

# 1) Introduction to wind power



## Introduction

With this first experiment you should get in touch to the experiment equipment and learn how to use it. The sound level of the buzzer will show you how much power the wind turbine produces.



### Learning Objects

Examine how wind turbine power is changing when moving the wind machine away from the wind turbine.

Examine how wind turbine power is changing when turning the wind turbine relative to the wind direction.



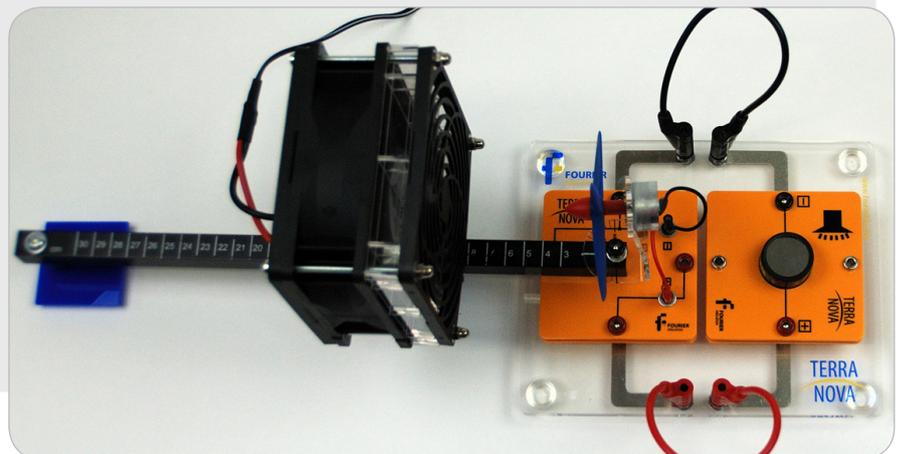
### Concepts

Electrical circuits



### Time Frame

1 lesson



## Equipment

1. Main board
2. Wind generator module with rail and power supply (12V)
3. Wind turbine module (with three rotor blades)
4. Buzzer
5. 2 cables



## Equipment Setup Procedure

1. Plug the wind turbine module onto the main board without the generator part (Important: do not plug the module onto the main board in wrong direction – see the picture for reference!)
2. Fix the rail to the wind turbine module
3. Mount the wind turbine on top of the rail and connect the small cables to the module
4. Fix the wind machine to the rail at the 5 cm position



## Notes

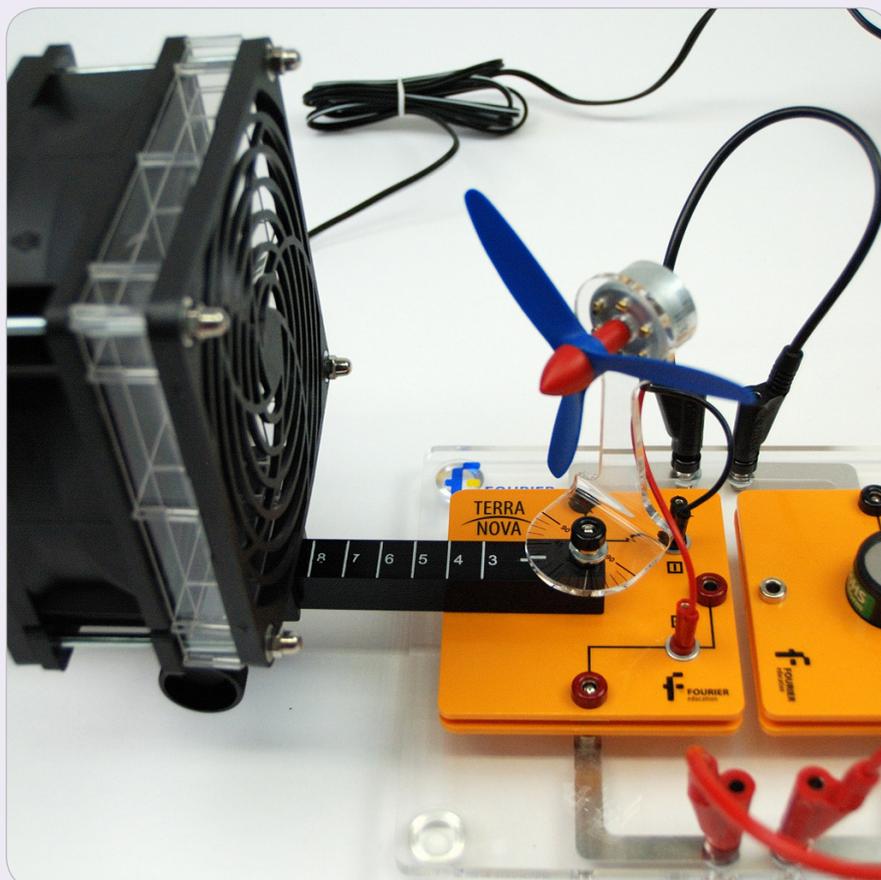
For this experiment no data logger is necessary. It can be used as easy introduction into the topic wind power and especially for acquainting the students with the experimental equipment.

The experiment only gives qualitative results. Instead of measuring voltages or currents the students have to use the buzzer module as "sensor".



## Experimental Procedure

1. Dependence of buzzer sound level on wind machine position - increase the distance of the wind machine from the wind turbine and listen to the sound level of the buzzer. How does it change?
2. Dependence of Buzzer sound level on turning angle of the wind turbine - fix the wind machine at the 20 cm position to the rail - change the angle of the wind turbine towards incoming wind and listen to the sound of the buzzer. How does it change?





## Questions

1. Which dependence of the sound level on distance between wind machine and wind turbine did you observe?
2. How did the sound level of the buzzer change when turning the wind turbine?



## Answers

1. The sound level of the buzzer decreases with increasing distance between wind machine and wind turbine. The reason is that wind speed decreases with distance.
2. By turning the wind turbine beginning with  $0^\circ$  the sound level of the buzzer decreases. With reaching  $90^\circ$  the wind turbine does not rotate anymore and the buzzer does not show any signal.