4.3 Energy Resources & Electricity Generation

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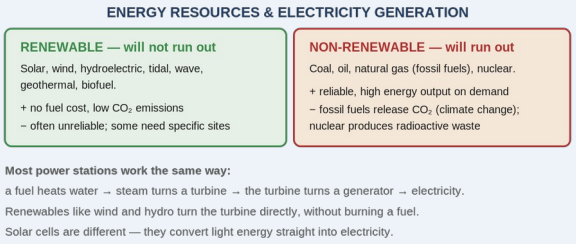
1. KEY VOCABULARY

TERM	MEANING
Renewable	An energy resource that will not run out.
Non-renewable	An energy resource that will run out (a finite supply).
Fossil fuel	Coal, oil or natural gas — formed from ancient organisms.
Turbine	A wheel turned by steam, wind or water to drive a generator.
Generator	A machine that turns kinetic energy into electricity.

2. RENEWABLE vs NON-RENEWABLE



3. THE TWO GROUPS

Renewable: solar, wind, hydroelectric, tidal, wave, geothermal, biofuel.
Non-renewable: coal, oil, natural gas (fossil fuels) and nuclear.

4. HOW A POWER STATION WORKS

1. A fuel is burned (or a nuclear reaction) to heat water into steam.
2. The steam turns a turbine.
3. The turbine turns a generator, which produces electricity.

Wind and hydro turn the turbine directly — no fuel burned.

5. WEIGHING THEM UP

Fossil fuels: reliable, high output — but release CO_2 and will run out.
Nuclear: reliable, no CO_2 — but produces radioactive waste.
Renewables: clean and will not run out — but often less reliable.

6. THE WHY

Why we still use fossil fuels despite the drawbacks: they give a large, reliable output on demand, which many renewables cannot yet match.
Why solar cells are different from other resources: they convert light energy straight into electricity — no turbine or generator needed.

7. COMMON EXAM MISTAKES

✗ "Nuclear power is renewable."
✓ Nuclear is non-renewable — uranium fuel is finite.
✗ "Renewable means it produces no pollution at all."
✓ Renewable means it will not run out — impacts still vary.
✗ "Wind turbines burn a fuel."
✓ Wind turns the turbine directly — no fuel is burned.

8. SELF-CHECK · cover & quiz

Can you…

1. Define renewable and non-renewable?
2. Sort the main energy resources into the two groups?
3. Describe how a typical power station generates electricity?
4. Give an advantage and a disadvantage of fossil fuels?
5. Explain why nuclear is non-renewable?
6. Explain how solar cells differ from other resources?