# Solar Thermal Energy Encyclopedia Article

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# Solar Thermal Energy

The **heat energy** that is supplied to Earth by the **sun** is called solar **thermal energy**. The sun, like all **stars**, is a massive sphere of superheated gas that remains heated by the **nuclear reactions** occurring within its center. Within its core, the fusion of hydrogen atoms creates **helium** atoms. Because the resulting helium atoms have a lower **mass** than hydrogen protons that fused to form them, a "mass defect" is said to occur in which portions of **matter** are converted into energy, some of which is radiated as solar thermal energy. These atomic reactions release so much energy that the **temperature** of the center of the sun is estimated to be approximately 10 to 20 million degrees Celsius. The surface of the sun, however, has a much lower average temperature of about 6,000°C. Once created, solar thermal energy travels a mean distance of 92,960,000 mi (149,591,000 km) to reach Earth where it has many profound effects. For instance, solar thermal energy in conjunction with Earth's rotation creates atmospheric and oceanic currents that affect global **weather** patterns.

Solar thermal energy also has practical applications. Heat from the sun can be used in thermoelectric **generators**. Here, solar thermal energy is used to create or save **electricity** by superheating water or oil for use in generators. Solar energy is also used as a supplemental heat source for households in areas where sunlight is plentiful. For domestic use, solar energy is collected in roof plates, and the heat that is generated can be transferred to water and stored there for distribution throughout the house. Similarly, solar stoves use focused thermal energy from the sun to cook food.