

Conserving Energy In Your Swimming Pool

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Swimming pools provide a great amenity for your guests if you manage or own a hotel. That extra place where guests can relax will draw them back again and again to your establishment.

Having a swimming pool means that you might be adding significant costs to your operating budget. There are several ways that you can reduce operating and maintenance costs, lower water consumption, and conserve heat if you heat your pool. Many establishments heat their pool to maintain a comfortable environment for their guests. We will discuss some options for reducing or eliminating some of the associated costs of having a swimming pool.

Optimize water filtration and pumping.

A study conducted by the Center for Energy Conservation at Florida Atlantic University in the United States showed that pool owners, residential and commercial, could save energy and maintain a comfortably heated pool by using a smaller, higher efficiency pump, and operating it less hours per day.

When a pump wears out or can't be repaired, a pool owner typically installs a larger one, thinking that "bigger is better." Instead, a larger pump may increase the costs of pumping and maintenance. To choose the right pump you should consult design charts that match the hydraulic characteristics of the pump to piping and the pool's flow characteristics. A pump supply company should have access to these charts.

Smaller pumps, which cost less, can be used if you decrease the pool circulation system's hydraulic resistance. This can be done through one or more of the following ways:

- Substitute a larger filter rated 50% higher than the pool's design flow rate.
- Increase pipe diameter.
- Decrease pipe length.
- Replace abrupt 90-degree elbows with 45-degree elbows or flexible pipe.

These types of changes can slash up to 40% off the pump's use of electricity.

Circulating water.

Another way to save energy is to reduce the pump's operating time. Pool pumps often run much longer than necessary. Pool owners need to understand the reasons behind circulating the pool's water.

Circulating water keeps your pool's chemicals mixed. However, as long as the water circulates while chemicals are added, they should remain evenly mixed with minimal daily circulation. Secondly, circulating the water keeps the pool free of debris by drawing water out through the filter.

It is not necessary to recirculate the water completely every day to remove the debris and clean the water. One complete circulation usually takes between 6 and 12 hours per day. This may be longer than necessary because most debris either floats or sinks, and can be removed with a skimmer or vacuum. After about an hour, most of the pumping power is wasted by circulating clear water and does little to improve the water's quality.

Furthermore, longer circulation does not necessarily reduce the growth of algae. Instead, using chemicals in the water and scrubbing the walls are the best methods. A combination of smaller pump sizing and shorter circulation times can reduce energy consumption as much as 60% and that is a big savings in actual dollars spent to operate.

One last simple measure for saving energy is to use an accurate timer to control the pump's cycling. Use a clock that can activate the pump for many short periods each day

if debris is a problem. Running the pump continuously for, say, 3 hours leaves the other 21 hours a day for the pool to collect debris. Several short cycles keep the pool cleaner all day.

Summary of recommendations.

Pool owners can save a great deal of money by:

- Choosing the smallest pump and largest filter suitable for the pool system.
- Decreasing the hydraulic resistance of the pool's circulation system.
- Circulating the water in short cycles.
- Installing a timer.

Keep in mind that all pools are different. Circumstances such as special cleaning, climate, pool size, usage, and possible heating of the pool all affect the potential for saving money.

Reducing water and heat loss.

Almost all of a pool's heat loss, about 95%, occurs at the surface. Mostly through evaporation to the air and radiation to the sky. A pool cover is an effective means to keep heat (and water) in a pool by reducing evaporation of water from the pool when it is not in use. It also will help to reduce radiant heat losses.

A pool cover can reduce water loss by 30 to 50 percent. Each gallon of 80-degree water that evaporates removes around 8,000 BTU from the pool. Reducing water loss also reduces the amount of chemical water treatment required. Chemical treatment can cost quite a bit of money.

Outdoor pools gain a significant amount of heat from the sun, absorbing about 75 to 85 percent of the solar energy striking the pool surface. A bubble cover (sometimes called a solar cover) is one of the least expensive covers made specifically for swimming pools. It is similar to bubble-packing material except that it has a thicker grade of plastic and ultraviolet (UV) inhibitors. Vinyl covers are made of a heavier material, which extends the use factor. You can also get vinyl covers with a thin layer of flexible insulation sandwiched between two layers of vinyl.

A transparent bubble cover may reduce solar energy absorption by 5 to 15 percent, and an opaque cover may reduce it by 20 to 40 percent. However, the decrease in solar gain can be balanced or more than offset by the cover's retention of the pool's heat. This is dependent on the temperature and the humidity.

Generally, the drier and cooler the air, the greater the heating benefit from covering the pool during the daytime. Of course, a cover should always be used at night to prevent losses when there is no solar gain.

A cover also helps you keep the pool clean and extend the life of the chemicals in your pool. At a cost of 20 to 60 cents a square foot, a pool cover may pay for itself in as little as one year. Be aware, however, that UV radiation deteriorates the cover, requiring that you replace it every 3 to 5 years.

Before you buy one, make sure that the cover comes with at least a 2-year warranty. Also find out how easily you can place the cover over the pool, how to remove it, and how to store it. Systems are available that move the cover off and on the pool with a motor or hand crank. Check them out.

Always use the cover according to the manufacturer's directions to achieve maximum results. Always consider that people can use the pool unsupervised which will make you want to assure that your cover is well taken care of.

A windbreak around the pool can also reduce evaporation and make pool "lounging" more comfortable and private. A 7-mph wind at the pool surface can increase heat loss by

300 percent. A windbreak for an outdoor pool can be either a fence or vegetation. It needs to be high enough to the pool so that it effectively blocks wind from moving across the pool surface, but doesn't block beneficial solar energy.

Heating a pool efficiently.

If you are selecting a pool heater, ask for an energy efficient model. Several pump manufacturers make retrofit desuperheater coils for pool heating, and several make heat pumps for pool heating. Natural and propane fueled heaters are also available.

If your mechanical system has provisions for heat recovery you might consider using a heat exchanger of some type and transferring this waste heat to your pool heating needs. Heat exchangers come in various types and configurations. I have always found that the "plate and frame" type was the most effective method of capturing waste heat and turning it into pool heating. Consult your pump specialist about this option.

Solar pool heaters are a good investment if you are located in a climatic region with a high number of solar hours. It is relatively simple to integrate a solar water heater since most pools require a pump, filter, and plumbing. With a solar energy system, the pool water is pumped through the filter and then through the solar energy collector(s) instead of directly back to the pool. The sun heats the water in the collector(s) before it returns to the pool.

One unique use of solar collectors is to actually cool an overheated pool. Water from the heated pool is circulated through the collectors during the night hours and the heat is lost to the atmosphere through the process of radiation.

The area needed for collectors to heat your pool depends on numerous factors. A general rule of thumb is that the collector surface area should be equal to at least half of the pool's surface area. In a relatively sunny climate, this additional heating helps extend swimming time into spring and autumn. In cooler cloudier climates, you may need to increase the collectors' surface area to equal the entire surface area of the pool.

Collectors can be mounted on roofs or anywhere near the pool that provides the proper exposure, orientation, and tilt angle toward the sun. The optimum collector orientation is south, but west-facing orientations are good if the collectors' surface area is increased to at least 75 percent of the pool's surface area.

Because swimming pools include a pump and related plumbing, adding on a solar heater can be relatively simple. Unless you have experience with plumbing and electrical wiring, however, have a professional install your system. Often the pump circulates the pool water enough, but be sure it maintains a high flow rate to keep the panels operating at optimal efficiency. Your collector should require little maintenance if the pool's chemical balance and filtering system are checked regularly.

Swimming pools are a great drawing option for guests. Make your swimming pool not only pleasant but a small profit center in your overall operation.

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