

Concentrated solar power (CSP)

Concentrated solar power (CSP) is a potentially significant source of electricity for South Africa, given the available solar resources and the capacity of CSP with heat storage to provide both peaking power and base load.

South Africa had three CSP production plants under construction by 2013. Under the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) 400 MW from CSP plants was contracted in the first three bidding windows, of which 200 MW will come online by 2016. Plants providing this capacity include a 50 MW central tower CSP plant near Upington and three CSP trough plants, two 100 MW capacity plants near Pofadder, and a 50 MW capacity plant near Groblersshoo.

The potential capacity for CSP in South Africa is estimated to be around 547 GW.¹ This limited by available solar irradiance and land elevation, and by proximity to electricity transmission lines.

Level 1

In this scenario, only the 400 MW of CSP capacity secured under the REIPPPP windows one to three is built. They are replaced CSP plants of the same capacity at the end of their life span.

Level 2

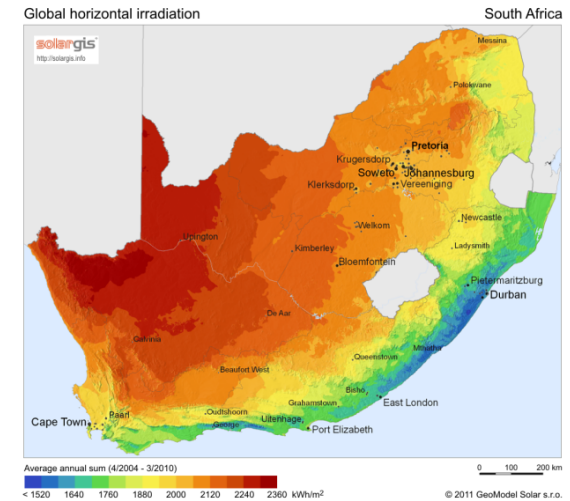
In this scenario, a total of 1200 MW of CSP capacity is built by 2030 (as per the draft IRP, 2010). The installed capacity then continues to grow to 2400 MW by 2050.

Level 3

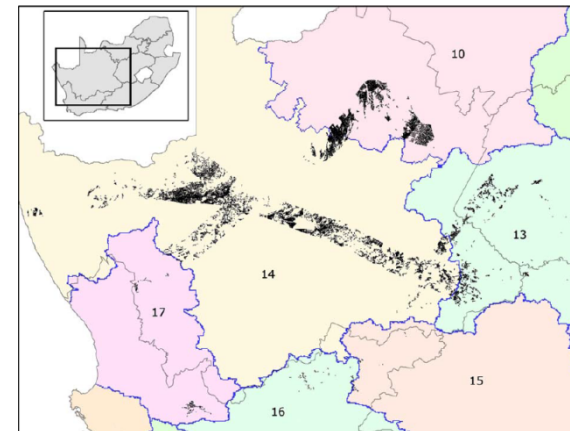
In this scenario the capacity grows to match the IRP 2010 Emissions adjusted scenario of 8950 MW by 2030 and this value is then doubled by 2050.

Level 4

In this scenario CSP is installed at an ambitious rate in South Africa. CSP capacity of 136,900 MW is installed by 2030 and 273,000 MW (half the maximum CSP potential estimated by Fluri [1]) is installed by 2050.



Map of average annual insolation values over South Africa. Source: <http://geosun.co.za/solar-maps/>



Map indicating the areas (shaded black) in South Africa where conditions are optimal CSP installation. Source: Fluri, 2009

1. Fluri, T.P. "The potential of concentrating solar power in South Africa." *Energy Policy* 37.12 (2009): 5075-5080.