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WATER CONSUMPTION IMPACTS OF RENEWABLE TECHNOLOGIES: THE CASE OF CSP

Jordan Macknick *, Robin Newmark, Craig Turchi

ABSTRACT: Renewable technologies are likely to play a larger role in the future U.S. electricity generation mix. In particular, concentrating solar power (CSP) systems could provide much of this future generation, and would be deployed primarily in the arid Southwest. The Bureau of Land Management has already fast-tracked 10 CSP projects for accelerated reviews in the Southwest. As water security is a major concern in the Southwest, there is a potential for water rights conflicts to stall or prevent CSP installations. The environmental impacts of CSP, including on water, are often misunderstood and highly dependent upon the technologies used and the local conditions of the proposed solar site, with the result that CSP systems can have a higher or a lower water intensity than conventional electricity generation. Common CSP systems utilize steam power blocks that are most efficient when using water for cooling. Water use in steam CSP plants can be reduced by over 90% if dry-cooling technologies are used. Such technology changes have tradeoffs in terms of plant performance and the cost of generating electricity, the magnitude of which are highly dependent upon the climatic conditions of the CSP plant location and the time-of-delivery rates for electricity generation.

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