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Compressed air energy storage in South Africa

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Abstract

The suitability of Compressed Air Energy Storage (CAES) as a source of peaking plant capacity in South Africa is examined in this research report. The report examines the current state of CAES technology including examples of operational and planned facilities. It further evaluates the potential challenges and benefits of the use of CAES in South Africa. A high level proposal for plant design capacity is documented, and potential costs for construction thereof are estimated. The cost of a CAES plant is compared to generating options using the Levelised Cost of Energy (LCOE) method.

The study proposes that by 2018 additional peaking plant capacity will be required and that a CAES plant able to provide additional capacity up to 3 500MW would help to alleviate the potential shortfall which may be experienced at this time. The report further proposes conversion of underground mines for use as air receivers for high pressure storage of large volumes of compressed air required for CAES.

The research report concludes that CAES presents a feasible solution to the potential future shortfall in peaking plant capacity in South Africa, and that site identification and construction of a suitable storage cavern presents the main obstacle to the implementation of this technology.