



DIVISION OF RATEPAYER ADVOCATES



The Green Rush

Implementing Renewables in California

August 2011

Overview of Presentation

1. History of Renewables Legislation
2. Challenges to implementing RPS
3. Findings from DRA's Green Rush Report
4. Findings from DRA's Solar Paradox Report
5. Conclusions and Recommendations



Renewable Portfolio Standard (RPS)

SB 1078 (Simitian 2002)

- Required increasing Renewables by 1% per year
- Goal of achieving 20% by 2017
- Required comparison to market price of energy
- Required above market costs to be paid through above market fund
- Allowed for limiting procurement if prices were too high



RPS Accelerated

SB 107 (Simitian 2006)

- Soon after SB 1078 chaptered, SCE reported Renewable contracts totaling 17% of their portfolio
- 2004 IEPR recommended accelerating Renewable goal to 20% by 2010
- SB 107 maintained most provisions in SB 1078
- Allowed for limiting procurement if prices were too high



Adopted Ratepayer Protections through Limits on Total Costs

SB 1036 (Perata 2007)

- Required consideration of indirect system costs
- Required comparison to market price of comparable products
- Required above market costs to be paid through Renewable trust fund
- Reaffirmed limiting procurement if prices are too high



33% RPS by 2020

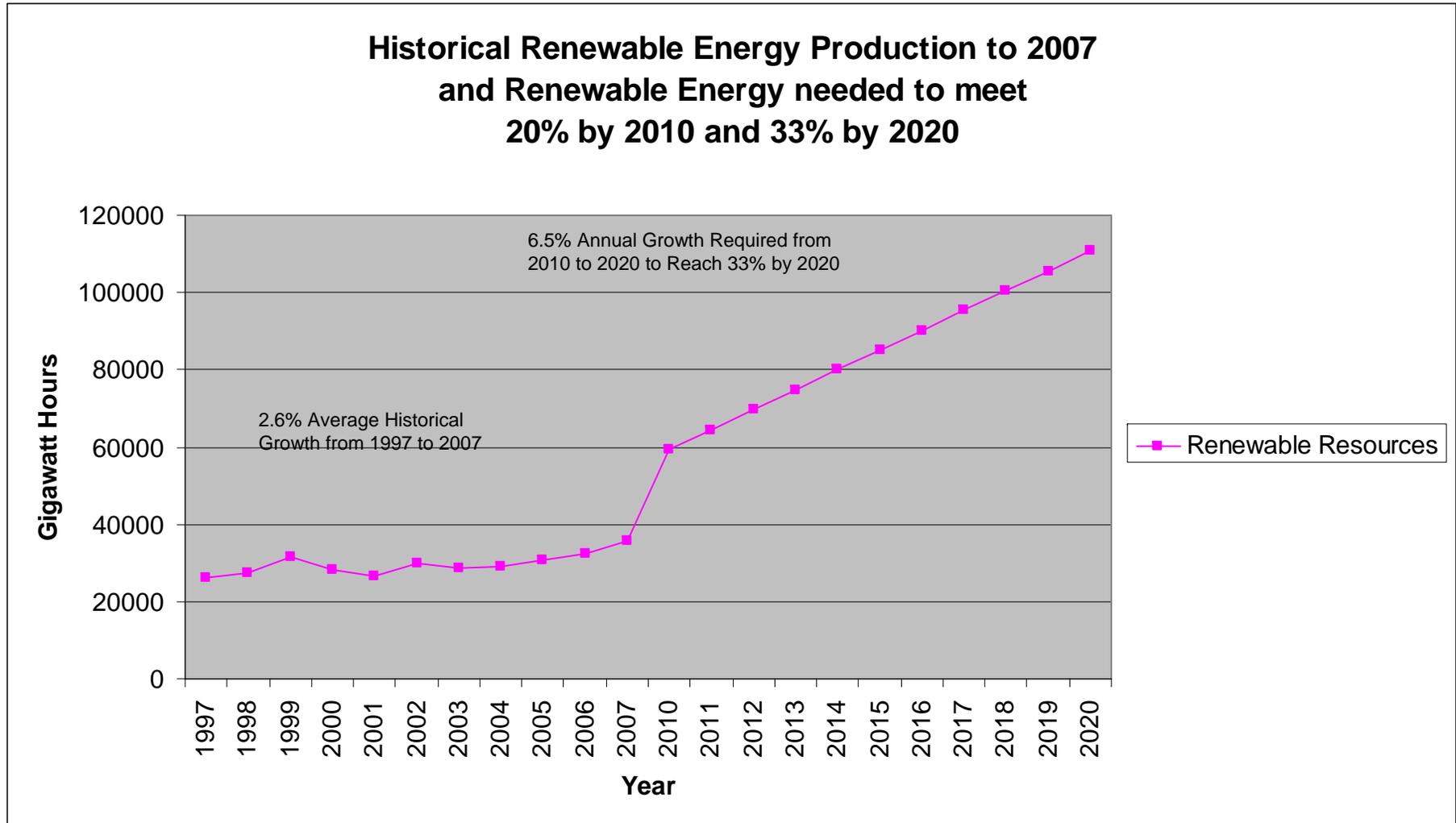
SBx1 2 (Simitian 2011)

- Long-term goal of competitive & self sustaining supply of Renewables
- Requires reporting on total cost of program each year
- No penalty if all reasonable action taken to achieve goal
- Requires CPUC to establish a cost limitation for each IOU
- Limits procurement to resources that can be procured without exceeding de minimis rate increases

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Historical Renewable Development



Source: CEC Net System Power / 2008 CEC Demand Forecast

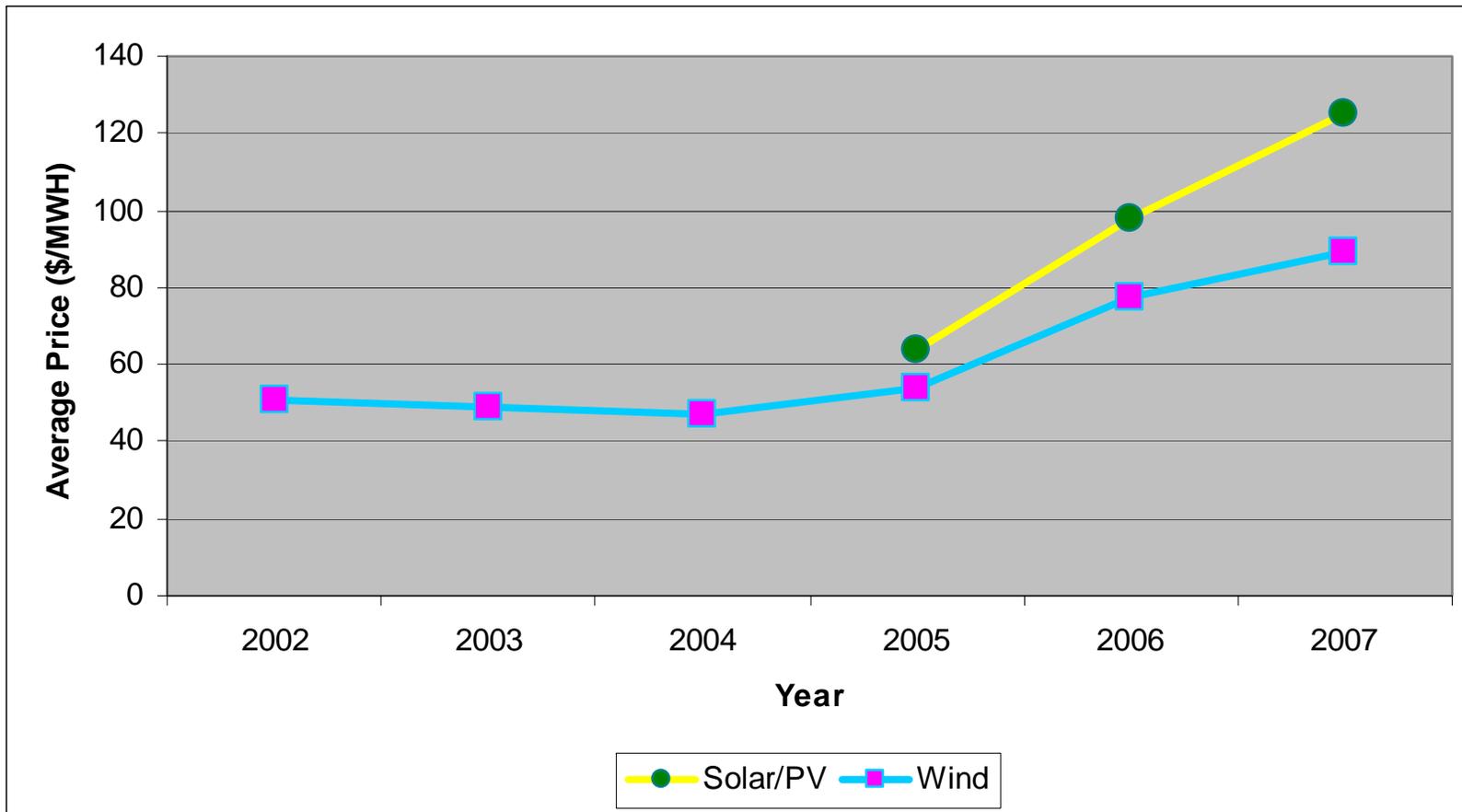


RPS Implementation Challenges

- Market Price Referent (MPR) doesn't reflect total cost of implementing program
- Accelerating Renewables affects market prices
- Pressure to meet goal increases costs:
 - ▶ Sub-optimal mix of resources and cost shifting
 - ▶ Stresses resource development



Acceleration to 2010 RPS Goal Increased Wind and Solar Bids



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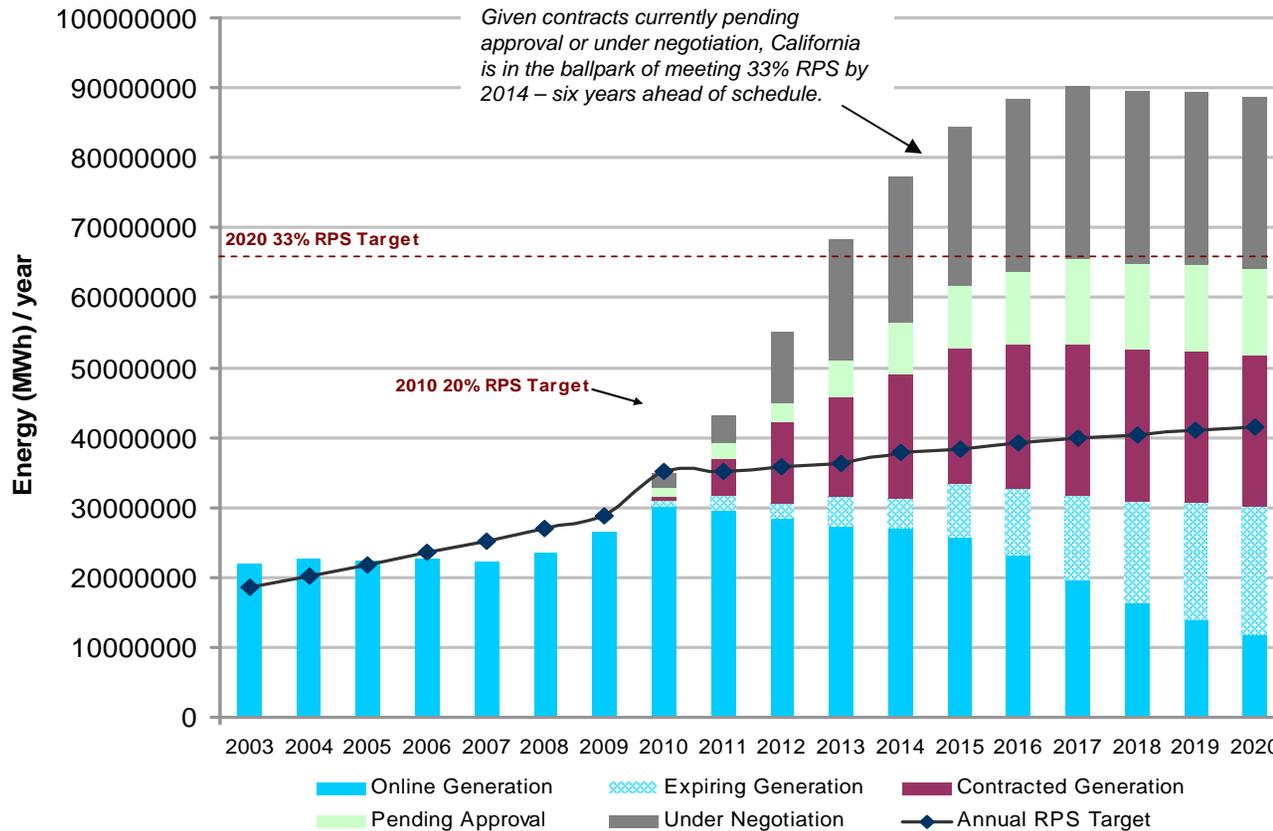
RPS Not Achieving Hedge Against Natural Gas Prices

- RPS contracts tied to natural gas prices
- Market based program decouples cost from price
- Natural gas prices must be extremely high to achieve any savings
- GHG emission prices must be high to break even



Findings from DRA Green Rush Report

Utilities on-track to meet 33% by 2020

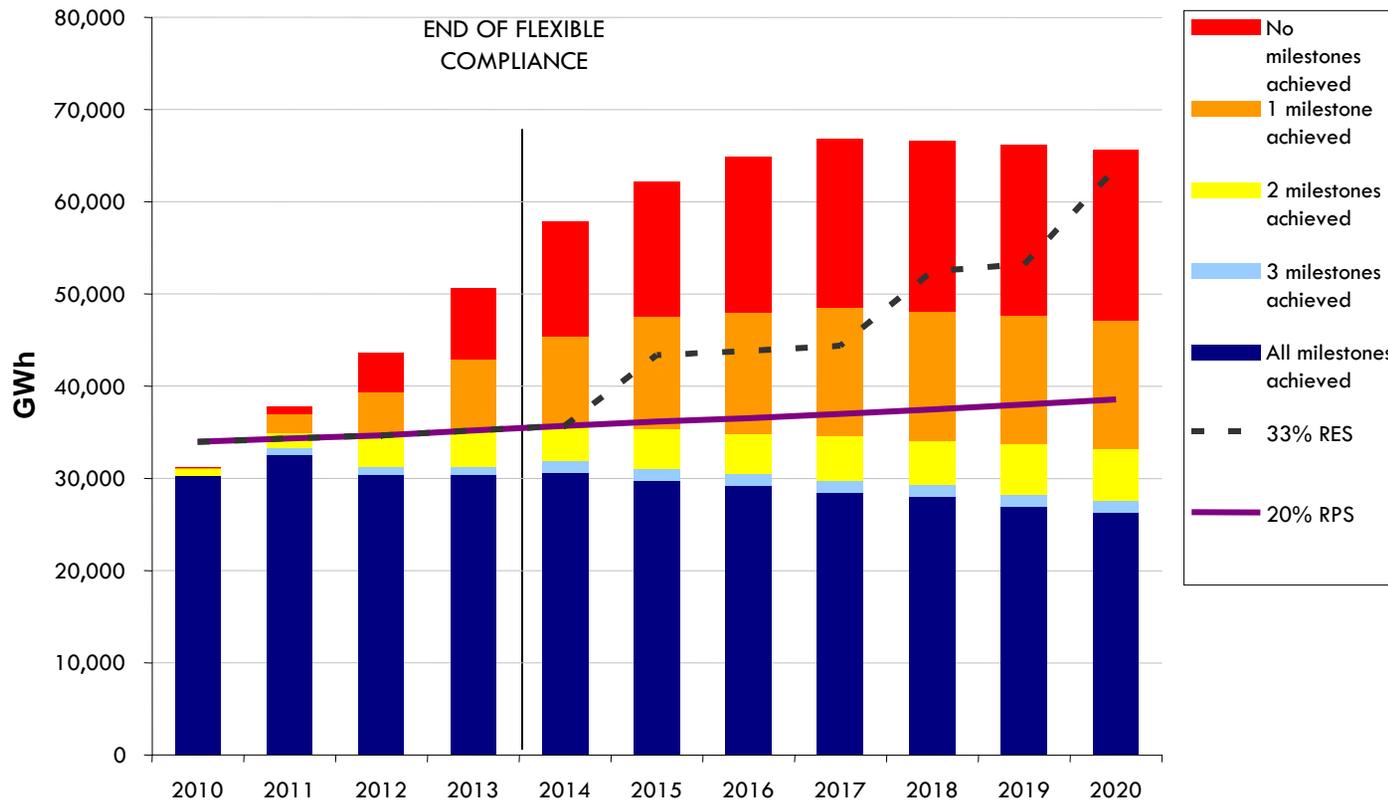


Source: California Public Utilities Commission, 2nd Quarter 2010



Risk Profile of Executed RPS Contracts

All IOUs RPS Procurement Pipeline
by number of milestones reached



Data from the August 2010 Compliance Reports and Project Development Status Reports (PDSRs) filed by PG&E, SCE, and SDG&E.



Findings from Green Rush Report

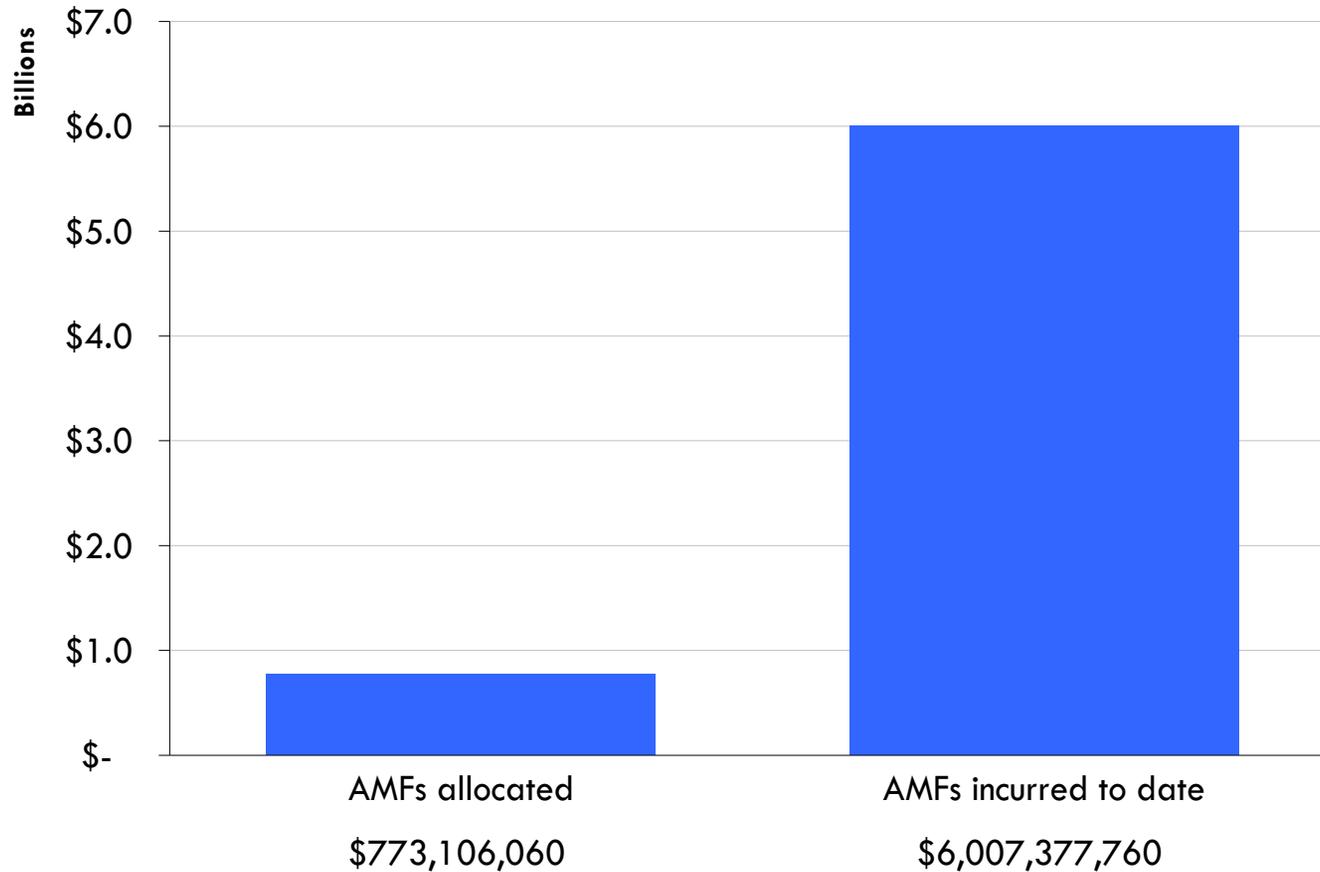
Renewable Contracts Above MPR

| IOU | Share of Contracts above Applicable MPR | Average Applicable MPR (Levelized \$/MWh post-TOD) |
|------|---|--|
| PG&E | 77% | \$123.46 |
| SCE | 41% | \$92.27 |
| SDGE | 47% | \$100.57 |
| All | 59% | \$104.08 |

See DRA's [Green Rush Report](#) on the web



AMFs to 2010 for RPS-Eligible Contracts



Data from August 2010 AMF Calculators. Figures in nominal dollars. Does not include \$2 Billion in above market bi-lateral contracts



Multiple Programs Created a Renewable Jungle

- IOU Renewable Solicitations
- IOU bi-lateral Contracts
- Utility Owned Generation (UOG)
- California Solar Initiative (CSI)
- Feed-In-Tariffs (FIT)
- Combined Heat and Power (CHP)
/ Qualifying Facilities (QFs)
- Renewable Auction Mechanism
(RAM)
- Self Generation Incentive
Program (SGIP)
- Emerging Renewables Program
(ERP)
- Tradable Renewable Energy
Credits (TREC's)
- Net Energy Metering (NEM)
- National Solar Homes Program
(NHSP)
- Solar Photovoltaic Program
(SPVP)

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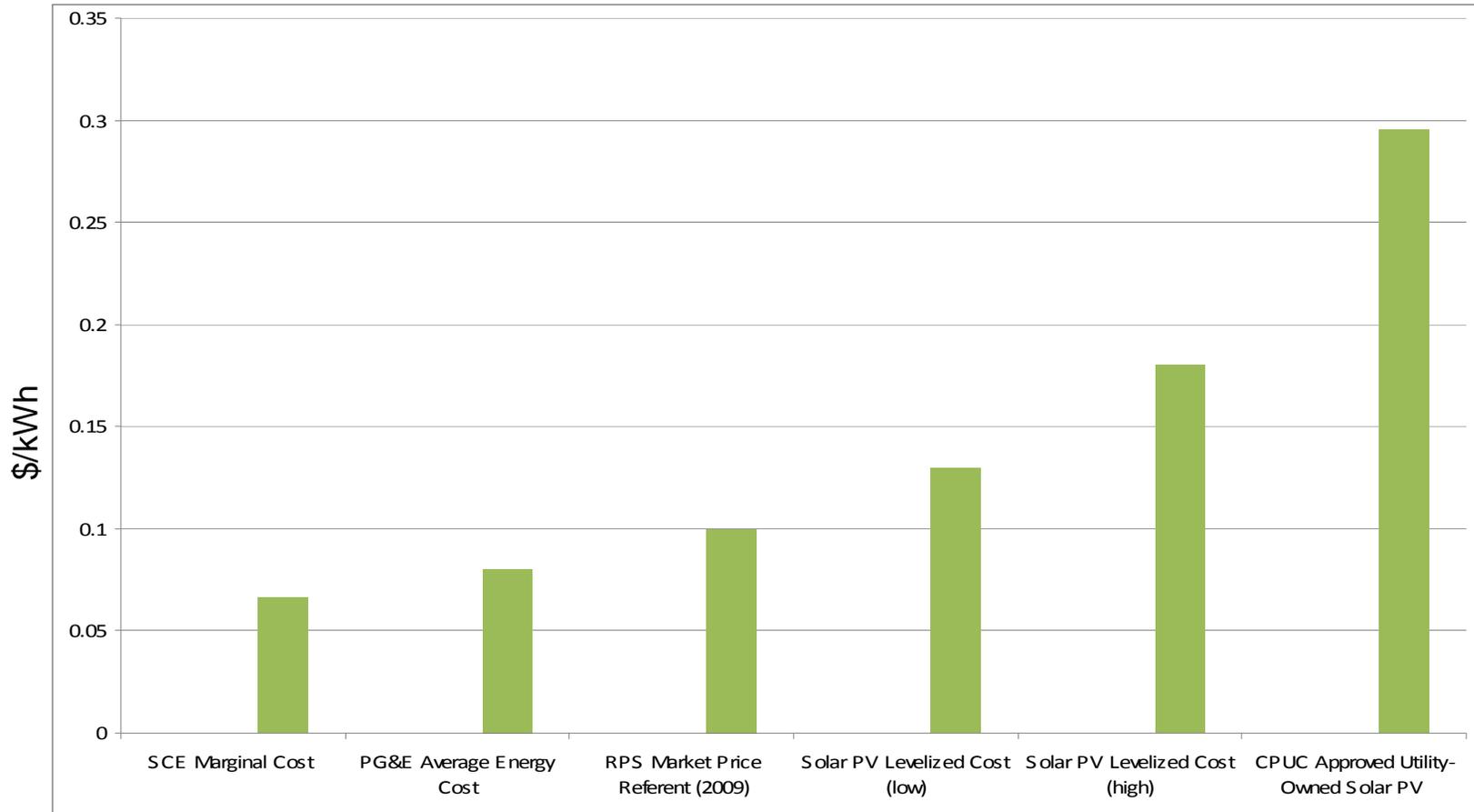
RPS Programs by Technology and Size

| | Solar PV | | Wind | | Other |
|--------------------|----------------|-------------------|----------------|-----------|-------------------|
| Less than 1 MW | CSI NHSP | ERP NEM | ERP SGIP | NEM | NEM |
| 1-3 MW | FIT RAM | SPVP | FIT RAM | SGIP | FIT RAM |
| 1-20 MW | SPVP RAM | | RAM | | RAM |
| Greater than 20 MW | RFO PPA UOG | SPVP Bilateral | RFO PPA UOG | Bilateral | SPVP Bilateral |



Avoided and Marginal Energy Cost Benchmarks

(Levelized \$/KWh)



Findings from Solar Paradox Report

Declining CSI Prices and Rising IOU Bid Prices

- The purpose of the *Solar Paradox Report* was to determine how changes in the solar PV industry were impacting California ratepayers
- In 2008, the wholesale prices for solar PV modules and materials dropped significantly worldwide as a result of increased production coinciding with a sharp reduction in demand
- In 2010, DRA conducted an analysis of the declining costs of solar PV materials and modules in California for the time period 2007 – 2010

See DRA's [Solar Paradox Report](#) on the web



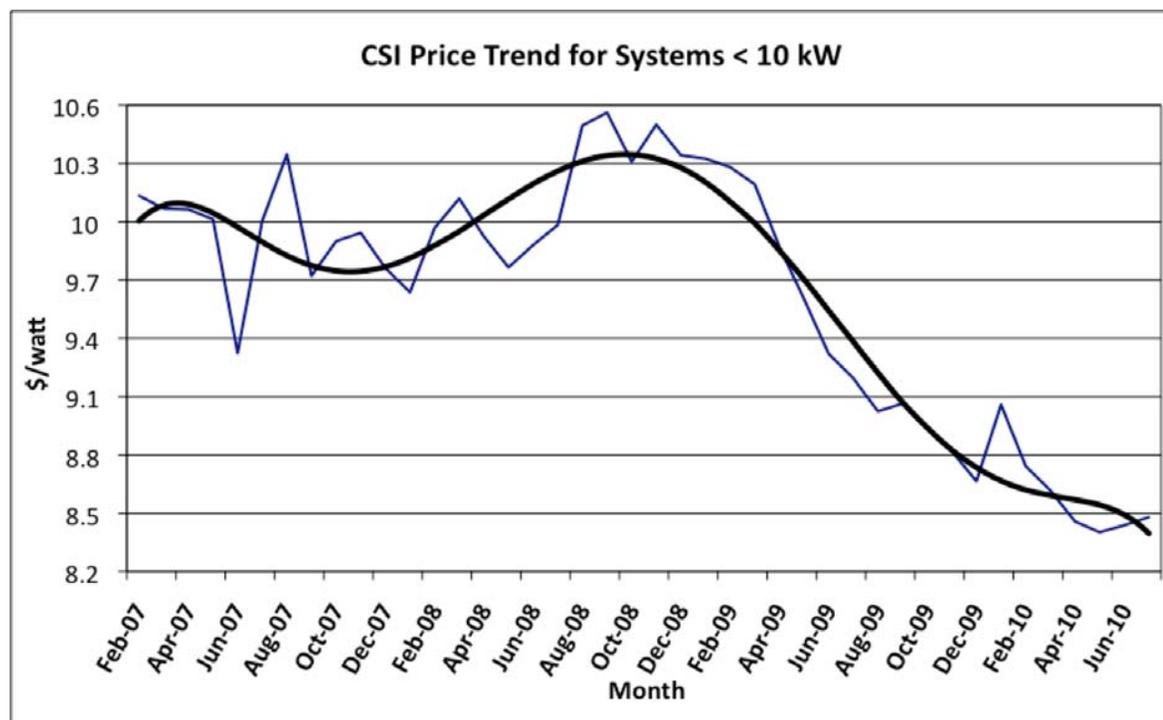
DRA's Paradox Analysis

- Using the average installed cost of a CSI system ranging from 1 – 100 kW:
 - ▶ Comparing the price changes to bid prices for utility-scale solar PV projects (>10 MW) short-listed by the IOUs in their annual RPS RFO
- DRA's analysis found that:
 - ▶ Retail solar PV prices in the CSI program have decreased
 - ▶ Utility-scale solar PV bid prices have actually increased



Smaller System CSI Prices are Declining

- Analysis of CSI price trends revealed that the average price of a CSI system began to decline in Q1 2009 and has continued downward
- Prices for systems < 10 kW decreased by 18.8% from a peak in October 2008



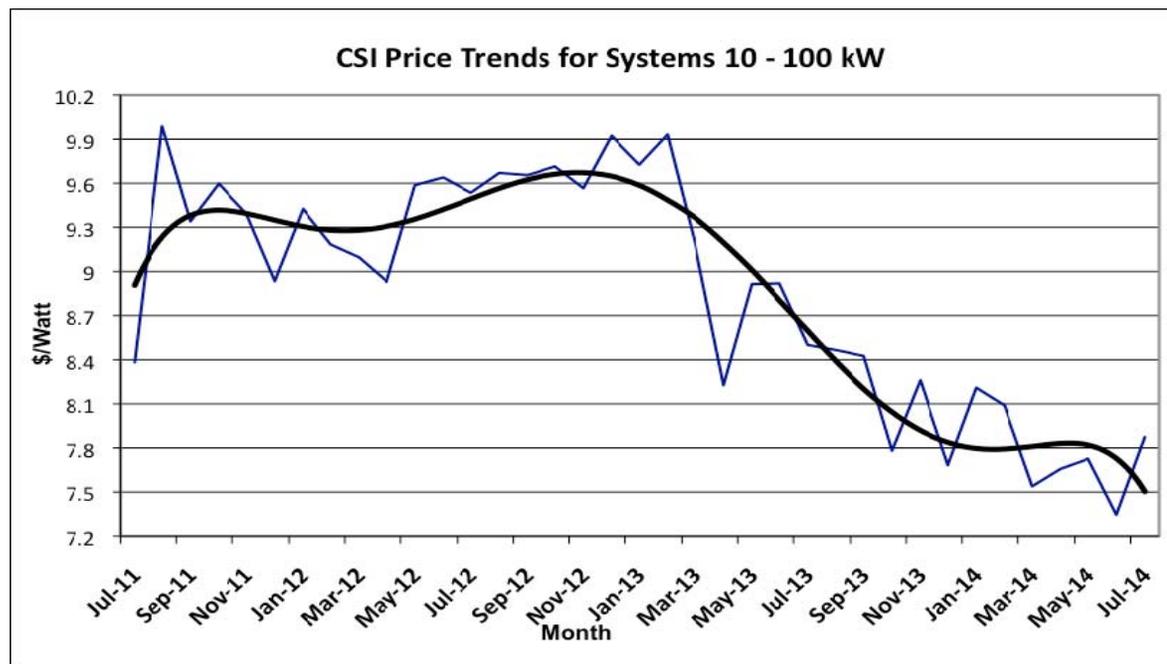
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Larger System

CSI Prices are Declining Even More

- CSI price declines are more dramatic in larger systems which could be the result of economies of scale
- Prices for systems between 10 – 100 kW declined by 22.3% from a peak in November 2008



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Cost Impacts of CSI on Ratepayers for Each kWh Produced

- CSI participating customers provided:
 - ▶ Levelized incentive of \$0.04/kWh
 - ▶ Transmission and distribution system capacity
 - ▶ Avoided cost of energy consumed:
 - Baseline electricity customer: \$0.13 / kWh
 - Top tier electricity customer: \$0.40+ / kWh
- CSI non-participating ratepayer costs:
 - ▶ Levelized incentive of \$0.04 / kWh
 - ▶ Transmission and distribution capacity provided
 - ▶ Uncollected revenue (\$0.13 - \$0.40+ / kWh)
- CSI system savings:
 - ▶ Avoided cost of marginal replacement energy
 - ▶ Avoided cost of Renewable energy
 - ▶ Reduced transmission and distribution system load



Conclusions

- Solar PV installations in the CSI program are appropriately reflecting the declining prices occurring in the solar industry
- Prior to the Solar Paradox Report, IOU bid prices did not reflect these market transformations:
 - ▶ This could be attributable to the difficulty Renewable developers are having with securing financing for their projects
 - ▶ This could also be the result of the CPUC's disinclination to reject solar PV contracts that are uncompetitive in price
- CSI is an effective mechanism for transforming the Solar PV market and excess CSI generation can be cost-effective for non-CSI participant ratepayers



Conclusions

- 20% by 2010 (2013) and 33% by 2020 Renewable goals are likely to be achieved
- Some Renewable programs are achieving the long-term goal of developing a competitive & self-sustaining supply of Renewables
- Cost protections in original RPS legislation have not been achieved
- MPR and above market fund has not been implemented in ways that limit overall costs as originally envisioned by SB 1078
- Cost of achieving RPS goals is not reflected in current rates



Recommendations

- Completely decouple Renewables from natural gas prices
- Periodically assess cost of RPS compared with achieving Renewable and GHG goals by other measures
- Integrate cost of RPS with other programs to ensure lowest overall system costs
- Assess costs and effectiveness of various RPS programs to determine what is working and what is not



Recommendations

- Reject higher-priced contracts:
 - ▶ Approving high-priced contracts sends a signal to developers that the CPUC does not consider cost containment for RPS
 - ▶ Establish an annual volume weighted average contract price limit for each utility in a given year
 - ▶ Require an application instead of an advice letter for contracts that exceed above market costs of \$100 million

- Use CSI program design as a model for the RPS program:
 - ▶ The CPUC should use the CSI program design as a model for achieving 33% RPS by approving lower cost projects over time to encourage the market to pass on savings to ratepayers
 - ▶ Establish an overall rate impact for meeting CSI goals and achieving RPS program goals





DIVISION OF RATEPAYER ADVOCATES

Contact Information

Dave Ashuckian, Deputy Director

DAA@cpuc.ca.gov

(415) 703-1977

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