

## Swimming in savings

By Brian Sloboda  
Cooperative Research Network

Swimming pools and hot tubs are fun toys, but accompanying high electric bills are not inevitable. A number of relatively simple changes can cut operating costs by half or more.

At about \$400 per year, the typical residential in-ground pool can account for one-quarter of a household's annual utility bill. Hot tubs cost just a bit less to operate—about \$300 per year. Electricity for above-ground pools runs about \$100 per year.

Most pool energy goes to power the circulating pump, with much smaller amounts needed for cleaning and water treatment. In heated pools (which make up only 10 percent to 20 percent of all residential pools), energy use varies widely depending on climate and use patterns. The most common heat source is natural gas, followed by propane and electric resistance systems. Solar heating and electric heat pumps are gaining ground as high-efficiency options but are still not widely used.

Pumps are the heart and soul of any pool. Most pools rely on a single-speed, 1.5- to 2-hp pump that runs at full speed for eight hours a day or more. More efficient pool pump options include:

Replace an existing single-speed pump with a high-efficiency single-speed pump. High-efficiency pumps use 8 percent to 10 percent less energy and are only marginally more expensive than standard pool pumps—about \$10 to \$20 above the normal pump cost of \$350.

■ **Replace an existing single-speed pump with a two-speed pump.** As



the name suggests, two-speed pumps can run at two speeds and are more efficient because they don't go "full throttle" all of the time. By running at a lower speed for 16 hours per day, you can save 60 percent to 70 percent on electric bills. A two-speed pump will cost an extra \$100 to \$150.

■ **Replace an existing pump with a variable-speed pump.** The most efficient pumps can vary speed—and therefore electricity consumption—with the required workload. Although a variable speed pump will cost about \$650 more than a basic pump, it saves the most energy by far—nearly 90 percent—and offers the greatest operational flexibility. Price and availability should improve over the next

few years as more pool owners adopt this technology.

In addition to replacing an inefficient circulating pump, other measures to consider are:

- **Use a bigger filter.** An oversized filter will result in less pressure loss on the pumping system, enabling greater water flow with less energy. The larger filter will also last longer between replacements. **11123C7-1006B**
- **Use bigger pipes (typically, 2 inches in diameter instead of 1.5 inches) and large-radius elbows.** Making the flow path smoother and wider reduces pressure loss and pumping power.

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## Powering safely during an outage

One of the great things about the modern American electric grid is that power almost always flows when we need it. Given our dependence on electricity, it's understandable why portable generators are popular when the power goes out and stays out for a while.

But generators can cause more harm than good if not used properly. In honor of Electrical Safety Month, recognized each May, I want to give you a few safety tips to protect yourself and our linemen who are working to restore your power.

First, never, ever plug a portable generator directly into one of your home's outlets—unless you have had a licensed electrician install a “transfer switch” in your home. If you don't have a transfer switch, power provided by the generator can “backfeed” along power lines, which can electrocute a lineman working on those lines. **435C9-1200C**

In addition, portable generators create carbon monoxide, the odorless, colorless gas that can quickly become deadly if the generator isn't exhausted outside. Attached garages with an open door don't count—the carbon monoxide can still seep indoors and poison inhabitants. Generators must go *outside* in a *dry* area, which might mean you'll need to rig a canopy to protect it from precipitation at a safe distance from



your home's windows, doors, and vents. How far is a safe distance? Even 15 feet can be too close.

Other things to keep in mind: Plug appliances directly into the generator using heavy-duty, outdoor-rated extension cords, but don't overload it. Follow the manufacturer's instructions for maximum load. Shut off the generator before refueling, or a fire could start—and it's a good idea to have a fully charged fire extinguisher nearby, just in case.

Safety is a top priority at McDonough Power, for our employees and consumer-members alike. Contact us at 309.833.2101 if you'd like to learn more about how to properly install and use a portable generator.

For more tips on how to stay safe during a power outage, visit [www.safeelectricity.org](http://www.safeelectricity.org).

Our office will  
be closed  
Monday, May 27  
in observance  
of Memorial  
Day.



# Solar energy costs decline, but still not free

By Angela Perez



Solar energy has come a long way since 1830, when British astronomer John Herschel famously used a solar thermal collector box (a device that absorbs sunlight to collect heat) to cook food during an expedition to Africa.

Today, photovoltaic (PV) materials directly convert light into electrical energy without the need for turbines, generators, or other mechanical assistance. When a PV system absorbs sunlight, energy passes on to electrons. The energized electrons break free and, in the right conditions, join an electric current—which can then power your home.

PV systems for homes are most commonly made up of dark, flat panels placed on roofs. Smaller versions can operate individual lights or remote machines (such as irrigation pumps or traffic signs), while larger applications are able to power buildings or supply electricity to the grid.

## What it costs

Over the past 20 years, the price of PV modules has tumbled, and with

it, PV arrays are emerging as an ever-growing part of the nation's renewable energy supply. According to the Solar Electric Power Association, the price of PV modules has plummeted from \$9 per watt in 1992 to \$1.15 per watt in 2012.

NearZero, a non-profit research institute based in Stanford, Calif., recently surveyed 21 experts about solar's outlook. The consensus was that "for the next 15 years at least, PV prices will continue to head down." According to the U.S. Department of Energy (DOE) Lawrence Berkeley National Laboratory, the total installed costs for residential PV fell substantially in 2011 and through the first half of 2012, by as much as 14 percent. **9212D3-308A**

Commercial and utility-scale solar systems are seeing similar shifts—a setup that once necessitated an outlay of more than \$3,600 per kilowatt just two years ago can now be put in for less than \$2,000 per kilowatt.

As solar has become more affordable, more than a dozen cooperatives

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## Learn more about solar energy

### Find Solar

Interested in installing a solar PV system at your home, but are unsure of the expense? This tool takes your home's location, energy use, and state and federal incentives into account to calculate potential costs and benefits. It also provides an estimate of how long it will take before your investment pays off—often the key question that makes or breaks a PV system's feasibility. [www.findsolar.com](http://www.findsolar.com)

### U.S. Department of Energy

The Office of Energy Efficiency and Renewable Energy, part of the U.S. Department of Energy, offers excellent information on solar energy, from frequently asked questions to information on the federal Solar America Initiative. A comprehensive Solar Timeline tracks the renewable resource from ancient use to future applications. [www.eere.energy.gov/solar](http://www.eere.energy.gov/solar)

### National Renewable Energy Laboratory

The National Renewable Energy Laboratory (NREL) fine-tunes the performance of solar power technologies and researches new ways to harness the sun's energy. Check this site for industry news, programs, and in-depth information on specific technologies. [www.nrel.gov/solar/](http://www.nrel.gov/solar/)

### Solar Decathlon

Drawing on college students from around the world, the U.S. Department of Energy-sponsored Solar Decathlon showcases cutting-edge applications of solar technology. Teams compete to meet a list of criteria related to energy efficiency and sustainability, including powering small, home-grown buildings for a week on the National Mall in Washington, D.C. Pick a team and cheer them on: [www.solardecathlon.org](http://www.solardecathlon.org)



## Solar energy (Continued from page 16c)

across the country, notably in Arizona, Colorado, Florida, Texas, and Utah, are constructing community solar “gardens”—centralized PV systems, segments of which are sold or leased to members—to meet growing consumer calls for solar alternatives. Other co-ops are investing in large PV farms as a way to diversify their generation mix and meet state renewable portfolio standards. **6332D9A-202C**

In addition, high-temperature solar thermal energy (concentrating solar power) has begun making some tiny inroads as a round-the-clock power source in the Southwest. The technology uses long troughs of shiny parabolic mirrors that concentrate the sun’s rays on receiver tubes filled with synthetic oil (or a tower containing molten salt). The fluid gets heated to as high as

750 degrees Fahrenheit before being pumped through heat exchangers to create steam that spins a turbine-generator. Concentrating solar power is seen by some as a possible way to stockpile renewable electricity for later use—the heated material can continue to produce power even when the sun doesn’t shine.

“Although solar power remains more expensive and less reliable than more traditional forms of power generation, we’re excited about its potential,” says Kelly Hamm, Energy Services Manager at McDonough Power. “If you’re considering putting in solar panels, or any type of ‘backyard’ renewable generation at your home, make sure to contact us first to make sure the system meets our interconnection standards.”

## The bottom line

Sunlight may look like an easy way to generate electricity, especially in remote areas without easy access to transmission lines. But there are drawbacks. The sun only shines for a set number of hours daily, and cloudy or overcast conditions can wreak havoc on solar power production. However, state and federal rebates for installation and declining equipment costs can make a PV system financially feasible in the right location.

*Sources: Solar Energy Industries Association, Lawrence Berkeley National Laboratory, U.S. Department of Energy, Solar Electric Power Association, NearZero*

## Swimming (Continued from page 16a)

■ **Downsize the pump.** Most pools are designed with an unnecessarily large pump. Going from a 1.5-hp or 2-hp down to a 0.75-hp or 1-hp model can reduce pumping energy by half or more, often with no loss of performance.

■ **Control pump run time.** Depending on the effectiveness of your filtering system and the amount of use the

pool gets, it may be possible to save a significant fraction of pumping energy just by running the pump less. The normal target is to cycle the pool’s volume through the filter one or two times per day. But you could try fewer hours and see if the pool still is acceptably clean. Although this no-cost measure is appealing, it will not save as much money and

energy in the long run as replacing an inefficient pump with an efficient, two-speed or variable-speed pump.

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## Member Prizes

Every month we will have four map location numbers hidden throughout *The Wire*. If you find the map location number that corresponds to the one on your bill (found above the usage graph), call our office and identify your number and the page that it is on. If correct, you will win a \$10 credit on your next electric bill.



## Tip of the Month

Properly installed shades can be one of the most effective ways to improve windows’ energy efficiency. Lower them during summer; in winter, raise during the day and lower at night on south-facing windows. Dual shades, with reflective white coating on one side and a heat-absorbing dark color on the other, can be reversed with the seasons and save even more energy. Learn more at [EnergySavers.gov](http://EnergySavers.gov).

*Source: U.S. Department of Energy*