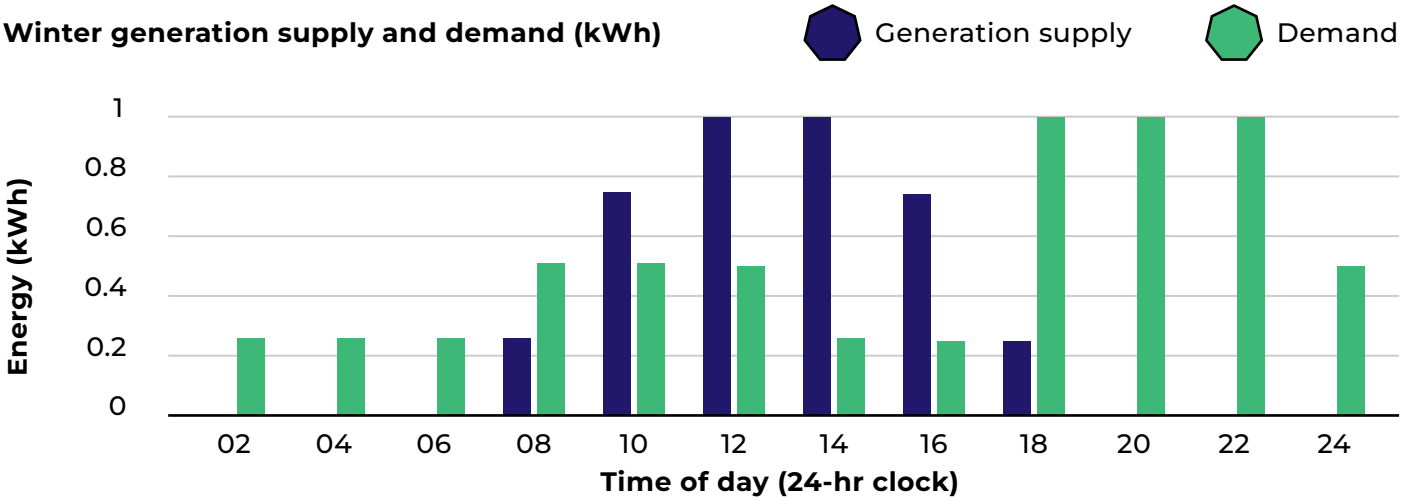
Activity sheet 7

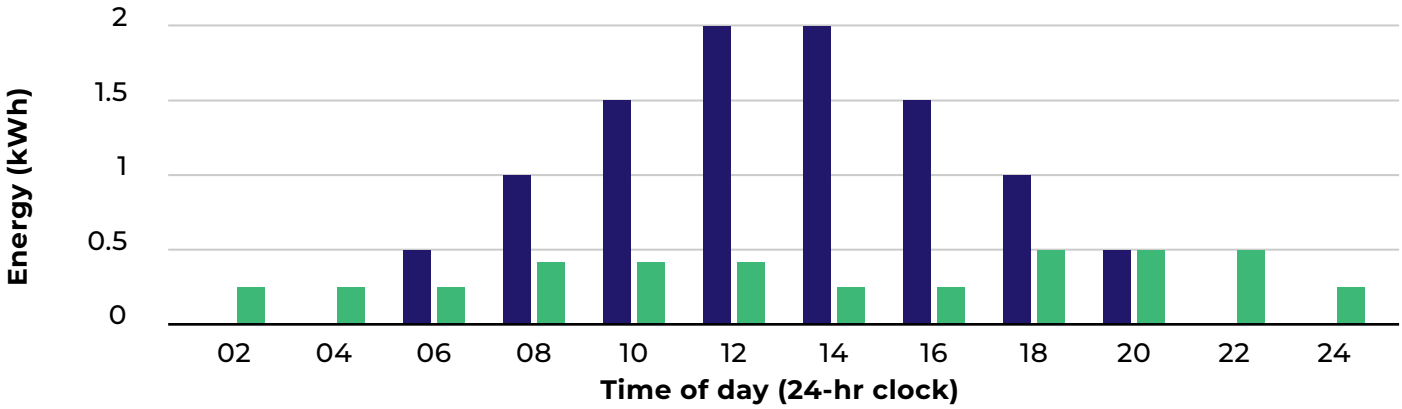
The charts show a home's daily electricity production and consumption patterns. Each bar represents the average supply or demand in kWh across 12 x 2-hour periods.

What qualitative information does the general shape of each chart provide? Annotate each chart with your ideas.

Winter generation supply and demand (kWh)



Summer generation supply and demand (kWh)



What is the total demand and supply per day?

	Demand	Supply
Winter:		
Summer:		

What minimum and maximum battery storage does this data suggest?

Min:

Max:

Activity sheet 8

The homeowner buys an electric vehicle (EV) with a **60 kWh battery**. Their home charging point can deliver **7.4 kW maximum charge rate** to the EV.

When is the owner most likely to charge the EV?

How long would a full charge take?

How long would a 20% top-up take?

The owners' daily electricity use is **5 kWh**. The range of the EV is **240 miles**.

How does supplying 1 kWh of power to the house affect the range?

There are **477,000 pure EVs** in the UK as of mid-2022.

Assuming they have the same 60 kWh average battery size, what is the total demand if 80% need a 20% top-up while 20% need a full charge?

80% topping up:

20% full charge:

Total demand:

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Battery technologies

Activity sheet 9

Challenges to the national grid include:

- **increasing dependency on intermittent renewable energy sources**
- **increasing electric vehicle (EV) charging**
- **the need to become more resilient.**

How can national and local grid storage help to overcome these three challenges?

The UK is predicted to need **50 GW** of grid storage by 2050. Complete the grid to show how you would divide **50 GW** across four sizes of installation and four timescales.

	5 MW	50 MW	100 MW	500 MW
1 hour				
2 hours				
5 hours				
10 hours				

Calculate your total capacity in GWh:

Briefly justify how you have divided up the total capacity: