



Tools of the Trade: Alternative Water-well Pumps

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By John & Sue Weaver

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SunPumps SDS Series
solar-powered pump

Electric water-well pumps are the norm, but as anyone who has experienced a prolonged power outage knows, they don't always deliver when the going gets tough. Thankfully, there are other well-pump options.

Before we discuss those options, you should understand the basic difference between types of well pumps: Shallow well pumps. These are located above ground and designed to lift water out of the well through a suction pipe. They are rarely useable on wells more than 30 feet deep.

Deep-well jet pumps. Deep-well jet-pump heads are mounted above ground, but their jet body extends into the well below water level. They lift water from depths of 20 to more than 100 feet.

Submersible deep-well pumps. Submersible pumps are long and slender. They fit inside the well casing and force water upward from a pumping element below water level. They aren't restricted by suction lift limitations, so a powerful submersible pump can lift water from most any depth.

Most of these pumps rely on electrical current, but muscle-power, solar energy, wind energy or a combination thereof can be used as a power source for a number of well pumps.

Hand Pumps

During an extended power outage, you'll be glad you have a hand pump on your farm. A properly chosen hand pump requires nothing more than muscle power to lift water from a well up to 300 feet deep. Most can be set up as permanently mounted fixtures in tandem with conventional pumps or easily fitted to a wellhead only when needed.

Bison Pumps hand pump On the downside, all hand pumps require priming before use, and cast-iron hand pumps can freeze.

The simplest of these are shallow-well pump heads like Oasis Pumps' no-frills Model No. W1 and Lehman's cast-iron hand pumps. The Oasis W1, like all Oasis hand pumps, is crafted of lightweight, unbreakable thermoplastics that show no wear on the cylinder or plunger cup after millions of strokes. Its closed design prevents the entry of airborne or other contaminants, and it pumps up to 10 gallons of water from depths up to 30 feet.

If you prefer a more traditional approach, you'll like Lehman's American-made, cast-iron beauties. They have an array of hand-operated, cast-iron, deep-well pump heads that lift water from wells from 75 to 300 feet deep, several of which can be driven by windmills with the addition of Lehman's Pump Jack attachment.

Bison Pumps builds easily installed, stainless-steel, deep-well hand pumps. Manufactured in Houlton, Maine, they provide generous volumes of fresh water with every stroke, from wells with a static water level of up to 200 feet.

Simple Pump lever-arm hand

pump Simple Pump's stainless steel and aluminum deep-well pumps in lever-arm and ADA 100-accessible, crank-arm versions require just 10 pounds of force to lift 3 gallons of water per minute from up to 100-foot static water depths. (Static water depth indicates how far water comes up a well pipe, so pumping from great depth is possible.)



Simple Pumps can be fitted with the company's 1/5-horsepower gear-motor attachment that operates on 12 to 15 volt DC current from an automotive or deep-cycle marine battery or an idling truck or tractor.

Solar-powered Pumps

Photovoltaic-powered (PV) solar pumps work well for household purposes and for farm applications like watering the garden. Photovoltaic panels produce energy from sunlight through the use of silicon cells; they work equally well in hot and cold climates and have a life expectancy of roughly 20 years.

These cells are enclosed in a glass frame (called an array) that makes up the solar module. Because the sun doesn't shine every day, water storage tanks are important elements of these units. When storage tanks are filled to capacity, further energy generated by the solar array is routed to and stored in batteries.

Solar pumps lift and store water year-round, though short days and cloudy weather reduce energy production. They're fairly easily moved between locations, making them a fine bet for watering livestock on far-flung ranches.

Conergy's Solar Slowpump (formerly the Dankoff Solar Slowpump) was the world's first commercially available low-power solar pump. While it's non-submersible, it neatly draws water from shallow wells, springs, cisterns, tanks, ponds, rivers and streams and pushes the water as high as 450 vertical feet and through miles of pipeline.

Slow pumping minimizes the size and cost of the solar array, wire and piping necessary. Made in a range of sizes, it survives most freezes, and its wearing parts typically last five to 10 years, with an overall pump life expectancy of 15 to 20 years.

Sunelco offers a variety of solar-powered pump brands for farm use, including Shurflo and SunPumps. The Shurflo 9300 is designed to be able to run dry or process dirty or silty water without sustaining damage. The 9300 delivers 112 gallons per hour at its maximum depth of 230 feet. The SunPumps SDS series are low-cost submersible pumps that offer 1/2 to 5 gallons per minute with up to 230 feet of lift.

Wind-powered Pumps

Wind power is another alternative to electricity-driven pumps. Windmills have been used to water livestock on America's farms and ranches for more than 100 years, beginning with the Halladay windmill in 1854 and continuing

Aermotor windmill pump to the Aermotor and Dempster designs, which are still in use today.

In addition to drawing water with windmills, wind generators can provide electricity to drive well pumps in emergency situations and to home and farm owners who choose to live off-grid. They work best in locations where the wind blows steadily (but not too hard). As with solar pumps, household water is stored in tanks, and excess generated energy is directed to a battery array.

For a traditional, full-sized windmill to pump water for livestock, irrigate crops or keep your pond full, it's hard to beat Aermotor; they've been building farm windmills since 1888, so they've had ample time to get things right. Six- and 8-foot diameter, complete windmill packages (excluding towers) still cost less than \$3,000 and come with a seven-year warranty.

For a more modern approach, Airlift Technologies' water-pumping windmills offer 315 feet of lift from the static water level and pump 1 to 30 gallons per minute, with no moving parts below ground. These units can be located up to 1/4 mile from the well they power and can be installed by one person in less than a day.

Gas-powered Pumps

High-pressure, gasoline-powered pumps are designed for moving water (excluding drinking water) from one place to another, such as for irrigation purposes on the farm or for flood control. Honda makes two of the best.

Honda WH20XK1AC1 gas-powered

pump Honda's WH15XK1C1 1 1/2-inch, high pressure, self-priming pump comes with a Honda GX120, 118cc easy-start commercial engine and provides a 115-gallon-per-minute discharge capacity and 127-foot head lift. The somewhat larger WH20XK1AC1 2-inch unit has a Honda GX160, 163cc engine; it pumps 134 gallons per minute, and its total head lift is



141 feet.

On either side of that spectrum, McCulloch offers its FPP10B gasoline-powered, high-pressure pump, a lightweight, easily portable unit with a 1-horsepower, 26cc McCulloch engine capable of pumping 24 gallons per minute with a total head lift of 82 feet; as well as a big, brawny behemoth, the McCulloch FP300A with a 6.5-horsepower, 196cc McCulloch engine that pulls 265 gallons per minute with a total head lift of 85 feet.

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