Analysis of the causes of wind power congestion at communication base stations

Why is wind power a problem in telecommunications?
Wind power is one of the fastest-growing technologies for renewable energy generation. Unfortunately,in the recent years some cases of degradation on certain telecommunication systems have arisen due to the presence of wind farms,and expensive and technically complex corrective measurements have been needed.

Which telecommunication services are more sensitive to wind turbines?
The telecommunication services included in this review are those that have demonstrated to be more sensitive to nearby wind turbines: weather, air traffic control and marine radars, radio navigation systems, terrestrial television and fixed radio links.

Does a wind turbine cause a scattering signal?
In summary,a wind turbine may cause a scattered signalof dynamic nature which is both amplitude and frequency modulated due to the rotating blades. The time and frequency characteristics of this scattering signal will depend on multiple factors.

Why do wind turbines make errors?
These errors may be due to clutter returns(signal echoes from the wind turbines),signal blockage (the physical size of the wind turbine creates a shadow zone behind them) and interference to the Doppler mode of the radar (frequency shifted echoes from the rotating blades) .

How are wind turbine echoes characterized in weather radars?
For example,in weather radars,although echoes from isolated storms are mixed with the wind turbine clutter echoes,the wind turbine signals are characterized by random radial velocity and large spectrum width,as it can be observed in Fig. 10.

How does a wind farm affect TV services?
Interference effects of a wind farm on TV services In the case a wind farm degrades the analog television quality,secondary or ghost images are observed,which are dependent on the amplitude and the relative delay between the transmitted signal and the scattered signals.

The methods described in the paper allow a thorough case-by-case analysis before the wind farm is installed, taking into account the particular features of each installation and ...

The case study employs the IEEE 14-bus power grid, a 7-node gas network, and an 8-node heat network test system to evaluate the optimal configuration of a city-level multi ...

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However, there are serious technical challenges militating rapid installation of base stations, such as environmental congestion, high capital expenditure (CAPEX), multiple ...

Among various power system operating constraints, transmission congestion plays a significant role. In this paper, we analyze the problem of the wind curtailment due to transmission ...

Therefore, this review succinctly compiles the basic steps of theoretical analysis and simulations of the impact of wind turbines on communication signals, and the remedies to ...

Abstract Congestion management with the emergence of electric vehicle charging stations (EVCSs) can be considered as one of the challenges facing the network operator, ...

The assessment of suitability of a certain location for the installation of a wind farm requires the consideration of multiple impact issues: visual aspects, environmental effects such as the ...

However, there is still a need to understand the power consumption behavior of state-of-the-art base station architectures, such as multi-carrier active antenna units (AAUs), as well as the ...

Therefore, this review succinctly compiles the basic steps of theoretical analysis and simulations of the impact of wind turbines on communication signals, and the remedies to minimize the...

We investigate the use of wind turbine-mounted base stations (WTBSs) as a cost-effective solution for regions with high wind energy potential, since it could replace or even outperform ...

The power consumption of the BS antennas in sector breathing is determined and compared with normal cell breathing and dense femtocell allocation based congestion control ...

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