



# California Public Utilities Commission Programs supporting energy from Biomass



Implementing one of the most ambitious renewable energy standards in the country

**8th Annual Forum of the California Biomass Collaborative**

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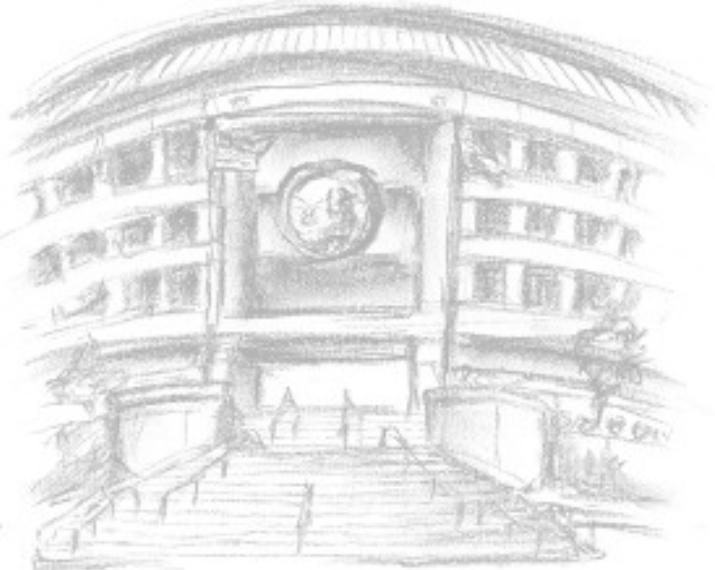
April 5, 2011 UC Davis





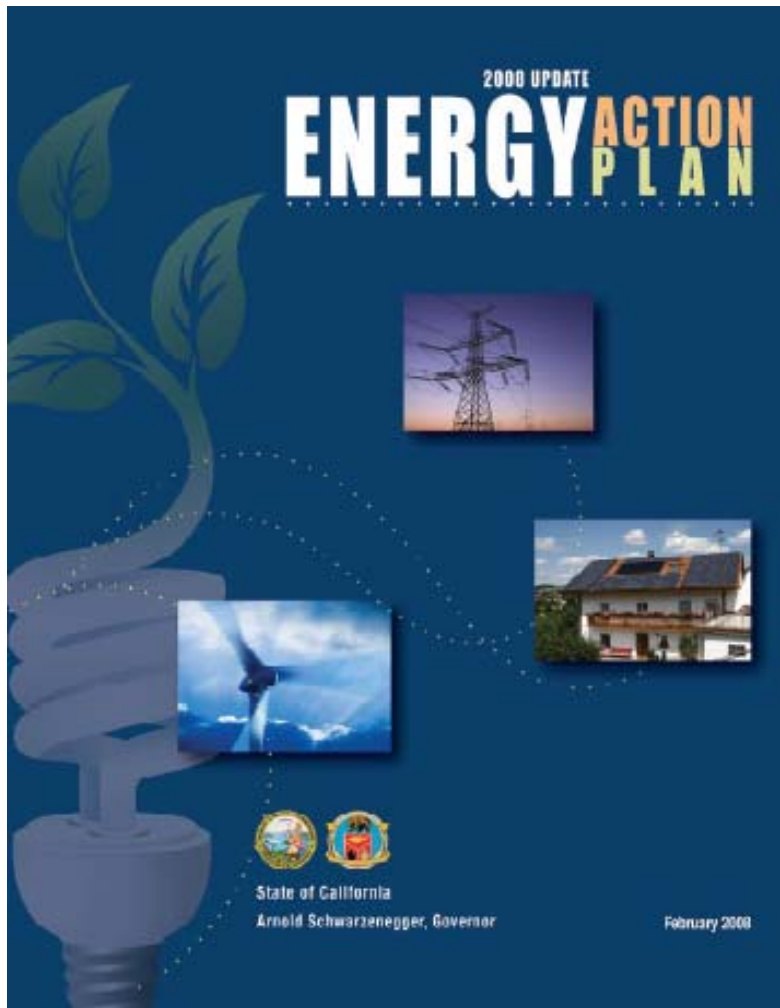
# California Public Utilities Commission

- The CPUC regulates investor owned telecommunications, electric, natural gas, water, railroad, rail transit, and passenger transportation companies, in addition to authorizing video franchises.
- **CPUC mission:** to ensure safe and reliable services at just and reasonable rates, with a commitment to environmental enhancement and a healthy California economy.
- Five Governor-appointed Commissioners





# California's Preferred Resources



## “Loading Order” of Energy Resources:

- Energy efficiency
- Demand response
- Distributed generation
- Renewable generation
- Cleanest available fossil resources





# Overview of 20% Renewable Portfolio Standard (RPS) Program

- Retail energy sellers\* must procure **20% renewable energy by 2010** (SB 107, 2006)
  - All RPS-obligated retail sellers must procure an incremental 1% of retail sales per year until 2010
  - 20% obligation continues post-2010
- RPS procurement compliance is measured in terms of energy delivered tracked through renewable energy credits (RECs) generated, **not signed contracts**
- 20% Bioenergy Goal in 2006 Executive Order
- State Legislature passed a 33% by 2020 RPS bill SBx1 2 awaiting Governor Brown's signature.

\* retail sellers include investor-owned utilities (IOUs), energy service providers (ESPs), and community choice aggregators (CCAs)





## Status of RPS Procurement

- CPUC has approved 184 contracts for over 16,000 MW of new and existing eligible renewable energy capacity
- IOUs achieved 18% in 2010 with actual generation
  - IOUs are forecasted to achieve 20% RPS in 2012
- Recent RPS solicitations have been robust
  - Increased participation from experienced developers, but smaller percentage of bids from bioenergy projects
  - 2009 RPS solicitation resulted in 100,000 GWh of bids
  - Shortlisted 2009 bids would meet 1/2 of 33% target





# New Bioenergy Capacity

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
<b>Biomass</b>						9.5	25.9	20.8		56.2
<b>Biogas</b>	10.5	6.3			6.8		1.87	1.48		26.95
<b>Geothermal</b>					17		50			67
<b>Wind</b>	22.8	60	51.3	75	85	330.9	253.5	583	288.8	1750.3
<b>Small Hydro</b>					4.5	0.4	0.8	4.8		10.5
<b>Solar PV</b>						12	25	43	11.22	91.22
<b>Total</b>	33.3	66.3	51.3	75	113.3	352.8	357.07	653.08	300.02	2002.17





# RPS Bioenergy Contracts Update

## In 2010:

- 2 (6.2 MW) biogas contracts were approved for existing facilities.
- 2 (114 MW) biomass contracts were approved. Mt Poso and DTE/Next Era are both conversions of existing coal facilities.
- 1 (25 MW) existing biomass contract was approved. (Woodland)
- 1 (11 MW) re-started biomass facility began operation. (Blue Lake)
- 1 (1 MW) new biogas facility began operation. (Santa Maria II, a Feed In Tariff (FIT) contract)





# Procurement Options for Biomass

Based on utility expenditure forecasts, the large IOUs will spend over a billion dollars on bioenergy generation in the next three years.

- Renewable Portfolio Standard (RPS) Solicitations
- Qualifying Facilities (QF)
- Renewable Auction Mechanism Standard Contracts
- Bilateral Power Purchase Agreements (PPA)
- Feed-In Tariff (FIT) – 2 options
  - PU Code § 399.20
  - AB 1613 (Blakeslee, 2007)
- Additional distributed generation program:
  - Net Energy Metering Tariff: Customer credited for onsite generation up to their annual onsite load

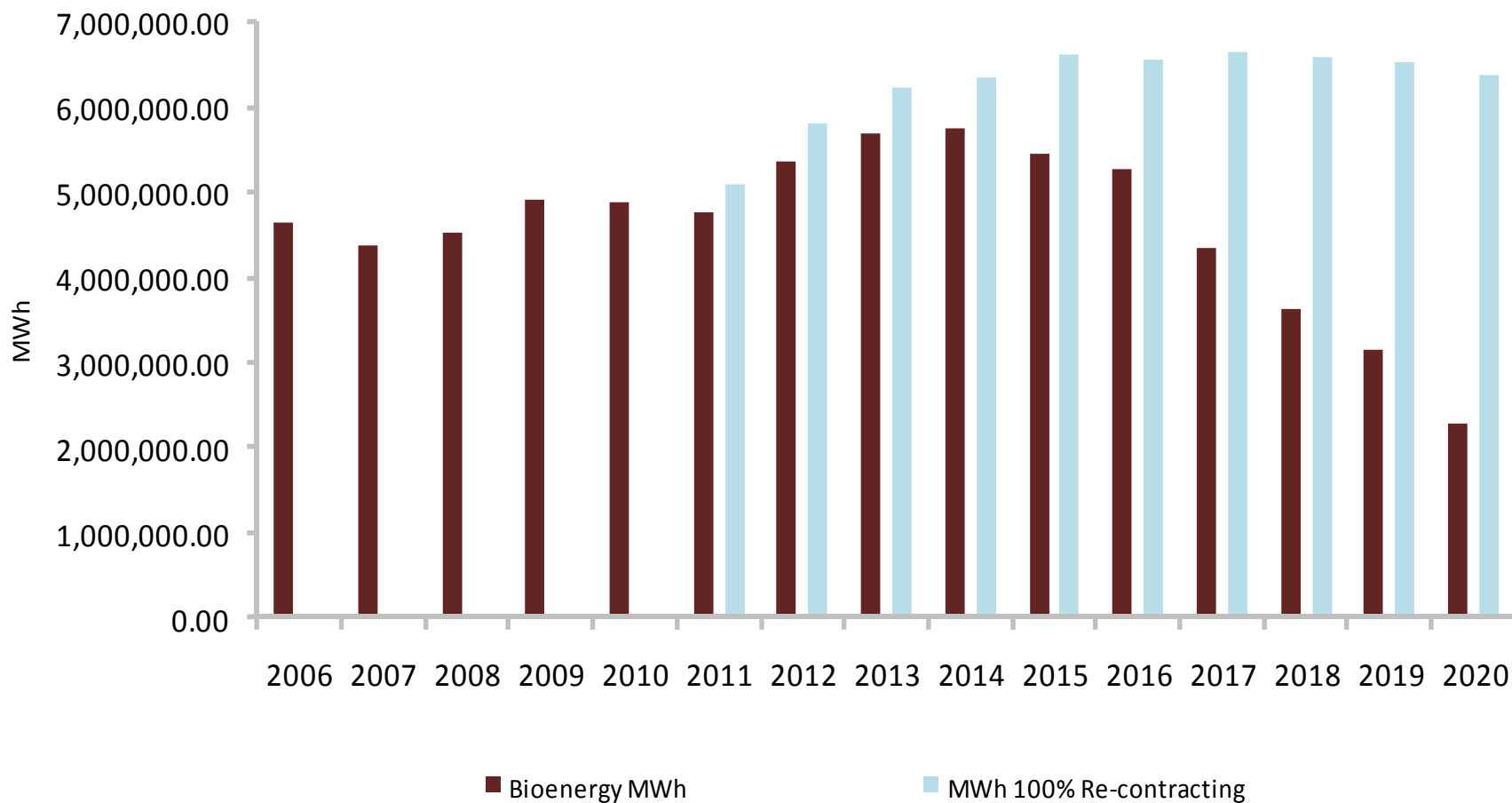






# Bioenergy Generation Contributes to California's Long Term Energy Procurement Strategy: IOUs projected to spend at least \$3 B on bioenergy by 2020

## Large IOU Bioenergy Generation





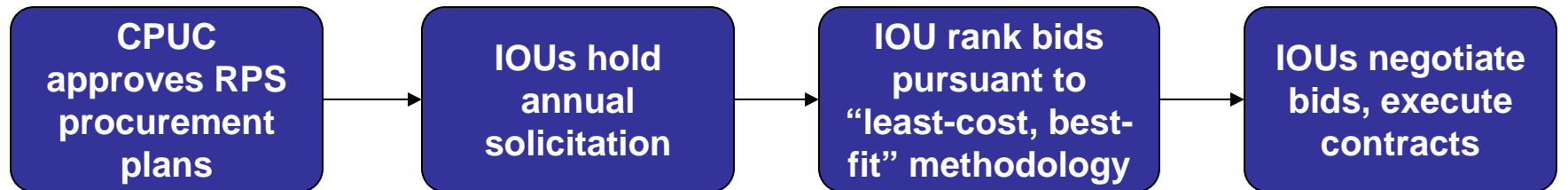
# Procurement Options by Size

Facility Capacity (MW)	Utility Contract under RPS Solicitation	Utility Contract as a QF	Utility Contract under Bilateral Negotiation	Renewable Auction Mechanism	Utility Feed-In Tariff	NEM Tariff	SGIP
0– 1.5	No	Yes	No	Yes	Yes (under PU Code § 399.20 AB 1613)	Yes	Yes
1.5–20	Yes	Yes	Yes	Yes	Yes (under AB 1613 only)	No	Up to 5MW
≥ 20	Yes	Yes	Yes	No	No	No	No

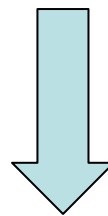




# RPS Standard Solicitation Process



- Independent evaluator oversees solicitation, bid evaluation, and negotiations
- Bilateral contracts (negotiated outside of a competitive solicitation) are also eligible



**Once the IOU executes contract, must submit to the CPUC for approval**





# Qualifying Facility Program

- Public Utilities Regulatory Policy Act (PURPA) of 1978 established QFs and outlined their payment according to the avoided cost of power.
- QF is defined as non-utility generator with less than 80 MW capacity that utilizes cogeneration and/or renewable fuels (for bioenergy,  $\geq 95\%$  biomass).
- There are currently 48 bioenergy QFs representing 656 MW.
  - 22 biomass and 26 biogas





# Renewable Auction Mechanism

- On December 16, 2010, the Commission approved the **Renewable Auction Mechanism (RAM)** for small renewable generators up to 20 MW
  - RAM establishes an interim 1,000 MW procurement target over two years and requires the IOUs to hold two auctions per year
- **Key Program Design Elements:**
  - Standard Contract - simple, non-negotiable contract
  - Project Viability - seller must meet minimum criteria to participate in the auction
  - Market-Based Pricing - bids are selected on price, starting with the lowest price bid until the auction capacity cap is reached





# Bilateral Power Purchase Agreements

- Renewable energy purchased at a negotiated price from facilities of all sizes.
- Opportunity for generators who might otherwise not participate in the standard RPS solicitation.
- Generation can fulfill a Load-Serving Entity's RPS requirement.
- Requires CPUC Approval by Resolution





# Feed-in Tariffs (Scenario 1: AB 1969)

- Contract Term Length: Long-term contract (10, 15, or 20-yr)
- Project size limit: 3.0 MW (expanded from 1.5 MW under SB 32 (Negrete McLeod, 2009))
- Price: Fixed price is determined by Market Price Referent (MPR), as adjusted by time of delivery and season
- Program size: 750 MW (statewide) (expanded from 500 MW under SB 32 (Negrete McLeod, 2009))
- Tariffs transfer Renewable Energy Credits (RECs) from generator to utility
- Two options under tariff (depending on customer's choice):
  - Full sale of production
  - Excess sales (after onsite usage)
- CPUC is currently implementing SB 32





# Feed-in Tariffs (Scenario 2: AB 1613)

- Applies to all Combined Heat and Power (CHP) up to 20 MW
- Fixed or variable price to be determined by the CPUC. CPUC can require IOUs to purchase excess electricity.
- Price schedule extends to a maximum of 10 years
- CHP systems must be sized to the customer's thermal load
- There is no requirement that CHP systems be sized to the customer's electric load. Thus, oversized systems (from an electric perspective) are permitted.
- A 20 MW maximum size limit applies
- Only new CHP systems (installed after January 1, 2008) are eligible. (Sec. 2841). However, per AB1613, the CPUC is considering whether repowered CHP will be eligible.
- A NOx standard of 0.07 pounds per MWh applies, with a credit to CHP customer-generators that are 60% efficient or better of 1 MWh per 3.4 MMBtu of waste heat recovered.







# Net Energy Metering for Bioenergy

- Onsite generation provides customer with credit for net monthly power production at the generation portion of their rate
- Eligible Technologies: Wind, Solar, Biogas-fired generators, and fuel cells
- Program Guidelines
  - Statewide cap 50 MW
  - Facility capacity cap: 1 MW
    - As pilot, 3 generating facilities statewide may be from 1 to 10 MW





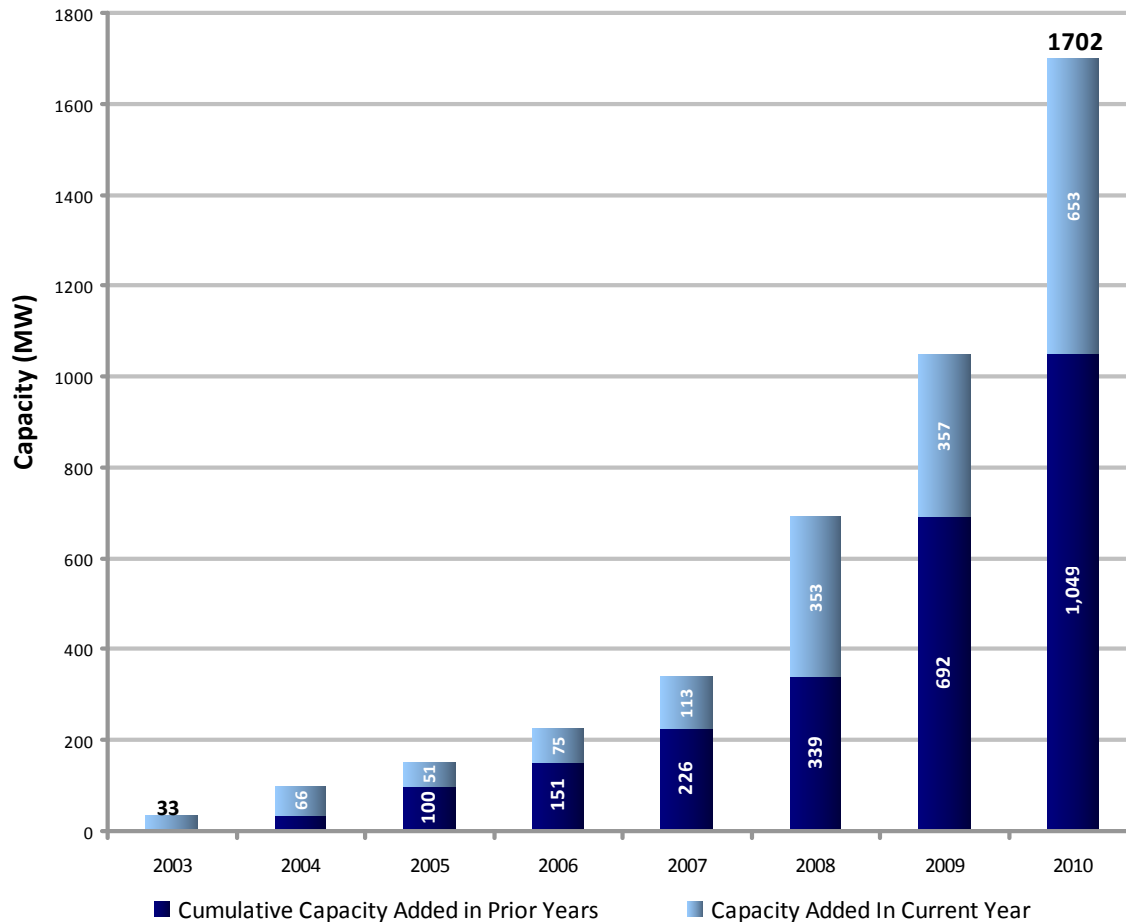
# Self-Generation Incentive Program (SGIP) for Bioenergy

- Incentive Program to offset the upfront capital costs for bioenergy facilities
- Eligible Technologies: wind turbines, fuel cells, and corresponding energy storage systems
  - Historically biogas fueled Combined Heat and Power (CHP), internal combustion engines, small turbines, and fuel cells
  - Beginning 1/1/2010 – CPUC is authorized to include other clean DG technologies
- Incentive Limitations
  - Systems ranging from 30 kW to 5 MW may apply for incentives
  - Incentives are paid for the first 3 MW, per D.08-04-049, in a stepped decline
  - A 20% adder for using a California supplier (PU Code 379.6(g)) is calculated on the non-renewable incentive rate of \$2.50 per watt – so a renewable fuel cell produced in-state would qualify for  $\$4.50 + 20\% (\$2.50) = \$5.00/\text{Watt}$





# 1,702 MW of new capacity online since 2003\*



## New 2010 capacity, by region

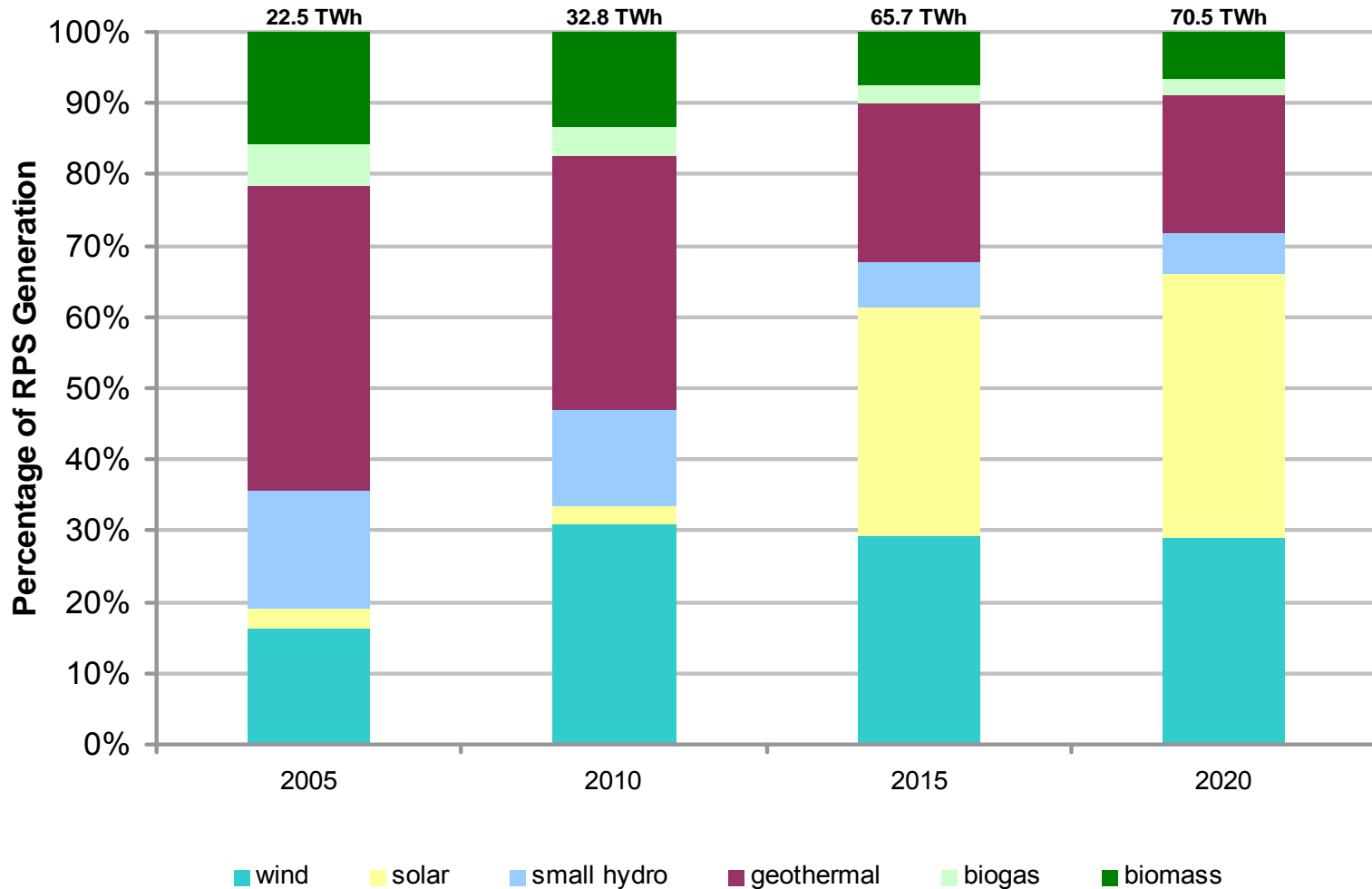
	Number of Projects	MW	GWh/y
In-State	7	172	351
Out-of-State	4	218	672
<b>Total</b>	<b>11</b>	<b>390</b>	<b>1023</b>
Percentage In-State	64%	44%	34%

\* More projects – over 1,000 MW – have come online since 2003 under short-term contracts, but Energy Division generally does not credit the RPS program with incenting the development of these projects.





# Percentage of RPS Generation by Technology

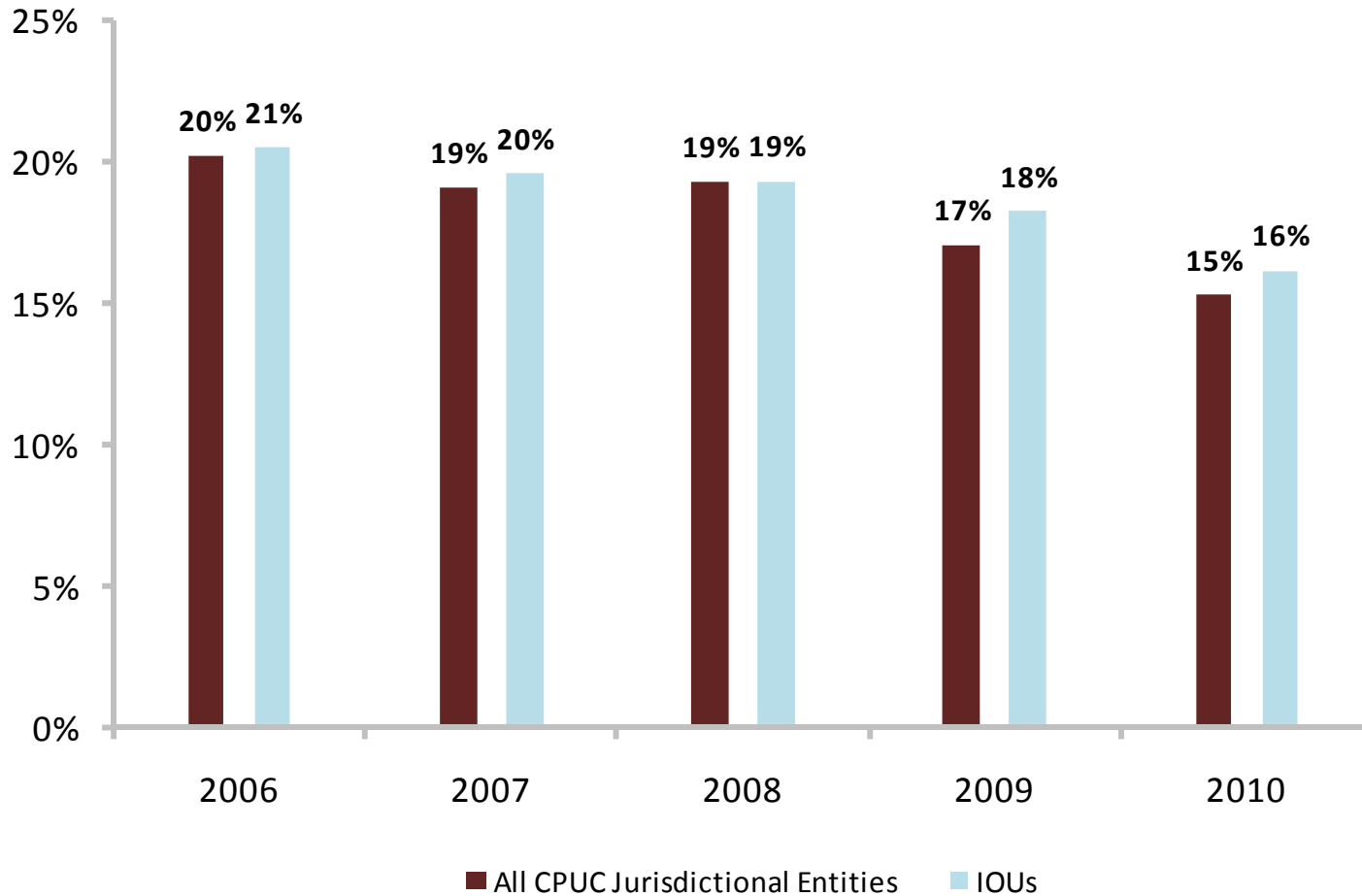


Source: California Public Utilities Commission, 4th Quarter 2009



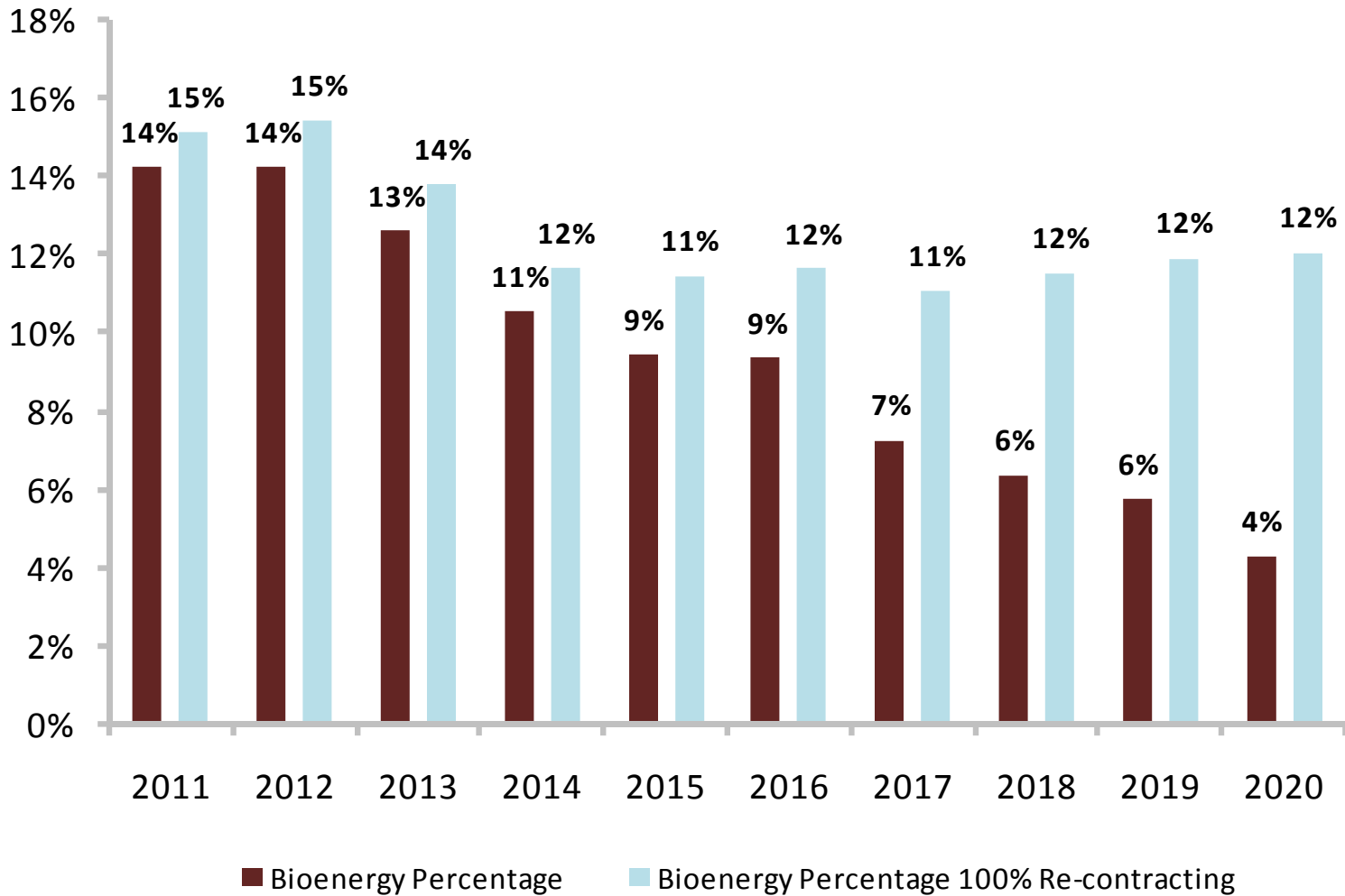


## Historical Bioenergy Percentages





## Large IOU Bioenergy Forecast





## More Information

- See RPS Webpage at:  
<http://www.cpuc.ca.gov/PUC/energy/Renewables/>
- Judith Iklé, Program Manager, Energy Division,  
California Public Utilities Commission  
[jci@cpuc.ca.gov](mailto:jci@cpuc.ca.gov)  
415-703-1486





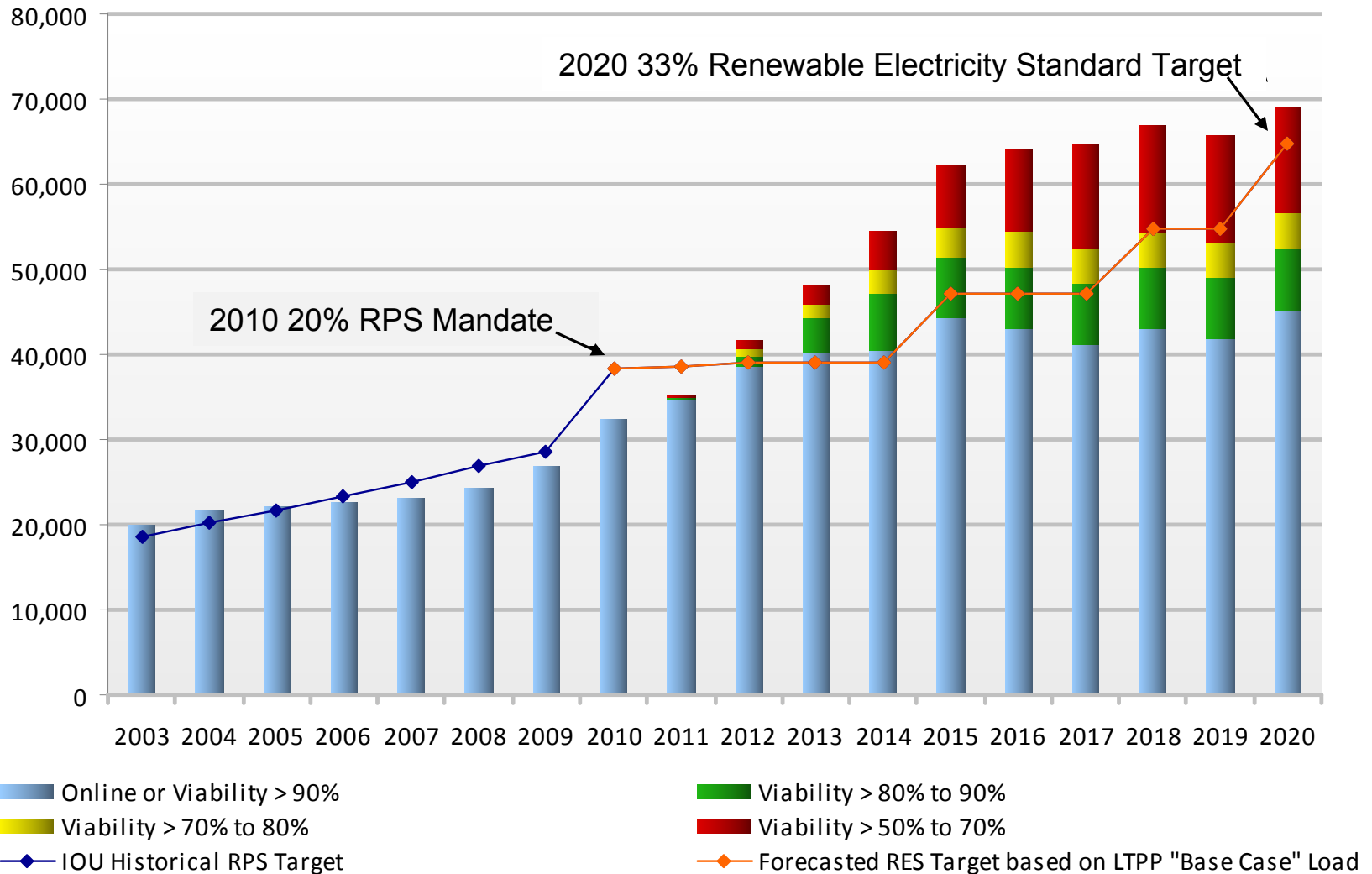
# Backup Information







# IOU RPS Forecast with Executed Contracts

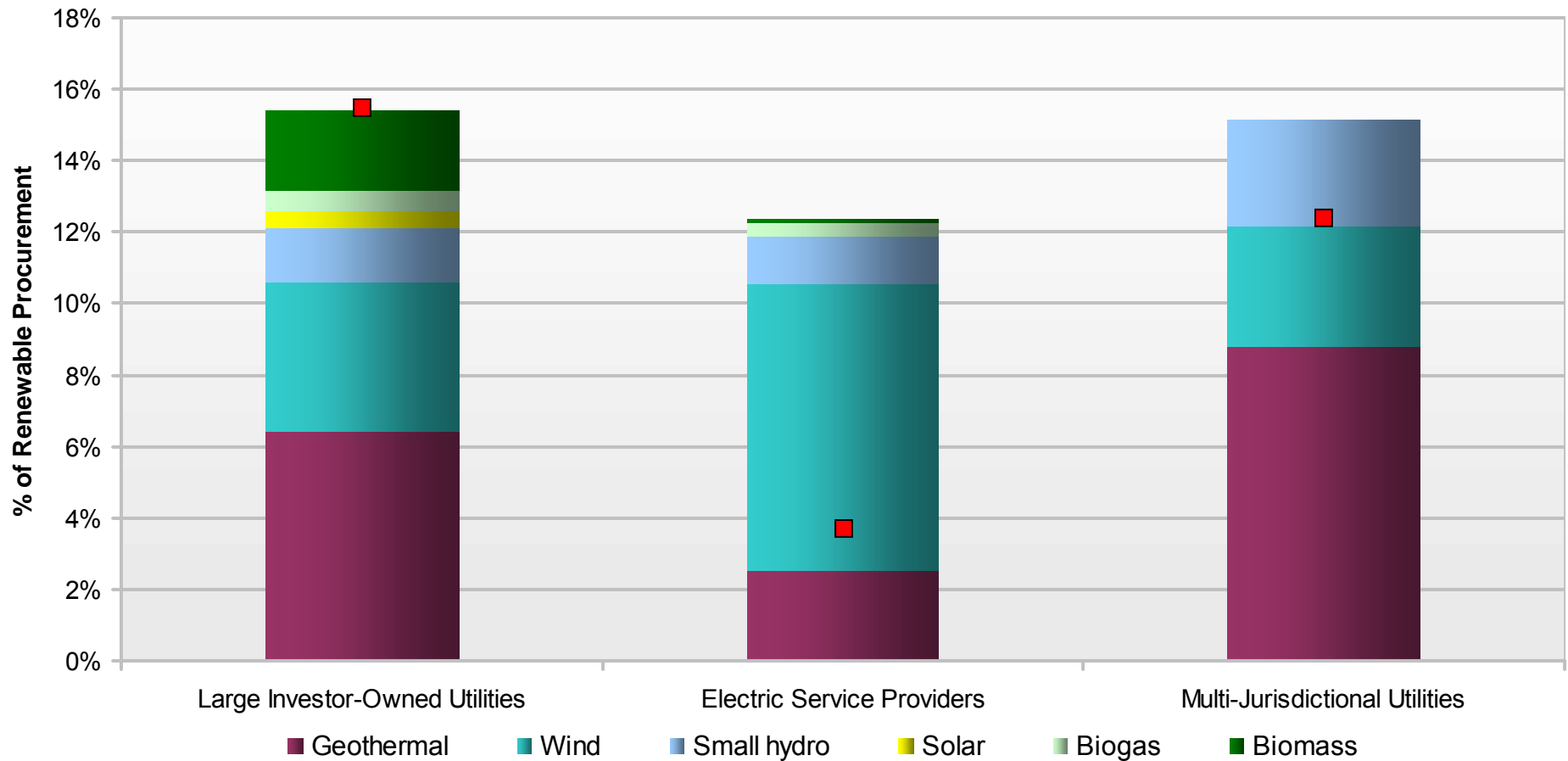


Source: California Public Utilities Commission, 4th Quarter 2010





# 2009 RPS Procurement by Fuel Type



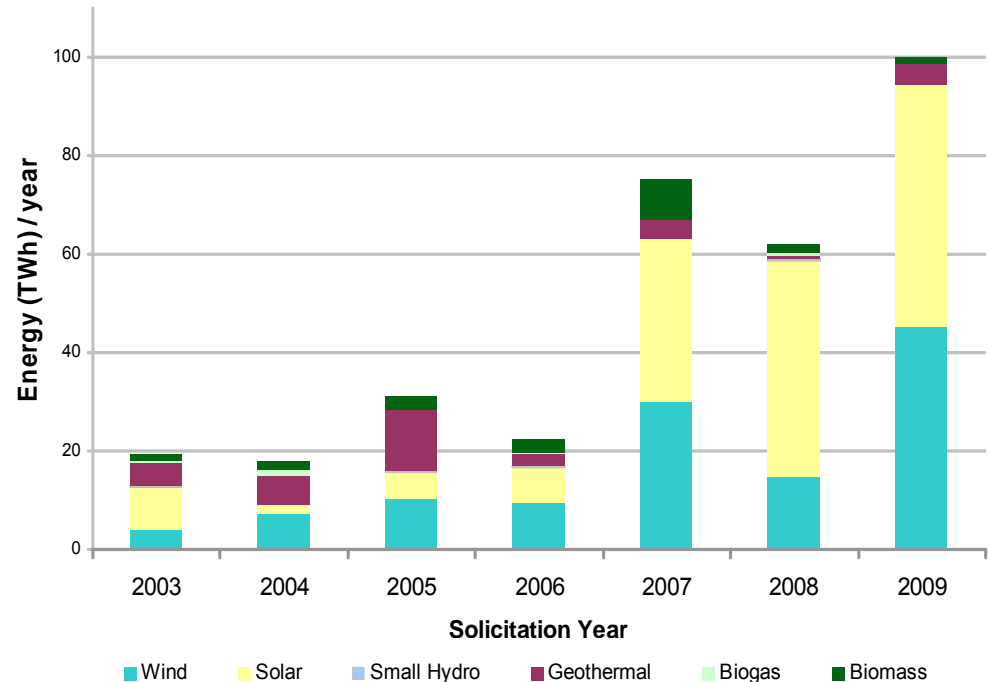
**Note - The small utilities did not procure any RPS-eligible generation in 2009.**



# Fuel mix shifting towards solar

- Bids to IOUs are increasingly weighted towards solar
  - Solar thermal leading until recently, as PV costs have dropped
  - Some solar thermal project developers shifting technology to solar PV

Bids in IOU Solicitations 2003-2009, by Fuel Type



Source: California Public Utilities Commission, 1st Quarter 2010





# RPS Compliance Rules

- Annual Procurement Targets (APT): 20% of retail sales starting in 2010
  - Prior to 2010, retail sellers had to increase renewable procurement by 1% each year
- Flexible compliance
  - Unlimited banking: A REC can be banked indefinitely
  - Borrowing: If facing a shortfall, an entity can delay RPS compliance for 3 years if entity demonstrates one of the allowable reasons
- Non-compliance Penalty: 5 cents per kWh, up to \$25 million per year





# Renewable Energy Credits

- RECs = the renewable attributes of 1 MWh of renewable energy and are used to demonstrate RPS compliance
- The Energy Commission tracks RECs through the Western Renewable Energy Generation Information System (WREGIS) to verify compliance and prevent double counting
- IOUs can purchase “bundled” contracts (RECs + energy) or “REC-only” contracts (only RECs)
- Through the 2013 compliance year, IOUs and ESPs can satisfy up to 25% of RPS targets with REC-only contracts
- IOUs can spend no more than \$50/REC through 2013
- RECs can not be used to comply with greenhouse gas emissions reduction programs





# REC Trading Rules

- No limits on market participation
- IOUs can pay no more than \$50/REC through 2013 for REC-only transactions. All transactions subject to reasonableness review by CPUC.
- RECs can be traded in the market for up to 3 years before an RPS-obligated entity commits it to RPS compliance
- Once committed, an RPS-obligated entity can use for compliance in that year or in any future year
- Large IOUs and ESPs can use REC-only contracts for up to 25% of annual RPS target, no limits for others





# Cost Containment

**Law limits the total costs of renewable energy above market prices for fossil energy**

- CPUC established a methodology to determine the market price of electricity
- MPR represents the cost of building and operating a combined cycle gas turbine power plant (CCGT) under a long-term contract
- Each IOU can expend a certain amount of money on above-MPR contracts (cost limitation)
- If the cost limitation is exhausted, IOUs can limit RPS procurement to renewable energy resources that can be procured at or below the MPR





## CPUC Adopts Market Price Referent

- Calculated annually for RPS Solicitations
- Calculates levelized all-in market price deemed *per se reasonable*, i.e. recoverable through rates
- Feed-In tariff program adopts MPR values for pricing

Adopted 2009 MPRs* - \$/kWh			
Online Date	10-Year	15-Year	20-Year
2010	0.08448	0.09066	0.09674
2011	0.08843	0.09465	0.10098
2012	0.09208	0.09852	0.10507

\*Adopted 12/17/2009 in Resolution E-4298.

