

What is a liquid air energy storage system?

An alternative to those systems is represented by the liquid air energy storage (LAES) system that uses liquid air as the storage medium. LAES is based on the concept that air at ambient pressure can be liquefied at -196°C , reducing thus its specific volume of around 700 times, and can be stored in unpressurized vessels.

What is the exergy efficiency of liquid air storage?

The liquid air storage section and the liquid air release section showed an exergy efficiency of 94.2% and 61.1%, respectively. In the system proposed, part of the cold energy released from the LNG was still wasted to the environment.

Can a hybrid energy storage system improve thermal energy recovery?

Future prospective can aim to develop LAES hybrid solutions with an efficient thermal energy recovery system. Liquid air energy storage (LAES) represents one of the main alternatives to large-scale electrical energy storage solutions from medium to long-term period such as compressed air and pumped hydro energy storage.

Can cryogenic heat exchangers be used for Process Cooling and liquid air storage?

A review of cryogenic heat exchangers that can be applied both for process cooling and liquid air energy storage has been published by Popov et al. . The paper stated that the heat exchangers for cryogenic applications can be divided into three main categories: i) tubular spiral wound; ii) plate HEX; and iii) regenerators.

What is the difference between liquid based and solid based cold storage?

The liquid-based cold storage materials have a high specific heat and are easy to control both the temperature and the heat transfer, but are flammable and expensive. The solid-based cold storage materials are cheaper and safer but are not easy to control the temperature and heat transfer.

What is a working fluid for ASU?

Wang et al proposed the use of crude nitrogen from the ASU as the working fluid for LAES, part of compression heat from LAES charging process for the regeneration of ASU absorber (air cleaning unit), and the use of high-purity oxygen product from the ASU sold for additional revenues.

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