

As new energy vehicles in the Chinese market gradually enter the retirement phase, retired batteries can still meet the requirements for various echelon (secondary) uses, such as in low-speed electric vehicles, as backup power source for telecommunication base stations, and in electrical energy storage.

Over the past decade, global installed capacity of solar photovoltaic (PV) has dramatically increased as part of a shift from fossil fuels towards reliable, clean, efficient and sustainable fuels (Kousksou et al., 2014, Santoyo-Castelazo and Azapagic, 2014). PV technology integrated with energy storage is necessary to store excess PV power generated for later use ...

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Hydrogen is regarded as secondary energy that is perfectly complementary to electricity owing to its friendly storage characteristics and can play a vital role in the future low-carbon society.

As the energy crisis and environmental pollution problems intensify, the deployment of renewable energy in various countries is accelerated. Solar energy, as one of the oldest energy resources on earth, has the advantages of being easily accessible, eco-friendly, and highly efficient [1]. Moreover, it is now widely used in solar thermal utilization and PV ...

Under the ambitious goal of carbon neutralization, photovoltaic (PV)-driven electrolytic hydrogen (PVEH) production is emerging as a promising approach to reduce carbon emission. Considering the intermittence and variability of PV power generation, the deployment of battery energy storage can smoothen the power output. However, the investment cost of ...

Shared energy storage (SES) system can provide energy storage capacity leasing services for large-scale PV integrated 5G base stations (BSs), reducing the energy cost of 5G BS and achieving high efficiency utilization of energy storage capacity resources. However, the capacity planning and operation optimization of SES system involves the coordinated ...

As a clean, low-carbon secondary energy, hydrogen energy is applied in renewable energy (mainly wind power and photovoltaic) grid-connected power smoothing, which opens up a new way of coupling ...

This paper mainly studies the key technologies of energy storage in microgrid system from three aspects: power smoothing control, load shifting control, and off-grid operation control [].2.1 Power Smoothing Control. The output power of grid-connected photovoltaic power generation system is related to installation

inclination, efficiency of photovoltaic array, ...

2.1 Solar photovoltaic systems. Solar energy is used in two different ways: one through the solar thermal route using solar collectors, heaters, dryers, etc., and the other through the solar electricity route using SPV, as shown in Fig. 1. A SPV system consists of arrays and combinations of PV panels, a charge controller for direct current (DC) and alternating current ...

3 The perspective of solar energy. Solar energy investments can meet energy targets and environmental protection by reducing carbon emissions while having no detrimental influence on the country's development [32, 34] countries located in the "Sunbelt", there is huge potential for solar energy, where there is a year-round abundance of solar global horizontal ...

The focus is on monitoring system design. The wind/PV/energy storage microgrid system is a closed loop automatic control system with information collection, remote control, scheduling and management, energy condition monitoring. ... The fair active and reactive power allocation can be realized in WFs to meet the requirements of WT equipment ...

As the primary consideration, sizing optimization has great impact on wind-photovoltaic-hydrogen storage integrated energy system (WPHIES) construction. However, few studies on sizing optimization consider the characteristics of renewables coupled with hydrogen storage, or discuss decision-making fuzziness. Therefore, a three-objective mixed integer ...

charging and discharging power to the power of battery energy storage system [7]. Under the grid-connected mode, the energy storage system can realize the combined control of power smoothing and load shifting. The control block diagram is shown in Fig. 2. The photovoltaic and energy storage system is connected to the grid through a single point.

The future land requirements of solar energy obtained for each scenario and region can be put in perspective compared, for example, to the current level of built-up area and agricultural cropland.

Energy storage technologies can reduce grid fluctuations through peak shaving and valley filling and effectively solve the problems of renewable energy storage and consumption.

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