



# FACTORS THAT AFFECT THE ELECTRICITY OUTPUT OF A SCHOOL'S SOLAR PANELS

SCHOOLGEN ACTIVITIES LEVELS 5-6

## Teacher-led Activity

Compare the monthly sunshine hours in your region to the monthly electricity output of a Schoolgen school's solar panels. Identify and consider other factors that may affect the output. Compare the output of solar panel-based generating systems with other means of generating electricity.

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## PREDICTIONS

Record your predictions.

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Do you think the number of sunshine hours will affect the electricity output of a school's solar panels?

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Why?

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Why not?

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Which month(s) do you predict will have the greatest electricity output?

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Why?

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Which month(s) do you predict will have the least electricity output?

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Why?

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Describe any trends or patterns you see in the monthly sunshine hour's data.

Which months had the highest electricity output?

Which months had the lowest electricity output?

Describe any trends or patterns you see in the monthly solar panel energy output data, and compare with any patterns in the sunshine data.

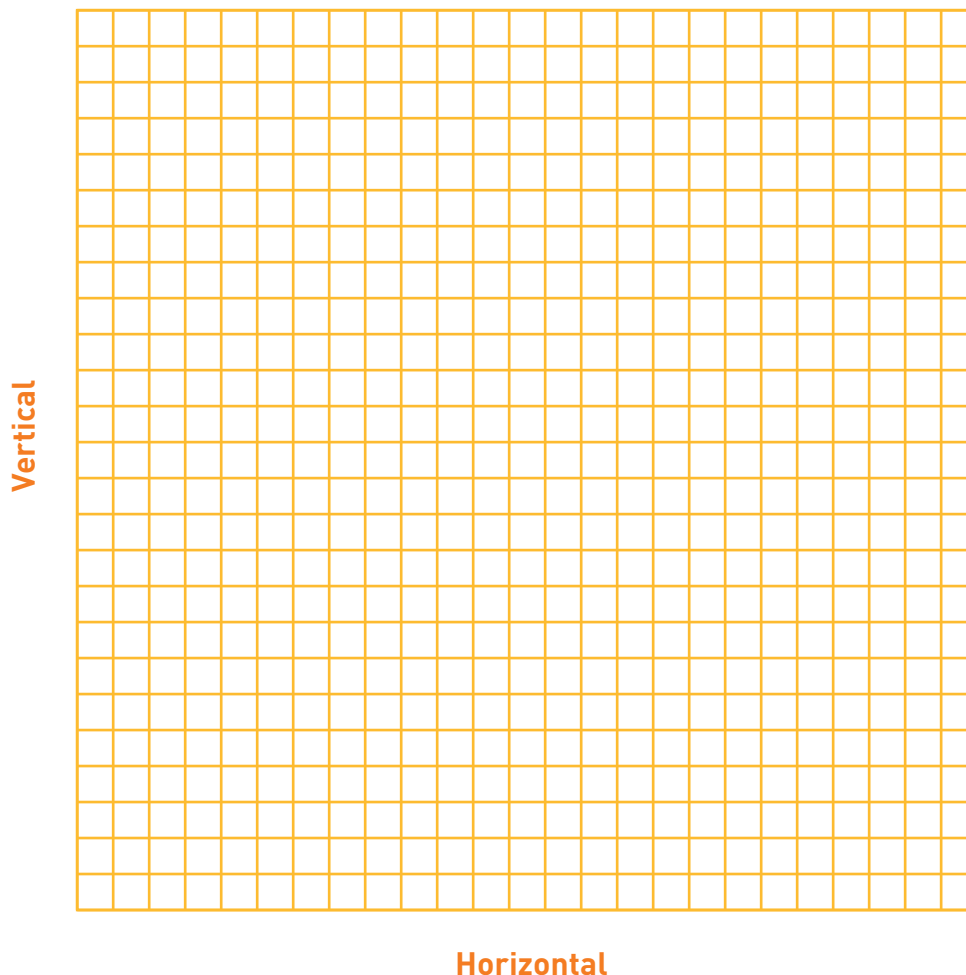
On the basis of the data, do you think the two are correlated?

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4. A better way to test the **correlation** might be by drawing a **scatter plot** of energy output against sunshine hours.

Note: If you think that energy output may depend, in some way, on sunshine hours, then sunshine hours is the **independent** variable, and is plotted on the horizontal axis, and energy output is the **dependent** variable that goes on the vertical axis. Remember to label your axes with titles and units.

Title: \_\_\_\_\_



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What can you conclude from this graph?



Does the data support your predictions?



What factors, other than hours of sunshine, do you think contribute to the electrical energy output of solar panels? Explain your ideas.



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## EXTENSION

Here are some extension questions to consider.

<sup>1</sup>Legends provide the key to the data plotted on a graph.

The number of days in a month varies (from 28 to 31). Is this important when you are comparing monthly totals? If so, can you suggest a way to improve your comparison?

The sunlight hours per month supplied by NIWA are averages over a minimum of 5 years in the period 1971-2000. The solar panel data is for particular months over the past year. How might this difference affect your interpretation of the data?

Research and find out the output capacity of:

- a big hydro-electric power station, e.g., Clyde or one of the Waikato River dams
- a major coal or gas burning thermal power station, e.g., Huntly or New Plymouth
- a geothermal power station, e.g., Wairaki or Ohaaki
- a single wind turbine (choose one local to you).

How many 170W solar panels would it take to get the same output capacity as each of these?

List some of the environmental advantages and disadvantages of each of these means of generating electricity.

You could present the answers to these questions in a table.