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

Worksheet 3: Air source heat pump (Tutor)

Using your notes and the internet (refer to Resource Micro-renewable energies ¶ D Q V Z H U W K H following questions:

1. Describe the principle of operation of an air source heat pump system.

Air source heat pumps produce domestic hot water from heat from the air.

Air is drawn in to the evaporator unit usually outside the premises. Cold liquid refrigerant passes through a heat exchanger (evaporator) that absorbs the heat from the air and evaporates into gas. The gas is then compressed raising it to a higher temperature.

This hot gas then passes through a second heat exchanger (condenser) and gives up its heat to the surrounding atmosphere (a water or air heating circuit) before it is condensed into liquid.

The condensed refrigerant liquid still at high pressure and still hot, is then forced through an expansion valve which causes it to rapidly cool through evaporation. The now cool refrigerant liquid is ready to absorb more heat from the evaporator causing the liquid refrigerant to evaporate into gas.

The air source heat pump turns a large amount of slightly hot liquid into a small amount of very hot liquid.

Whilst energy is used (electricity) to power the circulating pump and compressor, about four to five times the energy is produced in the form of water or air heating.

2. In small groups, discuss the planning permission requirements for air source heat pumps including whether installation is covered by permitted development and write down your findings below,

Most householders can carry out small extensions or additions to their homes permitted development

Fitting a ground source heat pump in a house or a block of flats is classed as permitted development.

While planning permission is unlikely to be needed certain limits have to be met.

© 2015 City and Guilds of London Institute. All rights reserved.

Level 3 Diploma in **Electrical Installations (Building and Structures)**