

Wind Power

Dotting the landscape of many countries, and an increasingly common site off the coast of Britain in particular, Wind Turbines are likely to be an increasingly common source of demand for certain metals.

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Heat from the sun, converted into wind in the earth's atmosphere, is used to power wind turbines. Turbines are powered by rotor blades that function like airplane wings, the spinning caused by the difference in air pressure on each side of the blade creating both lift and drag. The common horizontal-axis wind turbines connect either directly to an electricity generator or through a gearbox to accelerate rotations creating electricity.

A turbine's structure is largely constructed of steel and concrete; their rotors of fibreglass, plastic or resin.¹ Copper is critical to both creating and conducting electricity. Copper is widely used in generators for magnet wire, transformers, gearboxes, controls and cabling. Use of copper is more extensive in offshore than in land-based turbines due to greater distances of cabling and the additional transformers required.²

Copper's characteristic of allowing electricity to be collected from dispersed sources while minimising losses makes it highly suitable for use within energy efficient infrastructures. By increasing cable diameter conduction efficiency is increased, while in generators electrical current losses in the form of heat can be reduced through the use of thicker wire.³

Copper has been widely used for electrical conductors referred to as brushes, however it has been found that maintenance requirements can be reduced through the use of silver which more than doubles the life expectancy, so reducing running costs.⁴

Footnotes

1. US National Renewable Energy Laboratory.
2. Energy & Infrastructure, Winds of Trade Towards Copper.
3. Centurion Energy, Energy Loss of a Wind Turbine, July 2009.
4. Windpower, Copper or Silver ? How to Choose Reliable Wind-Turbine Brushes, October 2018.

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