

United States Representative Gabrielle Giffords

Presents

Solar Power for the Home: Getting Started

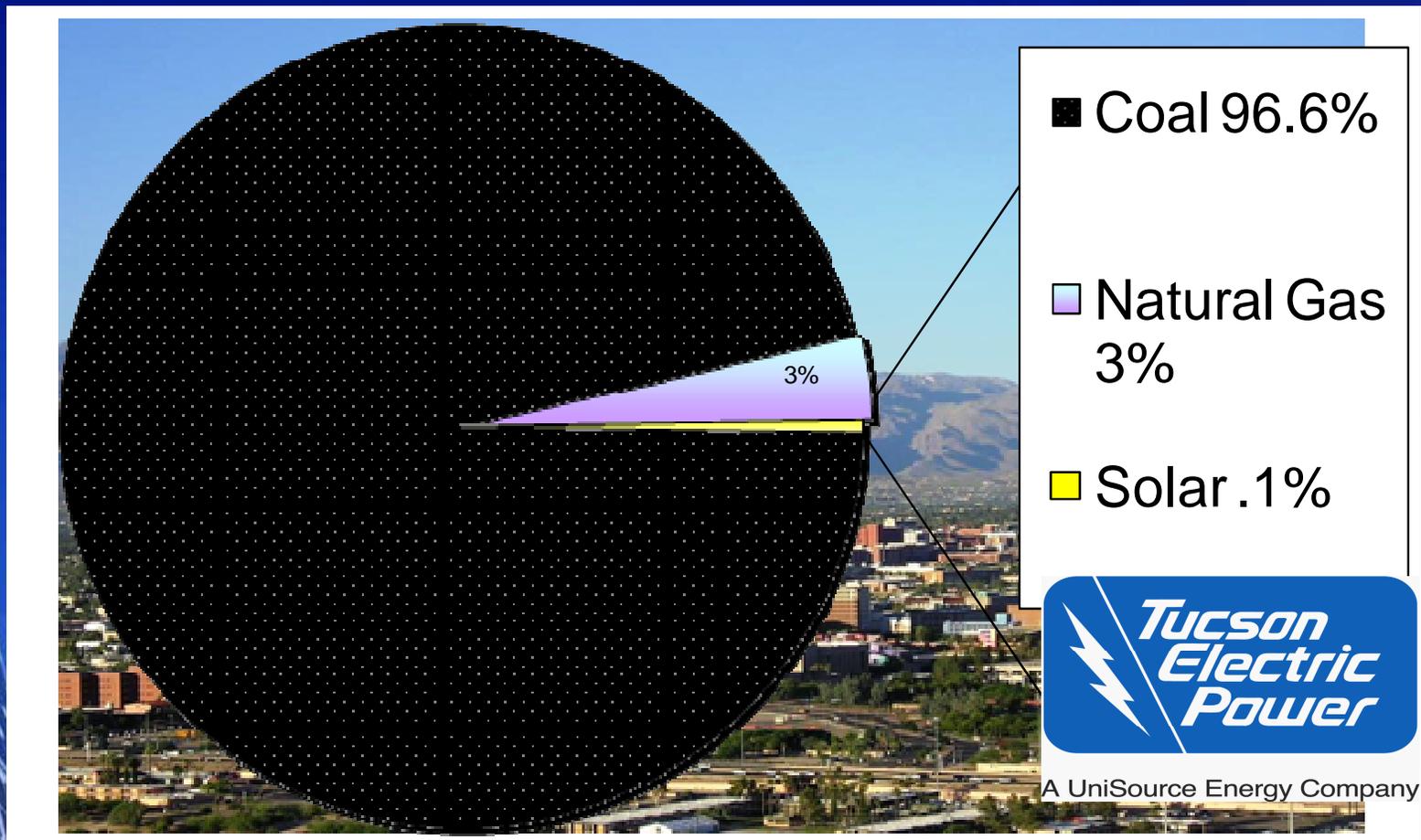


www.Giffords.House.gov



The 8th District of Arizona

Tucson Energy Sources



Fossil Fuel & Nuclear vs. Renewable Energy

- Nuclear



Fossil Fuel & Nuclear vs. Renewable Energy

- Oil



Fossil Fuel & Nuclear vs. Renewable Energy

- Natural Gas



Fossil Fuel & Nuclear vs. Renewable Energy

- Coal



Fossil Fuel & Nuclear vs. Renewable Energy

- Hydropower



Fossil Fuel & Nuclear vs. Renewable Energy

- Geothermal



Fossil Fuel & Nuclear vs. Renewable Energy

- Wind Power

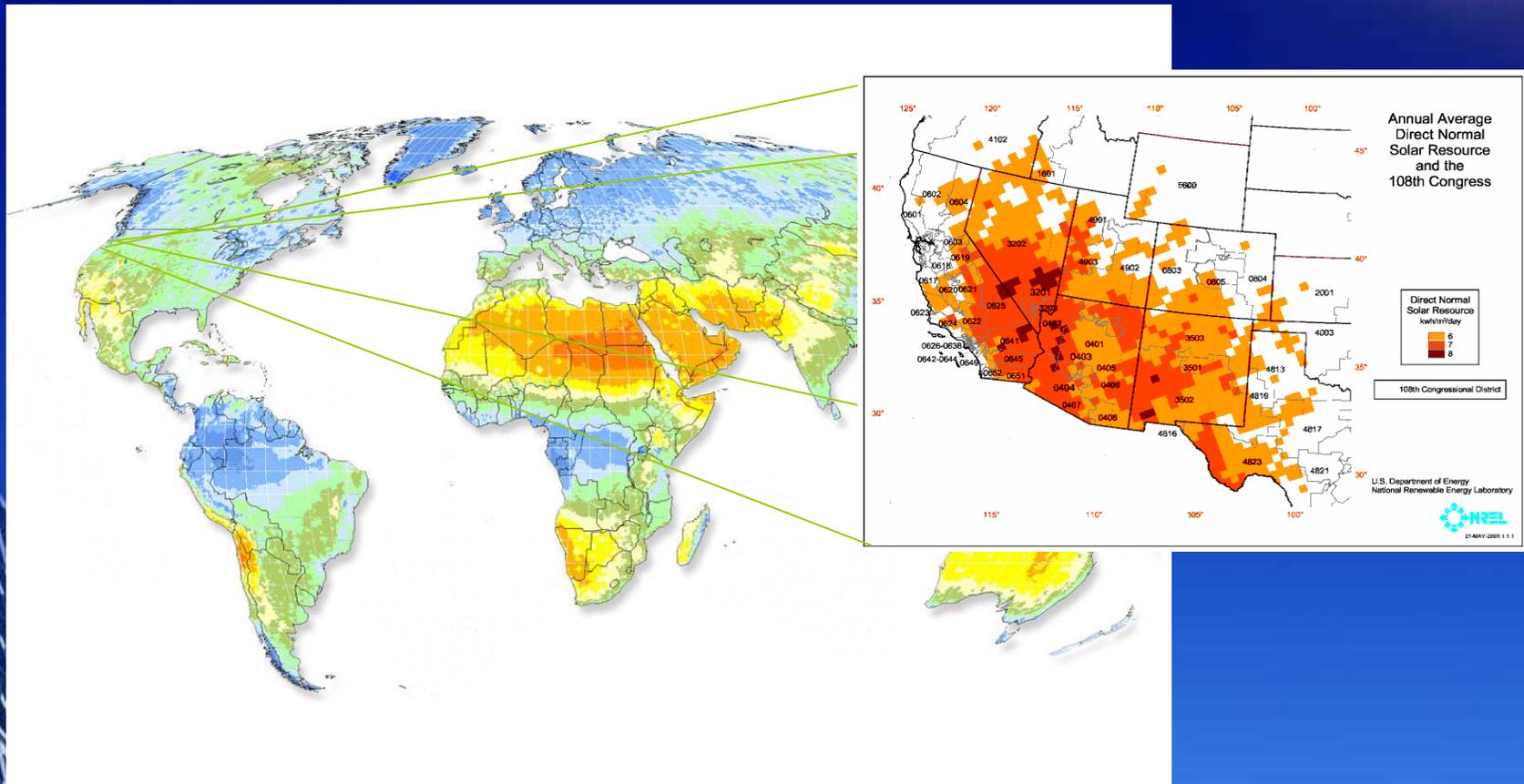


Fossil Fuel & Nuclear vs. Renewable Energy

- Solar



“World Class” Solar Resources



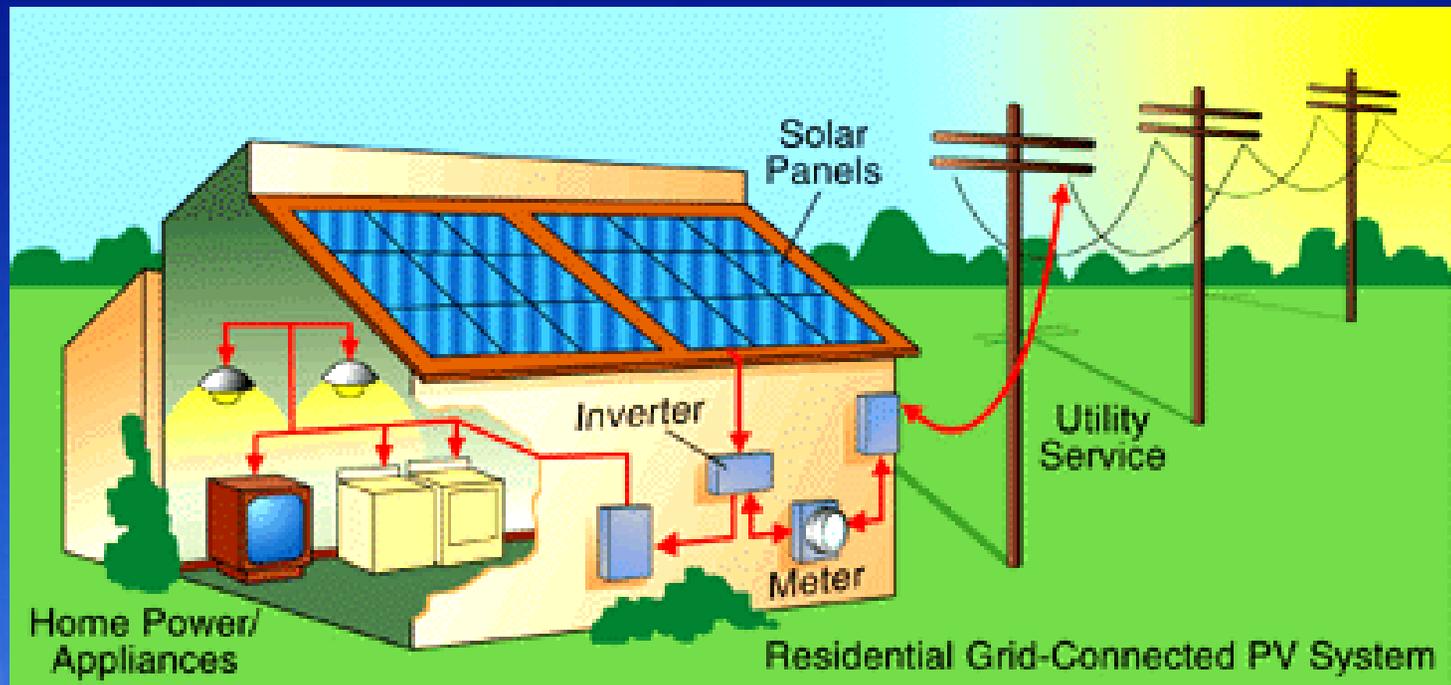
Solar Energy Collection

- Concentrated



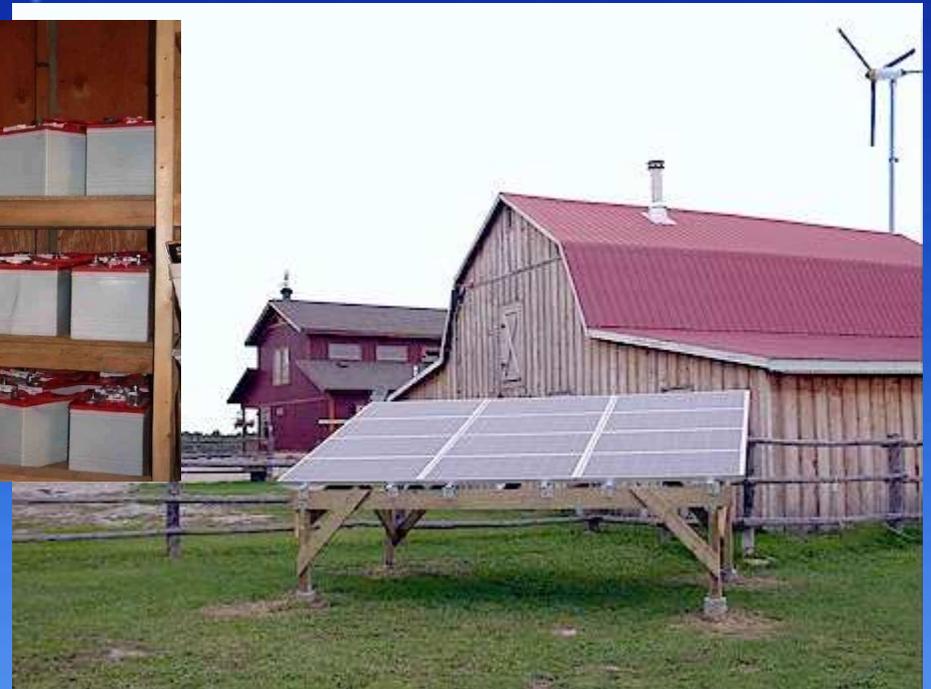
Solar Energy Collection

- Grid-Tied PV Systems



Solar Energy Collection

- Stand Alone – Off the Grid



Home PV Systems

- One kilowatt-hour (kWh) equals the amount of electricity needed to burn a 100 watt light bulb for 10 hours
 - Takes $\frac{1}{2}$ -1 Gallon of water and 1 lb of coal to produce 1 KWH
- The average household in the United States uses about 11,000 kilowatt-hours of electricity each year
 - 11,000 lbs of coal
 - Over 20,000 lbs of CO₂ added to the atmosphere
 - 6-11,000 gallons of water
- A typical 3 kilowatt Solar System will generate around 5,000 kilowatt-hours per year
 - Zero lbs of coal and CO₂ and no water!

Installations



Steps for Homeowners

- Find a good installer
- Site visit
- Contact your HOA
- Permit from City or County
- Interconnection agreement with utility
- Apply for utility rebate
- Installation
- Inspection by City or County
- Inspection by utility
- System operational
- Receive utility rebate
- This can take 6 – 10 weeks

Hardware

- PV modules
- Mounting supports
- Inverter
- Batteries (if applicable)
- Wiring

Solar Hot Water

- Solar hot water system is a \$2,500 - \$4,500 investment.
- Saves between \$20-\$40 a month for typical family.



Solar Hot Water

- Hot Water System
 - Passive system
 - Active system
- Pool Heater
 - Proven technology
 - Fast payback
- Utility rebate may soon be available
 - With inspection



Economic Incentives

Federal Incentives (through 2008)

- ***Residential:***
 - 30% tax credit
 - \$2,000 cap
- ***Commercial:***
 - 30% investment tax credit
 - 5-year accelerated depreciation

Economic Incentives

State Incentives

- ***Residential:***
 - 25% tax credit
 - \$1000 cap
 - Applies to PV and hot water
 - No state retail tax
- ***Commercial:***
 - 10% tax credit
 - \$25,000 cap per system and \$50,000 per company annually

Utility Incentives

TEP Sunshare

- **Option #1** - TEP has a \$3 per watt buy down – to buy a system with about 5 - 8 solar panels with a total of 1000 watts or 1 kilowatt, TEP would provide a rebate of \$3000 or 40% of the total system cost.
- **Option #3** - Customers can purchase and install their own photovoltaic equipment. Upon installation and inspection, the system is connected to TEP's grid and participants receive a subsidy of \$2,000 per AC kilowatt of capacity. TEP will provide all maintenance labor for the system through 2012.

* This will change after REST



Utility Incentives

Trico Electric

- \$4 per watt for residential
- up to 50% the total cost of the unit
- no net metering
- caps incentives for commercial systems at 5 kW

Sulphur Springs Valley Electric

- \$4.00 per watt up to 2000 watts
- \$8,000 cap or one-half the cost of the system, whichever is less.
- Sulphur Springs does not buy power from customers with solar systems



Sample Price Chart for Residential Solar PV

<u>System Size in DC</u>	<u>Actual Output in AC</u>	<u>KWh Per Year</u>	<u>Total System Cost without incentives</u>	<u>TEP Rebate</u>	<u>State Tax Credit</u>	<u>Federal Tax Credit</u>	<u>Net Project Cost</u>	<u>Estimated Payback Period</u>
1.52 KW = 1520 Watts	1.08 KW = 1080 Watts	2562	\$13,081	-\$4,560	-\$1,000	-\$2,000	\$5,521	15.0 years
2.47 KW	1.75 KW	4163	\$18,423	-\$7,410	-\$1,000	-\$2,000	\$8,013	13.2 years
3.04 KW	2.16 KW	5124	\$21,388	-\$9,120	-\$1,000	-\$2,000	\$9,268	12.7 years
4.56 KW	3.24 KW	7686	\$30,254	-\$13,680	-\$1,000	-\$2,000	\$13,574	12.5 years
6.08 KW	4.32 KW	10248	\$40,023	-\$18,240	-\$1,000	-\$2,000	\$18,783	12.8 years
6.84 KW	4.86 KW	11530	\$44,514	-\$20,520	-\$1,000	-\$2,000	\$20,994	12.8 years
8.55 KW	6.07 KW	14412	\$54,434	-\$25,650	-\$1,000	-\$2,000	\$25,784	12.6 years

Conservation Tips

Solar energy is more effective
in combination with a change in lifestyle.

Start Small....

- A typical two-person household generates about **60,000 lbs** of CO₂ each year

Set your thermostat down 2° in winter and up 2° in summer. You can save about **2,000 lbs of CO₂** a year!



Conservation Tips

Get a power strip and switch it off when not using electronics. Even when turned off, things like hairdryers, cell phone chargers and televisions use energy. 75% of the electricity used to power home electronics is consumed while the products are turned off.



Replace a regular incandescent light bulb with a compact fluorescent light bulb. CFLs use 60% less energy. Switch just one bulb and save about 150 pounds of carbon dioxide a year.



Conservation Tips

Dry your clothes outside and **save 1400 lbs of CO2**



You can save **3,000 pounds** of CO2 every year if your new car gets only **3 miles** per gallon more than your current one.



Wash your clothes in cold water instead of hot. It can save 500 pounds of CO2 per year.



Conservation Cont'd.

- Medium Sized Jobs...

Invest in energy-efficient appliances. Savings in upgrading all appliances can save up to 6,000 pounds of CO₂/year.



Conservation Tips

Wrap your water heater in an insulation blanket. You'll save money and 1,000 lbs of CO₂ a year. You can save another 550 lbs by setting the thermostat no higher than 120 degrees Fahrenheit.



Share a ride **2 days** a week. Reduce your CO₂ emissions by 1,590 pounds a year.



Conservation Tips

Plant trees! A single tree will absorb **2000 lbs** of CO₂ over its lifetime. And shade provided by trees can also reduce your air conditioning bill by **10 to 15%**.



Install a ceiling fan. They cost less than a nickel an hour to operate while a central air conditioning unit costs around a half-dollar an hour to operate.



Conservation Cont'd.

- Large Projects

Properly insulating your walls and ceilings can save **25%** of your home heating bill and 2,000 lbs of CO₂ a year. Caulking and Weather-stripping can save another 1,700 lbs per year. Energy conserving windows helps as well!



Conservation Tips

Get a home energy audit!

Many utilities offer free home energy audits to find where your home is poorly insulated or energy inefficient. You can save up to 30% off your energy bill and 1,000 pounds of carbon dioxide a year.



Conclusions

- Arizona has world class solar energy potential.
- Using coal for energy contributes to global warming and uses large amounts of water.
- Residential solar PV and hot water are viable ways to reduce emissions and save money over time.
- Do your homework before choosing an installer.
- **Conservation pays!**

Please visit www.Giffords.House.gov

Congresswoman Gabrielle Giffords enjoys a hot dog cooked in a solar oven! July 5, 2007



GreenWatts

www.greenwatts.com

An affordable way to support generating 'green' power

- Customers can “adopt” a GreenWatt by adding a contribution on their electric bill.
- Funds collected pay for donations of PV solar for schools and nonprofits.

