

What is photovoltaic (PV) power prediction?

Abstract: Photovoltaic (PV) power prediction is a key technology to improve the control and scheduling performance of PV power plant and ensure safe and stable grid operation with high-ratio PV power generation.

Can cleaning solar panels reduce photovoltaic electricity generation?

Our findings highlight the benefit of cleaning panels in heavily polluted regions with low precipitation and the potential to increase PV generation through air-quality improvements. Air pollution and dust can reduce photovoltaic electricity generation.

How much solar radiation is attenuated during a dusty day?

For example, the attenuation of solar radiation during a very dusty day reaches 40-50% in Greece because of desert dust (Kosmopoulos et al. 2017).

Does surface solar irradiance affect atmospheric aerosol attenuation?

We use surface solar irradiance from the NASA CERES-SYN1deg dataset from 2003 to 2014, which provides both all-sky (both clouds and aerosols are included) and all-sky-no-aerosol (only clouds are included without aerosols) scenarios. The effect of atmospheric aerosol attenuation is calculated by taking the difference between the two scenarios.

What contributes to the attenuation of solar radiation in cloudless atmosphere?

Phenomena that contribute to the attenuation of solar radiation in cloudless atmosphere are the extinction due to aerosols, molecular diffusion (or Rayleigh), and gaseous absorption.

Does PV module output decrease with temperature?

PV module output decreases with temperature according to a temperature coefficient, α , which is the percent reduction in power per degree Celsius above a reference temperature. PV module efficiency unavoidably degrades with age at a rate, degr , of about 0.5% per year.

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