



## **National Unit specification: general information**

**Unit title:** Building Services Engineering: Introduction to Energy  
(SCQF level 4)

**Unit code:** FT86 10

**Superclass:** TH

**Publication date:** August 2011

**Source:** Scottish Qualifications Authority

**Version:** 01

### **Summary**

This is a mandatory unit of the Skills for Work Building Services Engineering Award and is suitable for candidates with no previous engineering, technical or employment experience. The candidate will be introduced to and learn to identify the main types of energy and their sources as well as the fundamentals of energy conservation as they apply to the household building services engineering (BSE) sector. Candidates will also learn the main types of material disposal as they apply to the BSE sector.

### **Outcomes**

- 1 Describe the main types, sources and operating principles of energy and the reasons for reducing carbon emissions from households.
- 2 Explain the methods and types of energy conservation and material disposal.

### **Recommended entry**

Entry is at the discretion of the centre.

### **Credit points and level**

1 National Unit credit at SCQF level 4 (6 SCQF credit points at SCQF level 4)

## **General information (cont)**

**Unit title:** Building Services Engineering: Introduction to Energy  
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### **Core Skills**

Opportunities to develop aspects of Core Skills are highlighted in the support notes of this Unit specification.

There is no automatic certification of Core Skills or Core Skill component in this Unit.

## **National Unit specification: statement of standards**

**Unit title:** Building Services Engineering: Introduction to Energy  
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Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

### **Outcome 1**

Describe the main types, sources and operating principles of energy and the reasons for reducing carbon emissions from households.

#### **Performance Criteria**

- (a) Describe the two main types of energy used in households.
- (b) Describe sources of energy that can be used in households.
- (c) Illustrate the main reasons for reducing carbon emissions from households and the contribution being made by the BSE sector to achieve it.

### **Outcome 2**

Explain the methods and types of energy conservation and material disposal.

#### **Performance Criteria**

- (a) Explain the basic working practices associated with energy conservation and environmental protection.
- (b) Explain the main methods of conserving water and reducing wastage of water.
- (c) Explain the main types of material disposal.

### **Evidence Requirements for this Unit**

Evidence is required to demonstrate that the candidate has achieved all Outcomes and Performance Criteria.

Written and/or oral evidence should be produced to demonstrate that the candidate has achieved all the Outcomes and Performance Criteria. The evidence should be produced in the form of open-book supervised and controlled conditions.

The evidence may be produced by one or more than one assessment covering all Outcomes.

## National Unit specification: statement of standards (cont)

**Unit title:** Building Services Engineering: Introduction to Energy (SCQF level 4)

### Outcome 1: Written and/or oral evidence

Candidates must correctly describe two of the main types of energy used in households in terms of the carbon footprint, from the following:

- ◆ High carbon energy sources from: natural gas/LPG, fuel oils, solid fuels (coal and peat), electricity (from non-renewable sources).
- ◆ Low carbon energy sources from: solar thermal, solid fuel (biomass), hydrogen fuel cells, heat pumps, combined heat and power (CHP), combined cooling, heat and power (CCHP).
- ◆ Zero carbon energy sources from: electricity (wind), electricity (tidal), hydroelectric, solar photovoltaic.

Candidates must also explain all of the following:

- ◆ The main reasons for reducing carbon emissions from households.
- ◆ How building services engineering industries are working to reduce carbon emissions from households.
- ◆ How and where to get more guidance and advice on energy saving and conservation techniques.

Candidates must also identify the basic operating principles of installations containing environmental energy sources, including solar thermal, wind turbine, solar photovoltaic.

### Outcome 2: Written and/or oral evidence

Candidates must explain all of the following:

- ◆ The working practices associated with energy conservation and environmental protection, including planning work activities, accurate measurement and cutting, reuse of off-cuts.
- ◆ The basic working practices associated with water conservation within households, including three of the following:
  - flow reducing valves, spray taps, low volume flush WC
  - methods and reasons for capturing surface water
  - promoting user awareness
  - recycling used water
  - regular maintenance of terminal fittings and float valves
- ◆ The methods and processes of safely disposing of waste materials associated with licensed waste disposal; waste carriers license; recycling.
- ◆ The implications and dangers associated with incorrect waste disposal.

## **National Unit specification: support notes**

**Unit title:** Building Services Engineering: Introduction to Energy (SCQF level 4)

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

### **Guidance on the content and context for this Unit**

The content and context of this Unit is at a basic, introductory level. The main purpose of the Unit is to make candidates aware of, and prepare for employment within, the BSE sector in any of the main occupational areas of plumbing, electrical, heating and ventilating, refrigeration and air conditioning.

Outcome 1 covers the main types of energy used in households where these are categorised by their carbon footprint as high carbon, low carbon and zero carbon. The candidate will develop an understanding of the range of energy types and the main reasons for reducing carbon emissions from households. The candidate will also develop an understanding of the contribution being made by the BSE sector to reduce carbon emissions and of the basic operating principles of low and zero carbon environmental energy sources. The candidate will develop an understanding of how and where to get more guidance and advice on energy saving and conservation techniques.

Outcome 2 covers the basic working practices associated with energy conservation and environmental protection as well as the key area of water conservation within households. The candidate should be encouraged to consider the implications of non-compliance with appropriate waste disposal methods.

### **Guidance on learning and teaching approaches for this Unit**

Candidates should be given opportunities to work towards Outcomes in an integrated way whenever possible.

Practical activities should be teacher/lecturer-led in that all equipment, techniques and processes should be explained, demonstrated and thoroughly understood before (candidate) commencement. Demonstrations should be clear, logically sequenced and reflect current safe working practices to ensure candidate understanding.

### **Opportunities for developing Core Skills**

Throughout this Unit there may be opportunities for candidates to develop the Core Skill of *Communication* at SCQF level 4. This may be possible whilst the candidate is describing and explaining the responses during the assessment process.

## **National Unit specification: support notes (cont)**

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### **Guidance on approaches to assessment for this Unit**

An integrated approach to assessment across the outcomes in this Unit is suggested. If this is being delivered as part of the Skills for Work award the use of holistic assessment with other applicable Units is suggested. In addition, the project-based approach may be used to gather evidence of candidate achievement. Centres may also wish to develop the employability skills of the candidates through role-play techniques where appropriate.

Candidates could be assessed on their knowledge and understanding of the main types of energy and sources of energy used in the BSE sector by using a questioning method such as restricted response/short answer questions. This will ensure that candidates have the knowledge and understanding. It is also recommended that the questions used should sample across the PCs.

### **Opportunities for the use of e-assessment**

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by information and communication technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

### **Disabled candidates and/or those with additional support needs**

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website [www.sqa.org.uk/assessmentarrangements](http://www.sqa.org.uk/assessmentarrangements)

## History of changes to Unit

Version	Description of change	Date

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