Unit 301: Understand the fundamental principles and requirements of environmental technology systems

Worksheet 6: Micro wind (Tutor)

Using your notes and the internet (refer to Resource 1, 'Micro-renewable energies') answer the following questions:

1. In small groups and using the internet, discuss the planning requirements, including Building Regulations for micro wind systems.

Defined as 'permitted development' so planning permission not required in England and Scotland providing certain criteria are met including:

For building-mounted turbines, the criteria include:

- **the house is detached**
- **the top of the turbine blades is no more than three metres above the top of the house, or 15 metres above the ground**
- **all of the turbine is at least five metres from the edge of the householder's property.**

For pole-mounted turbines, the criteria include:

- **the top of the turbine is no more than 11.1 metres above ground**
- **all of the turbine is at least 1.1 times the height of the turbine away from the edge of the householder's property.**

And for both types of turbine:

- **there is no other wind turbine and no air source heat pump on the site**
- **the bottom of the blades is at least five metres above ground**
- **the turbine's swept area is no more than 3.8m^2**
- **the site is not on land safeguarded for aviation or defence purpose.**

The installation of solar PV panels on the roof on a house needs to comply with Building Regulations including Part A on Structural Safety.

2. List the **two** main types of micro wind turbine arrangement.

1 Horizontal axis wind turbine

2 Vertical axis wind turbine

3. What is the purpose of the 'inverter' in a micro wind system?

It detects when there is sufficient output from the wind turbine and converts this d.c. output to a.c. that matches the supply a.c. including magnitude and frequency.

It also monitors the supply and immediately disconnects the solar PV panels if there is a power cut.

4. List **seven** advantages of micro wind systems.

- **The wind is free and genuinely renewable and with modern technology it can be captured efficiently.**
- **Benefit from the Government feed-in tariff.**
- **The feed-in tariff is guaranteed by the Government for 20 years.**
- **Producing your own power protects against rising energy prices.**
- **Once the wind turbine is built the energy it produces does not cause green house gases or other pollutants.**
- **Although wind turbines can be very tall each takes up only a small plot of land.**
- **Remote areas that are not connected to the electricity power grid can use wind turbines to produce their own supply.**

5. List **four** disadvantages of micro wind systems.

- **The strength of the wind is not constant.**
- **Wind turbines can be noisy and building mounted ones can cause vibration.**
- **When wind turbines are being manufactured some pollution is produced.**
- **It may be beneficial to replace the inverter after 10 years.**