

The role of the French station-type energy storage system





Overview

This paper aims to evaluate the relative role of renewable energy technologies, nuclear power and carbon capture and storage technologies, the impact of different cost scenarios in the optimal electricity.

How much storage capacity does France have?

In 2015, France had 5.82 GW of operational storage capacity, of which pumped storage comprised 5.81 GW. However electro-chemical storage is growing rapidly, in particular with lithium-ion batteries, with batteries accounting for nearly 52 per cent of the remaining storage capacity.

Are renewables the key to the French energy transition?

Among them, the “ 100% renewable power mix” study (ADEME, 2015), and “ electricity mix development trajectories 2020-2060” (ADEME, 2018a) explicitly optimize the power system and study the role of renewables in the French energy transition. Our results in the previous fully-renewable power mix study were very close to those of these two studies.

What are the applications of energy storage systems?

The applications of energy storage systems have been reviewed in the last section of this paper including general applications, energy utility applications, renewable energy utilization, buildings and communities, and transportation. Finally, recent developments in energy storage systems and some associated research avenues have been discussed.

Which energy storage technologies can be used in a distributed network?

Battery, flywheel energy storage, super capacitor, and superconducting magnetic energy storage are technically feasible for use in distribution networks. With an energy density of 620 kWh/m³, Li-ion batteries appear to be highly capable technologies for enhanced energy storage implementation in the built environment.

What is stationary energy storage?



One of the key words about stationary energy storage is flexibility. Matching generation and demand will imply using a broad range of flexibility levers: flexibility from generation and consumption, from grid development and from energy storage (electric, thermal, inertial gravitational).

Which energy storage system is suitable for centered energy storage?

Besides, CAES is appropriate for larger scale of energy storage applications than FES. The CAES and PHES are suitable for centered energy storage due to their high energy storage capacity. The battery and hydrogen energy storage systems are perfect for distributed energy storage.



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