Renewable Energy: Wind – Energy from Nothing

Factsheet 01

Facts and Figures

How Does Wind Energy Work?

Wind energy is nothing more than the conversion of rotational energy into electricity. Rotational energy is extracted from the blowing wind via the rotating rotor of the wind mill. This rotational energy is used to generate electricity with the help of a generator. This direct current is adapted to the electricity grid via the inverter: Conversion into alternating current and adjustment of the frequency. With the help of a transfer station, the electricity is fed into the grid.

The higher the wind turbine and the larger the rotor diameter, the more energy can be extracted from the wind. Currently, large wind turbines have a hub height of 170 m and a rotor diameter of > 150 m.

Wind turbines are installed individually or in wind farms, often on hills or at the shore. More and more wind farms are also being built in the open sea - offshore - because the wind blows particularly strongly and often here.

Wind Energy in Europe

Man has known how to use the power of the wind for centuries. One only has to think of the numerous windmills in the Netherlands, Spain and Greece.

Of all the energies used to generate electricity in Europe, wind power has grown the most. It has overtaken nuclear and coal power. In 2021, 11,004 MW of new wind power capacity was built in the EU, 10,047 MW of which was onshore. This was just about the same level of onshore wind power expansion as in 2017. A tripling is necessary if the European climate goals are to be achieved. According to a study by the Fraunhofer Institute, an annual increase of at least 9 gigawatts of wind energy is needed by 2030 to produce enough CO_2-free electricity for Germany alone. The institute is focusing primarily on large offshore wind farms.

Using Wind Energy on a Small Scale

The large wind turbines require a permit and are not a solution for private individuals. However, there are now small wind turbines that can be mounted on the roof of a house

Professions & Competence Profiles

Wind power technology is relevant for many professions in the field of engineering, project management, plant construction, the skilled trades and also in the commercial sector:

- Service technician
- Site Manager
- Technical Operations Manager
- Land acquisition agent
- Commercial* Operations Manager
- Project buyer
- Wind assessor
- Industrial climber

Working on wind mills at great heights requires a lot of special skills, both as an industrial climber and as a technician, mechanic or electrician.

Good Reasons for Using Wind Energy

- **Wind Energy is Clean:** there are no exhaust fumes, waste or waste water when generating electricity from wind power. There are no additional costs for the disposal of power plant waste or environmental damage, as is the case with coal and nuclear power plants.
- **Wind Energy is Sustainable and Free:** no resources are consumed in the generation of wind energy, wind is abundant and free.

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3 Country Check on Wind Energy

Spain

Spain is strongly positioned in the wind energy sector. In 2021, there were 1,267 wind farms with 21,431 installed wind mills in Spain. The share of wind energy (onshore) in net electricity generation in Spain was 23.9 % in 2022. Wind energy thus ranks 2nd after natural gas and ahead of nuclear energy in 3rd place. Spain is also a leader in research and is testing a new technology without a rotor to convert wobble into energy.

Greece

In 2022, wind energy (onshore) accounted for 27.9 % of net electricity generation in Greece. Wind energy is thus by far in 2nd place after natural gas (48 %) and ahead of lignite.
On 17.01.2023, Greece has now set a new output record for electricity generation from wind. For the first time, wind turbines fed electricity with a capacity of over 3,000 MW (3,053 MW) into the Greek electricity grids.
Greece also wants to use offshore wind energy in the future. On 12/12/2022, an event "Offshore Wind Energy in Greece: The Way Forward" was held under the auspices of the Ministry of Environment and Energy.

Slovakia

Slovakia (and Malta) bring up the rear in the European comparison when it comes to the expansion of wind mills. The government in Bratislava does not seem to attach much importance to the expansion of wind power; no new ones have been built for years. In the current energy mix, wind energy accounts for just 0.01 percent, as of January 2023.

Remember

The production of renewable energy also involves the consumption of resources, interference with nature and environmental pollution. Save energy where possible.

Sources:
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