

# Are hydrogen refueling stations energy storage

Are hydrogen refueling stations sustainable?

Herein, we propose a sustainable design for hydrogen refueling stations that utilizes the cold energy of liquid hydrogen to improve energy efficiency and reduce the life-cycle environmental impact.

Why are liquid hydrogen refueling stations important?

As the number of fuel cell vehicles (FCVs) grows, the advantages of LH<sub>2</sub> in terms of energy density, hydrogen purity, and long-distance transportation make liquid hydrogen refueling stations (LHRS) increasingly important in hydrogen infrastructure development [5,16].

Are liquid hydrogen refueling stations better than GHRS?

As an outstanding alternative to GHRSs from an energy-saving perspective, liquid hydrogen refueling stations (LHRSs) provide some benefits. Liquid hydrogen (LH<sub>2</sub>) has a higher volumetric energy density (10.1 MJ/L) than that of gaseous hydrogen (GH<sub>2</sub>) (0.0107 MJ/L), and thus requires compact storage space .

How is hydrogen produced in a refueling station?

For distributed generation, the hydrogen is produced by steam reforming of natural gas at the forecourt refueling station at a design capacity of 1,330 kg/d annual average rate of production.

What is a hydrogen refueling station (hrs)?

With such promising potential, hydrogen refueling stations (HRSs) are being extensively developed, fueled by the increasing demand for refueling hydrogen fuel cell electric vehicles (HFCEVs) . Specifically, there has already been a great deal of research on the major equipment and technologies of HRS [16, 17].

What are the characteristics of a gaseous hydrogen refueling station?

Therefore gaseous hydrogen refueling stations (whether produced on-site or transported) have the following primary characteristics: initial GH<sub>2</sub> storage, compression, high-pressure storage (if applicable), and thermal management (therefore a pre-cooling phase) prior to the hydrogen flowing into the vehicle's tank.



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