

Geothermal Energy Prospectivity of South Australia

Hill, Anthony J., Department of Primary Industry and Resources South Australia, Adelaide, South Australia, Australia

Geothermal energy potential in Australia falls into two categories: hydrothermal (from relatively hot groundwater) and the hot basement rocks (hot fractured rock). In deeper parts of the Cooper Basin in South Australia, geothermal gradients reach 55-60°C/km over buried Carboniferous radiogenic granites where temperatures in excess of 250°C have been recorded at depths of 4.5 km.

South Australia has large regions of interpreted high crustal temperature associated with buried granite intrusives at depths >3 km, and these form key exploration targets. Other targets include hydrothermal energy from the Great Artesian Basin in the state's far NE; residual heat sources in the South East of South Australia around Australia's most recently active onshore volcanoes; and potential radiogenic iron oxide deposits that may have even higher heat flow than the granites and enhanced natural thermal systems.

The high heat flows resulting from radiogenic granites is referred to as the South Australian Heat Flow Anomaly (SAHFA) that exhibits a mean heat flow of $92 \pm 10 \mu\text{Wm}^{-2}$, compared to an average of 51-54 μWm^{-2} in other countries with a maximum heat flow of 126 μWm^{-2} recorded in the Mount Painter Inlier near Paralana Hot Springs.

South Australia's comparative advantages in the form of naturally occurring Hot Rock geothermal resources; world class, government designed (supportive) investment frameworks; exemplary implementation of a trustworthy regulatory regime have attracted 9 companies to invest in emission free Hot Rock energy projects in 64 Geothermal Exploration Licence (GEL) areas covering ~ 30,000 square kilometres in this State with 5 year licence commitments in excess of \$410 million. This represents 93% of all geothermal licences in Australia.