

Downloadable (with restrictions)! In China, the annual energy consumption for cooling represents a relatively large and rising trend. District cooling systems (DCSs) have attracted increasing attention owing to their energy-saving operation and high-efficiency. However, a reasonable operation strategy for DCSs with multi-cold sources is still a problem.

Liquid air energy storage (LAES), as a form of Carnot battery, encompasses components such as pumps, compressors, expanders, turbines, and heat exchangers [7] s primary function lies in facilitating large-scale energy storage by converting electrical energy into heat during charging and subsequently retrieving it during discharging [8].Currently, the ...

In the compressed air-liquid CO₂ energy storage system, the system efficiency is 67.74 %, ... the middle pressure must surpass the critical pressure to guarantee liquefaction by the ambient temperature of the cold source. In addition, the split ratio of heat pump cycle is 0.3 under design condition, and it can be adjusted with the user needs.

Liquid air can be employed as a carrier of cold energy obtained from liquefied natural gas (LNG) and surplus electricity. This study evaluates the potential of liquid air as a distributed source with a supply chain for a cold storage system using liquid air. Energy storing and distributing processes are conceptually designed and evaluated considering both the ...

The integration of hydrogen-based energy systems with renewable energy sources represents a fascinating development. Santarelli et al. [27] examined the performance of a self-sufficient energy system consisting of an electrolyzer, a hydrogen tank, and a proton exchange membrane fuel cell.Zhang et al. [28] employed a modified approach to optimize ...

From the overall point of view, the traditional energy system is transformed into a sustainable energy system [18]. Furthermore, the DCS combined with ice thermal storage (ITS) can balance the cooling demand and take advantage of the low electricity price in the night to store the cold energy in order to use during the peak load period [19].

There have been several efforts on the LAES systems integrating LNG cold energy to enhance power performance. These systems generally fall into two main categories, focusing either capacity (capacity-focus system) or efficiency (efficiency-focus system) [16, 17].Capacity-focused systems prioritize the utilization of LNG cold energy in the air ...

Energy storage systems provide a mechanism to store excess energy during off-peak periods and releasing it ... the thermodynamic and exergoeconomic analyses models of two compressed and liquid carbon dioxide energy

storage systems without extra heat/cold sources. Wu et al. [17] improved a conventional transcritical compressed carbon dioxide ...

Thermal energy storage (TES) is a technology that stocks thermal energy by heating or cooling a storage medium so that the stored energy can be used at a later time for heating and cooling applications and power generation.

Among all types of TES technologies, sensible thermal energy storage (STES) systems are the most common, mature, and commercially developed technology. In STES, energy is stored when the temperature of the medium changes. Depends on the source of energy, STES offer an economically viable thermal energy storage strategy which reduces GHG ...

Operating temperature - source gives information about the temperature level of a heat/cold source, whereas operating temperature - supply gives information about what temperature is supplied to the heating or cooling system. ... Thermo-economic optimization of an ice thermal energy storage system for air-conditioning applications: 2013 [68 ...

As a consequence, enhancing the energy efficiency of the cold source system is critical for optimizing the energy efficiency of the central air conditioning system. After analyzing the potential for energy-savings, we propose an energy-saving control technique for cold source systems based on the PCA-ANN data model.

The energy storage efficiency of an ATES system is about 70%-100% and 50%-80% in the cold and heat storage modes, respectively (Lee, 2012). Integration or combination of ATES heating and cooling systems is one of the ways to increase the energy efficiency of heat-only or cold-only storage systems, especially in large-scale applications ...

In the aforementioned systems, the liquefaction of low-pressure CO₂ often involves a complex cold storage unit with solid-liquid phase change materials, requiring complex operating mechanisms and control strategies. Alternatively, many researchers have explored the use of external cold sources to liquefy carbon dioxide.

Techno-economic analysis of an advanced polygeneration liquid air energy storage system coupled with LNG cold energy, solar energy, and hydrate based desalination. Author links open overlay ... The system develops the respective integration of external cold and heat sources in energy storage and release processes to strengthen the operational ...

While cold thermal energy storage has been applied as ice storage air conditioning systems for a long time, the combination of electricity, cold, and heat energy storage has recently gained attention. ... This study proposed a zero-energy coastal community integrated energy system with hybrid RE sources and MES, which utilized ocean-related ...

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