

# Heliostat Field Efficiency Variations (CSP-2)



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## Scientific Achievement:

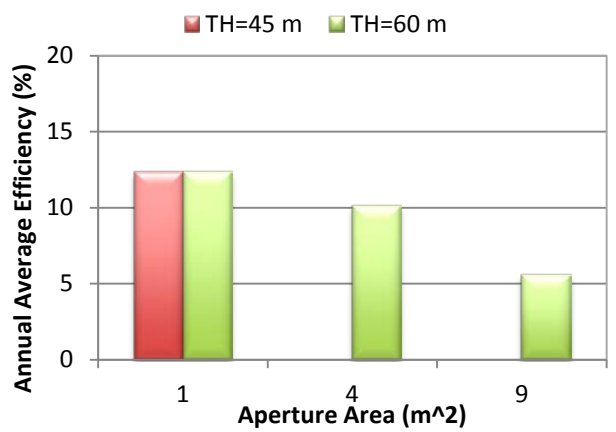
We studied the annual field efficiency of a 1-m<sup>2</sup> and a 4-m<sup>2</sup> receiver with a range of heliostats.

## Significance and Impact:

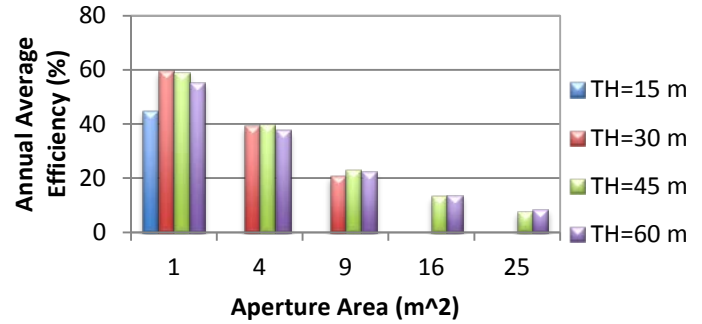
The results show that a 1-m<sup>2</sup> receiver yields significantly low efficiencies. But if a 4 m<sup>2</sup> receiver is used, efficiencies of about 60% can be achieved.

## Research Details:

- We carried out an analysis of field efficiencies with respect to tower height, and receiver and reflector dimensions.
  - 1-m<sup>2</sup> Receiver : A 1-m<sup>2</sup> receiver will yield good efficiencies only with heliostats of smaller sizes. A field of 1-m<sup>2</sup> 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-m<sup>2</sup> Receiver: Similarly, a 4-m<sup>2</sup> receiver yields good efficiencies with a 1-m<sup>2</sup> 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-m<sup>2</sup> heliostats with a 1-m<sup>2</sup> receiver.



Efficiencies of 1-, 4-, 9-, 16-, 25-m<sup>2</sup> heliostats with a 4-m<sup>2</sup> receiver.

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