

# Info for teachers

- This PowerPoint is to accompany the *Power House Maths Follow Up Activity* booklet
- Coloured chilli images show the level of challenge of each activity green (mild), orange (hot), or red (extra hot).

# Powering Your House Challenge



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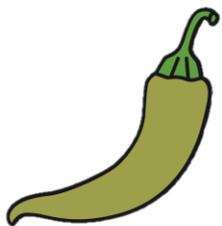
# What did we learn at the museum?



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# Powering your house

Houses need different amounts of energy throughout the year.

Can you plan a project that uses between 50-70kW per day?

A solar panel provides 6 kW of energy per day.

A small wind turbine provides 14 kW of energy per day.



*Why would there be this range in what is needed?*

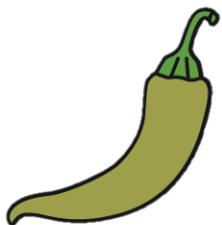
*What times of year (or day) will energy use peak in our houses (or school)?*



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# Powering your house

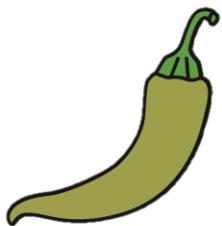
On average throughout the year, a house needs 60kW per day.

Is your project making at least 60kW? If so, how many extra kW a day is your energy project making?



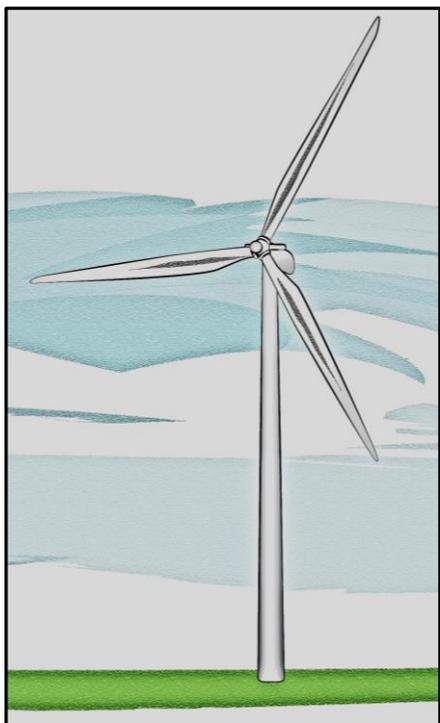
*Some projects may be making less than 60kW per day. What could they do on days when they need more energy?*

*What times of year might you need more energy?*



# How much does it cost?

Wind turbines are more expensive than solar panels but they generate more energy.



*Wind turbines cost  
£20,000*

*Solar panels cost  
£6,000*



**How much does your energy project cost?**

*Who made the cheapest energy project?*

*Did any groups calculate the same amount of energy at different prices?*

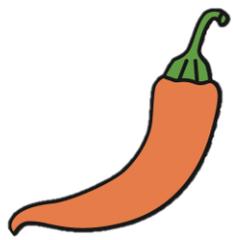
*If not, do you think this is possible?*



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# How much does it cost?

Wind turbines are more expensive than solar panels but they generate more energy.



*Wind turbines cost  
£20,000*

*Solar panels cost  
£6,000*



**What is the cheapest way to generate at least 60 kW of energy?**

*Is this the best way to power your house?*

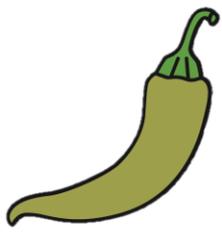
*Is there another cost-effective way if your house was somewhere reliably windy?*



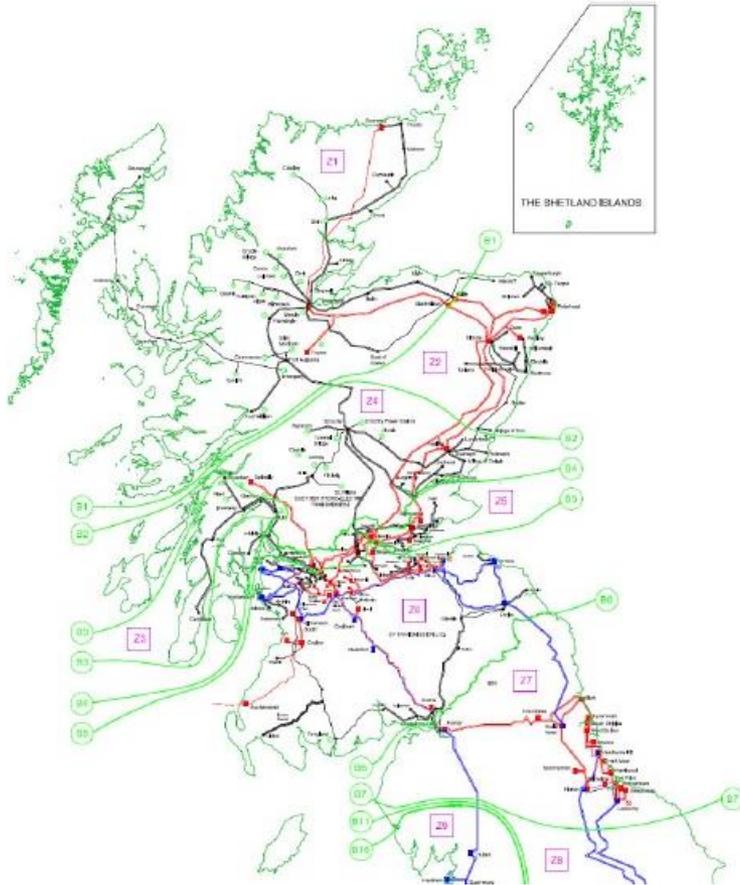
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# The National Grid



Did anyone generate more energy than they needed? If you did then you can sell it back to the National Grid.

If you generate 1kW extra per day, over a year you can earn £500.

1kW= £500

2kW= £1000

**How much could you earn per year from the extra energy your project produced?**



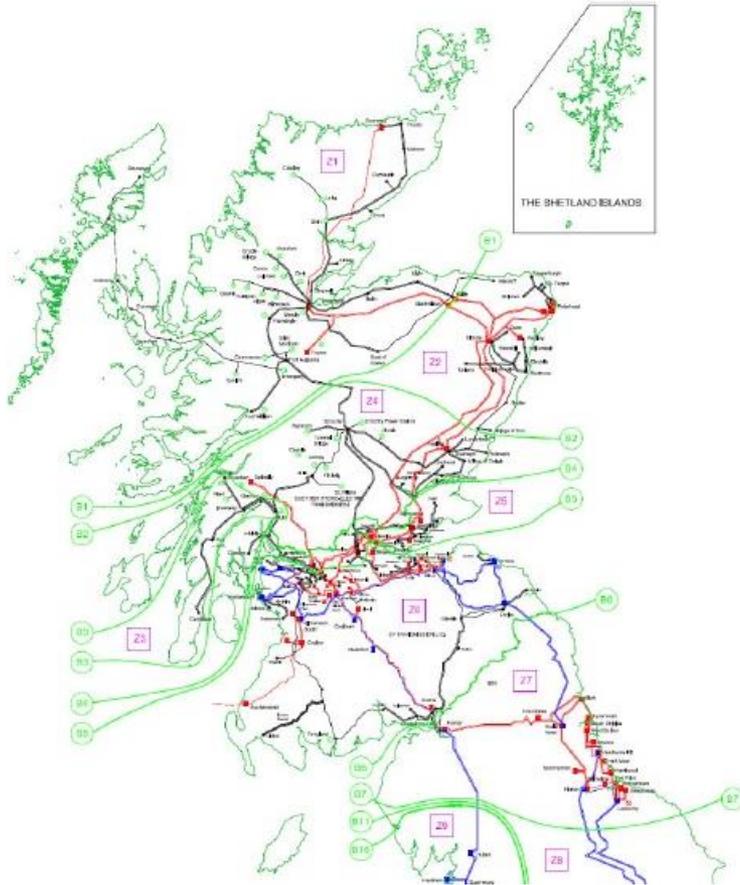
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# The National Grid



Did anyone generate more energy than they needed? If you did then you can sell it back to the National Grid.

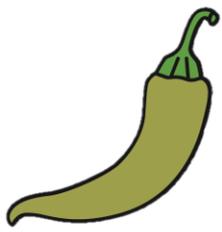
If you generate 1kW extra per day, over a year you can earn £500.

1kW= £500

2kW= £1000

**How many years would it take to earn back the cost of your power system?**

*Is this the total cost of the system?*



# Insulation and energy efficiency

You can also save money by using less energy in your home. There are two ways to do this:

Insulating your house (preventing the heat escaping)

Cost: £3000 saves 9kW per day

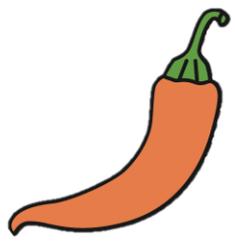
Getting appliances (like fridges and kettles) which are energy efficient.

Cost: £1000 saves 5kW per day



**If you added insulation and energy saving appliances to your energy project how many kW of power would you still need to produce?**

*What other ways can we reduce the amount of energy we use?*



# Insulation and energy efficiency

Reminder:

Wind turbines cost £20,000

Solar panels cost £6,000

Insulation costs £3,000

Energy efficient appliances cost £1,000.

**How much would it cost to build your energy project including insulation and energy efficient appliances?**



*Did anyone find a cheaper method?*

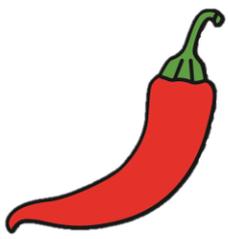
*Did anyone's cost more than their original project before energy saving?*



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# The Final Challenge!

**You have £86,000 to spend. You have space in your house for a maximum of 8 solar panels and a maximum of 4 wind turbines. How much money could you make per year?**

- 1 wind turbine = 14kW per day = £20,000
- 1 solar panel = 6kW per day = £6,000
- Insulation costs: £3,000 saves 9kW per day.
- Energy efficient appliances cost: £1,000 saves 5kW per day.
- You can sell energy at 1kW per day x £500

*Which group made the most money?*

*Were there any advantages or disadvantages of their energy project?*

*Who do you think would need to do calculations like this for their job?*

*What would you need to think about when positioning your solar panels and wind turbines?*