

PG&E Webinar

12.16.09

Solar for the Entrepreneur (for Solar Contractors)

Solar for the Entrepreneur

For Solar Contractors

Matt Heling

Program Manager

Solar & Customer Generation

Pacific Gas and Electric Co.





Goal

Identify the information, resources, and requirements that the solar entrepreneur needs to be familiar with to start a solar contracting business

- **Focus is on electric generation on the customer side of the meter**



Agenda

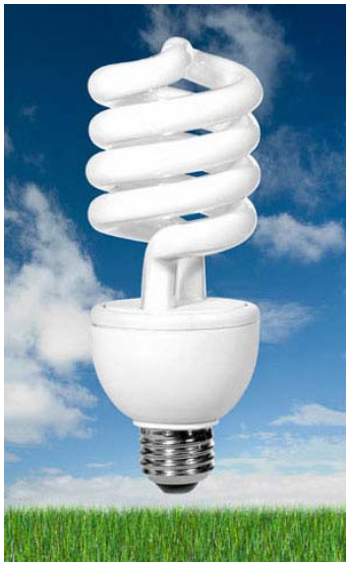
- Energy efficiency
- System performance
- PG&E solar programs
- Certification requirements
- System monitoring
- Permitting and interconnection requirements
- System purchase/financing options
- Useful resources



Energy Efficiency



Energy Efficiency



- Energy efficiency is typically the most **cost-effective** way to reduce a customer's energy bill
- Energy efficiency also **reduces the size of the solar system** that is needed
 - Can significantly improve total package (EE+PV) payback
- An **energy efficiency audit** is required to be eligible for some customer-side incentive programs



Large Solar PG&E Home: PV System Cost and Payback

Size and Cost of Solar Before EE (6.1 kW)	Cost of Implementing EE	Size and Cost of Solar After EE (3.6 kW)	Total Combined Cost
\$ 34,898*	\$ 6,962	\$ 19,047	\$ 26,009*
~ 15 years	~4 years	~ 22 years	~ 10 years

Reduction in payback period from ~15 yrs to ~10 yrs

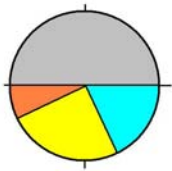
*(\$9/watt)-CSI Incentive
-30% Federal Tax



PV System Performance – Basics

Site Screening

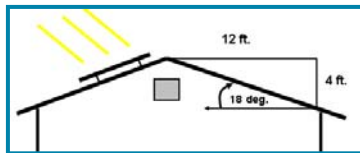
What physical site characteristics makes a site a good candidate for PV?



– Orientation – S or SW is best



– Solar “window” – Access to mid-day sunlight



– Roof tilt – $\sim 30^\circ$ is ideal, but even flat is okay



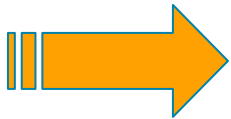
– Weather – Typically good in CA



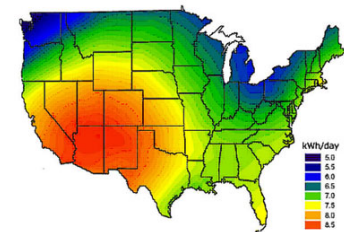
PV System Performance

Rules of thumb:

- Each 1 kW of PV system capacity typically* ...
 - Requires ~100 ft² of roof space
 - Produces ~1,300 – 1,700 kWh/yr.
 - Depends on many factors, including:
 - Location
 - Shading
 - System orientation
 - etc.



PV production calculators can estimate production for specific PV system types, locations, technologies, configurations, etc.



* Values presented are approximations only and may vary depending on a variety of factors.

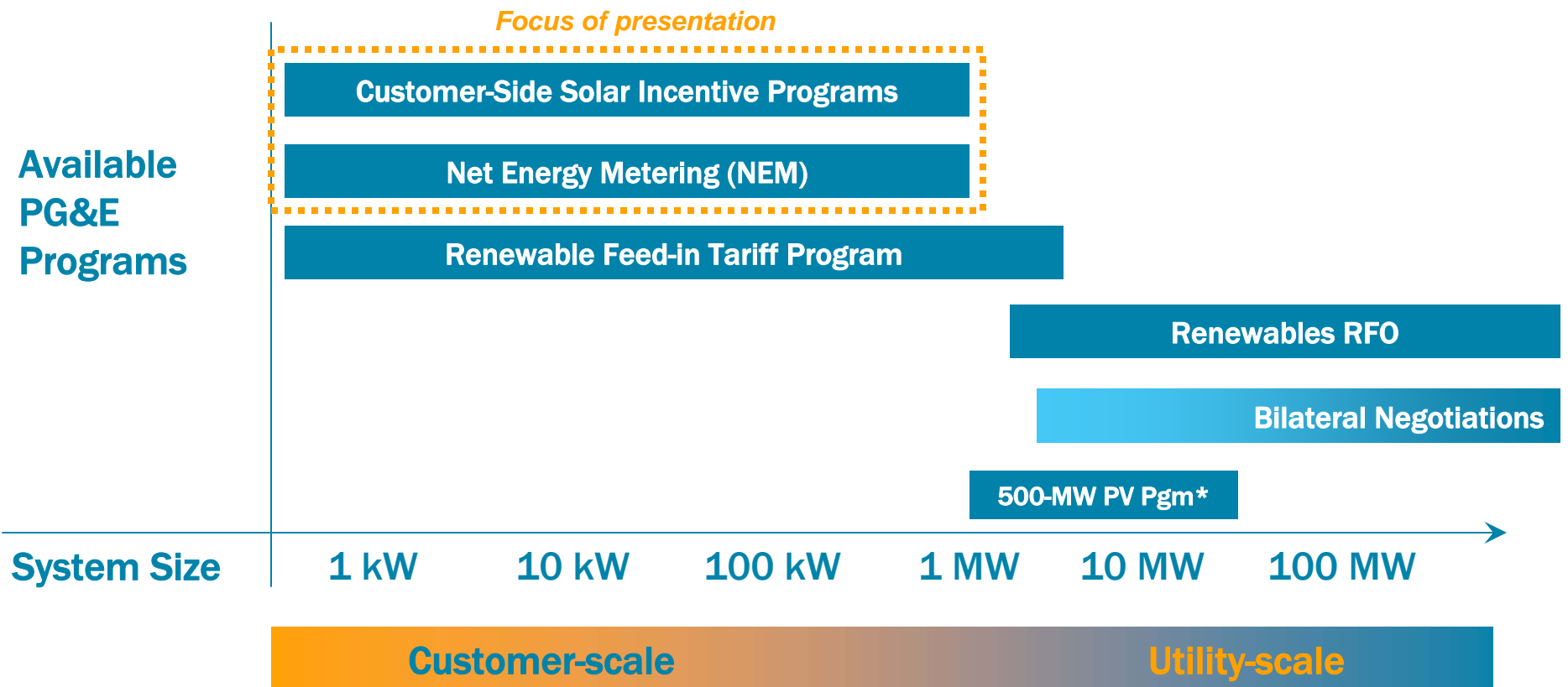


PG&E Solar Programs



PG&E Solar Programs

By system size



* If approved by the CPUC



PG&E Solar Programs

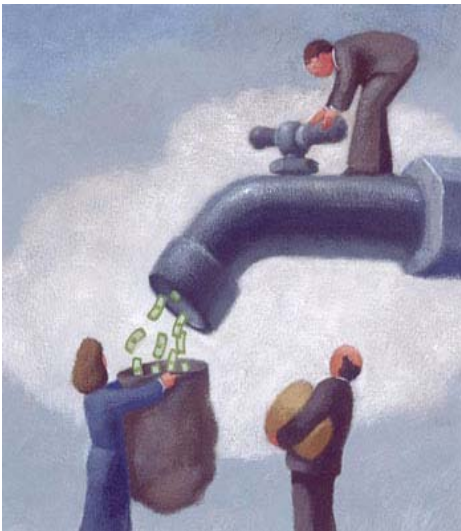
PG&E Program →	Customer-Side Solar Incentive Programs			Net Energy Metering (NEM)	Renewables Feed-in Tariff (FIT)	PG&E 500-MW PV Program *	Annual Renewables Request for Offers (RFO)
	California Solar Initiative (CSI)	Low-Income CSI Programs	New Solar Homes Partnership (NSHP)				
What is it?	An incentive program for customer-side solar, designed to help customers reduce on-site load	Incentive programs for customer-side solar specifically for low-income applications	An incentive program for customer-side solar for new residential developments	A tariff that permits customers to “bank” solar electricity produced that is in excess of instantaneous consumption	A multi-year standard contract with PG&E to provide renewable generation up to 3 MW	A program to install 250 MW of utility-owned solar and 250 MW of contracted solar (procured by PG&E via PPAs)	PG&E purchases eligible renewable energy resources to meet CA-mandated Renewable Portfolio Standard (RPS) goals, typically via Power Purchase Agreements (PPAs)
Customer- or utility-side?	Customer-side	Customer-side	Customer-side	Customer-side	Utility-side	Utility-side	Utility-side
Eligible participants	PG&E customers	PG&E customers	Housing developers in PG&E territory	PG&E customers	Renewable generators	Interested bidders	Interested bidders
Eligible system sizes	1 kW – 1 MW	1 kW – 1 MW	1 – ~5 kW	1 kW – 1 MW	Up to 3 MW	~1 to 20 MW	> 1.5 MW
Financial opportunity	Incentives from \$1.10 – 1.85/W (one-time, up-front payment) or \$0.15 – 0.26/kWh (paid monthly for 5 years)	Incentives vary; up to entire cost of PV system	\$2.50/W - \$3.60/W, depending on home’s efficiency	Retail rate for electricity supplied to grid; annual true-up period (no net export)	~\$0.10/kWh times adjustment (ranges from ~0.7 to 2.6)	~\$0.25/kWh times time of delivery adjustment	Varies
References	www.pge.com/csi www.gosolarcalifornia.com www.csi-trigger.com	www.pge.com/lowincomesolar www.gridalternatives.org/sash	www.gosolarcalifornia.org/nsdp/index.html	www.pge.com/gen	www.pge.com/b2b/energysupply/wholesaleelectric-suppliersolicitation/standardcontractsforpurchase/index.shtm	docs.cpuc.ca.gov/published/proceedings/A0902019.htm	www.pge.com/renewablesrfo/

Focus of presentation

* If approved by the CPUC. Application filed on 2/24/09; anticipating CPUC decision in Q1 2010)



Customer-side Incentives and Other Financial Opportunities



- **CSI – California Solar Initiative**
- **NSHP – New Solar Homes Partnership**
- **MASH – Multifamily Affordable Solar Homes**
- **SASH – Single Family Affordable Solar Homes**

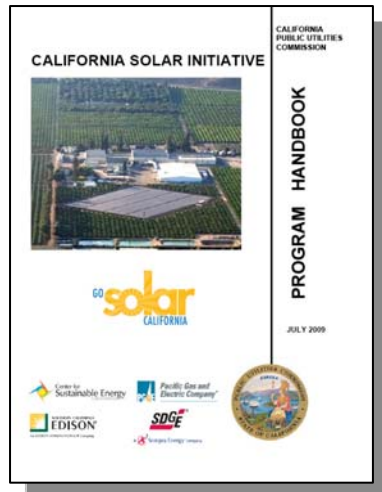
- **NEM – Net Energy Metering**

- **Local Incentives and Financing Opportunities**
 - San Francisco
 - Berkeley (Berkeley First)
 - Sonoma (SCEIP)

- **Federal ITC / Depreciation**



California Solar Initiative (CSI)



- Provides incentives for solar system installations to customers of PG&E, SCE, and SDG&E
- \$2B incentive program with a goal of 1,750 MW of installed PV capacity
- Current CSI program statistics for projects in PG&E service territory*:
 - Completed projects: ~ 14,000
 - PV capacity installed: ~ 150 MW
 - Incentives paid: ~ \$300,000,000
- Eligibility requirements
 - System must be grid-connected
 - System must be > 1 KW and < 5 MW**
 - Designed to offset customer load
 - For installations on existing / new construction facilities

* As of 11/11/09. Data source: PG&E CSI Program Statistics website: www.pge.com/myhome/saveenergymoney/solarenergy/csi/csiprogramstatistics/index.shtml

** System can be up to 5 MW, but incentive is only provided for up to 1 MW.



California Solar Initiative (CSI) (cont'd)

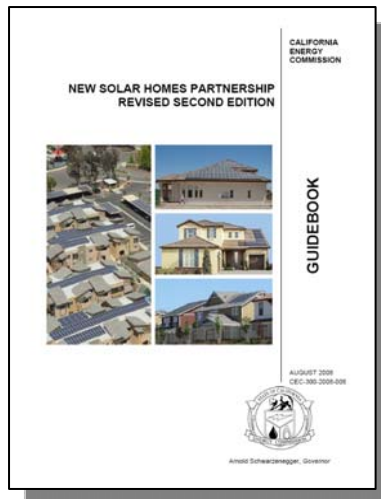
- Incentive types and amounts

	Expected Performance-Based Buydown (EPBB)	Performance-Based Incentive (PBI)
Payment basis	PV system size and design (expected production)	PV system actual energy output
System size	< 50 kW	Any
Payment frequency	One time, up-front	Monthly for 5 years
Incentive amount*	\$1.10 - \$1.85 / kW	\$0.15 - \$0.26 / kWh

* Values as of 12/16/09 for PG&E territory. Values vary by sector and CSI MW step. Visit www.csi-trigger.com for up-to-date incentive rates.



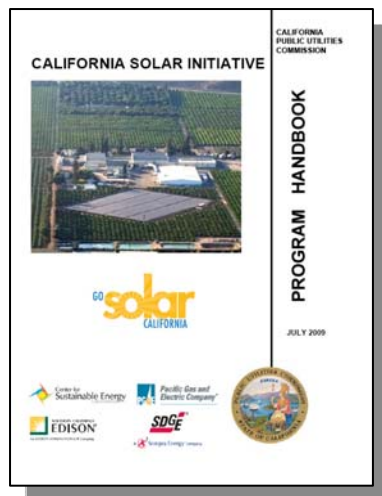
NHSP – New Solar Homes Partnership



- **Only For New Residential Home Construction**
 - Builders
 - Developers
 - Custom home owners
- **Aims to install 400MW**
- **Incentive budget is \$400MM**
- **One time, upfront, expected performance based incentive (EPBI)**
- **PV system size 1kW AC or larger (>5kW requires justification)**



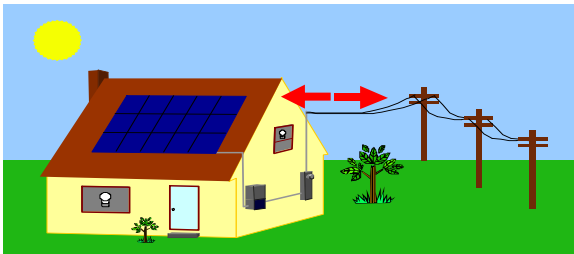
MASH and SASH



- **Designed to encourage solar adoption for low income housing residents**
- **MASH**
 - Administered by PG&E
 - \$108MM available for incentives
 - Track 1a: \$3.30/Watt for systems that offset common load
 - Track 1b: \$4.00/Watt for systems that offset tenant load
- **SASH**
 - Administered by Grid Alternatives
 - \$108MM available for incentives
 - Very low income customers may receive a 1kW fully subsidized (up to \$10,000) system



Net Energy Metering (NEM)

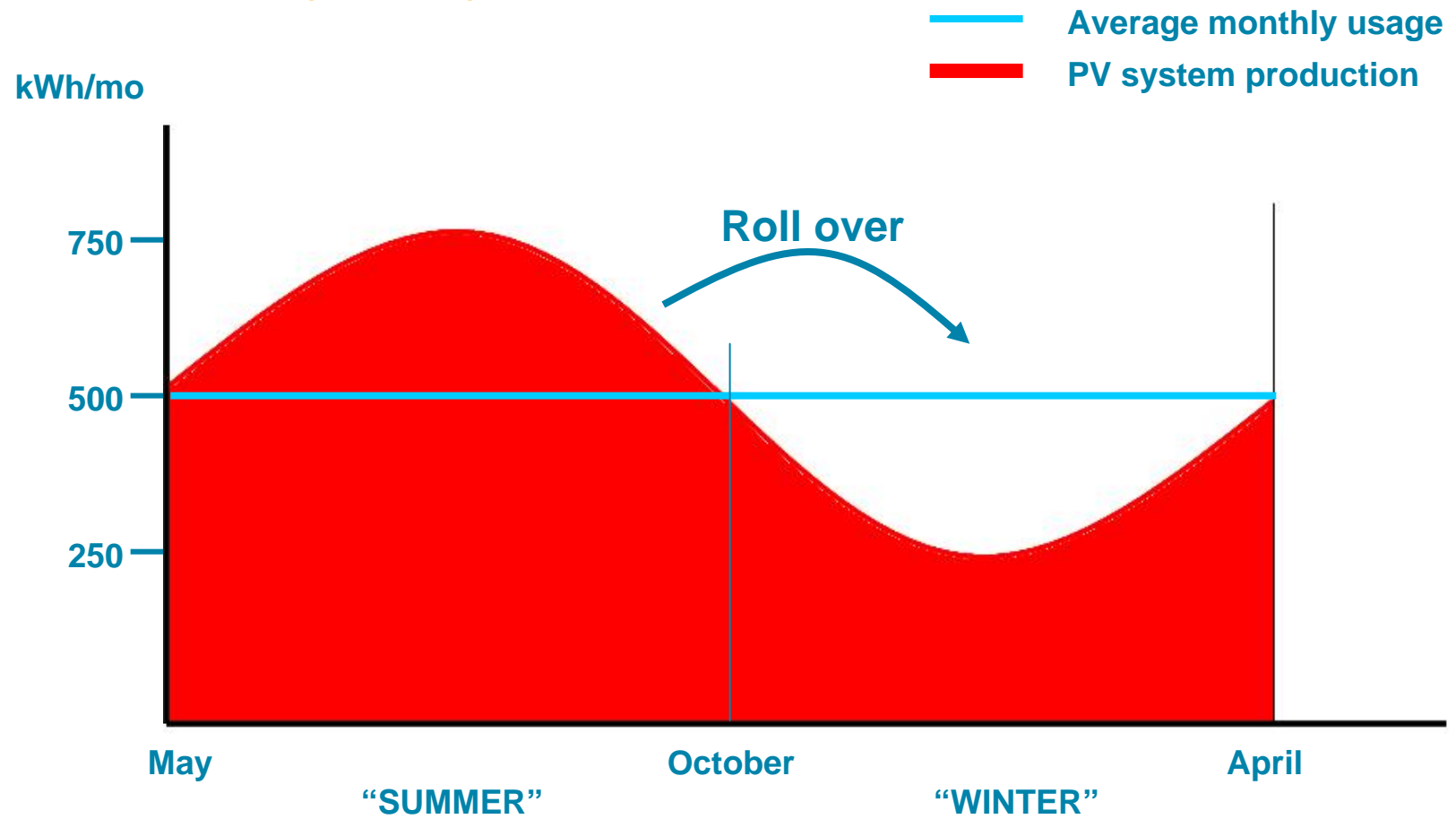


Source: Andy Black

- Complements the CSI program
- Permits customer to offset the cost of electrical usage by when exporting electricity to the grid
 - Credit at retail rate
 - Grid acts as “battery”
- Credits can be carried over month-to-month
 - Annual true-up
 - CSI program requires that system be sized to facility load (or less)
 - AB 920 requires that excess generation (kWh) be compensated (details pending)



Net Energy Metering (NEM) (cont'd)





Other Solar-related Financial Opportunities

- **Local government grants and loans**
 - Opportunities vary by locality
 - Examples:
 - San Francisco incentive
 - Berkeley financing program
- **Solar Investment Tax Credit***
 - Went into effect January 1st 2009
 - Available for next 8 years (through 2016)
 - 30% of net solar system cost
 - No monetary cap
 - Applies to residential & commercial
- **Bonus Depreciation***
 - Applies to commercial system owners Only
 - Benefits extended for systems installed in 2009
 - Benefits will continue for systems installed 2010 with reduced depreciation allowances



**All tax related statements are designed to inform and not to be construed as tax advice. Please consult a tax attorney to determine applicability for a particular project.*



Certification Requirements – *Contracting*



Certification Requirements – Contracting

- **Contractor business licensing**
 - To be eligible for CSI incentives, solar systems must be installed by contractors with an appropriate of California contracting license:
 - A, B, C-10, or C-46
 - Contracting licenses can be obtained through the California State License Board (CSLB)
 - www.cslb.ca.gov
 - Classes are available from a variety of sources
- **Employee licensing/certification**
 - The *North American Board of Certified Energy Practitioners* (NABCEP) offers certifications and certificate programs to renewable energy professionals throughout North America
 - Not required for individuals, but considered a “plus”
 - Example: NABCEP Solar PV Installer Certification
 - Local workforce development programs may also train qualified individuals
 - Example: San Francisco, Richmond



Certification Requirements – *Equipment*



Certification Requirements – *Equipment*

Product certification

- To be eligible for CSI incentives, all major equipment must be on the CEC eligible equipment list
 - PV modules
 - Inverters
 - Meters (for performance monitoring)
 - www.gosolarcalifornia.org/equipment/index.html
- This website also contains instructions for adding new equipment to the eligible equipment list



System Monitoring Requirements



Performance Monitoring and Reporting Service (PMRS)

- Service that provides system performance information and/or alerts to customers
- Required for eligibility under the California Solar Initiative (CSI) Program
 - Exempt for some Expected Performance Based Buydown (EPBB) customers if over the cost cap
 - Required for Performance Based Incentive (PBI) customers
- PMRS meters and providers must be listed by the CEC to be eligible



Performance Monitoring and Reporting Service (PMRS)

- Benefits of PMRS
 - Real time monitoring and alerts
 - Simple web based views
 - Downloadable data for consumption
 - Tracking of power production and usage, both real time and historical data
 - Reduce long term operations and maintenance costs
 - Optimize energy production
 - Increase return on investment (ROI)



Can add to system cost but some companies offer it as part of standard package.



Permitting and Interconnection Requirements



System Permitting Requirements

- **Solar energy systems must meet applicable local (city, county) building and electrical codes**
 - **Can vary significantly by locality**
 - **Associated fees can also vary**



Interconnection with PG&E

- The system can't be turned on until PG&E's Interconnections department approves the project
 - PG&E's Generation Interconnection Services (GIS) facilitates the interconnection process
- Systems under 30 kW go through a streamlined (i.e., easier) interconnection process
- For Net Energy Metering (NEM) projects, interconnection requirements of "Rule 21" must be met
 - Rule 21: <http://www.pge.com/tariffs/pdf/ER21.pdf>
 - GIS facilitates meeting these requirements
- Interconnecting equipment must be certified to applicable standards
 - Example: Inverters must be certified to UL 1741
- GIS contact information: gen@pge.com, 415-972-5676



Purchase/Financing Options



Purchasing Options

- **Cash / Financing**
 - Financing may be available through locality
- **Power Purchase Agreement**
 - Third Party owns system and is responsible for financing, designing, installing, monitoring and maintaining for the customer
 - No upfront fee required from customer
 - Customer purchases electricity (kWh) the system generates at contracted rates
 - Customer may purchase system after contract expires
 - Contracts are typically 20 to 25 years
 - RECs (Renewable Energy Credits) are claimed by third party
- **Lease To Own**
 - Third Party owns system and is responsible for financing, designing, installing, monitoring and maintaining for the customer
 - Customer typically pays a small upfront fee
 - Customer enters into a lease agreement
 - Significant reduction in electricity bill
 - Contracts are typically ~10 years
 - Leases may have annual built-in increases – typically not exceeding increases of electricity rates



Tying it Together



Necessary Project Steps

- To complete a solar contracting job in a timely, cost-effective manner, it's necessary to effectively coordinate the various phases/steps of the process, including:
 - Secure financing (if necessary)
 - Secure labor force (if contracted per job)
 - Acquire CSI-eligible PV equipment
 - Plan city/county building/electrical inspections
 - Obtain PG&E permission to interconnect



Additional Resources



Educational Resources

- (Other) classes at PG&E's Pacific Energy Center
 - *Basics of PV Systems for Grid-Tied Application*
 - *PV System Site Analysis and System Sizing*
 - *Understanding Financial Analysis Methods for PV Systems*
 - *Any many others*
- Junior colleges
- UC Extension classes
- NABCEP (for practitioners)
- Other third-party courses and training





Information Resources - Financial

Program/Topics	Resource	Link	Notes
CSI	PG&E CSI website	www.pge.com/csi	PG&E CSI resource
	GoSolarCalifornia website	www.gosolarcalifornia.org	State-wide CSI resource
	CSI Handbook	www.gosolarcalifornia.ca.gov/documents/CSI_HANDBOOK.PDF	Official CSI program rules
	Trigger Tracker	www.csi-trigger.com	Displays current incentive rates
NEM	PG&E NEM website	www.pge.com/gen	
NSHP	PG&E website	www.pge.com/nshp/	Details for applying for NSHP incentives
SASH	SASH website	www.gridalternatives.org/sash	Managed by GRID Alternatives
MASH	MASH website	www.pge.com/lowincomesola	Managed by PG&E
SCEIP	Sonoma County	www.sonomacountyenergy.org/	For Sonoma County specific financing options
EE surveys	California State Government	www.energy.ca.gov/HERS/index.html	For hiring HERS rater
Federal ITC	IRS	www.irs.gov/formspubs/	ITC forms
Incentives	DSIRE database	www.dsireusa.org/solar/	Details for applicable depreciations
Local Municipality Rebates	San Francisco	www.sfwater.org/solarincentive	SF City Rebates
	BerkeleyFirst	www.berkeleyfirst.renewfund.com/	Berkeley's PV financing program
	Sonoma County Energy Independence Program	www.sonomacountyenergy.org	Sonoma's program



Information Resources - Other

Program/Topics	Resource	Link	Notes
Solar Industry Associations and Advocacy Groups	CaISEIA	www.calseia.org	California Solar Energy Industries Association
	SEPA	www.sepa.org	Solar Electric Power Association
	Solar Alliance	www.solaralliance.org	
	SolarABCs	www.solarabcs.org	Solar America Board for Codes and Standards
	VoteSolar	www.votesolar.org	
Practitioner Training	NABCEP	www.nabcep.org	North American Board for Certified Energy Practitioners
PG&E Classes	PG&E Classes	www.pge.com/solarclasses	Free classes available on a multitude of solar and solar-related topics



Thank you!

Your thoughts?

- Suggestions for future content?
- Opinions on content and delivery?
- Topics to emphasize or de-emphasize?
- How can we provide a better service?



Feedback is welcomed!

mgh9@pge.com