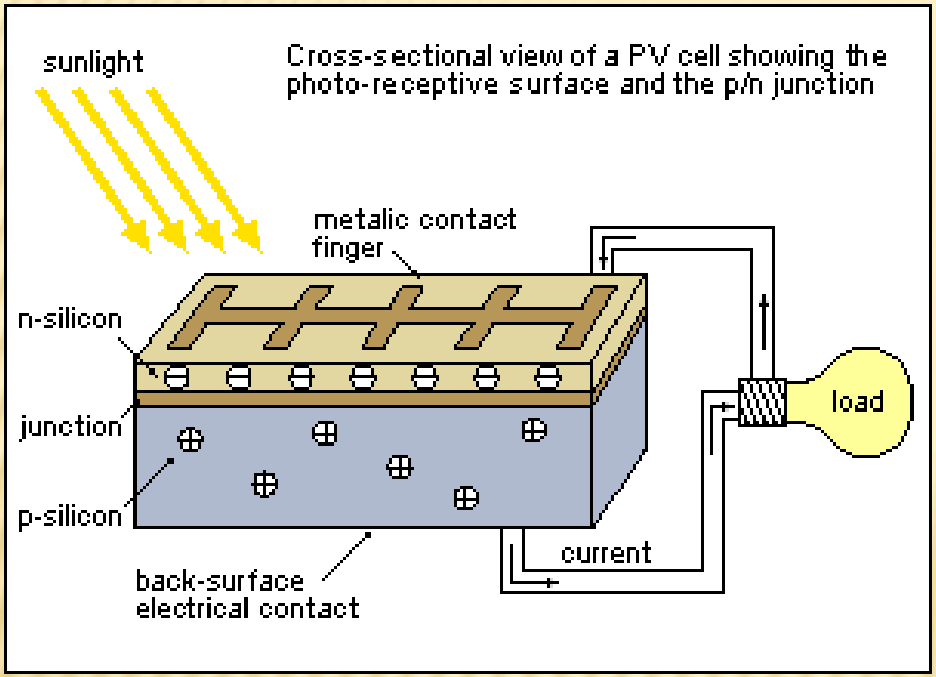
By: Crystal Warren

IMPLEMENTATION OF SOLAR PANELS ON COMMERCIAL PROPERTIES AND THE COST-BASED INCENTIVES

MY PLAN

- Encourage commercial property/business owners to install solar panels to reduce the amount of electricity used from the grid
- Send any excess energy back to the grid
- Offer federal, state, and local cost incentives to reduce the price of installation
- Make mandatory for new buildings by 2010, and make mandatory for already existing building by 2012

HOW PHOTOVOLTAIC PANELS WORK



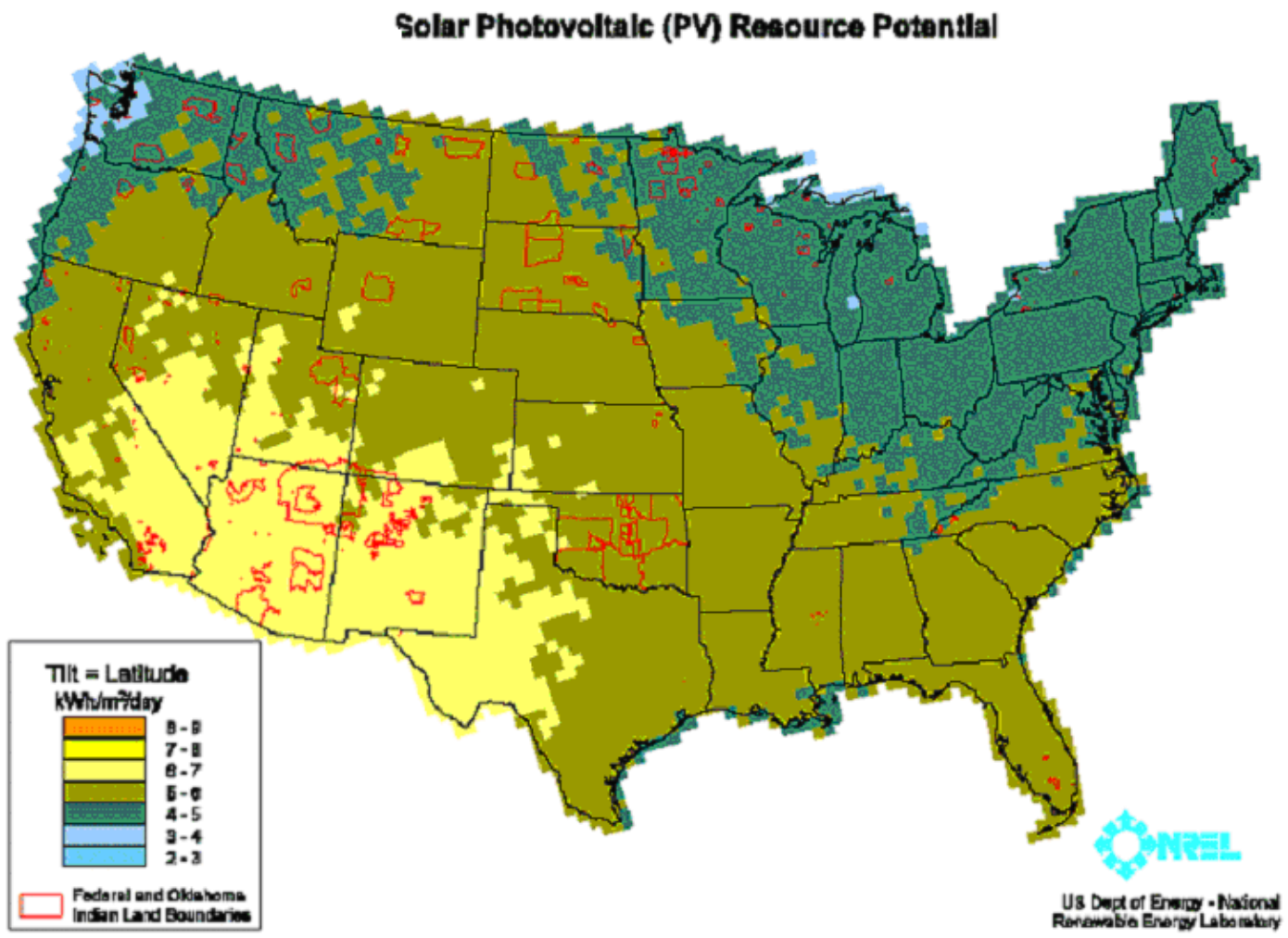
- Top layer – protection
- Bottom layer – base
- Middle layer – silicon
- Photons strike individual atoms in the silicon to free outer electrons

- Electrons move to the top of the silicon layer, where they move in a current along wires to the panels that feed electricity into the house.

WHY SOLAR?

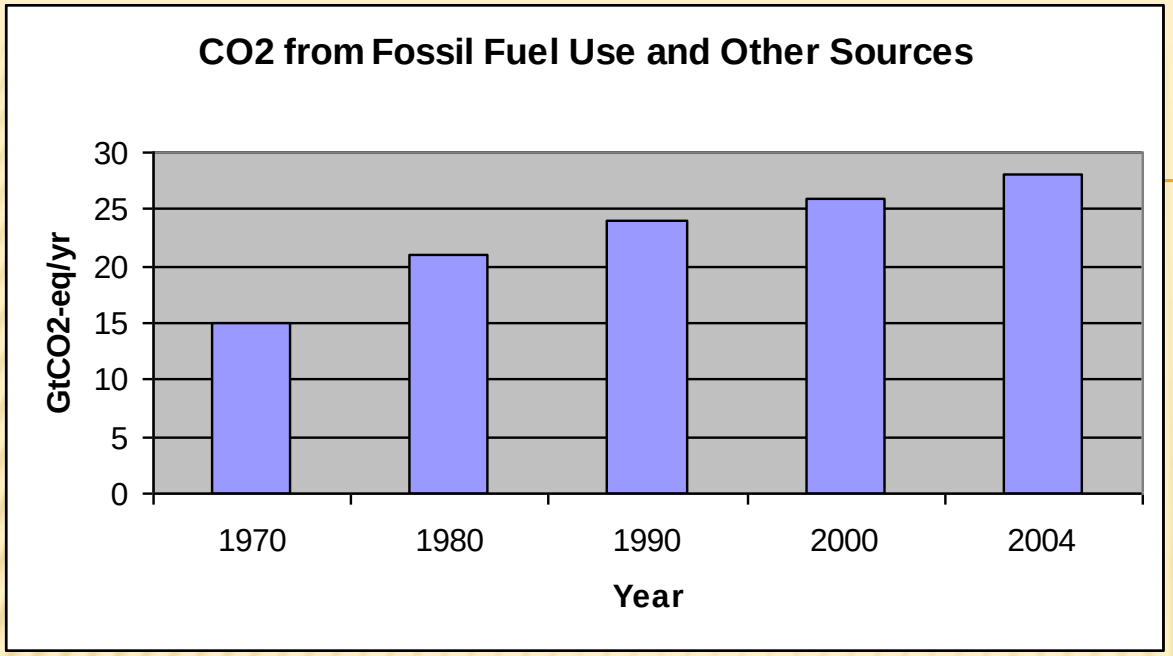
- 970 trillion kWh of energy fall from the sky every day
- PV systems can reduce or eliminate the amount of electricity purchased from your utility provider
- Can save money by acting as a hedge for increasing energy prices
- Energy is clean, renewable, and reliable
- Helps the community by staying off the grid

WHY SOLAR?



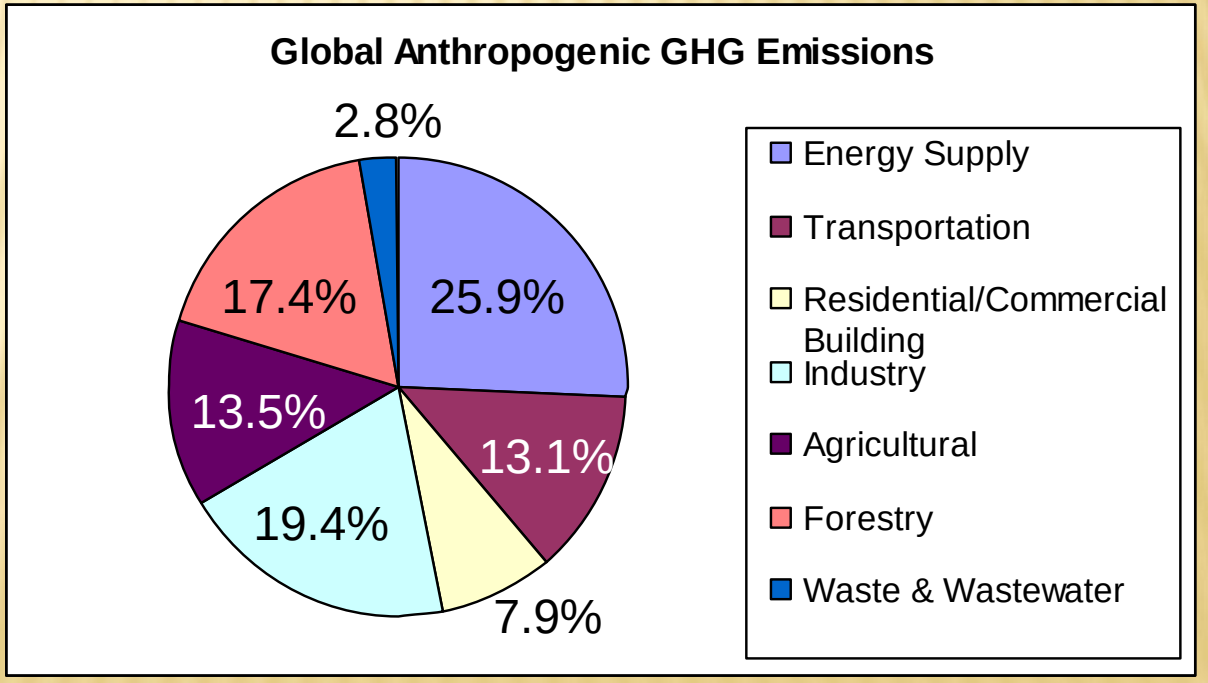
Germany has the most successful solar panel program, and it receives less sunshine than Seattle

WHY SOLAR?



CO_2 levels from FF emissions are increasing each year

Energy Supply contributes the most anthropogenic GHG emissions



IPCC Fourth Assessment Report

WHY SOLAR ON COMMERCIAL PROPERTIES?

- Most people not at home during daytime (and peak) hours (7 am to 6 pm)
  - At work or out running errands
- Commercial properties more likely to have large, flat roofs
- Commercial properties use more electricity than residential

COMMERCIAL PROPERTIES USING SOLAR

- Commercial Properties > 5,000 square feet install solar panels
- Includes retail stores, distribution and manufacturing centers, office buildings, malls, schools, hospitals, banks
- Can provide up to 100% of electricity during the day (when power from the grid is most expensive)
- Many commercial properties open around 8:00 am and close around 6:00 pm, so this may provide almost all of electricity needed

PROS VS CONS OF SOLAR

- Pros
  - Reduced carbon footprint
  - Silent; no moving parts
  - Utilizes unused space
  - Extremely low maintenance
  - Max amount of power produced when energy prices are at their highest
  - Net metering
- Cons
  - Sundown
  - Cost
  - Efficiency (15-20%)

FOSSIL FUEL VS SOLAR EMISSIONS

- A fossil fueled power plant produces 2,500 pounds of CO_2 for each megawatt-hour of electricity. Solar produces no CO_2 . So, for every 1.0 kilowatt-hours of electricity generated by solar energy, nearly 2.5 pounds of CO_2 is not released into the atmosphere.
- My parent's business February electric bill

  (20,000 sq ft, open 8-5, does not include heat):

$$\frac{2.5 \text{ lbs } CO_2}{1.0 \text{ kWh}} \times \frac{4080 \text{ kWh}}{\text{month}} = \frac{10{,}200 \text{ lbs } CO_2 \text{ saved}}{\text{month}}$$

EPA Clean Energy

TRIED AND TRUE: WAL-MART

- Installed solar panels in 22 locations in California and Hawaii
- Total solar power production from the 2 states is estimated to exceed 20 million kWh per year
- Each system can provide up to 30% of the power for the store
- Will help reduce GHG emission by 6,500-10,000 metric tons per year
- Stores expect to achieve savings over their current utility rates immediately

http://walmartstores.com/Media/factsheets/fs_2306.pdf

TRIED AND TRUE: FED EX

- Hub at Oakland National Airport installed 904 kWh solar array
- Provide about 80% of energy at the peak load demand
- Covers 81,000 sq ft of roof space
- Has 5,769 PV modules → more than 300,000 solar cells
- Is the equivalent used by more than 900 homes during the daytime
- Over 25 years, will offset 810,000 tons of CO_2, which is equivalent to removing 2100 cars from the road

FedEx Express Super Hub in Oakland, CA Fact Sheet

TRIED AND TRUE: GOOGLE

- Headquarters in Mountain View, CA (Googleplex) installed 9,212 solar panels
- Is 1600 kW
- Produces enough electricity for 1000 homes, or 30% of Google's energy at peak electricity demand
- Has website to monitor how much solar electricity is generated

http://www.google.com/corporate/solarpanels/home

INCENTIVES ALREADY IN PLACE

- Can receive federal incentives (up to 20% of installation costs)
- California:
  - Receive $2.50/watt installed (up to 30% of installation costs)
  - Get paid a monthly (nontaxable) percentage of how much energy actually produced, for up to five years

INCENTIVES ALREADY IN PLACE

- Germany
  - If anyone with solar panels, pay 20¢/kWh received from grid
  - Receive 50¢/kWh for energy sent back to grid
  - Power prices fixed for the next 20 years

MY INCENTIVES

- Federal: pays 1/3 of installation
- State: pays 1/3 of installation
- Owner: pays 1/3 of installation
- Local: utility company charges 25¢/kWh purchased from grid
  - Pays 50¢/kWh sent back to grid
- Maintain fixed energy prices for at least 15 years

CONCLUSIONS

- Increased amount of solar panels =
- Decreased amount of fossil fuel combustion =
- Decreased amount of GHG emissions
- Solar panels could comprise of at least 25% of energy supply
  - 5,751 Tg CO2 Eq in 2005
  - Maximum 4,313 Tg CO2 Eq in 2012
- One happy Earth and many happy polar bears

QUESTIONS????