



Get a Solar Home Now:

How Installing Solar Can Power the World

Presented by

Craig Rush

American Solar Energy
Society

City of Foster City Environmental Sustainability Task Force

"Go-Green" Speaker Series, May 18, 2011

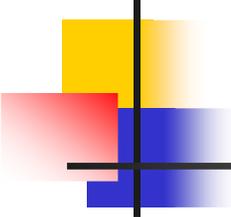
gogreen@fostercity.org

From the City of Foster City &
ESTF's Go Green Event 5/18/11



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Solar Energy – 2 Types

Solar Thermal

Heat Energy

Solar Electric

Electric Energy

Photovoltaic

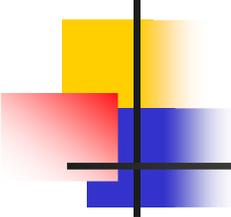
PV

(Photons)

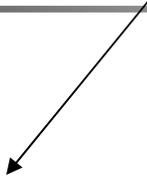


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Solar Thermal Applications

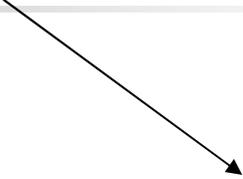


Solar Pool Panels

Swimming Pools

Radiant Heat

Hot Tubs



Solar Hot H₂O

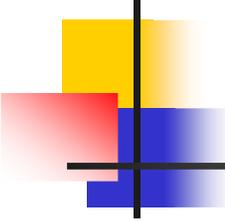
Domestic Solar Hot Water

DSHW



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Passive Solar Hot Water

- Seamlessly hooks into existing water circuit
- No Moving Parts
- Low Profile – Not Visible
- Several Sizes Available
- 30% Federal Tax Credit
- PGE rebate ~ \$1000



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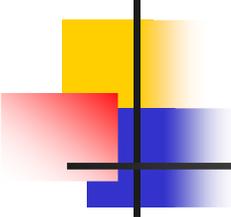
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Installed Solar Hot Water



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Solar Thermal Pool Systems

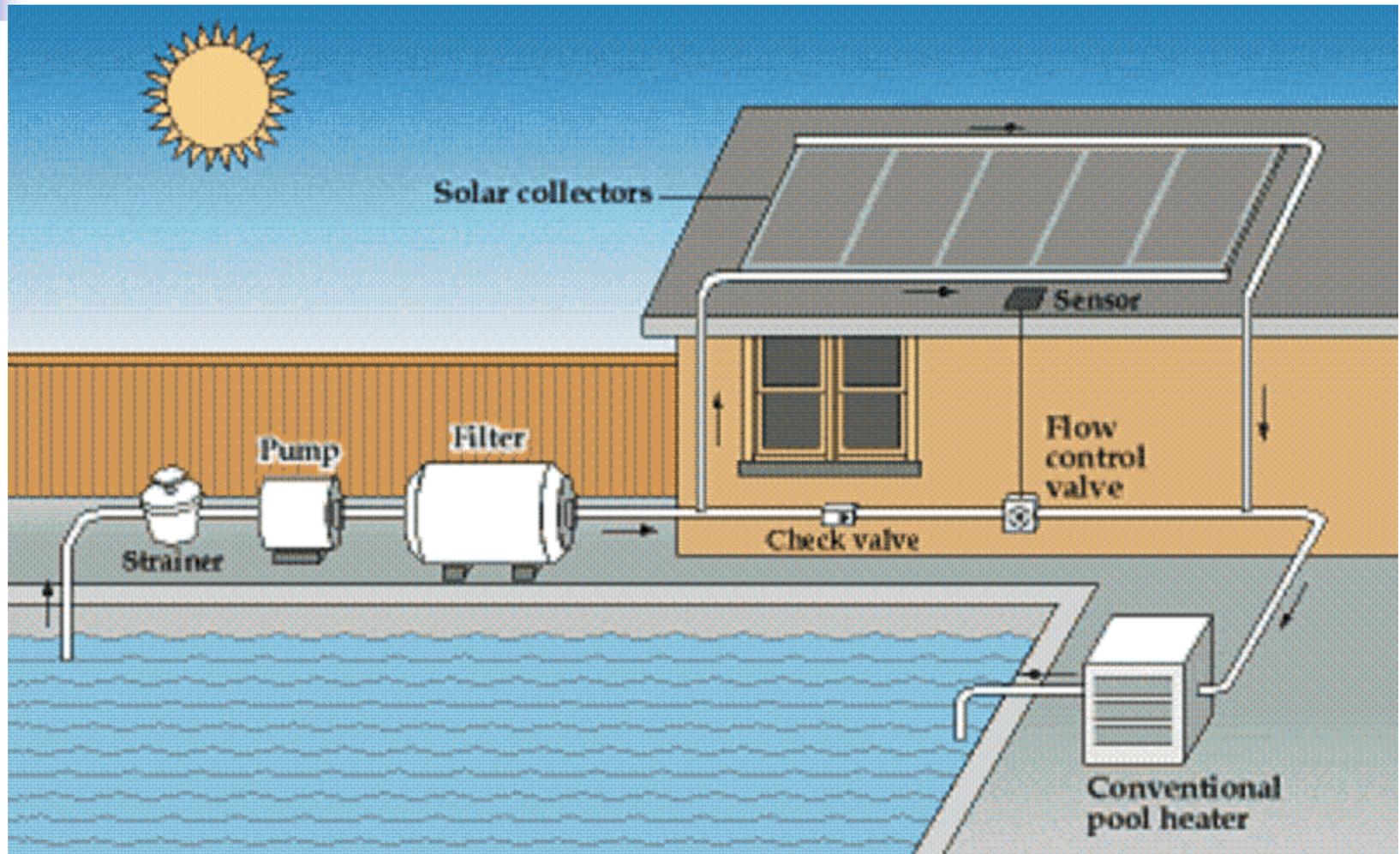
- Captures Thermal Energy (Heat) from Sun
- Reduces \$500/Month gas Bill to \$0
- Integrates into Pool Pumping System
- Maintains Comfortable (Mid-80's) Swimming Temperature
- Extends Swimming Season May to Mid-Oct

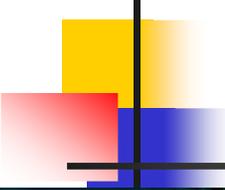


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Solar Pool Heating



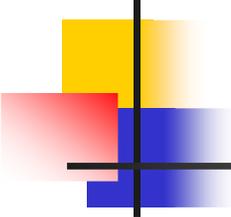


Solar Pool Installation



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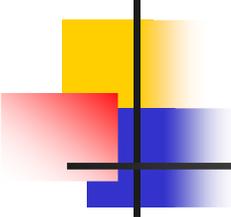
Solar Electric (PV)

- What's all the Buzz?
 - Eliminate Electric Bill
 - Proven Technology
 - 25 Year Warranty, 40+ year life
 - Huge Environmental Benefits
 - Buy Your Electricity – Stop Renting it



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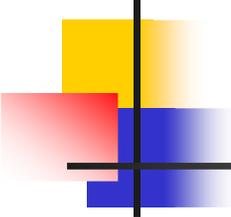
Electricity Terminology

- 1 watt = enough energy to light a match
- 1,000 watts = Kilowatt (**kW**)
- 1,000 watts for an hour is a kilowatt-hour, **kWh**
- Running a 3500-watt air conditioner for an hour is 3.5 kWh.
- 1,000 kW = 1 Megawatt (**MW**)



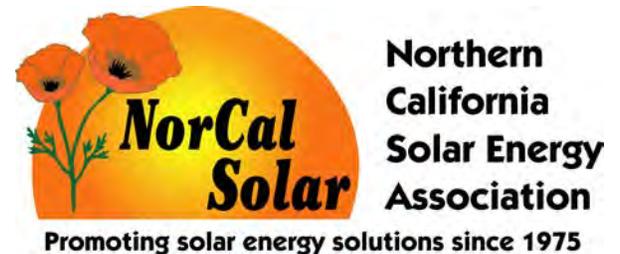
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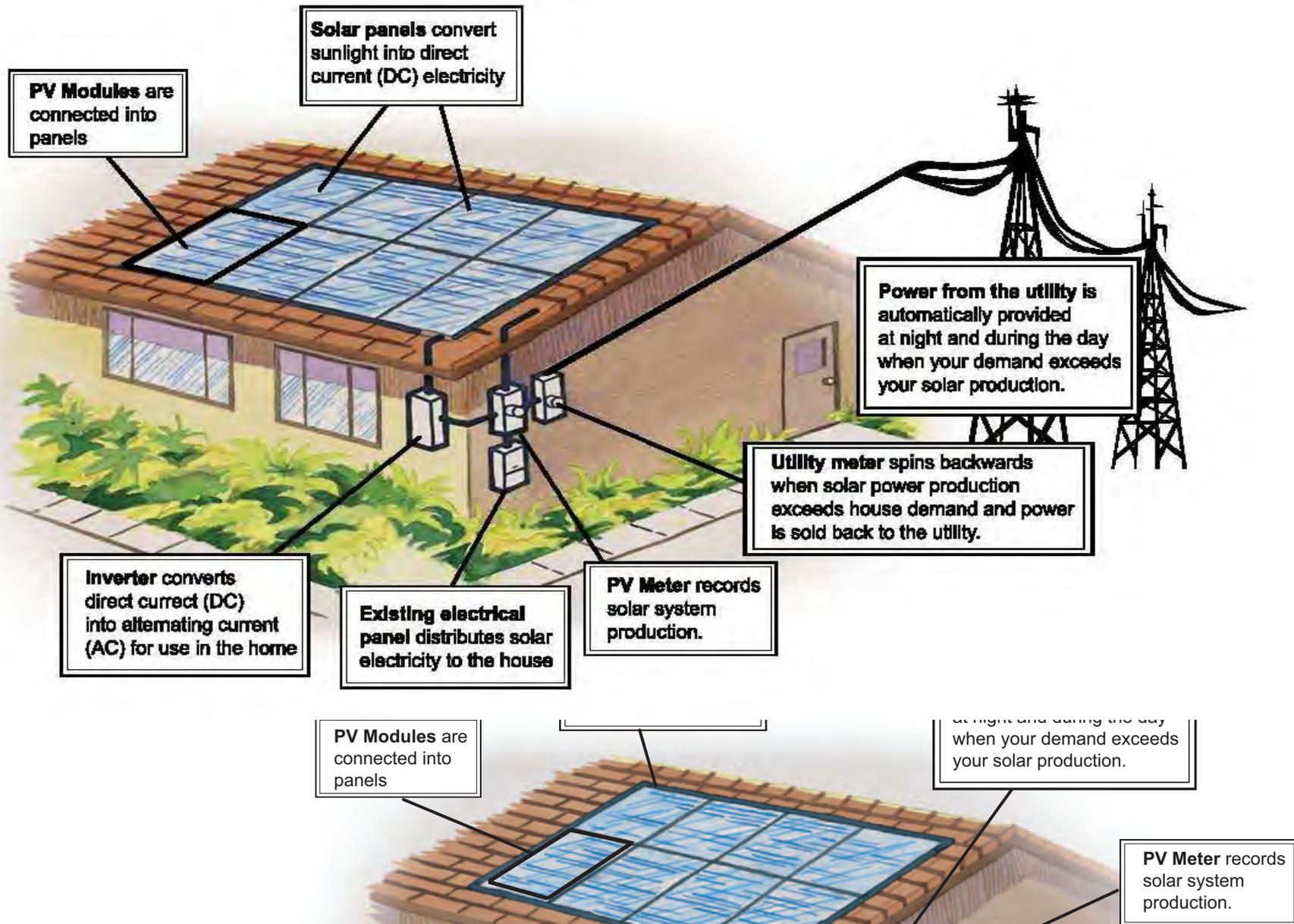
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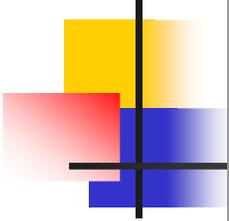


Energy Use in Context

- The average U.S. household used approx. 888 kWh per month. (Dept. of Energy, 2001)
- Ave. PGE Customer = 750kWh per month.
- In CA 1 kWh = 1.5 pounds of CO2 emissions.

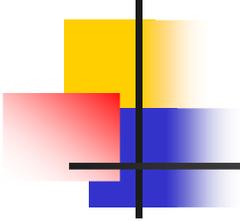






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**NorCal
Solar**

**NORTHERN
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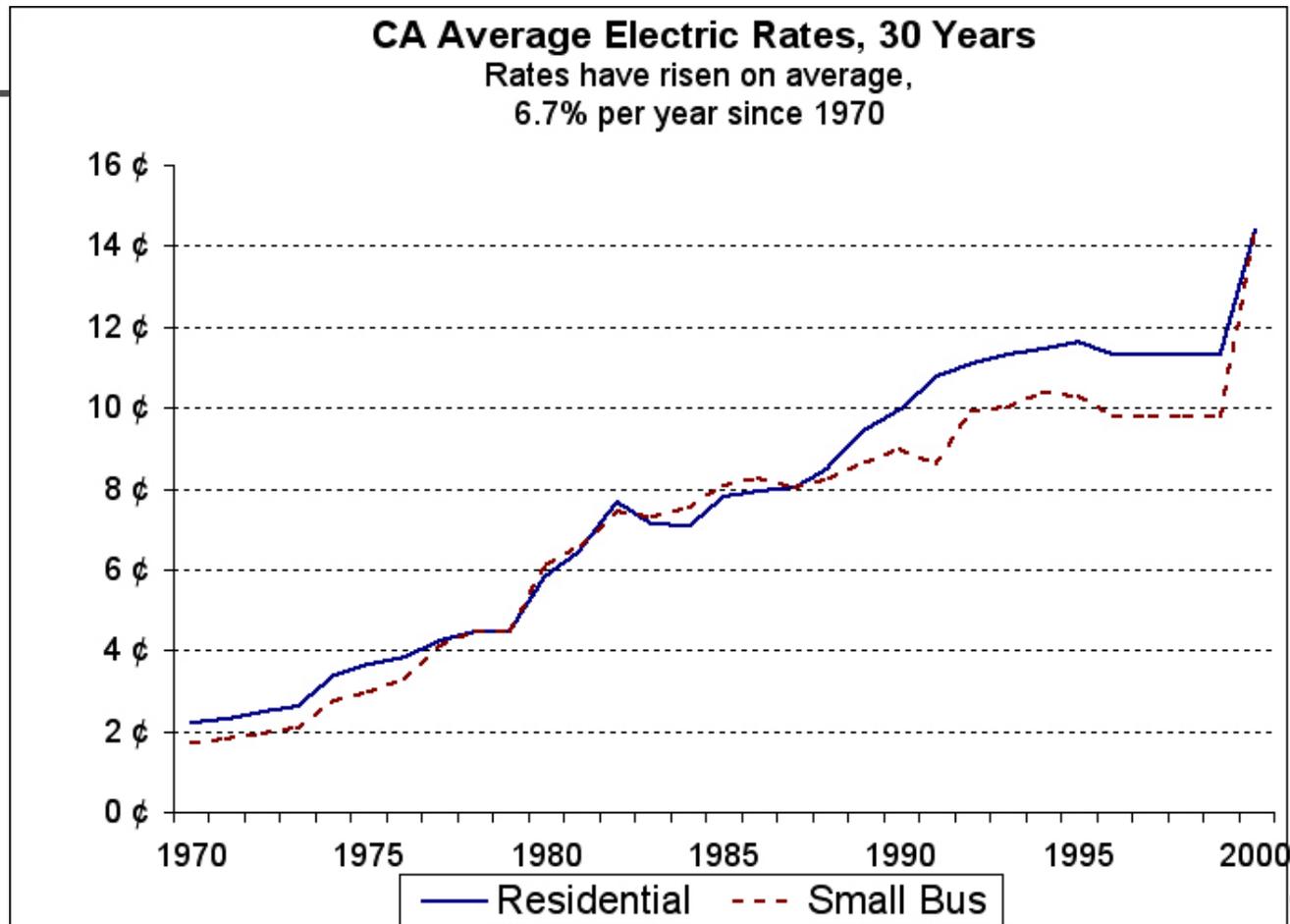
Solar Arbor



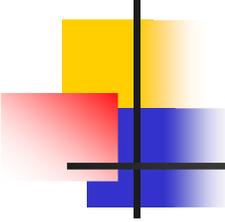
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Ca Average Electric Rates



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What Makes Solar Work?

- Net Metering

- Retail Credits for Solar Generation

- Account settled annually – True up bill.

- Accumulate Debits/Credits throughout year

- TOU Rate Schedule

- Rate based on time of day when energy is used

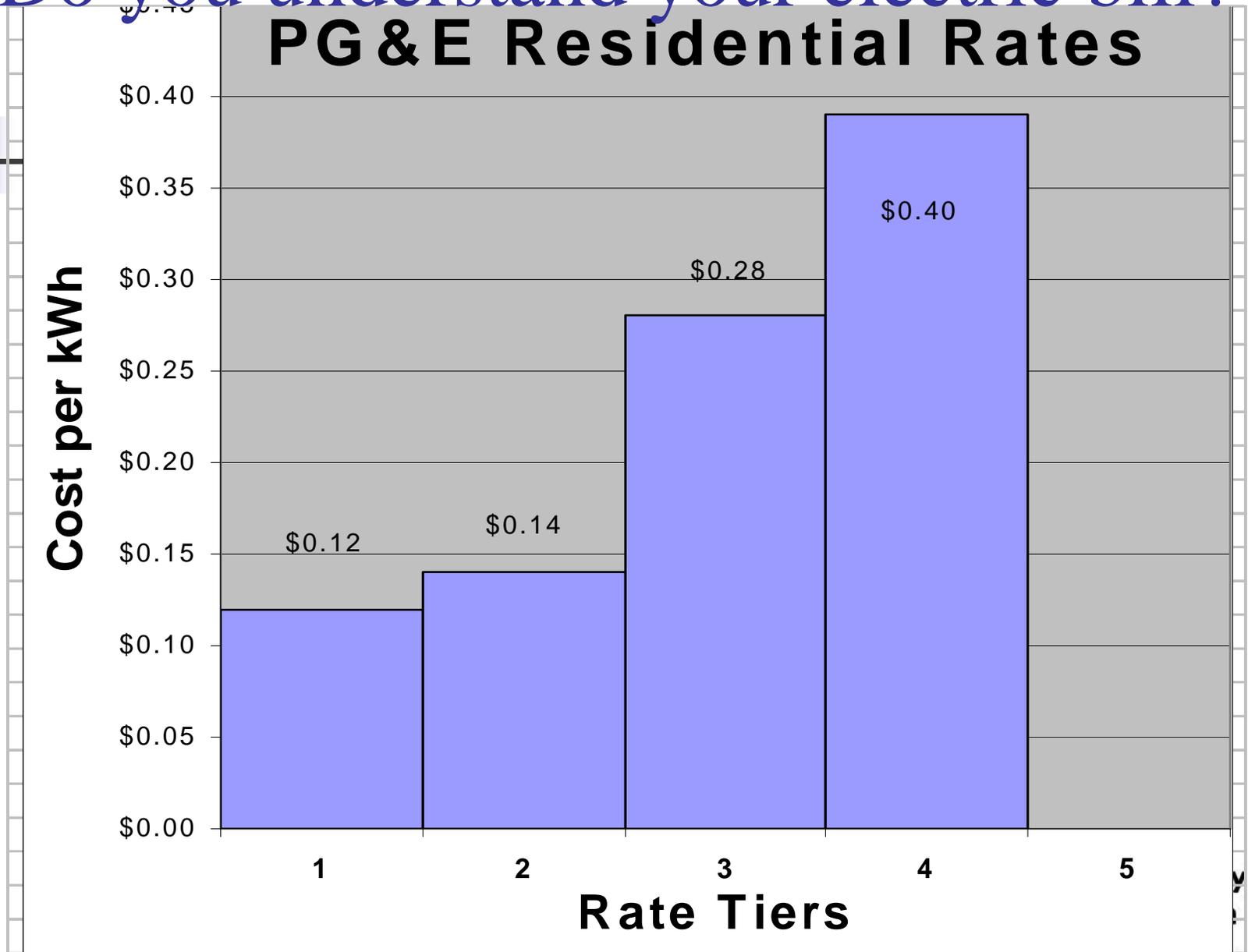
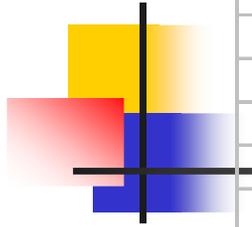
- Sell High / Buy Low



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Do you understand your electric bill?



Do you understand your electric bill?

Summer baseline individually metered (11.9 kWh per day for Territory X) :

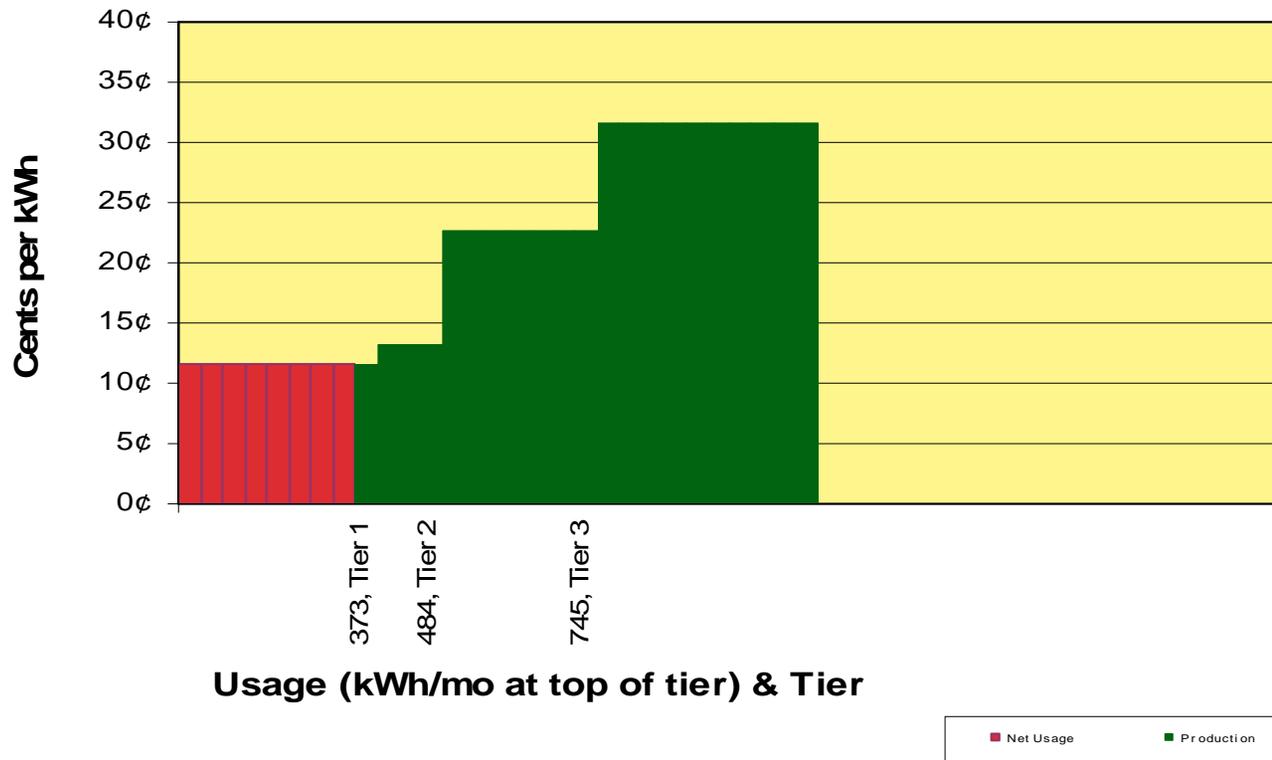
\$0.12	Tier 1: Baseline		up to \$44	367kWh
\$0.14	Tier 2: 101 - 130% of Baseline		\$45 - \$58	368-477 kWh
\$0.28	Tier 3: 131 - 200% of Baseline		\$59 - \$132	478-733 kWh
\$0.39	Tier 4: 201 - 300% of Baseline		over \$133	734+kWh



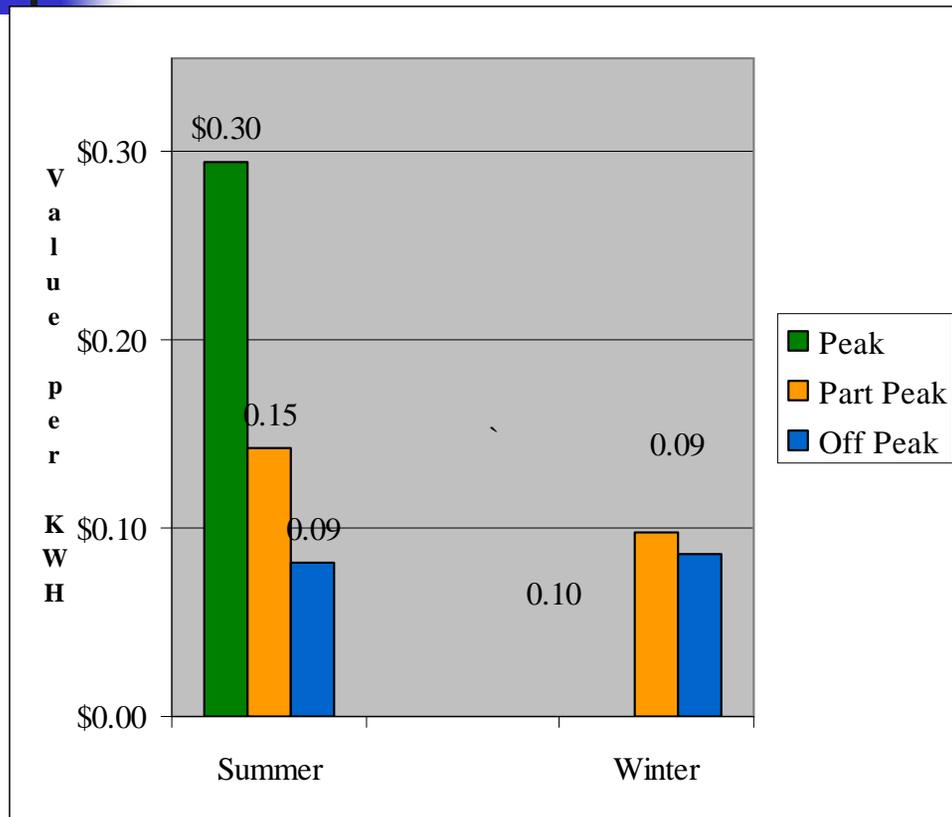
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PG&E Tiers After Solar

Residential Tiered Usage With Solar



PG&E Solar E6 Rate Schedule



Summer
Peak: 1-7pm, M-F

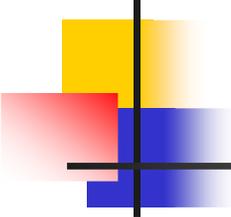
Partial-Peak: 10am-1pm &
7pm-9pm M-F

Off-Peak – all other times



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What does TOU do for YOU?

- Sell High – Buy Low
- Smaller system sizes
 - About 75%



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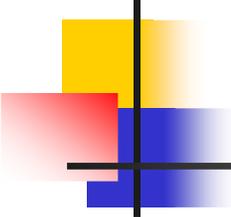
Typical Cost Detail 5kW AC

Gross Cost	\$7.50	5,000	\$37,500
Rebate	/AC watt	\$0.35	\$1,750
Net Cost			\$35,750
Tax Credit	30%	After CSI	\$10,725
NET	\$5.01		\$25,025
Discount	/AC watt		33%



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Energy Use

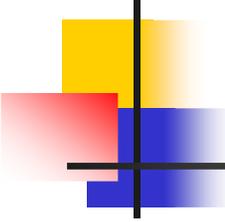
Determined by:

- Habit
- Number of Occupants
- Building Envelope



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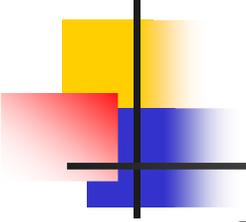
Reduce Then Produce

- Solar Knocks off High-Tiers First
- Insulation
- Double-Pane Windows
- Phantom Loads
- Energy Upgrade CA
 - Rebates for reducing the energy envelope



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Environmental Benefits

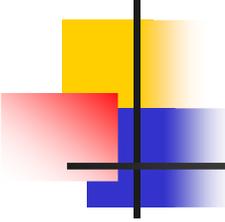
Quiet, benign, no moving parts, no mortality from operations

- Pollutants avoided (CO, CO₂, NO_x, SO₂, HC, PM, etc.) – protecting air, climate.
- No water needed to operate (21 gal./kWh is grid average).



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Environmental Benefits (cont.)

- Lessens demand to build and operate Dams, Natural Gas, Coal and Nuclear power plants.
- Reduces need to process and dispose of nuclear fuel & waste.
- Reduces need to drill for natural gas and transport it to market.
- Lowers harmful coal mining operations.



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Solar Benefits

- Distributed, reduces peak demand, transmission bottlenecks.
- Independent from 2001 electricity crisis debt and future price hikes and supply problems.
- Grid-tied systems automatically shut down during a power outage (as required by law).
- High quality modules (25 year warranty) - withstand 1" hail.



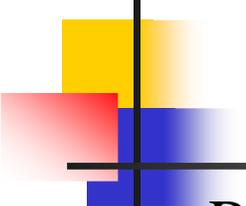
Solar Related Benefits

- Attractive when installed at roof pitch (fair comparison are to alternatives).
- Shades roof, helps cool house.
- Helps California achieve RPS 20% RE by 2010 & 80% greenhouse gas reduction goal by 2050!



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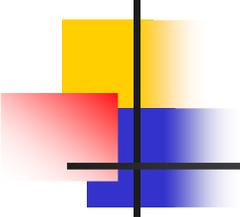
Important Solar Benefits

- Rising electric costs are avoided
- Solar costs less up front, when financed
- Investment recouped upon sale of home
- Savings grow over time
- Helps to insure human's long-term success



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Solar Benefits

- Yield comparable to high yielding investments.
- Virtually no maintenance, keep panels clean.
- No training needed to operate, fully automatic.
- Creates jobs, saves PV owners money and builds wealth using local photons .



When Hiring a PV Contractor

1. Turnkey vs. unbundled services
2. Get recommendations from *most recent* customers
3. Hire a trained PV contractor; make sure their *contractors license* is up to date and there are no complaints outstanding on their record.
4. Get estimates in writing
5. Confirm warranty is 10 years on parts and installation
6. Ask about including all permits and rebate paperwork in price of service (e.g. “Turnkey” vs. “a la carte” installation.)
7. For new buildings/remodels – make sure PV installer is connected to other contractors as early possible.



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How to find a PV installer

- www.consumerenergycenter.org
- NorCal Solar members list www.NorCalSolar.org
- CalSEIA members list
- NABCEP certified
- Diamond Certified www.DiamondCertified.org



Remember

- Check the contractors license at the state contractors licensing board
- Make sure they have insurance – or *you* could be on the hook for accidents
- Is this someone you can work with, and you think will be here in 5, 10, 15 years?



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More Information

- GoSolarCalifornia.ca.gov
- Consumerenergycenter.org
- Clean Power Estimator
 - <http://www.consumerenergycenter.org>
- Norcalsolar.org
- Votesolar.org



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