OPITO

Learning Lab©

POWERING THE FUTURE

Electricity 2

Supply & Demand

GLASGOW SCIENCE CENTRE

Registered Scottish charity SC030809

You’re going to be a Data Analyst, using numbers to make decisions about how to generate renewable electricity for Banktown, a fictional town.

Learning Lab©

This table shows how much electricity Banktown needs across one full **morning** in winter.

We call this **electricity demand**.

Using the information in the table, create a bar graph on your worksheet to show electricity demand throughout the day.

Time	Electricity demand (kWh)
1am	20
2am	17
3am	15
4am	15
5am	18
6am	28
7am	40
8am	62
9am	60
10am	60
11am	50
Midday	48

This table shows electricity demand during one full **afternoon** in winter.

Use the information in the table to full in the remaining section of your bar graph.

Time	Electricity demand (kWh)
1pm	50
2pm	45
3pm	48
4pm	60
5pm	75
6pm	82
7pm	83
8pm	80
9pm	80
10pm	75
11pm	50
Midnight	30

Electricity demand changes throughout the day.

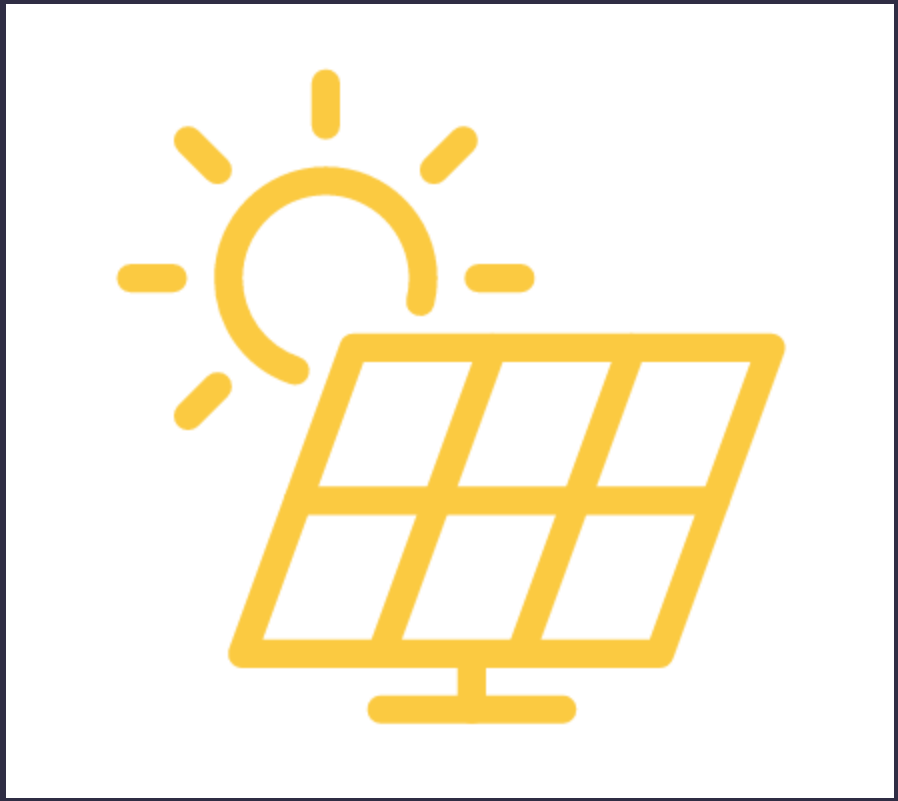
On your worksheet, write full sentences to explain why these changes happen at certain times of day.

For example, from midnight to 6am electricity demand is low because most people are asleep and they are not using electricity.

Learning Lab©

Banktown's electricity comes from a power station that burns fossil fuels. The local council are interested in installing renewable technologies to meet electricity demand.

They have decided to investigate if a solar panel farm would be suitable.

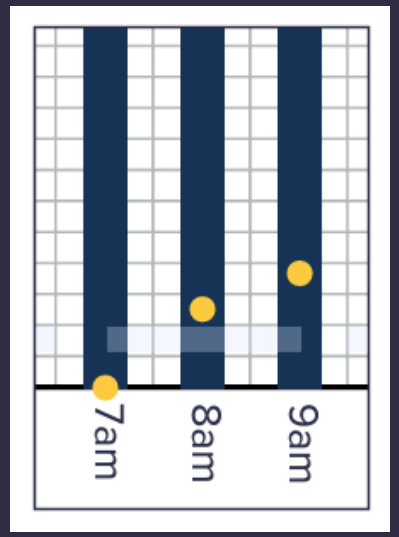


This table shows how much electricity could be generated by a solar panel farm built near the town.

We call this **electricity supply**.

Using the information in the table, add points to your bar graph to show how much electricity the solar panels can generate in the morning.

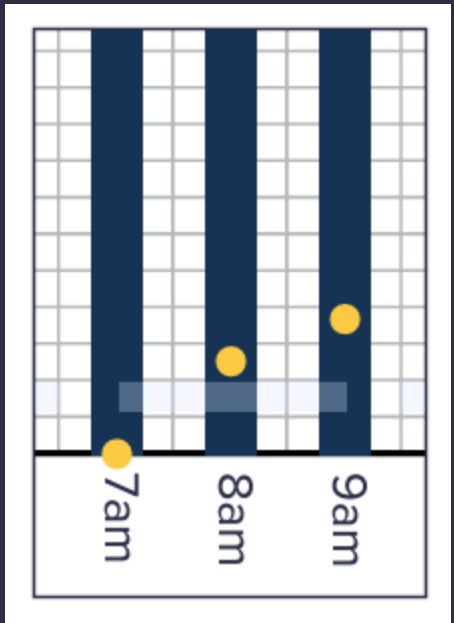
For example:



Time	Electricity demand (kWh)
1am	0
2am	0
3am	0
4am	0
5am	0
6am	0
7am	0
8am	5
9am	8
10am	35
11am	65
Midday	72

Using the information in the table, add points to your bar graph to show how much electricity the solar panels can generate in the afternoon.

For example:



Time	Electricity demand (kWh)
1pm	75
2pm	77
3pm	68
4pm	62
5pm	7
6pm	0
7pm	0
8pm	0
9pm	0
10pm	0
11pm	0
Midnight	0

There are large parts of the day when solar panels would not generate enough electricity for Banktown.

On your worksheet, write some other ways that Banktown could generate electricity.

Learning Lab©

Supply & Demand - Extension

The times when solar panels cannot generate enough electricity for Banktown are shown in **Table 1** on your worksheet.

Complete the table to show the difference between electricity demand and electricity supply at these times of day.

The first row has been completed for you.

Time	Electricity demand (kWh)	Electricity supply (kWh)	Electricity demand – electricity supply
1am	20	0	20 – 0 = 20
2am	17	0	
3am	15	0	
4am	15	0	
5am	18	0	
6am	20	0	
7am	40	0	
8am	62	5	
9am	60	8	
10am	60	35	
5pm	75	7	
6pm	82	0	
7pm	83	0	
8pm	80	0	
9pm	80	0	
10pm	75	0	
11pm	50	0	
Midnight	30	0	
Total electricity that can't be generated using solar panels			_____ kWh

Next, complete the final row by adding each of your answers.

This will show Banktown's total electricity demand that cannot be supplied using solar panels.

The times when solar panels **can** generate enough electricity for Banktown are shown in **Table 2** on your worksheet.

Complete the table to show the difference between electricity supply and electricity demand at these times of day.

The first row has been completed for you.

Time	Electricity demand (kWh)	Electricity supply (kWh)	Electricity supply – demand
11am	50	65	65 – 50 = 15
Midday	48	72	
1pm	50	75	
2pm	45	77	
3pm	47	68	
4pm	60	62	
Total electricity from solar panels that could be wasted			_____ kWh

Next, complete the final row by adding each of your answers.

This shows how much electricity can be generated using solar panels, but might be wasted because it isn't needed.

Learning Lab©

Electricity that is generated using renewable technologies can be stored in large batteries. We can then use it when it is needed.

If Banktown installed some of these batteries, it would reduce the amount of additional electricity the town would need to generate.

Using your answers from Table 1 and Table 2, calculate how much electricity Banktown would still need to generate.

Total electricity that can't be generated using solar panels	_____ kWh

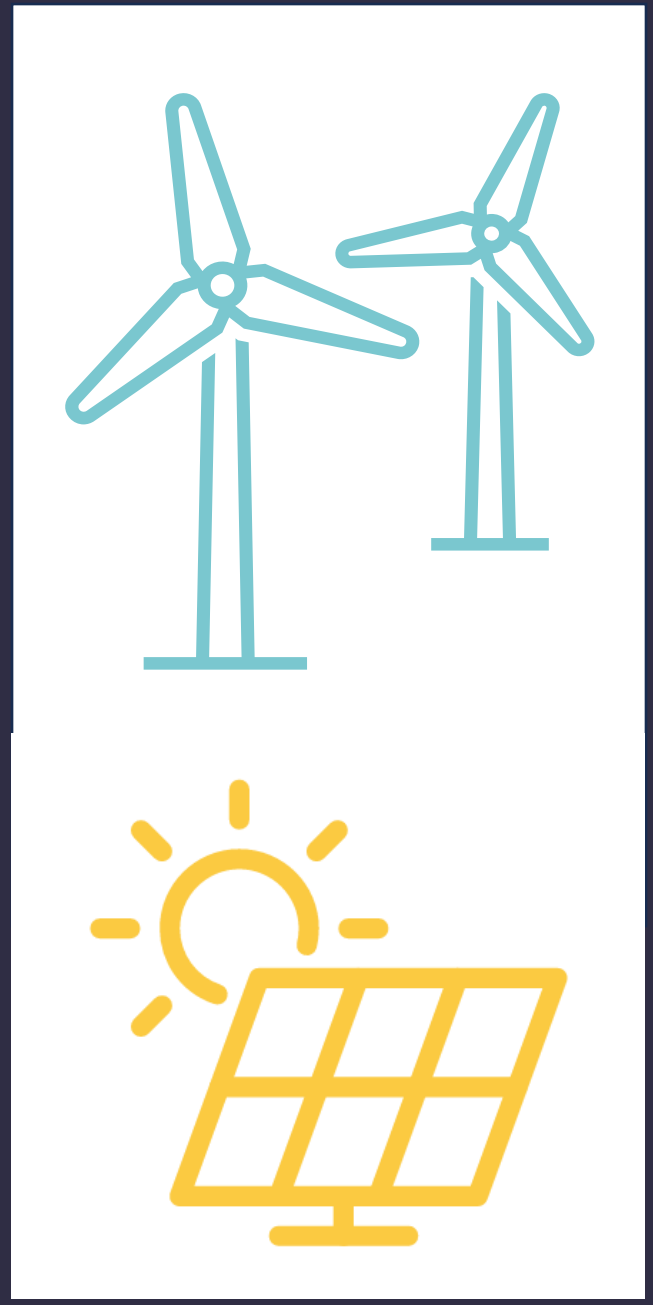
Total electricity from solar panels that could be wasted	_____ kWh

The Banktown council have decided to use an energy mix to generate electricity for the town.

Their energy mix is made up of solar panels and wind turbines.

Why is it important for different towns and countries to use an energy mix?

Write your answer on the worksheet.



Learning Lab©

OPITO

Learning Lab

Learning Lab

from Glasgow Science Centre

POWERING THE FUTURE

ABERDEEN SCIENCE CENTRE

dundee science centre

SCIENCE SKILLS ACADEMY
ACADAMAIDH SGILEAN SAIDHEANS

Life Science Centre

GLASGOW SCIENCE CENTRE

Registered Scottish charity SC030809