THE SOLAR TOWER

In the area where concentrated sunlight heats the water, the steam produced is used to drive a turbine which, by means of a generator, provides electricity.

The water is heated to 600-1,200°C, 1-20 bar pressure.

The sun’s rays reach the heliostats and are redirected to the receiver, to concentrate solar radiation in it.

A heliostat is a 120 m² planar mirror.

CONCLUSIONS

Thermoelectric generation systems (solar tower, the linear Fresnel system, the Stirling disk and cylindrical-parabolic) have much higher conversion efficiency than photovoltaic technology. These systems allow countries with favorable weather conditions and high solar radiation (such as Spain) to obtain clean electric energy in large quantities and, therefore, and reduce fossil energy.

The future is the thermoelectric solar energy

THERMOELECTRIC SOLAR ENERGY

WHY SOLAR ENERGY?

Of all forms of energy, solar is the most abundant. 120 trillion of MW of sunlight constantly reach the Earth. In a year, the sun sends more energy to Earth than there is in the reserves of oil, natural gas, coal and uranium together, and 10,000 times of the energy consumed. Furthermore, it is a non-limited energy, economic and green. So, why is it so poorly used?

This question was the starting point for this work on thermoelectric solar energy done by a group of teenager students (4 º ESO).

HOW WE GET ELECTRICITY FROM THE SUN?

The sun gives us much more energy than we need, but it must be captured efficiently. For many years this has been one of the most interesting technological challenges. Only recently, we have developed efficient systems for capturing solar energy.

All these systems use the same principle to obtain electricity from the Sun; they concentrate sunlight on a single point to raise its temperature.
CONCENTRATING SURFACE
Sun's rays are reflected by mirrors. In this way, it is possible to concentrate the sun's radiation in a point by a factor from 600 to 1,500 times. These mirrors have parabolic or plane shapes.

SOLUTIONS TO PROBLEMS
Systems of solar thermal energy have some drawbacks: on cloudy or winter days with fewer hours of sunlight, the energy production decreases dramatically.

HYBRIDIZATION: It is possible to combine it with biomass as a renewable source or natural gas (the least polluting fossil fuel). This can counteract any failure of solar supply, improve overall performance and adjust the energy demand of consumers in the production.

STORAGE: The molten salt is a substance that melts at 222°C and retains heat for a long time. If heated with water during daylight hours, it can be used to continue generating electricity at night or in the hours without sun.