Pioneer Central High School

2010 New York State Virtual Wind Farm Contest School Submissions
Students in Ms. Reling's Earth Science classes participated in a New York State Virtual Wind Farm contest this winter. Students worked collaboratively to place virtual windmills on a Google Earth map in positions that would create the most efficient wind farm design. They learned about wind characteristics, topography, and engineering design of windmills.

Part of the contest involved a community outreach project. Since we have a number of wind farms in our district and others may be coming, we chose to focus on benefits of wind farms to landowners, communities and schools as well as negative impacts wind farms can have.

Please click the links below for topics. Some links include specific information about the Bliss wind farm.

What does the community get from a wind farm?

- Windmills and birds
- Windmills and bats
- Flicker effect
- Noise from windmills
Windmills create jobs!

Construction of the wind farm created over 400 jobs, and the vast majority were filled by Western New York based employees. Operation of the wind farm has created 35 full-time local jobs.

What do landowners get for having windmills on their property?

- When windmill companies build windmills on other peoples land the owners are going to expect something in return. The windmill companies must give them something in return but their trying to spend as least money as possible but at the same time they want to persuade the landowners. Some windmill companies guarantee $6000 a year per windmill.
- In addition some windmill companies have profit sharing laws where landowners receive additional money if the power company makes more power in that month, but the landowner will always receive the minimum amount they were promised. The landowners profit will never go lower but it can go higher.
- The landowners make sure they are signing a valid legal contract before they agree to anything. Also landowners need to know how long the contract is going to last for and whether it can be renegotiated. Another thing landowners look for is what will happen if the windmill company goes bankrupt. What would happen to the windmills? Would they just sit there and rust or would they be taken down?
- If you add up the amount of windmill payments for each landowner it averages around $1 million each year.
What do schools and towns get for having windmills near their property?

- Windmill companies offer compensation to most schools and towns around where their windmills are placed. This means that residents of these towns and district have to pay less or maybe even no tax at all! Also the windmill companies will build better roads for that town and it won't cost them a cent.
- In some cases windmills are placed closer to a neighbors house than the landowners house. In this situation some windmills companies will pay both of the houses but they won't pay the neighbor as much as they would pay the actual landowner.
- Also some windmill companies will pay some of the school taxes and the residents of that school district wouldn't have to pay as much school tax as other schools.

Do wind farms kill birds?

Surprisingly yes!
Wind farms kill approximately 10,000-40,000 birds per year!
That's a lot of Birds!
Do Windmills Kill Birds???

Birds are not exactly safe from windmills. However, windmills kill less birds than many man made structures. These structures include light communication towers, power lines and sky scraper windows. Even domestic cats kill 10 times more birds every year than wind turbines.

Should we stop production of windmills???

- Although hazardous to birds the percentage that actually get killed due to wind farms is minimal. There are plenty of things that could potentially destroy the population. Wind power is one of the most efficient forms and there are more crucial debates rather than worrying about the birds.
Do windmills kill bats?

- Windmills are killing bats all over the United States. Windmills kill bats by creating a vacuum near the rotors which causes the bats lungs to explode. Some scientists estimate that perhaps only one bat is killed per turbine in a year while other scientists think that it could be much higher.
- When it's really windy, which is when the turbines are reaping the most energy, bats don't like to fly. I would say that you could shut the windmills off when it's not windy. Not as many bats would be killed then.
- Of course, bats not killed by windmills are the ones that reproduce. So their young will inherit a trait that will allow them to live with windmills. In other words, I believe evolution could take care of the problem.

Flicker effect

- Tall structures such as wind turbines, also known as windmills, cast shadows. These shadows vary in length according to the sun's altitude and position. The rotating wind turbine blades cast moving shadows which only under certain conditions cause flickering at nearby properties or households.
In some cases the constant flicker effect, can have side effects on people whom have epilepsy. It can trigger an epileptic seizure.

And also a lot of people just do not like the shadow that it casts into their house or on their property. Some say it is very annoying and an eye sore.

Do windmills make too much noise?

- Well, they said everything with moving parts will make some sound, and wind turbines are no exception. As well designed wind turbines are generally quiet in operation, and compared to the noise of road traffic, trains, aircraft and construction activities, the noise from the wind turbines is very low. Outside the peoples houses, which are at least 300 meters away, and more often further, the sound of a wind turbine generating electricity is likely to be about the same level as noise from a flowing stream about 50-100 meters away or the noise of leaves rustling in a gentle breeze.
Synopsis

Windmills are more efficient around water, roads and power lines to save money. Because money is key, and the more roads you make, the more money it’ll take. So if you make the windmills taller, it’ll get more wind because the higher in the atmosphere, the windier it is. And closer to the road and power lines, you’ll spend less money!!

Water makes more wind, by less friction. And putting them by power lines would also make the energy less expensive because you don’t have to make the extra lines. Same as the roads. The bigger and taller your windmill is, the better it will work. The prevailing wind comes from the west so it’s best to put the windmills on the eastern shore of the lake to get more wind. Putting windmills on hills was thought to be a better strategy but it really doesn’t matter as much as we thought.
Welcome Pioneer Central High School - Print Summary

Wind Farm Energy Summary

- Number of Turbines: 8
- Wind Farm Area (km²): 2.69
- Power Capacity (MWh): 24.00
- Energy Output Yearly (kWh/yr): 67,352,000

Wind Farm Emission Offsets

- Sulfur Dioxide
  - Kilograms per Year: 57,006
- Nitrogen Dioxide
  - Kilograms per Year: 27,897
- Carbon Dioxide
  - Kilograms per Year: 24,591,151

- Equivalent number of Cars Removed: 4,471
- Equivalent number of Trees Planted: 4,170,324

Wind Farm Cost Summary

- Turbines & Towers: $32,148,000
- Installation: $3,312,000
- Transmission Lines: $1,941,190
- Service Roads: $708,423
- Total: $38,109,613
- Cost To Energy Ratio ($/kWh): 0.57

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