

# Oilfield pumping unit photovoltaic energy storage

Can reversible pump-turbine units maximize a grid-connected photovoltaic and wind power plant?

This paper presents the modeling and application of an optimal hourly management model of grid-connected photovoltaic and wind power plants integrated with reversible pump-turbine units to maximize the monthly operating profits of the energy system and meet electricity demand.

What are solar photovoltaic pumping systems?

Therefore, solar photovoltaic pumping systems are associated with various fields of science and engineering. In remote, less-populated areas without electricity, where it is either challenging to connect to the grid or it is not possible, solar photovoltaic water pumping systems can play a significant role.

What components are included in a photovoltaic pumping system?

The PV array, power converter unit, battery storage, and motor-pump set are the main components that are included in a photovoltaic pumping system.

Which motor-pump sets are used in photovoltaic pump applications?

Induction or alternative current (AC) motors with a centrifugal pump and direct current (DC) motors with a positive displacement pump are the two most widely used motor-pump sets in photovoltaic pump applications.

What is pumped hydroelectric energy storage (PHES)?

Pumped Hydroelectric Energy Storage (PHES) With the increased production of energy from renewable resources, such as wind and solar, into many countries' electric grids, the overall need for cost- and energy-efficient storage capacity increases. Many plants that use RE resources rely on the normal availability of solar radiation, wind, or water.

How does a photovoltaic array work?

The model that was developed includes a simulation of photovoltaic arrays from the company SunPower SPR-E20-435-COM, Figure 3. The six-pulse voltage inverter, which powers the induction motor (IM), is connected to the solar power source. The five panels are linked in parallel and the six are in series to generate the appropriate output power.

So most of the researches on the energy-saving technology of pumping units still focus on the mechanical structure or intelligent control of conventional pumping units, such as the variable ...

Beam pumping unit is a main oil production equipment in land-based oilfield. Oil production energy consumption caused by beam pumping unit accounts for one third of the total energy consumption in ...

This study presents a technique based on a multi-criteria evaluation, for a sustainable technical solution based

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on renewable sources integration. It explores the combined production of hydro, solar and wind, for ...

Considering 100% renewable energy fractions with three (3) system configurations, and six (6) scenarios as shown in Figure 1 8: -Type 1 (solar photovoltaic + battery storage), -Type 2 (solar ...

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Figure- 1. Battery storage system for the PV water pumping system. The PV data, Boost DC-DC converter calculation and values, MPPT topology, VSI control technique and the motor-pump ...

The pumping unit is the main equipment for oil production in the oilfield. However, its serious energy consumption has greatly increased the cost of oil extraction. The reason of this phenomenon is t...

Energy storage through pumped-storage (PSP) hydropower plants is currently the only mature large-scale electricity storage solution with a global installed capacity of over 100 GW. The objective of this study is to ...

This paper will introduce some technologies such as phased pumping units, dual-horsehead pumping units, shock absorber device, load reducer device, lower barbell pumping units, multi-balance device, flywheel ...

To solve these problems, many scholars and pumping unit manufacturing companies have developed a variety of new energy-saving pumping units [12][13][14][15][16] [17] [18]. Although these possess ...



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