

# Wind Power Automation



# What is a wind turbine?

Wind turbines are rotating machines that can be used directly for grinding or can be used to generate electricity from the kinetic power of the wind. They provide the clean and renewable energy for us of both home and office. Wind turbines are a great way to save money and make the environment clean and green.



# How do wind turbines work?

Wind turbines work on a simple principle: instead of using electricity to make wind-like a fan-wind turbines use wind to make electricity. Wind turns the propeller-like blades of a turbine around a rotor, which spins a generator, which creates electricity.

Wind is a form of solar energy caused by a combination of three concurrent events:

1. The sun unevenly heating the atmosphere
2. Irregularities of the earth's surface
3. The rotation of the earth.



# Where are wind turbines located?

Wind turbines can be located anywhere there is enough room to place them and no danger to populace.

The preferred locations are sufficiently windy and have largely constant winds, e.g. exposed high areas, like hills or small mountains or coastal areas, some wind turbines are even placed off the coast.

The limiting factors in the placement of wind turbines are the price and ease of transport to that area, the infrastructure of the area and assembling the turbines.



# HMI

To generate, distribute and manage energy effectively, certain companies make products to provide all the tools you need to have a highly reliable industrial-grade network infrastructure. For example, Human Machine Interface (HMI) systems are used to provide energy analysis and control, allowing users to take action for better energy management.

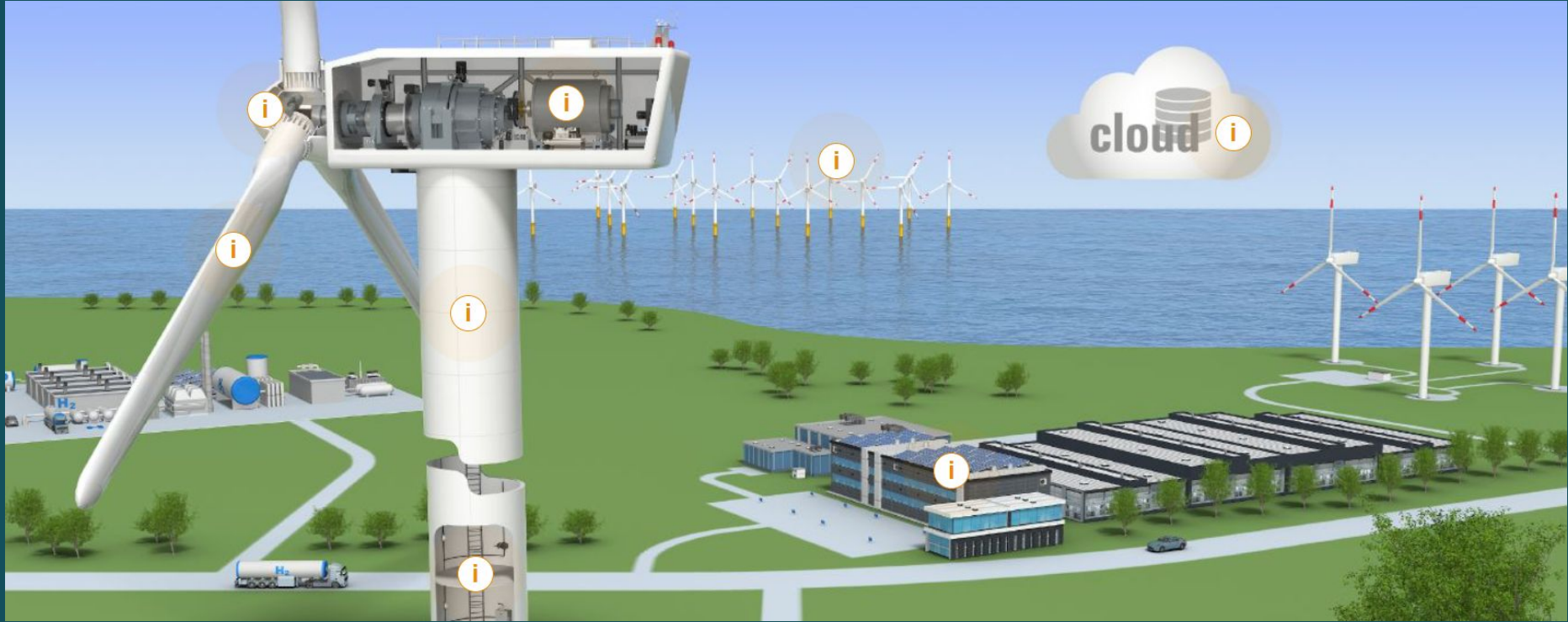




On a wind farm, the distance between wind turbine towers could be miles apart, and wind turbines are prone to electrical interference. It is essential for wind farms to employ rugged networking devices with long distance transmission capability for remote monitoring in harsh environments.

Remote monitoring systems are used to collect and organize data generated from wind turbine towers and substations so that users in the control center can accurately control operation on the wind farm. The control center manages the state of power energy and integrates different types of power plants together.





# Customizable housing assembly. Customized assembly technologies for various purposes

Prefabricated solutions for the production of enclosures are used in various industries to reduce the depth of production and save costs. The same applies to the production of modern wind turbines.





# LED systems are used for indoor lighting

The LED system provides a high potential for reducing overall operating costs. In the growing competitive wind energy market, it is more important than ever to guarantee the maximum efficiency of a power plant at the planning stage with the lowest possible costs for acquisition and subsequent maintenance.

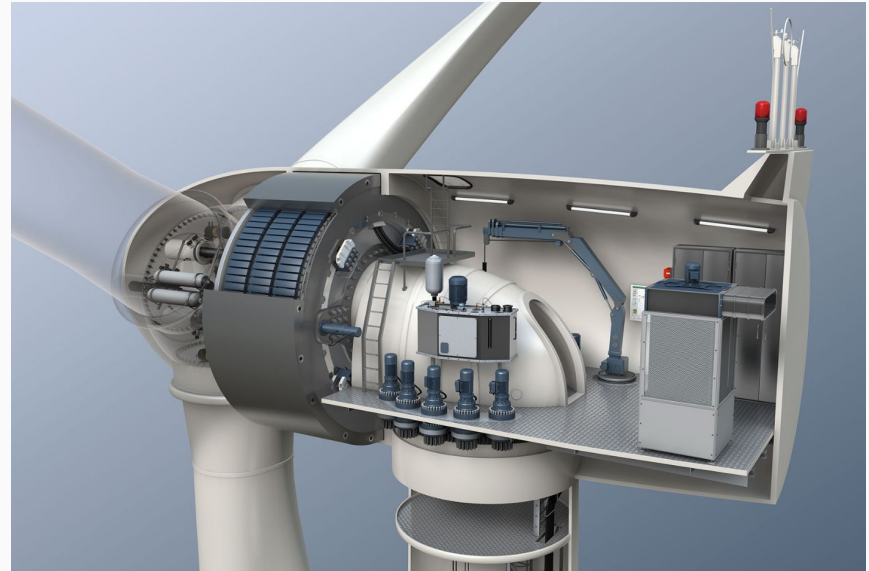


# LED compared to fluorescent lamps

To date, linear fluorescent lamps have often been used to provide indoor lighting at wind farms. Compared to LED technology, linear fluorescent lamps have many disadvantages during the current operation of the power plant.

In addition to the high power consumption, they are also very fragile and often lead to unjustified additional maintenance and replacement costs. Of course, often the actual installation and maintenance work is preceded by unscheduled maintenance, since it is simply impossible to work safely in towers without sufficient internal lighting.

In contrast, LED lamps are particularly energy efficient and have a service life of up to 20 years.



# Customized solutions for the hub

For each material or system, the rotating hub presents a challenge. There are solutions for harsh environments with high-quality products to ensure the safety of relevant functions, such as blade feed systems. An important connection between the hub and the nacelle is maintained by network devices. Modern health monitoring systems provide up-to-date information as early and reliably as possible.



# Customized solutions for blades

The rotor blades of a wind power plant are subjected to particularly high loads. Gusts of wind, icing and lightning can cause damage that is invisible from the ground. Such damage is often detected only during scheduled maintenance, by which time the volume of necessary repairs will increase significantly. In the worst case, it may be necessary to turn off the wind power plant for several weeks, which means no energy production. Monitoring systems constantly monitor the condition of each individual rotor blade and detect any minor changes.



# Individual solutions for the base of the housing

Currently, the wind energy sector is facing the challenge of meeting the growing demands for profitability. Wind turbine manufacturers are constantly looking for opportunities to reduce the normalized cost of energy (LCOE). To solve these problems, modern companies offer reliable components and specialized solutions that reduce capital and operating costs. Further trends include health monitoring systems and data-driven business models such as Data Analytics. In these areas of automation and digitalization, modern companies are able to offer proven and reliable solutions that reduce downtime and increase productivity.



**Today, wind power is one of the fastest growing sources of electricity worldwide. In the face of the problem of growing profitability and growing demands, modern and promising plants must become more economical and reliable.**