



# ENERGY SMART POOLS SOFTWARE

The U.S. Department of Energy has developed a computer software program called *Energy Smart Pools*. The program is designed to give pool owners an analysis of their pool's current energy consumption and project the potential savings to be realized by implementing a variety of energy management systems that **Reduce Swimming Pool Energy Costs**.

## ENERGY SMART POOLS

The *Energy Smart Pools* software is based upon recent DOE sponsored evaporation research, standard engineering principles, and accepted calculation methodologies. These studies were conducted by Colorado State University and involved both indoor and outdoor pools under active and passive conditions, and yielded a new evaporation equation. The results of the studies have been adopted by ASHRAE and will be included in the next ASHRAE Applications Handbook.

The department discovered that pool owners and operators had a difficult time evaluating pool energy management measures because pool energy use is often metered through the home or facility meter. It is therefore difficult to isolate the cost of pool heating. This is complicated by the fact that pool energy use is dependent on many different variables which makes manually estimated calculations difficult.

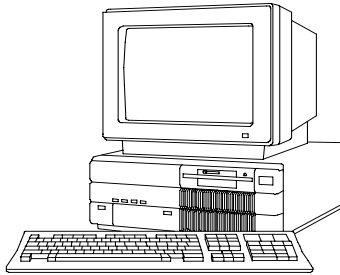


The *Energy Smart Pools* software uses hourly temperature and humidity data along with solar data to provide an accurate simulation of the heat losses and gains of a pool. Over 50 U.S. weather sites are currently available in the software.

The program is intended to provide annualized:

- 1) Simulation of energy costs

- 2) Costs, savings, and payback of adding a pool cover system
- 3) Costs, savings, and payback of adding a solar heating system



In addition to calculating pool heating energy use, it also provides pump energy use; and for indoor pools, ventilation, heating, and motor energy use. The software can also be used to determine savings from use of energy efficient motors, or high efficiency heating systems.

## FREE ANALYSIS!

How much could YOU save by making your pool "Energy-Smart"? Contact the organization who supplied you with this fact sheet (listed in the box below) or call the Energy Efficiency and Renewable Energy Clearinghouse at 800-DOE-EREC for information.

Using the new *Energy Smart Pools* software developed by the U.S. Department of Energy, you can obtain a detailed analysis and projected savings with just a few inputs from you. The best part, there is no cost to you!

## SOFTWARE AVAILABILITY

If you would like a copy of the software to perform your own calculations, the software can be obtained by writing to the address at the bottom of

this sheet. The U.S. Department of Energy is making the software available to all requesters. A nominal charge may be incurred to cover the cost of duplication and distribution..

## SOFTWARE REQUIREMENTS

To be able to run the *Energy Smart Pools* software you need the following equipment, software, and settings:

- *Energy Smart Pools* software: three 3.5 high density disks
- IBM or 100% IBM compatible 386 or 486 computer with a minimum of 4MB of RAM (8 MB of RAM is recommended)
- A hard disk drive with a minimum of 15MB of free hard disk space
- Windows 3.1 running in enhanced mode
- Virtual memory set at 5-7MB (the more the better)
- Default printer in Windows Print Manager should be HP LaserJet or Epson
- No shadow RAM or cache memory in BIOS



## TELL A FRIEND

If you know someone who is interested in saving money on their pool operation, please pass along a copy of this fact sheet to them. Reproduction and distribution of this fact sheet is not restricted, but strongly encouraged.

## ESTIMATING COSTS / SAVINGS

The results shown in table #1 are for several locations around the country and are based upon a set of generic pool input conditions shown in Table #2. Compare the size and conditions of your pool to the results from the *Energy Smart Pools* software program by choosing a location that most resembles your own.

To derive your estimate:

- 1) Determine your pool surface area and divide by 1000.
- 2) Find the location which most closely matches your climate.
- 3) Multiply the number(s) shown for your location in table # 1 by the factor determined in Step # 1.
- 4) Adjust the results for difference in fuel costs.



Example: A 16' x 30' indoor pool in Dallas.

- $16 \times 30 = 480/1000 = .48$
- $.48 \times \$4468 = \$2145$  annual saving in heating costs
- $.48 \times \$1881 = \$903$  annual savings with a pool cover
- $.48 \times \$1641 = \$788$  annual savings with a solar system

You may also wish to compare the other conditions used in the examples to those of your pool. This will provide you with a further insight to your estimated cost.

This process will only give you an estimate. An actual analysis using the *Energy Smart Pools* software is strongly recommended before making any major purchasing decisions.

*As is the case with any computer simulation program, the base case simulation results should be compared to actual pool heating costs, if available, as actual weather and operating conditions can be highly variable.*

Table 1. Projected Pool Heating Costs / Savings

City	Pool Type	Annual Heating Costs	Pool Cover Savings	Solar System Savings
Atlanta	Indoor	\$4,598	\$1,919	\$1,314
	Outdoor	\$490	\$421	\$417
Boston	Indoor	\$4,695	\$2,028	\$906
	Outdoor	\$1,389	\$790	\$565
Chicago	Indoor	\$4,698	\$1,996	\$978
	Outdoor	\$1,042	\$693	\$648
Dallas	Indoor	\$4,468	\$1,881	\$1,641
	Outdoor	\$250	\$191	\$176
Denver	Indoor	\$4,097	\$1,819	\$1,302
	Outdoor	\$1,408	\$858	\$730
Kansas City	Indoor	\$4,584	\$1,992	\$1,251
	Outdoor	\$483	\$393	\$369
Los Angeles	Indoor	\$4,739	\$2,087	\$1,517
	Outdoor	\$5,827	\$2,615	\$1,512
Miami	Indoor	\$4,038	\$1,549	\$2,023
	Outdoor	\$2,615	\$1,452	\$1,174
New York	Indoor	\$4,567	\$1,966	\$1,021
	Outdoor	\$951	\$627	\$582
Philadelphia	Indoor	\$4,567	\$1,966	\$1,021
	Outdoor	\$951	\$627	\$582
Phoenix	Indoor	\$3,630	\$1,669	\$2,208
	Outdoor	\$4,094	\$2,011	\$1,402
San Francisco	Indoor	\$4,869	\$2,091	\$1,315
	Outdoor	\$1,826	\$924	\$518
Seattle	Indoor	\$4,743	\$2,034	\$639
	Outdoor	\$1,756	\$818	\$395

Table 2. Input Variables.

Variable	Outdoor	Indoor	Direction
Pool Surface Area	1000	1000	↑
Pool Temperature	82°	82°	↑
Pool Activity Level	low	low	↑
Air Temperature	site specific	82°	↓
Relative Humidity	site specific	50%	↓
Wind Speed at Pool Surface	site specific	still air	↑
Annual Operating Dates	May 20-Sep 5*	year around	↑
Daily Operating Hours	9:00am-9:00pm	9:00am-9:00pm	↑
Heating System Efficiency	75%	75%	↓
Heating Fuel and Cost	Gas \$.50/therm	Gas \$.50/therm	↑
Solar Collector Area	750 sqft	750 sqft	↓

\* Except for Los Angeles, Phoenix and Miami which were year around.

Fact Sheet Supplied by: