Profit analysis of pumped storage power station technology

What are the development models of pumped storage power stations?
According to the different stages of the development of the power market, this paper puts forward the corresponding development models of pumped storage power stations, which are successively the "two-part price system" model, the "partial capacity fixed compensation" model, and the "completely independent market participation" model.

Do pumped storage power stations improve economic benefits?
According to the results of sensitivity analysis,the operation of pumped storage power stations under different models is guided,to promote the improvement of economic benefitsof power stations. In the selection of sensitive factors,priority should be given to the factors that have a greater impact on income.

What is the price mechanism of pumped storage power stations?
In terms of the pumped storage price mechanism,most of the existing studies focus on the price mechanism of pumped storage power stations at a certain stage,including the current two-part price mechanismand the bidding mechanism under the market environment,and the horizontal comparison of the multi-stage price mechanism is lacking.

Should pumped storage power stations use a three-stage model?
The calculation example analysis shows that compared with the traditional model,the "three-stage" model can bring better benefitsto the pumped storage power station,and when the actual value of demand fluctuates within -8%,the pumped storage power station has the ability to resist risks higher than the market average.

How to determine the operation strategy of a pumped storage power station?
When formulating the operation strategy of the power station, reference can be made to the operation data reported by the power station for the five years from 2018 to 2022. The power consumption and power generation of the pumped storage power station during this period are shown in Figure 5.

What is the competitive strategy optimization model of pumped storage power station?
In the competitive strategy optimization model of PSPS,the physical characteristicsof a pumped storage power station need to be considered,such as the variable speed technology of the generator or pumping unit,whether there is a frequency converter,and whether it is synchronous or asynchronous motor.

This paper analyzes the development status of pumped storage station, and according to the present operation situation of the pumped storage station in our country, the regional differences in social and ...

As the most mature and economical large-scale energy storage technology, pumped hydro storage is one of the important technical means to improve the flexibility of the grid and the ...

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With the increasing scale of new energy construction in China and the increasing demand of power system for regulating capacity, it is imperative to accelerate

Therefore, this paper analyzes the construction of small and medium-sized pumped storage power stations in Zhejiang from the aspects of construction background, technology ...

In China, there are a large number of abandoned mines, which provide a large underground space to construct underground pumped storage power stations for the renewable energy storage.

The analysis indicates that Jiangshantou Pumped Storage Hydropower Station will serve as the primary mechanism for power regulation.

Mixed pumped storage power plants (MPSPPs), developed on conventional hydropower stations, have recently gained attention in the hydropower industry, with shorter ...

With the increasing scale of new energy construction in China and the increasing demand of power system for regulating capacity, it is imperative to accelerate the large-scale ...

It can provide decision support for the pumped storage power station to participate in the bidding and capacity allocation strategy of the electric energy and auxiliary service market, and ...

In this regard, taking the pumped storage power station (PSPS) as an example, this paper establishes an optimal decision-making model for PSPS to participate in the energy market and to provide ...

With the continuous improvement of market participation, the economic benefits of pumped storage power stations are also gradually improved, which promotes the cost recovery of ...

Starting from a weekly forecasted market clearing price curve, an algorithm to maximize the profit of a pumped-storage unit considering reserve bids is developed. A comparison between the...

The pumped storage power station (PSPS) is a special power source that has flexible operation modes and multiple functions.

This work studies the optimal operation of pumped storage power plants with fixed- and variable-speed generators in different electricity markets. This paper extends the state of the art ...

The mathematical formulation considers energy storage losses and gains, and the Pareto efficient solutions of the multi-objective optimization model simultaneously increase reliability, ...

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As an energy storage technology, pumped storage hydropower (PSH) supports various aspects of power system operations. However, determining the value of PSH plants and their many services and ...

The general dispatch of the pumped storage units is based on experiential scheduling by analyzing the load forecasting and meteorological information [5], which fails to make full use of ...

The calculation example analysis shows that compared with the traditional model, the "three-stage" model can bring better benefits to the pumped storage power station, and when the ...

On the basis of index screening and weighting analysis, the sustainability evaluation model of pumped storage power station was constructed by using fuzzy comprehensive evaluation ...

Pumped storage, as the most mature energy storage technology at present, can provide flexible resources with different time scales to ensure the safety of the power system and promote the ...

Many countries configured a certain proportion of pumped storage power in the network to keep their grid stability. This paper introduces the current development status of the pumped ...

Finally, an example analysis of a pumped storage power station is carried out, and the risk evaluation grade is good. The research in this paper will promote the healthy and orderly ...

Executive Summary While the concept of pumped storage hydropower (PSH) is not new, adjustable-speed pumped storage hydropower (AS-PSH) is equipped with power electronics; thus, it has more ...

2 Research Status at Home and Abroad Pumped storage power stations, as basic energy facilities, have a huge investment scale, and the construction of the geographical environment is relatively ...

Increasing importance has been attached to energy storage in the aspect of reserve, as energy storage has the advantages of power flexibility and relatively low reserve cost.