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Performance of the Solar Two Central Receiver Power Plant **RECEIVED**

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Abstract. Solar Two is a utility-led project to promote the commercialization of solar power towers by retrofitting the Solar One pilot plant from a water/steam-based system to a molten salt system. Solar Two is capable of producing 10 MW_e net electricity with enough thermal storage capacity to operate the turbine for three hours after sunset. The plant was turned over to its operations and maintenance contractor in February 1998, marking transition from start-up to the test and evaluation phase. Solar Two has collected as much as 230 MWh thermal and generated as much as 72 MWh_e gross electricity in one day. The plant has demonstrated dispatchability after dark, during clouds, and during sunshine hours. To date, Solar Two has collected thermal energy at a maximum rate of 39 MW_t and generated gross electricity at a maximum rate of 11.1 MW_e. Important lessons have been learned in the areas of heat trace, valve selection, materials of construction, and steam generator design. Testing has begun in a number of areas relating to receiver performance, storage tank performance, salt chemistry, overnight thermal conditioning, electricity dispatching, performance monitoring and evaluation, availability tracking, and receiver controls.

1. INTRODUCTION

Molten-salt solar power towers offer dispatchable solar electricity by virtue of cost-effective thermal energy storage. In the long term, they will be able to provide capacity factors as high as 77%. Currently, 65% is realistic. It is anticipated that power towers could produce electric energy at a cost of 14 cents/kWhr in the year 2000, 5 cents/kWhr by 2010, and 4 cents/kWhr by 2020 [1]. Before they are ready for commercial deployment, however, power towers require demonstration of the reliability of the molten-salt systems and the development of low-cost heliostats. Reliability is

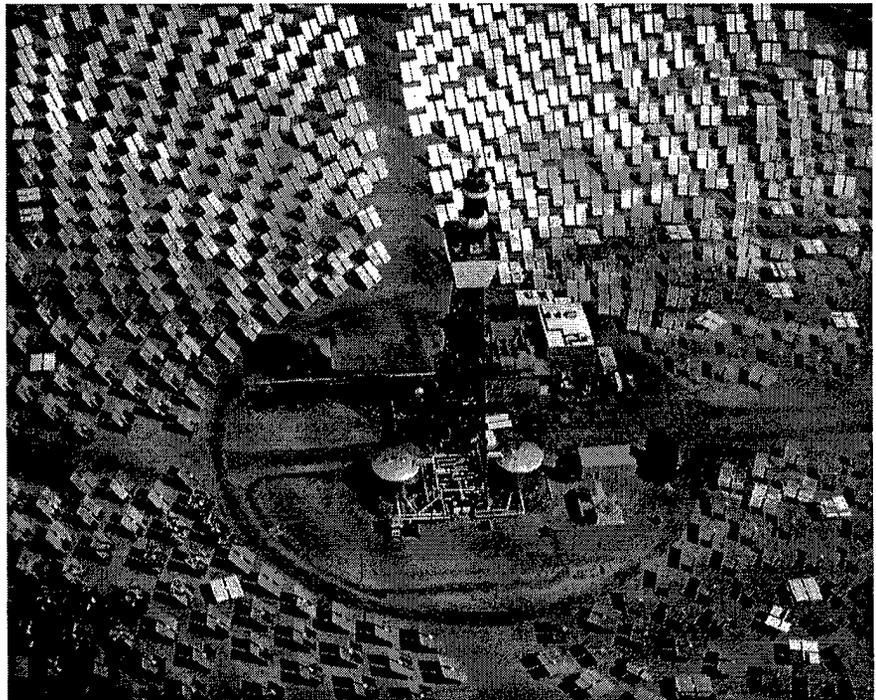


Figure 1. Aerial view of Solar Two.

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