AP ENVIRONMENTAL SCIENCE • EXERCISE SHEET

6.12 Wind Energy

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

Objective

Build the skills to answer exam questions on **wind energy**.

You must be able to:

- describe how **wind turbines** 风力涡轮机 generate electricity
- state advantages and disadvantages
- explain intermittency and siting issues

1 Worked examples

Study these first. Each one shows the method for a question type used later —follow the steps and you can do the Practice and Exam-style questions yourself.

How it works

Wind turbines use moving air to spin blades connected to a generator, producing electricity. Wind is a **renewable**, low-carbon source.

Advantages

- Renewable, **no CO_2** during use, no fuel cost.
- Land between turbines can still be farmed.

Disadvantages

- **Intermittent** —only works when the wind blows (needs storage/backup).
- Can **harm birds and bats**; noise and visual impact.
- Best only in consistently **windy** locations (coasts, plains, ridges).

A worked judgement

A wind farm on a windy coast provides clean power and lets the land below stay in use, but produces nothing on calm days and may affect local birds.

2 Practice

Now apply the methods above.

2.1 What spins a wind turbine's blades? [1]

2.2 State one advantage of wind energy. [1]

2.3 State one disadvantage. [1]

3 Exam-style questions

3.1 A disadvantage of wind power is that it is [1]

- **A** a major CO_2 source
- **B** intermittent (depends on wind)
- **C** nonrenewable
- **D** available everywhere equally

3.2 A region installs a large wind farm.

(a) State one benefit and one drawback. [2]

(b) Explain how the intermittency problem could be managed. [2]

3.3 Explain why wind energy is considered renewable and low-carbon. [2]

4 Go further

You are now ready for the real exam questions on this subtopic:

- work through the **6.12 Wind Energy** lesson on the **Learn** page;
- read the **Wind Energy** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 Moving air (wind).

2.2 Any one: renewable, no CO_2, no fuel cost, land still usable.

2.3 Any one: intermittent, harms birds/bats, noise/visual impact, location-limited.

3.1 B —intermittent (depends on wind).

3.2 (a) Benefit: clean, renewable power / dual land use; drawback: intermittent or harms birds. (b) Store surplus energy (batteries) or combine with other sources/backup for calm periods.

3.3 Wind is continually renewed by the Sun-driven atmosphere and burns no fuel, so it emits no CO_2 during operation.