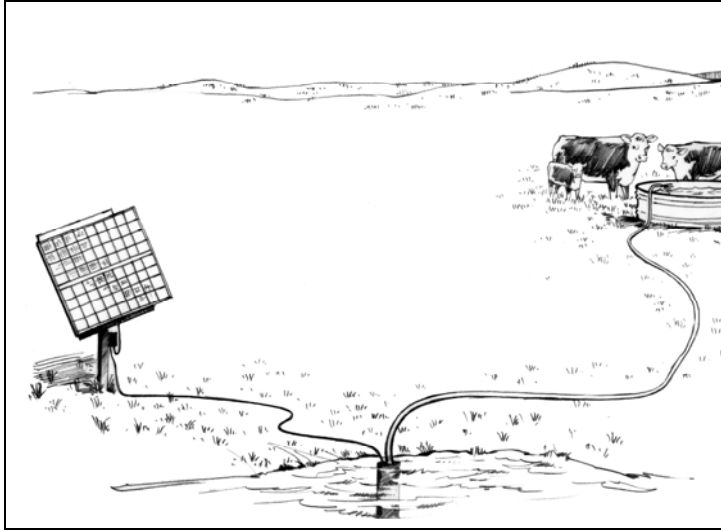


Remote Solar Water-pumping Systems



Why consider a solar alternative?

In remote locations, solar water-pumping systems may be your best option for providing water for livestock, small-scale irrigation, wildlife, and homes off the traditional power grid.

Extending the existing power line is costly, so farmers and ranchers often use three other power sources: generators, wind turbines, and solar or a hybrid combination.

Combustion engines are used most often, but require significant maintenance including regular oil changes and tune-ups, plus the time and cost to fuel them.

Windmills require sufficient and regular wind resources, and wind often does not blow during summer months when power is most needed. Other drawbacks are maintenance requirements.

What's the solar advantage?

Watering seasons usually occur from early spring to late fall when most of the state receives plenty of sunlight to power solar photovoltaic (PV) panels. Advantages of solar-powered pumps include:

- **Fuel cost** – Once a PV system is purchased and installed, there is no additional cost for fuel. Most locations east of the Cascades have excellent solar resources; locations west of the Cascades have adequate solar resources to power a PV system.
- **Oregon tax credits** – State tax credits for renewable energy technologies like solar and wind reduce the cost and payback period. Tax credits on qualified systems cover up to 50% of eligible project costs. See tax credit info below for more information.
- **Reliable power** – PV power systems require the least maintenance of all three alternatives to utility power, produce no emissions and operate silently. The modules carry 20- to 25-year warranties. PV systems have become the power choice for many critical applications such as military operations and emergency stations where reliability is essential.
- **Flexibility** – Many PV pumping systems allow for convenient expansion or relocation. If a pump is large enough to accept additional power, PV modules can be added later to increase water output for seasonal operation.
- **Quick installation and portability** – Most systems can be installed in less than a day. They also can be moved from one water source to another to serve different livestock or encourage relocation of livestock. Some ranchers have systems installed on trailers to move them quickly where water is needed.
- **Off-stream use** – PV systems protect streams, riparian areas and other water bodies when water access for animals is set back from these areas. Placement can also reduce runoff to protect water quality.

What components are needed?

Most PV pumping systems consist of PV modules and mounting rack, a direct current (DC) pump, pump controller and a water storage tank. In some cases, the use of a racking system that tracks the sun may be desirable. Additional materials may include plastic pipe, wiring, a float switch and protective fencing.

Are storage batteries required?

Most systems operate without batteries and pump water only during bright daylight hours. It may be better to increase the size of the storage tank. Storing water rather than electricity will increase system reliability and reduce system complexity. Plan on at least five days of water storage.

What is the cost of a PV pumping system?

The cost will depend on conditions at the site. The factors most affecting the cost are flow rate and vertical lift required by the pumping system.

- PV modules currently cost about \$5 per watt and will range in cost from \$1,000 to \$4,000 for most systems including the mounting rack.
- Low-flow and/or low-lift pumps may cost as little as \$500, while high-lift submersible well pumps may be \$2,500 or more.
- The control unit for the pump will generally cost \$300 to \$500.
- Additional materials, including pipe, wire, switches and hardware will vary in price

Example: A 400-foot well capable of producing 2 gallons /minute will need two 200 Watt PV modules to pump roughly 700 gallons on an average summer day. The cost will likely be about \$3,000.

What to do before you buy

Take the time to accurately estimate water requirements, specific needs of the pumping system and storage tank size. Unlike line-connected pumps that deliver water on demand, most PV pumping systems deliver water only when sufficient sunlight is available. You will need to know:

- Daily watering needs (flow rate)
- Vertical lift (head) between the water source and storage tank
- Distance between the water source and storage tank
- Water quality and available flow of the well, spring or stream plus seasonal variations of the water source

State Tax Credit: Check out Oregon tax credit information **BEFORE** you buy. Information is available at www.oregon.gov/ENERGY/RENEW/Solar/Support-BETC.shtml or call Rob DelMar at 1-800-221-8035, Ext. 246.

