

A/Example of a system with gearbox

Power: 3.3 megawatts

Rotor diameter: 126 meters

Hub height: 117–137 meters

Rotational speed: 5–16 revolutions/minute

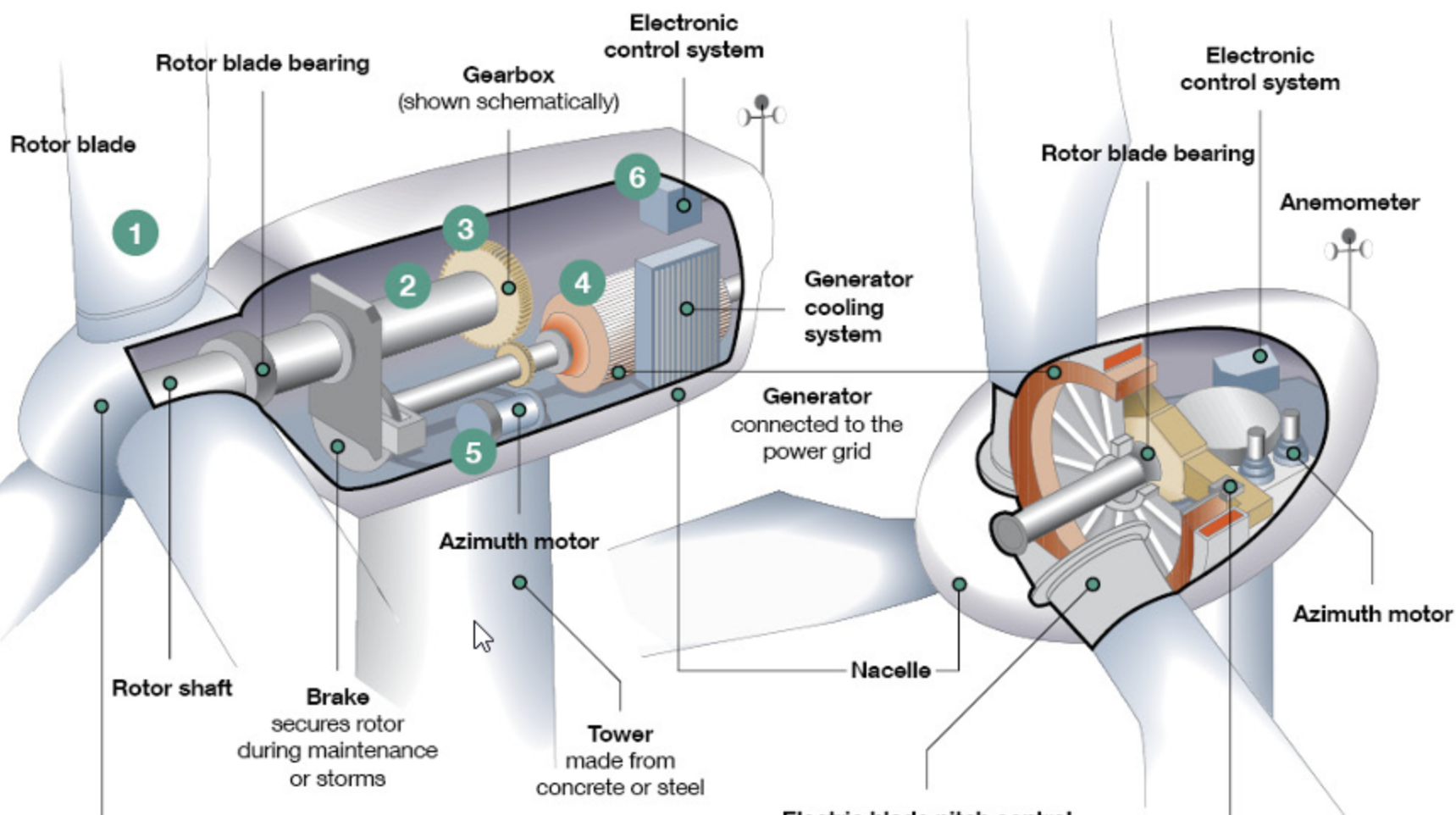
B/Example of a gearless system

Power: 3 megawatts

Rotor diameter: 116 meters

Hub height: 67–149 meters

Rotational speed: 4–13 revolutions/minute



Grid connection

The wind turbine is connected to the power grid via an intermediary DC circuit. The alternating current generated by the generator is first converted into direct current and then back into alternating current with the correct frequency and voltage. This enables variable-speed operation of the wind turbine and minimizes mechanical loads.

Electric blade pitch control

In pitch-controlled turbines, the angle of attack can be changed to maintain a consistent rotational speed at varying wind speeds

Brake
secures rotor during maintenance or storms

How wind turbines work

1

The wind sets the wind turbine's rotor blades in rotating motion

2

The rotary motion is transferred to the gearbox

3

In the gearbox, slow rotary motion is converted into fast rotary motion

4

The generator converts the gearbox's rotation into electricity. Gearless systems don't use a gearbox to convert rotation speed. In exchange, their generator is larger and heavier

5

The azimuth motor always turns the nacelle so that the rotor is favorably positioned in the wind

6

In case of too strong winds or maintenance work, a regulator switches off the system