

PV Solar Primer Contents

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What is PV Solar?

- Photo = Light; Voltaic = Electricity
- PhotoVoltaic (PV) solar systems convert sunlight into electric current
- Developed for use by NASA back in 1950's, now in use throughout the world on all seven continents (eight if you include space)
- Totally renewable energy with zero pollution
- Highly reliable (UL rated) with no moving parts
- Used to provide power in a wide variety of harsh climates, remote locations and demanding applications
- Made by leading manufacturers for home and business use
- 25 year warranties



What is a PV Solar system?

A PV Solar System consists of three key components*:

1) PV Solar Modules (aka Panels)

Panels convert photons (sunlight) striking their surface into free electrons, which flow and make electricity (DC power)

2) Inverter

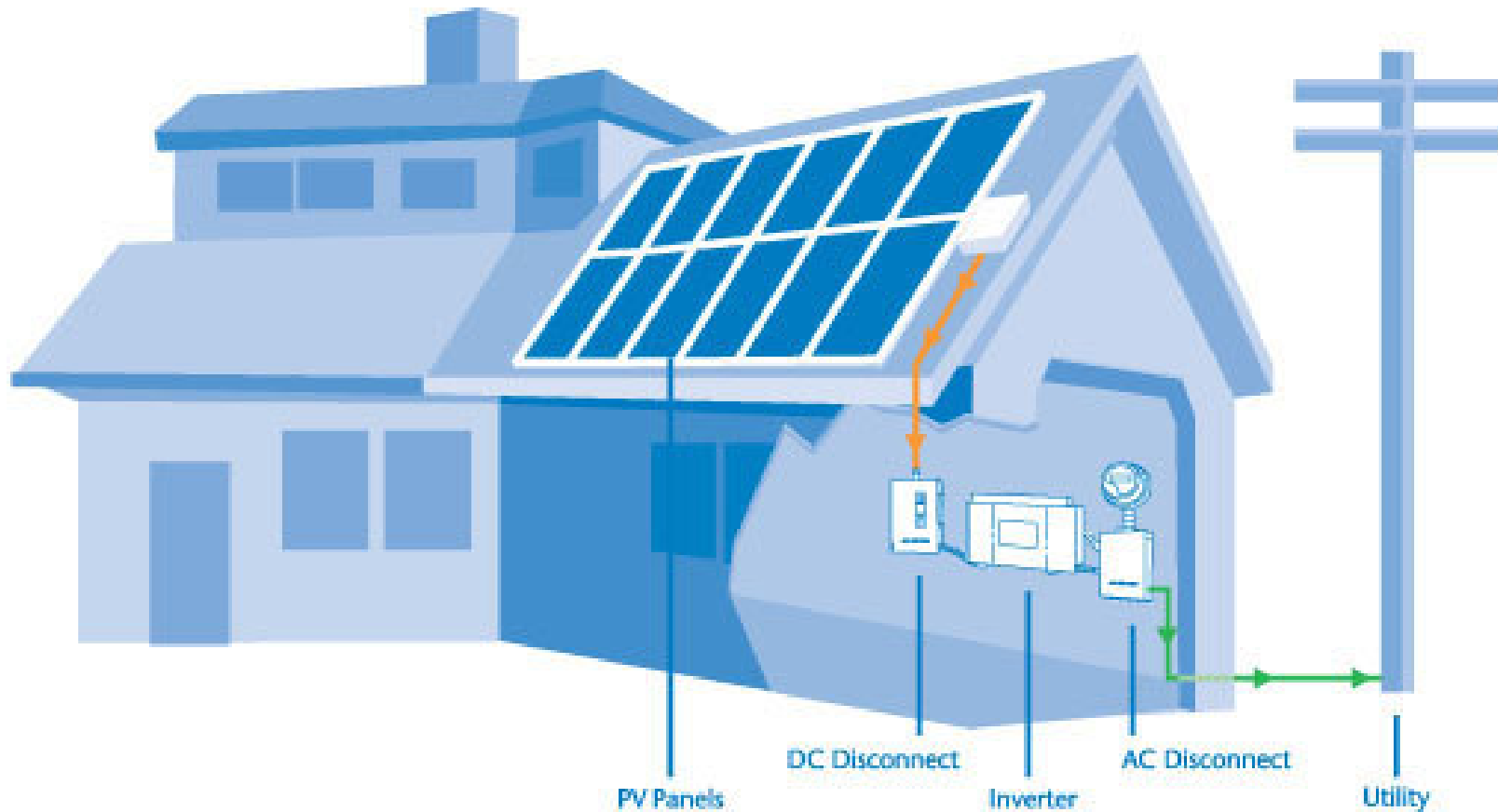
Converts the power generated by the Panels (DC) into power used by your home and by PG&E grid (AC)

3) PG&E Grid Interconnection

Usually referred to as the meter- to provide excess power for sale back to the utility

*Additional equipment is needed to mount the modules to a fixed surface (roof or ground), concentrate the electricity coming from the modules, and control the interactions of the inverter and the utility grid

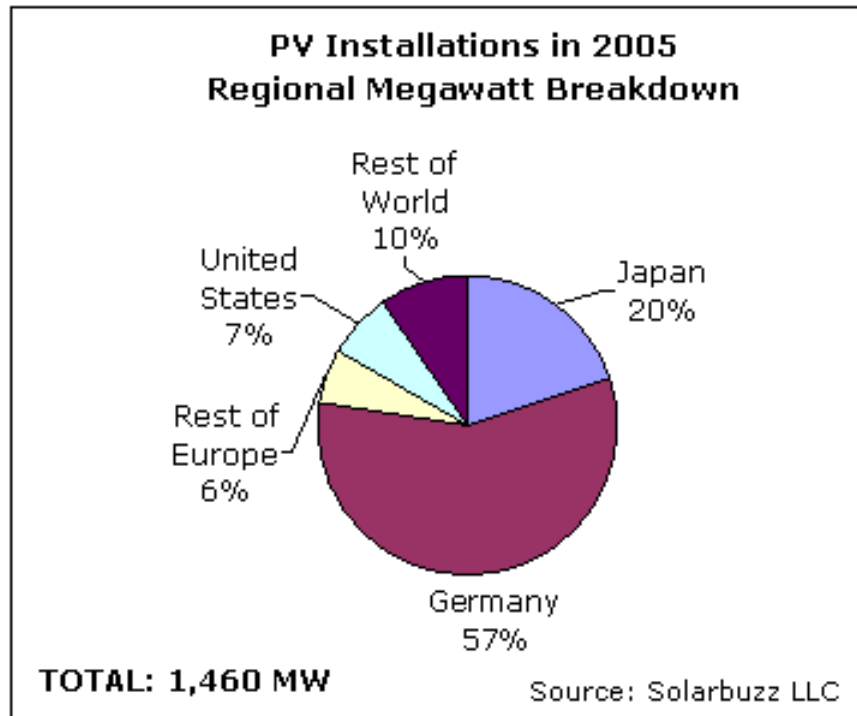




Common myths about PV Solar

- Isn't it only for hot sunny climates?
 - Even cold cloudy areas can generate solar electricity
- Isn't it too expensive for home use?
 - With aggressive state / Federal tax incentives, PV solar is quite affordable
- Isn't it just for remote farms or cabins?
 - With a grid-connected PV solar system, any suburban home is eligible
- Isn't it too inefficient to be cost-effective?
 - With new R&D breakthroughs, PV solar is quite efficient
- Isn't it too complicated for home use?
 - PV solar systems are virtually maintenance-free, reliable and durable
- Isn't it just for new home construction?
 - PV solar can be installed on flat/pitched rooftops, ground-mounted racks / poles

Global PV Market



In the US:

**85% is in
California**

***California gets 40
percent more
sunlight than
Germany and 20
percent more
than Japan***

Government incentives for PV Solar

- California Solar Initiative Rebates will pay for ~ 30% of cost of PV solar system, \$2.50 per AC Watt (\$3.25 for Government, Non-Profit) in 2007 for projects <100kW (*a little less in the Bay Area as SoCal is reference site*)
- Performance Based Incentives (PBI) will be paid for projects >100kW, with payments based on actual solar power produced over a five-year period (\$0.391/kWh; \$0.50/kWh for Government, Non-Profits).
- California Tax Credit of 7.5% (pending extension by the CA Legislature)
- Federal Tax Credit of 30% (cap of \$2,000 for residential)
- Federal accelerated depreciation (5 years) for business PV solar
- California "Solar Rights Act" pre-empts objections by others (Associations, CC&Rs, cities, towns, counties)
- California law requires utilities to "buy back" PV solar power from homeowners at the utility's own prices (known as "net metering")
- California law requires PV solar system to be exempt from property tax

Sizing a PV Solar system

- 1kW PV solar system will produce ~1,825 kWh per year in the Bay Area according to Cal Energy Commission (CEC) data
- Detailed look at actual utility bills and site (roof orientation, shading, etc.) will determine optimum size of PV solar system
- Time of Use Metering may allow for smaller systems
- Figure on ~ 6 kW (DC) of PV per 1,000 of monthly average electricity usage
- ~ \$8,500 per kW to install (before any incentives such as rebates, tax credits or depreciation) ~ \$5,000 per kW \$net, net



Residential Example

- 600 sf available roof space
- \$195 avg monthly PG&E Electric Bill
- 1,019 kWh average monthly electricity usage
- 6.0 kW system

\$47,930 Total (Gross Cost)
- \$12,350 CEC Rebate (Financed by Sky Power)
- \$4,632 Tax Credits (\$2,632 State, \$2,000 Federal)
=\$30,948 Net Cost of System

Saves \$2,000/year in PG&E!



Optimal Residential Project

- \$100 + monthly **ELECTRIC** bill
- 750+ kWh per month average electricity usage
- Sunny, South Facing Roof without obstructions



Commercial Office Building Example

- 2 Story - 3,200 sf available roof space
- \$1,000 avg monthly PG&E Electric Bill
- 6,500 kWh monthly electricity usage
- 34.2 kW system (65% of Total)

\$278,000 Total (Gross Cost)

- \$85,000 CEC Rebate

- \$73,000 Tax Credits (\$15,000 State, \$58,000 Federal)

- \$45,000 NPV of Accelerated Depreciation

= \$75,000 Net Cost of System to Finance Long Term

Saves \$650/month in PG&E!



Optimal Commercial Project

- Owner Occupied (or pays PG&E)
- \$500 - \$1,500 monthly ELECTRIC bill
- 3,000 - 9,000 kWh per month electricity usage
- 2,000 - 7,000 square foot of roof available
(Optimal roof area relative to power consumption)



Checklist for PV Solar

- ✓ Is your roof new, going to be replaced soon, or have 15 - 20 years of life left?
- ✓ Does your roof face south or have a southeast/southwest exposure?
- ✓ Is your roof free from shade during the 9 am - 3 pm exposure window?
- ✓ If your roof isn't a good fit, is there space on your property for a ground-level or pole-mounted PV solar array?
- ✓ Is any part of your home used as a home office for tax purposes? (Fed ITC and accelerated depreciation sweeten the economics...)
- ✓ Are you OK with the appearance of rooftop PV solar panels as a sign of energy independence and caring for the environment?



Next steps for getting PV solar

- Gather up your utility electric bills for the last 12 months of electric consumption (For PG&E, call 800-PGE-5000 for the data)
- Receive a free personalized economic analysis from Sky Power Systems of what your costs and credits will be
- Schedule a free site evaluation from Sky Power Systems
- Sign a contract with Sky Power Systems for the PV solar system
- Schedule the installation of your new PV solar system
- Sign the CEC rebate application and the PG&E interconnection forms that Sky Power Systems will prepare
- Enjoy the savings from lower electric costs and the freedom from electric rate hikes for the next 30 years!



Extra Benefits of PV solar

- Your home's equity will increase from the extra cash flow due to electric savings -\$20 per \$1 of annual savings, meaning as electric rates increase, so does the value of the system!
- Your ongoing electric power costs are fixed - no more rate hikes for decades!
- You can add to your system at any time if you need more power - PV solar is very modular and flexible!
- You contribute to the reduction of foreign oil consumption by the US and the reduction of pollution in the Bay Area - each 1kW of PV solar reduces CO2 emissions by over 1 ton per year!
- You get to watch your electric meter run backward during the day!

