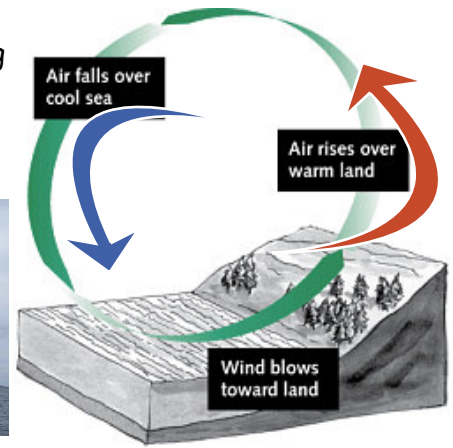


Wind is created by the uneven heating and cooling of the earth. Air particles move from **HOT** to **COLD** and from **COLD** to **HOT**, creating a circular movement. We feel this movement as wind.

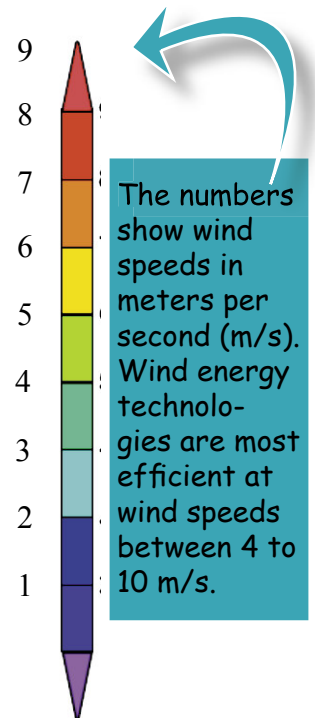
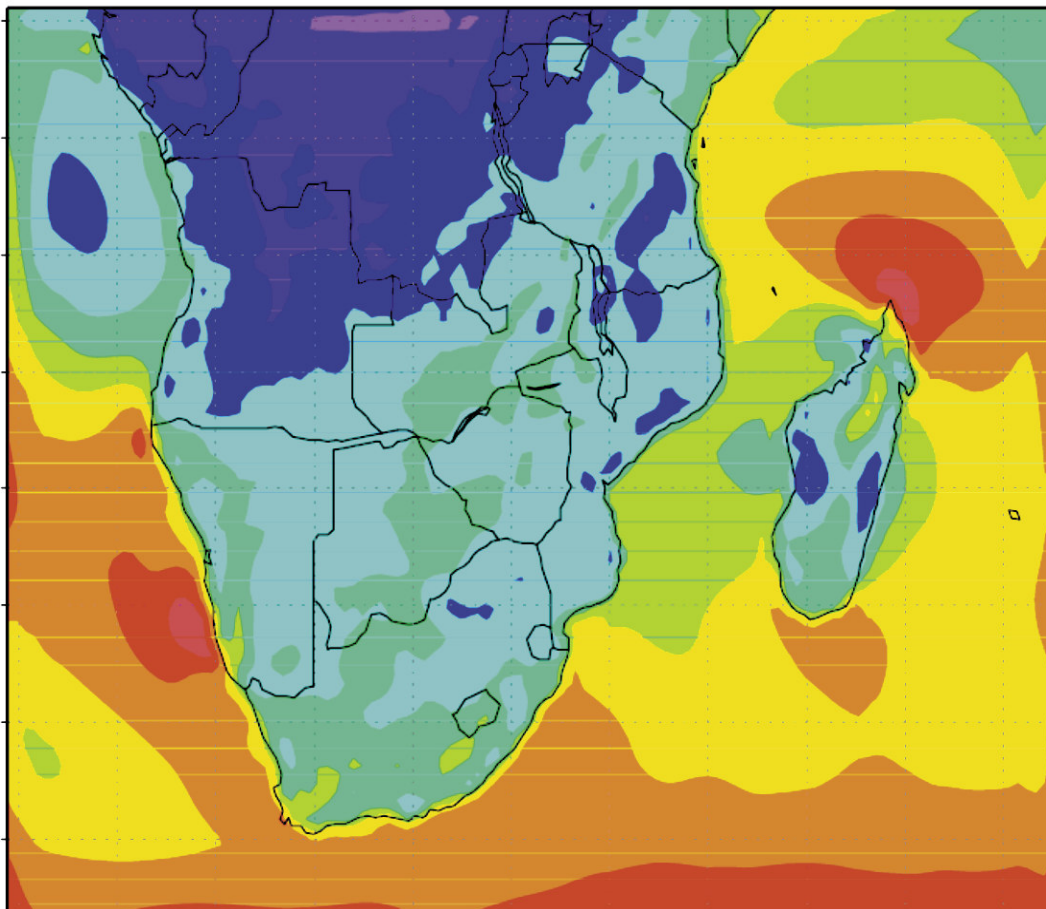
Wind is mostly stronger along the coast than in the inland because the temperature difference is higher there.



Wind energy has been used for thousands of years for windmills, boats and ships. Moving air particles push against the sails of a boat or rotors of a windmill and creates movement.



Wind energy can be extremely strong and destructive. The speed of wind is measured in kilometres per hour (or meters per second). Tornadoes and hurricanes are examples of the destructive force of wind.



Namibia's wind energy resources are the highest along the Atlantic coast. Indeed Namibia has some of the highest wind speeds in southern Africa and parts of the Namibian coast have amongst the highest wind energy potential on the African continent with an annual average wind speed of 6 to 7 m/s.

# WIND PUMPS

The most common use of wind energy in Namibia has been for wind water pumps. There are an estimated 30,000 wind water pumps in Namibia. The second highest number in Africa!

Wind water pumps are mechanical units. Wind energy turns the rotor blades which turns a mechanical gear box. This lifts a piston in the borehole cylinder through rods and transfers the water through solid pipes.

Often wind pumps are combined with diesel engines in order to be able to pump water during windless months. Wind water pumps require regular maintenance such as the greasing of gears.



# WIND CHARGERS

A wind charger is a modern technology which uses wind energy to generate electricity for home applications. The rotor blades are turned by the wind, which turns a generator (like a car alternator). The materials used are mostly light-weight, which increases efficiency. Wind chargers can thus operate at low wind speeds (4 m per second).

The electricity produced can be stored in batteries.

Wind chargers can easily be combined with Solar Home Systems (to complement or replace PV panels), but require more regular maintenance of different moving parts. Wind chargers can produce between 400 W to 6,000 W (6 KW) and stand about 10 m to 30 m tall.



# WIND TURBINES

Wind turbines are very large electricity-generating units. In principle they function like wind chargers, but produce between 100 kW to 4.5 MW of electricity for large scale applications. The tower can stand over 50 m high and the generator on top often has three rotor blades. The blades' diameter can reach up to 113m. A wind turbine's cost effectiveness increases with the size of the turbine. The system requires expert equipment and expertise to install, maintain and operate. Wind turbines can be installed on land or in the sea (off-shore).

Namibia's first wind turbine was installed at Walvis Bay in 2005. It has a capacity of 220 kW and produced 20,000 kWh during the month of December 2005 alone. This is sufficient for all the energy requirements for 50 to 100 homes in a month.



**Additional Information**  
<http://www.fi.edu/tfi/units/energy/windguide.html>  
[http://healthandenergy.com/table\\_of\\_contents.htm](http://healthandenergy.com/table_of_contents.htm)  
<http://www.eere.energy.gov/windandhydro>

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