

Engineering Models for Solar Tower Technologies (SEI-2)



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Scientific Achievement:

We developed a detailed procedure to arrive at the critical parameters of solar tower technology (e.g., tower height, mirror area, receiver sizing) for a chosen capacity, storage conditions, and location of tower.

Significance and Impact:

This research demonstrates a novel approach to estimate the solar tower parameters. This work will be translated into a computational model that helps in analyzing the performance (both technical and financial) of solar towers.

Research Details:

- Performed detailed literature survey of the existing tower plants (operational and under construction) to benchmark the parameters related to solar towers.
- Developed detailed engineering models for heliostat layout, receiver size estimation, and shadowing and blocking.
- Computed annual efficiencies from the models developed for a heliostat layout similar to that of Gemasolar power plant (Fig 1).
- Determined annual reflected energy from the heliostat field to establish the field boundary.

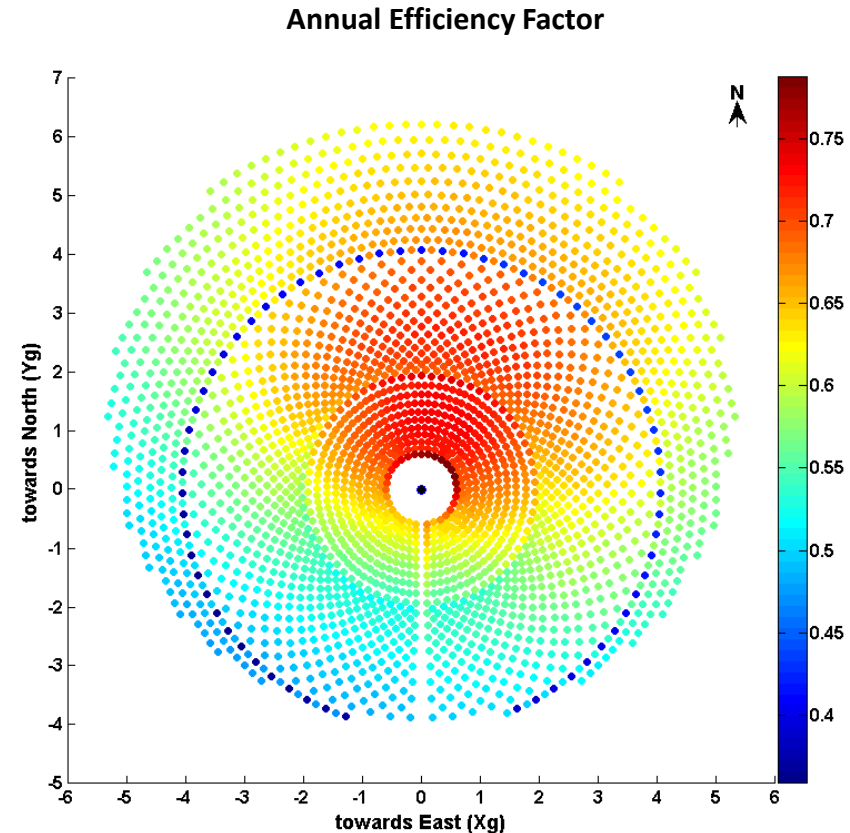


Fig. 1. Annual efficiency factors of Gemasolar field considering cosine, attenuation, and shadowing and blocking effects.

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