

DOCKETED

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City of Palo Alto Renewables Initiatives

**Presentation to CEC
December 13, 2016**

Jim Stack, PhD

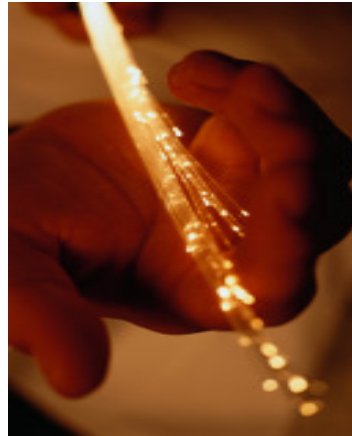
Outline

- How Palo Alto has achieved a 50% RPS
- Obstacles that need to be addressed
- The role of energy storage
- The role of distributed resources
- Palo Alto's unique challenges and goals
- Questions

Palo Alto's Utilities Services



Water - 1896



Fiber - 1996



Electric - 1900



Wastewater - 1898

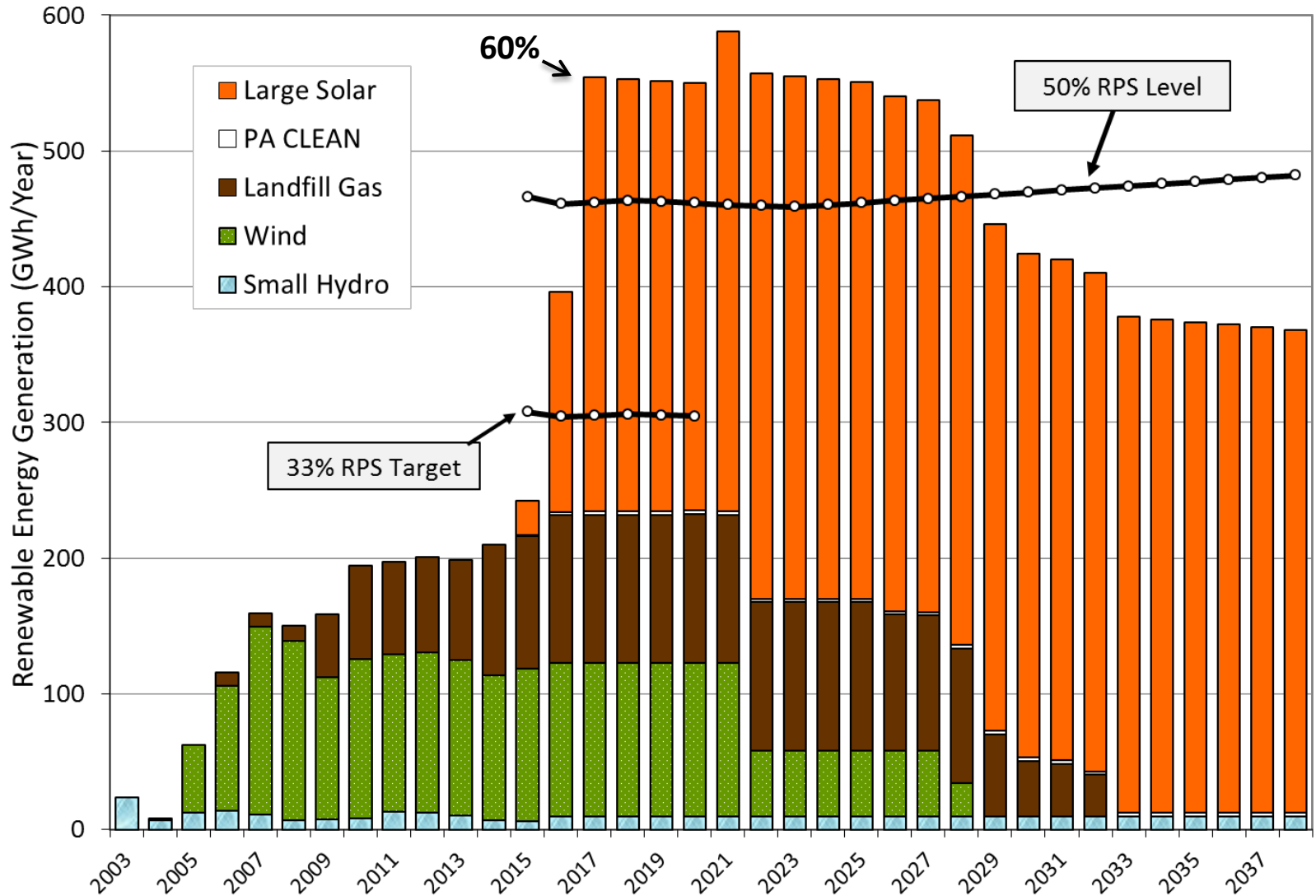


Storm Drain



Gas - 1917

How Palo Alto has achieved 50%



How Palo Alto has achieved 50%

- Adopted a voluntary RPS target in 2002
- Began executing PPAs in 2004
- Now have 13 executed PPAs (plus 3 terminated)
 - 6 solar (5 operating)
 - 5 landfill gas (all operating)
 - 2 wind (both operating)
- Aggressive energy efficiency efforts to reduce load
- This effort has required a major investment of staff time, training, and resources

Palo Alto's Renewable Resources

5 Solar Projects ☀️

- Elevation Solar C
- Western Antelope Blue Sky Ranch B
- Frontier Solar
- EE Kettleman Land
- Hayworth Solar

2 Wind Projects 🏠

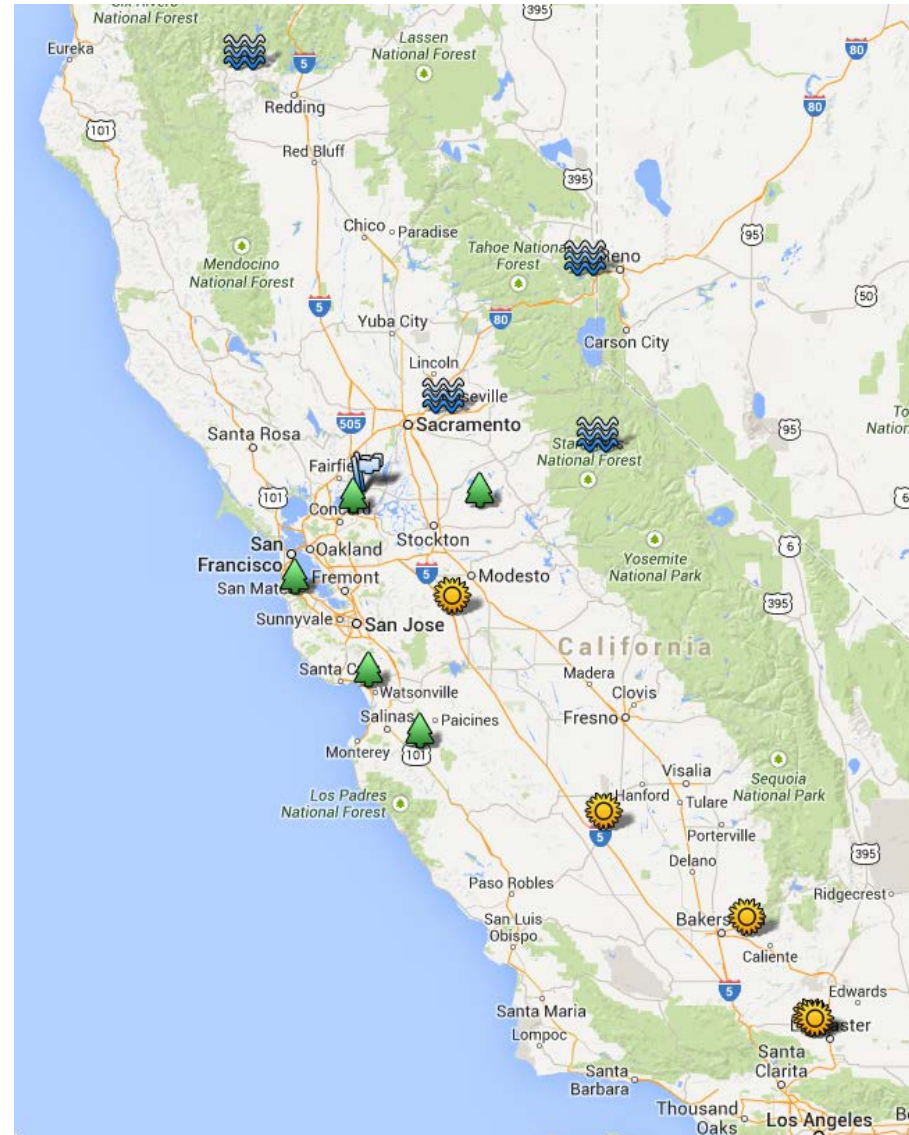
- High Winds
- Shiloh Wind

5 Landfill Gas Projects 🌲

- Santa Cruz
- Ox Mountain
- Keller Canyon
- Johnson Canyon
- San Joaquin

Small Hydro Projects 🌊

- New Spicer Meadows
- Lewiston, Nimbus, Stampede



Obstacles that Need to be Addressed

Macro Level Challenges

- Skyrocketing TAC rates
- Falling LMPs → More curtailment, less value
- Rising (and constantly evolving) RA requirements and costs
- Uncertainty around impacts of regionalization on RPS/RA/GHG regulations
- Inability for local DERs to be counted toward RA requirements

Obstacles that Need to be Addressed

Regulatory Wish List

- Need for regulatory consistency and predictability
- Regulations should reward early action, not discourage it
- Minimize reporting redundancy
- IRPs should be flexible
 - One size does not fit all
 - Things change over time

The Role of Energy Storage

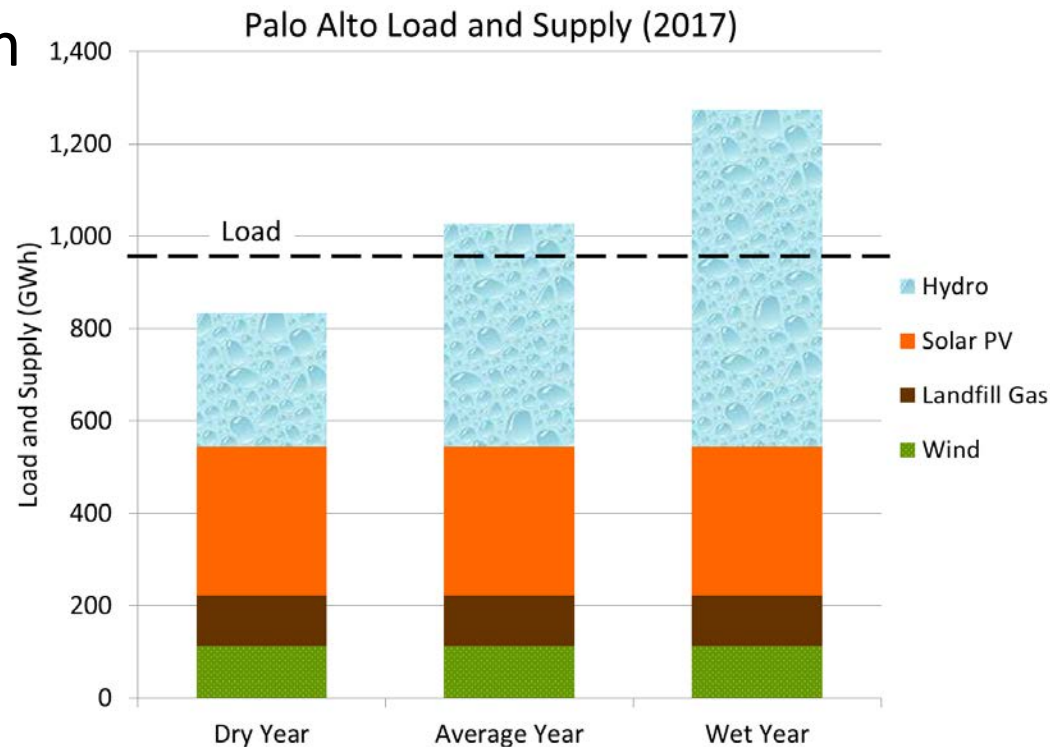
- No role at present—not cost-effective
- May become cost-effective post-2020
 - Palo Alto evaluating small-scale pilot project for customer-sited storage
- When cost-effective, it will be useful for:
 - Minimizing curtailment of solar resources
 - Mitigating the duck curve
 - Satisfying RA and AS needs
 - Improving grid stability/resiliency

The Role of Distributed Resources

- Local PV currently meets ~1% of Palo Alto energy needs
 - Goal of meeting 4% of energy needs by 2023
 - Ranked 7th in US for PV installations per capita
 - Feed-in tariff program active
 - Planning community solar program
- Very high penetration of EVs (1600 registered in Palo Alto, plus commuter vehicles)
- Minimal distribution system impact to date
- Voluntary demand response program
 - Can reduce summer peak load by 300-900 kW

Palo Alto's Unique Challenges

- Very limited potential for local generation
- High PV and EV penetration
 - Difficulty forecasting long-term load
 - Difficulty with distribution system planning
- Heavy concentration of hydro resources



Palo Alto's Unique Goals

- Carbon Neutral supply portfolio (since 2013)
- Local Solar Plan
 - Meet 4% of energy needs by 2023
 - Feed-in tariff program & community solar
- Big electrification push (natural gas & transportation)
- Sustainability/Climate Action Plan
 - 80% GHG reduction by 2030

Questions/Feedback

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