Wind power and photovoltaic power generation monitoring and early warning

Can weather patterns predict photovoltaic and wind power production anomalies?
Our findings suggest that weather patterns can serve as indicators for expected photovoltaic and wind power production anomalies and may be useful for early warnings in the energy sector. European countries are collectively facing pressing challenges in securing electricity supply with an increasing share of renewable energy.

Why do we need a forecast for wind and photovoltaic power generation?
The ability to forecast wind and photovoltaic power generation in advance provides valuable insights for grid operators, energy traders, and renewable energy system planners . Accurate forecasts enable efficient load balancing and support decision-making processes related to energy storage and backup generation.

What is wind-photovoltaic combined power generation forecasting model based on multi-task learning?
Conclusion This paper introduces a wind-photovoltaic combined power generation forecasting model based on multi-task learning. The proposed model takes into account the spatio-temporal correlation between wind and photovoltaic power. The MIC method is firstly used to analyze the correlation between wind and photovoltaic power.

Are there missing data for wind and photovoltaic power generation?
There are no missing datain our dataset,but the outliers values of power and meteorological data account for 1.67% and 4.16% of the wind and photovoltaic power generation,respectively. The data in this paper include meteorological and power generation data. Different features may have different dimensions and magnitudes.

Can combining wind and photovoltaic power data improve forecasting accuracy?
Consequently,by exploring the complex correlations between the two energy sources ,,combining wind and photovoltaic power data can greatly improve forecasting accuracywhen wind farms and photovoltaic power plants are located in the same region.

Why is power generation forecasting important?
However,both wind and photovoltaic power are volatile and intermittent,posing significant challenges to grid security and economic stability with high renewable energy penetration . Therefore,improving the accuracy and efficiencyof power generation forecasting is pivotal for the power system.

The randomness, volatility, intermittency of photovoltaic wind power and the input of a large number of energy storage plants with two-way power flow into the distribution network lead to ...

The efficiency (i PV) of a solar PV system, indicating the ratio of converted solar energy into electrical energy, can be calculated using equation [10]: (4) i P V = P max / P i n c ...

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Early warning indicators are a crucial component of early warning system. Currently, power ramp event detection relies primarily on calculating characteristic values such as ramp amplitude ...

Wind and photovoltaic (PV) power forecasting are crucial for improving the operational efficiency of power systems and building smart power systems. However, the uncertainty and instability of factors affecting ...

Links: Source document (in Chinese) ; Monitor results for 2019, 2018 & 2017 ; Explanation of the monitors assessment criteria and monitor results of 2016 ; Statistics on wind power curtailment by province over 2017 . ...

To achieve the goals of carbon peak and carbon neutrality, Xinjiang, as an autonomous region in China with large energy reserves, should adjust its energy development and vigorously develop new energy sources, ...

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