

Solar Energy – An Overview

Since the early 1970's the solar power (solar photovoltaics) has shown that we can get substantial amount of power neither by burning fossil fuels (coal, oil and natural gases) nor by using nuclear fission reactions. The Sun provides us with a staggering amount of clean, green, eco-friendly and more over free energy.

Earth's ultimate recoverable resource of oil, estimated at 3 trillion barrels, contains 1.7×10^{22} joules of energy, which the Sun delivers to our planet in 1.5 days. Since 120,000 TW of solar radiation strikes on the surface of the Earth, 10% efficient solar conversion systems covering 0.16% of the land would produce 20 TW of power, nearly twice the annual global energy consumption.

Basically we can harness solar power in two different ways:

- 1) Solar Photovoltaics (PV)
- 2) Concentrating Solar Energy

Traditionally Silicon PV cells are used for harnessing solar power due to abundant availability of silicon and higher conversion efficiency compared to its counter parts. Now the Silicon solar cells have nearly 20% efficiency. That means if 100 Watts of solar energy is available only we 20 Watt is available for use.

In early 1990's multi-junction solar cells were introduced. These solar cells have comparatively higher efficiency around 40% - 45%. Though these kind of solar cells are restricted to space applications and have not been commercialized due to its high cost ($2.48\$/\text{cm}^2$). But several research works are being done to reduce the cost of these solar cells. The future is bright for the use of these technologies only if cost could be brought down. *Nellis Solar Power Plant*, United States is one of the largest Photovoltaic Power Plant.

Also now a day's several concentrating solar power plants (CSP) are being set up. The CSP use several mirrors to concentrate power at a single point and heat salt water, which eventually rotate the turbine to generate electricity. *PS10 solar power tower* is Europe's first commercial CSP near Sevilla, Spain.

Once Ralph Nader (A Great Columnist) once said "The use of solar energy has not been opened up because the oil industry does not own the sun". Not only interests from individuals but also from societies and countries can help us build a greener, cleaner and eco-friendly planet. It's not only for us but for the generations to come.

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