“SWITCH COAL”

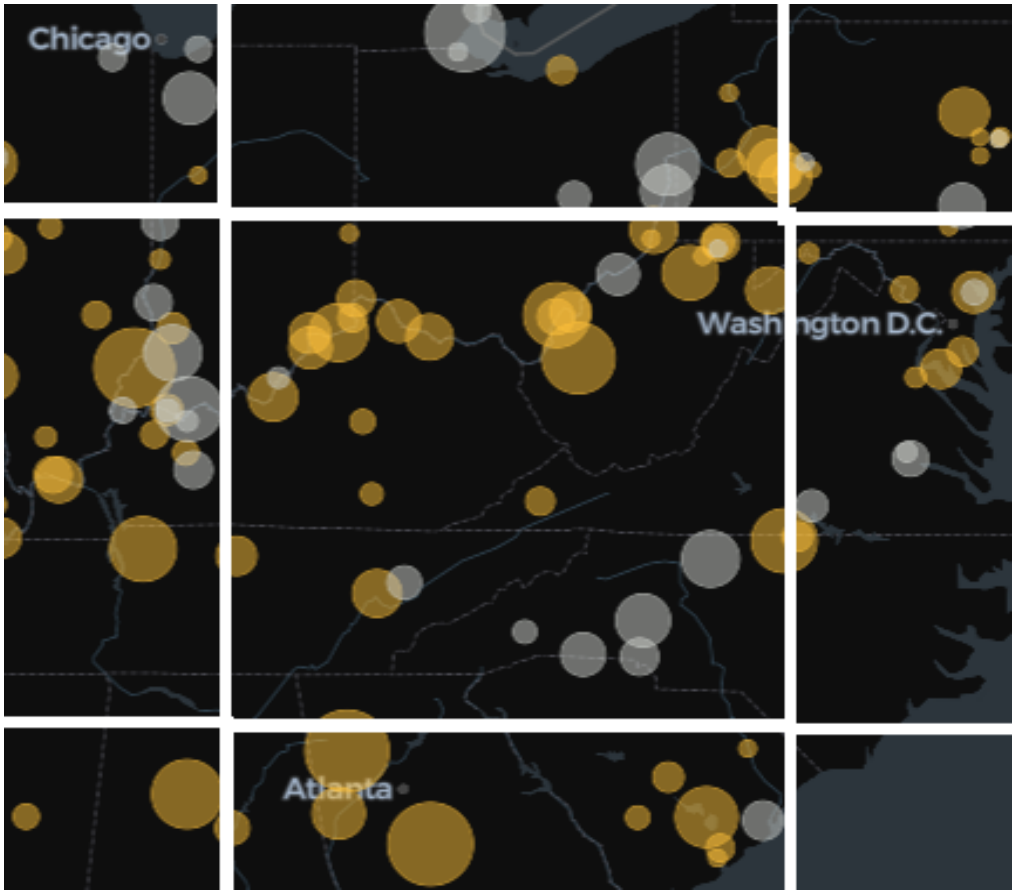
Short description

1) Find a coal plant

https://www.carbonbrief.org/mapped-worlds-coal-power-plants/

This website **lists all coal plants** of the world. Find a coal plant in your country by navigating the global map to your country. You can zoom in to see the cities:

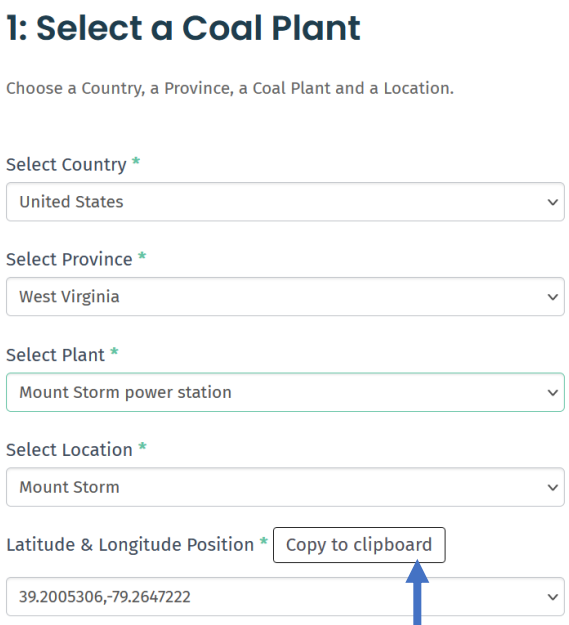
(set to year 2019 in the legend box at the left)



If you click on the circle, you will get the BASIC DATA for the coal plant, note down the name of the coal plant you choose.

Now open the webpage www.ZeroEmissionThinkTank.com and go to the switch coal **input mask** https://zeroemissionthinktank.com/switch-coal-help-us-save-the-planet/

Scroll down to find the coal plant you chose to research:



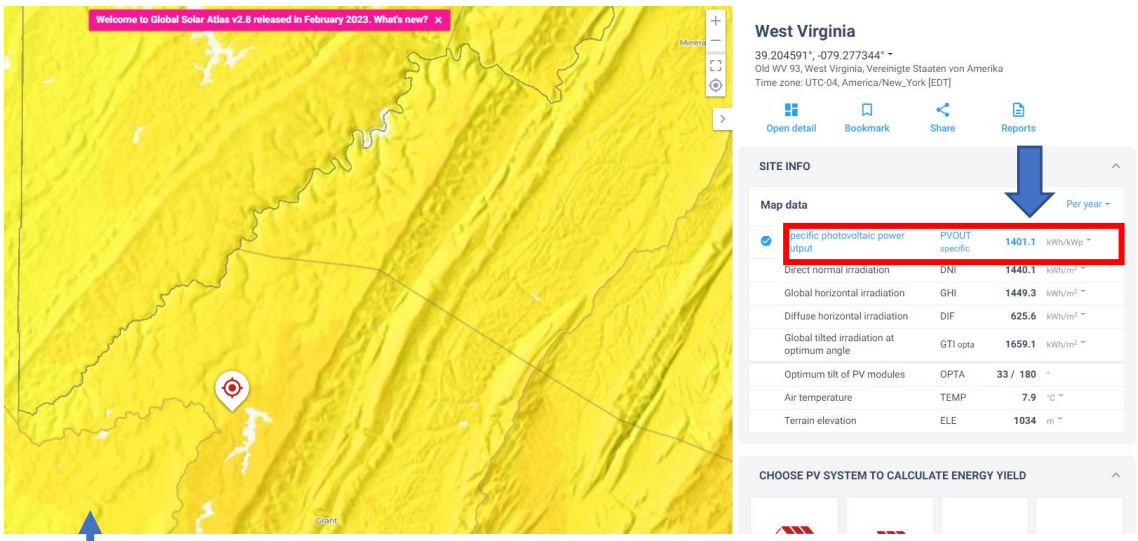
2) Find solar resources

Now start the **global solar map** published by the World Bank www.globalsolaratlas.info

You can now copy the coordinates (arrow “Copy to clipboard”) into the search field of the Solar map and click enter.

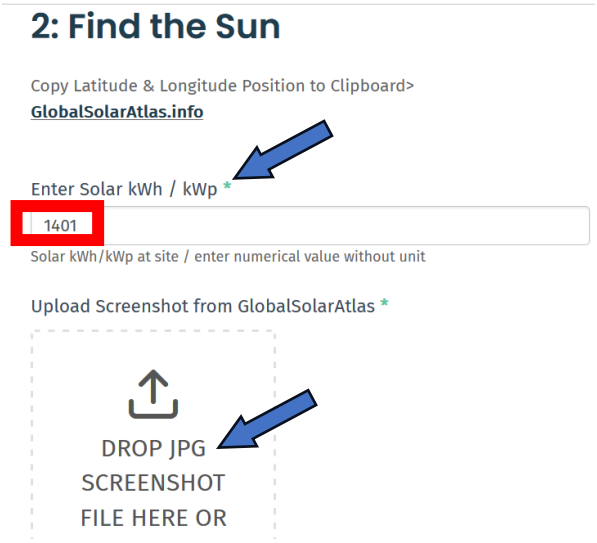
Write down the 'specific photovolatic power output” which is the blue data point in the legend (in kWh/kWp), see blue arrow below.

In the example below it is **1401** kWh/kWp:



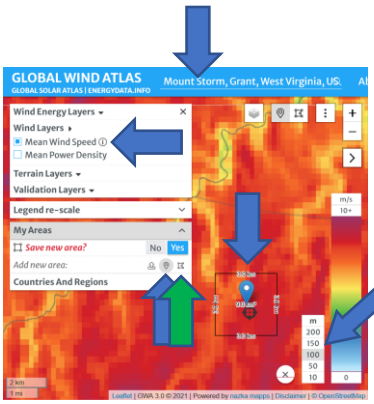
Now enter this blue value (“1401”) into the **input mask:**

Upload a screenshot (the yellow picture with the results), so we can verify your results by color.



3) Find wind resources

Now start the **global wind map** published by the World Bank www.globalwindatlas.info

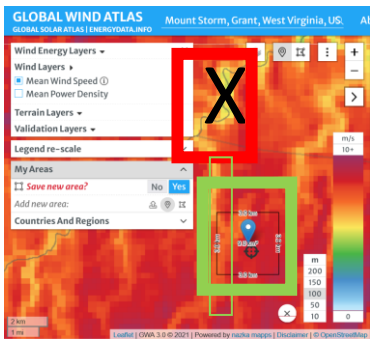


Copy the coordinates of the coal plant into the search field of the Wind map (“Copy to clipboard”), same as above for solar, and click enter.

Click on “Mean Wind Speed” and set the tower height of the wind mills to 150m.

Now, with the cursor, open up a square of approx.. 10km x 10km near the coal plant (right green arrow) or (easier) go for the default 3km x 3km (left blue arrow). Find the highest wind speed for such a 10km x 10km square (1).

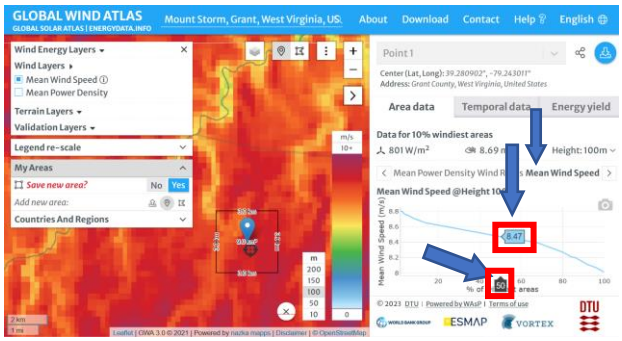
Note: Especially for larger coal plants it would be good to pick a larger square. A detailed description for the procedure is given here, if you have time for it. The results will be more accurate: https://zeroemissionthinktank.com/news/02_switch_coal_2023_instruction.pdf



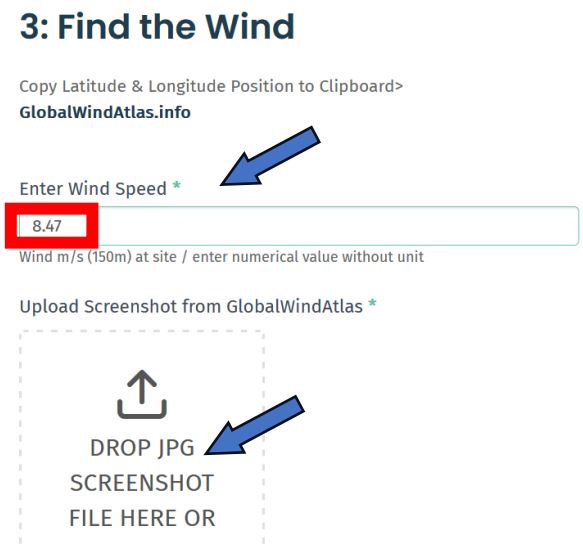
Note: You may want to select a representative wind speed for the square (green box) and not a much lower wind speed (red box with the X).

Note: it would be good to find a 10km x 10km square close to the coal plant, however good wind speed is more important, so you can search within 100km around a coal plant.

Click on “Mean Wind Speed” on the right half of the screen (upper blue arrow). Adjust the wind speed with the cursor to 50% and note down the wind speed value (8.47m/s in the example):



Go back to the **input mask** and enter the wind speed (8.47m/s). Also upload a screenshot with the square chosen, so we can verify your results by color:



RESULTS

Site:	Mt. Storm, West Virginia, USA
Sun:	1401 kWh / kWp
Wind:	8.47 m/s

That`s all for you!

Thank you so much for helping out with your research. We could not do this solutions study

without you!

With your help, ZETT can now run the economics for each coal plant in the world, based on Bloomberg economic data. We can now find out if it is cheaper to switch to wind-solar-battery systems with 100% renewable energy. We will publish the results in a study on our ZETT webpage later this year.

TAKE HOME MESSAGE: The KEY QUESTION is, is it cheaper?!

If the answer is YES, it is a **no brainer** to act on climate now, because it`s cheaper! Money rules the world. No excuses left.

YOUR NAME

You can also enter your name and email, as well as the name you want us to use for the publication. The name for publication can be your own name, but it can also be a phantasy name like “Zebra 35”, if you do not want to be named. It is your choice which name to use for the publication.

Note: Your email will only be used to send you periodic updates like our ZETT newsletter, if you choose this option in the menue.

(1) Note (just for your knowledge): A modern windmill has a rating of 7.5 MW with a 175m rotor diameter (“D”). If we wanted to build a 500 MW wind farm, we need approx.. 66 windmills (500 MW / 7.5 MW = 66). A typical layout for a wind farm is designed with a distance between the windmills of 1.5 D if the wind mostly comes out of one direction (in cross winds / 1.5 x 175m = 267.5m) and 10 D in the main wind direction (10 x 175m = 1750m). If we now take a 6km x 6km square, it is enough for 3 rows (6000m / 1750m = 3), each with 22 turbines (6000m / 267.5m = 22). Therefore 3 rows with 22 windmills each gives the 66 windmills needed (3 x 22 = 66). However, not all the space is typically usable, or the windrose may require a different spacing between the windmills, e.g. a 3D x 5D layout, which is why we prudently assume a larger area with 10km x 10km.