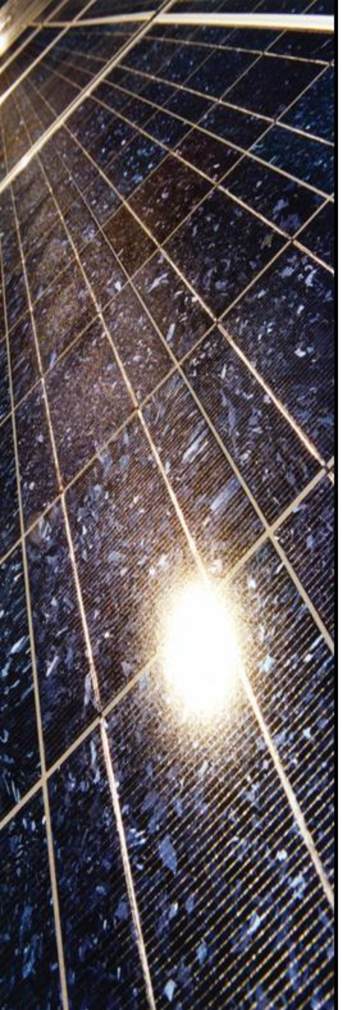


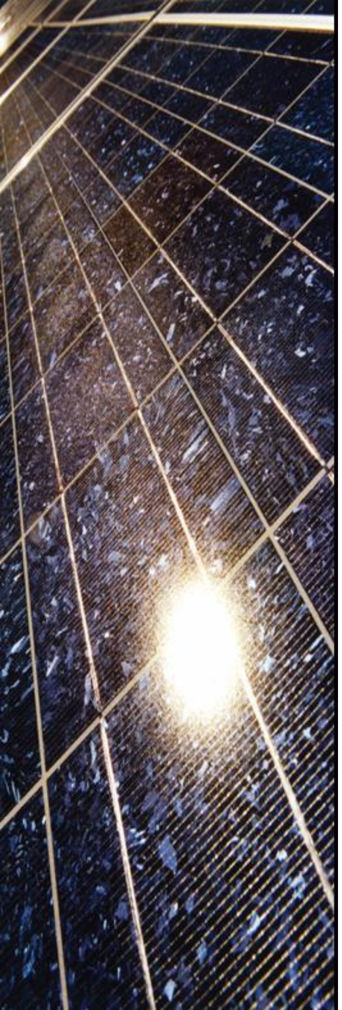
SOME RECENT DEVELOPMENTS IN US SOLAR MARKETS

PACE and WDG

Adam Browning

The Vote Solar Initiative

www.votesolar.org



Scalable opportunity

- Current clearing price for wholesale distributed generation solar *under $0.14/kWh*
- Current solar module average selling price:
  - Now: ~$1.80/W – $1.50/W
  - 2011 projected: ~ $1.50/W – $1.25
- Significant potential for additional cost reductions in material and installation

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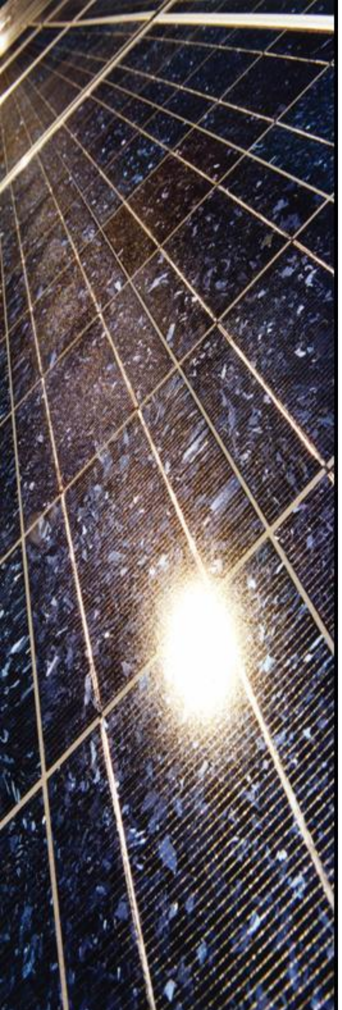
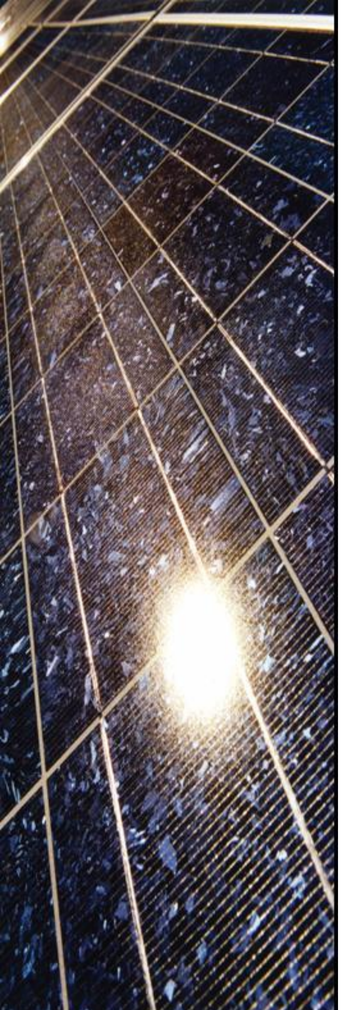


Two Markets

- Retail
  - Generation and consumption on customer side of meter
- Wholesale
  - Generation for further distribution and sale to utility customers

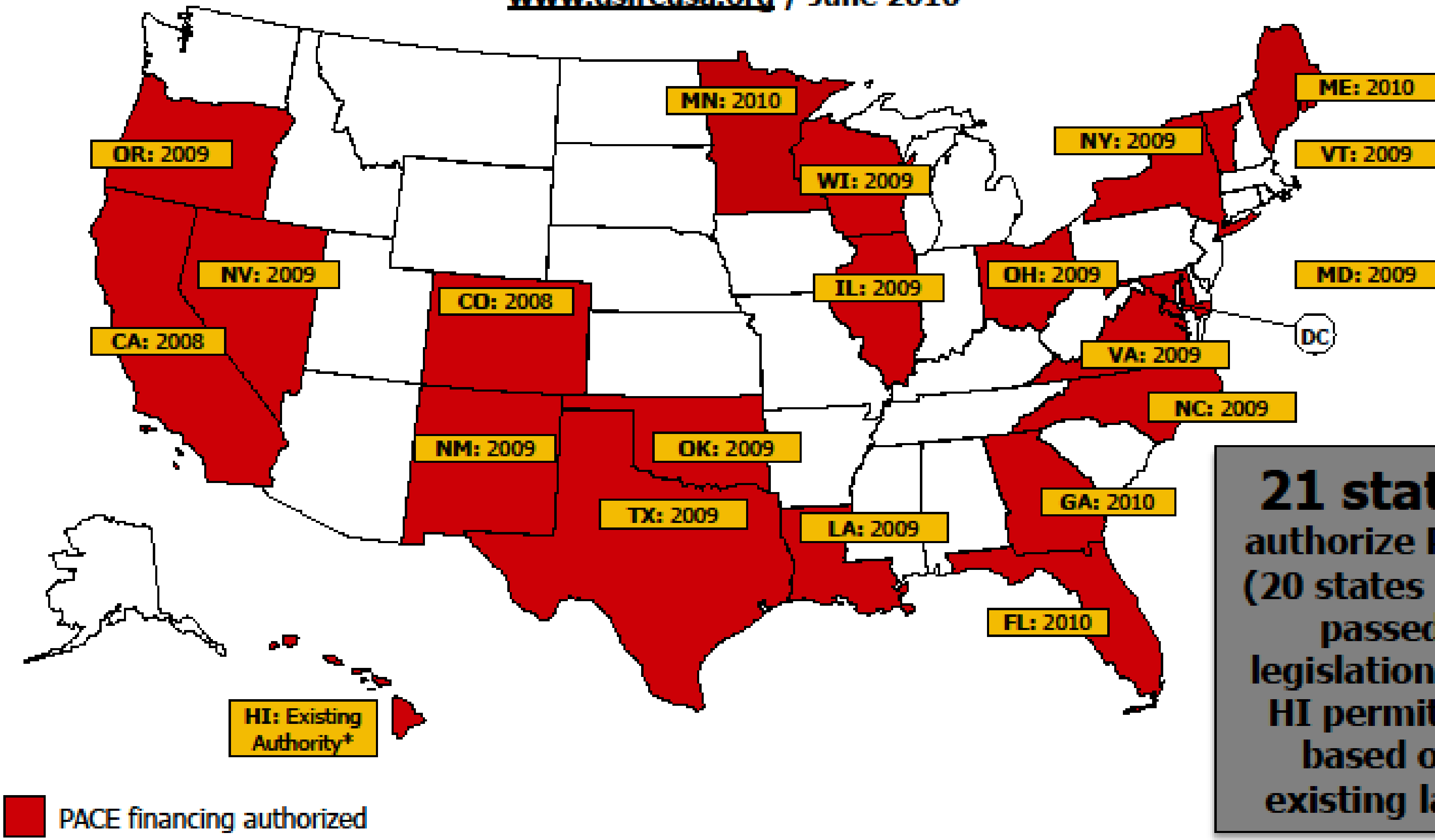


Retail Market

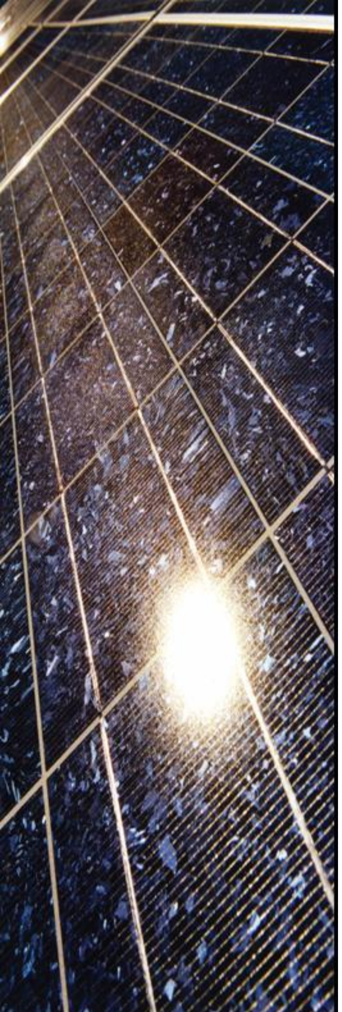
- Behind the customer meter
- Value of generation comes from avoided utility purchase
- Incentives decline to grid parity
  - Incentives:
    - Public goods fund (CSI)
    - RECs
      - Fixed (residential AZ, CO, etc)
      - Market-based (NJ)
- Grid parity = unsubsidized market
  - CA: incentives down from $4.50/W to $0.65/W; now ~2.5% capacity basis
  - 600+ MW at 65,000 customer sites

Property Assessed Clean Energy (PACE)

www.dsireusa.org / June 2010



21 states authorize PACE (20 states have passed legislation and HI permits it based on existing law)



Current status

- FHFA/Fannie Mae/Freddie Mac effectively blocked PACE
- Direct attack on a municipality’s authority to tax – local rights issue
- **<u>H.R.5766 (Rep. Thompson)</u>** would provide a fix
- Expecting new Senate bill
- All eyes on lame duck session

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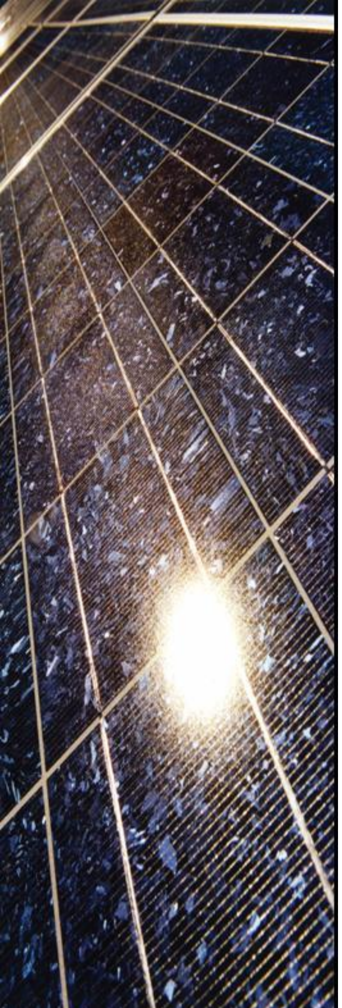

Wholesale Market

- Generation for sale to utility
  - Renewable Portfolio Standard
  - Feed-in tariff
  - Utility PV programs
  - Competitive wholesale DG

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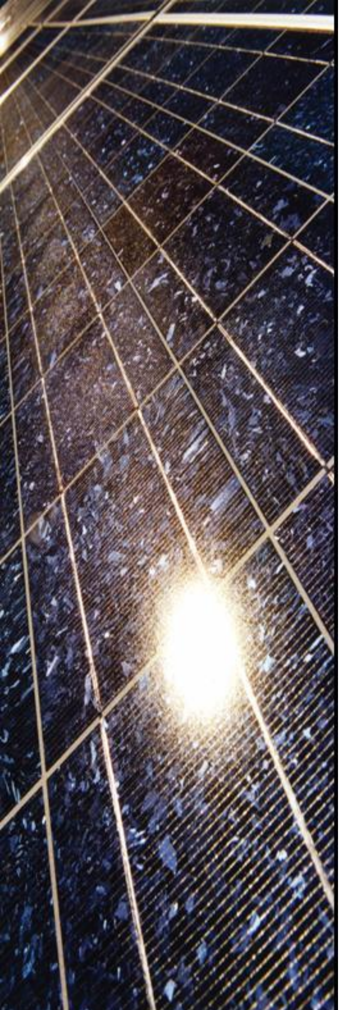

California RPS

- Currently: 20% by 2010
  - >7 GW of solar contracts signed
    - PV, CPV and solar thermal electric
  - ~5 GW of solar contracts <u>priced less than</u> 20-year LCOE of gas turbine
- Executive Order: raise to 33% by 2020
  - Prop 23?
  - special legislative session?
- Multiple WDG programs
  - ReDEC Analysis:17 GW of wholesale DG PV potential

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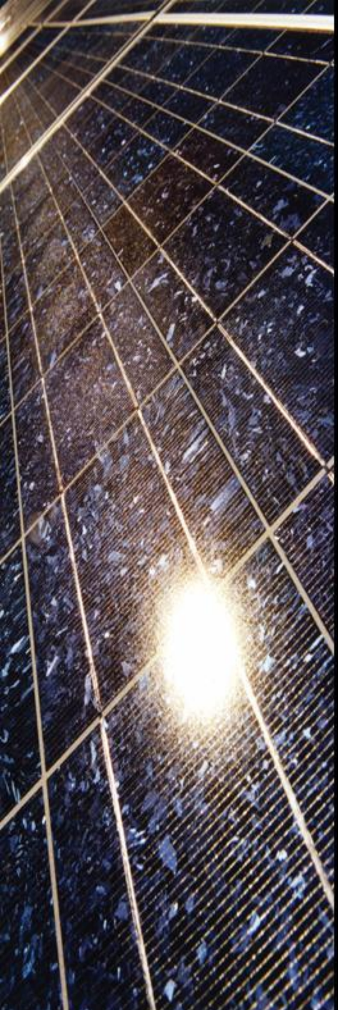
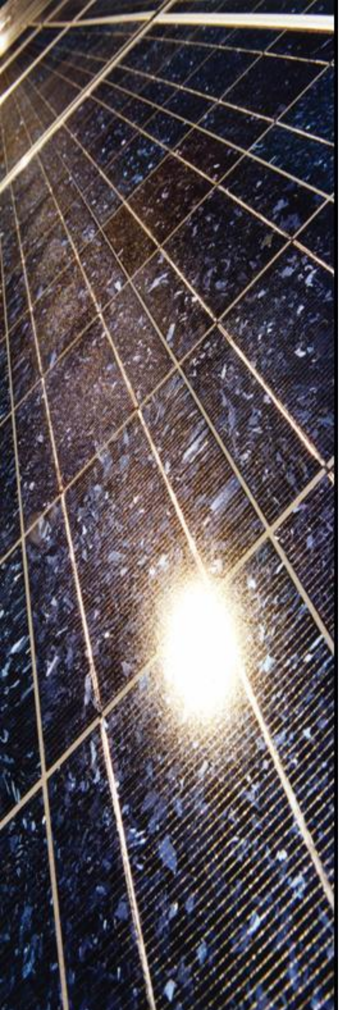
Wholesale DG: Key Issues

1. How to deal with jurisdictional issue?
2. How to set the price?
3. Cost control: capped or uncapped?
    1. If capped, how to pick winners?
    2. How to ensure only viable projects are selected?
4. Drive down price and cost?



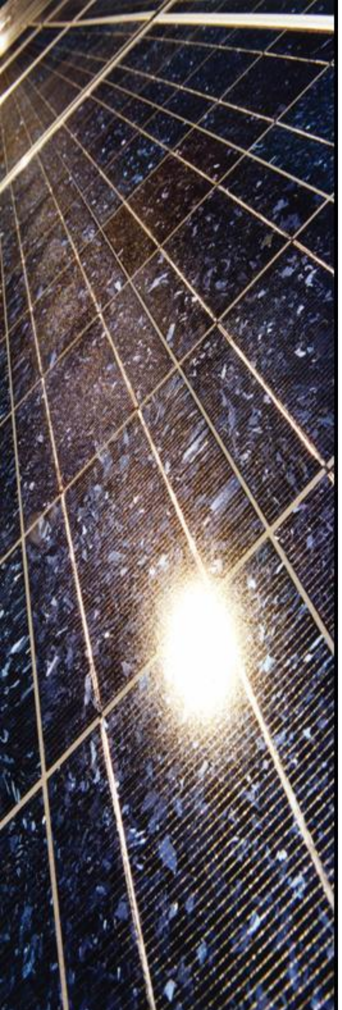
Jurisdictional Issue

- FPA gives FERC exclusive jurisdiction over wholesale sales
- States are preempted from setting wholesale power rates that exceed utility avoided cost
- Petition for Declaratory Order at FERC: EL10-64-000, EL10-66-000
  - Price at avoided cost
  - Create new requirement, price set by market (competitive bid)
  - Avoided cost + marginal difference covered by REC or tax benefit



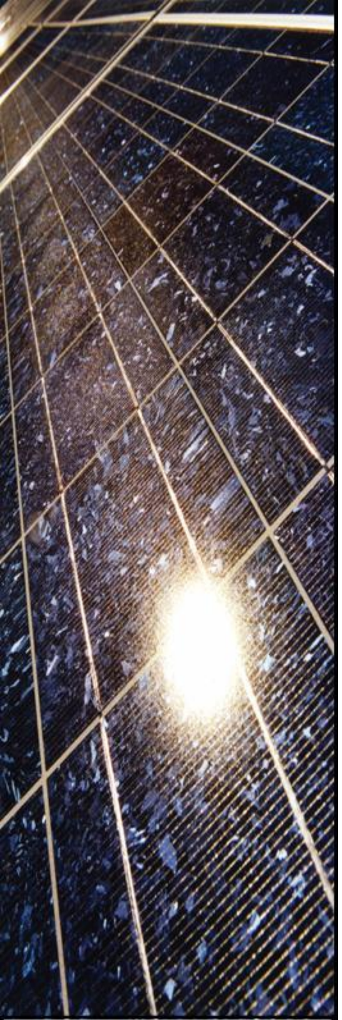
California Feed-in Tariff #1

- AB 1969 (2006)
- 500 MW statewide
- Projects <1.5 MW
- Priced at MPR (20 year LCOE of a combined cycle gas turbine)
- Nominal uptake
  - 9 PV contracts in PG+E territory in 2009



CA Feed-in Tariff #2

- Sacramento Municipal Utilities District
  - 100 MW feed-in-tariff
  - All renewable technologies eligible
  - Projects up to 5 MW
  - Pricing based on time-differentiated avoided cost
  - Modeled on PV production, comes out around 14 cents, 20 year LCOE
  - Sold out first day– all PV (projects may or may not be daisy-chained)
  - Also have retail policies--rebates for DG, SolarShares



CA FiT# 3: SCE Standard Offer Contract

- Up to 20 MW system size, eligible to all renewables, priced at MPR
- Sold out; 140 MW of PV in 20 MW increments
- 2008 MPR: with TOD, ~$0.15/kWh
- http://www.sce.com/NR/sc3/tm2/pdf/2457-E.pdf
- 2010: Moving to competitive solicitation, 250 MW annually

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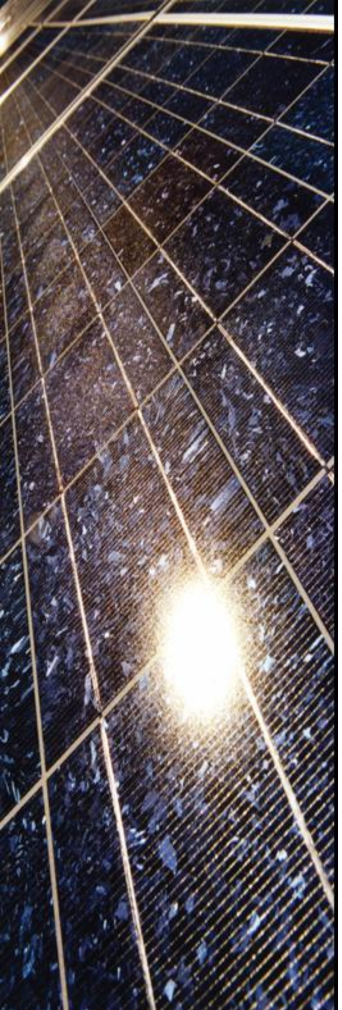

CA Feed-in Tariff #4: SB 32

- 750 MW state-wide, POU and IOU
- Systems up to 3 MW
- Value-based price setting: MPR + TOD + environmental compliance cost + value of offsetting peak demand on distribution circuits.
- Other ratepayers must be ‘indifferent’
- Rulemaking not yet begun

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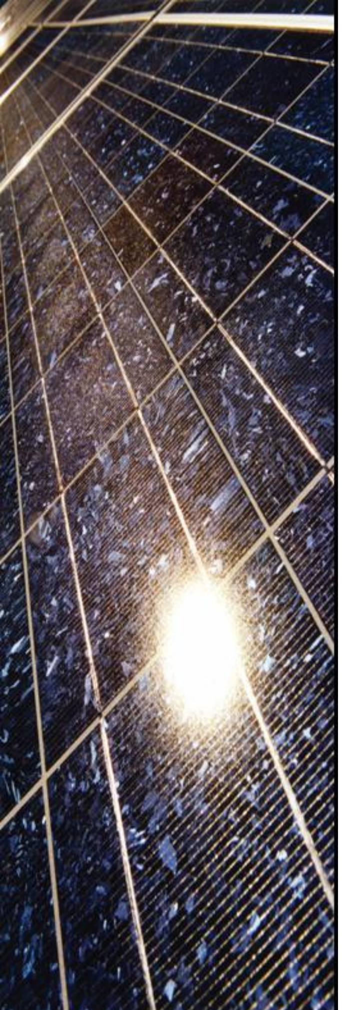

Utility PV Programs

- Southern California Edison
  - 500 MW split between utility and independent solar developers, all in 1-2 MW sized installations (90% rooftop)
- Pacific Gas and Electric
  - 500 MW; 1/2 utility-owned, 1/2 PPA
  - Project size 1-20 MW, over 5 years
- San Diego Gas and Electric
  - ~100 MW; 76 MW IPP, 24 MW utility-owned
- Total: 1.1 GW over 5 years

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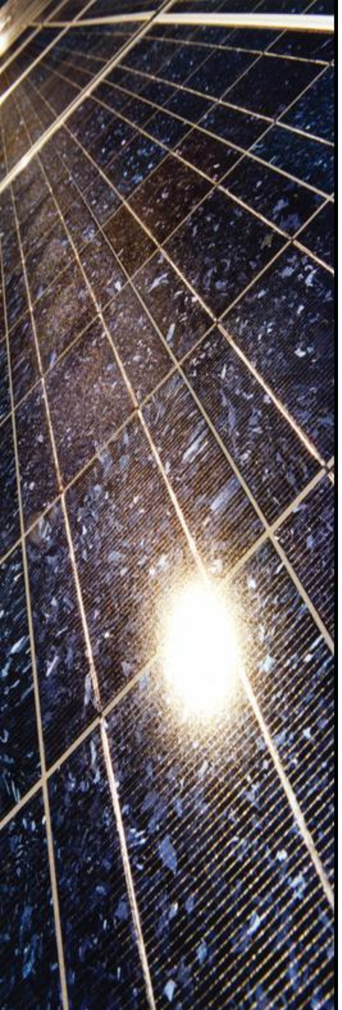
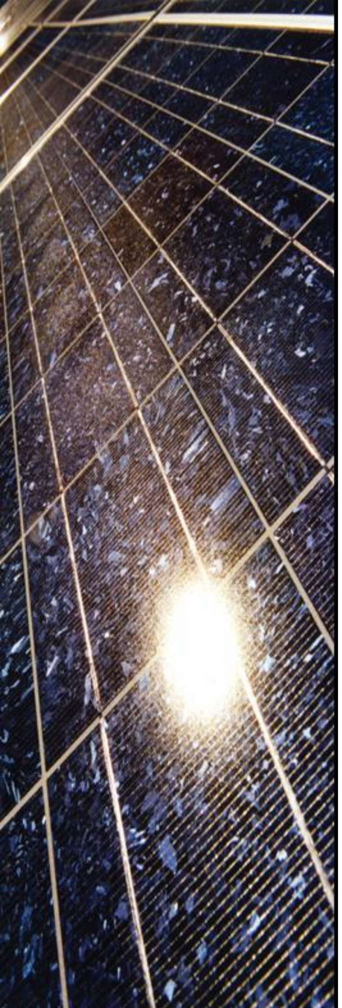


CPUC Proposed Program

- 1 GW pilot
- Systems up to 20 MW
- Utilities to conduct at least 2 solicitations a year
- 3 categories of product: baseload, peaking as-available, intermittent as-available.
- Development deposit and contract timeline
- Standard, non-negotiable contract



Keys to Successful WDG Program

- Make it legal
- Big/broad enough for biz growth
- Equitable standard contracts to facilitate financing
- Strong mechanisms to weed out non-viable contracts
- Synch interconnection/contracting

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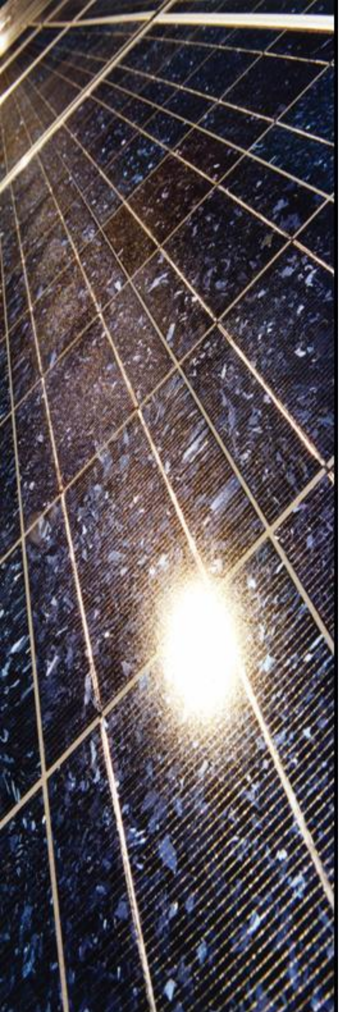
When there's a huge solar energy spill,
it's called a "nice day."
Pass the NY Solar Jobs Act



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