Federal Utility Partnership Working Group
Spring 2013 – May 22-23
San Francisco, CA

Energy Market Outlook

Helping Customers Meet Their Diverse Energy Goals

Hosted by: Pacific Gas and Electric Company

Pacific Gas & Electric Company (PG&E)

Company Facts

- Fortune 200 company located in San Francisco, CA
- $15B in operating revenues in 2011
- 20,000 employees

Energy Supply

- Services to 15M people:
  - 5.2M Electric accounts
  - 4.3M Natural Gas accounts
- Peak electricity demand: 20,000 MW
- Over 50% of PG&E's electric supply comes from non-greenhouse gas emitting facilities

Service Territory

- 70,000 sq. miles with diverse topography
- 160,000 circuit miles of electric transmission and distribution lines
- 49,000 miles of natural gas transmission and distribution pipelines

A Demonstrated Commitment to Sustainability

Named by Newsweek as the “Greenest Utility in America” in 2009 and 2010

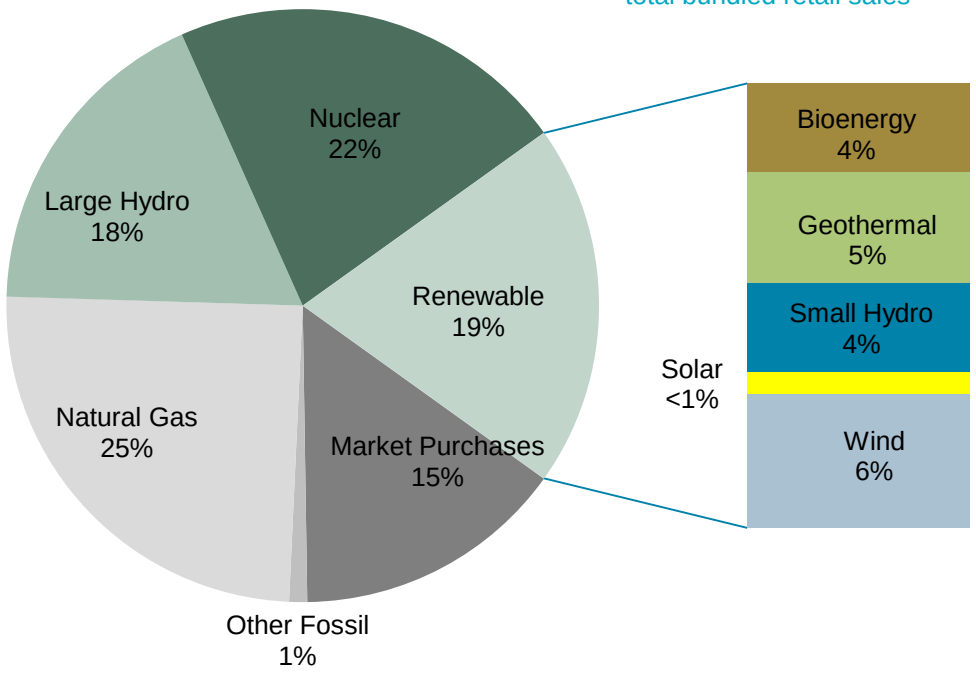
Serves 5% of the U.S. population; emits < 1% of the total CO_2 emitted by the utility sector

Connected more solar customers than any other utility in the country with over 85,000 PV systems installed (30% of the installs throughout the entire U.S.)

PG&E Power Mix (2011)

	PG&E Preliminary 2011 Power Mix	PG&E 2010 Power Mix	PG&E 2009 Power Mix
Eligible Renewable	**19%**	**15.9%**	**14.4%**
Bioenergy	4%	4%	4%
Geothermal	5%	5%	4%
Small Hydroelectric	4%	3%	3%
Solar PV	<1%	<1%	<1%
Solar Thermal	0%	0%	0%
Wind	6%	4%	3%
Nuclear	**22%**	**24%**	**21%**
Large Hydroelectric	**18%**	**17%**	**13%**
Natural Gas + Other Fossil	**26%**	**25%**	**35%**
Market Purchases	**15%**	**18%**	**16%**
TOTAL	**100%**	**100%**	**100%**

Figures represent % of PG&E's total bundled retail sales



""Market Purchases" is non-auditable electricity purchased from the market and generally reflects energy mix of the Western United States

Sources: http://www.pge.com/about/environment/pge/cleanenergy/ and PG&E's Energy Compliance and Reporting department as of May 31, 2012

Note: The 2012 preliminary will be reported during first Quarter 2013

Helping Customers Meet Their Diverse Energy Goals

Pricing Programs

Demand Response

Distributed Generation

Electric Vehicles

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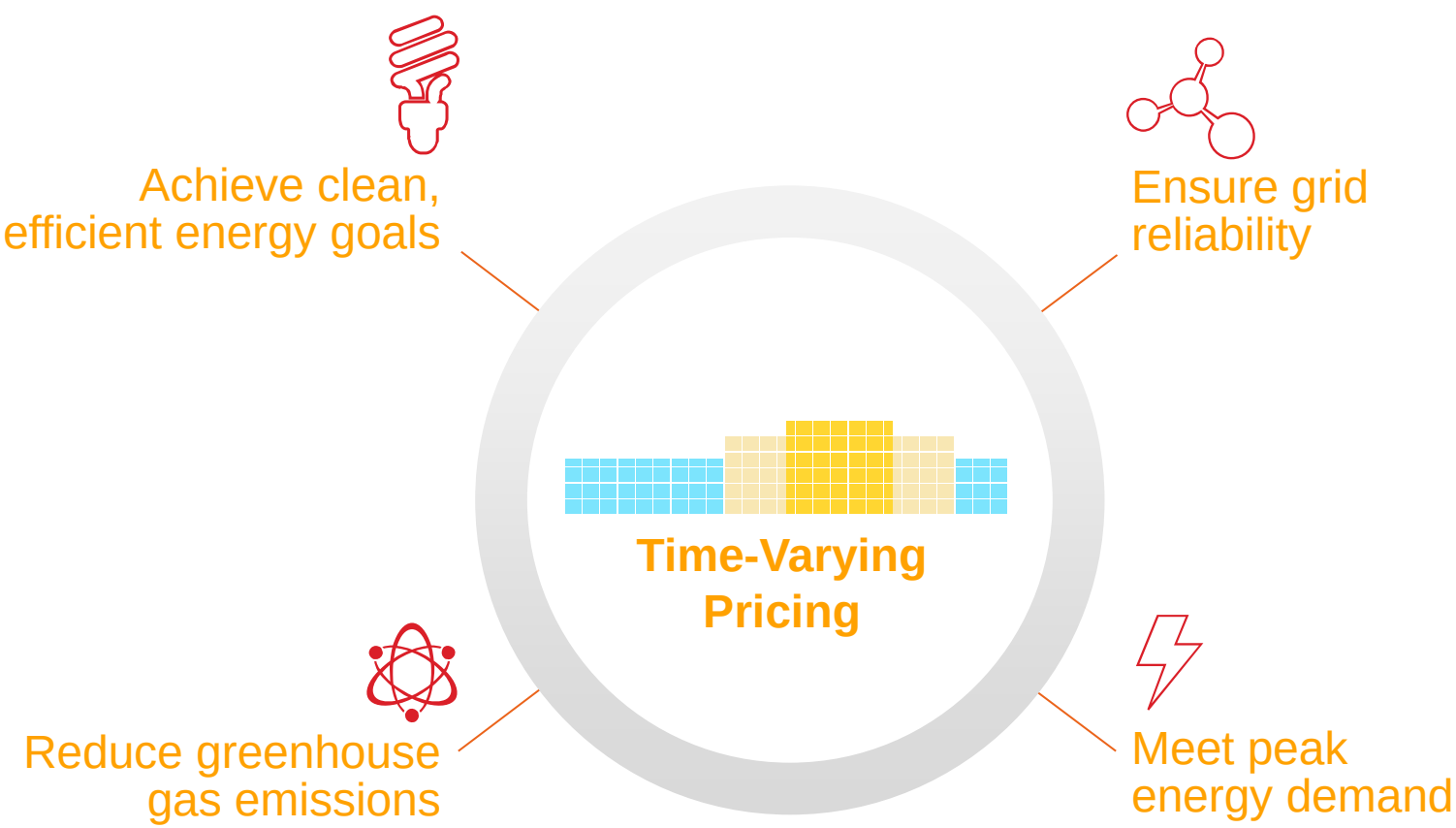
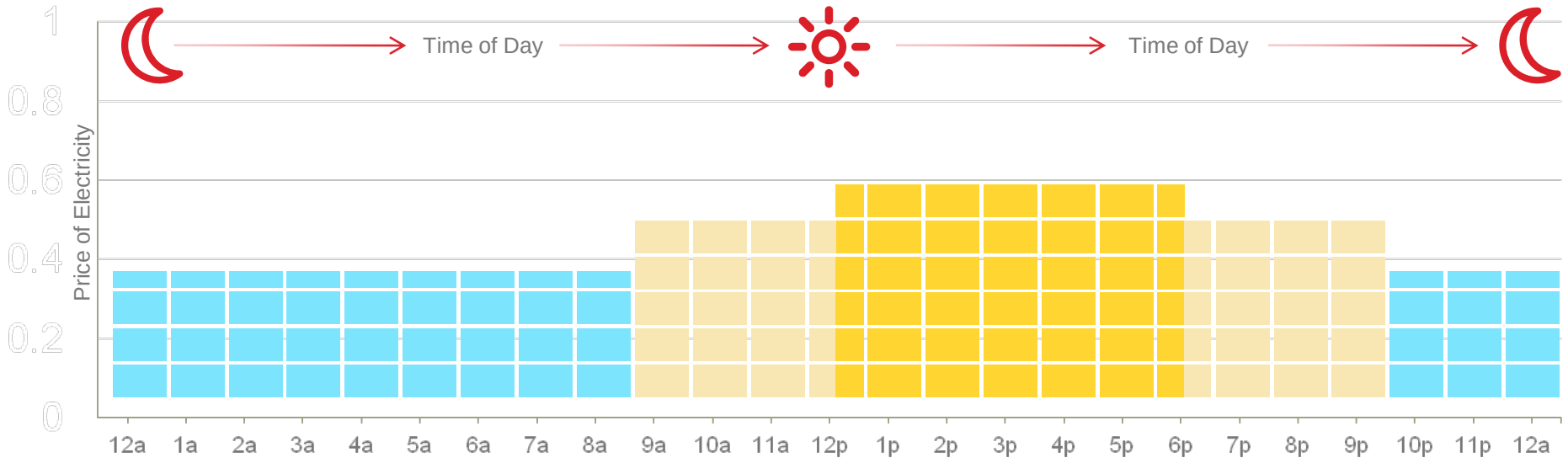
Time-Varying Pricing



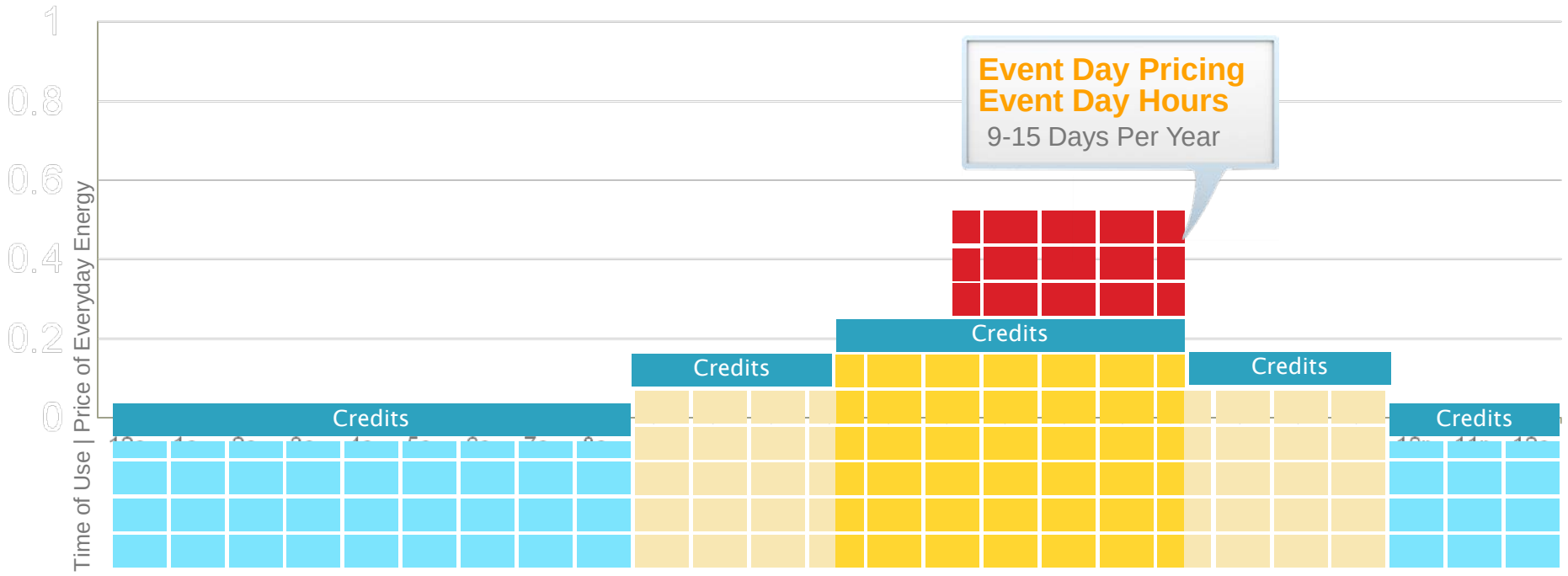
What Is Time-Varying Pricing?

- Part of state-wide plan to reduce demand peaks
- Business electric rates will vary by time of day



Peak Day Pricing

- Additional “Event Day” electricity conservation incentives
- 9–15 days/year
- Substantial credits toward electricity use and/or demand charges on other days



Additional PDP facts

Eligibility

- Requires Interval / Smart Meter
- Direct Access and net metering customers not eligible for Peak Day Pricing

Large Commercial and Industrial Customers

- Beginning May 2010, eligible businesses with monthly demand of more than 200 kW automatically transitioned to Peak Day Pricing
- Customers have ability to opt out of Peak Day Pricing by choosing alternative time-of-use rates

Online Tools to Support Customer Participation

- Usage analysis
- "What if" analysis
- Rate Comparisons

Ask PG&E account managers for details

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What is Demand Response (DR)?

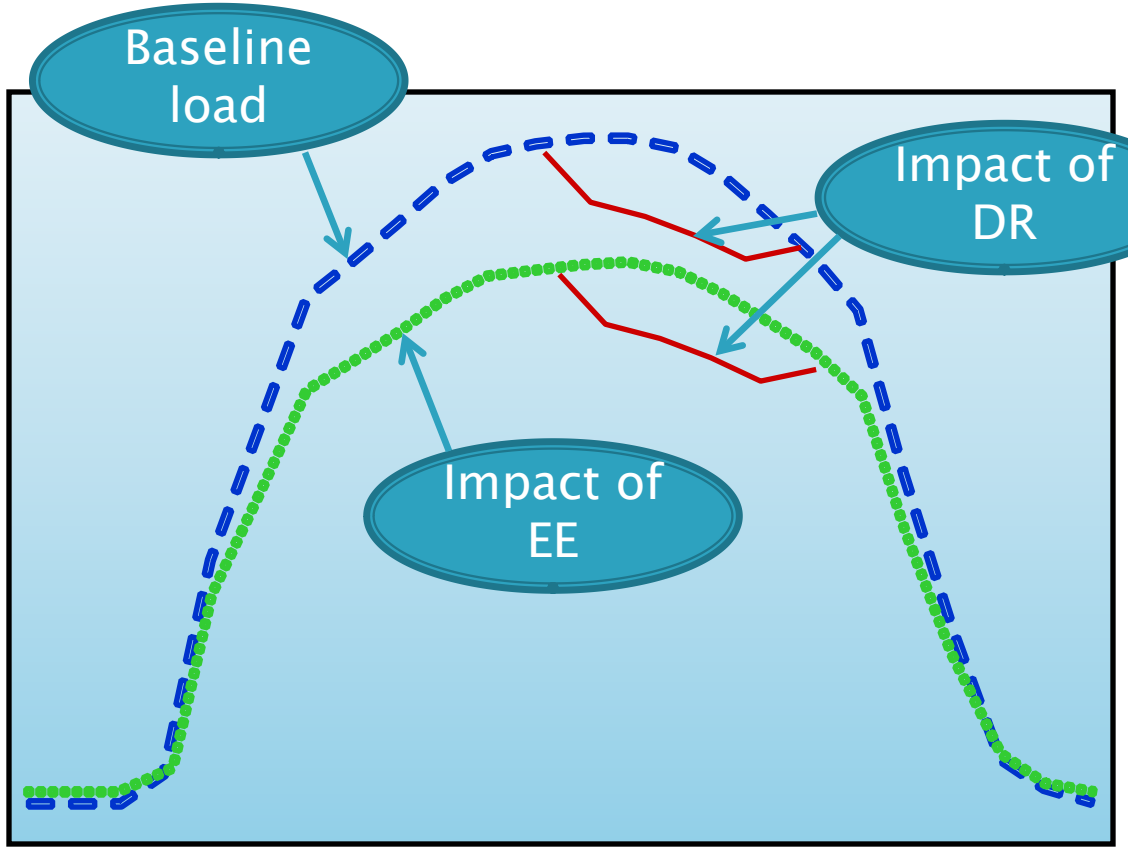
"Changes in electric use by demand-side resources from their normal consumption patterns in response to changes in the price of electricity, or to incentive payments designed to induce lower electricity use at times of high wholesale market prices or when system reliability is jeopardized."

– **Federal Energy Regulatory Commission**

Energy Efficiency vs. DR

Energy Efficiency

Permanent reduction of energy usage while maintaining the same levels of comfort and productivity



Demand Response

Temporary, short term, reduction in electrical demand during emergencies or periods of high demand

Federal facilities can choose the DR program that best fits their preferences

	Description	Enrolled Federal Facilities	How to learn more?
Aggregator-Administered Programs (CBP & AMP)	• Dispatched in response to high temperatures or electricity prices • 30-minute or day-ahead advanced notification of events • Monthly capacity payments • Aggregators often shield participants from penalties	3	• Aggregators' contact info listed on PG&E website • PG&E account manager can provide introduction
Demand Bidding Program (DBP)	• Dispatched in response to high temperatures or electricity prices • Day-ahead notification of events • Voluntary, "best efforts" payment for energy reduced	12	• Info & enrollment available online • Ask PG&E account manager for details
Peak Day Pricing (PDP)	• Dispatched in response to high temperatures throughout PG&E territory • Day-ahead notification of events • Discounted rate during most hours, elevated pricing during peak period on event days	11	• PDP transition schedule is available online • Ask PG&E account manager for details
Base Interruptible Program (BIP)	• Dispatched to preserve grid stability • 30-minute minimum response time • Monthly capacity payment with high penalties for non-performance	0	• More info available online (note: BIP is not usually well-suited for HVAC / lighting loads)

Additional info for all programs (and online enrollment for some) at:
http://www.pge.com/en/mybusiness/save/energymanagement/index.page

DR Enabling Technologies

Many customers need tools to help them take advantage of DR programs and time varying rates

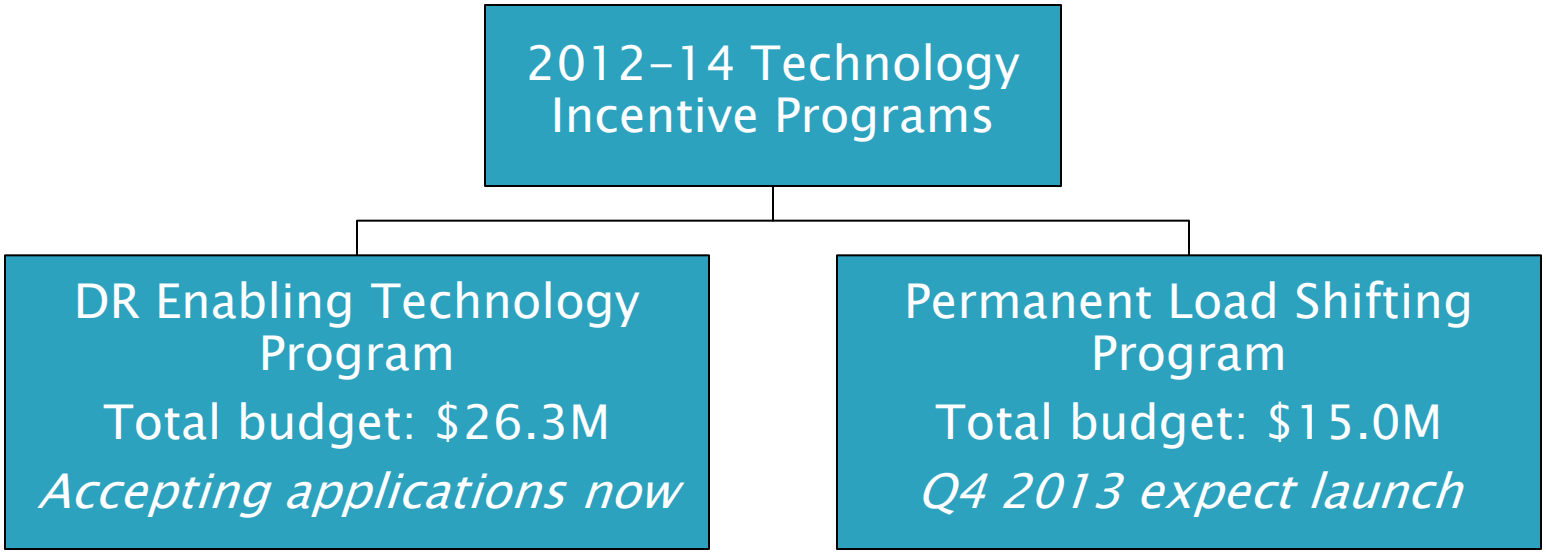
Visibility

Control

Automation

DR Technology Incentives @ PG&E

Similar to energy efficiency, DR enabling technology incentive programs help bring such tools within customers' reach



Incentives for technologies that partially or fully automate customer response during DR events

Incentives for technologies that permanently shift customers' electrical usage to off-peak times of the day

Fast, flexible, local resources are on the horizon

Locational DR

- Implementing locational dispatch for most of our DR programs
- Allows for more targeted usage of DR in response to local high prices or T&D issues

'Flexible' DR

- Increasing solar and wind penetration creating need for flexible resources that can respond quickly and in non-peak hours
- Flexible resources include quick-start ($\leq$10 min), ramping, and even potentially load escalation
- Enabling technology (e.g., AutoDR) can help deliver flexible resources
- Currently conducting pilots to demonstrate flexible DR and will be launching flexible DR programs as early as 2015

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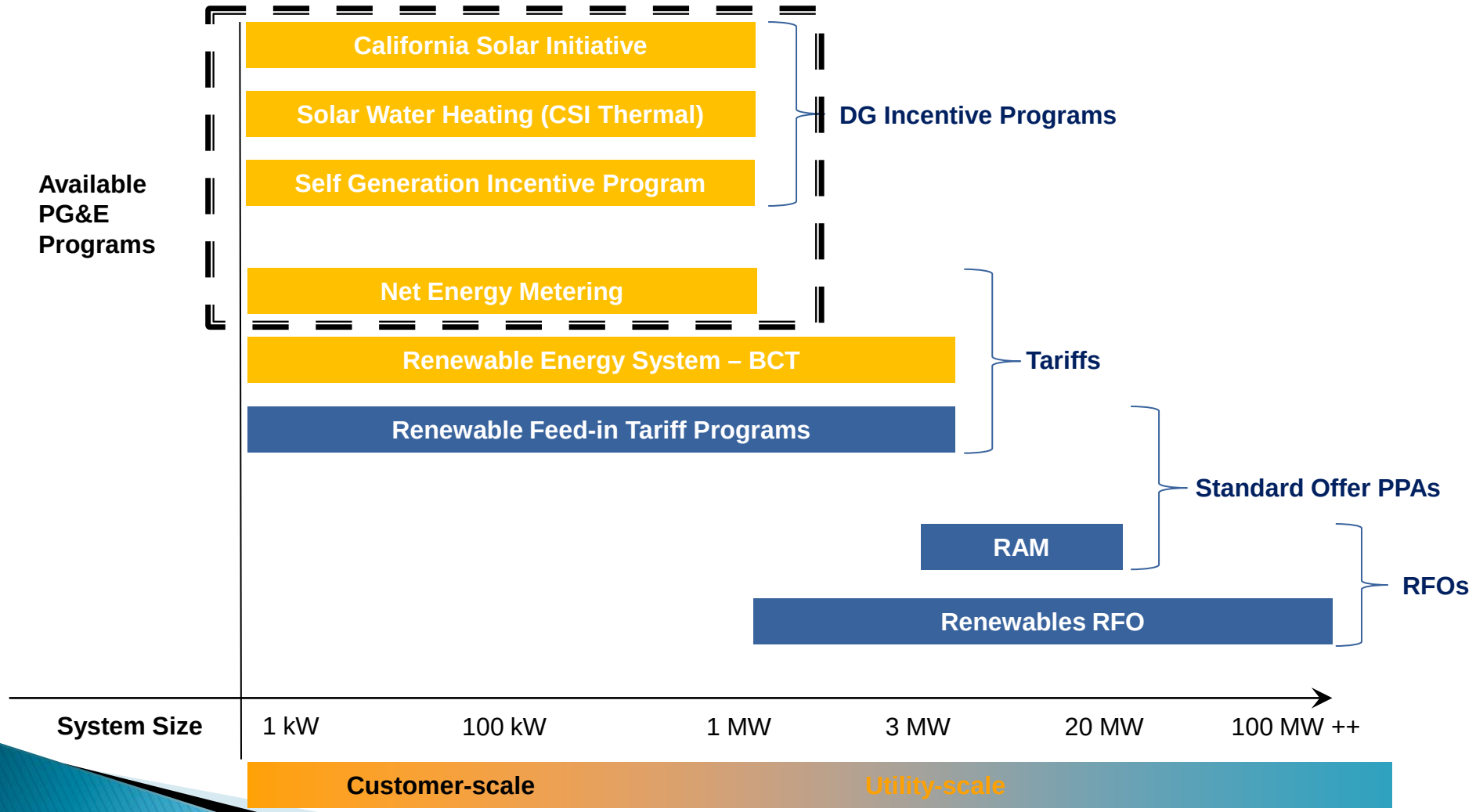
PG&E Clean Energy Programs

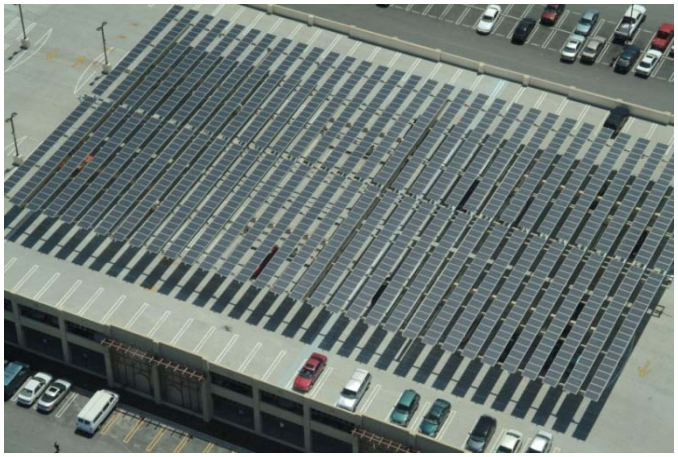


Note: not all programs count towards RPS requirements

Commercial DG Incentive Programs

California Solar Initiative (CSI)	• Solar Photovoltaic (PV) • Generate Electricity
CSI Thermal	• Solar Water Heating (SWH) • Displace Natural Gas
Self Generation Incentive Program (SGIP)	• Wind Turbines, Fuel Cells, Microturbines, Combustion Engines, Gas Turbines, Advanced Energy Storage • Generate Electricity/Waste Heat

Solar Technology Incentives (CSI)



Solar (PV)

- Utilize solar PV to generate electricity
- Incentives up to 1MW
- $0.20/W (upfront) or $0.025/kWh (performance-based for 5 yrs.)
- Waitlist in place for new applications

Solar Water Heating (SWH)

- Utilize solar water heating to displace natural gas
- Incentives up to $500k
- $14.53 per estimated annual therms displaced

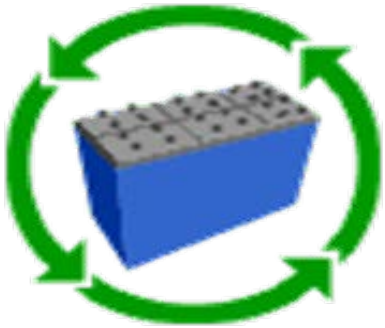
Other DG Technology Incentives (SGIP)

Wind

- Utilize wind turbines to generate electricity
- Incentives up to 3MW (Tiered incentive rates)*
- $1.19/W (50% upfront/10% annually over 5 yrs.)

Fuel Cells

- Utilize fuel cells to generate electricity and waste heat through a chemical reaction
- Incentives up to 3MW (Tiered incentive rates)*
- $2.03/W** (50% upfront/10% annually over 5 yrs.)



Advanced Energy Storage

- Batteries that store energy from the grid or onsite generation for onsite load management
- Incentives up to 3MW (Tiered incentive rates)*
- $1.80/W (50% upfront/10% annually over 5 yrs.

* Up to 1 MW = 100%, 1-2 MW = 50%, 2-3 MW = 25%
** Additional $1.80/W if fueled with Biogas

Other DG Technology Incentives (SGIP)

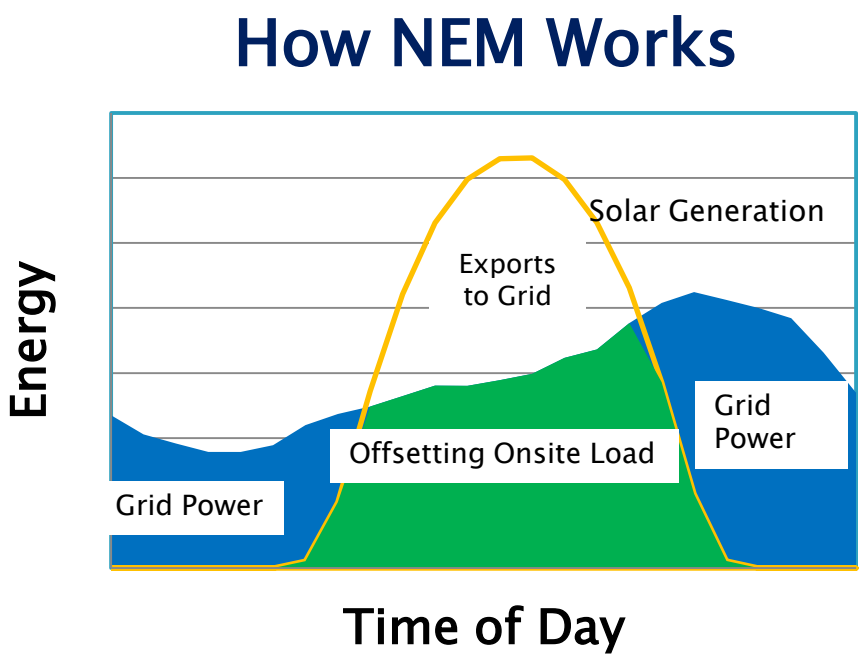
Combustion Turbines

- IC Engine:
  - Utilize gas fuel and combustion to create electricity and waste heat – utilizing piston technology
- Gas Turbines (CHP):
  - Utilize gas fuel and combustion to create electricity and waste heat – utilizing a gas turbine technology
- Microturbines:
  - Utilize a smaller gas turbine technology (generally < 250 kW) to create electricity and waste heat

- Incentives up to 3MW (Tiered incentive rates)*
- $0.48/W** (50% upfront/10% annually over 5 yrs.)

* Up to 1 MW = 100%, 1-2 MW = 50%, 2-3 MW = 25%
** Additional $1.80/W if fueled with Biogas

Net metering enables customers to partially or fully offset their bills



- Renewable generation up to 1 MW, sized to customers' annual load
- Generation first used to fulfill customer load
- Excess generation exported to the grid (meter spins backwards) and compensated at full retail rate
- Customer's energy needs that exceed what is generated are fulfilled by PG&E

PG&E's Enhanced Green Option

- Voluntary option for customers to purchase 100% solar energy
- Sourced from new small/mid-sized solar projects in PG&E service area
- Customers pay fixed price for solar and receive bill credit for avoided conventional generation costs
- Open to all PG&E bundled electric customers
- 1-year initial commitment; customers may leave at any time thereafter

Proposal pending CPUC approval; targeting early 2014 launch

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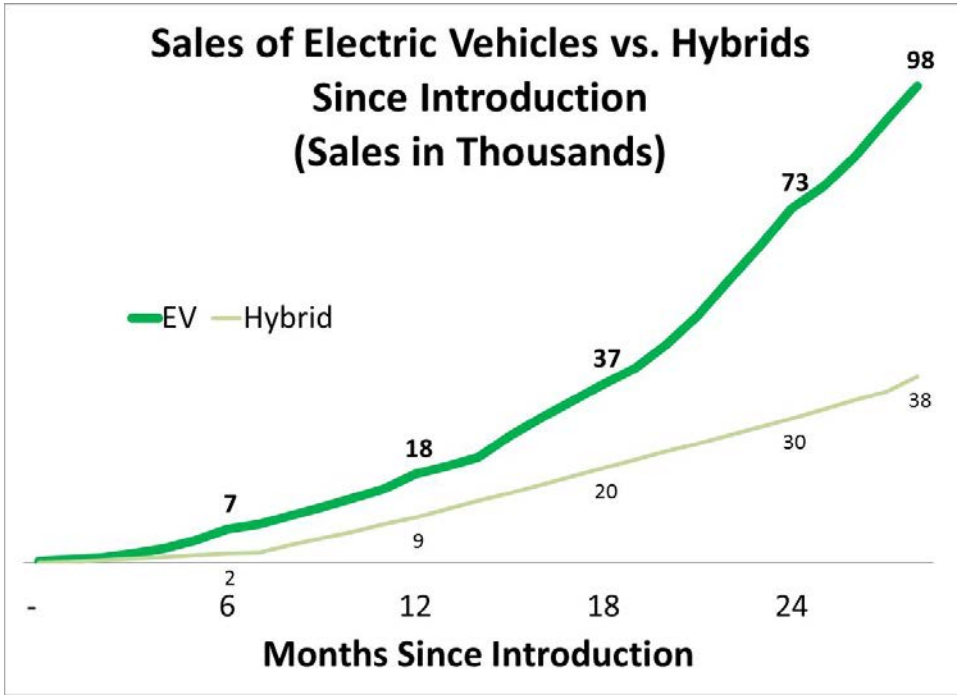
Electric Vehicle Adoption



- EV adoption occurring at more than twice the rate of hybrid electric vehicle adoption when they were first introduced
- EV drivers strongly motivated by availability of **workplace charging**

Supporting EV charging

- EV charging can take many forms
  - Level 1: The typical wall outlet (1.4kW @ 110V)
  - Level 2: The standard charger (3.3kW-6.6kW @ 220V)
  - DC Fast Charger: Specialized equipment designed to charge an EV in 30 minutes (50kW+)

- EVs typically consume about 8-11kWh per day
- Workplace charging unlikely to impact facility peak load significantly, as most charging is complete within a few hours
- Contact your utility to have service planning performed

Questions & Answers