



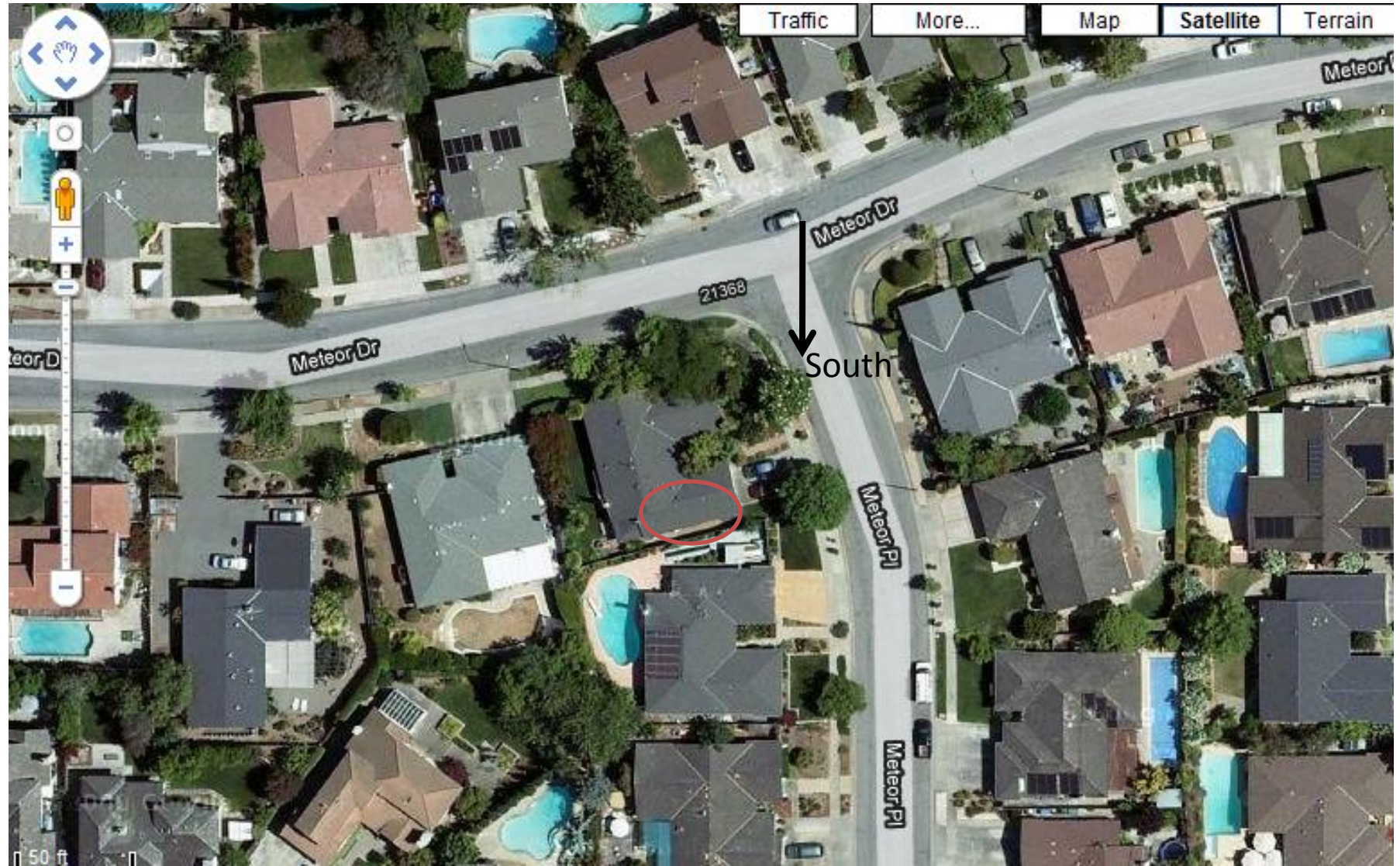
Home Solar Panels in Silicon Valley

Peter Hirsch

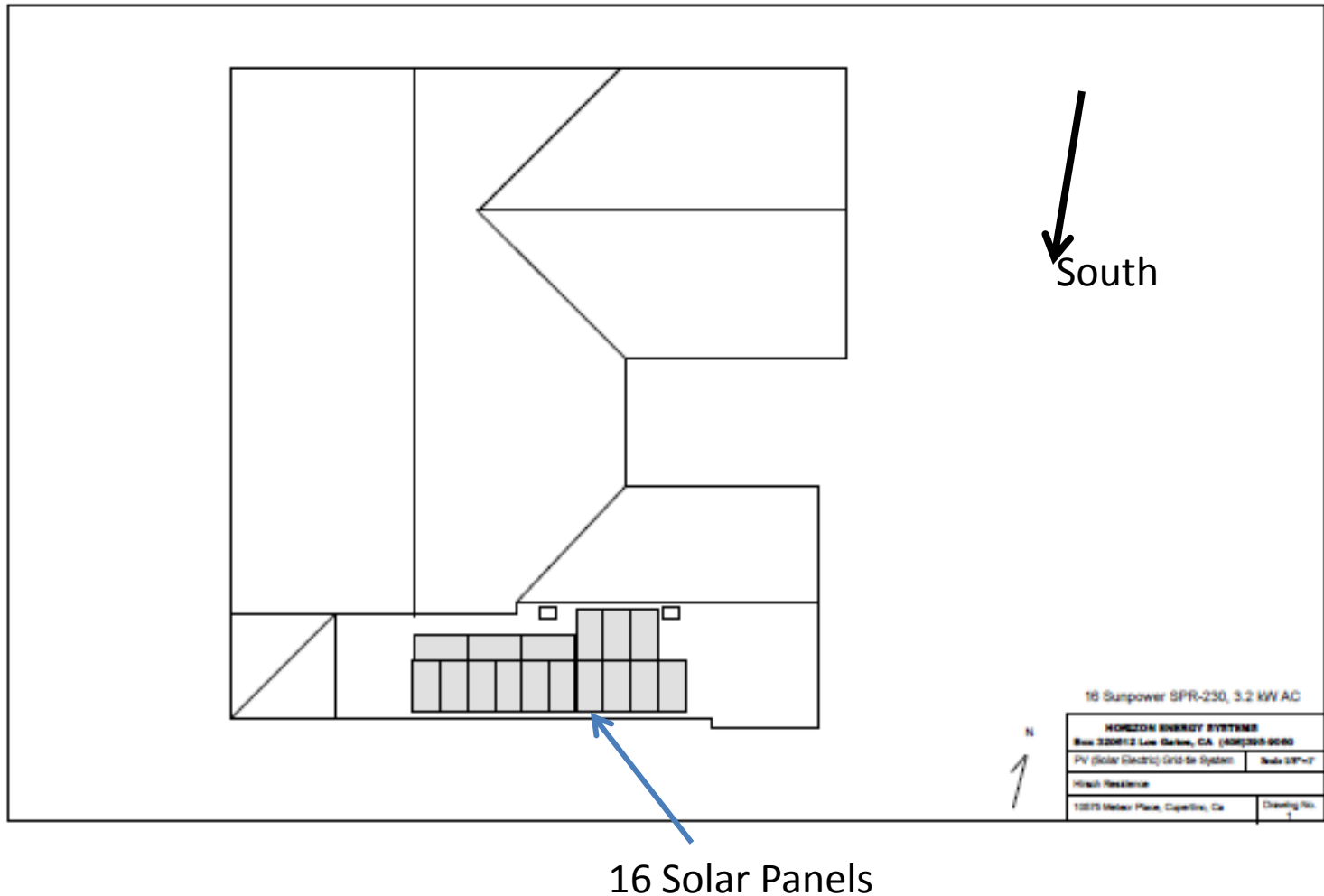
Items to Check Before Deciding on Solar

- How much electric energy am I using?
- How old is my roof? When will it need to be replaced?
- Do I have a roof area facing south preferred (or west) that is not blocked by trees or other structures from the sun?
- Do I have the money to invest in solar?

Location of Solar Panels on House



House Drawing with Solar Panels

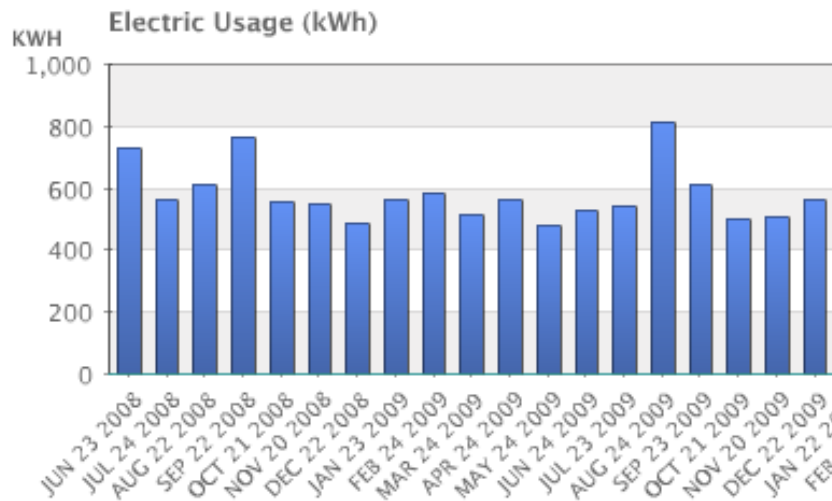


Determining the Size of the Solar System

Bill History Graphs

Account #: 9582735425

Select Graph Electric Usage (



Usage

- Average Monthly Usage 550kWh
- Average Daily Usage 19kWh
- Average Hourly Usage .81 kWh

Generation

- 3.2 kW System can generate
 - 3kW for 4 hours = 12kWh
 - 2kW for 4 hours = 8 kWh
 - 1kW for 2 hours = 2 kWh
- Total = 22 kWh/Day

- 2.7 kW System can generate
 - 2.5kW for 4 hours = 10 kWh
 - 1.8kW for 4 hours = 7.2 kWh
 - 0.8kW for 2 hours = 1.6 kWh
- Total = 19 kWh/Day

Cost to Install

<u>Size</u>	<u>Total Cost</u>	<u>Net Cost</u>
• 2.7 kWh	\$18,948	\$11,482
• 3.2 kWh	\$25,729	\$15,680
• 7.6 kWh	\$49,815	\$29,971

Cost of Solar Panels

Solar Cost Justification

Gross Cost for 3.2 kW solar system	\$25,729.00			
California Rebate \$1.03/watt	\$3,329.00			
Federal Rebate 30% credit on taxes	\$6,720.00			
System cost after rebates an credits	\$15,680.00			
Cost for new Breaker Panel	\$985.00			
Solar System Cost to me after rebates	\$16,665.00			
Lost Investment and Investment Income				
5%, less Taxes 2%=3%/Year	1.03			
	\$17,164.95	Year 1		
	\$17,679.90	Year 2		
	\$18,210.30	Year 3		
	\$18,756.60	Year 4		
	\$19,319.30	Year 5		
	\$19,898.88	Year 6		
	\$20,495.85	Year 7		
	\$21,110.72	Year 8		
	\$21,744.05	Year 9		
	\$22,396.37	Year 10		
	\$23,068.26	Year 11		
	\$23,760.31	Year 12		
	\$24,473.11	Year 13		

Savings Due to Solar Panels

	No Electric Car			Electric Hybrid Car		
Sale of 5kWh power 200 days at .081/kWh	\$81.00	per year		\$0.00	per year	
Total Savings in Utility Bill in 2009	\$956.00	per year		\$875.00	per year	
5% increase in electric rates+usage/year	1.05		1,003.80 Year 2	918.75		
			1,053.99 Year 3	964.69		
			1,106.69 Year 4	1,312.92	Electric car (+\$300/year)	
			1,162.02 Year 5	1,378.57		
			1,220.13 Year 6	1,447.50		
			1,281.13 Year 7	1,519.87		
			1,345.19 Year 8	1,595.86		
			1,412.45 Year 9	1,675.66		
			1,483.07 Year 10	2,059.44	2nd Electric car (+\$300/year)	
			1,557.22 Year 11	2,162.41		
			\$1,635.08 Year 12	\$2,270.53		
			\$1,716.84 Year 13	\$2,384.06		
			\$15,977.61	\$19,690.27		
Appreciation in House value with solar			\$10,000.00	\$10,000.00		
Total Savings			\$25,977.61	\$29,690.27		
Maintenance and Repair costs estimate			\$1,500.00	\$1,500.00		
Net savings after 13 years (break even)			\$4.50	\$3,717.15		

Environmental Savings

Enviromental Savings Estimate over 25 years			
	CO ₂	200,000	lbs
	NO ₂	600	lbs
	Particulants	40	lbs

Solar Panel Timeline

Date	Event
9/01/09	Serious looking at Companies
9/23/09	Estimate Received
1/(12-13)/10	Solar installation, Initial City Inspection
2/25/10	Electrical Sub-Panel fixed
2/25/10	City Inspection approved
3/10/10	PG&E Installed Net Meter

Company Selected

- Sun Power
 - Solar Panels
 - Panel efficiency 18.5%
 - Watts/Panel =250 watts
 - 16 Panels = 4kW
 - Warrantee 25 years
 - Inverter
 - Warrantee 10 years
- Horizon Energy
 - Local Installer
 - Los Gatos, Ca
 - 408-975-0111
 - Warrantee 10 years

Roof Before Solar Panels

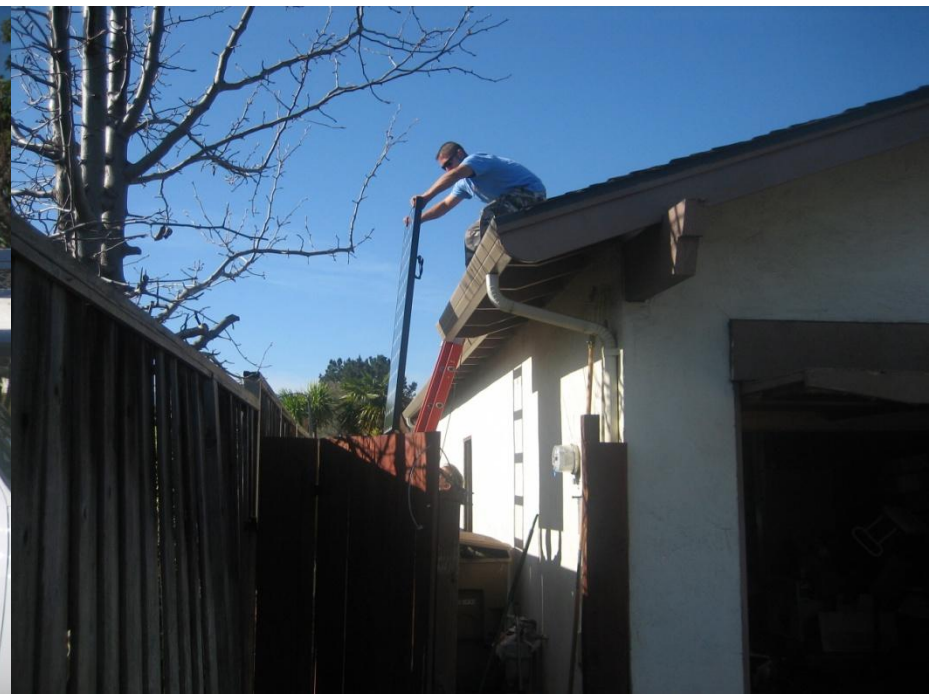
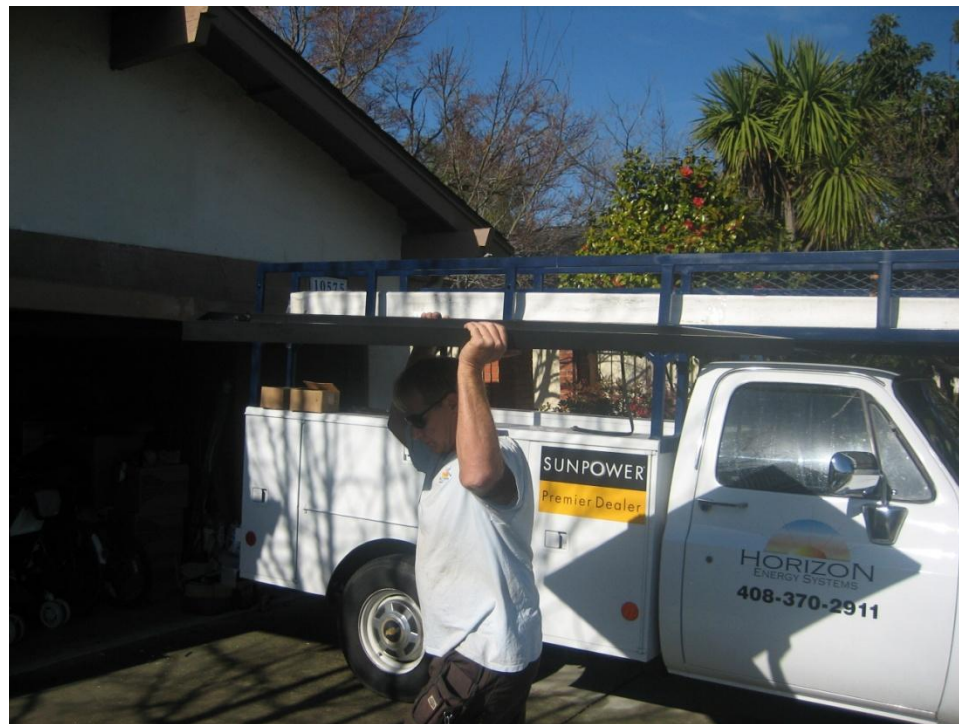


Tree
Removed

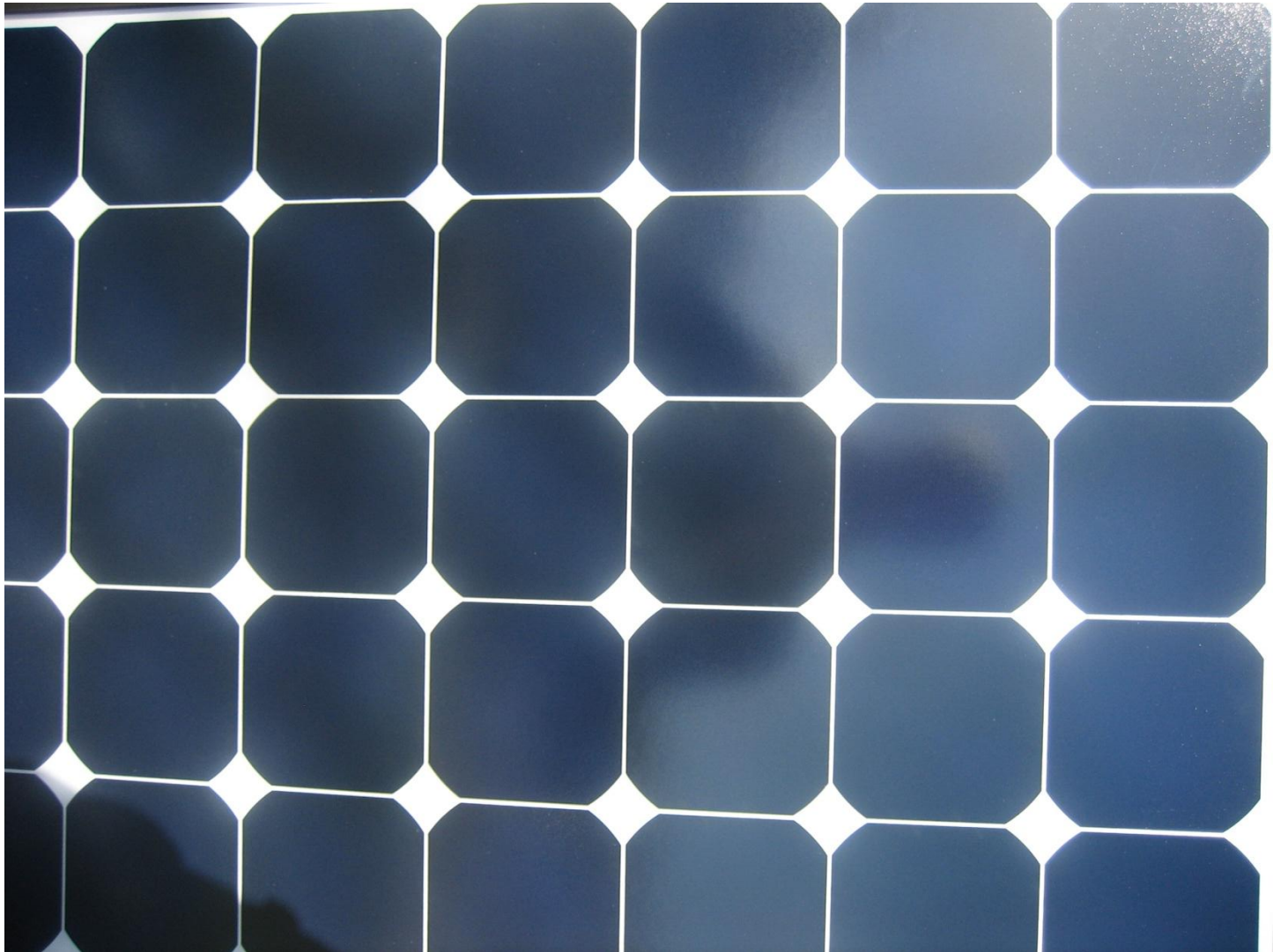
Solar Panels in Boxes



Carry Solar Panels to Roof



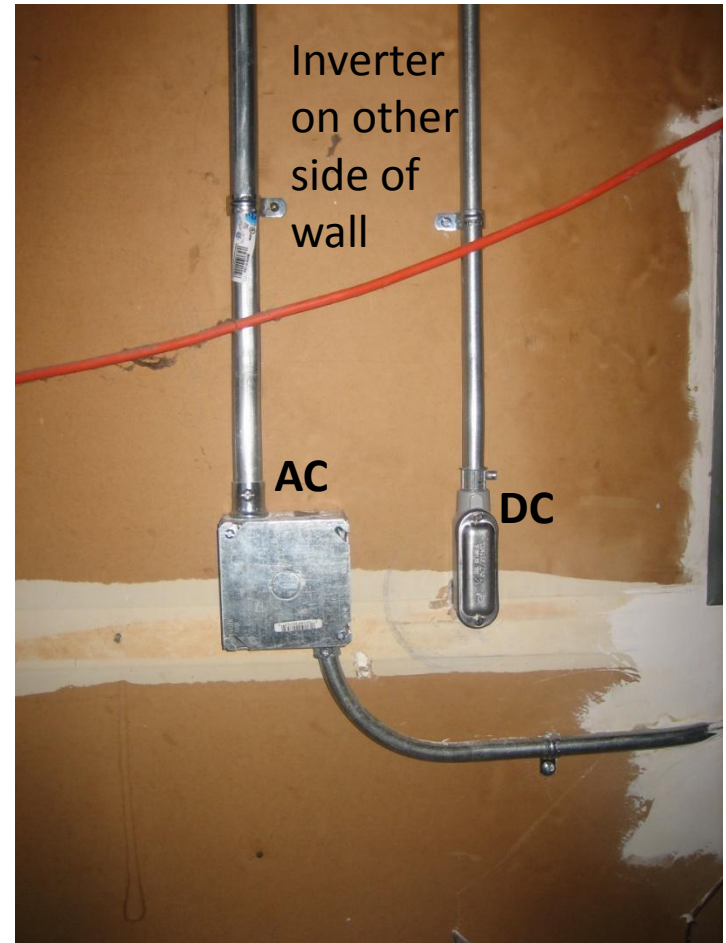
Solar Panel Front



Solar Panel Back



Running DC and AC Lines in Garage



Completed Solar Panel Installation



Inverter

Converts DC to AC

(Mini-FACTS Device)



Inverter
On/Off
Switch

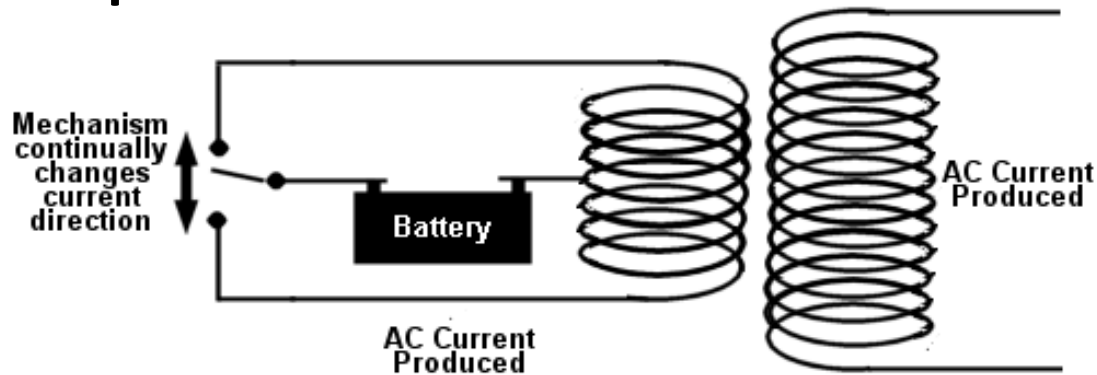
Inverter Showing Solar Generation 5-27-10



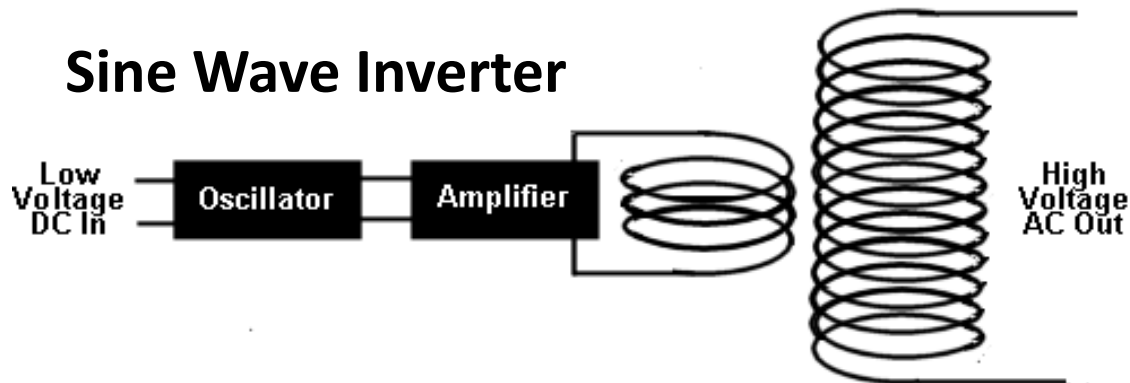
Highest
Value Seen
3720 kW

How Does an Inverter work?

Square Wave Inverter



Sine Wave Inverter



External Circuit Breaker for Solar Panels near Meter



PG&E Permission to Generate



Pacific Gas and
Electric Company®

Generation Interconnection Services

245 Market Street
San Francisco, CA 94105

Mailing Address
Mail Code N7L
P. O. Box 770000
San Francisco, CA 94177

March 15, 2010

Peter M Hirsch
10575 Meteor Pl
Cupertino, CA 95014

Subject: Permission to Operate Account No. 9582735425
Generator Log No. 30S44952
Date of Field Inspection & Authorization: 03/10/2010

Dear Peter M Hirsch:

Thank you for your participation in Pacific Gas and Electric Company's (PG&E) Solar and Net Energy Metering (NEM) Program. You're now interconnected to PG&E's electric grid and ready to experience the benefits of renewable energy. Your recent solar installation represents one of nearly 30,000 interconnections by customers across our service area - almost half of the residential installations across the nation.

This letter confirms you have "Permission to Operate" your 4 kW photovoltaic generating system installed at 10575 Meteor Pl, Cupertino, CA, which is connected to PG&E's electric distribution system.

This Permission to Operate is required by PG&E's Electric Rule 21* and your Interconnection Agreement with PG&E. It does not, however, confirm the safety, durability or reliability of your solar generating system. You are responsible for maintaining the safe operation of your solar system.

This Permission to Operate only applies to the system described in your Interconnection Agreement. As part of this authorization, you are also responsible for notifying PG&E if you make any changes to your system.

If you have additional questions regarding the interconnection of your solar system, please contact PG&E's Generation Interconnection Services at 415-973-3003. For billing questions with your new solar system, please contact our Solar Customer Service Center at 1-877-743-4112. For information regarding your California Solar Initiative (CSI) incentive payment, please e-mail solar@pge.com.

Sincerely,

A handwritten signature in black ink, appearing to read 'Mike Handel'.

Mike Handel
Senior Project Manager

**PG&E's authorization for you to operate your solar generating system is subject to all terms and conditions of Rule 21, your Interconnection Agreement and any other applicable rules, tariffs, laws and regulations.*

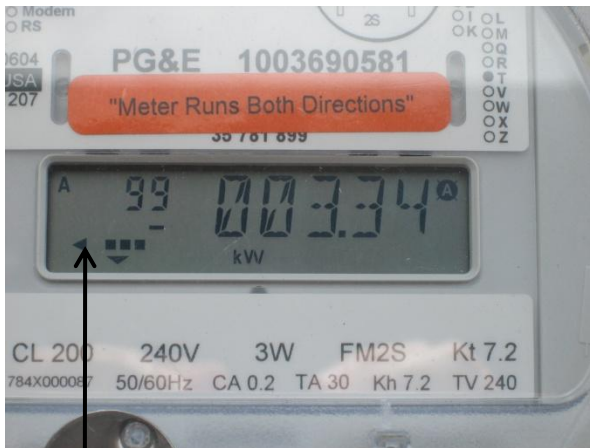
PG&E Net Meter



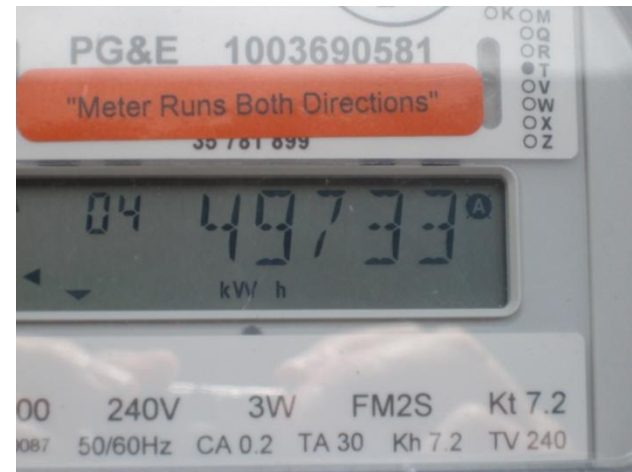
- Meter initially set to 50,000 kWh
- On 3/30/10, produced 59 kWh more power than consumed
- Arrow pointing to the right indicates that power is flowing into the home

Net Meter Results

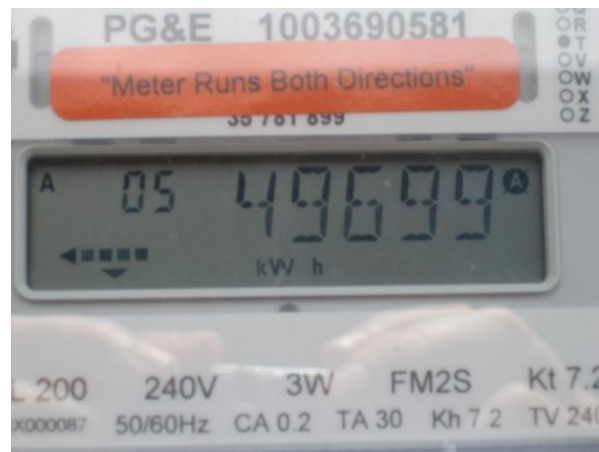
5/27/2010



Flow Out of House 3.34 kW



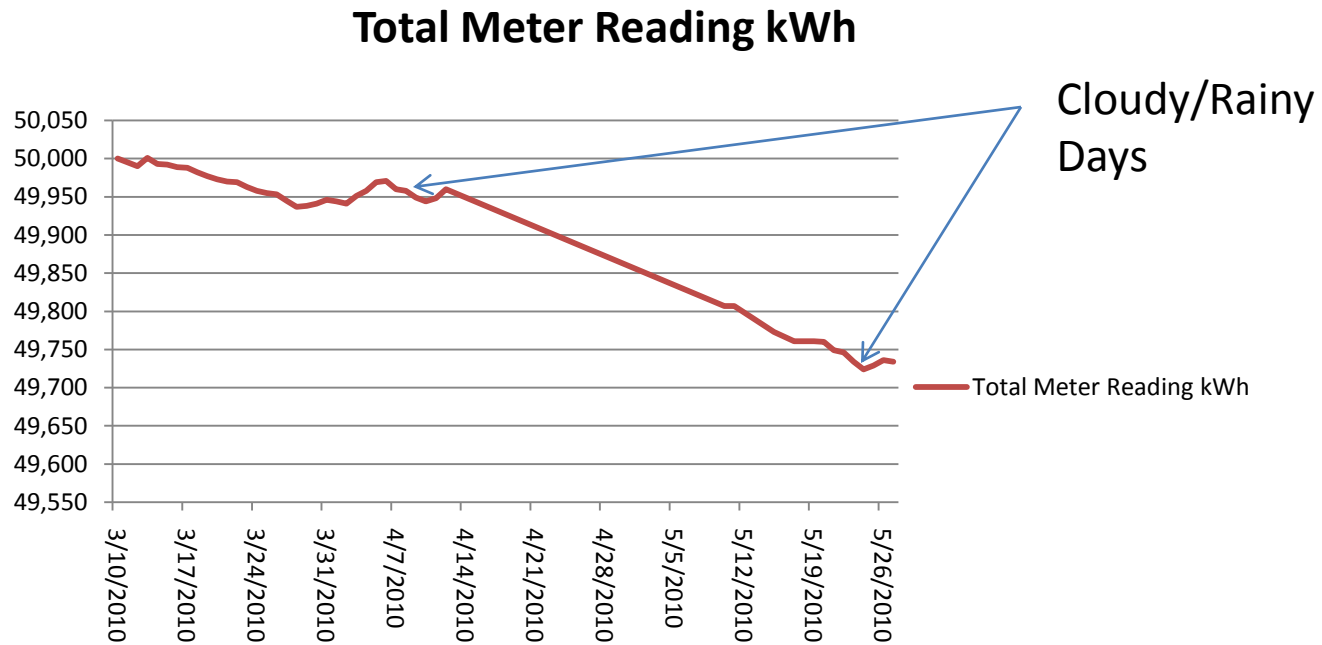
Net Generation 267 kWh



Net Peak Generation 301 kWh

Daily Energy Use

3/10/10 - 5/27/10



April 2006

Charges			
04/01/2006 - 04/27/2006			
Electric Charges			\$32.50
Total Usage	397.80000 Kwh		
Winter Peak Usage			
Baseline Usage	81.00000 Kwh @	\$0.11472	
101-130% of Baseline	10.80000 Kwh @	\$0.11472	
Winter Off-Peak Usage			
Baseline Usage	270.00000 Kwh @	\$0.08966	
101-130% of Baseline	36.00000 Kwh @	\$0.08966	
Baseline Credit	351.00000 Kwh @	-\$0.01559	
Electric Meter Charge	\$0.11532/day		3.11
Net Charges			\$35.61

The net charges shown above include the following component(s). Please see definitions on Page 2 of the bill.

Generation	\$12.37
Transmission	4.55
Distribution	7.84
Public Purpose Programs	2.48
Nuclear Decommissioning	0.15
Trust Transfer Amount (TTA)	2.72
DWR Bond Charge	1.93
Ongoing CTC	1.83
Energy Cost Recovery Amount	1.74

9582735425-9
Page 4 of 5



PETER M HIRSCH

April 2009

Charges			
03/25/2009 - 04/23/2009			
Electric Charges			\$57.90
Total Usage	564.00000 Kwh		
Winter Peak Usage			
Baseline Usage	97.18000 Kwh @	\$0.11589	
101-130% of Baseline	29.15400 Kwh @	\$0.11589	
131-200% of Baseline	18.66600 Kwh @	\$0.24477	
Winter Off-Peak Usage			
Baseline Usage	280.82000 Kwh @	\$0.09048	
101-130% of Baseline	84.24600 Kwh @	\$0.09048	
131-200% of Baseline	53.93400 Kwh @	\$0.21936	
Baseline Credit	378.00000 Kwh @	-\$0.01631	
Electric Meter Charge	\$0.11532 / day		3.46
Net Charges			\$61.36

August 2009

PETER M HIRSCH

Charges

08/25/2009 - 09/22/2009

Electric Charges

\$103.13

Total Usage

611.00000 Kwh

Summer Peak Usage

Baseline Usage

97.06000 Kwh @ \$0.29741

101-130% of Baseline

29.11800 Kwh @ \$0.29741

131-200% of Baseline

42.82200 Kwh @ \$0.42629

Summer Off-Peak Usage

Baseline Usage

253.84000 Kwh @ \$0.08741

101-130% of Baseline

76.15200 Kwh @ \$0.08741

131-200% of Baseline

112.00800 Kwh @ \$0.21629

Baseline Credit

350.90000 Kwh @ -\$0.01631

Electric Meter Charge

\$0.11532 / day

3.34

Net Charges

\$106.47

The net charges shown above include the following component(s).

Please see definitions on Page 2 of the bill.

Generation	\$61.23
Transmission	6.13
Distribution	25.68
Public Purpose Programs	3.76
Nuclear Decommissioning	0.17
DWR Bond Charge	3.00
Ongoing CTC	5.09
Energy Cost Recovery Amount	1.41

Taxes and Other

Energy Commission Tax

\$0.13

Utility Users' Tax (2.400%)

2.56

TOTAL CHARGES

\$109.16

Usage Comparison	Days Billed	Kwh Billed	Kwh per Day
This Year	29	611	21.1
Last Year	31	764	24.6

PG&E Electric Bill

April 2010



*Pacific Gas and
Electric Company*

WE DELIVER ENERGY.™

PETER M HIRSCH

Taxes and Other

Utility Users' Tax (2.400%)

\$0.13

TOTAL CHARGES

\$5.72

Usage Comparison	Days Billed	Kwh Billed	Kwh per Day
This Year	30	0	0.0
Last Year	N/A	N/A	N/A

Rotating outage blocks are subject to change without advance notice due to operational conditions.

Generation includes charges for the portion of your energy usage provided by the Department of Water Resources (DWR) and is being collected by PG&E as an agent for DWR. DWR is collecting 23.139 cents per kWh from Bundled customers for each kWh it provides plus the Power Charge Indifference Adjustment component of the Cost Responsibility Surcharge from Direct Access and Transitional Bundled Service customers.

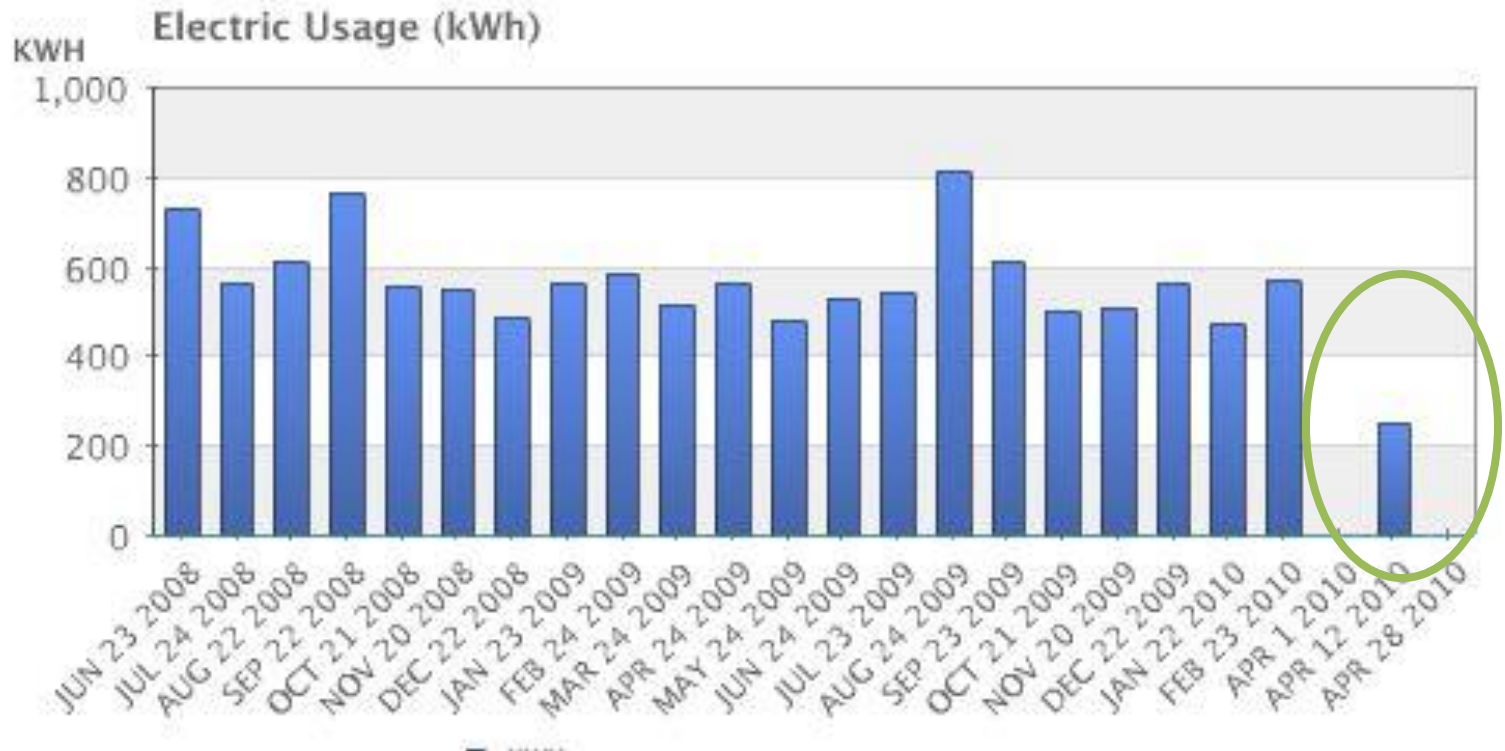
Monthly Electric Usage

6/08 – 4/10

Bill History Graphs

Account #: 9582735425

Select Graph Electric Usage (kWh) ▼



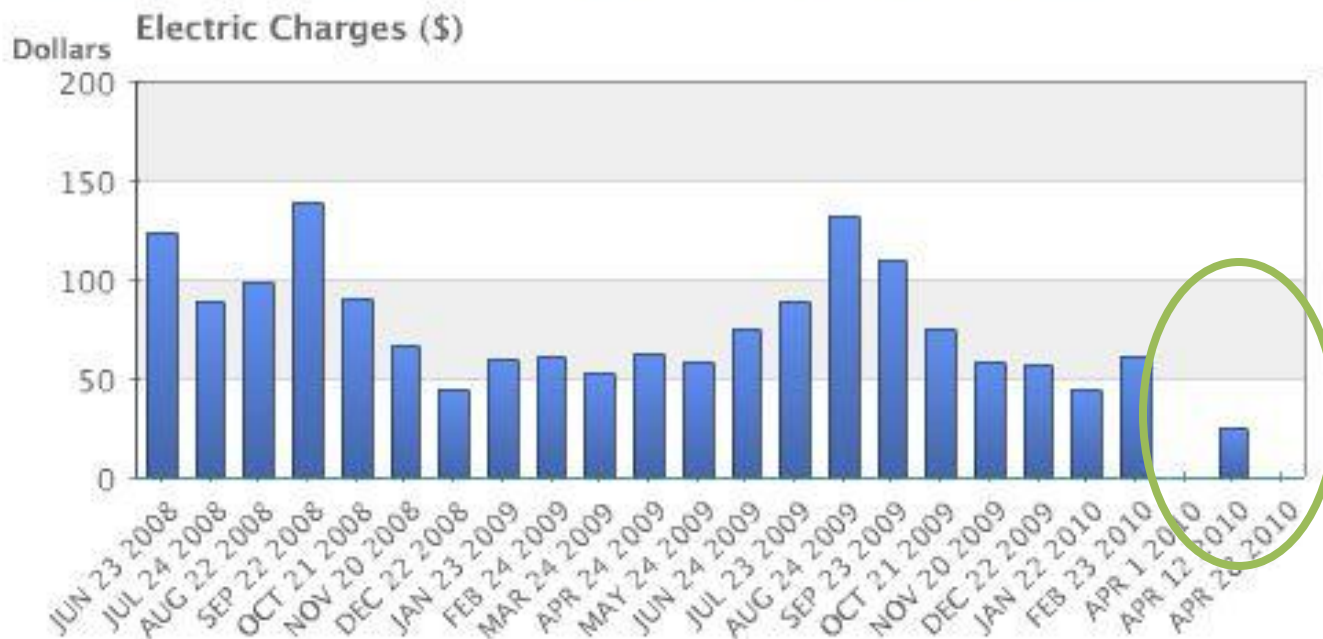
Electric Costs

6/08 -4/10

Bill History Graphs

Account #: 9582735425

Select Graph Electric Charges (\$) ▼





Home Solar Panels in ~~Silicon~~ Green Valley

Peter Hirsch

Google Power Meter

www.google.com/powermeter

Track energy over time

See how much energy you have used by the day, week or month.

Always on power

The darker shaded portion of the graph shows power that is always on, such as any appliance that goes on standby mode. Many appliances are always on; you just don't know it. Discovering these is one of the easiest and fastest ways to reduce energy use and save money.

Customize your experience

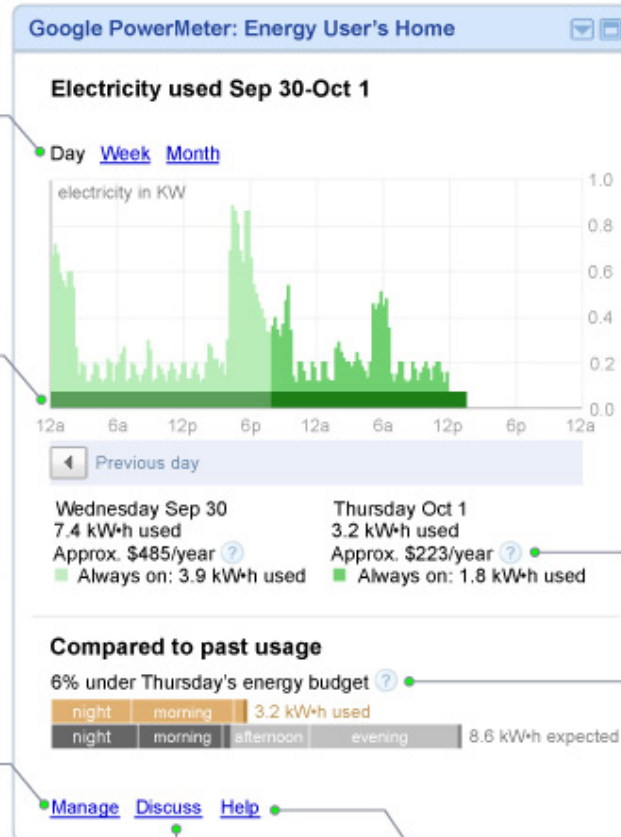
Add your estimated cost per kWh, sign up for weekly emails, and share your usage with family and friends.

Join the community

Get tips on how to save from other Google PowerMeter users and share what has worked for you.

Have a question?

Learn more about Google PowerMeter from our online help center.



Predict your costs

Google PowerMeter helps you to predict your annual energy bill so that you can start making changes and saving early.

Budget Tracker

Set an energy savings goal for yourself and track your progress.

Where PowerMeter works

- Works with a few utilities such as San Diego Gas and Electric (not PG&E yet)
- Requires a Smart Meter or The Energy Detective (TED)

The Energy Detective (TED)

- <http://www.theenergydetective.com/store/>
- \$200-\$300
- Data is transmitted over existing wiring in your home every 1 second, so no matter where you plug TED's Gateway in, it receives the data

