

## Performance Optimization of Concentrated Solar Power Plants through Technological Innovations

**Maulikkumar Vinodbhai Patel**

Kadi Sarva Vishwavidyalaya University, Gandhinagar, Gujarat, India

### Abstract

This work describes optimization methodologies to maximize the efficiency of CSP plants. CSTs hold great potential for the production of sustainable energy, provided that they are optimized with efficient optimization methods that lead to minimum cost with an acceptable energy capture efficiency. In order to identify the precise areas of a CSP plant where optimisation techniques could be applied to maximise power generation, this study aims to perform a comprehensive examination of the existing literature and industry, boost plant efficiency, and lower production costs overall. The review mainly approaches the essential points including design of solar collectors, thermal energy storage, heat transfer fluids, solar tracking systems, and operational control. The aim is the identification of more efficient and productive energy generating mechanisms. Moreover, the challenges and opportunities related to the application of optimisation techniques to Control Concentrated Solar Power (CSP) plants are presented, as well as potential future research and development directions. This paper will contribute to the efforts of ongoing activities aimed at increasing the performance, sustainability of CSP plants through the incorporation of up-to-date literature, and highlighting potential areas of advancements.

### Keywords

Concentrated Solar Power Systems, Techonological Innovations, Optimization Techniques, Renewable Energy Generation.

