

## Tasks

### Model 2 – Water turbine / hydropower

#### Construction task

Build model 2 according to the instructions. Observe the following points while building:

- The shaft of the waterwheel should move smoothly so that the belt (O-ring) on the transmission wheel can transmit the rotational movement to the drive wheel of the solar motor.
- The red cable of the solar motor generator is connected to the input jack on the LED marked with a + (plus pole).
- The LED is only designed to show how the solar motor can be used to generate electricity. It may be operated with a maximum of 2 V direct current. Higher voltages will immediately destroy it.
- Also ensure that the motor does not come into contact with water.
- Use the additional extension cable with the light for measurements with the multimeter, and note the distance to the water source.

A water turbine is a turbine that allows us to make use of hydropower. In a hydropower plant, the kinetic energy of the flowing water is converted into mechanical energy using the water turbine.

As the turbine shaft rotates, it drives a generator that converts the rotational energy into electrical current.

In our model, the waterwheel transmits its rotational energy to the transmission wheel. The rotational movement of the transmission wheel is then transmitted to the drive wheel of the solar motor via a round belt (O-ring) This type of drive is called a belt drive.

The solar motor here acts as a generator and converts the rotational energy into electrical energy, causing the LED to light up.

#### Topic task

1. Electricity from hydropower. Hold the water wheel under a tap and let it spin fast enough to light up the LED. Note the direction of rotation. What factors directly impact the speed of the generator shaft in your experiment, and does this increase the performance of the water turbine in generating power?
2. Hydropower is the only renewable energy source that can also be stored. How can hydropower be stored?

3. What is the advantage of water storage power plants over other types of hydropower plants?
4. What regions offer the best conditions for using hydropower?
5. Even if regional conditions are good, there may be arguments against actually constructing a hydropower plant. What are they?

### Experimental task

1. Prove your experiments for topic task 1. Measure the voltage at different heights of the stream of water to the waterwheel, and enter your measurement results on the sheet. What observations can you make, and why?
2. What happens to the LED during the experiment?