



Opening the Grid for Clean Local Energy Barriers in CA and Policy Solutions

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Mission

To accelerate the transition to local energy systems through innovative policies and programs that deliver cost-effective renewable energy, strengthen local economies, foster environmental sustainability, and enhance energy security

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The Many Demands for Clean Local Energy aka DG

- *Consumer Demand*: I want **my** energy to be clean
- *It's the Economy*: I want good jobs in my community
- *It's the Economy Too*: I want the cleantech industry to drive growth
- *Saving Money Long-Term*: I want a long-term efficient and cost-effective energy system
- *Power System Resilience*: I want the lights to stay on when there are problems, storms, or even attacks
- *Social Justice*: I want the most impacted communities to benefit from clean energy
- *A Warming Planet*: I want to de-carbonize society

The Drivers for DG in California **Now**

- *Consumers want Access and EVs*: Demand to be green far exceeds available opportunities and will grow quickly
- *Californians need Jobs*: High unemployment, especially in building trades, demands near term job creation
- *Losing the Cleantech Race*: Competitive forces demand local deployment to attract industry
- *Rising Rates*: Cost forecasts demand new approach to energy system investment
- *System Balance*: San Onofre situation demands immediate capacity and voltage solutions and near-term paradigm shift
- *Climate Crisis is Happening*: Energy system must transition as fast as possible and communities must prepare to adapt

Procurement

- **Barrier:**
Policy needed to require utilities to “purchase” the electricity. All targets treated as ceilings

Grid Access

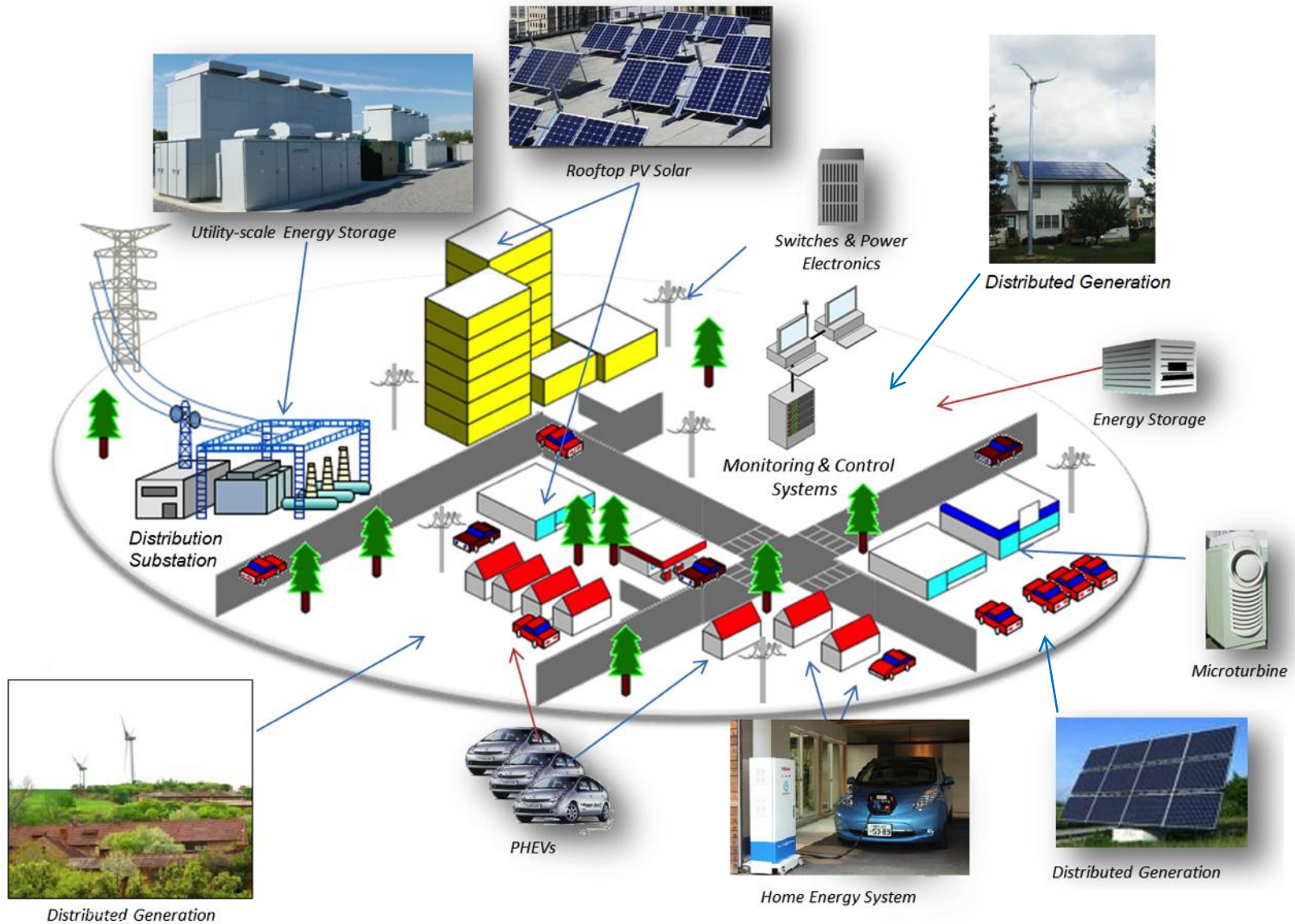
- **Barrier:**
Interconnection to the distribution grid can be risky, expensive, and time-consuming

Financing

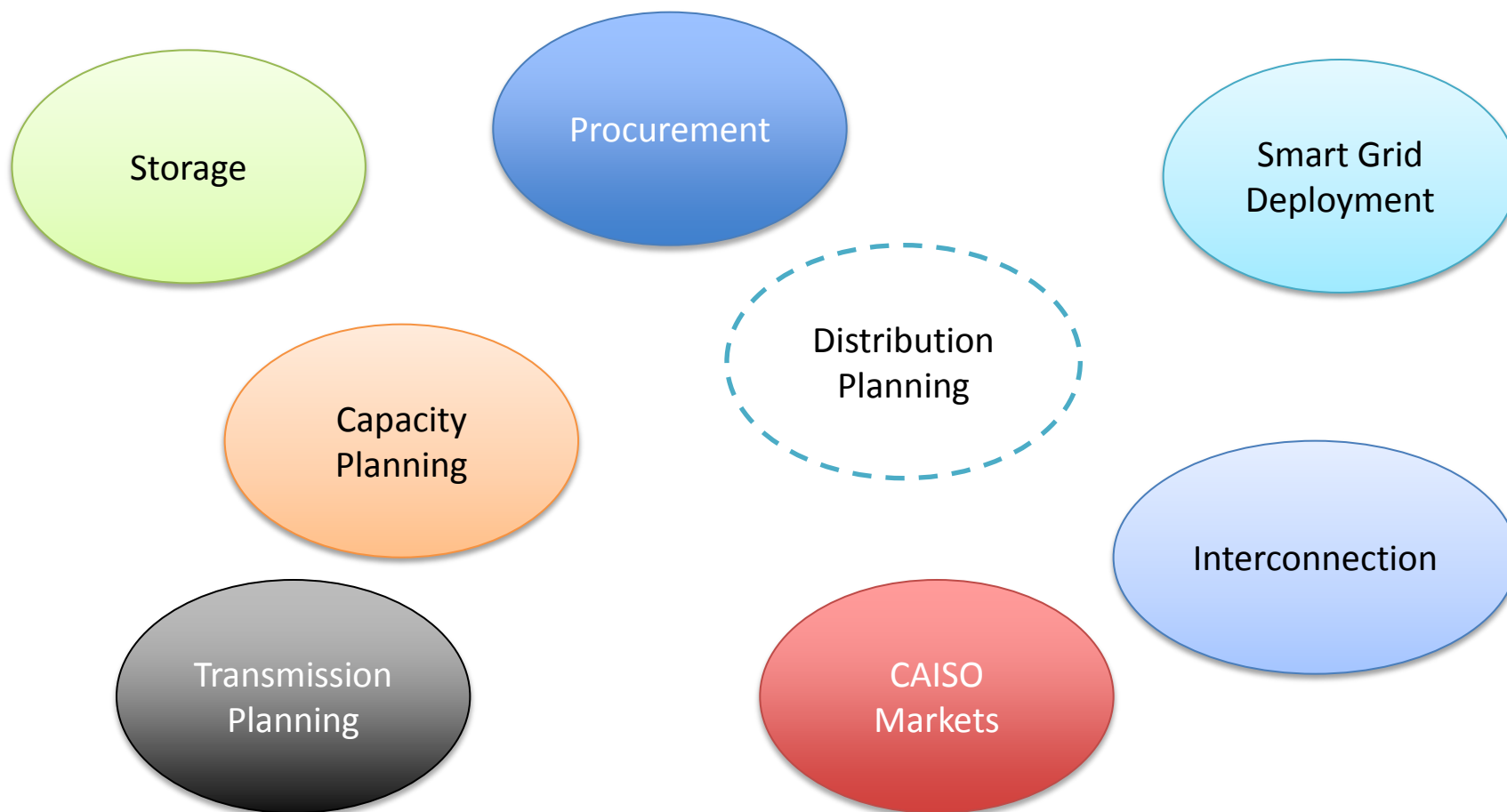
- **Barrier:**
Based on risks associated with other barriers

INTEGRATION

DG+IG: Intelligent Grid=DR+ES+EV+MC2



*Energy Policy continues to be worked in silos.
A decentralized future requires bridging the silos.*



Planning for the future energy system should be proactive, assuming a highly decentralized future

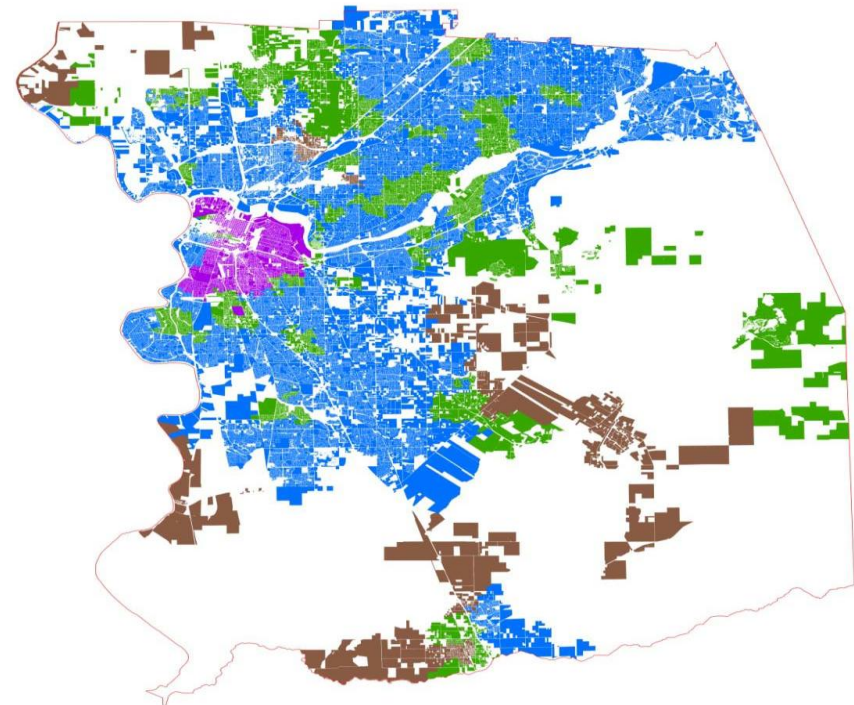
- ✦ CAISO – Transmission system
 - ✦ Transmission Planning Process (TPP)
 - ✦ FERC Order 1000, Non-Transmission Alternatives
- ✦ Distribution Planning Process (DPP)
 - ✦ AB 2340 (Shared D-Grid Upgrades), AB 2341 (Future-proofing the Grid)
 - ✦ Highlighted in 2012 IEPR Update
- ✦ Long-Term Procurement Planning (LTPP)
 - ✦ Higher RPS targets
 - ✦ DG resources priority
 - ✦ IG Resources (like energy storage) are included

- ✦ Resource Adequacy (CPUC)
- ✦ Non-generator resources in ancillary services market (CAISO)
- ✦ Reliability Demand Response Product (CAISO)
- ✦ Flexible Capacity Procurement (CAISO)
- ✦ Pay for Performance regulation (CAISO)
- ✦ Energy storage proceeding (CPUC)
- ✦ Smart Grid Deployment / Pilot (CPUC)
- ✦ Integrated Energy Policy Report (CEC)

Timely and transparent distribution grid interconnection:

- Interconnection of Wholesale DG projects to CA IOU distribution grids previously took an average of 2 years.
- In contrast, interconnection to SMUD's distribution grid takes an average of 6 months.
- Two SMUD staff members completed interconnection studies for 100 MW of CLEAN Program projects in two months (equivalent to 2.5 GW of WDG across California)

Rule 21 reform focused on
transparency, certainty



Policy	Program Size	Project Type
RPS	33% by 2020	Almost all central station
Renewable Auction Mechanism (RAM)	1.3 GW	Unlikely to be “true DG”
CLEAN Programs: AB 1969, SB 32, SB 1122	1 GW	Under 3 MW WDG
IOU PV Programs	< 750 MW	Mostly WDG solar
CSI	1.75 GW	Rooftop solar
Net metering cap	5 GW	Mostly solar
Small Generator Incentive Program (SGIP)	< 100 MW?	Biopower
Total Capacity of Programs	< 9 GW?	Depends on definition of DG

Legislation:

- ✦ AB 1969 – Old CLEAN program started in 2008 (500 MW)
 - ✦ Projects < 1.5 MW
- ✦ SB 32 – Improved CLEAN passed in 2009 (*didn't add MW for IOUs)
 - ✦ Projects < 3 MW
- ✦ SB 1122 – Added 250 MW of biopower to SB 32

Renewable Market Adjusting Tariff (Re-MAT):

- ✦ Implementation of SB 32 delayed over 3 years
- ✦ Program Decision approved in May 2012
- ✦ Proposed Decision on tariffs, PPA published yesterday
- ✦ As written, at launch, 0 MW for SCE, 100 MW of PG&E, 26 MW for SDG&E
- ✦ Program split among 3 categories
- ✦ Solar category will filled immediately

“SB 32 Clean-up” sponsored by Clean Coalition

Utility Name	Approx. Customers	Est. Program Size (MW)	Program Status
LA DWP	1,400,000	75	Planned for 2013
SMUD	592,500	35	Launched 2010, Fully subscribed
Anaheim	175,000	7	Launched, price too low (5-7c/kwh) for participation
Imperial Irrigation District	145,900	12	Not launched
Modesto Irrigation District	110,000	8	Not launched
Riverside	106,000	7	Launched, price too low (5 c/kwh) for participation
Turlock Irrigation District	99,453	7	Self Generation program (price too low)
Glendale	84,500	4	Not launched

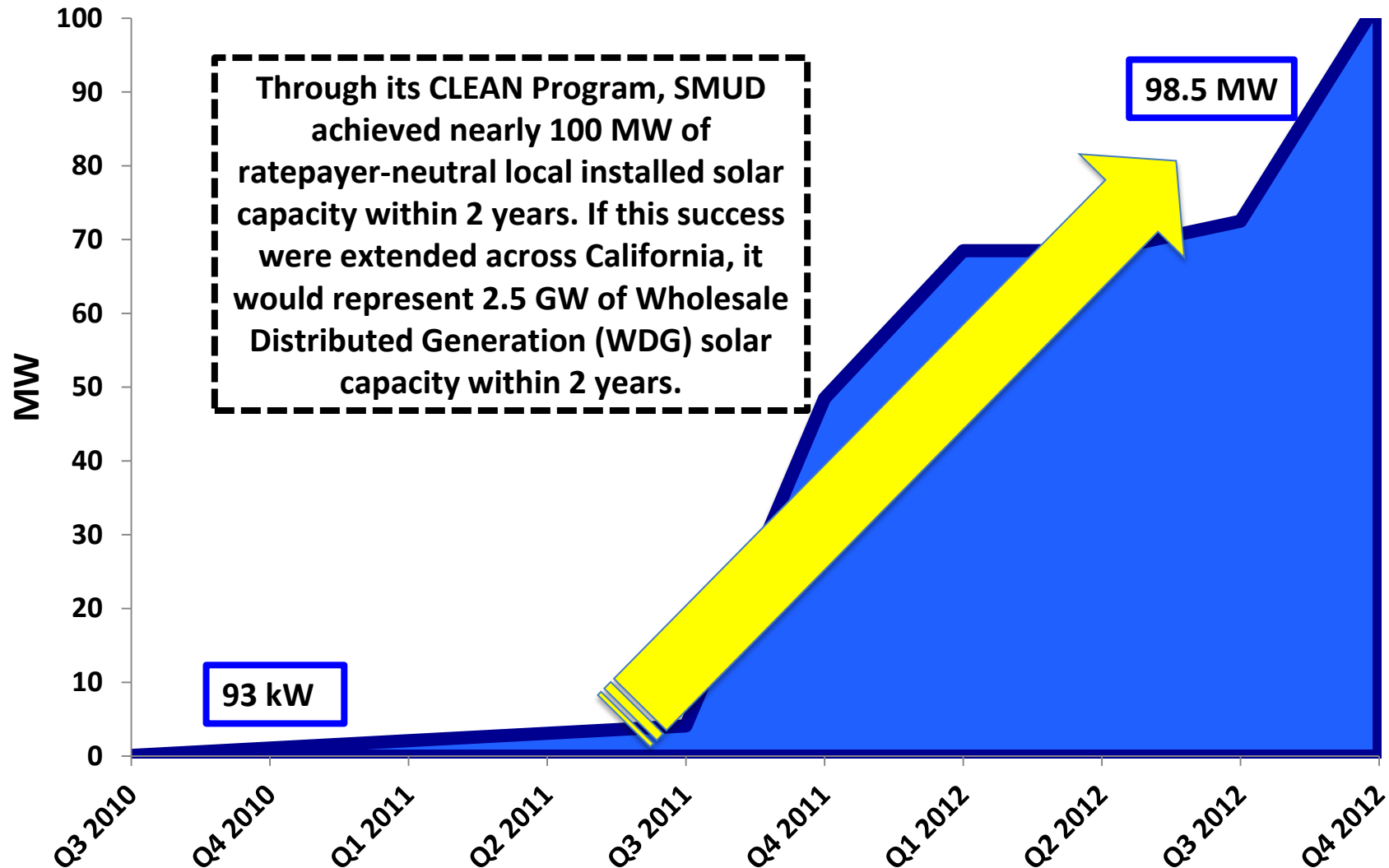
Signed Bill

- Start date **July 1, 2013**
- “**shall consider avoided costs for distribution and transmission system upgrades**, whether the facility generates electricity in a manner that offsets peak demand on the distribution circuit, and all current and anticipated environmental and greenhouse gases reduction compliance costs ~~and avoided costs~~”

Implementation

- Clean Coalition working directly with POUs through existing CLEAN Outreach initiative
- Without CPUC oversight, it's up to communities and local advocates to hold utilities accountable

SMUD Cumulative Installed Solar



SB 1332 Applicable

- ✦ **LADWP**: 5x oversubscribed at launch. Will make 20 MW available every 6 months. Additional authorized 50 MW still TBD
- ✦ **Riverside, Anaheim, Turlock Irrigation District (TID), Modesto Irrigation District (MID)**: Unclear whether / how programs will be improved based on new provisions
- ✦ **Imperial Irrigation District (IID)**: Program announced but no details
- ✦ **Glendale**: Hired consultant to calculate long-run avoided cost. Considering bigger program than minimum required
- ✦ Clean Coalition working directly with POUs through existing CLEAN Outreach initiative

Other

- ✦ Palo Alto CLEAN – Launched April 2012 (4 MW), Price adjustment January 2013
- ✦ Marin Energy Authority (MEA)
- ✦ Clean Power SF

What Policies are Relevant to Shared Renewables?

- ✦ Net Metering = subset of Retail DG
- ✦ Virtual Net Metering (VNM) = Modified Retail DG
- ✦ Solar Gardens = Hybrid VNM and Wholesale DG
- ✦ CLEAN Programs = Wholesale DG

Active Initiatives

- ✦ SDG&E Share the Sun
- ✦ SB 43 (Wolk)

RPS

- ✦ Brown: “Floor, not a ceiling” – legacy?
- ✦ Current talk of 40% by 2030 is very weak

CLEAN Programs

- ✦ Governor’s 12 GW DG goal – legacy?
- ✦ No current activity around adding MW to wholesale DG
- ✦ Landscape change as current programs fail?

SB 43 (Wolk) – Shared Renewables

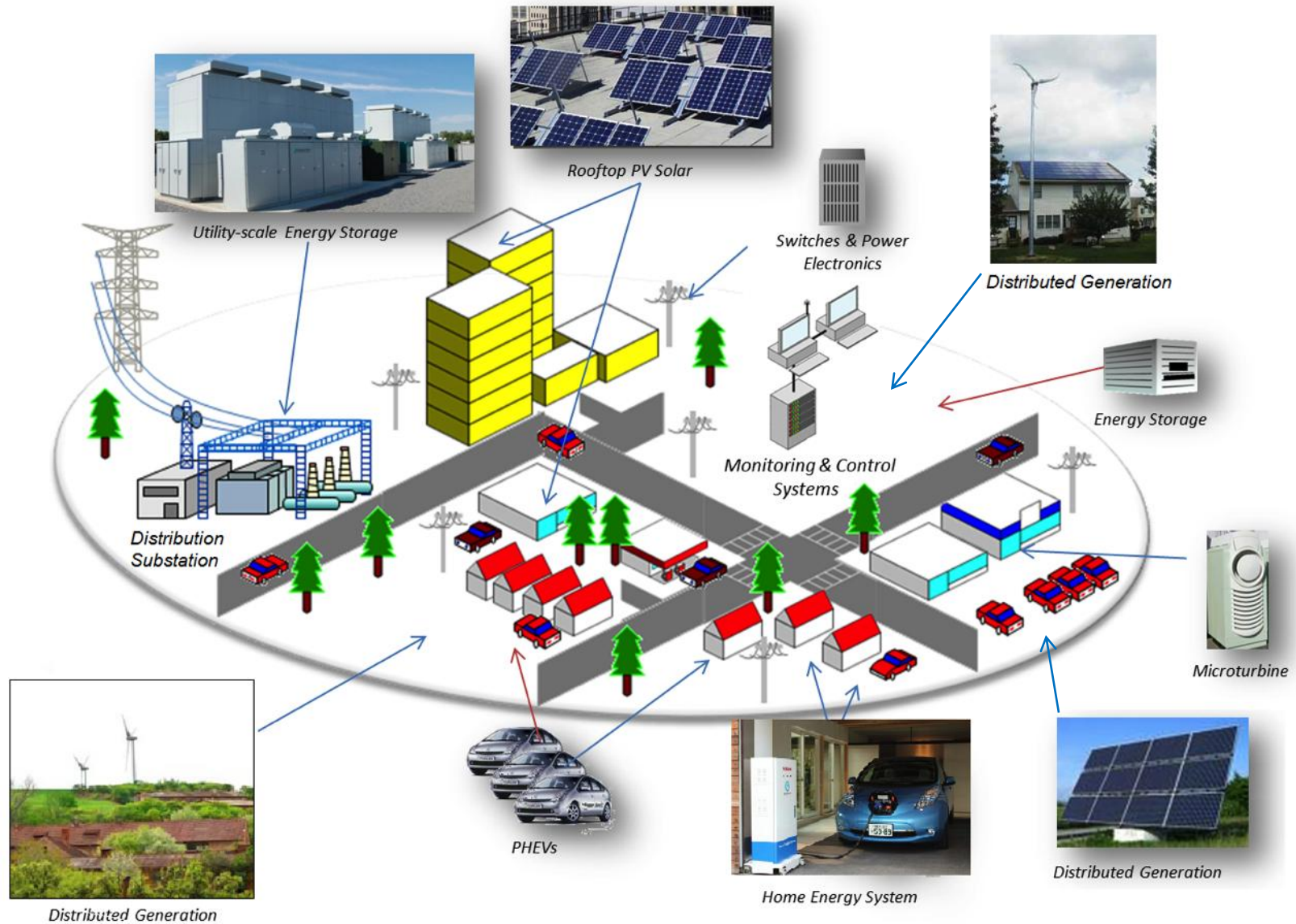
SB 699 (Hill) – Distribution Planning and Transparency

SB 37 (deLeon) - On-bill repayment

Prop 39 Bills – half a dozen major ones

PACE Bills

Clean Coalition Vision = DG+DR+ES+EV+MC2

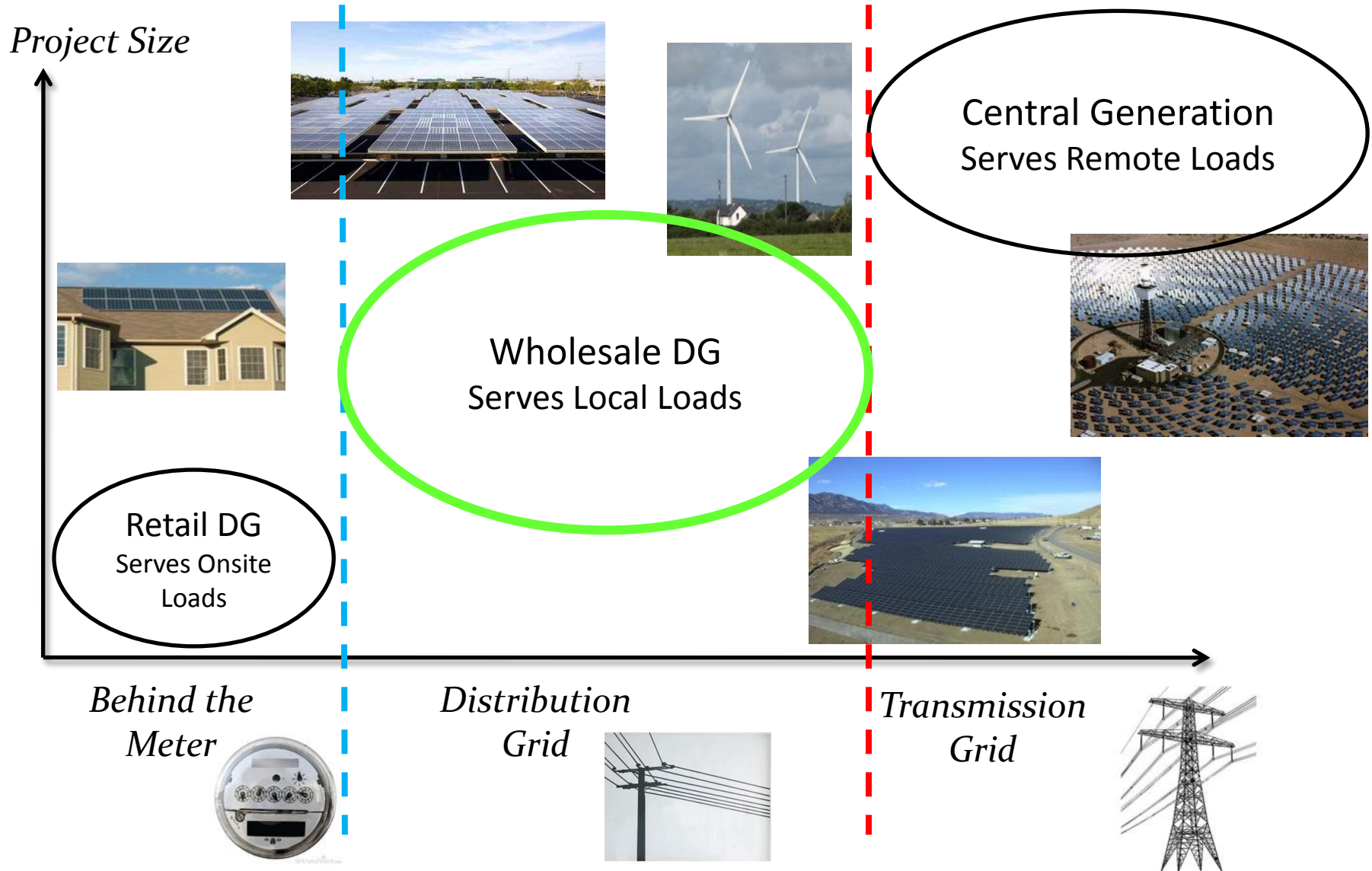




Backup Slides



Wholesale DG is the Critical & Missing Segment

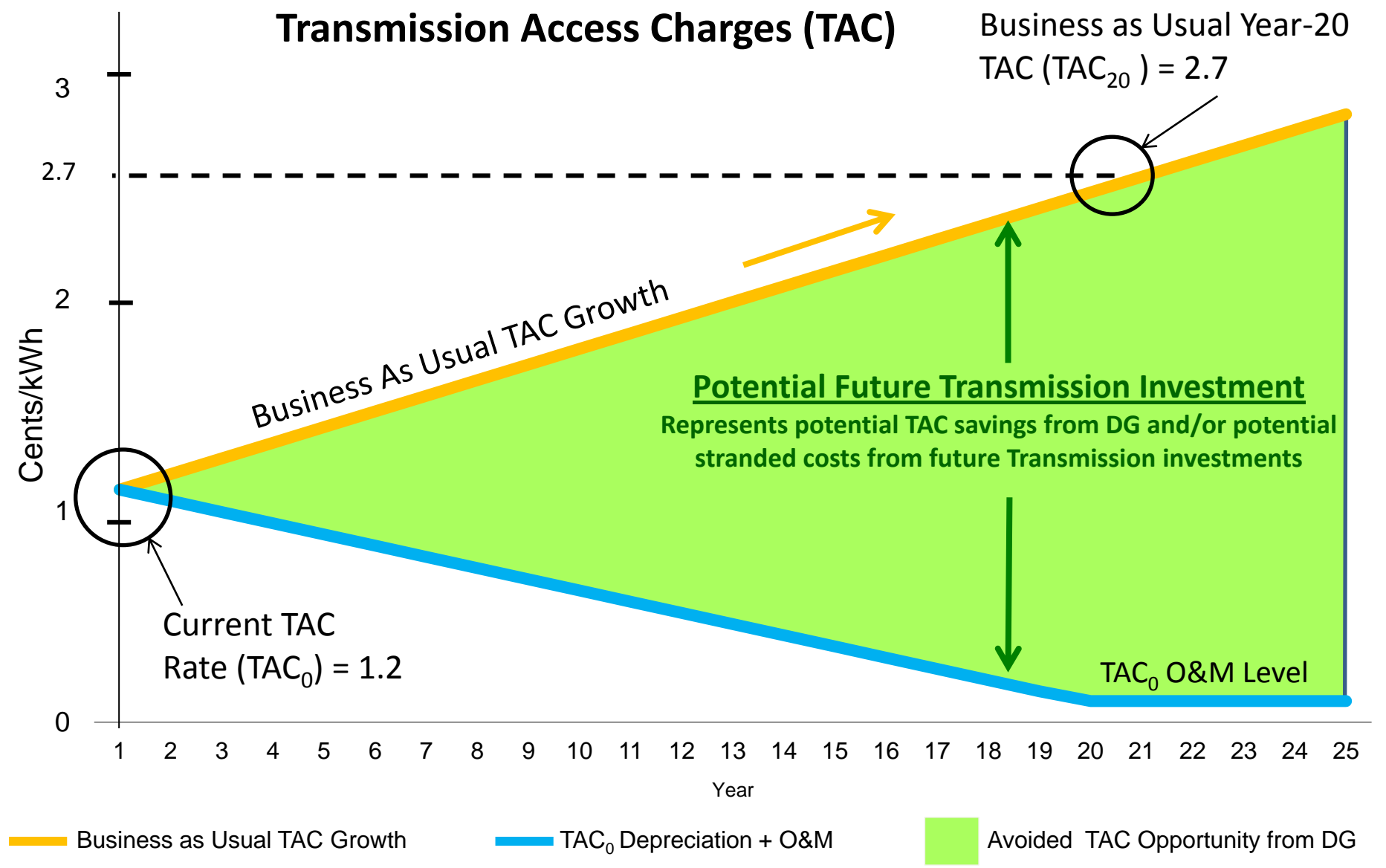


Total Ratepayer Cost of Solar

	Distribution Grid					T-Grid
PV Project size and type	100kW roof	500kW roof	1 MW roof	1 MW ground	5 MW ground	50 MW ground
Required PPA Rate	16¢	15¢	14¢	9-11¢	8-10¢	7-9¢
T&D costs	0¢	0¢	0¢	0¢	0¢	1-3¢
Ratepayer cost per kWh	16¢	15¢	14¢	9-11¢	8-10¢	8-12¢

Sources: CAISO, CEC, and Clean Coalition, Nov2012; see full original analysis from Jul2011 at www.clean-coalition.org/studies

The most cost-effective solar is large WDG, not central station as commonly thought, due to the significance of hidden T&D costs



- ▶ **CLEAN = Clean Local Energy Accessible Now**

- ▶ CLEAN Programs are the next generation of feed-in tariffs

- ▶ **CLEAN Features:**

- ▶ Procurement: Standard and guaranteed contract between the utility and a renewable energy facility owner
- ▶ Interconnection: Predictable and streamlined distribution grid access
- ▶ Financing: Predefined and financeable fixed rates for long durations

- ▶ **CLEAN Benefits:**

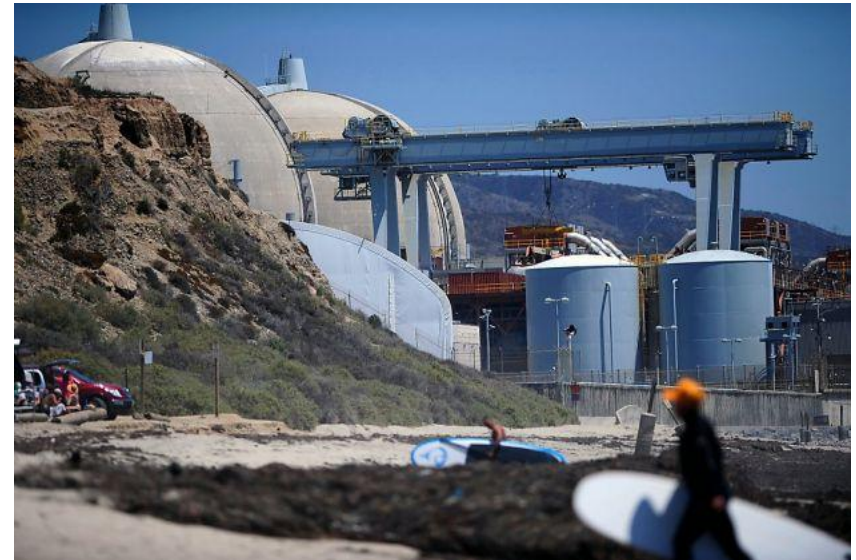
- ▶ Removes the top three barriers to renewable energy
- ▶ The vast majority of renewable energy deployed in the world has been driven by CLEAN Programs
- ▶ Allows any party to become a clean energy entrepreneur
- ▶ Attracts private capital, including vital new sources of equity
- ▶ Drives local employment and generates tax revenue at no cost to government

	PG&E	SCE	SDG&E
Original RAM Decision	421	498	81
Expanded Allocation (after shifting PV program MW)	421	723	155
Signed and Approved PPAs	203	364	53
Cancelled PPA	20	90	0
RAM 3 Targets (approvals sought in April/May)	132	230	52
Remaining MW (assuming RAM 3 Targets met)	106	219	50

- ▶ RAM 3 Auction was held in Dec 2012 – Results not yet public
- ▶ Final Auction (RAM 4) should be in May/June 2013

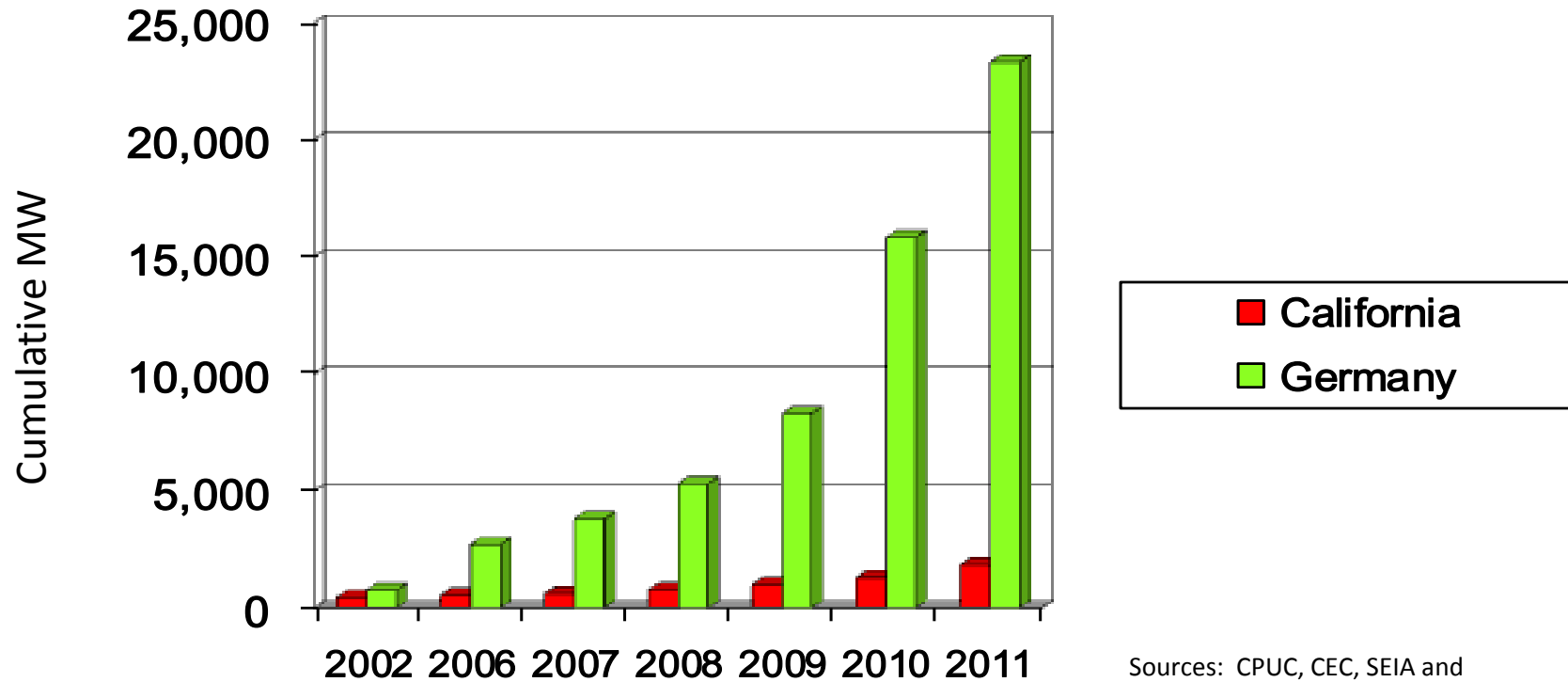
Centralized Generation Over-Reliance = Bad Bet

- Several large investments in central-station generation have been proven very unwise
- San Diego blackout caused \$100 million in economic damages
- San Onofre Nuclear Generating Station (SONGS) suffered radioactive leak and was shut down shortly after ratepayer-funded \$671 million upgrade.
- Since, January 2012, SONGS is costing us \$54 million per month for ZERO benefit



- We must invest in a grid that is more resilient and provides greater energy security.
- Our energy system must offer protection and resiliency against attacks, disasters, and grid failures.

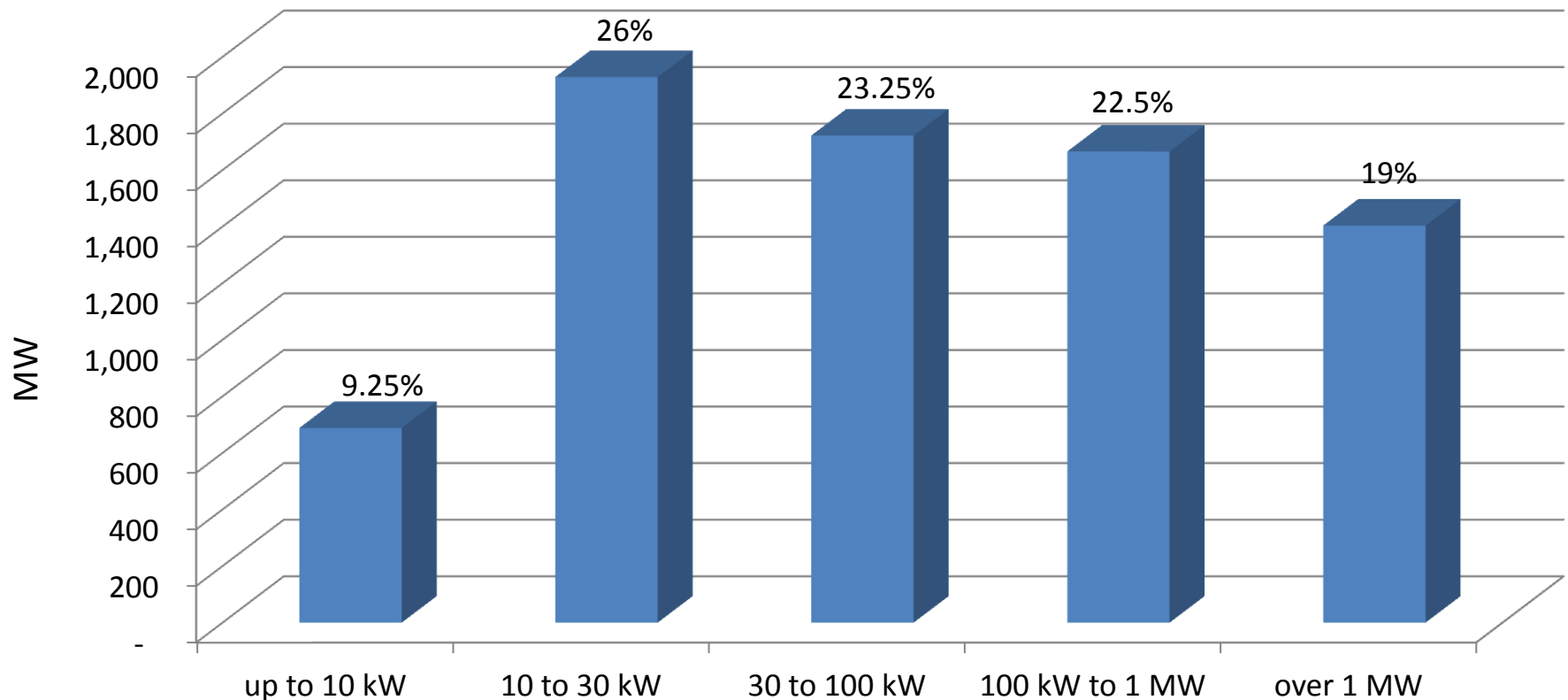
Solar Markets: Germany vs California (RPS + CSI + other)



Sources: CPUC, CEC, SEIA and German equivalents.

Germany added nearly 15 times more solar than California in 2011, even though California's solar resource is 70% better!!!

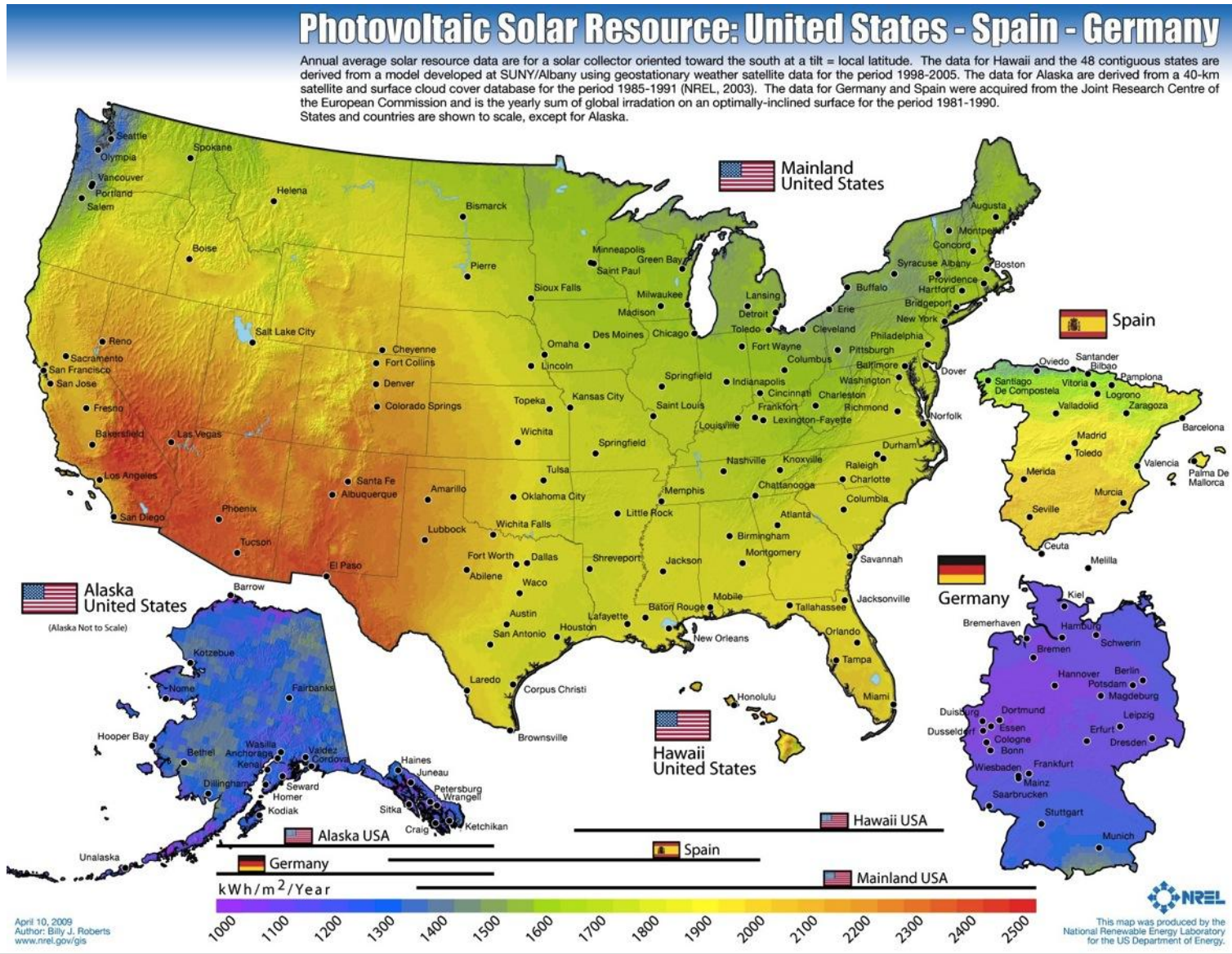
German Solar PV Capacity Installed in 2010



Source: Paul Gipe, March 2011

**Germany's deployed solar capacity is essentially 100% WDG
and about 90% is on rooftops**

US has far better solar resource than Germany



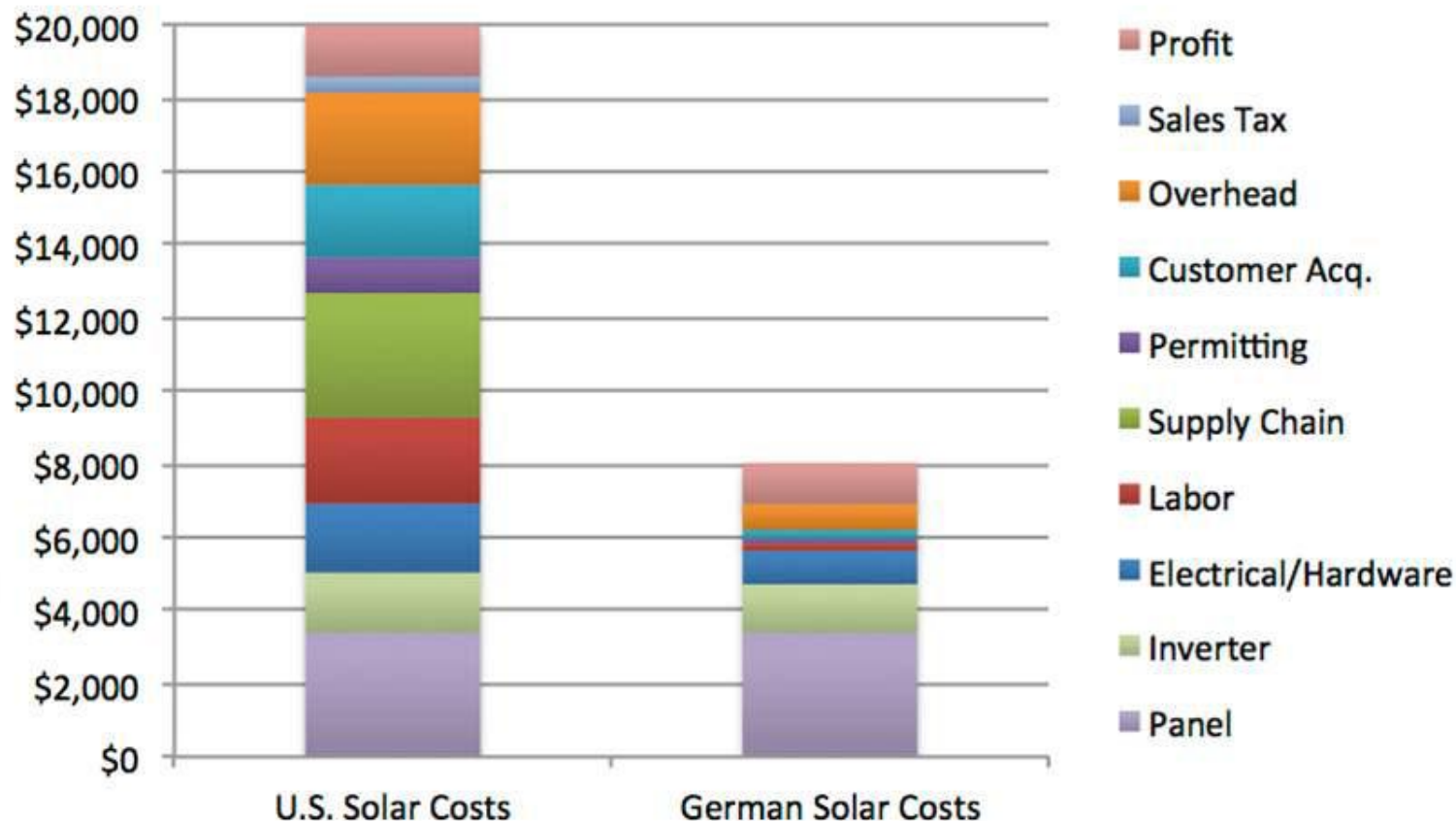
Project Size	Euros/kWh	USD/kWh	California Effective Rate \$/kWh
Under 10 kW	0.195	0.2470	0.0993
10 kW to 40 kW	0.185	0.2344	0.0942
40.1 kW to 1 MW	0.165	0.2091	0.0841
1.1 MW to 10 MW	0.135	0.1711	0.0688

Source: http://solarindustrymag.com/e107_plugins/content/content.php?content.10624, June 2012

- Conversion rate for Euros to Dollars is €1:\$1.27
- California's effective rate is reduced 40% due to tax incentives and then an additional 33% due to the superior solar resource

Replicating German scale and efficiencies would yield rooftop solar at only between 7 and 10 cents/kWh to California ratepayers

Comparison of U.S. and German Solar Costs



Rooftop solar project installation costs are roughly 2.5 times higher in the US than in Germany

Sources: LBNL, PwC, and Forbes; Sep2012