW
- Rancho Seco: 1,950 MW
- Sundesert: 1,950 MW
- Diablo Canyon Units 3-5: 913 MW
- Rancho Seco: 7.4 TWh
- San Onofre: 18.2 TWh
- San Joaquin/Wasco: 35.5 TWh
- Rancho Seco: 17.7 TWh
- Sundesert: 15.7 TWh
- Diablo Canyon Units 3-5: 7.4 TWh
Clean California Power (In-State) Without Nuclear Abandonments

+19 pts

Source: California Almanac, “In-State Power,” 2016; Rooftop Solar Added; https://docs.google.com/spreadsheets/d/1uXuqaEFBBvdNLnmuUic5mmhCkqOoU0VTunn3meS_dAU/edit?usp=sharing
Nuclear Abandonments Locked in Fossil

Including distributed solar

Source: California Almanac, “In-State Generation by Fuel Type”, 2014
2014 California Emissions 2.5x Higher Without Nuclear

- **CA In-State Power**
- **CA In-State Power w/Nuclear Build-Out**

Total Nat Gas Rises with Nuclear Closures

Fossil fuels

Clean Energy

Source: EIA
Nuclear More than Hydro Resulted in Higher Emissions

California Almanac, “In-State Generation by Fuel Type”, 2016
Loss of San Onofre Cancelled Out Solar Gains

Source: EIA

California Almanac, “In-State Generation by Fuel Type”, 2016
Halting/Closing Nuclear = 120% More Emissions from Power Sector

California Almanac, “In-State Generation by Fuel Type”, 2016
Nuclear Abandonments Result in 50% More Electricity from Fossil & 69% Less from Clean

California Almanac, “In-State Generation by Fuel Type”, 2016
Appendix: Closer Look
Clean California Power Declined (In-State)

Source: California Almanac, “In-state System Power,” 2016; Rooftop Solar Added; https://docs.google.com/spreadsheets/d/1uXuqaE-BBvdNLnmuUic5mmhCkqOoU0VTunn3meS_dAU/edit?usp=sharing
Clean California Power Declined (Total)

https://docs.google.com/spreadsheets/d/1Mmh7DbtAhnexJpM9f-BvdlyN4x6qG7G6Af1tyE4uY/edit?usp=sharing

Source: Environmental Progress
Clean California Power (Total) Without Nuclear Abandonments

Source: California Almanac, “Total System Power,” 2016; Rooftop Solar Added; 2009 change in how Cal Almanac classifies “unspecified” does not affect trend. https://docs.google.com/spreadsheets/d/1Mmh7DbtAhnexJpM9f-BvdlyN4x6qG7G6AfEt1tyE4uY/edit?usp=sharing

Percent of Total that is Clean Power

+18 pts

44

2002

62

2015
Clean California Power Declined (Total)

Zero Carbon Power Total

Source: California Almanac, “In-state System Power,” 2016; Rooftop Solar Added: https://docs.google.com/spreadsheets/d/1uXuqaE-BBvdNLnmuUic5mmhCkqOoU0VTunn3meS_dAU/edit?usp=sharing
Generation from Abandoned and Existing Nuclear Plants

Source: US Energy Information Administration, 2016; Based on 92% capacity factors
Nuclear Would Have Been Over 50 Percent of California Power Had they Not Been Stopped

Source: EIA
If Diablo closes, 21% of California’s clean electricity would be lost

Includes distributed solar

Source: US Energy Information Administration
Diablo Canyon produced 14 times more electricity than Topaz, one of world’s largest solar farms.

Source: EIA
Abandoned Nuclear vs. Total Renewables (incl. large dams)

Source: California Almanac, “In State Power,” 2016
Electric vehicles will require 1 - 5x clean power currently provided by Diablo Canyon

Sources and Calculation: Nissan Leaf needs 30 kWh of electricity to travel 100 miles, or .3 kWh per miles. Department of Energy, 2016. http://www.fueleconomy.gov/feg/Find.do?action=sbs&id=37066. 5,000,000 Nissan Leafs at 0.3kWh per mile, multiplied by 12,000 miles (California average)
Closure of San Onofre Nuclear = Equivalent of 2M Cars

Source: California Almanac. In 2011, San Onofre Generating Station 18,175,000,000 KWh of power. It was replaced by natural gas, which according to US EIA generates 1.2 pounds of CO2 per KWh, or 9,975,282 metric tons of CO2. Average US vehicle emits 4.7 metric tons of CO2 per year. 9,975,282 divided by 4.7 = 2,100,059 cars
California Population Expected to Rise 13% by 2030