Comparative analysis of batteries and hydrogen energy in Poland

How is solar potential determined in Poland?
To reach a target,the current solar potential in Poland,the photovoltaic (PV) productivity,the capacity of the energy storage in batteries as well as the size of the hydrogen production system were calculated. The solar potential was determined using archival meteorological data and the Krieg estimation method.

Is solar energy production possible in Poland?
The phenomena of the growing possibilities of solar energy production in Polandrepresent the subject of many studies. The main areas of interest are photovoltaic installations' productivity ,supporting infrastructure and energy storage [20,21],as well as the impact of photovoltaic panels on environmental sustainability .

How energy transformation is happening in Poland?
In the literature,more and more research is being conducted on the energy transformation of Poland,whose energy profile is changing due to the search for alternatives to emission-intensive mining[12,13]. Renewable sources such as photovoltaics [3,14]and partly hydrogen energy are becoming more and more popular .

Why is hydrogen a better storage option than a battery?
Storage in hydrogen is more advantageous than batteries due to the smaller investment outlays. Content may be subject to copyright. value of hydrogen (HHV = 12.7 MJ Nm3).

What is the optimal angle for solar installation in Poland?
The juxtaposition of optimal installation angels for solar installation . In Poland,the optimal angle varies with latitude. It ranges from 35for the north (Gdansk)of the country. Based on data from the PVGIS database for all the) were developed. Table 2 pr esents the radiation meter per year.

What are the economic indexes of hydrogen storage?
Whereas,for systems with energy stored the economic indexes were,as follow: SPBP = never,NPV = 183,428 EUR for batteries and SPBP = 14.74 years,NPV = 22,639 EURfor hydrogen/fuel cell installation. Storage in hydrogen is more advantageous than batteries due to the smaller investment outlays. Content may be subject to copyright.

Purpose: The study aims to investigate the role of hydrogen technology in sustainable energy in Poland and Germany. It seeks to offer a comparative analysis to fill gaps ...

This article presents the results of a comparative scenario analysis of the "green hydrogen" development pathways in Poland and the EU in the 2050 perspective. We prepared the scenarios by linking three models: two sectoral models for the power and transport sectors, and a Computable General Equilibrium model (d-Place). The basic precondition for the large-scale ...

Comparative analysis of batteries and hydrogen energy in Poland

This paper presents a comparative analysis of electric, hydrogen and biofuel transitional pathways to a future sustainable road transport in Iceland, a country with a renewable-based energy system. The analysis is based on a system-dynamics model of Icelandic energy and transport systems (UniSyD_IS). The model is divided into four main modules: fuel supply, ...

In conclusion, the comparative analysis of solar cells and hydrogen fuel technologies highlights their complementary roles in achieving a clean, sustainable, and resilient energy future. Solar cells, with their mature technology, offer scalability, accessibility, and cost-effectiveness for direct electricity generation from sunlight, making them ideal for decentralized ...

In the paper, the author compared two modern technologies of energy storage characterized by a small size, i.e. lithium-ion batteries and the electrolyzer-fuel cell system with a power of ...

Hydrogen also has the potential to become a relevant energy carrier for long-term and large-scale energy storage due to its low level of self-discharge, stackable capacity, and high energy density [5, 6].However, its application as an energy carrier has often led to comparison versus batteries, particularly in mobility applications where the low efficiency of fuel cells (FC) ...

Presently, the worldwide hydrogen energy utilization is composed of both the petroleum refining and the chemical processing, with a relatively tiny share of commercial utilization, while the hydrogen fuel cell is becoming an essential direction of terminal application [20].The global hydrogen production market was US$120.77 billion in the year of 2020 [21].

Purpose: The study aims to investigate the role of hydrogen technology in sustainable energy in Poland and Germany. It seeks to offer a comparative analysis to fill gaps in existing literature and provide insights for stakeholders in achieving Sustainable Development Goals.

The study evaluates the competitiveness of hydrogen energy storage in Poland. o The economic viability of hydrogen storage and Li-ion batteries is compared. o Electricity prices fluctuations in the day-ahead market are considered. o Both energy storage systems are unprofitable in the current price fluctuations.

The study of the viability of hydrogen production as a sustainable energy source is a current challenge, to satisfy the great world energy demand. There are several techniques to produce hydrogen, either mature or under development. The election of the hydrogen production method will have a high impact on practical sustainability of the hydrogen ...

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paper presents the results of a technical-economic comparative analysis of two en. he nominal power of hydrogen generators on basic technical indicators, which can influence investment decision-making. The economic analysis included factors such as the impact of grants, the sale price of the product and the purc.

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A comparative environmental Life Cycle Assessment study of hydrogen fuel, electricity and diesel fuel for public buses August 2023 DOI: 10.1016/j.apenergy.2023.121766

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