

FREQUENTLY ASKED QUESTIONS **(SOLAR WATER HEATER)**

Q.No.1 What is Solar Water Heater?

Ans. A Solar Water Heater is a device which provides hot water for bathing, washing, cleaning, etc. using solar energy. It is generally installed at the terrace or where sunlight is available and heats water during day time which is stored in an insulated storage tank for use when required including mornings.

Q. No. 2 How does it work?

Ans. A Solar Water Heater comprises of a or an array of solar collectors to collect solar energy and an insulated tank to store hot water. Both are connected to each other. During the day time, water in solar collectors gets heated which is either pumped or flown automatically on thermosyphon principle to the storage tank. Hot water then stored in the tank can be used for various applications.

Q. No. 3 What are different types of Solar Water Heaters?

Ans. Two types of Solar Water Heaters are available; one based on flat plate collectors and the other based on evacuated tube collectors. Flat plate collector (FPC) based systems are of metallic type and have longer life as compared to Evacuated tube collector (ETC) based system because ETCs are made of glass which are of fragile in nature.

Both these systems are available with and without heat exchanger. They can also work with and without pump. Systems without pump are known as thermosyphon systems and those with pump are known as forced circulation systems.

Q. No. 4. Which type of solar water heater is suitable for different places/ category of users?

Ans. ETC based systems are cheaper than FPC based system. They perform better in colder regions and avoid freezing problem during sub-zero temperature. FPC based systems also perform good with anti-freeze solution at sub zero temperature but their cost increases. In other regions, both perform equally good.

Systems working on thermosyphon principle are simple and relatively inexpensive. They are suitable for domestic and small institutional applications, provided water quality is good and it doesn't have large chlorine contents. Forced circulation systems are generally preferred in industries or large establishments.

At places where water is hard and have larger chlorine content, if FPC based system is being installed, it must be with heat exchanger as it will avoid scale deposition in copper tubes of solar collectors which can block the flow of water as well reduce its thermal performance. ETC based systems will not block the flow of water but its performance may go down due to deposition of salt contents on inner surface of glass tubes, which could be cleaned easily once in a year or so.

Q. No. 5 What is the approximate cost of solar water heater?

Ans. Cost of solar water heater depends on size and type of system installed. Smallest size of a system is 100 liter per day, which means that it can deliver 100 liters of hot water in a day at 60 C. A 100 lpd capacity system is sufficient for a family of 3-4 members and it may cost Rs. 15,000 to Rs.22,000 in plains depending on the type of system. In hilly & N-E region, the cost may be 15 to 20% more.

The system cost does not include the cost of cold water tank, & its stand which is required if overhead tank is not installed in a house/ building. Cost of hot water insulated pipe line also, may be extra if number of bathrooms is more than one. Additional cost towards all these components may increase by 5 to 10%.

The cost, however, does not increase linearly with increase in capacity, rather it comes down proportionately as we go for higher capacity system.

Q. No. 6 Is there any subsidy available from Government?

Ans. Yes, the Government provides subsidy to the extent of 30 to 60% to different category of users and States subject to certain benchmarks as per below:

- General category states for all types of beneficiaries: **30% capital subsidy or loan at 5% interest on 80% of the benchmark cost**
- Special category states for domestic & non commercial categories (not availing accelerated depreciation): **60% capital subsidy or loan at 5% interest on 80% of the benchmark cost**
- Special category states for commercial users category (availing accelerated depreciation): **30% capital subsidy or loan at 5% interest on 80% of the benchmark cost**
- Benchmark Cost : ETC based systems : Rs. 10,000/ sq. m.
 FPC based systems : Rs. 11,000/ sq. m.

Q. No. 7 How can I avail this subsidy & get the system installed at my place?

Ans. The system can be installed at net of subsidy by following ways:

Domestic Systems

- **Through State Nodal Agency-** Contact respective state nodal agency in your state (list with phone no. given on MNRE website) who will visit the site, provide information on cost, size & other details of system required and get it installed at net of government subsidy through some manufacturers.
- **Through Accredited Channel Partners of MNRE** (List available at MNRE website)- Contact any of them and get the system directly installed from him at net of subsidy.

Institutional Systems

- **Through State Nodal Agency-** In same fashion as above by inviting tenders and placing order to selected manufacturer
- **Through DGS&D rates-** Details available on DGS&D website
- **Through Accredited Channel Partners-** In same fashion as above

Q.No. 8 Why should I go for a Solar Water Heater? What do I save from it?

Ans. A 100 litre per day capacity system suitable for 3-4 people can save upto 1500 units of electricity in a year, depending on hot water used. It can also save around 140 litres of diesel in an establishment using oil fired boiler besides reducing green house gas emissions in the atmosphere. Higher capacity systems will save higher amount of electricity/fuel oil besides reducing higher amount of GHG emissions.

Electricity is expensive and is not available due to power cuts in many areas when required for heating water. Solar Water Heater, since it stores hot water in an insulated tank, provides water all the time when required. Fuel oil is also expensive and creates pollution. Storing the fuel oil for long term use in commercial establishments is another problem.

The table below gives approximate likely electricity and money savings for a typical 100 liters per day system located in different parts of the country.

	Northern Region	Eastern Region	Southern Region*	Western Region*
Expected no. of days of use of hot water per year	200 days	200 days	300 days	250 days

Expected yearly electricity saving on full use of solar hot water (units of electricity)	1000	1000	1500	1250
Monetary savings at different prices of electricity, Rs/year				
Rs. 4/kwh	4000	4000	6000	5000
Rs. 5/kwh	5000	5000	7500	6250
Rs. 6/kwh	6000	6000	9000	7500

* The use pattern and savings for southern region pertains to the typical climate of Bangalore, while those for western region relate typically to Pune climate.

Q.No.9 What happens on cloudy/rainy day? Do I still get hot water?

Ans. On cloudy days also, if it is for a day or two, you still get warm water as water gets heated due to diffused radiation available in the atmosphere. The system, however, is either connected to an electric geyser in the house or an electrical back-up is provided in the storage tank of the system which is switched on when water is not sufficiently hot. So, you get hot water all the time even on rainy days.

Q.No.10 How do I decide about the size/capacity of the system to be installed?

Ans. For a house with one bathroom and 3 to 4 members, 100 liter per day capacity system should be sufficient. For more numbers of bathrooms, the capacity will increase accordingly due to pipe losses & more number of family members. Generally the capacity is decided based on hot water required in mornings for bathing. If the usage is in evening & at other times also, the capacity is decided accordingly. Some useful thumb rules for estimating the hot water requirement are given below:

Application	Typical Requirement of Hot Water at 60°C.
Household bathing using buckets	10-20 liters per person per bath.
Household bathing using shower with a mixing tap	20-30 liters for 10-15 minute bath
Shaving, while a tap runs	7-10 liters
Household bathing in bathtub (one filling)	50-75 liters
Wash basin with a mixing tap (hand wash, brushing of teeth, etc.)	3-5 liters per person per day.
Kitchen washing	2-3 liters per person per day.
Dishwasher	40-50 liters per wash cycle
Clothes washing machine	40-50 liters per cycle

Q.No.11 How do I assure that a good quality system is installed at my house?

Ans. Ministry has laid down some minimum technical requirements for installation of solar water heating systems in the field. These have been made mandatory for manufacturers and suppliers and are available on MNRE website: www.mnre.gov.in. These requirements are have been prepared in such a way that even a lay man can also check them and ensure that those are being adhered to by the manufacturers/suppliers. In case any manufacturer/supplier is found not sticking to these requirements, he may be blacklisted if informed to the Ministry.

Q.No.12 Are there any maintenance requirements?

Domestic solar water heating system do not need significant maintenance requirements. Occasional leakages in the plumbing could be easily repaired by common plumbers. In case quality of water is hard, scale deposition in the collectors may result over the years. This may require de-scaling with acids for which it is best to contact the suppliers. Broken glass may also have to be replaced by the suppliers. If outside exposed surfaces are painted, the paint may have to be redone every 2-3 years to prevent corrosion of the surfaces.

Q.No.13 Any trouble shooting guide for solar water heating systems?

Ans. Some of the troubleshooting are mentioned below:

Problem faced	Probable cause and remedies
No water in tap	<ul style="list-style-type: none">- No cold water supply- Wall at the outlet of system closed- Air lock in the pipes
Water not heated at all, although cold water flow is normal	<ul style="list-style-type: none">- Consumption of hot water may be too high; Check use points and use pattern- Collector may be shaded- No flow of water through the Collector as it might be choked due to scaling; Get it checked from the manufacturer
Water not hot enough or sufficient quantity of hot wter is not available	<ul style="list-style-type: none">- Cloudy weather- Consumption too high- Frequent on-off of hot water tap- Collector dirty- Vapour lock in the collector which can be removed by allowing it to cool & draining the system- Partial choking of the collector
Little quantity of boiling hot water is received	<ul style="list-style-type: none">- Vapour locking in the collector- Pinched inlet/outlet pipes