Modelling of a new hydro-compressed air-storage system

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ABSTRACT
The interest in energy storage systems is increasing, since it provides an excellent solution to store the low-cost excess energy from the energy sources, which are available at peak demand hours. This paper presents a new compressed-air storage system that combines ambient air and hydraulic oil, in order to store energy in compressed-air form and benefit from the advantages of both pneumatic and hydraulic systems. The process consists of charging and discharging cycles, however, this paper investigates the discharging cycle, where a new technique of Small-Scale Compressed Air Energy Storage (SS-CAES) system is realised. The new idea in RC-CAHES is to obtain higher efficiency in energy conversion machines during charging and discharging processes with numerous advantages over conventional types of energy storage systems. This study demonstrates the effectiveness of this technique by proving that it has higher efficiency than a similar Compressed Air Energy Storage (CAES) systems.