

WIND ENERGY



GREEN LIGHT FOR BUSINESS

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Eolic Energy is produced by moving wind turbine blades driven by the wind and turning it into electrical energy. In the global energy mix, wind energy accounted for 6.49% of the total electricity production in 2021.

BENEFITS

As a renewable energy source, wind energy does not emit greenhouse gases and limits the use of fossil fuels for energy generation if it succeeds in taking up a larger share of contribution in the world's energy mix. On top of that it is inexhaustible and can be considered a native energy source – one that is available all over the world and is derived from natural processes that are constantly replenished – and it contributes to sustainable development, whilst reducing dependence on traditional fossil fuels.

Another advantage of wind energy is that it needs no further fuel or connection to energy needed to produce wind energy after it is completely installed, producing little to no impact on the environment. Also, this means zero installation costs post installation. Wind energy produces an environmental footprint which is 90 times smaller than that of coal. This reduces overall cost compared to other forms of renewable energies which could rely on fossil fuels to power them. On top of this, as it takes up relatively little land space, it does not disrupt normal farmland operations and can also it does not the exploitation of greenfield sites.



Economically, wind energy overall costs have dropped by 70% over the past decade, accompanied by a 75% increase in generating capacity from the beginning of the century, showing a lot of potential for increasing use and efficiency in energy production. As it is a mature technology with medium to long term prospects, it is simple to implement compared to other newer green energy sources. On top of insignificant operational costs, it also requires rare maintenance further reducing costs associated with wind energy.,



WIND ENERGY



Another disadvantage of wind power derives from its intermittency: energy generation is fully dependent on wind flows, which are not steady. Intermittency and the lack of predictability make it impossible for wind energy to be used exclusively, unless efficient energy storage technologies are developed. Moreover, ideal locations for wind power generation are coastal areas and open fields, but these sites are often in remote areas, requiring an additional investment in transmission lines to transport electricity to where it is needed.

CHALLENGES

Although wind energy is considered to be one of the main sources of renewable energy of the future, wind power generation is characterized by some major disadvantages that could partly stem the future development of this energy source.

The first concern relates to its environmental impact: despite wind energy being generally considered as environmentally-friendly because of its renewable nature, wind turbines can be dangerous to the local wildlife. Not only birds and bats could be harmed and killed by the rotation of blades, but turbines also interfere with bat sonar navigation. Moreover, wind plants are a major source of visual and noise pollution.

Europe's wind industry is currently floundering, with wind turbine makers reporting losses and laying off workers. Investments are in a rocky state, as orders for new turbines in 2022 were down by 47% on 2021. The fall in investments is caused by a combination of growing competition from Chinese manufacturers and higher production costs due to inflation. As a matter of fact, the price of wind turbine has risen by 40% over the last two years, with prospective revenues not increasing proportionally. Governments have worsened the situation, with revenue caps only increasing uncertainty in the market.



WIND ENERGY



FUTURE IMPROVEMENTS

If the traditional onshore are considered as the 1st generation wind-farm technologies, then the floating wind farms are the last technology advancement. This technology makes it possible to position wind turbines even at deeper and larger areas which would allow for higher wind speeds and hence higher generated power. Those are expected to become the next cost-effective and efficient method for generating power in larger scales (expected to reach 5 GW by 2030 and 25 GW by 2035). Furthermore, another advantage is that they are out of view meaning no visual impact which outpaces the traditional onshore ones.

There are two potential issues when considering offshore wind turbines. Firstly, those are a solution to mainly the developed countries because they already possess a well-developed electric grid used for the energy transmission to the end user which is not the case for the developing countries. Another potential challenge could be the higher cost of installation when compared to the traditional onshore turbines which could be overcome by the broader interest and hence use of the technology. During the latest COP27, the Global Offshore Wind Alliances welcomed nine new countries meaning there are currently 14 countries collaborating to “lift the barriers” to developing offshore wind.



WIND ENERGY



GREEN LIGHT FOR BUSINESS

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