

Abstract

The present work deals with the technical feasibility of central receiver system using solar tower technology. This technology is based on solar concentration ratio of up to 1000 suns that can supply solar process heat at higher temperatures of about 800°C. This technology has been under development since 1980s after the pioneering experience of Solar I and Solar II in USA and the Plataforma de Almeria in Spain during the period of 2000-2010. It has reached the commercial maturity and is full expansion. Algeria is very rich in solar energy resources. It possesses large unpopulated and unproductive land in the Sahara which represents 80% of the total country area. This makes the country an ideal place for the implementation of the concentrating Solar Thermal Power Plant technologies (STPP). Algeria has expressed a high interest in developing its solar energy resources. To this end, it has introduced a program where solar thermal energy plays a central role. In order to study the viability of STPP under Algerian climate, we present here a technico economic assessment of a solar tower power pilot plant located in Tipaza near Algiers. Using the economical, technical, meteorological and radiometric data, we have carried a simulation of the STPP under SAM Advisor Software. The results show that for a net annual energy of about 1 MW, the levelized cost of electricity (LCOE) is about 0.1\$/kWh which is relatively high in comparison with the LCOE of fossil power plant (0.04 \$/kWh). However by increasing the plant power from 10 to 100 MW, the results indicate that the LCOE is drastically reduced. This suggests that, at high power, STPP can be competitive with conventional power plant