

Heliostat Field Efficiency Variations (CSP-2)



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Scientific Achievement:

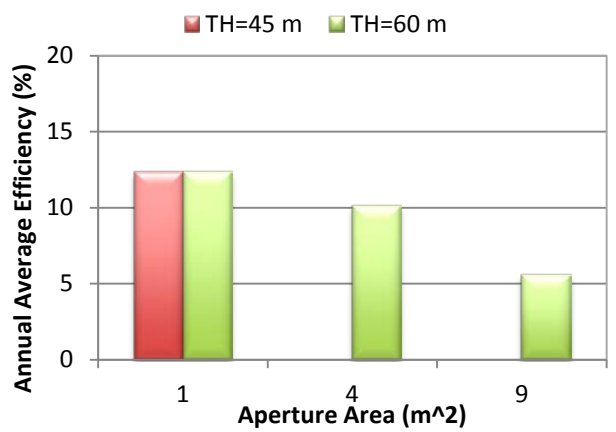
We studied the annual field efficiency of a 1-m² and a 4-m² receiver with a range of heliostats.

Significance and Impact:

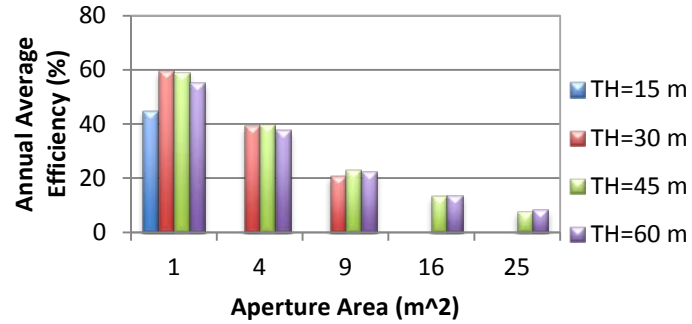
The results show that a 1-m² receiver yields significantly low efficiencies. But if a 4 m² receiver is used, efficiencies of about 60% can be achieved.

Research Details:

- We carried out an analysis of field efficiencies with respect to tower height, and receiver and reflector dimensions.
 - 1-m² Receiver : A 1-m² receiver will yield good efficiencies only with heliostats of smaller sizes. A field of 1-m² heliostats yields an efficiency of only about 12%. To achieve higher efficiencies, these heliostats must be segmented and canted to increase their effectiveness at redirecting light to the receiver.
 - 4-m² Receiver: Similarly, a 4-m² receiver yields good efficiencies with a 1-m² heliostat without canting. Efficiencies of about 60% are achieved without canting.
- To get good field efficiencies, the receiver must be larger.



Efficiencies of 1-, 4-, and 9-m² heliostats with a 1-m² receiver.



Efficiencies of 1-, 4-, 9-, 16-, 25-m² heliostats with a 4-m² receiver.

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