

# Potential Improvements to Existing Geothermal Facilities in California

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## **ABSTRACT**

This paper summarizes the results of a recent study (the Facilities Improvement Report) performed with funding by the Public Interest Energy Research (PIER) program of the California Energy Commission (CEC). The Facilities Improvement Report describes potential improvements to 45 existing power plants in 7 currently producing geothermal fields in California. The improvements are of two general types: improvements in resource supply and improvements in surface facilities. To resolve inconsistencies in reported plant capacities, distinctions are made between original capacity, electromechanical capacity, 2005 capacity (which takes into account resource limitations), and actual annual average power. The total electro-mechanical capacity of the geothermal plants in California is about 2,650 MW-gross, and the 2005 capacity is about 1,850 MW-gross (1,600 MW-net).

The difference between the electro-mechanical capacity and the 2005 capacity (about 800 MW) represents the increase in power output that could be achieved if adequate resource supply were available. The difference between the most-likely resource capacity and the electro-mechanical capacity of existing plants shows the amount of incremental power output that could be achieved by a combination of plant improvements and construction of new plants in already producing fields. Most of the latter type of incremental potential (about 1,400 MW) is in the Salton Sea Field. Despite a surplus of electro-mechanical capacity in some areas of The Geysers, there is still potential for additional plant capacity in The Geysers (probably in the range of 100 to 150 MW).

As of 2005, the capital cost for new geothermal facilities in California is likely to be in the range of \$2,900 to \$3,500 per kW installed, including both drilling costs and plant construction. O&M costs are in the range of 1.8 to 2.5 ¢/kWh, excluding financing costs, depreciation, and any ongoing capital expenditures. Capital costs for the improvements described in the Facilities Improvement Report ranged from \$300 to \$3,000 per kW of increased output. O&M savings ranged from 0.02 to 1.0 ¢/kWh.

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