



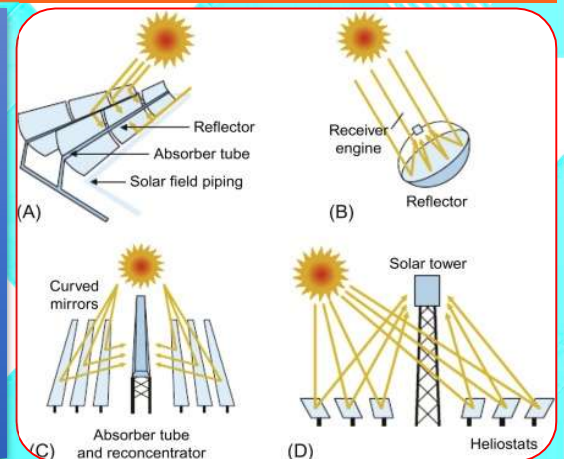
What is concentrated solar power (CSP)?

Concentrated solar power (CSP) is an approach to generating electricity through mirrors. The mirrors reflect, concentrate and focus natural sunlight onto a specific point, which is then converted into heat. The heat is then used to create steam, which drives a turbine to generate electrical power. The process can be repeated continuously because CSP technology can store the heat produced. It can therefore be used on days where there is no sun, or before sunrise and after sunset.

How does concentrated solar power work?

CSP technologies use a mirror configuration that concentrates the sun's solar energy onto a receiver, which converts it to heat. The heat is then converted into steam to drive a turbine that produces electrical power. CSP plants can use thermal energy storage systems to store the power until it's needed, for example during periods of minimal sunlight. The ability to store energy is what makes CSP a flexible source of renewable energy.

CSP systems can also be combined with other power sources to create hybrid power plants. For example, CSP can be integrated with thermal-fired power plants that use fuels like coal, natural gas and biofuel.



Efficiency of CSP

The efficiency of a CSP system varies depending on several factors. The type of system, the engine and the receiver all make a difference to how efficient a concentrated solar power system will run. However, according to a statistic cited by Energy Sage, most CSP systems have an efficiency of between 7 and 25%.

To provide some context, hydropower systems can achieve up to 90% efficiency and wind turbines can achieve efficiencies of up to 59%. Solar PV efficiencies are similar to concentrated solar power systems with most photovoltaic panels achieving an efficiency of between 14 and 23%.

Advantages of CSP

- Reduces water consumption compared to current Rankine process
- Makes smaller, more dispatchable power plants cost viable
- Reduces capital costs by increasing the efficiency of converting Sunlight into energy.
- Clean and renewable energy source
- Can double as a short-term energy
- Can generate heat for industrial applications

Dis Advantages of CSP

- More expensive than solar PV and wind power.
- Only feasible at the utility scale
- Concerns over environmental impacts
- Concentrated solar power uses a lot of water to drive steam turbines and to cool thermochemical reactors.

Editorial Team

Faculty Co-ordinator

Prof. Mr. Chaitanya Shrivastava

Students Co-ordinator

1. Aachal Soni
2. Tikesh Kardate
3. Nawneet Pratap Singh
4. Shailendra Singh