# Environmental protection and economical efficiency of wind power generation

Wind power generation systems produce electricity by using wind power to drive an electric machine/generator. The basic configuration of a typical wind power generation system is depicted in Figure 2. Aerodynamically ...

We found that the use of powerful wind turbines significantly increases the contribution of the manufacturing stage to the overall economic cost of the wind farm. On the ...

Over the last decade, the improvement of wind power generation systems has greatly improved the competitiveness of wind energy with respect to other energy sources, including conventional ones (IRENA 2019).The installed wind power capacity worldwide has grown steadily and at the end of 2018 it exceeded 597 GW (GWEC 2019).Furthermore, ...

Operating wind turbines do not emit greenhouse gases like carbon dioxide ( CO 2) or any other air pollutant such as nitrogen oxide (NOx), sulphur oxide (SOx), or particulate matter (PM). Wind ...

This study conducts an environmental efficiency analysis of 104 coal-fired power plants in China by simultaneously considering multiple undesirable outputs (CO 2, SO 2, NO x, and PM 2.5 emissions) generated during the production process and the heterogeneity caused by differences between the five major power generation companies (Datang, Guodian, Huadian, ...

With the deepening implementation of the energy revolution and the advent of the era in which renewable energy will be grid parity, China"s offshore wind power projects have gradually taking steps to shape a large-scale development. This paper reviews the relevant policies for offshore wind power, adopting the levelized cost of electricity (LCOE) model to ...

Wind power development is one of the important measures to achieve China"s committed dual carbon targets (carbon peak before 2030 and carbon neutrality before 2060). This study assessed the technical and economic potential of China"s onshore and offshore wind power potential through Geographic Information System (GIS) layer overlay and raster calculations. ...

The focal intention of this study is to inspect the influence of energy efficiency and renewable energy on both the growth of GDP on environmental quality and to develop a framework and model to ...

When the assessment of the wind power efficiency of the EU countries accounts for economic, energy security, and environmental aspects resulting from replacing ...

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The effect of wind power on the environment varies for human beings, local climate, land use, marine animals, and wildlife. This paper considers each of these effects and how they can be mitigated. Understanding these ...

Charabi et al. investigated the wind potential estimate and cost of wind power generation in the southern and northern regions of Oman using 36 wind turbines. They found the Leitwind 90 1000-kW turbine to be the most suitable of both regions, as it provides the lowest energy cost of $0.0606 per kW and $0.0453 per kW in the north and south, respectively.

Advantages of Wind Power. Wind power creates good-paying jobs. There are nearly 150,000 people working in the U.S. wind industry across all 50 states, and that number continues to grow. According to the U.S. Bureau of Labor Statistics, wind turbine service technicians are the fastest growing U.S. job of the decade.Offering career opportunities ranging from blade fabricator to ...

Abstract Resolving the contradiction between environmental protection and economic development is essential for sustainable development. As the world"s largest developing country, China has achieved rapid economic growth at the cost of serious environmental pollution. Taking China"s "low-carbon pilot" cities as study objects, we conduct a ...

Texas alone generates 24.9 GW of US wind power, generating wind power over the remaining 25 countries. GW Germany at a height of 59.3m is the highest installed wind power in Europe. Gode Windfarms is the largest offshore wind farm with 582 MW in combination (phases 1 ...

Hydropower is the most economically developed renewable energy source in China. In the twenty-first century, the era of clean and low-carbon development, hydropower can meet the continuous growth of energy consumption and help China achieve its goal of carbon neutrality by 2060. In 2019, China"s installed hydropower capacity was 358.04 GW, and ...

The power output from the wind turbine is calculated using the manufacturer characteristic curve and the wind speed at hub height that is given by the power law expression [34] as: (10) v v o = z z o ? where (v) is the wind speed at the hub height (z), (v o) is the measured wind speed at the reference height (z o = 10 m), and (?) is the ground surface friction coefficient.

The IGCC power generation technology is a revolutionary clean coal power generation technology that offers numerous advantages, including high power generation efficiency and exceptional environmental protection performance. This technology enables the clean utilization of coal-fired power generation with near-zero emissions.

The traditional extensive economic growth relies on a large amount of resources and production factor inputs

and is unsustainable; the neoclassical economic growth theory believes that the economic growth driven by the increase of total factor productivity is sustainable (Young, 2003).Carbon emission efficiency is a kind of green total factor productivity considering ...

The study suggests that wind farms with larger and taller wind turbines (15 MW) have a reduced impact on near-surface wind speed and heat fluxes compared to wind farms ...

For a comprehensive assessment of the environmental sustainability of a wind power, basic emergy flow diagram and emergy indices are presented in this paper to ...

The share of wind-based electricity generation is gradually increasing in the world energy market. Wind energy can reduce dependency on fossil fuels, as the result being ...

Wind energy stands out because it is free, clean, inexhaustible, has the capacity to generate greater power, and has lower energy costs. From local to global scales, the ...

Additionally, the increase in wind power output improves the energy-environmental efficiency of conventional units and alleviates the impacts of generation pollutants on the environment. The energy-environmental efficiency included in the green dispatch model is represented more as the invisible capital, rather than the resource consumption of conventional ...

Abstract Affected by user demand and policy, the technological innovation speed and economic efficiency of different power technologies will change internally. By setting different policy scenarios, based on the levelized cost of electricity (LCOE) model, the paper comprehensively compared the impact of different policy portfolios and policy input intensity on ...

Wind power generation systems produce electricity by using wind power to drive an electric machine/generator. The basic configuration of a typical wind power generation system is depicted in Figure 2. Aerodynamically designed blades capture wind power movement and convert it into mechanical energy.