

DIY 1000 watt wind turbine

by [spence](#) on June 2, 2006

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intro: DIY 1000 watt wind turbine

We built a 1000 watt wind turbine to help charge the battery bank that powers our offgrid home. It's a permanent magnet alternator, generating 3 phase ac, rectified to dc, and fed to a charge controller. The magnets spin with the wind, the coils are fixed, so no brushes or slip rings necessary.



step 1: Build the magnet disks

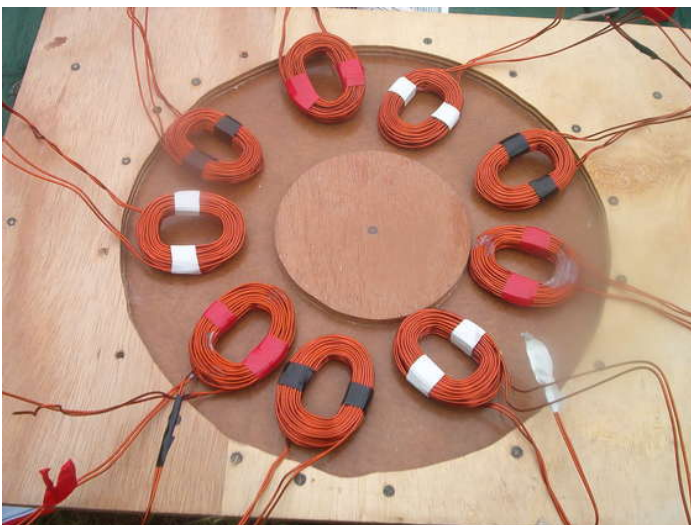
We had 12" steel disks hydro cut. We cut a template for mounting the magnets. Then we mounted 12 grade n50 magnets around the outside edge. We then built a form, and poured the resin with hardner.

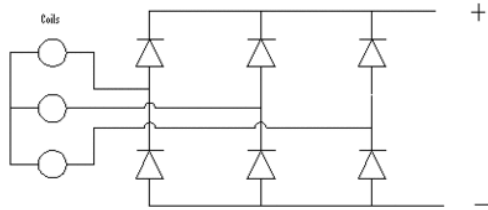




step 2: Build the coil disk

We wound the nine individual coils, soldered them in a 3 phase wye configuration, and encased them in resin. We used 35 turns of 2 parallel strands of 14 gauge enameled wire for 12 volts. Use 35 turns of single strand for 24 volts.





step 3: Build the bearing assembly

Two Harley Davidson wheel bearings are inserted into the pipe, with a smaller pipe locked between them to keep them in place.



step 4: construct the blades

The blades are 2" x 6" pine, cut at 10 degrees on a table saw, and sanded into a rough airfoil. Not perfect, but close enough.

More can be found at

<http://tech.groups.yahoo.com/group/axialflux/>

<http://www.green-trust.org>

<http://youtube.com/watch?v=o9EEHFKEckM>

step 5: Bolt it all together


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Comments

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 **shooter01** says: Apr 14, 2009. 12:03 PM [REPLY](#)
How do you hook this up to a home. I live on top of a hill and a turbine would work great for me, but I just cannot comprehend how it hooks to my homes power supply.

 **sspence** says: Apr 14, 2009. 12:27 PM [REPLY](#)
turbine charges batteries which feed an inverter connected to your ac breaker panel.

 **shooter01** says: Apr 14, 2009. 1:46 PM [REPLY](#)
So I will probably need an electrician to do this? right.
And while you were pouring that compound that holds the magnets together what did you put underneath them and overtop of them, and then you covered that with the compound. What exactly is the compound you used?

How far apart do the coils and magnets need to be from each other?


What was the stuff that came in a bar that you filled the holes in the dried compound with and then sanded off?


 **sspence** says: Apr 14, 2009. 2:13 PM [REPLY](#)
I was my own electrician.


there is a steel plate under the magnets, and I put a paper strip around the outside to hold the epoxy.


used bondo to fill the holes.


you might want to get Dan Bartmann's book, as it explains all this. <http://www.otherpower.com>


 **shooter01** says: Apr 15, 2009. 8:30 AM [REPLY](#)
One more question how do I know if I have enough wind to make it turn the wind mill?

 **shooter01** says: Apr 15, 2009. 8:14 AM [REPLY](#)
Okay I checked the books website out will the book Homebrew Wind Power
A Hands-on Guide to Harnessing the Wind by Dan Bartmann and Dan Fink show me what to get and how to hook it up to my home's power supply?

 **ghans_00** says: Apr 11, 2009. 8:38 PM [REPLY](#)
Hi Everyone, can you give me an idea of how hard it is to drive a permanent magnet alternator to produce enough electricity, say 12v 70 amps max capability.
Does it create a stopping force just like car alternators??? I wonder...
is it turnable by hands (pls. give me atleast an example of how much torque is produced during magnetic flux induction.)
Perhaps you can also suggest me some motors w/ these specifications and attributes low torque during induction.
Thanks Guys!

 **sspence** says: Apr 12, 2009. 6:29 AM [REPLY](#)
It's easy to turn with your fingers (no cogging) with no load attached. The heavier the load, the more torque it requires. This is the same for any alternator / generator.

 **ghans_00** says: Apr 13, 2009. 8:30 PM [REPLY](#)
Thanks a lot Sir! The info you gave is very helpful to me, but can you give a hint how much torque will I be dealing with if let's say my load is at least 50amps?... how much if 70amps load?
Pls. kindly specify torque and how much it translates say on how much it is not turnable by bear hands.
I'm from a poor family so I cannot afford to buy equipments for this kind of testing. All I'm relying now is the bit by bit info given to me by good people like you!
I really appreciate your help... Thanks!

 **sspence** says: Apr 14, 2009. 5:08 AM [REPLY](#)
I don't have those numbers, but it's capable of being spun by a 30 mph wind with 800+ watts attached.



ghans_00 says:

Apr 15, 2009. 6:55 AM [REPLY](#)

30mph... I'd like to know how long is the diameter of the blades are Sir?
I also have another questions...

1. About car alternator and permanent magnet alternators... How would you compare the amount of torque that is produced during its charging state in its own respective specification since car alternators have the higher rpm req.?
Since I started w/ 70amps 12v, and 50 amps load(battery).... let's stick to it. It's ok if you just answer it by percentage!

2. I also wonder, what if I add another load of 45amps. That would make a circuit of alternator/generator(12v70amps), battery(12v50amps), and 45amps load.

Would i experience more increase in torque while charging and consuming at the same time?
I hope I'm making sense... There is so much I'm wondered of. Thanks!



conntaxman says:

Apr 11, 2009. 5:26 AM [REPLY](#)

Well I put my vawt with the 12 magnet and 9 coils with 200 windings each coil.

At 60 rpm im getting 20 volts and 2 amps so that is about 40 watts. Have no idea if that is good or not. The wind speed is about 7 to 10 miles per hr.
Thats what the weather man says for my area.Two lights in the top left cormor of window.



Dan90011 says:

Apr 11, 2009. 5:33 PM [REPLY](#)

Is anyone near Los Angeles or Rosamond, CA that can show me a wind turbine they have made on their own. Even better can someone with experience share the knowledge and teach me how to make one.

dan90011@yahoo.com



Yondo says:

Apr 7, 2009. 7:02 PM [REPLY](#)

Perhaps you can enlighten me...

I took your advice and choose power4home.com as you rated them #1.

I paid by credit card and some of the ebooks arrived corrupt and damaged. Others were fine and very good. Some of their video links are dead.
I emailed them at support@power4home.com a number of days ago and got no answer. I have since emailed a second time and again, nothing.

They have no other way to contact them (phone or address) yet they state they will answer any questions at the support email address.

I have since done some research on the web about the company which I should have done before. They are listed as "a scam" by some, "not a scam" by others, "will not refund if dissatisfied as they stated they would on their web page".

There is no way to go back and try to re-download the ebooks as once you do and click from their page...that page is gone.

So being "highly satisfied" by power4home, what's your take on this? Do you by any chance have a telephone number?

My next step is to contact the Attorney General here in Texas.

Thanks for your help.



sspence says:

Apr 8, 2009. 6:11 AM [REPLY](#)

I never rated them, reviewed them, or recommended them. They look extremely scammy to me.



liquidice says:

Apr 2, 2009. 7:25 PM [REPLY](#)

hey sspence just wondering did you make your rectifier or is this just the schematic for what you used? if you did what diodes did you use. just trying to work on an all in one controller I can adjust. i know they make them but i like to leave myself the option to build my own. also could you show a picture of the coils tied up in wye before the resin poured if you can, I have some creative ideas for it (i.e. quick plugs)? thanks for your time and of course patience. and also for educating the masses with your knowledge.



sspence says:

Apr 6, 2009. 6:49 PM [REPLY](#)

I ordered a heavy duty rectifier from china. handles at least 100 amps. I sell them at <http://www.green-trust.org/products/>



wolfenberger says:

is it possible to make a 3,000 watt wind turbine using your design? If so what would i need to do? thank you

Apr 3, 2009. 8:05 PM [REPLY](#)



sspence says:

You would need quite a bit of redesign, including much longer blades, and thicker wires.

Apr 6, 2009. 6:46 PM [REPLY](#)



wasacurlyjoe says:

I recommend a wind turbine recipe book using axial flux wind generators by Hugh Piggott. You can google him and find the book at his site.

Apr 6, 2009. 9:34 AM [REPLY](#)



Derin says:

You would need to thicken the wires to get 3kW out of this.

Apr 5, 2009. 9:10 AM [REPLY](#)



dontforget says:

What if you wanted the windmill to be able to power an entire home would it be possible to make a bigger version of this windmill?

Apr 1, 2009. 4:19 AM [REPLY](#)



crazyman43 says:

hey i to hear more about this would email so we talk about this i like like more info how it's done. crazyman47302@hotmail.com

Mar 31, 2009. 12:53 PM [REPLY](#)



Davorin says:

How did you connect the coils? There is double winding wires. is there one end connect so in one coil current flows parallel up and down or there is some other way?

Jan 6, 2009. 8:34 AM [REPLY](#)



sspence says:

In the coil, the strands are in parallel, both end of each strand are connected to each other. This is to share the current between the strands, it acts as a larger wire, but is easier to wind. 3 coils are connected in series, and the 3 series are connected in the center, leaving one end of each series to come down the tower to the rectifier.

Jan 6, 2009. 12:01 PM [REPLY](#)



m1sterb0b says:

Someone told me that the way that the coils are hooked up to each other is crucial because there is, in a sence, a polarity, in that one side is positive and the other side is negative. He said that if you have 2 coils hooked up the wrong way that they could actually just cancel each other out. Is this true?

Mar 28, 2009. 9:07 PM [REPLY](#)



JakeTobak says:

Yes, it is. I was making a smaller turbine for my intro to technology and engineering class and for our first model we had to reverse 2 of our coils since our output was so low. We knew before hand that they had to alternate, but we must have gotten confused for one of them that messed up the rest.

Mar 30, 2009. 2:59 PM [REPLY](#)

Our coils were all wired together in series, it might work differently here, but I doubt it.



conntaxman says:

Well have finished up my alternator, I have the 12/9 and the coils have 200 windings each seires of 3. Im turning the alt. with a drill and counted the rpm's. At 100 rpm Im getting about 20 volts and 1 to 2 amps from a load of a car tail light bulb. If I short the alt . at the 100 rpm's I shows about 9 amps. Dose that sound pretty good?

Mar 28, 2009. 9:17 PM [REPLY](#)

Tks for any advice and reading.
Johnny



nickk says:

Hello ,
You say "We used 35 turns of 2 parallel strands of 14 gauge enameled wire for 12 volts" does this mean that the final output will be 12 V DC ? if yes then it is not enough to charge a battery, we need 13.5 VDC to do so, what do you say ?

Mar 16, 2009. 4:10 PM [REPLY](#)



sspence says:

it doesn't output 12v, it's a turbine designed for a 12v battery system. just like when you buy a "12v" solar panel, it actually outputs 17v.

Mar 16, 2009. 7:51 PM [REPLY](#)



m1sterb0b says:

Mar 28, 2009. 9:03 PM [REPLY](#)

I thought that trying to charge a battery with too much voltage (over volting) was bad for it. I really know nothing about charging batteries, I'm new to all of this (I'm trying to learn so I can build several wind generators for my house) and some of it is confusing.



jonek1kw says:

Mar 2, 2009. 8:02 PM [REPLY](#)

Great project, like it alot, I was wondering though what if a person were to add another set of coils like previously suggested recessing on set of magnets and then add another set of twelve behind it for a combine total of 36 magnets and 18 coils, do you think that could possibly work? Kinda new to this so please excuse if it's a ridiculous idea



sspence says:

Mar 3, 2009. 4:56 AM [REPLY](#)

No, that's not going to work. you need two magnet plates sandwiching a coil plate, with a 12:9 magnet to coil ratio. Why would you want to add additional coils and magnets? the design as presented works fine. don't screw it up.



m1sterb0b says:

Mar 22, 2009. 7:24 PM [REPLY](#)

When/if I get around to building a wind generator, do I NEED to use that particular ratio or is that just one that you found works well. Also, why does that ratio work well? What would happen if say you had 10 magnets to 12 coils instead of 9 to 12 and what would happen with 13 coils to 9 magnets instead of 12 to 9. Also, I grazed through and didn't notice a question regarding this (will keep searching) But . . . What is 3 phase? whats the difference between 2 and 3, and does that have anything to do with the ratio of coils to magnets?



sspence says:

Mar 25, 2009. 5:44 AM [REPLY](#)

That ratio keeps opposing phases from being triggered at the same time, canceling each other. 3 phase means you have 3 sine waves being created, over lapping each other, smoothing the output and increasing the power being generated. It takes time for the voltage to swing through zero, hit peak, and swing through zero to the other peak. if you have 3 such signals, out of phase, the output stays near peak most of the time.



m1sterb0b says:

Mar 28, 2009. 8:31 PM [REPLY](#)

Also, can I ask what kind of controller circuit you are using, and how many batteries you are using in your battery bank.

Does this generator actually take you off grid, or does it just cut the cost of your energy bill (if it just cuts the cost, by about how much does it cut)



m1sterb0b says:

Mar 28, 2009. 8:28 PM [REPLY](#)

okay, that makes sense. I'm new to the wind generator idea. I'm either going to do exactly what you did, or I'm going to try to find some generators or motors pre-made (maybe like one out of a treadmill or something like that) and use that to generate electricity).



jonek1kw says:

Mar 3, 2009. 6:21 AM [REPLY](#)

Didn't know if you understood what i was saying. Do the steel plates behind the magnets prevent the magnetic fields from extending in both directions. My thought was to keep the 12:9 ratio sandwiching the coils in between the magnets. But by adding another sleeve of coils followed by another sleeve of magnets, i was thinking it might have been possible to bring down 2KW max output, through 6 wires instead of 3 all the way down to the control system to keep the phases from canceling out



sspence says:

Mar 3, 2009. 7:45 AM [REPLY](#)

The steel plate completes the flux lines for the magnets. There's little magnetic field on the back side. you could design a 2kw machine using larger awg wire and longer blades. may have to play with the number of coils to get the voltage back in line as the speed will be off.



philwinds says:

Mar 22, 2009. 1:56 AM [REPLY](#)

it's me again. Can I use cars voltage regulator instead of the voltage controller you are using, considering that they are same 12 volts.



sspence says:

Mar 25, 2009. 5:52 AM [REPLY](#)

No. A car regulator works by regulating the field coils. This unit uses magnets, there are no field coils.



philwinds says:

Mar 22, 2009. 1:54 AM [REPLY](#)

Hello,

If we have to charge a 10 pieces 12 volts battery used overnight, how many hours will it take to fully charge the said battery considering that the turbine operates normally.



sspence says:

Mar 25, 2009. 5:51 AM [REPLY](#)

depends on how many amp hours were removed from the battery, and how much wind you get, i.e., how many amp hours you produce. You lose 20% in the process due to battery inefficiency.



nickk says:

Do you think drilling a hole in the magnet itself to fix it with a screw will work ?
Does it affect the characteristics of the magnet in some way ?

"I'm asking this because the supplier has only 4 magnets with holes for fixing while the other magnets do not have any"

Mar 15, 2009. 5:09 PM [REPLY](#)



sspence says:

More than likely you will break the magnet or seriously affect it's power.

Mar 15, 2009. 6:14 PM [REPLY](#)



jonek1kw says:

have another question about the magnets, i noticed that one of the links posted through yahoo tech groups which i linked to from here shows hugh piggott using 8 magnets roughly the size of 2" x2" x1" was there a special reason that you chose to use 12 of the 2"x 1"x 1/2" and that he used 6 coils instead of 9, i was just curious as to the purpose in the differences

Mar 3, 2009. 2:11 PM [REPLY](#)



MY says:

So, if I understand you correctly...the 2x2x1 magnet produces significantly more power than the 2x1x1/2? Have you measured how much more? Thanks!

Mar 14, 2009. 5:24 PM [REPLY](#)



sspence says:

The larger the magnet, the more flux. I can't tell you how much more that particular magnet would generate. Too many variables. The wire would have to be beefed up to take advantage of the additional strength. The wind would have to be there to push the additional load.

Mar 14, 2009. 6:18 PM [REPLY](#)



sspence says:

This is a newer version, and produces more power.

Mar 3, 2009. 3:17 PM [REPLY](#)



jonek1kw says:

thanks for all the answers

Mar 3, 2009. 3:55 PM [REPLY](#)

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