Solar thermal electric power generation

Solar thermal technologies are designed to convert the incident solar radiation into usable heat. The process of solar heat conversion implies using energy collectors - the specially designed mirrors, lenses, heat exchangers, which would concentrate the radiant energy from the sun and transfer it to a carrier fluid. The fluid passes through the sunlight collector and becomes very hot. Typical heat carrier fluids are water/steam, oil, or molten salt. Then the fluid is transferred to the heat engine, which converts the heat to electricity.

There are several different kinds of solar collectors, which are described below. These collectors are only functional with the direct beam of sunlight and would also benefit from sun tracking - the technology that keeps the reflectors at an optimal angle to the sun.

This article explains the fundamentals of CSP well, but it already became obsolete in terms of technology commercialization. For example, it mentions that there are no commercial solar tower plants, but actually there are now. Here, I include the list of operating Solar Thermal Power Stations available on Wikipedia page, which indicates the capacity of the plants, their location, and technology used.

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There are two types of systems to collect solar radiation and store it: passive systems and active systems. Solar thermal power plants are considered active systems.[3] These plants are designed to operate using only solar energy, but most plants can use fossil fuel combustion to supplement output when needed.[2]

Despite the fact that there are several different types of solar thermal power plants, they are all the same in that they utilize mirrors to reflect and concentrate sunlight on a point. At this point the solar energy is collected and converted to heat energy, which creates steam and runs a generator. This creates electricity.

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