WALMER ENERGY

Middle East Off-Grid Small Wind Power Generation System

Overview

Can small-scale wind energy be integrated into hybrid systems?

The study targets six Class 1 wind regions in Saudi Arabia—Abha, Al-Baha, Arar, Qassim, Tabuk, and Taif—traditionally considered unsuitable for large-scale wind energy. By using the Weibull distribution function for wind energy evaluation, the research highlights opportunities for integrating small-scale wind energy into hybrid systems.

Are solar and wind generators a viable alternative to electricity in Saudi Arabia?

Saudi Arabia, spanning about 2.2 million km², includes many remote villages not connected to the power grid and reliant on diesel generators (DG). DGs, however, incur high maintenance and operational costs. Solar and wind generators, combined with DGs or energy storage systems (ESS), offer cost-effective and sustainable alternatives 5.

Will a high-res solar energy system improve wind energy production?

The WTs will generate power most efficiently at this wind speed, but the overall wind energy output will be lower than in regions with higher peak wind speeds. A HRES integrating wind with solar and storage technologies could optimize energy production in this region.

What is a wind turbine system?

This hybrid system is designed to ensure reliable and cost-effective energy supply for remote regions by optimizing resource utilization and storage. The power generated by WTs is primarily influenced by wind speed. To enhance efficiency, WTs are typically installed at significant heights on towers.

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