

Power Your School Worksheet

LEARNING OBJECTIVE:

Students use energy data from the Renewable Energy Living Lab to calculate the potential energy for solar and wind energy at their school. They use this data to write a recommendation as to what type of energy generation the school should pursue.

ENGAGE:

Your school has received a grant from the Department of Energy to help offset power costs by funding the placement of either solar panels on your school roof or wind turbines on school grounds. Working as an engineer, your task is to analyze data about the potential amount of solar and wind energy available at your school location. Then, you will write a recommendation for which option (solar panels or wind turbines) your school should build, using your data analysis for support.

EXPLORE:

1. Go to the Renewable Energy Living Lab at <http://www.teachengineering.org/livinglabs/index.php>.
2. Enter the Renewable Energy Living Lab and choose age group K-12.
3. Zoom in on your state. Find your school!
4. Check the boxes under the Resources folder (located on the left under the Data Layers tab) to switch between the maps depicting the potential for the five different forms of renewable hydropower, biomass, geothermal, wind and solar. Use the icons in the lower left corner to read more information about each form of energy.

EXPLAIN:

Part 1: Data Analysis

In order to make a decision, first analyze the potential for solar and wind energy at your school. Use the Renewable Energy Living Lab to figure out how much solar potential and wind potential exists at your school location. Follow the steps below to get started!

1. Describe the amount of solar energy that is received by your school. (Be detailed. Include the numerical data [that is, 5.0 kWh/m²/day]).

2. Describe the amount of wind energy received by your school. (Be detailed. Include both relative descriptions [that is, class type] and numerical data [that is, 5.0 m/s]).

ELABORATE:

3. Using the numerical data from questions 1 and 2, calculate the amount of solar and wind energy the school could possibly generate in one year, based on the following conditions:
- Your school roof has a surface area of approximately 4,300 square meters; 50% of that space is useable space.
 - Your school football field can hold approximately four wind turbines safely. Each wind turbine has an area of approximately 1,000 m².
 - Your units should be in kilowatt hours/year. (Remember, 1000 W = 1 kW)

Calculations:

My school would generate _____ kWh/year of solar energy.

My school would generate _____ kWh/year of wind energy.

EVALUATE:***Part 2: Writing a Recommendation***

Now that you have analyzed the data, write your recommendation to explain whether your school should place solar panels on its roof or wind turbines on its grounds. Include the following in your recommendation:

1. Option selected (solar panels or wind turbines).
2. Explanation for your renewable energy source selection, based on data.
3. Recommendation for where the option should be located.