

Solar Energy

Background

Solar is the Latin word for sun—a powerful source of energy that can be used to heat, cool, and light our homes and businesses. That’s because more energy from the sun falls on the earth in one hour than is used by everyone in the world in one year. Oklahoma ranks seventh in the nation for solar energy potential because we have so many sunny days. On average we have 3,089 total hours of sunshine per year.

A variety of technologies convert sunlight to usable energy for buildings. The most commonly-used solar technologies for homes and businesses are solar water heating, passive solar design for space heating and cooling, and solar photovoltaics for electricity.

Solar photovoltaics solar cells, also called photovoltaic (PV) cells, convert sunlight directly into electricity. PV gets its name from the process of converting light (photons) to electricity (voltage), which is called the PV effect. The PV effect was discovered in 1954, when scientists at Bell Telephone discovered that silicon (an element found in sand) created an electric charge when exposed to sunlight. Soon solar cells were being used to power space satellites and smaller items like calculators and watches. Today, thousands of people power their homes and businesses with individual solar PV systems. Some utility companies use PV technology for large power stations.

Solar panels use both direct and indirect sunlight to make electricity. Solar panels used to power homes and businesses are typically made from solar cells combined into modules that hold about 40 cells. A typical home will use about 10 to 20 solar panels to power the home. The panels are usually mounted at a fixed angle facing south, or they can be mounted on a tracking device that follows the sun, allowing them to capture more sunlight. Many solar panels combined together to create one system is called a solar array. For large electric utility or industrial applications, hundreds of solar arrays are interconnected to form a large utility-scale PV system. Traditional solar cells are made from silicon, are usually flat-plate, and generally are the most efficient.

Solar farms require five to seven acres of land per megawatt capacity. In Mustang, Oklahoma, Oklahoma Gas & Electric operates a farm that occupies over 16 acres of land and features 2,000 fixed and 8,000 sun-tracking solar panels. This farm generates enough electricity for over 1,000 homes.

Vocabulary

array— a group arranged in rows and columns

cell— a small compartment, cavity, or bounded space

convert— to change from one substance, form, use, or unit to another

energy— the capacity (as of heat, light, or running water) for doing work

module— any in a series of similar units for use together

passive— of, relating to, or making use of the sun’s heat usually without the aid of mechanical devices

potential energy— the amount of energy a thing (as a weight raised to a height or a coiled spring) has because of its position or because of the arrangement of its parts

solar— of, derived from, relating to, or caused by the sun

solar panel— a group of solar cells forming a flat surface

technology— the use of science in solving problems (as in industry or engineering)

utility— the quality or state of being useful