

Solar thermal system

Goal

- ✓ Technological effect: Generation of warm water by using sun light; in doing this, the climate is less affected by CO₂-emissions than by using fossil fuels.
- ✓ Pedagogical effect: Knowledge about this technology is gained by experience; it reduces prejudices and shows that and how alternative energy supply works.

Target group

All pupils and teachers.

Technology

Solar thermal collectors generate warm water by using sun light. Everybody that has left a hose in the sun before knows this principle. The same principle is used in solar thermal collectors to directly produce heat. Instead of a hose, a blackened surface of aluminium or copper is used as absorber. This is placed inside the collector through which a medium flows that transports the heat.

If the absorber is placed inside a well insulated box with a glass cover, you have a **flat plate collector**.

If it is placed in the middle of evacuated glass tubes, like in a thermos flask, you have an **evacuated-tube collector**. An evacuated-tube collector is more efficient than a flat plate collector, but also more expensive.

In the solar accumulator, water is heated by the heat transport medium, usually water and anti freeze, by transmitting the heat via a heat exchanger. The hot water can now be used for taking a shower or to support the heating system when the solar thermal system is big enough.

Use in school

In schools there is usually little need for warm water. It becomes interesting when a gymnasium with showers and changing rooms belongs to the school, because particularly when taking a shower, relatively much warm water is needed.

If no warm water is needed, a demonstration system for the classes is recommendable.

Visualisation

Solar thermal systems work invisibly and silently. The solar cells are usually fixed onto the roof and thus not visible to people in school. Therefore it is even more important to inform about function and output of the system. There are several possibilities for visualisations that show the temperature of the accumulator as well as the amount of warm water that is produced by the system. The visualisation should be located on an eye-catching, central spot in the school building. In doing so, you can also easily detect a defect of the system.

For pedagogical reasons, the solar system should rather be dimensioned smaller than to leave out the visualisation for financial reasons.

What else is important?

Building a solar thermal system together with the pupils exemplifies the topic 'renewable energies' better than a prefabricated system that is installed on the roof. There are do-it-yourself kits to build a solar thermal system. Experts usually have to instruct, but the collaborative assembling of the system has been an impressive experience at many schools.



Solar thermal system under construction at a school

Further information

- ✓ Schools that have already installed a solar thermal system are the best consultants. They know the problems, but also the corresponding solutions.
- ✓ Power authorities can also advise you on renewable energies.