

Homemade vertical wind turbine generator

In this DIY project, we'll walk you through the process of creating your very own vertical axis wind turbine using items you might already have lying around, like an old satellite stand, a bicycle rim, and even empty water bottles.

Cut four pieces of wood (here we use $\frac{3}{4}$ x 2) to the desired length (slightly longer than the diameter of the rim). Arrange these pieces into a cross shape and secure them to the rim with screws, creating a simple frame. These will serve as supports between the rim and the water bottle blades

Draw a line lengthwise along each bottle, dividing it in half from top to bottom. This line will serve as your cutting guide. Carefully cut along the marked line, splitting the bottle in half lengthwise using a Sawzall or Handsaw. Cut all the water bottles you plan to use for your wind turbine blades.

Take one of your prepared water bottle halves. Place it against the rim, with the concave side facing the direction you want the wind to catch it. Place a wood piece under the water bottle half, between it and the rim using screws, fasten the water bottle half to the wood support. Continue attaching blades around the rim, maintaining equal spacing between them. Attach each half-bottle to the ends of the wooden frame using screws and zip ties. Ensure the bottles are securely fastened and will catch the wind effectively.

Take an ceiling fan motor and add magnets to it. If using curved magnets, crack them in half to create more pieces. Attach these magnets around the motor's rotor. For optimal performance, use neodymium magnets, either curved or flat, ensuring they are evenly spaced and have alternating polarity (north-south).

Connect the ceiling fan motor (now functioning as an alternator) to a rectifying diode to convert AC to DC. Connect a smoothing capacitor in parallel with the output of the diode to reduce flickering and provide a more stable DC output.

Take your modified ceiling fan motor (now functioning as an alternator). Identify the best location to mount the generator. Position the generator so that its shaft aligns perfectly with the center of the rim. Ensure there's enough clearance for the rim to spin freely without hitting the generator body. With the generator in position, mark where you'll need to drill holes for mounting appropriate bolts, nuts, and washers to firmly attach the generator to its mounting point.

Wire the output to your desired application. Here we used 12 top hat LEDs as a demonstration. Gently spin the blades of the wind generator and observe the LEDs lighting up. You should see the LEDs light up as the motor generates electricity.

Have you been wanting to try out harvesting wind energy to power your home but you've been put off by the excessive price of commercially available wind turbines? Here's a guide to building your own vertical axis wind turbine out of scraps most of us have lying around the house. If you don't have the materials lying around, they are cheaply available from your local hardware store. The benefit of a vertical axis wind turbine is that it doesn't need to be aligned to the wind direction, it harnesses wind energy no matter which direction the wind is blowing.

Have you thought about going off grid? Here are some tips and tricks for reducing your homes energy usage and the steps you need to take to start going off grid. Also have a look at our guide for correctly sizing your inverter.

We've split the guide to making the turbine up into four sections, making the turbine blades, making the structure, mounting the blades and finally adding the generator. You start working on the frame while you are waiting for the blades to soak and dry through various stages.

To start off, you need to shape the turbine blades. To do this, you need to make the plywood workable by soaking it overnight in cold water. You could place them on a step in the pool, in a pond or in the bathtub. Make sure they are completely covered and that water is able to get in between the individual sheets.

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