

Solar Basics

Sustainable Living Center
March 13, 2018

The Sun... (aka Solar Energy)

- ◉ Directly or indirectly the sun is responsible for all of the energy on earth.
- ◉ Direct solar energy is a clean, renewable energy resource that is easily vast enough to provide us with all of our energy needs
- ◉ There are three main ways we can harvest solar energy: Passive solar collection, solar thermal, and photovoltaic cells

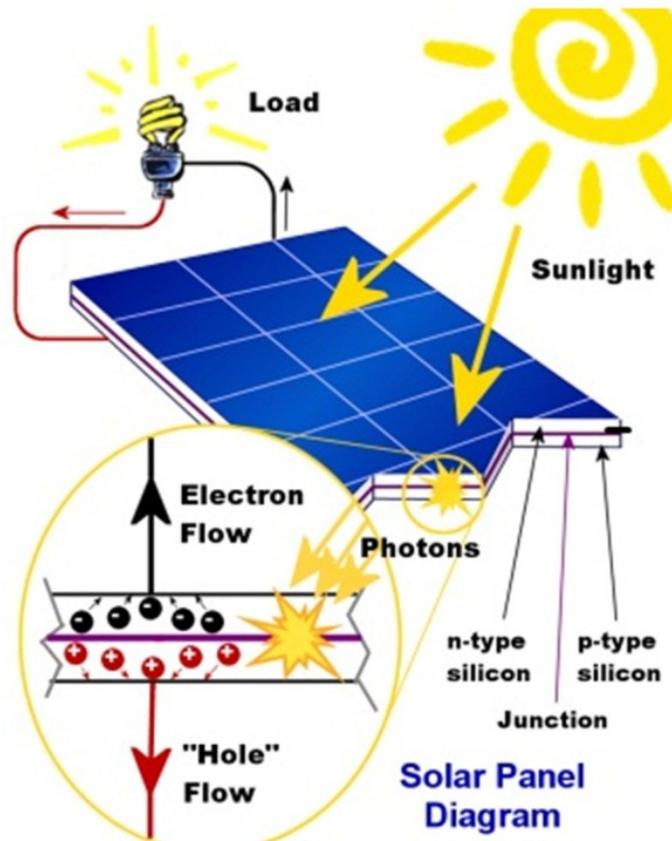
Passive Solar

- Ancient civilizations first used dwelling location and orientation to make better use of heat from the sun.
- The principles of passive solar incorporate elements of a home's location, orientation, window size and placement, insulation, shading, ventilation, thermal mass, and more to allow it to collect heat from the sun's rays in winter and to reject heat in the summer.

Thermal Solar

The Mechanics of PV

How Does Photovoltaic Energy Work?



Layers of silicon, phosphorous and boron are arranged into cells in PV solar panels. When sunlight strikes these cells, the panels are designed to absorb the photons that are present. The photons excite the electrons within the materials in the solar cells to such a point that they are released from their atomic orbits and create an electrical charge. The phosphorous electrons create a negative charge, while the boron electrons generate a positive charge. The combined result is a directional current, otherwise known as DC electricity.

Why Solar?

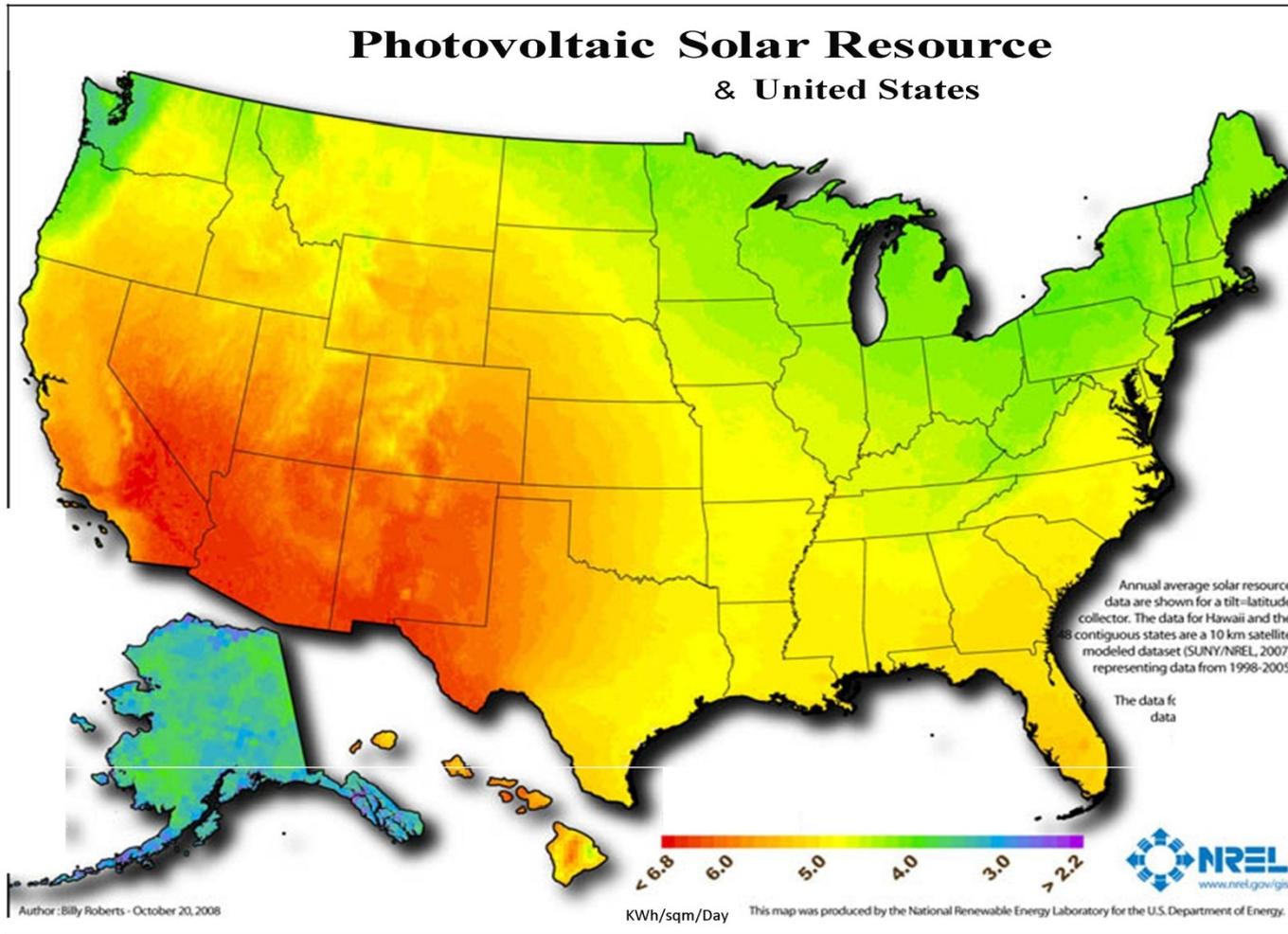
- **The main benefits of solar energy are:**

- Solar energy systems do not produce air pollutants or carbon-dioxide
- When located on buildings, they have minimal impact on the environment

- **Two limitations of solar energy are:**

- The amount of sunlight that arrives at the Earth's surface is not constant. It varies depending on location, time of day, time of year, and weather conditions.
- Because the sun doesn't deliver that much energy to any one place at any one time, a large surface area is required to collect the energy at a useful rate.

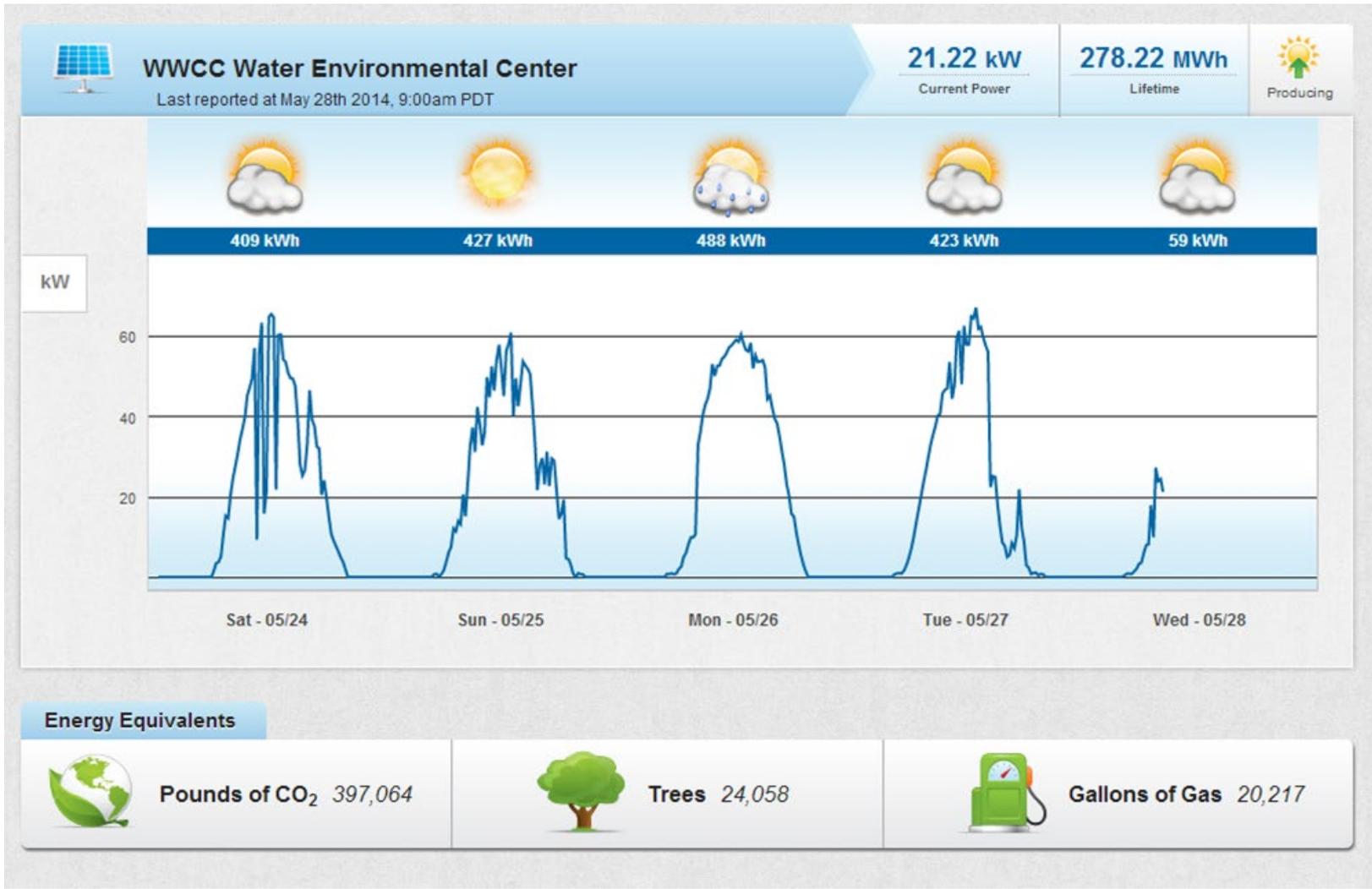
Does Solar make sense for my Region?



WWCC WEC – 75 KW Array



Production monitoring



Make the sun, and my money, work for me...

- Produce electricity for my household's use
- 30% Federal Tax Credit (projects completed through 2016)
- Production Credit (cash) of up to \$5,000 per year.
 - Base rate: \$ 0.15 per kwh
 - WA Panels only: \$ 0.36 per kwh
 - WA Panels and inverters: \$ 0.54 per kwh (through 2020 – who knows after?)

And work...

- 100% Sales Tax Exemption for systems < 10 kW and 75% for systems > 10 kW – through 2018
- REAP – Loans and grants available to rural small businesses, farmers, and ranchers for renewable energy and energy efficiency projects.
- Efficiency-friendly financing:
 - PSCCU Energy Smart Loan
 - Umpqua Greenstreet Loan products

What is my Investment?

- Varies greatly depending on numerous factors, such as:
 - Home size
 - Home's orientation
 - Vegetation on Site
 - Other buildings
 - What equipment is used
- The system should be right-sized to maximize the production for your home.
- Have a site analysis done by a reputable installer.

Questions?

