Backyard pools can be energy efficient with the right mind-set and equipment.

Secret Energy Hog

Want to know where one-quarter or more of the electricity goes in many homes? Hint: It's outside.

By Steve Easley

We've all heard about the "vampire" energy losses, and most know that about 6% to 8% of our home's energy use is consumed by products that continuously suck energy—like TVs that are not on, cell phone chargers, stereos, computers at sleep, printers, and the like. Just about anything that we plug into our outlets uses some energy when not "on."

What if I were to tell you about a tried-and-proven energy saving technology that could reduce energy use in five million homes to the tune of 9 to 14 billion kW hours per year and eliminate 10 million tons of green house gases being pumped into the atmosphere by two-thirds? This stealthy energy robber is equivalent to the emissions of 1.3 million cars.

What if I told you that most units installed in homes have only modest improvements over what was manufactured in the 1940s. What if I told you that installing this higher efficiency technology would mean a dollar savings per home equal to or better than what an Energy Star home package would save in a new home? What is amazing is that this a huge energy hog is not even part of a home energy rating or even on the radar screen of home energy audits, even though it can account for up to 25% of a home's electricity use!

The culprit is in-ground swimming pools. There are more than 5 million residential in-ground pools in the United States today with energy gulping pool pumps, and that number is growing. Over the last 10 years about 4% per year.

The typical pool has a 1 to 2-horse power motor that draws about 1,500–2,500 watts of electricity to pump and filter water.

Most pool pumps run about six hours a day. To put this into perspective it takes about 24, 500 megawatt power plants just to provide the electricity required to supply power for pumping and filtering water for pools. This is even higher if you consider the above-ground pools.

Watt-a-Waste

Pools can be more energy efficient—with the right mind-set. The standard pool pumps typically installed today are extremely wasteful. They draw about 2,000 to 2,200 watts and have a demand of 2-2.2 kW. (I also confirmed 2000 watts by measuring the watt draw of my own pool pump. Yikes.)

A pool that operates six hours per day for nine months a year would use 12 kwh per day or 3,294 kwh per year @ $.25 per kwh. That's about $800 per year. Some utilities have a tiered rate structure that can even cost more. Even at the U.S. average of $.12 per kWh, that's still about $400 per year. Pool sweeps can easily consume another 3–4 kWh per day or another $100 per year.

New Technology Can Save 50%–80%

There are now high-efficiency, variable speed, low-flow pumps that are electronically controlled and can save huge amounts of energy and money.

The typical pool pump motor is an induction motor and has efficiencies of 35% to 70%, which is not efficient. Since they operate at high speeds they consume more energy than variable speed pumps.

Variable speed motors have permanent magnets and are similar to the electric motors used in hybrid cars. They can vary their speed and flow rates. These motors have efficiencies in the 90% range. The wattage draw of high efficiency pool pump motors range from 180 watts to 400 watts, or average about 2 kWh per day, which is quite a bit less than the 12 kWh per day of the typical pool pump.

Some of their efficiency gain is due to the fact that the motor is more efficient. The other major gain in cost savings is because when you cut the flow rate and the speed of the motor in half the power is cut to one-eighth.

Photo courtesy Pentair

LED pool lights reduce lighting energy from 500 watts to 70 watts and provide the same light output.

Since you cut the flow in half you now have to run the pump twice as long to get the same filtration, but the net result is you are using ¼ of the energy compared to an outdated pool pump. This is due to the affinity law, which mathematically explains that power usage goes up at a nonlinear rate as you increase pump speed and flow.

If you run your pump at a slower speed for longer periods of time it is more efficient and less costly to operate. Since variable speed pumps are higher quality motors, they last longer. Manufacturers estimate a 15-year life based on advanced aging tests from the manufacturers.

Rebates and Other Advantages

Utility companies have figured out that high-efficiency pool pumps make sense because not only do they reduce energy use, but they also provide significant reductions in peak demand since pool pumps run during the hottest hours of the day in summer. Jeff Farlow from Pentair, a pool pump manufacturer, points out that more than 20 utilities offer rebates from up to $400.

Variable pool pumps are quiet compared to standard pumps, they put less stress on the pool's plumbing systems, and they offer better filtration. These pumps can also be configured to eliminate the booster pump for the pool sweep, which could save an additional 1,000 kWh per year. GB

Hayward's EcoStar family of pumps offers a variable speed, totally enclosed fan-cooled motor and industry-leading hydraulic design. According to the manufacturer, it can save up to 90% on energy costs compared to a single-speed pump. The EcoStar SVRS offers an itegrated safety vacuum release system that helps prevent suction entrapment without additional devices, plumbing, or wiring.

IntelliFlo Variable Speed pumps combine variable drive technology, onboard digital intelligence, and permanent magnet motors (used in hybrid cars) to reduce pump-related energy costs by up to 90%.

Top photo courtesy Hayward

Steve Easley is owner of Steve Easley & Associates, a nationally recognized building science consultant that specializes in green and best practice building. Contact him at steve@steveeasley.com