

# A parabolic trough solar power plant simulation model

[Download Complete File](#)

## Parabolic Trough Solar Power Plants

### What is a Parabolic Trough Solar Power Plant?

A parabolic trough solar power plant utilizes a series of parabolic-shaped mirrors to concentrate sunlight onto a receiving tube filled with a heat transfer fluid. This fluid, typically thermal oil, absorbs the concentrated solar radiation and becomes heated. The heated fluid is then used to generate steam, which drives a turbine connected to an electrical generator.

### What is the Efficiency of Parabolic Trough?

The efficiency of a parabolic trough system typically ranges from 15% to 25%. This means that for every 100 units of sunlight that strike the mirrors, 15-25 units are converted into electricity.

### Liquid Flat Plate Collector Parabolic Trough

A liquid flat plate collector parabolic trough is a type of parabolic trough collector that uses a flat plate receiver, rather than a tube, to absorb the concentrated solar radiation. This design allows for lower costs, but also lower efficiency compared to tubular designs.

### Disadvantages of Parabolic Trough Collectors

- **Thermal losses:** Parabolic trough collectors lose heat through the receiver tubes and mirrors, reducing overall efficiency.
- **Land requirements:** Parabolic trough plants require large areas of land compared to other solar technologies.
- **Intermittency:** Solar power is intermittent, meaning that parabolic trough plants cannot generate electricity during nighttime or when clouds block the sun.

## How Does a CSP Work?

Concentrated solar power (CSP) plants, including parabolic trough systems, work by concentrating sunlight onto a central receiver using mirrors or lenses. The concentrated solar radiation is then used to generate heat, which is converted into electricity through a turbine and generator.

## Applications of Parabolic Trough

Parabolic trough systems are used in a variety of applications, including:

- Power generation
- Industrial heat production
- Desalination

## Maximum Temperature of a Parabolic Trough

The maximum temperature of a parabolic trough collector is typically around 400-600°C.

## Advantages of Parabolic

- **High efficiency:** Parabolic trough collectors can achieve high conversion efficiencies compared to other solar technologies.
- **Scalability:** Parabolic trough plants can be built in large sizes to meet varying energy demands.

- **Reliability:** Parabolic trough systems have proven to be reliable with long operating lifetimes.

## Fluid Used in a Parabolic Trough

The most common heat transfer fluid used in parabolic trough collectors is thermal oil. Thermal oils are synthetic oils specifically designed to withstand high temperatures and pressures.

## How Does a Parabolic Solar Collector Work?

A parabolic solar collector works by concentrating sunlight onto a receiver tube using a parabolic-shaped mirror. The concentrated solar radiation heats the fluid inside the receiver tube, which is then used to generate electricity or heat.

## Materials Used in Parabolic Trough Collector

Parabolic trough collectors are typically constructed using the following materials:

- **Mirrors:** Silvered glass or aluminum-coated polymer
- **Reflectors:** Glass or polymer
- **Receiver tubes:** Steel or ceramic
- **Structural supports:** Steel or concrete

## Parabolic Trough Collector with Solar Still

A parabolic trough collector with a solar still is a hybrid system that combines a parabolic trough collector with a solar still. The parabolic trough collector concentrates sunlight onto the solar still, which uses the heat to evaporate water and produce distilled water.

## Efficiency of a Parabolic Trough Solar Collector

The efficiency of a parabolic trough solar collector typically ranges from 15% to 25%.

## Formula for Parabolic Trough Collector

The formula for calculating the solar flux concentrated by a parabolic trough collector is:

$$\text{Flux} = (\text{Solar constant} * \text{Mirror reflectivity} * \text{Concentration ratio}) / \cos$$

Where:

- Solar constant = 1367 W/m<sup>2</sup>
- Mirror reflectivity = 0.9 (typical)
- Concentration ratio = Diameter of parabola / Diameter of receiver tube
- Theta = Angle of incidence

## How is Solar Energy Harvested Using a Parabolic Dish?

Solar energy is harvested using a parabolic dish by concentrating sunlight onto a central receiver. The concentrated solar radiation is then used to generate heat, which is converted into electricity through a turbine and generator.

## What is a Parabolic Solar Cooker Used For?

A parabolic solar cooker is used to cook food using the heat from concentrated sunlight.

## Parabolic Method of Solar Harvesting

The parabolic method of solar harvesting involves using parabolic-shaped mirrors or lenses to concentrate sunlight onto a central receiver.

## Purpose of Parabolic Dishes

Parabolic dishes are used to concentrate sunlight for a variety of applications, including:

- Power generation
- Industrial heat production
- Research and development

sunday lesson for sunday june 15 2014 vector mechanics for engineers statics 10th  
edition solutions manual lippincott manual of nursing practice 9th edition free  
calculus single variable 5th edition solutions yamaha yz490 service repair manual  
1981 1990 math 55a honors advanced calculus and linear algebra structure of dna  
and replication worksheet answer key keeping skills sharp grade 7 awenser key  
anatomy and physiology coloring workbook answers chapter 10 blood chapter 9 test  
geometry form g answers pearson 1984 yamaha phazer ii ii le ii st ii mountain lite ss  
ss elec snowmobile service repair maintenance overhaul workshop manual making  
spatial decisions using gis and remote sensing a workbook fundamentals of  
computer graphics peter shirley why am i afraid to tell you who i am clinical  
supervision in the helping professions a practical guide iti computer employability  
skill question and answer kuhn disc mower parts manual gmd66sel esteeming the  
gift of a pastor a handbook for christians who want to grow up in god kenwood ts  
450s service manual bullied stories only victims of school bullies can understand  
stop bullying bullied stories manual hp elitebook 2540p building social problem  
solving skills guidelines from a school based program jossey bass social and  
behavioral science series navodaya entrance sample papers in marathi physical  
chemistry 3rd edition thomas engel philip imitating jesus an inclusive approach to  
new testament ethics stoner spaz by ronald koertge cosco scenera manual  
polpoa venetiancookbookof sortsmother jonesthe mostdangerouswoman  
inamericacriminal lawin irelandcase 400manual theartof legomindstorms  
ev3programmingfull colorpolaris rangershopguide motorscooter repairmanuals  
cbse9 thcivics guideevergreen deutzbfm1015workshop manualyamaha  
c3servicemanual 20072008 masseyferguson repairmanual thearmchaireconomist  
economicsand everydaylife conductingresearchliterature reviewsfrom paperto  
theinternet femtosecondlaser micromachiningphotonics andmicrofluidicdevices  
intransparentmaterials topicsinapplied physicsdigitalcomputer fundamentalsmcgraw  
hillcompanymercury smartcraftinstallation manualpitotchemistry 103with  
solutionmanual certifiedparks safetyinspectorstudy guidestudyguide  
understandinglifescience grade12norms andscore conversionsguide freddavid  
strategicmanagement 15thedition harmankardonavr 3600manualengineering  
mechanicsdynamics fifthedition bymeriamkraige 2001nissan frontierservice  
repairmanualdownload manualeseat toledo2005troubleshooting guidefor

carrierfurnace bcafirstsem englishnotestheqmg canonmanuals freedownload  
anintroduction tomathematicalcryptography undergraduatetextsin  
mathematicshusqvarna50 chainsawoperatorsmanual mitsubishikp1c  
manualembedded linuxdevelopmentusing eclipsenowblackballed theblack  
andwhitepolitics ofraceon americascampuses