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

Worksheet 8: Micro-combines heat and power (heat-led) (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-CHP systems.

Planning permission not generally required as all the work is internal. However, while external flues are generally classed as permitted development exceptions do exist. These include:

- **Flues on the rear or side elevation of the building are allowed to a maximum of one metre above the highest part of the roof.**
- **If the building is listed or in a designated area even if you enjoy permitted development rights it is advisable to check with your local planning authority before a flue is fitted. Consent is also likely to be needed for internal alterations.**
- **In a conservation area or in a World Heritage site the flue should not be fitted on the principal or side elevation if it would be visible from a highway.**

The installation of micro-CHP must satisfy the requirements of Part L of the Building Regulations that covers the requirements with respect to Conservation of fuel and power.

Additionally, other aspects of the work such as electrical installation and plumbing work will also have to comply, eg Part J (Heat Producing Appliances) and Part P (Electrical Safety).

2. List **four** technologies that can be used for micro-CHP.

Stirling engine

Rankine engine

Internal combustion engine

Fuel cells

3. Briefly describe the operation of a stirling engine.

A sealed cylinder containing a gas (such as helium) is heated at one end by the burning gas and then cooled at the other by the return heating water so that it expands and subsequently contracts and is arranged to actuate a piston to drive an electrical generator.

4. List **five** advantages of micro-CHP systems.

- **When the micro-CHP is generating heat, the unit will also generate electricity to be used in the home (or exported).**
- **By generating electricity on-site the consumer could be saving carbon dioxide compared with using grid electricity and a standard heating boiler.**
- **Micro-CHP is eligible for feed-in tariffs.**
- **For the householder, there is very little difference between a micro-CHP installation and a standard boiler.**
- **Servicing costs and maintenance are estimated to be similar to a standard boiler – although a specialist will be required.**

5. List **five** disadvantages of micro-CHP system.

- **Micro-CHPs are still in the 'early adaptors' phase, meaning that prices are still relatively high and that the systems are still being adjusted.**
- **The noise production of micro-CHPs is a relatively large problem.**
- **Payback time is still quite high.**
- **Not completely renewable.**
- **Seasonal variations – may be ineffectual in responding to dynamic requirements of users particularly coping with seasonal variations; often producing excess heat during the summer period.**