

Analysis of the hydrogen energy storage system industry chain

What is a hydrogen-based chemical energy storage system?

A hydrogen-based chemical energy storage system encompasses hydrogen production, hydrogen storage and transportation, and power production using hydrogen as a fuel input²¹. (See Exhibit 12.) The application of HESS centers around the energy conversion between hydrogen and other power sources, especially electricity.

What is the hydrogen energy industry chain?

The hydrogen energy industry chain encompasses the production of hydrogen in the upstream, storage and transportation of hydrogen in the midstream, and the utilization of hydrogen in various applications downstream. These applications span multiple sectors, including transportation and industrial chemistry.

What is hydrogen storage & transportation?

Hydrogen storage and transportation is the intermediate link of hydrogen energy industry chain, which is the key to balancing the fluctuation of the industry chain and ensuring the security of supply. Hydrogen is flammable, explosive (explosion limit is 4% to 74.2%) and diffusible, resulting in difficulties in storage and transportation.

Why is hydrogen energy a strategic emerging industry for energy structure adjustment?

The hydrogen energy industry has high scientific and technological content, a long industrial chain, and good social benefits, making it a strategic emerging industry for energy structure adjustment. The entire industry chain of hydrogen energy includes key links such as production, storage, transportation, and application.

Why is hydrogen a fundamental technology in China?

Hydrogen application is growing as a fundamental technology in China because of concerns regarding carbon neutrality, industry distribution, and renewable energy. As a world-class manufacturing country, China already has preconditions for the industrialisation of hydrogen energy.

What is the development trend for hydrogen energy applications?

Finally, in terms of hydrogen energy applications, with the gradual upgrading and progress of top-level design and technology, hydrogen energy applications based on transportation, industrial engineering, energy storage, electricity to gas and microgrids will show a diversified development trend.

5.2. Outlook

The factors affecting the CDC of the hydrogen energy industry chain can be divided into two categories: internal and external factors. The research on internal factors is ...

China's hydrogen energy industry chain is currently focused ... and perfect natural gas pipeline infrastructure to promote the construction of green hydrogen production and hydrogen energy ...

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The study presents a current insight into the global energy-transition pathway based on the hydrogen energy industry chain. The paper provides a critical analysis of the role of clean hydrogen based on renewable ...

High penetration of renewable energy brings seasonal electricity imbalance in the power system and results in considerable energy curtailment. Such large-scale curtailed electricity could be ...

Hydrogen energy technology is pivotal to China's strategy for achieving carbon neutrality by 2060. A detailed report [1] outlined the development of China's hydrogen energy ...

Under the background of the power system profoundly reforming, hydrogen energy from renewable energy, as an important carrier for constructing a clean, low-carbon, safe and ...

The global hydrogen demand is projected to increase from 70 million tonnes in 2019 to 120 million tonnes by 2024. Hydrogen development should also meet the seventh goal of "affordable and ...

This review examines the central role of hydrogen, particularly green hydrogen from renewable sources, in the global search for energy solutions that are sustainable and safe by design. Using the hydrogen square, safety ...

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