# How a wind turbine comes together

A typical wind turbine will contain up to 8,000 different components. This guide shows the main parts and their contribution in percentage terms to the overall cost. Figures are based on a REpower MM92 turbine with 45.3 metre length blades and a 100 metre tower.

## Tower 26.3%

Range in height from 40 metres up to more than 100 m. Usually manufactured in sections from rolled steel; a lattice structure or concrete are cheaper options.

## Rotor blades 22.2%

Varying in length up to more than 60 metres, blades are manufactured in specially designed moulds from composite materials, usually a combination of glass fibre and epoxy resin. Options include polyester instead of epoxy and the addition of carbon fibre to add strength and stiffness.

## Rotor hub 1.37%

Made from cast iron, the hub holds the blades in position as they turn.

## Rotor bearings 1.22%

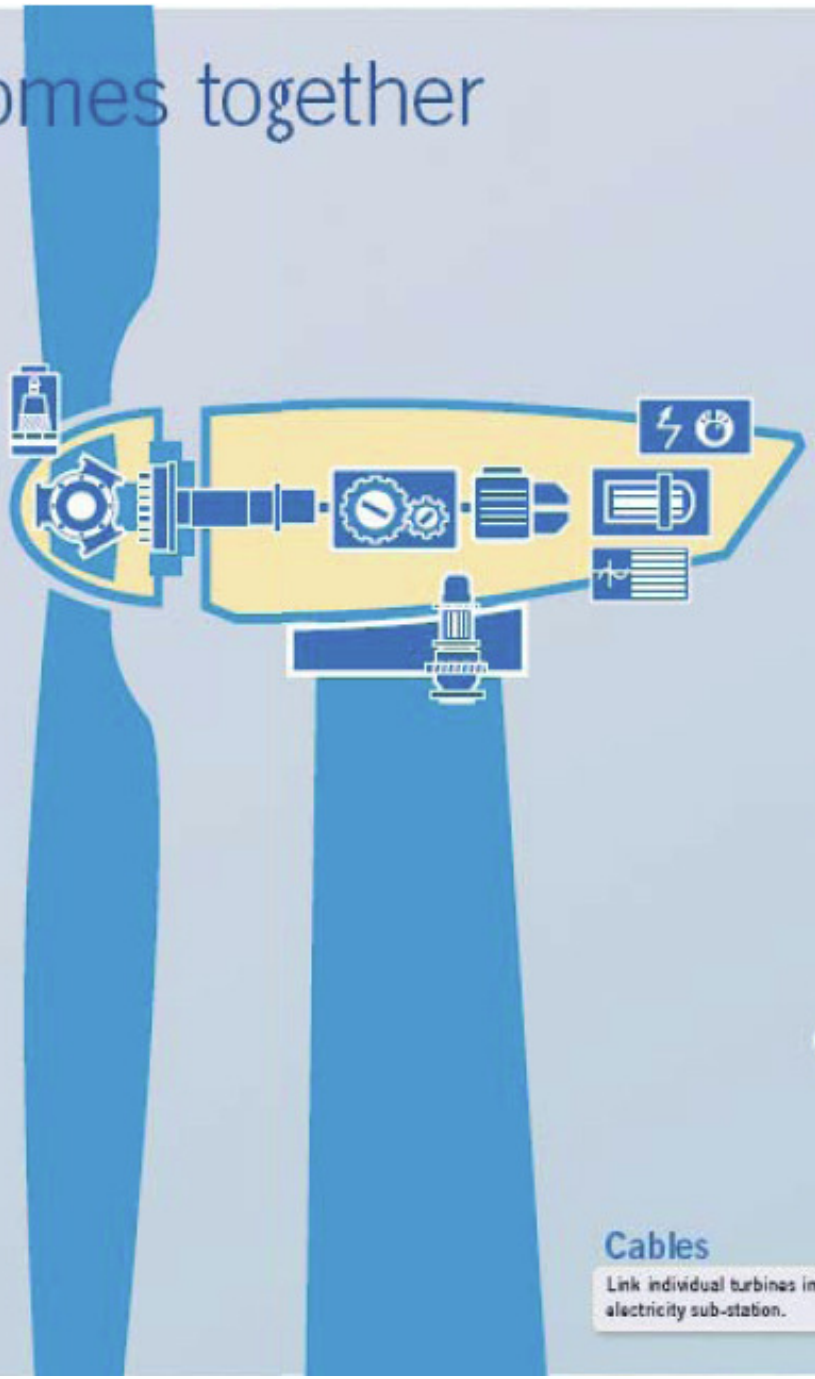
Some of the many different bearings in a turbine, these have to withstand the varying forces and loads generated by the wind.

## Main shaft 1.91%

Transfers the rotational force of the rotor to the gearbox.

## Main frame 2.80%

Made from steel, must be strong enough to support the entire turbine drive train, but not too heavy.



## Gearbox 12.91%

Gears increase the low rotational speed of the rotor shaft in several stages to the high speed needed to drive the generator

## Generator 3.44%

Converts mechanical energy into electrical energy. Both synchronous and asynchronous generators are used.

## Yaw system 1.25%

Mechanism that rotates the nacelle to face the changing wind direction.

## Pitch system 2.66%

Adjusts the angle of the blades to make best use of the prevailing wind.

## Power converter 5.01%

Converts direct current from the generator into alternating current to be exported to the grid network.

## Transformer 3.59%

Converts the electricity from the turbine to higher voltage required by the grid.

## Brake system 1.32%

Disc brakes bring the turbine to a halt when required.

## Nacelle housing 1.35%

Lightweight glass fibre box covers the turbine's drive train.

## Cables 0.96%

Link individual turbines in a wind farm to an electricity sub-station.

## Screws 1.04%

Hold the main components in place, must be designed for extreme loads.