



# Energy Smart Management INDOOR POOLS

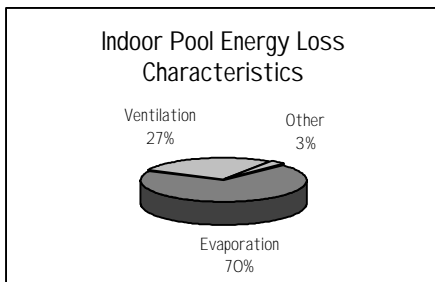
## OVERVIEW

Indoor swimming pools are big energy consumers. Pool owner/operators spend billions of dollars annually to heat the nation's pools. Much of this energy is often wasted and can be saved with proper management. Wasting energy also contributes to our growing air quality problem.

**RSPEC** is a national program that asks you to consider measures to **Reduce Swimming Pool Energy Costs**.

## HOW POOLS LOSE HEAT?

Pools lose energy in a variety of ways, but evaporation is by far the largest source of energy loss for swimming pools. When compared to evaporation, all other losses are small.



The diagram illustrates the impact of evaporation on the total energy consumption of the indoor pool.

The reason evaporation has such an impact is that evaporating water requires tremendous amounts of energy. It only takes 1 Btu to raise 1 pound of water 1 degree, but each pound of 80° water that evaporates takes a whopping 1048 Btu's of heat out of the pool.

Unlike outdoor pools, indoor pools are not subject to day/night temperature fluctuations, radiated heat to the night sky, and winds to carry away their heat. However, indoor pools do require room ventilation to control indoor humidity caused by the large amount of evaporation. Without a proper ventilation system, high indoor humidity levels will cause numerous problems,

including condensation on cold surfaces and rusting of structural components. The energy required to run this ventilation system adds to the cost of operating an indoor pool. Also, the ventilation air must be conditioned, which further adds to the costs.

Because most indoor pools are used year-around and they have no opportunity to gain solar heat, they often have much higher energy costs than outdoor pools.

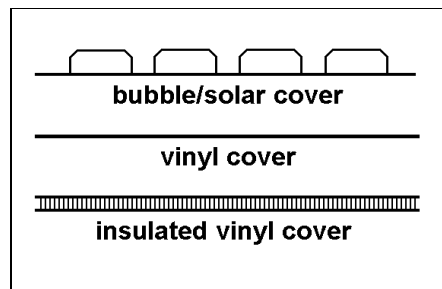
**There are many energy management improvements that can be implemented with indoor pools.**

## POOL COVERS

Since evaporation is the major source of heat loss for swimming pools, to minimize evaporation, one must cover the pool. Covering your pool when it's not in use is the single most effective way of reducing pool heating costs. **Savings of 50-70% are possible.**

Pool covers on indoor pools reduce evaporation (and consequently the need to ventilate indoor air and replace it with unconditioned outdoor air), saving large amounts of energy. Exhaust fans can be shut off when the pool is covered.

Below are three types of pool covers. Refer to the Pool Cover fact sheet for further information.



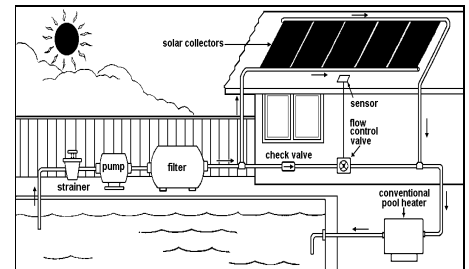
Building maintenance is lowered by reducing humidity-related problems. Building temperatures can be setback at night with a savings of 10% for a 10 degree setback.

Pool covers also provide many other

benefits besides saving energy. They conserve make-up water by 30-50% and can reduce chemical consumption.

It is highly recommended that the first step to cutting pool energy loss be the evaluation of the economics of using a swimming pool cover.

Covers must be managed properly for safety. They should always be completely removed before anyone enters the pool.



## SOLAR HEATING SYSTEMS

One of the most cost-effective uses of solar energy is to heat swimming pools. Swimming pools require low temperature heat, which is where solar collectors are most efficient.

You can use either unglazed or glazed collectors to heat an indoor pool. If the pool is located in a cold climate region, the unglazed systems will not provide much heat in the winter, but may be more cost-effective overall because of their lower initial cost.

Solar pool heating systems can provide up to 100% of your pool heating needs at certain times of the year. The combination of a solar pool heating system supplying heat to the pool and a cover cutting evaporation when the pool is not in use is a great way to manage your facility's energy costs and protect your building.

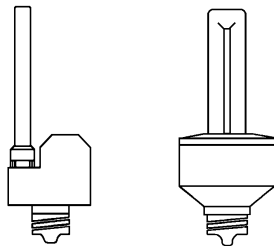
## HIGH EFFICIENCY HEATERS

If you plan to purchase a conventional pool heating system, shop around for a high efficiency pool heater. High efficiency gas heating systems are available with steady state efficiencies as

high as 97%. Electric heat pump pool heaters are also available with coefficients of performance (COPs) in the 6.0-8.0 range when operated in warm weather. A COP of 6.0 is 600% more efficient than an electric resistance heater.

## EFFICIENT LIGHTING

Replace inefficient incandescent lamps with high efficiency compact fluorescents. They consume 1/3 the electricity and last 10 times as long as incandescent lamps. Replace standard fluorescent ballasts and lamps with electronic ballasts and T-8 lamps. They will reduce consumption by 30%.



Compact Fluorescents

The initial cost of energy-efficient lighting is more, but the combination of the energy savings and labor savings on replacement will far offset that initial cost in most cases where lights are on for several hours per day or night.

Large indoor areas, such as the pool room, can be lit with high intensity discharge (HID) lamps. They offer high efficiency and high output.

Install motion detectors in areas like shower/dressing areas and rest rooms, offices, conference rooms etc. or on security lighting. They will not only save energy, but will startle would-be intruders.

## EFFICIENT PUMPS/MOTORS

Using properly sized energy efficient pumps and motors when replacing older pumps and motors, or when designing new pools, can significantly lower the electrical consumption portion of pool operating costs. Motors use many times their initial cost in electrical consumption over their life and often consume several times their cost in the first year alone. The energy savings from an energy efficient motor can pay for itself in a very short time.

## WATER EFFICIENCY

Reduce water heating costs in the shower area by lowering shower temperatures to 95°. It will not only lower energy costs, but will shorten the amount of time people spend under the shower, producing further savings.

Install low-flow showerheads and automatic shut-off valves on showers to reduce water consumption and conserve energy. Insulate the shower water heater to further reduce water heating costs.

## EFFICIENT OPERATION

Consider carefully the temperature that you keep the pool water. Each degree rise in the temperature can cost you an additional 10%. The National Swimming Pool Foundation recommends 78-80° for active swimming and 82-84° for general use.

It's a myth that it takes more energy to heat a pool up when you turn the temperature down than you save by lowering the temperature or by turning off the heater. Turn the temperature down, or turn off the heater whenever the pool will not be used for several days. Experiment to determine how long it takes to heat the pool back up. Lowering the temperature and raising it back up again always saves more energy than keeping it at a constant temperature.

Keep all the intake grates clear of foreign debris. Clogged drains require the pump to work harder.

Don't backwash your filter more frequently than necessary. Backwashing too frequently wastes water, while not backwashing wastes energy by working the pump harder.

For residential pools, reduce filtration time to 6 hours/day. If the water doesn't appear clean, increase the time in half-hour increments until you get the desired results. You can automate this by installing a time clock for daily pump operation.

Tune up your pool heater annually. A properly maintained pool heater is more efficient. Also, keep ventilation

system clean and tuned up.

Tighten the building envelope from the inside by sealing all air leakage locations in the exterior shell. This not only saves building heat loss, but keeps damaging moisture from getting to the building structure.

Improve the energy efficiency of the building envelope by properly installing adequate insulation to reduce heat loss. Upgrade single-pane windows to double or triple glazing. Or install tight fitting plastic on the interior.

Installing a heat recovery ventilator on the exhaust air stream allows the ventilation system to exhaust the moisture while retaining the heat. Or as an alternative, you can install a dehumidification system that reduces the amount of ventilation needed while recovering part of the evaporated water.

## POOL ANALYSIS!

How much could YOU save by installing a high efficiency heat pump pool heater? Contact the organization who supplied you with this fact sheet (listed in the box below) to receive an energy analysis of your pool using the Department of Energy's *Energy Smart Pools* software. Or you can download a free copy of the software from the **RSPEC** Internet web site at: <http://www.eren.doe.gov/rspec>.

You will also find additional fact sheets and information on saving energy in pools at the **RSPEC** web site or by calling the Energy Efficiency and Renewable Energy Clearinghouse at 800-DOE-EREC.

## TELL A FRIEND

If you know someone else who's interested in saving money on their pool operation, feel free to pass along a copy of this fact sheet to them. Reproduction and distribution of this piece or any of the **RSPEC** fact sheets or software is not restricted, but actually encouraged. **RSPEC** can make a difference!

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