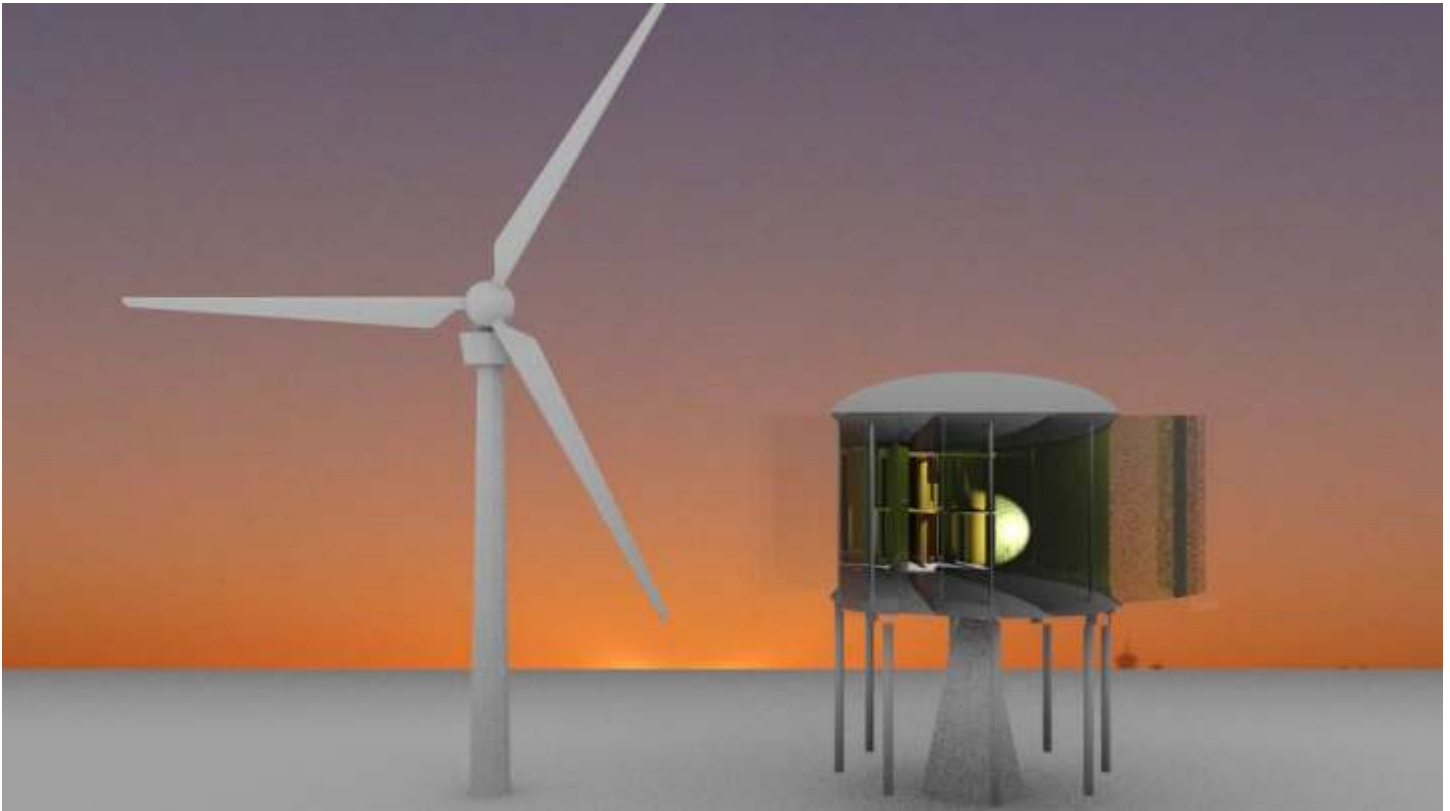


A Comparison Between FTC Energy's Vertical Axis Wind Turbine System And A Standard Three-bladed Horizontal Axis Wind Turbine

A Layman's Perspective

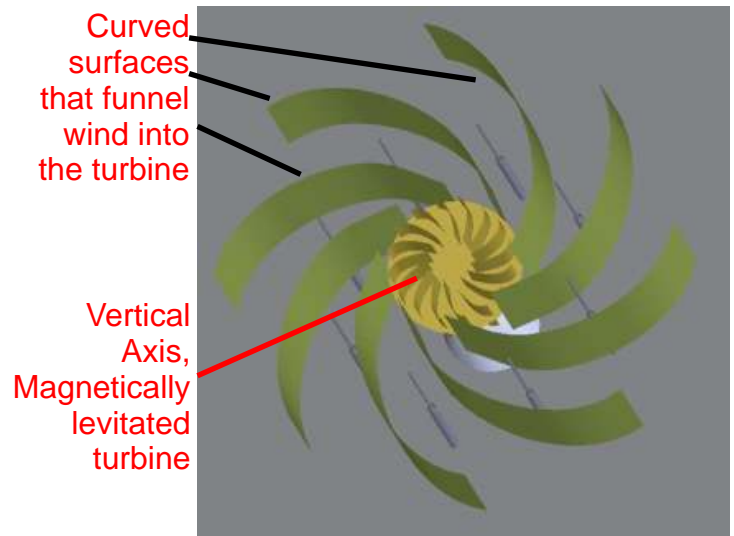
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The problem with wind power today is not the wind. The problem is with what we're being told by the horizontal windmill manufacturers. Look at the two wind turbines above. The three-bladed turbine on the left, according to the HAWT industry, intercepts nearly 4 times the wind area that the FTC VAWT turbine on the right intercepts. To explain, they claim the HAWT intercepts its entire swept area - $\pi * \text{radius}^2$. This paper will test that claim using an advanced physics engine based on Newtonian Physics.

I will intentionally leave out of this paper as much mathematics as possible. What I want to show is something simple and quickly understood. I will do this by using images of wind being driven into the turbines. With modern computer power, we can do this.

Anatomy of FTC Energy's Turbine



What I will show you is computer generated smoke being driven into wind turbines. This smoke is a simple way to see how air flows. Smoke is also how they streamline cars and test airplanes so the technology is well known. The key is how the smoke moves through the turbine system. Much of the technology used by FTC Energy is proprietary so I cannot show everything, but you will see a lot.

The images are like X-rays because this leaves just the smoke and its movement to be seen. The turbine is highlighted in orange so that you can know where the smoke is moving with relation to the blades.

We had to leave the background dark for the smoke to be more visible. We also reduced the energy driving the smoke to nearly zero. If you increase the driving force, you can push smoke through almost anything. We also raised the vorticity to insure that if there were any obstacles to the movement of the smoke through the unit that it would easily swirl.

The goal was to get efficient flow through the turbine with minimal resistance while proving our claim that the FTC turbine is an effective power source.

Image at 0 seconds

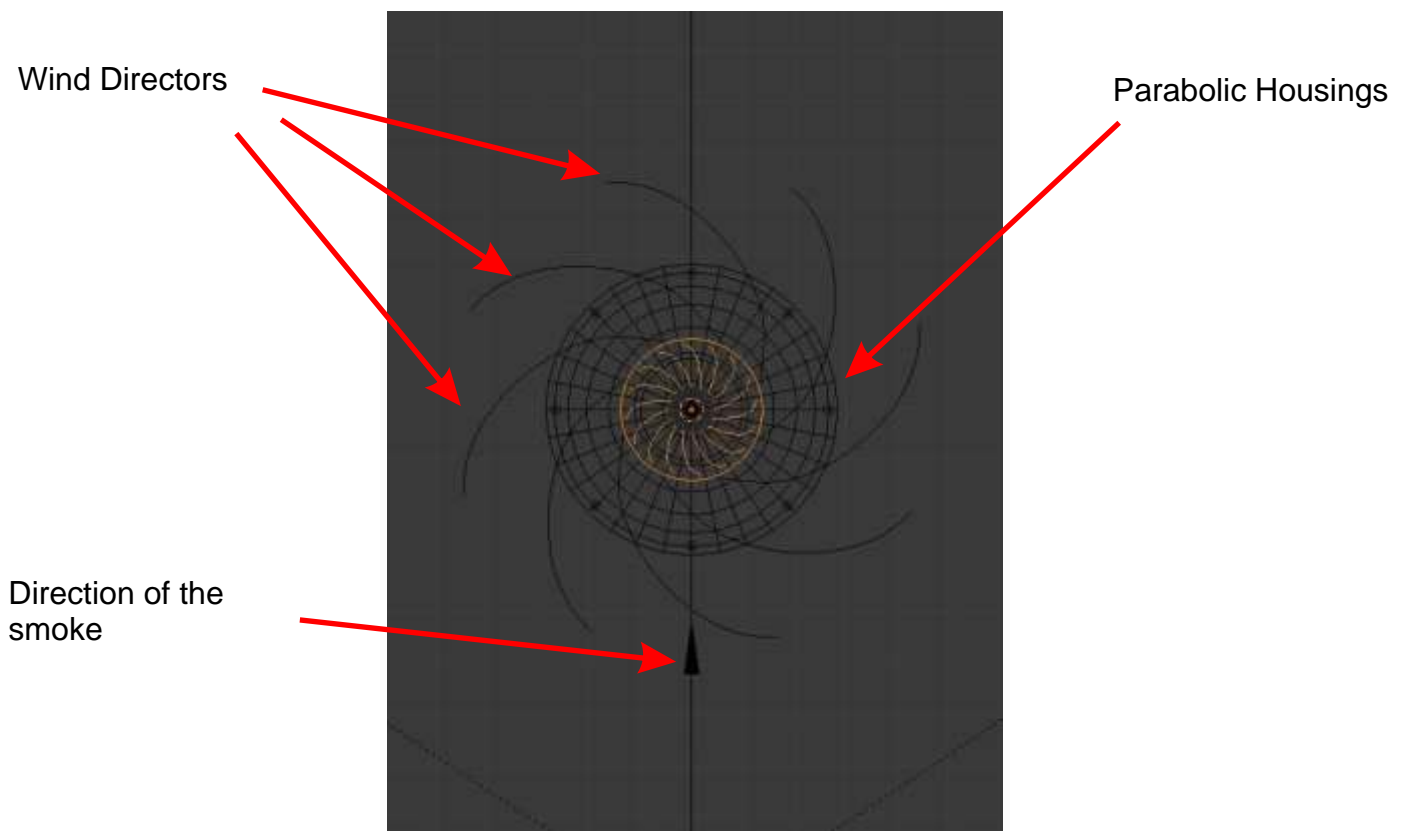
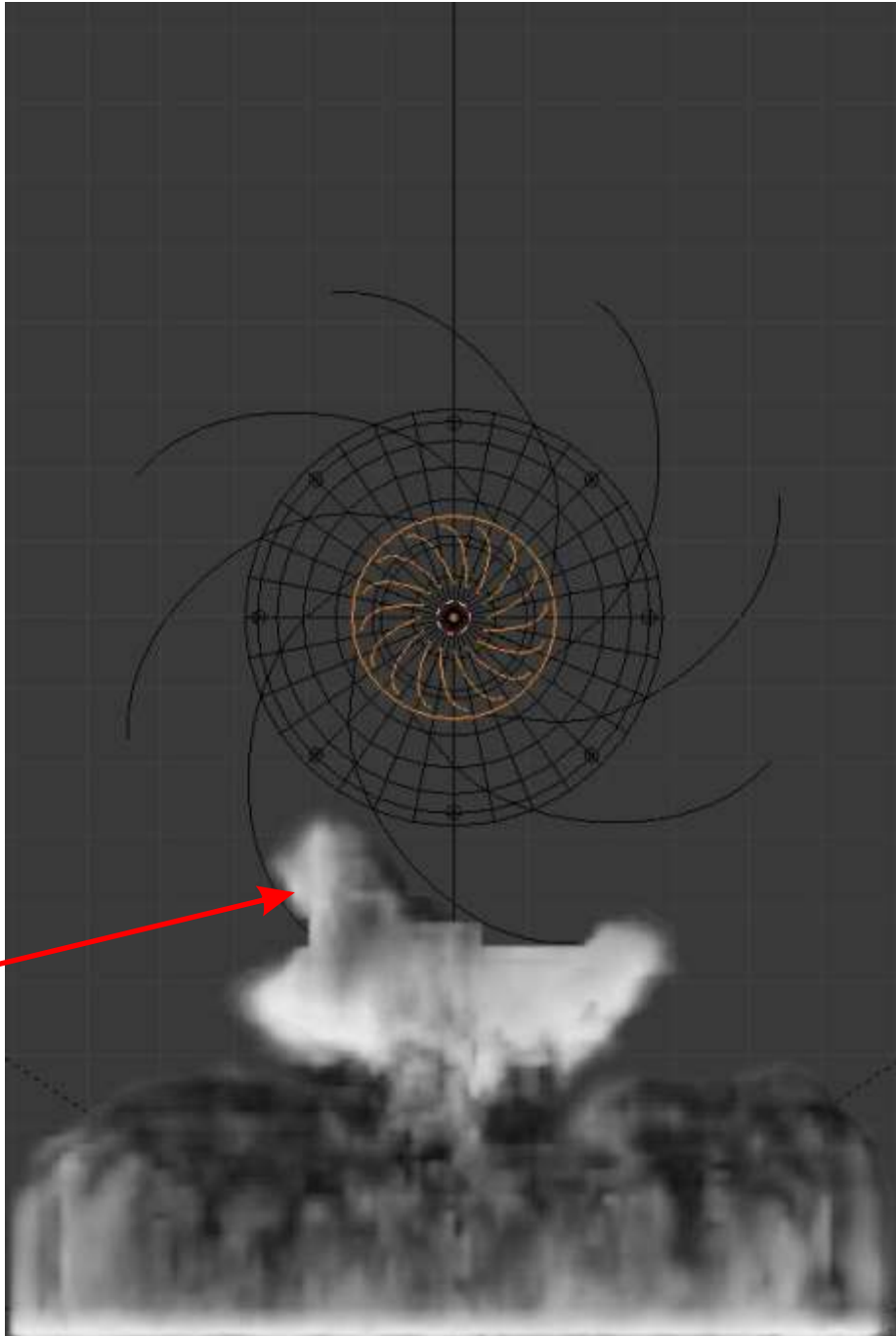


Image at 1 second



Smoke is being controlled by the wind directors and is moving along the channel towards the blades.

Image at 2 seconds

This channel has started to fill with smoke so air is flowing into it.

Smoke has already reached the turbine and has started pushing the blades

This channel is filling with smoke so we know air is flowing into it and will reach the turbine.

Notice the limited turbulence back here.

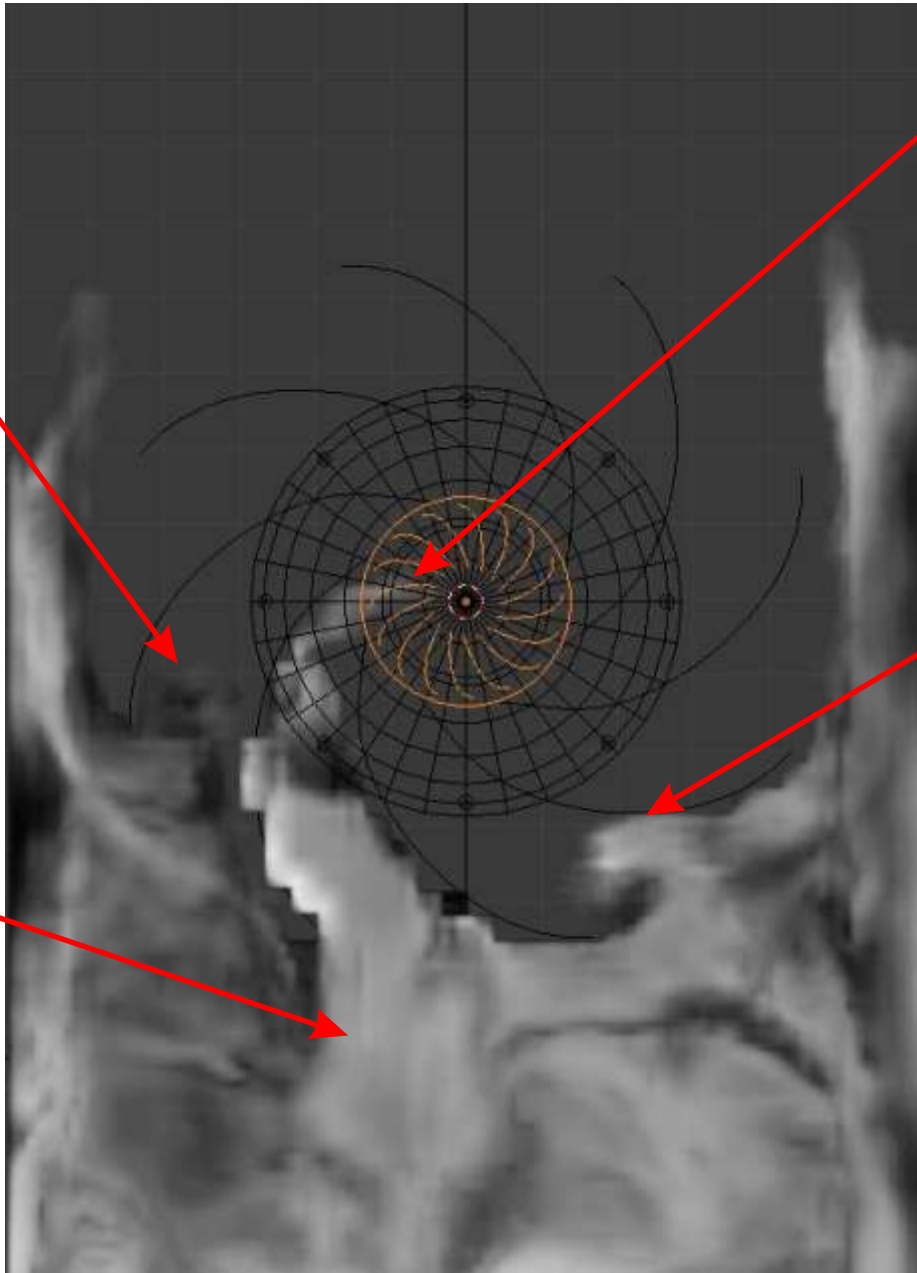


Image at 3 seconds

Smoke from the second channel has reached the turbine and is providing more force.

Smoke from the first channel is pushing one blade and causing a lift action on another.

The smoke has crossed the turbine and is pushing the opposite blade as it exits the turbine.

Watch this area. A vacuum is forming that will begin to pull air through the turbine. This shows even the back wind directors are contributing.

A third channel is now coming into play.

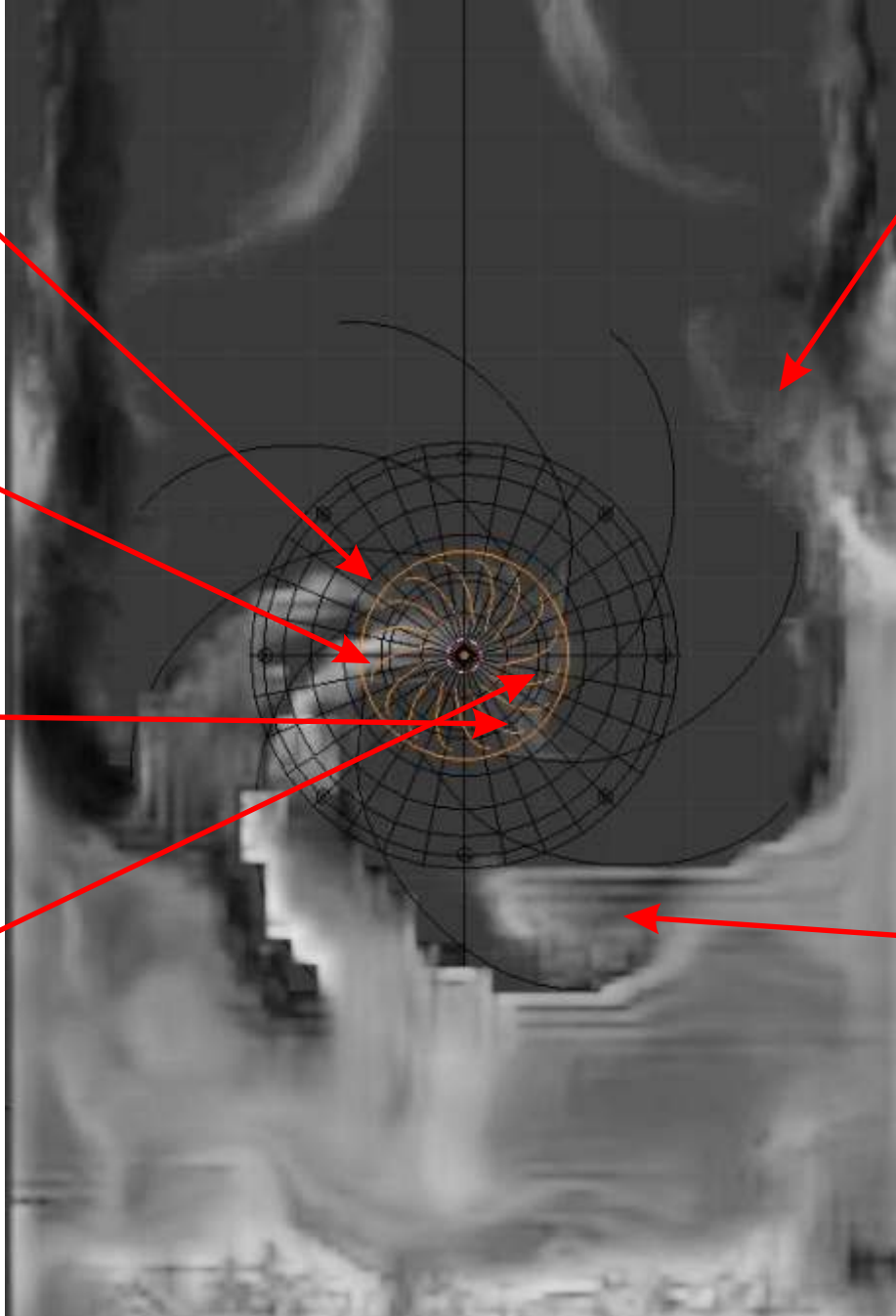
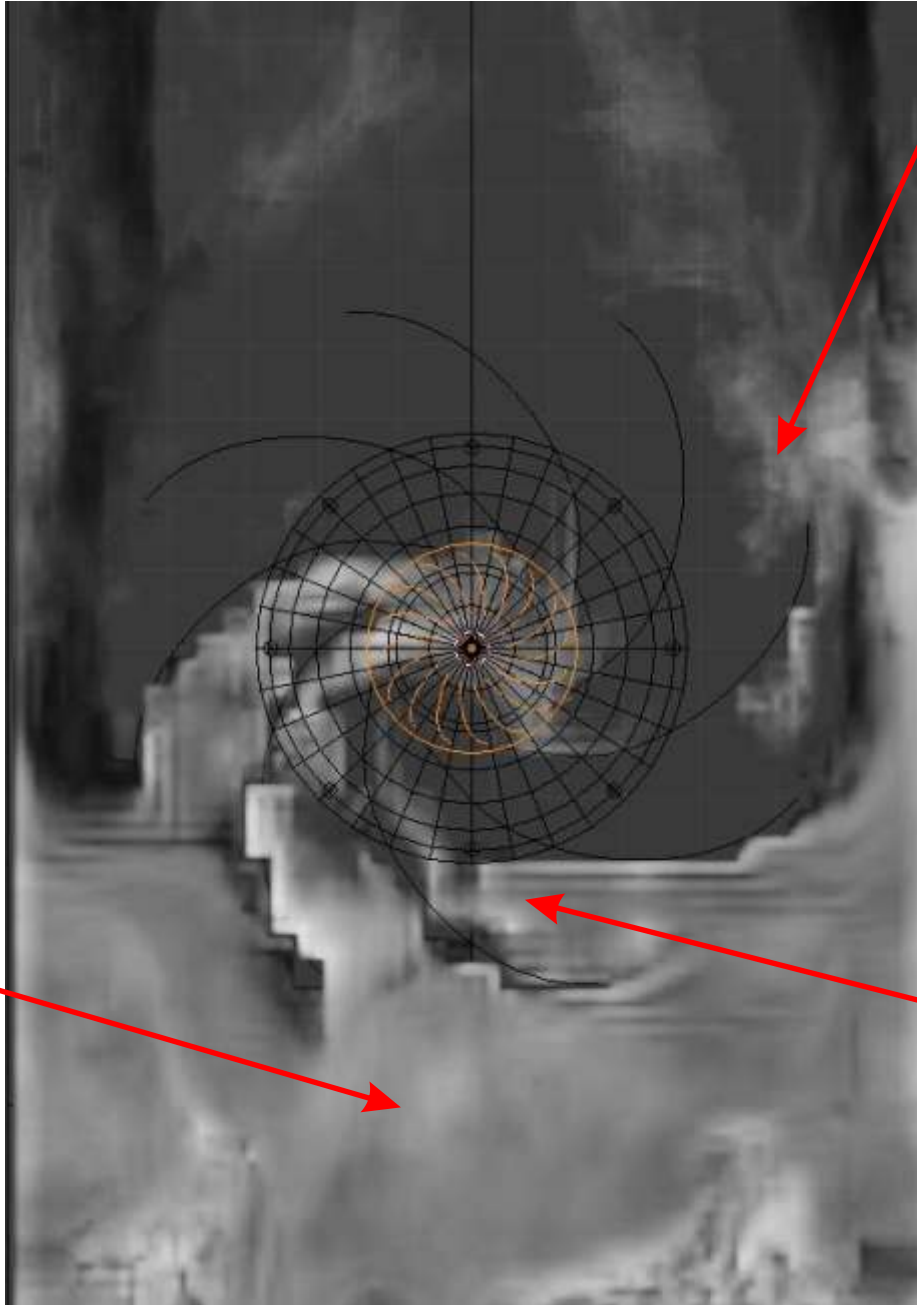


Image at 4 seconds

Channels 1 and 2 are now fully powering the turbine. They are both pushing and pulling. The smoke is crossing over and pushing the opposite blades

Notice the smooth air flow back here

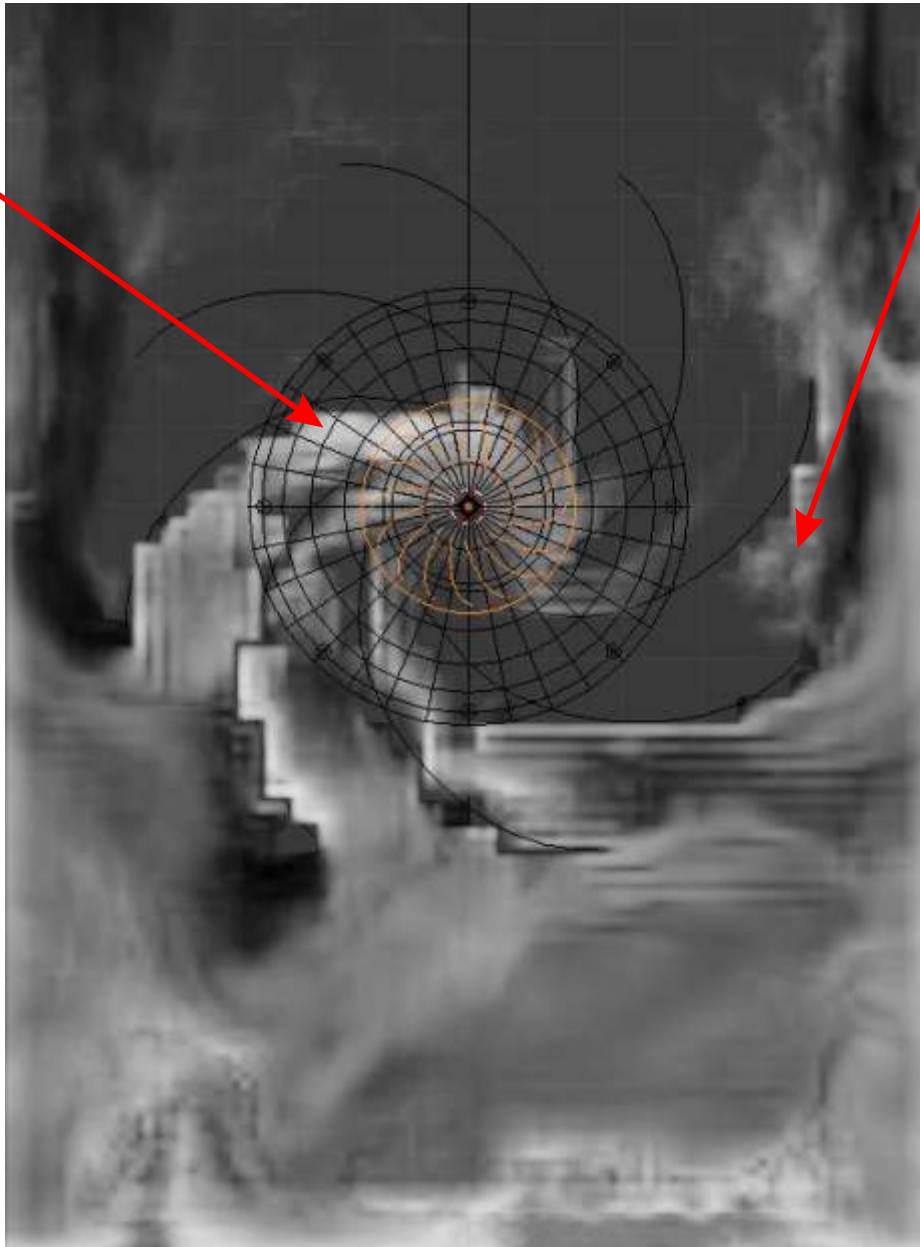


The backside vacuum is now fully realized. You can see smoke being pulled into the back channels. The back wind directors are making the wind flow faster into the turbines by creating a negative air pressure.

The third channel is now making a contribution to the power delivery.

Image at 5 seconds

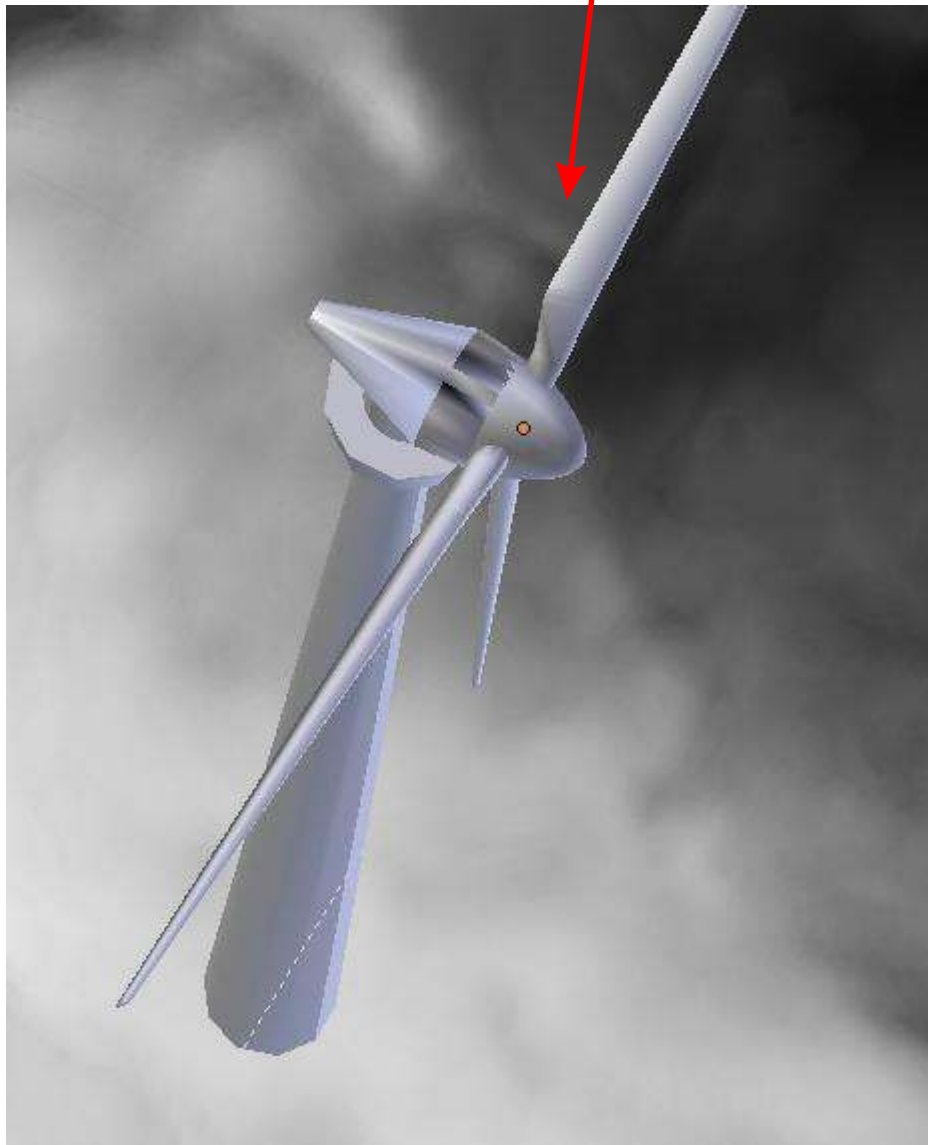
The three channels are now fully powering the turbine with tremendous force.



We now have a second vacuum source. The additional vacuum is causing the wind from the front to drive hard into the turbine.

We cannot find where the HAWT causes any appreciable interaction with the smoke. Unless the HAWT can be affected by the wind, it can't make power. This may be why HAWTs generally make about 3% of their rated capacity. We tried using different densities of smoke, different temperatures, driving the smoke hard with a wind force, and even manually turning the propeller to create some turbulence. The only thing we saw was the suggestion of interaction in the image below.

We think this area may be some interaction, but we're not sure.



Conclusion:

Wind power does work when properly used. We cannot find where HAWTs are useful for wind power based on our simulations.

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