European Solar and Energy Storage Solutions

Wind power generation base processing

Overview

What are wind speeds and generation based on?

The repository contains wind speeds and generation based on three different meteorological models: ERA5, MERRA2, and HRRR. Data are publicly accessible in simple csv files. Modeled generation is compared to regional and plant records, which highlights model biases and errors and how they differ by model, across regions, and across time frames.

How can wind power production be integrated into the power system?

When integrating massive wind power production into the power system, predictable forecasts should be combined with predictions of the wind direction. Important forecasting aspects for risk management depend on accurately determining the wind direction and velocity uncertainty.

Where can I find wind speeds and estimated generation?

PLUSWIND provides wind speeds and estimated generation on an hourly basis at almost all wind plants across the contiguous United States from 2018–2021. The repository contains wind speeds and generation based on three different meteorological models: ERA5, MERRA2, and HRRR. Data are publicly accessible in simple csv files.

Can data pre-processing methods be used for wind data?

Therefore, the underlying assumptions of uncertainty that are used in data pre-processing methods may not be valid when applied to wind data, which means that analyses based on existing data pre-processing methods may not be suitable for wind data, thus resulting in biased conclusions.

Where is wind power generation data stored?

Wind power generation data are in the wind_farms folder, which includes six Microsoft Excel files. The real-time power generation and weather conditions are recorded in these files. The basic information about each wind farm is

listed in Table 1.

What data sources do wind turbines use?

The main data sources include wind turbine operation data such as power, wind speed, wind direction, rotational speed, pitch angle, ambient temperature, wind measure mast operation status, etc., as well as meteorological mast data within the wind field, such as wind speed, wind direction, and temperature at different heights.

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Modeling and Simulation of Large-Scale Wind Power ...

To clarify the typical power output process of a large-scale wind power base, a novel method is proposed for wind power output scene simulation in this paper. Firstly, the genetic algorithm (GA) Kmeans is used to divide the ...

Artificial Intelligent Power Forecasting for Wind Farm ...

Wind power forecasting is a typical high-dimensional and multi-step time series prediction problem. Data-driven prediction methods using machine learning show advantages over traditional physical or statistical ...

Damage detection of wind turbine system based on ...

Abstract Numerous damage detection methods have been discovered to provide an early warning at the earliest possible stage against structural damage or any type of abnormality in the wind turbine system. In ...

Prediction System for Wind Power Generation Based on Machine ...

Based on 20 wind power datasets from different regions, this article uses a series of feature engineering, data normalization, construction of training and validation sets, and five models ...

A database of hourly wind speed and modeled generation for US wind ...

Wind plant characteristics. We attempted to find wind speeds and generation estimates for all utility-scale (>1 MW) wind plants in the contiguous United States that were ...

Historical reconstruction dataset of hourly expected wind generation

The figure suggests that wind power generation was rapidly introduced into power systems in the 2000s, reaching a total capacity of more than 4 GW in the 2020s; this ...

Feature Extraction Approach for Distributed Wind ...

This study addresses the integral role of typical wind power generation curves in the analysis of power system flexibility planning. A novel method is introduced for extracting these curves, integrating an enhanced K ...

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