

Abstract

Among all Concentrating Solar Power technologies available for power generation, the solar power tower, also known as central receiver system, is attracting a lot of interest day to day.

In the present work, a thermal performance comparison of two mature central receiver solar thermal power plants namely the Rankine cycle with a tubular water/steam receiver and the Brayton cycle with volumetric air receiver is carried out. The investigation has been carried out under the Algerian climate whereby various regions have been selected to provide a comprehensive analysis. TRNSYS-STECC software package has been used for simulating the thermal performance.

The results show that, though economically slightly not as competitive as the volumetric air receiver Brayton cycle technology, the water/steam receiver Rankine cycle technology is more suitable particularly under lower solar radiation intensity. The gas turbine requires higher operating temperatures which are usually difficult to reach throughout the year.