Solar pv power plant



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A solar power plant is a facility that converts solar radiation, made up of light, heat, and ultraviolet radiation, into electricity suitable to be supplied to homes and industries.

The process of electricity production in a solar plant is completely ecological and doesn't generate polluting elements for the environment, as well as being one of the most efficient renewable energies that currently exist.

Thanks to these advantages of solar energy compared to energies generated from fossil fuels or non-renewable sources, solar power plants represent a key tool for developing a new long-term sustainable production model, which is completely eco-friendly.

A solar thermal plant is a facility designed for converting solar energy into electricity through a conventional thermodynamic cycle. However, unlike thermal power plants that work by using fossil fuels, solar thermal power plants use a completely eco-friendly energy source like sunlight. The technology used to produce electricity is slightly different depending on the type of solar thermal plant we're talking about, but its operating system is similar.

A solar thermal power plant concentrates the solar radiation to heat a fluid with thermally conductive properties and raise its temperature until it's converted into steam. It's then fed to a turbine. Here, the thermal energy is converted into mechanical energy, which is transmitted to an alternator where its final transformation into electricity takes place. Once the thermodynamic cycle has been completed, the steam is returned to a condenser where it recovers its liquid state and the process is repeated again.

From an efficiency point of view, it's important to take into account that the performance of a solar thermal plant depends on the hours of sunshine and weather conditions. Therefore, these power plants also have a storage tank that allows the energy obtained to be stored to use it when necessary.

These facilities have a tower of large mirrors, called heliostats, capable of changing direction to capture the maximum solar radiation and concentrate it on a specific point. The heat is transmitted to a thermally conductive fluid that, as its temperature rises, becomes steam and starts a thermodynamic cycle.

This type of solar thermal power plant captures the sun's rays through concentrating or high-temperature collectors. The collectors are concave mirrors, that are mounted on a structure that allows their position to be modified to increase the intensity of the solar radiation, reaching temperatures greater than 250?C.

The operation of a solar photovoltaic plant is based on photons and light energy from the sun's rays. The types of solar panels used in these types of facilities are also different. While solar thermal plants use collectors,





photovoltaic power plant use panels consisting of photovoltaic solar cells made of silicon (monocrystalline or polycrystalline solar panels) or other materials with photovoltaic properties (amorphous solar panels).

Thanks to the materials they are made of, when the sun"s rays strike them directly, the electrons contained in the more external layers of the photovoltaic cells absorb the radiation and generate direct current electricity. To build a solar photovoltaic plant, these solar cells are connected in series to be integrated into a single module, forming photovoltaic panels.

In turn, the solar panels are connected in parallel, forming strings coupled to a current inverter, where the direct current coming from the photovoltaic cells is transformed into alternating energy. Then the electricity is directed to a transformer in which its voltage and intensity are adapted so that it can be transported through the electrical grid lines to the consumption centers.

To optimize its operation, the photovolatic power plant also has a weather tower, which analyzes the environmental conditions to identify the solar radiation intensity and its short-term evolution, as well as informing of the exact sunset time. Therefore, it's possible to predict the periods with shortage of light and store the energy needed to guarantee the electrical supply.

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