

# Cold energy air separation storage

<div class="df\_qntext">How can cold energy be used in air separation?

By properly utilising the cold energy of LNG, the practical costs associated with the separation of gases can be decreased. One of the most promising ways to use the cold energy contained in LNG is to incorporate it into the air separation process (ASP) in order to increase the operation's effectiveness.

<div class="df\_qntext">What is the utilization efficiency of LNG cold energy in air separation units?

Nevertheless, the utilization efficiency of LNG cold energy in air separation units is relatively low, typically fluctuating within the range of 10% to 25%. Ref. put forward an integrated system that consists of air separation, power generation, refrigeration, and ice thermal storage.

<div class="df\_qntext">How much cold energy is absorbed by the LAES system?

As shown in Figure 2, this portion of the cold energy is absorbed by the LAES system, with liquid propane (points 37-41) and LNG (points 2-6) jointly providing cold energy for air liquefaction. As air flows through HX1, LNG provides 4600 kW of cold energy and liquefied propane contributes 4562.16 kW, cooling the air to approximately -90 °C.

<div class="df\_qntext">What is a cryogenic air separation system?

Utilizing LNG cold energy, a cryogenic ASU produces high-purity oxygen at a cost-effective rate. Compared to the conventional system, the reduction in electric power usage is 66%. The air separation process was modelled using CULNG by Yongqiang Xiong and Ben Hua (2014).

<div class="df\_qntext">What are the benefits of cryogenic separation of air?

The cryogenic separation of air results in a variety of gaseous and liquid compounds. Because of their economic worth, the wise use of liquid products can also be beneficial to the sector. By properly utilising the cold energy of LNG, the practical costs associated with the separation of gases can be decreased.

<div class="df\_qntext">What is a three-tier cold energy utilization system?

This study presents a three-tiered cold energy utilization system that integrates liquid air energy storage (LAES), cold energy power generation, and cold energy air conditioning.

Phase change cold storage technology means that when the power load is low at night, that is, during a period of low electricity prices, the refrigeration system operates, stores cold energy in the phase ...

In addition, based on the baseline liquid air energy storage (B-LAES) system, an improved liquid air energy storage (I-LAES) system is also proposed to utilize the excess air compression heat to ...

Energy, exergy, and economic analyses reveal compelling findings: the implementation of LAES-ASU slashes cold storage unit investment costs by 62.05 % compared to traditional LAES, ...

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Examples are CO<sub>2</sub> capture, air separation, cold storage, floating storage regasification, etc. The proposed methods have the potential for greater energy efficiency and exergy. ...

While regasification process, cryogenic LNG has a great potential for cold energy recovery. This cold energy can be used in various applications such as power generation, material ...

Large amount of cold energy stored in liquefied natural gas (LNG) exhibits huge application potentials and also the issues of significant cold load fluctuations and low utilization efficiency, in view of which ...

In order to recover the cold energy and obtain greater economic benefits, LNG receiving terminals adopt a variety of approaches. These include air separation, light hydrocarbon recovery, ...

Cold storage, which primarily involves adding cold energy to a storage medium, and removing it from that medium for use at a later time, has wide applications for air conditioning use in ...

The air separation device uses LNG cold energy recovery in the system. A shift converter device and a cryogenic CO<sub>2</sub> capturing system are components of the trans-critical CO<sub>2</sub> power generation cycle.

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LNG cold energy can be used for power generation, air separation, liquefaction of CO<sub>2</sub>, production of dry ice, cold storage and rapid cooling, district cooling and other applications. The schematics and ...

To address these issues, we propose a novel air separation unit with energy storage and generation (ASU-ESG) which integrates an ASU, a liquid air storage unit, and an energy release and ...

LNG consumption is rising globally, releasing significant cold energy during regasification. Coupling LNG vaporization with liquid air energy storage (LAES) maximizes this cold energy recovery, enhancing ...

Air separation is a critical process in heavy industries, yet its high energy consumption and operational costs hinder the growth of downstream sectors. To address this, this study introduces ...

To address these issues, we propose a novel air separation unit with energy storage and generation (ASU-ESG) which integrates an ASU, a liquid air storage unit, and an energy release...

Moreover, there remains a surplus of production capacity in air separation. This paper proposes an external-compression air separation process, with liquid air energy storage function. It ...

LAES-ASU leverages liquid oxygen for cold energy storage, optimizing processes to minimize air separation

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unit power consumption during peak hours, thereby substantially reducing operating costs.

Cryogenic air separation is routinely used in large-scale production of high-purity oxygen. However, the relatively high power consumption of traditional cryogenic air separation no ...

LNG cold energy can be used for power generation, air separation, liquefaction of CO<sub>2</sub>, production of dry ice, cold storage and rapid cooling, district cooling and other applications.

Liquid air energy storage (LAES) is a promising technology for large-scale energy storage applications, particularly for integrating renewable energy sources. While standalone LAES ...

The objective of this research on the cold utilisation of LNG integrated with air separation processes is to investigate the feasibility of using the cold energy contained in LNG to ...

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