

## Insiders' Guide to Reducing Pool Energy Consumption

Homeowners are becoming more and more aware of ways to conserve energy. Compact fluorescent light bulbs, ENERGY STAR appliances, hybrid cars, and many other energy-efficient choices are mainstream ideas. Unfortunately, swimming pool energy- and water-saving opportunities are frequently overlooked.

Residential pool filtration systems are typically one of the three hungriest consumers of electrical energy in homes with pools. They are often right behind, and in some cases exceed, air conditioners and water heaters.

Fortunately, swimming pool industry leaders are embracing new energy- and water-saving technologies that conserve kilowatt use, reduce electrical utility peak demand (kW), reduce noise pollution and save money.

According to a 2008 report by the Natural Resources Defense Council (NRDC), there are more than 4.5 million inground residential pools in the United States consuming between \$1.1 and \$1.6 billion in energy costs per year. Energy use varies widely by region due to the differences in the length of the swimming season, energy rates, prevalence of heaters, and the way owners operate their pools. But the NRDC has estimated that our nation's residential inground swimming pools consume between nine and 14 billion kWh and between 36 and 63 million therms of natural gas each year. This results in national CO<sub>2</sub> emissions of approximately 10 million tons per year—the equivalent of 1.3 million cars and light trucks on the road. Pools are also responsible for a range of other environmental impacts, including the use of water to replace evaporative losses and the production and discharge of various chemicals to treat the water.

Fortunately, the NRDC report continues, much of the energy-associated impacts of pools can be offset cost-effectively with energy-efficient components and better system design.

When considering the overall energy consumption of a home with a swimming pool, the first thing to look at is the filtration system, the heart of which is the pump. The potential cost savings of a variable-speed pump over a traditional single-speed or two-speed model is dramatic.



### Behold the Variable-Speed Pump

A variable-speed pump can reduce a swimming pool's energy consumption up to 90 percent, depending on how often the pump runs, what it is used for (water features, circulation, running a pool cleaner, etc.) and the overall hydraulic design of the pool. That can translate to a reduction of 20 to 40 percent of a homeowner's monthly electric bill. This is because variable-speed pumps can change their speed to provide only as much flow as a system requires to complete certain tasks. For example, a variable-speed pump can run on very low speed for routine filtration, ramp up to operate a pool cleaner, and kick up even faster to create a white-water rapids effect for a large water feature.


Because a variable-speed pump uses so little energy for low-speed tasks like filtration, it is possible, depending on energy rates, to spend 10 cents filtering a particular amount of water, while it would cost a full dollar to filter the same amount of water with a standard pump.

*Replacing a single-speed pump with a variable-speed model and covering a heated pool, can generate annual savings comparable to those possible by upgrading a 2,500-square-foot, single story home to ENERGY STAR levels, at only a fraction of the cost. The amount of savings vary, of course, but in some regions, it is possible to generate even greater savings with the pool upgrades than with the typical home energy efficiency upgrades focused within the home's envelope.*

# Insiders' Guide to Reducing Pool Energy Consumption (continued)

## Annual Savings Pool vs. ENERGY STAR Home\*

Home savings from upgrading 2,500 sq. ft. single story home to ENERGY STAR levels.

City 	Climate Zone	Swimming Pool	ENERGY STAR Home
Phoenix	3	\$390	\$509
Los Angeles	4	\$633	\$529
Orlando/ Tampa	2	\$621	\$679
Islip (NY)	11	\$454	\$686
San Antonio	4	\$491	\$704

\*Natural Resources Defense Council (NRDC) Synergies in Swimming Pool Efficiency March 24, 2008

*In fact, variable-speed pool pumps have proven to be the most cost-effective appliance with the fastest ROI of all components offered in the Energy Efficiency Program, according to Pat Conlin, retired director of City of Palm Desert Office of Energy Management.*

## Beyond the Pump

In addition to the pump, homeowners should be aware of automation systems that save money by assisting with smart scheduling of equipment cycles, solar pool heating options, LED light savings over traditional incandescent pool lights, and the importance of using covers on pools and spas.

**Automation controls** affect energy consumption in two ways. The first is similar to how a programmable home thermostat conserves home heating and cooling energy. Both allow homeowners to schedule when equipment runs so things are comfortable and ready to use when everyone returns from work and school, but not unnecessarily when the home or pool or spa are not in use. Additionally, automation allows for programming daily functions during off-peak times to take advantage of lower utility rates. Homeowners can now make adjustments remotely using a computer, iPad or iPhone, making it easier and more convenient to maximize energy savings.

**Pool lighting** issues, meanwhile, are essentially the same as in other industries. It is all about how many watts are needed to produce the desired brightness, as well as the longevity of newer style LED lights. Some of the newest pool lights need only 70 watts to provide the same brightness as an incandescent light consuming 500 watts. Also, LED pool lights simply last longer.

**Covers** are an obvious necessity to anyone who understands evaporation and the fact that heat rises. Delving just a bit into the science, it takes 1 BTU (a measure of heat energy) to raise the temperature of 1 pound of water 1 degree Fahrenheit. However, every pound of 80-degree water that evaporates takes 1,048 BTUs with it. Capturing that heat, (i.e. reducing the rate of evaporation), is one easy way to conserve energy and heating costs. Next to pool pumps, heaters are typically the biggest consumers of energy in a pool system, especially gas-fired heaters.

**Solar heating systems**, on the other hand, consume very little energy—only what is required to circulate pool water through the panels and back to the pool. In colder climates, solar panels can supplement a gas-fired heater, dramatically reducing the demand on the primary heater. In warmer climates, solar can be the primary heat source. The same is true of heat pumps, which are also far more efficient than gas heaters.

## How much can be Saved?

According to the NRDC's research, annual utility bill savings of \$400 or more are possible by addressing inefficiencies in pool pumping, and more savings are possible by addressing losses in pool heating. In fact, the NRDC has concluded that the savings for some heated pools approach the typical savings from upgrading average-size new homes to ENERGY STAR's new home requirements. "Tremendous savings in heating and pumping energy use are possible in all pools through comprehensive design changes and/or component upgrades," the NRDC report summary states.

On a related note, the ENERGY STAR program recently added pool pumps to its list of products to be evaluated for ENERGY STAR recognition.

In the end, pools built with overall system efficiency motivating hydraulic design, equipment selection and other key factors are cleaner and far less expensive to operate.

