Edenwald School on the Mount Pleasant Cottage School Campus (Level III)

2010 New York State Virtual Wind Farm
Contest School Submissions

WORLD WIND TURBINE TECHNOLOGY
Wind Turbines from Spain, France, Germany, Netherlands, Italy and the USA.

This poster is a compilation of photos from around the world, which the students researched on the Internet. It will be prominently displayed in the lobby of the Edenwald School in Pleasantville, New York in order to raise awareness of this exciting form of "green" energy. TheWind Turbine Contest has also inspired the students to design and construct a working wind turbine to power a rock garden waterfall which they also plan to build. As a result of these activities the students are hoping to raise public awareness not only in the school, but also in the community.

NYS Virtual Wind Contest – Design Synopsis

Since this had been the first experience with the New York State Virtual Wind Contest, students were provided with an overview of Global Warming and the need for renewable energy sources before starting the contest. Upon completion of the overview, students explored various recommended resources and websites related to wind energy in preparation for starting their wind farm design. Within this design synopsis students will provide comments on their design decisions and influencing factors that contributed to the final result. After students had been given their user name and password each student was allowed to explore designing a wind farm individually for one class period. Upon the next class period a group discussion was undertaken to see what factors influenced each student's decision when designing their wind farm. In order to address key synopsis requirements students were asked the following three questions with their responds recorded.

1. **What physical, environmental, and human factors led you to select the location you used?**

STUDENT RESPONSES:

S1- I want the wind farm to be in the water so that there is less impact on people.

S2 - I chose to put my wind farm on land near the water so that there is less impact on people

S3 – I put my wind farm right next to the water so I could still have more wind yet build on land. I would not want the wind farm too close to houses or building where they could be a problem for people.

S4 - I would place the wind farm out in the country where the wind turbines are as far away from towns or cities. As for the impact on

wildlife, I would use large wind turbines so that I could produce a good amount of electricity, yet use less wind turbines.

S5 - I would want to build the wind farm where there is no chance of an earthquake, tornadoes, or major storms.

S6 - I think local people should vote on where they want a wind farm build near them and only build a small farm to start out.

S7 - I can't see how building a wind farm could be more harmful than the way we make electricity now. I know there will be some negative effects but there will also be benefits.

S8 -I think it is a good idea to build wind farms to help the with global warming and the environment yet when I look at pictures of large wind turbines it is hard for me to get use to seeing them. They almost seem like something from outer space.

S9 - I was reading that the wind turbines may harm birds, bats and other wildlife. I was wondering how many animals are effected by pollution from current electric plants? After talking about residential versus commercial zoning, I think it would be better to place wind turbines near power plants in commercial zones. Only when we need to should we build them near a residential area. Although I have never seen a real wind turbine, I don't think I would want to have one put up near where I live.

S10 - I would want the wind farm far enough away so it would have minimal impact on humans and wildlife, yet not too far away where the wind turbines would be hard to install and maintain.

2. **What factors led you to select the turbine type, blade diameter, and tower height you used? Note: Most students selected 3MW turbines because they felt more electricity would be produced using less wind turbines. ***When students tried to modify blade diameter and/or tower height the virtual wind program reset to standard values. Not changes were permitted.**

STUDENT RESPONSES:

S6 - I tried to use several different types of turbines so that various amounts of electricity would be generated and if there was any problem with a certain type not all the turbine would be affected. With respect to the blade diameter, I went with the larger blades because they can produce more electricity. I did not change the tower height.

S9 - I wanted my wind farm to also have a variety of wind turbines to generate different amounts on electricity.

3. What makes your design more efficient than other options?

STUDENT RESPONSES:

S2 - I thought that by using 3MW turbines I limited the land I needed for my wind farm and maintained a good cost to energy ratio ($KWh).

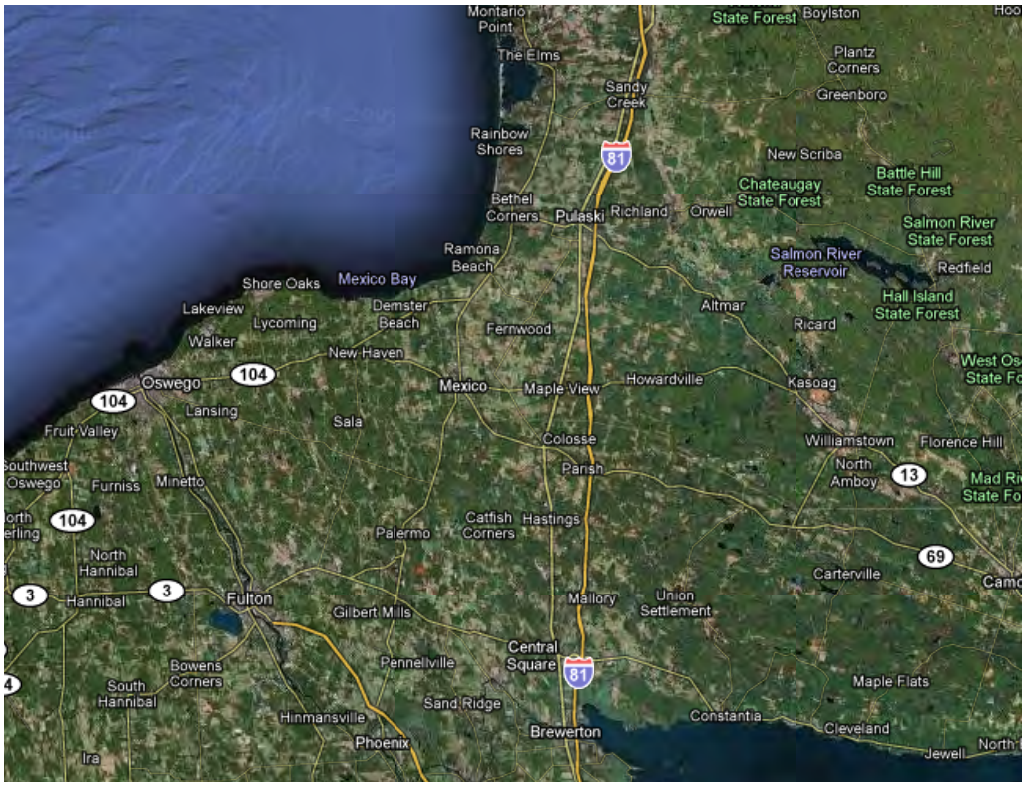
S5 - I thought my design was good because I put some wind turbines in the water and put others on land. I too used 3MW turbines and maintained a good cost to energy ratio ($KWh).

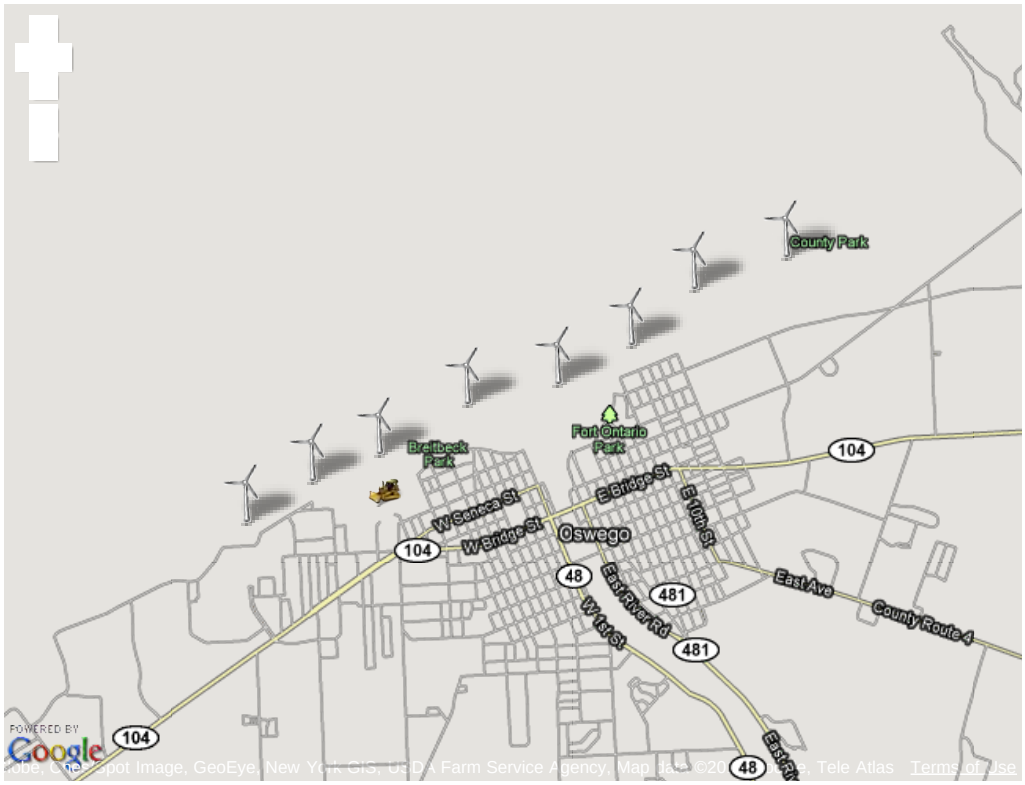
S7 - I thought my design stayed away from residential land and had the least environmental impact.

S9 -I liked my design because a placed several wind turbines around a power plant. By doing this less transmission line would be needed.

In summary, students used initial resources and related websites to begin to develop an understanding of various concepts related to developing a wind farm. By exploring the virtual wind tool students experienced through trail and error and using their reasoning what is needed to successfully build a wind farm. After applying what they had learned, many students were able to reduce their initial cost to energy ratio ($/KWh). Overall students felt this was a valuable way to learn about Wind energy.

SchoolPower ...Naturally





Welcome Eden9

Wind Farm Energy Summary

Number of Turbines	8
Wind Farm Area (km2)	0.72
Power Capacity (MWh)	24.00
Energy Output Yearly (kWh/yr)	67,789,269

Wind Farm Emision Offsets

Sulfur Dioxide	
Kilograms per Year	57,376
Nitrogen Dioxide	
Kilograms per Year	28,078
Carbon Dioxide	
Kilograms per Year	24,750,804
Equivalent number of Cars Removed	4,500
Equivalent number of Trees Planted	4,197,399

Wind Farm Cost Summary

Turbines & Towers	$32,148,000
Installation	$3,312,000
Transmission Lines	$3,789,292
Service Roads	$344,618
Total	$39,593,910
Cost To Energy Ratio ($/kWh)	0.58