

**Solar Pool Heating
Guidelines
&
Information**


At this time, there are no Federal Tax Credits for Solar Pool Heating

Home Energy Efficiency Improvement Tax Credits

Consumers who purchase and install specific products, such as energy-efficient windows, insulation, doors, roofs, and heating and cooling equipment in existing homes can receive a tax credit for 30% of the cost, up to \$1,500, for improvements "placed in service" starting January 1, 2009, through December 31, 2010. See EnergyStar.gov for a complete summary of energy efficiency tax credits available to consumers.

Residential Renewable Energy Tax Credits

Consumers who install solar energy systems (including solar water heating and solar electric systems), small wind systems, geothermal heat pumps, and residential fuel cell and microturbine systems can receive a 30% tax credit for systems placed in service before December 31, 2016; the previous tax credit cap no longer applies.

Solar Energy Systems	Solar Water Heating	<p>At least half of the energy generated by the "qualifying property" must come from the sun. Homeowners may only claim spending on the solar water heating system property, not the entire water heating system of the household.</p> <p>The credit is not available for expenses for swimming pools or hot tubs.</p> <p>The water must be used in the dwelling.</p> <p>The system must be certified by the Solar Rating and Certification Corporation (SRCC).</p>	30% of cost
SOLAR POWER PV SYSTEMS			
Photovoltaic Systems	Photovoltaic systems must provide electricity for the residence, and must meet applicable fire and electrical code requirement.	30% of cost	<p>Use IRS Form 5695 </p> <p>EXIT ↩</p> <p>Must be placed in service before December 31, 2016.</p>

Solar Pool Heating

A solar heating system for your pool is an economical alternative to expensive conventional heaters. Solar collectors capture free energy from the sun and use it to heat your pool. They extend your swimming season and reduce monthly fuel bills without depleting non-renewable fossil fuels. In fact, solar pool heating is the most economical solar application in the North East & Canada today. Solar heaters already make up more than 10 percent of all new pool installations on new pool heating system sales.

Five good reasons for using solar heating

No. 1: Solar saves on pool heating costs

Energy costs continue to rise. In the last two years alone, the price of natural gas has more than doubled. On the other hand, the sun's energy is free, and more and more pool owners are taking advantage of this opportunity to save money and avoid future price increases. Over a 15-year period, you could spend five times or more on heating with gas what you would spend on installing a solar heater today. Once your solar heating system is installed, there are no more heating bills to pay. Many pool owners switch to solar because it meets all of their heating needs. But, even if you continue to use a gas or electric heater as a backup, solar heating is a smart investment that will save you money, year after year.

No. 2: Solar extends your swimming season

A properly sized solar heating system will get you swimming earlier in the spring and later into the fall. Whether or not you have an existing heater, you can keep your pool warmer and open longer with free energy from the sun. In most areas of the North East & Canada, a solar heater used in combination with a solar pool cover can add two to four weeks to the beginning and two to four weeks to the end of the swimming season.

No. 3: Solar equipment is durable

Solar equipment often lasts longer than gas or electric heaters. With proper yearly maintenance, you can expect fuel heaters to last seven to 10 years. Most gas heaters come with a two-year warranty, and well-made heat pumps carry a two-year warranty with five years on the compressors. Solar panels have a minimum 10-year warranty and generally last 15 to 20 years or longer.

No. 4: Solar requires less maintenance

Unlike gas and electric heaters, which should be serviced by a technician every year, a solar heater requires very little servicing. Again, that means less cost and less hassle for the pool owner.

No. 5: Solar energy is good for the environment

These days we hear a lot about the damaging effect that burning fossil fuels is having on the environment. Burning fuels releases nitrogen oxides that cause the formation of smog in urban areas. Urban smog, which is worse on warm and sunny days, affects people with respiratory problems such as asthma. Using solar energy instead of burning fossil fuels can help reduce this smog. Burning fuels also produces carbon dioxide, the main cause of climate change. Replacing a natural gas or propane heater with a solar heater could stop three to 10 tones of carbon dioxide from entering the atmosphere each swimming season. That's about the same amount produced by operating your car for one year!

How does a solar heater work?

A solar pool heater is simple to operate and doesn't change the way you operate standard pool equipment. Figure 1 shows the components of a typical solar heater. Solar collectors are usually mounted on the roof of your home or other structure such as a shed or garage. This is the least expensive option and doesn't take up extra space on the property. When suitable roof space is not available, collectors can be ground-mounted on a rack. The existing pool pump is used to circulate water from the pool through the solar collectors and back to the pool. On sunny days, an automatic controller diverts the water from the pool to the roof by a motorized valve. The automatic valve uses special temperature sensors to determine when the solar collectors should be used. For those on a budget, a manual valve can be used. However, this tends to be an impractical option for most people because the valve must be turned at least twice a day at exactly the right time.

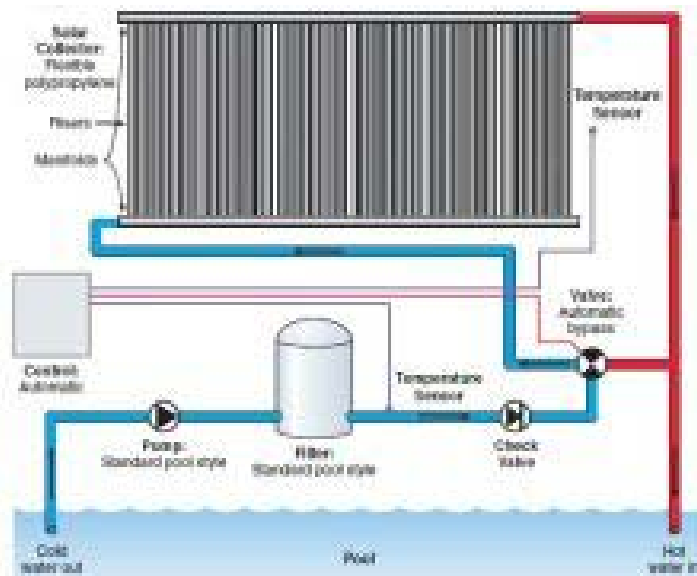


Figure 1

Pools gain heat

Pools gain heat from whichever heating system you choose to install. Any swimming pool in a sunny location is also naturally heated by solar energy. Sunlight is absorbed by the water, adding heat to the pool. This "passive" solar energy is a valuable commodity to a pool owner to supplement an electric or gas heater. An un-shaded swimming pool costs significantly less to heat than one that is shaded. Solar pool covers permit some of this passive solar heating while also reducing heat losses. Many outdoor pools require no auxiliary heating during the peak of the summer (in July and August) when heat losses are low and sunshine is abundant.

Indoor pools

Indoor pools are usually constructed of concrete and are part of the basic design and structure of the building they are in. Since they are less affected by outdoor weather conditions, they are particularly suited to solar heating. Unless an indoor pool is located so that sunshine falls on its surface for direct heat gain, it will require heating year-round. Solar heating systems for indoor pools should be designed by a solar professional. A pool cover should be used to reduce evaporation and subsequent humidity problems.

How do heat pumps and gas heaters compare to solar?

Although several different types of heaters are available, the most commonly used are natural gas heaters and electric air-source heat pumps. Roughly 10 percent of heated pools already use solar heaters.

Since a heat pump puts out considerably less power than a natural gas heater, it is important to correctly size the heat pump to ensure adequate heating for your pool. Its low output also means that it tends to run continuously, which can be excessively noisy for some pool owners. And, while it offers the advantage of being cheaper to operate than a gas heater, a heat pump may be less reliable and more prone to breaking. A heat pump takes longer to raise the temperature of your pool than a natural gas heater, which can raise a cold pool to the desired temperature relatively quickly. During sunny conditions, a solar pool heater can add heat as well as or better than many heat pumps. The temperature of a solar heated pool will fluctuate as weather conditions change. But, if a pool cover is used, the heat collected by solar panels on a sunny day can easily get you through a cool, cloudy period. And, water temperatures will be back up again after another day or two of sunshine. Because of our climate, many Canadian consumers are skeptical that there is enough sunlight to support a solar pool heater. In fact, there is more than enough solar energy for pool owners across Canada to heat their pools without a backup heater from May through September. A solar heater in Ontario will have no difficulty keeping a pool well above the desired temperature. Solar pool heating can typically extend the length of your outdoor swimming season by two to four weeks at either end. With a solar system, it costs nothing in fuel to try for an early start or a late finish, whereas most people with a fuel heater can't afford to open their pool until good weather is guaranteed.

Because a sufficient area of solar panels must be used to obtain maximum performance at minimum cost, accurate sizing of the collector area is critical.

How do costs for heat pumps and gas heaters compare?

Operating costs

Once a solar heater is installed and paid for, the energy to heat your pool is free.

Solar heating systems are very easy for the owner to maintain – the only expense is your time. If you want to hire a solar technician to perform annual maintenance, it would cost approximately \$200 per year.

Using a natural gas heater, a typical 16-ft. by 32-ft. outdoor pool would cost between \$600 and \$1200 to heat from May to September, if you use a solar cover. If no cover is used, the typical cost is between \$900 and \$1,700.

These costs are based on a natural gas price of \$9.13 per gigajoule, (GJ), so the fuel cost for your pool will depend on your current cost of natural gas.

In addition, a recommended annual cleaning of a gas heater costs \$100 to \$250.

Depending on the price of electricity, a typical heat pump (with a summer coefficient of performance of 4.25) costs about one quarter to one half that of natural gas to operate.

Reduce pool pump costs

The cost of energy to heat your pool represents only a portion of your pool's operating costs. You must also factor in the cost of electricity to run your pool pump. Most pools are equipped with a pump of at least 750 watts (approximately 1 horsepower) running 24 hours a day, circulating water through a filter unit and a pool heater. Based on this pump size, the electrical cost for operating 24 hours a day is about \$48 per month. You can use a timer on your pool pump to reduce its hours of operation. An operating cycle of 12 hours a day is recommended and results in a saving of \$24 a month.

SOLAR HEATING SYSTEMS

What maintenance is required for Solar Energy systems?

Pool heating systems require *practically no maintenance*. In the tri-state region, the collectors are drained simultaneously with the closing of the pool.

How does solar help the environment?

If a renewable energy source such as solar power was used to power one million homes, it would have the same effect on the environment as removing 850,000 cars from the road because it would reduce CO2 emissions by 4.3 million tons per year. (Source: EPA).

How will a PV system affect the value of my home or business?

According to a recent study, for every way that you reduce your annual utility bills by improving your energy efficiency, it adds to the value of your home. In most cases, a PV system will add more value to your home than the total net cost, so you are ahead from day one, even before you add in your utility bill savings.

Renewable solar energy is advantageous for the environment because there is (are):

- No moving parts to wear out.
- No contribution to smog, acid rain or global warming.
- Even when the “life cycle costs” of PV panels are included, i.e. the CO2 “footprint” or the CO2 generated by the manufacture and recycling of PV panels, PV’s account for only 15% of the CO2 from coal-fired electrical generation.
- Renewable solar power leaves the air as it is, contributing no carbon, or other air pollutants, as does burning coal, gas or oil (the fuel source for 70% of US electric generation).
- No pollution of water resources.
- No noise.
- It leaves the rivers alone to run freely, with nothing blocked or drowned, unlike hydroelectric plants (7% of US electric generation).
- It does not use a lot of land, since it is usually mounted on top of buildings.
- The fuel supply is unlimited. The sunshine will not diminish its supply by using it, unlike the fuels that supply 98% of the electricity you buy.
- The power is delivered to the production point by the sun, and its production is local to where it will be used, unlike the centralized system we have now.

POOL COVERS

Use a swimming pool cover

Using a pool cover will save you energy and maintain your pool's temperature when it is not in use. If used frequently, a cover can reduce your pool's energy consumption by up to 50 percent. Using a floating plastic swimming pool cover can significantly decrease the amount of energy required for pool heating as well as significantly reduce the loss of water due to evaporation.

Two cover types are available.

- The first is a solar blanket consists of a translucent cell or bubble arrangement of 0.3 mm (12 mil) polyethylene. It allows solar radiation to warm the water. This cover primarily prevents evaporative heat loss but also reduces heat loss through convection and conduction. With careful handling to prevent bubble breakage, it can last two to three swimming seasons.
- The second type, a thermal blanket (see Figure 6), consists of a 3 mm (1/8 inch) layer of closed cell polyethylene foam covered by a protective layer of woven polyethylene. It provides more insulation than a solar blanket, but because it is opaque it prevents solar radiation from warming the water. Leaving the pool uncovered on hot days will help warm the water. If you have a heated pool in a shaded area, an opaque blanket is the most cost-efficient cover you can get. It can last from four to five years.

SAFETY CAUTION

For safety reasons, a cover must be completely removed from the pool before anyone goes swimming to make sure no one can be trapped beneath it.

The effectiveness of any cover depends on the amount of time it is on the pool. The more you use your cover, the more energy you will save. For example, a cover used 14 hours a day can save energy consumption by 50 percent or more.

COVERS FOR INDOOR POOLS

Pool covers are also suitable for indoor pools. Indoor pools lose most of their heat by evaporation, and a well-fitting pool cover can virtually eliminate evaporative heat loss. As excess humidity caused by evaporation must be removed either by ventilation or refrigeration, a pool cover can have the additional benefit of saving on the cost of humidity control.

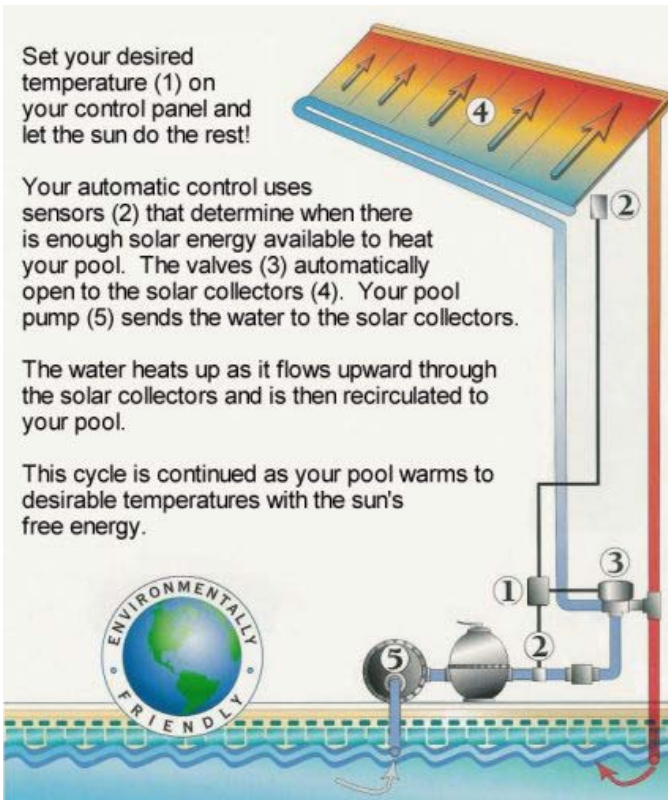
HANDLING POOL COVERS

Most people don't use their pool covers as often as they should because they are bothersome and awkward. But, the more often they are used, the more effective they are. Once removed, covers should be carried to a storage location some place out of the sun. Covers for non-rectangular pools may be cut into several sections for easier handling. The best and easiest way to store a pool cover is on a roller at one end of the pool. Not only do rollers prevent damage to covers that can be caused by constant handling, they can usually be operated by one person.

POOL COVER AND POOL MAINTENANCE

Pool covers and pools need maintenance. All covers require an annual cleaning with mild soap and water. In the winter, summer covers should be stored dry, rolled or folded and kept from freezing so that the plastic doesn't crack. Consult the manufacturer of your pool cover for maintenance recommendations. No matter how you heat your pool, the more efficiently your heater works, the lower your fuel bills will be. Fuel heaters should be cleaned and adjusted annually by a technician. Clean or backwash sand filters regularly to reduce the work your pump must do

Solar Pool Heating System



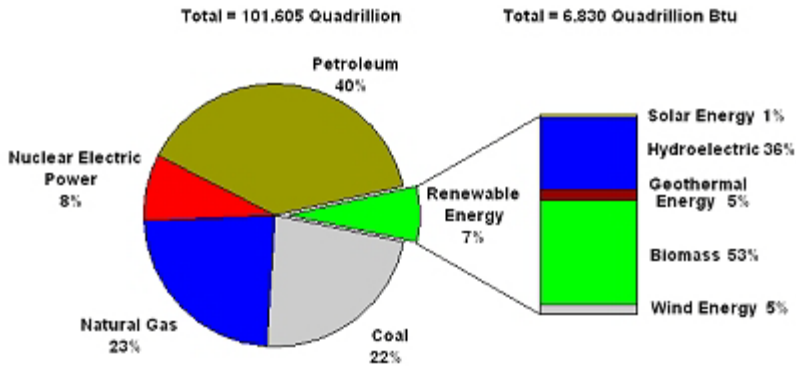
Commercial Off-Roof Installations



The use of renewable energy is not new.

Five generations (125 years) ago, wood supplied up to 90 percent of our energy needs. Due to the convenience and low prices of fossil fuels, wood use declined. Now, the biomass which would normally present a disposal problem is converted into electricity (e.g., manufacturing wastes, rice hulls, and black liquor from paper production).

Renewable Energy Consumption in the Nation's Energy Supply, 2007¹

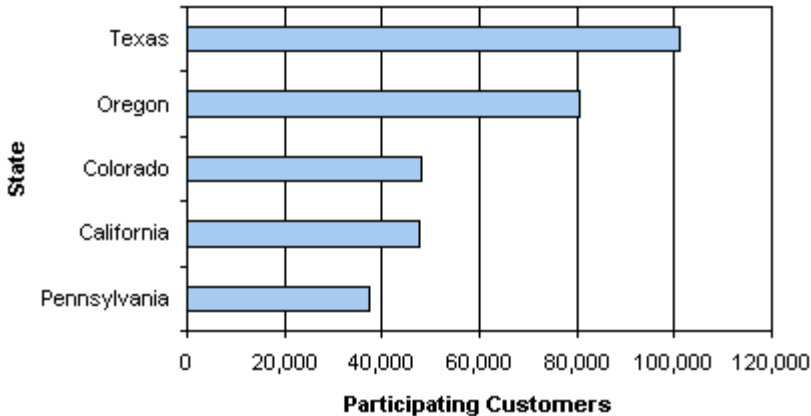


Source: Energy Information Administration, Office of Coal, Nuclear, Electric and Alternate Fuels

Green Pricing Participation Decreases.

Green pricing/marketing programs allow electricity customers to pay the additional costs for renewable energy through direct payments on their monthly bills. The total number of participating customers was 645,167 in 2006, an decrease of 32 percent from 2005. Of this total, 609,213 or 94 percent, were residential customers. The number of participating customers decreased in nine states, most notably in Ohio, which lost over 400,000 customers, as a result of Green Mountain Energy Co., a green power marketer, discontinuing service in Ohio. The state with the biggest increase was Oregon with a net gain of almost 17,000 customers, followed closely by New York, with a net gain of almost 16,000 customers.

U.S. Green Pricing Customers by Top 5 States, 2006



Source: EIA, Green Pricing and Net Metering Programs 2006

2009 Solar Pool Installation Pricing Guidelines

Solar Pool Heating enjoys the fastest return on investment of all solar technologies.

Find your pool size below to determine an approximate cost for a expertly installed, solar pool heating system utilizing the latest available technology.

Pool Size	Pool Surface Area	Solar Panel Surface Area	Approximate Cost*
10' x 20'	200 SF	96 SF	\$2,875 - \$3,200
18' Round	254	128	\$3,125 - \$3,500
20' Round	314	160	\$3,500 - \$3,850
24' Round	452	224	\$4,375 - \$4,800
16' x 32'	512	260	\$4,625 - \$5,100
18' x 36'	648	320	\$5,125 - \$5,775
18' x 40'	720	360	\$5,625 - \$6,175
20' x 40'	800	400	\$5,875 - \$6,425
22' x 40'	880	440	\$6,375 - \$7,100
22' x 45'	990	480	\$6,625 - \$7,300

**This sheet is a guideline only.

Actual cost for a pool heating system is based upon the unique project requirements and could vary by a factor of 10% higher or lower.

A site analysis and precise quote is available by **BE OFF THE GRID.com's** Solar Pool Heating Contractors.

Prices shown above are effective March 1, 2009 and are calculated based on a roof mounted system installed on an average walkable south facing roof with the pool filter located within 15' of the building.

Actual installation prices can vary due to factors such as the amount of piping from the solar panels to the pool filter, steepness of the roof surface, direction that the roof faces (east, west and north facing roofs may require additional panel area) and whether trenching is required to conceal the pipes.

Ground Mounted systems can add approximately \$2.50 per square foot of installed panel area to the total cost for construction of a ground mounted rack.

Solar installs customized solar energy solutions for both the private and public sectors. Our innovative systems will reduce energy costs as they help your business contribute to a cleaner, greener community.

As rising fossil fuel and electricity costs erode profits, businesses are increasingly turning to solar energy. Breakthroughs in technology over the past decade have made solar power not just cost effective, but proved that innovative solar strategies can yield substantial ROI month-over-month, year-over-year. Businesses of all sizes are making the move to solar; from mom and pop ice cream shops to Whole Foods, Fed-ex and many, many others.

Additionally, investing in solar technology greatly enhances your company's 'Green' public image. Studies have shown that the general public responds positively to businesses that take steps to implement energy-conscious and renewable technologies.