

PHOTOVOLTAICS (solar electricity)

This fact sheet provides consumers, producers, lawmakers, educators, and municipalities with current information about photovoltaics (PV) in Arkansas.

What is photovoltaics?

Photovoltaic (PV) systems convert the sun’s energy into electricity without consuming any fossil fuels. PV has proven itself as an effective, quiet, reliable, and increasingly economical approach to generating pollution-free energy and reducing greenhouse gas emissions.

In addition, PV systems have low operating costs, since their fuel (sunlight) is free and there are few moving parts. These systems are versatile—allowing power output to be increased by adding more modules—and operate well in nearly any climate. They are safe when installed properly.



PV modules don’t store energy, so batteries or the power grid are necessary for night use or for when there is no sunshine. Other related components may include: batteries, charge controller, inverter, mounting racks, meters, and wiring.

How are PV systems used?

Many utilities have recently installed large PV arrays to provide consumers with solar generated electricity or as backup systems for “critical” equipment. PV systems are currently being used for:

homes and business	water pumping for cattle	gate openers
environmental monitoring	communications	electric fences
trailers and RVs	marine and air navigation	health care
lighting	utility power	roof shingles
commercial applications	water purification	awnings
aeration and de-icing	compressors for fish farms	crop irrigation
powering sprayers	cathodic protection	calculators

Today's solar market includes building-integrated products, such as solar roof shingles for homes and opaque glass PV facades, which are aesthetically pleasing and effectively reduce the cost of PV installation. PV and passive solar are being incorporated into factory-built modular homes.

Economics

Over the lifetime of a PV system, the lower maintenance costs and nonexistent fuel costs make PV more economical than other fuels in off-grid (stand-alone) applications when power lines are more than ¼ mile away. When the cost to extend electric power lines from the electric grid averages from \$20,000 to \$80,000 per mile, the cost savings can pay for the PV system and the homeowner would never again have to pay another electric bill.

Question & Answer

Q: When is residential solar electricity practical and affordable?

A: (1) **when you design** your house and utilities (water, heat, power) for low energy use; (2) when you carefully select energy-efficient lights and appliances; and (3) when you eliminate energy waste by appliances or human carelessness. It is not practical to operate major heating appliances—which account for 80 percent of typical monthly electric bills—with solar electricity. Instead, use wood, propane or gas. Propane refrigerators or special electric refrigerators and freezers designed for solar powered homes are highly insulated saving 75 percent of the energy consumed by ordinary refrigerators. Instead of air conditioning, try a swamp cooler that works well for all but humid areas.

Q: How much does a solar electric system cost for a house?

A: A **1-kilowatt system** costs in the neighborhood of \$8,000 to \$10,000 and will provide about 20 to 30 percent of an average home's electricity needs. Contact a renewable energy dealer in your area for specific cost information.

Net Metering

Arkansas is among a number of states with net metering rules. Arkansas rules allow residential renewable energy systems with a generating capacity of up to 25 kW and commercial systems up to 100 kW to connect to the utility grid for net metering purposes. Essentially, net metering allows the utility grid to serve as storage, eliminating the need for battery storage in PV systems. When the PV system produces more electricity than the building is consuming, the excess is fed into the utility grid and the customer is credited for that energy through a special utility meter that can spin backwards.

Technologies eligible for net metering in Arkansas include solar, wind, hydroelectric, geothermal and biomass systems, as well as fuel cells and microturbines using renewable fuels. There is no limit on the number of customers per utility who may net meter.

PV at Work in Arkansas

Does PV work in Arkansas? Absolutely! There are many successful PV projects across the state. Here are just a few examples:

- The new **Clinton Presidential Library** in Little Rock includes a four-story archives annex powered by a rooftop PV system.
- The **Heifer International** headquarters building, under construction in Little Rock, includes a PV system that that will be used to generate electricity for charging hybrid/ electric cars.
- **Trice Elementary School** in Texarkana and **Fayetteville High School** boast PV systems that reduce the cost of energy for each school and serve as an educational tool.

More Information

Get more information about PV from these sources:

- ArkansasRenewableEnergy.org
- Arkansas Energy Office
www.1800arkansas.com/energy/
- American Solar Energy Society
www.ases.org
- Renewable Energy Access
www.renewableenergyaccess.com/
- DOE Office of Energy Efficiency and Renewable Energy (EERE)
www.eere.energy.gov
- Florida Solar Energy Center
www.fsec.ucf.edu/

Types of PV Systems	
Grid-Intertied or Utility-Connected	Alternative power system in which excess electricity may be sold back to the power grid
Stand-Alone	Independent of utility; uses inverter to change DC to AC; battery storage
PV-Direct	PV modules wired directly to a load
Hybrid System	Integrating PV with other power sources such as wind turbine or generator