

Current status of trough solar power generation system

What is a parabolic trough collector (PTC) & solar power tower (SPT)?

The parabolic trough collector (PTC) and solar power tower (SPT) are the two dominant CSP systems that are either operational or in the construction stage. The USA and Spain are global leaders in CSP electricity generation, whereas developing countries such as China and India are emerging by aggressive investment.

Can parabolic trough solar power plant be retrofitted with regenerative system?

Solar-assisted steam power plant retrofitted with regenerative system using parabolic trough solar collectors. Energy Rep. 2020;6:22-4847. Wang Y, Zhang C, Zhang Y, Huang X. Performance analysis of an improved 30 MW parabolic trough solar thermal power plant. Energy. 2020;213:0360-5442.

How many parabolic trough projects are there in the United States?

The United States is home to: Fourteen operating parabolic trough projects totaling 1,746 MW_e (NREL, "Concentrating Solar Power Projects in the United States"). The CSP technologies highlighted in the 2021 ATB are assumed to be power towers but with different power cycles and operating conditions as time passes, as shown in the following table.

What is the efficiency of solar trough & central receiver?

The total solar to electricity efficiency of the parabolic trough, LFL, and central receiver ranges from 11~16%, 8~12%, and 12~16%, respectively. 2.2. Heat transfer fluids (HTF) To collect the heat from the solar field, heat transfer fluid (HTF) should be used. The HTF significantly influence the effectiveness and performance of CSP.

What is solar tower power generation?

Germany and Spain in Europe are the pioneers of this technology. Solar tower power generation is a type of CSP that concentrates insolation onto a receiver mounted at a certain height on a tower (also called as the solar tower). The solar irradiation is concentrated by means of a heliostat field that surrounds it.

How to estimate the annual power generation of CSP?

Capacity parameters and self-utilization rate: in order to effectively estimate the annual power generation of CSP during the operation period, we need to grasp important data such as the direct solar radiation intensity, installed capacity, expected annual utilization hours, and the self-use rate of power plants.

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