



Residential concentrated solar power

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Concentrated solar power, also referred to as concentrating solar power, is technology that uses special reflectors to concentrate the energy of the sun onto a small area known as a receiver. The receiver collects the heat and stores it as a gas, liquid, or even solid particles. The heat generated can instantaneously be used to drive an electricity-generating steam turbine, or stored to do so later.

Clean energy: Concentrated solar power captures heat from sunlight, then uses it to produce electricity. No emissions are generated during the process. One of the only real byproducts is waste heat, but this can potentially be utilized for purposes such as water desalination.

Thermal energy storage: CSP systems can store heat in a medium like molten salt or oil. This storage technology is a major selling point for CSPs, as it operates at a lower cost than comparable lithium battery options.

Complements other renewables: Thermal energy storage means that CSP can serve as a dispatchable energy source - providing power when it is most needed, such as during evening peaks - or even as a baseload power which offers stable power continuously. This is an extremely valuable attribute given the intermittency of solar PV (solar panels) and wind energy, which are reliant on the sun shining and wind blowing to produce their energy.

Industrial heat applications: An emerging field is the utilization of CSP thermal energy in heat-intensive industrial processes. The hope is that CSP and other solar energy tech will help supplant fossil fuels in sectors such as cement and steel-making, where dirty fossil fuels are currently the dominant energy source. NREL has produced a detailed report exploring this topic.

Higher cost: Out of the seven major sources of utility-scale power generation, CSP is the most expensive. The DOE is hoping to bring the price down by 2030 and make CSP competitive with fossil fuels.

Only feasible at large scale: With the exception of CSP parabolic dish systems - a technology that hasn't seen much adoption yet - CSP systems are only feasible at the utility scale. This is in marked contrast to solar photovoltaics - solar panels - which are easy to apply as well as cost effective even at the level of individual homes.

Environmental concerns: CSP projects require large amounts of water for cooling, which can be problematic given that CSP plants are often located in arid environments such as the American Southwest or the Middle East. Land requirements are also substantial, and the land used for CSP can't be used for any other purposes. The impact on local wildlife must also be considered, particularly birds which can be burned as they pass through the highly concentrated light. You can learn more about the environmental impacts [here](#).



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