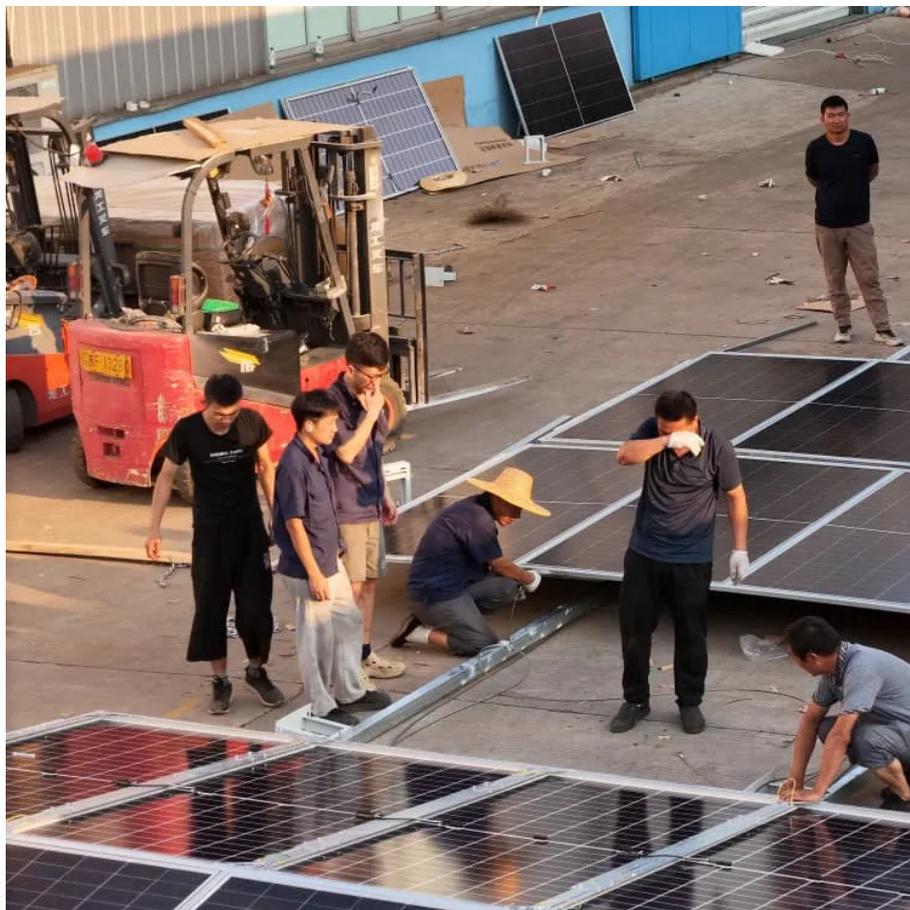


Western European Weather Solar Electricity System





Overview

Weather causes extremes in photovoltaic and wind power production. Here we present a comprehensive climatology of anomalies in photovoltaic and wind power production associated with weather patters.

Does weather affect wind power production in Europe?

Interestingly, the relative share of anomalies in onshore and offshore wind power production for Europe is typically similar independent of the weather patterns, although the estimate of the European mean wind power production for 2050 is by about a factor of four larger offshore (155.8 MW) than onshore (37.1 MW).

How much solar power does Europe produce per hour?

The model yields a mean hourly production for Europe of 130 GW for PV power and 151 GW for wind power for the 2050 installed capacity, which gives a ratio of PV to PV plus wind power production of 46%. Our model captures regional differences in weather impacts accounting for the heterogeneous distribution of installed capacities.

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.

Where is solar power produced in Europe?

The Iberia peninsula (around 39.9°N, 5.0°W) is investigated due to the high potential for PV power production. The Balkans and surrounding areas (40.3°N, 20.8°E) are analyzed due to the contrast in wind power production relative to Western Europe 7.



Western European Weather Solar Electricity System



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Extreme weather events (EWE), such as heatwaves, extreme rainfall, or droughts, have potential to interrupt the normal function of the energy system [1, 2]. These events can, ...

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[Photovoltaic Geographical Information System \(PVGIS\)](#)

PVGIS is a free web application that allows the user to get data on solar radiation and photovoltaic system energy production, in most parts of the world.

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[Photovoltaic Geographical Information ...](#)

PVGIS is a free web application that allows the user to get data on solar radiation and photovoltaic system energy production, in most parts of the world.

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