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Energy Efficiency Commitment 2002-2005

Technical Guidance Manual Issue 2

September 2002

Summary

This is the second edition of the Technical manual for the Energy Efficiency Commitment (EEC). It provides technical guidance to obligated suppliers for the installation of energy efficiency measures under the EEC. Chapter 1 outlines the rationale for this document; Chapter 2 explains the scheme coding format and Chapters 3 to 8 provide guidance on the installation of specific energy efficiency measures by EEC schemes.

In Chapters 3 to 8 any relevant criteria that must be adhered to when installing specific measures is noted. These details are provided as guidance only and are not intended to be comprehensive as all schemes can vary in their design**. It is the responsibility of each energy supplier to ensure that they have carried out their projects in accordance with appropriate EEC legislation and other relevant legislation.** Where appropriate, reference is made to relevant British Standards or guidance notes. An overview of British Standards is available at the BSI website at http://bsonline.techindex.co.uk/. Copies of the Standards can also be ordered through this site.

The accredited energy savings associated with insulation, lighting and heating measures are displayed in the 'EEC Scheme Spreadsheet' provided by Ofgem. Energy savings values for insulation and heating measures have been derived from the BREDEM model. These savings are displayed in an Excel spreadsheet entitled 'EEC Energy Savings Data' which is provided to energy suppliers separately to this document. The Building Research Establishments' (BRE) assumptions for these energy savings values are summarised in the report contained in Appendix 1 of this document.

The administration procedures for EEC are set out in Ofgem's document entitled 'Energy Efficiency Commitment Administration Procedures', dated December 2001. The document can be viewed on the Ofgem website – www.ofgem.gov.uk – by selecting Areas of Work, Current Projects, Energy Efficiency and Publications.

This Technical Manual will be used as a working document throughout the course of EEC, and will be subject to ongoing review and updates.

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1. Rationale

1.1. The Energy Efficiency Commitment (EEC) is a three-year programme, which forms an important part of the Government's Climate Change Programme and the Fuel Poverty Strategy. The EEC began in April 2002 and follows on from the Energy Efficiency Standards of Performance (EESoP) which began in 1994.

1.2. The EEC is an energy saving target, set by the Department of Environment, Food and Rural Affairs (DEFRA), and requires all energy supplier groups with 15,000 or more domestic customers to improve the energy efficiency of the housing stock in Great Britain. The overall target of 62 TWh has been apportioned between the obligated supplier groups and the individual suppliers will be required to meet their target by encouraging or assisting domestic customers to install energy efficiency measures in their homes. At least 50% of the energy savings must be targeted at customers receiving certain benefits or tax credits.

1.3. Ofgem is required to carry out a number of determinations in the course of administering the EEC. Of these, two are particularly relevant to the accreditation of energy savings for energy efficiency improvements. First, Ofgem is required to determine whether any proposed action qualifies for the purpose of achieving the whole or any part of a supplier's energy efficiency target. Secondly, if the action does qualify, Ofgem is required to determine what improvement in energy efficiency is to be attributed to the proposed action.

1.4. To enable Ofgem to determine which actions qualify, suppliers submit schemes to Ofgem for approval. Suppliers are required to provide information on the numbers and types of planned measures together with details of the proposed delivery route for the scheme. Determination of energy savings for the individual measures will be based on information collected from recognised sources. The accredited energy savings associated with insulation, lighting and heating measures are included in the "EEC Scheme Spreadsheet" provided to all obligated suppliers by Ofgem.

1.5. This document is intended to facilitate the approval process of suppliers' planned activity by providing comprehensive technical guidance on all

measures currently classed as qualifying action. In particular, the document includes:

- the appropriate methodology for calculating the energy savings attributable to a measure or, alternatively, the improvement in energy efficiency for non standard measures;
- the lifetime of the measure over which energy savings can be claimed;
- details of relevant British Standards for the measure; and
- if relevant, any specific requirements or restrictions on the delivery route for the measure.

1.6. This Technical Manual should be used in conjunction with the 'Energy Efficiency Commitment Administration Procedures', dated December 2001, and the 'EEC Scheme Spreadsheet'. The Administration Procedures document can be viewed at http://www.ofgem.gov.uk/newprojects/energyeff_pubs.htm.

1.7. The Technical Manual will be used as a working document throughout the course of the EEC and will be subject to ongoing review and updates. Issue 1 of the document was published in February 2002. Additions and revisions included in Issue 2 are:

- additional sections for heat recovery ventilation, fuel switching and ground source heat pumps;
- the inclusion of energy savings for solar water heating;
- the revision of energy savings for wet appliance trade-in schemes based on 2001 sales data and the additional calculation of energy savings for wet appliance incentive schemes.
- amendments to the boiler and heating control sections in light of Part L of the revised Building Regulations; and
- additional guidance for obtaining energy savings for new or innovative measures.

1.8. The Technical Guidance Manual will be updated when any new or additional information regarding the measures contained within the following chapters is brought to the attention of Ofgem, or when new measures are approved as qualifying action.

2. Scheme Codes

2.1. When submitting schemes to Ofgem for approval, a code must be displayed to identify the supplier involved, the year of submission, the measures employed and the sequential scheme number. Each scheme must have a unique code.

2.2. The scheme code must be entered on the written pro forma. The format of the code shall be as follows:

AAAA BB C DD E

Where:

AAAA is the supplier code

BB is the year of submission. For example, 2002 is 02

C is the measure type

DD is the sequential scheme number. For example the first scheme submitted will be 01, the second 02 etc.

E is the spreadsheet type

2.3. There should be no forward slashes or any other punctuation between the different parts of the scheme code. For example, AMER02A01.

2.4. The supplier group codes are as follows.

Supplier group	Supplier code
Amerada	AMER
British Gas Trading	CENT
Cambridge Gas	CAMB
Dee Valley Group	ESUK
LE Group	LOND
Npower	NPOW

Powergen	PGEN
Seeboard	SEEB
Scottish and Southern Energy	SSEN
ScottishPower	SCOT
TXU Energi	TXUE

2.5. The project measure types are as follows.

A Appliances	**L** Lighting
H Heating (inc. boilers and controls)	**M** Mix of measure types
I Insulation	**O** Other
T Traded energy savings	**E** EESoP 3 carry-over

Scheme Spreadsheet codes

2.6. As a scheme may have several different delivery mechanisms, possibly including both energy services and conventional routes, the associated scheme submission or completion may have multiple Scheme Spreadsheets. To acknowledge this, each spreadsheet must also have a unique code. The spreadsheet code essentially follows the scheme code format with one extra character.

2.7. The spreadsheet types are as follows:

C	A conventional delivery route
E	An energy services delivery route that qualifies for, and has been awarded, the 50% uplift in energy savings
N	An energy services delivery route that qualifies for, but has not been awarded, the 50% uplift in energy savings. A scheme may

	be submitted as type N if the supplier group has already reached the 10% target threshold for the uplift in savings.
T	A trade of energy savings between supplier groups.
S	Energy savings that have been achieved during Energy Efficiency Standards of Performance (EESoP) 3 projects and are being carried over towards the EEC target.

2.8. Schemes involving multiple spreadsheets must only involve spreadsheet types C, E and N. Trade and carry-over schemes cannot involve multiple spreadsheets.

3. Insulation Measures

Loft insulation

General Information

3.1. Loft insulation provided under EEC schemes should ideally be installed to a depth of 250mm. Suppliers may be accredited for depths of less than 250mm in circumstances where it is physically impossible or unsafe to install 250mm or if the householder requests a lesser amount.

3.2. All lofts insulated by an EEC scheme must include, where appropriate, loft boarding in order to provide safe access to the cold water tank. When insulating lofts, the loft hatches must be insulated and draught sealed.

3.3. Cases of condensation in newly insulated lofts have been identified in previous EESoP programmes. There are several factors that can lead to condensation in lofts, such as failing to draught seal the loft hatch or the blocking of loft vents with insulation. Energy suppliers must ensure that their installers take care to minimise the risk of condensation when installing loft insulation.

Lifetime

3.4. The lifetime of loft insulation is assumed to be 30 years.

Relevant British Standards

3.5. There are two British Standards relevant to the installation of loft insulation. These are:

BS 5803 Part 1: 1985 "Thermal insulation for use in pitched roof spaces in dwellings. Specification for man made mineral fibre thermal insulation mats." This specifies the standard loft insulation materials must meet to be eligible for installation under EEC.

BS 5803 Part 5: 1985 "Thermal insulation for use in pitched roof dwellings." Specification for installation of man-made mineral fibre and cellulose fibre

insulation. This standard specifies the requirements when installing loft insulation in pitched roof dwellings.

3.6. In addition to these requirements, good practice when insulating roof spaces requires the insulation of the cold water tank and associated pipe work. The relevant British Standard is:

BS 5422: 2001 "Method for specifying thermal insulation materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40°C to +700°C".

DIY Loft insulation

General Information

3.7. DIY insulation schemes will be eligible under EEC. The most appropriate way of calculating the energy savings arising from such schemes is to base them on a 'per square metre' installed basis. Appropriate energy savings values, on a per square metre basis are provided in the EEC Scheme Spreadsheet. There are two different values given for each fuel type, one for 150mm (6") insulation and one for 100mm (4") insulation.

3.8. If the DIY loft insulation scheme is delivered through a mail order route, the supplier should provide appropriate installation guidelines and appropriate safety guidance to all customers ordering loft insulation. As the customer has not visited a DIY store to purchase the loft insulation and has not had access to safety equipment, the supplier should provide a face mask, gloves and goggles at no cost to the customer. It would be preferable to include the safety equipment with each order, but if the supplier can show that the purchase is a repeat purchase and the customer has already been supplied with safety equipment, it will not be necessary to repeat the offer.

3.9. If the DIY loft insulation scheme is delivered through a retail route, the supplier should provide appropriate installation guidelines and appropriate safety guidance to all customers purchasing loft insulation. There is no requirement on suppliers to provide safety equipment due to the issues of repeat purchase.

However, it should be emphasised that safety is an important issue when installing loft insulation and this should be reflected in the written guidance. It is strongly recommended that the written guidance is suitably close to the product and that there is clear signposting to where the safety equipment can be purchased in store.

Lifetime

3.10. The lifetime of DIY loft insulation is assumed to be 30 years.

Cavity Wall Insulation

General Information

3.11. The energy savings associated with cavity wall insulation are displayed in the EEC Scheme Spreadsheet, and also in the Excel spreadsheet entitled 'EEC Energy Savings Data'. Note that the energy savings differ considerably between homes constructed pre 1976 and those constructed post 1976. Installers must therefore determine which of these age bands the property was built in when reporting to energy suppliers, to enable suppliers to accurately report on their completed schemes.

3.12. A Cavity Insulation Guarantee Agency (CIGA) guarantee must be provided to the customer when the insulation work has been completed.

3.13. The energy savings displayed in the EEC Scheme Spreadsheet and the 'EEC Energy Savings Data' are for mineral wool insulation. A supplier can also claim these energy savings for cavity wall insulation with Urea Formaldehyde (UF) foam if manufacture to BS 5617 can be demonstrated. Further details of this British Standard can be found in the Relevant British Standards section for this measure.

3.14. The Health and Safety Executive (HSE) has prepared a briefing note for installers to follow to ensure adequate precautions are taken for the safe installation of cavity wall insulation in gas-heated properties. This is included as Appendix 2 to this document.

Lifetime

3.15. The lifetime of cavity wall insulation is assumed to be 40 years.

Relevant British Standards

3.16. Insulation materials used must be certified by the British Board of Agrement (BBA) and must conform the following British Standards:

BS EN 13162: 2001 "Thermal insulation products for buildings. Factory made mineral wool (MW) products. Specification". This standard replaces the current BS6232.

BS 6676 Part 1: 1986 "Thermal insulation of cavity walls using man made mineral fibre batts (slabs). Specification for man made mineral fibre batts". This is the relevant standard for materials if man-made mineral fibre batts are used as the insulating material when insulating a cavity wall.

BS 6676 Part 2: 1986 "Thermal insulation of cavity walls using man-made mineral fibre batts (slabs). Code of practice for installation of batts (slabs) filling the cavity".

BS 8208: 1985 "Guide to the assessment of suitability of external walls for filling with thermal insulants. Existing cavity construction".

3.17. The relevant British Standard for UF foam is as follows:

BS 5617:1985 "Specification for urea-formaldehyde (UF) foam systems suitable for thermal insulation of cavity walls with masonry or concrete inner and outer leaves".

Draught-proofing

General Information

3.18. When calculating the draught-proofing energy savings, BRE have assumed that only buildings with 'high ventilation rates' should be insulated to merit the accreditation of the energy savings listed in the EEC Spreadsheet. Energy suppliers should

therefore only target homes with 'high ventilation rates' when undertaking draught proofing schemes. Typically, this type of home will be in an exposed position, or have ill fitting or sash style windows.

Lifetime

3.19. The lifetime for draught proofing measures is assumed to be 10 years.

Relevant British Standards

3.20. The British Standard relevant to the materials used for draught proofing is:

BS 7386: 1997 "Specification for draught strips for the draught control of existing doors and windows in housing". This Standard specifies the requirements for products to fit the common types of installed doors and windows in housing not originally designed to incorporate draught stripping.

External and internal solid wall insulation

General Information

3.21. The Excel spreadsheet entitled 'EEC Energy Savings Data' contains energy savings values for internal and external wall insulation, for installation on solid walled properties. The relevant values should be entered into the 'Other Insulation' section of the EEC Scheme Spreadsheet. The guidance given in the notes attached to the 'EEC Energy Savings Data' spreadsheet should be followed, to ensure that the appropriate energy savings are claimed.

3.22. As explained in these notes, two different sets of savings are applicable - one set when the U-value of either the internal or the external walls is improved to 0.45W/m^2 ^{o}C and another when improving the U-value of an internal wall to 0.37W/m^2 ^{o}C.

3.23. In addition to these systems, some other solid wall insulation products have had their energy saving capacity independently verified. Please contact Ofgem for details of these products.

3.24. When improving the U-value to 0.45W/m^2 ^oC, the following insulation systems are suitable:

External	35mm urethane foam and render
	45mm extruded polystyrene and render
	60mm expanded polystyrene and render
	60mm mineral wool slab and render
Internal	30mm phenolic foam and plasterboard
	35mm urethane foam and plasterboard
	47.5mm extruded polystyrene and plasterboard
	80mm mineral wool quilt, timber battens and plasterboard

3.25. When improving the U-value of an internal solid wall to 0.37W/m2C, the following insulation system is suitable:

100mm mineral wool quilt, timber battens

Lifetime

3.26. The lifetime of internal and external wall insulation is assumed to be 30 years.

Relevant British Standards

3.27. The following British Standards apply:

BS 5262: 1991 "Code of Practice for External Renderings". This Standard specifies the materials, aspects of design, mixes and methods of application of cement-based renderings to all common types of new and old backgrounds. It also includes advice on the inspection and repair of defective renderings.

BS 8212: 1995 "Code of practice for dry lining and partitioning using gypsum plasterboard". This Standard contains recommendations for materials, design backgrounds and insulation of dry lining to walls, ceilings and partitioning.

BS 5628 Part 3: 2001 "Code of practice for use of masonry. Materials and components, design and workmanship".

Hot water tank insulation

General Information

3.28. Details of the assumptions behind the energy savings for tank insulation are provided in the BRE report, contained in Appendix 1 of this document. The report specifies energy savings for different thickness of insulation for each fuel type. If it is more appropriate to use these values rather than the weighted average figure in the spreadsheet, the data can be entered in the "Other Insulation" section of the relevant worksheet.

Lifetime

3.29. A lifetime for tank insulation is assumed to be 10 years.

Relevant British Standards

3.30. The relevant British Standard for tank insulation is:

BS 5615: 1985 "Specification for insulating jackets for domestic hot water storage cylinders". This Standard specifies the performance, in terms of the maximum permitted heat loss, the materials, design and marking of jackets for cylinders to BS699 and BS1566.

High efficiency hot water cylinders

General Information

3.31. Using EESoP 3 R&D funds, a comparison was made between the energy required to heat 3 different types of hot water cylinders, namely the 'stock average' cylinder, the British Standard cylinder and the 'high performance' cylinder.

3.32. The stock average cylinder was defined by a combination of survey data on insulation and expert opinion on the mixture of tank (i.e. heat exchanger) types in the stock. The British Standard and high performance types are described in 'Central Heating System Specifications', CHeSS (Energy Efficiency Best Practice programme General Information Leaflet 59). Copies of these BRE documents can be downloaded from www.energy-efficiency.gov.uk.

3.33. For dwellings where the water is heated from a gas fired boiler the findings were:

In a property with no primary pipework insulation, the energy saved by replacing a stock average cylinder with a high performance cylinder is **994 kWh/annum**

In a property with insulated primary pipework, the saving from replacing a stock average cylinder with a high performance cylinder is **533 kWh/annum**

In a new house, the energy saved by installing a high performance cylinder rather than a British Standard cylinder is **153 kWh/annum**

3.34. For dwellings with water heated by electric immersion heater the savings are:

181 kWh/annum for replacing a stock average with a high performance cylinder

39 kWh/annum for installing a high performance rather than a British Standard cylinder

3.35. These energy savings values should be entered into the 'other insulation' section of the EEC Scheme Spreadsheet. The cylinders are classed as insulation

measures, because the vast majority of the energy savings result from the high levels of insulation in their design.

Lifetime

3.36. A lifetime of 20 years should be assumed for this measure.

Relevant British Standards

3.37. Installations of hot water cylinders should meet the best practice guidance set out in 'Central Heating System Specifications, CHeSS (Energy Efficiency Best Practice programme General Information Leaflet 59).

Radiator panels

General Information

3.38. The energy savings from radiator panels, on a 'per square metre installed basis,' are **134kWh/a** for gas, LPG and oil heated homes. These savings are attributable to panels installed behind radiators on both external and internal walls. These energy savings are for radiator panels constructed in a 'louvered' or 'saw toothed' fashion (with raised ridges), which is by far the most common method of design. The savings are also based on panels with a reflective surface. If a panel is used which does not have a reflective surface, the energy saving should be taken as **one half** of the above value.

3.39. Radiator panel energy savings should be calculated on a 'per panel' basis. This calculation requires the assessment of the area of the radiator panel, which should then be applied to the data shown above. For example, a panel with a surface area of 0.3 square metres would achieve energy savings of 40.2 kWh when installed. In submitting such schemes, suppliers should indicate the numbers of panels forecast to be installed, therefore allowing the overall scheme savings to be calculated. Suppliers should include a breakdown of their calculations in their Statement of Method for the scheme. The energy savings

values and total area of panel installed should be entered into the 'Other Insulation' section of the EEC Scheme Spreadsheet.

3.40. The energy savings attributable to radiator panels will be revised in the near future, when the results of an energy monitoring exercise currently being undertaken are finalised.

Lifetime

3.41. A measure lifetime of 10 years should be assumed for radiator panels.

Window glazing

General Information

3.42. As of April 2002, the Building Regulations will require all new glazing installations to have a minimum specification of double glazed low-emisivity glass. If an energy supplier wishes to undertake a glazing scheme, they should therefore ensure that the glazing installed possesses additional energy savings benefits to the requirements of the Building Regulations.

3.43. Suppliers should discuss with Ofgem any proposed measures and energy savings values prior to submitting a scheme.

Monitoring Requirements for Insulation Measures

3.44. Quality of installation monitoring for insulation measures must be undertaken on a sample size as specified by Ofgem. The monitoring must be undertaken by a suitably qualified person, and must check that the insulation measure has been installed in line with the relevant standards. Any deficiencies in quality of installation identified must be rectified. Suppliers undertaking DIY schemes should consult the Administration Procedures document or contact Ofgem, as different monitoring requirements may apply.

4. Lighting Measures

General Information

4.1. All CFLs and luminaires used in EEC schemes must be included on the Energy Saving Trust's list of approved CFLs and luminaires, and have achieved Energy Efficiency Recommended status, awarded by the Energy Saving Trust's Endorsement Programme. The approved CFL and luminaire list is circulated on an ongoing basis, as and when revisions are necessary. For confirmation of the current version, contact James Russill at the EST on 020 7654 2475.

4.2. The EEC Scheme Spreadsheet enables the calculation of energy savings arising from the installation of CFLs and luminaires. The relevant part of the 'CFL' worksheet should be used to input the number and lifetime of CFLs and luminaires delivered by the scheme.

Lifetime

4.3. Energy suppliers are required to enter the lifetime of the lamp (in hours) onto the CFL worksheet. The lifetime entered should be as displayed on the approved list. Where the life status is shown as 'ongoing' the manufacturer's claimed lifetime (i.e. as shown on the packaging) should be entered into the spreadsheet.

5. Heating Measures

Boilers

General Information

5.1. Boilers installed by EEC schemes must be a SEDBUK rated 'A' or 'B' model. The SEDBUK database has been set up as part of the Government's Energy Efficiency Best Practice Programme and can be viewed at http://www.sedbuk.com/. It indicates the combustion efficiency of all currently available boilers.

5.2. When evaluating condensing boiler schemes, the energy savings will be based on the combustion efficiency of the new condensing boiler (as provided by SEDBUK) against the minimum combustion efficiency required by the Building Regulations. The minimum SEDBUK values required by the Building Regulations are detailed in the table below.

Table 1: Minimum SEDBUK values required by Part L1 of the Building Regulations

Boiler Type	Minimum SEDBUK Value
Natural Gas	78%
LPG	80%
Oil	85%
Oil – Combi boiler	82%

5.3. The main exception to the above efficiencies are back boilers, for which the minimum SEDBUK efficiency required by the Building Regulations is 3% lower than the minimum SEDBUK value for a standard boiler for each fuel type. For example, the minimum SEDBUK value required for a natural gas back boiler is 75%. The energy savings for back boilers will be based on the SEDBUK combustion efficiency of the new condensing boiler compared against the minimum required combustion efficiency for the back boiler for the relevant fuel type.

5.4. The numbers of boilers installed by a scheme should be entered into the relevant part of the EEC Scheme Spreadsheet (there is a different heating worksheet for each fuel). The worksheets are set to a default combustion efficiency of 88% for condensing boilers. If the energy supplier does not provide the actual combustion

efficiency of the boilers provided by a scheme, this is the efficiency that will be used.

Lifetime

5.5. The lifetime assumed for boilers is 15 years.

Relevant British Standards

5.6. Installations of boilers must meet the best practice guidance set out in 'Central Heating System Specifications, CHeSS (Energy Efficiency Best Practice programme General Information Leaflet 59) and Part L1 of the Building Regulations 2001. "The Domestic Heating and Hot Water Guide to the Building Regulations 2001 – Part L1" can be downloaded at http://www.heatingcontrols.org.uk/.

5.7. Several British Standards also apply:

BS 5440 Part 1: 2000 "Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases). Specification for installation and maintenance of flues".

BS 5440 Part 2: 2000 "Installation and maintenance of flues and ventilation for gas appliances of rated input not exceeding 70kW net (1st, 2nd and 3rd family gases). Specification for installation and maintenance of ventilation for gas appliances".

BS 6798: 2000 "Specification for installation of gas-fired boilers of rated input not exceeding 70kW net".

BS 5449: 1990 "Specification for forced circulation hot water central heating systems for domestic premises".

BS 7671: 2001 "Requirements for electrical installations, IEE wiring regulations, 16th Edition".

Good Practice Guide 284 "Domestic central heating and hot water: systems with gas and oil-fired boilers"; DEFRA, 2000

Heating controls

General Information

5.8. The amended Building Regulations for England and Wales came into force on the 1st April 2002. The Approved Document L1, entitled 'Conservation of fuel and power in dwellings', applies to both new build and existing dwellings and specifies minimum boiler combustion efficiencies and heating control measures. The specified boiler combustion efficiencies are tabulated in Table 1. Energy savings will only be accredited for measures that are additional to these Building Regulations.

5.9. Ofgem acknowledges that the Building Regulations are not prescriptive on how compliance can be achieved. However, it is important to identify a list of measures that can be classed as additional to the Building Regulations, and hence as qualifying action. This will prevent inconsistencies between the obligated energy suppliers and negate any opportunity for a supplier to be unfairly disadvantaged.

5.10. In all cases, new build properties have to comply with the Building Regulations and all heating measures installed under the EEC should not be used to demonstrate compliance with the Building Regulations. All energy savings claimed from boilers and heating control measures must improve the energy efficiency of the property above the minimum level required by the Building Regulations, whichever method of compliance is used.

5.11. In the case of existing properties, the Building Regulations must be complied with when a new boiler or hot water cylinder is being installed. In either of these cases the installer must make reasonable provision to ensure that heating controls are installed to a new house standard. A supplier can be accredited with energy savings from intelligent heating controls and all TRVs in existing dwellings.

5.12. In the case of existing properties, if the heating controls are being upgraded without a boiler or hot water cylinder replacement the supplier may claim

energy savings (based on a stock average boiler efficiency of 67%) for all the heating controls installed.

5.13. The EEC Scheme Spreadsheet should be used to calculate the energy savings from heating controls. The spreadsheet contains options for energy savings from either installing heating controls in tandem with a new boiler or installing controls only. The spreadsheet assumes different packages of controls as follows:

Table 2: Heating Control Packages

	Requirements		
Package A	Hot water tank thermostat	-	-
Package B	Hot water tank thermostat	-	Room thermostat
Package C	Hot water tank thermostat	TRVs	Room thermostat
Package D	Hot water tank thermostat	TRVs	-
Package E	Hot water tank thermostat	TRVs	Delayed start room thermostat
Package F	Hot water tank thermostat	TRVs	Intelligent heating controls

5.14. For clarity, a heating control or control system can be included as 'intelligent' heating controls if its characteristics are such that it

- controls the heating on a basis of room temperature (not system water temperature)
- controls the temperature to *0.3 deg C or better
- anticipates the need to turn the boiler on or off by learning the response of the building
- has integral timing or is linked to an independent time controller

5.15. This includes control systems both with and without external temperature and/or flow temperature compensation.

5.16. A control conforming to the above definition would be classed as Package F on the EEC Scheme Spreadsheet. The energy savings accredited for Package F would not include any energy savings attributable to the hot water tank thermostat as this is required by the Building Controls. Package C/D represents the Building Controls minimum.

Lifetime

5.17. A lifetime of 15 years is assumed for heating controls.

Relevant British Standards

5.18. Relevant Standards and guidance documents for heating controls are:

BS 5499: 1990 "Specification for forced circulation hot water central heating systems for domestic purposes".

BS 7671: 1992 "Requirements for electrical installations, IEE wiring regulations, 16th Edition".

Good Practice Guide 302 "Domestic heating Controls"; DEFRA 2001

Electric heating controls

General Information

5.19. The energy savings from 6 types of electric storage heater controls have been investigated, and the results expressed as a percentage of the space heating energy for a dwelling. The values are displayed in the 'EEC Energy Savings Data' spreadsheet, on the 'Electric Controls' worksheet. The relevant values should be inserted into the 'Heating Controls' section of the 'Electricity' worksheet.

Lifetime

5.20. A lifetime of 15 years is assumed for electric heating controls.

Relevant British Standards

5.21. The following British Standard applies to installations of electric heating controls.

BS 7671: 1992 "Requirements for electrical installations, IEE wiring regulations, 16th Edition".

Solar Water Heating

General Information

5.22. Solar panels, used for the purposes of domestic hot water heating, are an eligible measure for use in EEC schemes. Table 3 illustrates the energy savings attributable to installations of the two different types of solar panel, namely the 'flat plate' and 'evacuated tube' varieties. The savings are presented in two formats. Energy savings for a typical installation are given for the different property types, and the different heating fuels. The savings are also shown on a 'per square metre installed' basis, again for the different heating fuels. Suppliers can enter measures in either format into the EEC Scheme Spreadsheet, using the 'Other Heating' sections of the worksheets.

5.23. Suppliers may find it easier to submit new schemes using the savings estimates for the different property types. Once schemes have been completed it should be possible to calculate the total area of solar panels installed, in which case the 'per square metre' data should be used in the completion report.

Lifetime

5.24. The lifetime of solar water heating is assumed to be 20 years.

Relevant British Standards

5.25. The following British Standards are relevant to the installation of solar water heating.

BS 5918: 1989 "Code of practice for solar heating systems for domestic hot water."

This standard contains recommendations for the design, construction, installation and commissioning of components and systems for domestic hot water preheating for single family dwellings.

BS 6757: 1986 "Methods of test for thermal performance of solar collectors"

This standard describes the test methods for proving the performance of solar panels.

BS EN 12976-1: 2001 "Thermal solar systems and components. Factory made systems. General requirements."

Table 3: Annual energy savings for flat plate collector and evacuated tube solar water heating

FLAT PLATE COLLECTORS		Water Heating Fuel				
		Gas	Electricity	Oil	LPG	Solid
Average kWh/yr saving per square metre of panel		**454**	**304**	**400**	**441**	**553**
Typical dwelling types, average occupancy levels and typical daily hot water requirements	**l/day**	**Energy Saving (kWh/yr)**				
FLAT 2.1	90.5	**1791**	**1200**	**1579**	**1739**	**2182**
MID-TERRACED 2.6	103	**1824**	**1222**	**1608**	**1771**	**2222**
END-TERRACED 2.6	103	**1824**	**1222**	**1608**	**1771**	**2222**
SEMI-DETACHED BUNGALOW 2.2	93	**1791**	**1200**	**1579**	**1739**	**2182**
DETACHED BUNGALOW 2.3	95.5	**1824**	**1222**	**1608**	**1771**	**2222**
SEMI-DETACHED HOUSE 2.9	110.5	**1824**	**1222**	**1608**	**1771**	**2222**
DETACHED HOUSE 3.3	120.5	**1824**	**1222**	**1608**	**1771**	**2222**

EVACUATED TUBE COLLECTORS		Water Heating Fuel				
		Gas	Electricity	Oil	LPG	Solid
Average kWh/yr saving per square metre of panel		**582**	**390**	**513**	**565**	**709**
Typical dwelling types, average occupancy levels and typical daily hot water requirements	**l/day**	**Energy Saving (kWh/yr)**				
FLAT 2.1	90.5	**2214**	**1483**	**1952**	**2150**	**2697**
MID-TERRACED 2.6	103	**2284**	**1530**	**2013**	**2217**	**2782**
END-TERRACED 2.6	103	**2284**	**1530**	**2013**	**2217**	**2782**
SEMI-DETACHED BUNGALOW 2.2	93	**2214**	**1483**	**1952**	**2150**	**2697**
DETACHED BUNGALOW 2.3	95.5	**2284**	**1530**	**2013**	**2217**	**2782**
SEMI-DETACHED HOUSE 2.9	110.5	**2343**	**1570**	**2066**	**2275**	**2855**
DETACHED HOUSE 3.3	120.5	**2378**	**1593**	**2096**	**2309**	**2897**

Heat Recovery Ventilation

General Information

5.26. Energy savings have been calculated for the BAXI EC25 heat recovery ventilation unit and are detailed in Table 4 below. Measure data should be entered in the 'Other Heating' section of the EEC Scheme Spreadsheet. It is important to enter both the correct energy savings and lifetime.

Table 4: Annual energy savings by fuel type for the BAXI EC25 unit

	Gas	Electricity	Oil	LPG	Coal
Annual Energy Savings (kWh)	237	166	213	235	307

Lifetime

5.27. The lifetime for heat recovery ventilation is assumed to be 10 years.

Relevant British Standards

5.28. The following British Standard applies to installations of heat recovery ventilation.

BS 7671: 2001 "Requirements for electrical installations, IEE wiring regulations, 16th Edition."

Ground Source Heat Pumps

General Information

5.29. When calculating the energy savings that can be accredited to ground source heat pumps, it is important to reflect whether the heat pump will replace all of the heating demand or just the majority of the heating demand from conventional electric or fossil fuelled heating systems.

5.30. The energy savings are based on the assumption that a dwelling needs a replacement heating system. If the ground source heat pump was not installed, the homeowner would replace their system with the same type as before - e.g. if they used gas as their heating fuel, they would purchase a new gas boiler.

5.31. The energy required to heat standard dwelling types to a suitable level is illustrated in the spreadsheet entitled 'Energy use data for heat pump calculations.xls'. The data is split by fuel type for gas, coal, oil, electrically and LPG heated homes. The data is shown in terms of the 'heat requirement' of the dwellings, the amount of delivered energy needed to meet this requirement (taking into account heating system efficiency) and the delivered energy shown

in EEC fuel standardised terms. The data is based on the standard dwelling types assumed for all energy saving values under EEC.

5.32. While the heat pump will replace most, if not all, of the energy used by the conventional heating system, it will itself use a quantity of electricity in order to operate. This electricity must be subtracted from the energy savings claimed. The efficiency of ground source heat pumps is referred to as the 'Coefficient of Performance' abbreviated as the 'CoP'. The CoP refers to the amount of useful heat, in kWh, that the heat pump can generate for each kWh of electricity it consumes while operating. For example, a CoP of 3 for space heating and 2.4 for water heating indicates that for each kWh of electricity consumed the heat pump will generate 3kWh of space heating.

5.33. When looking at the delivered energy data in the spreadsheet mentioned earlier, it can be assumed that 80% of this is for space heating and 20% for hot water heating. The overall CoP to assume for the example unit is therefore 3 x 80% + 2.4 x 20%).

Lifetime

5.34. The lifetime that can be claimed for the heat pump unit should be agreed with Ofgem and be backed by supporting evidence from the manufacturer.

Example Calculations

5.35. The following examples shows how the energy savings would be calculated if a ground source heat pump was installed in a gas heated home, and also an electrically heated home. In both cases the dwelling type is assumed to be 3 bedroom semi detached house. There is an example for a unit that is capable of providing 100% of the energy demand, and another example for a unit that is not capable of providing 100% of the energy demand and requires supplementary heating. A CoP of 2.88 is used in the examples.

A heat pump capable of providing 100% of the demand

5.36. This example is based on the assumption that the heat pump will be able to replace all of the dwellings conventional space and hot water heating demand. In this particular example, the heat pump replaces electric storage heating.

Delivered energy to meet heat requirement (@100% efficiency): **19,877 kWh**

Fuel standardised delivered energy (x 0.80): **15,902 kWh**

Heat pump needs to meet 19,877 kWh heat requirement. To calculate the energy consumption of the heat pump this heat requirement should be divided by the CoP of 2.88.

Heat requirement (19,877) divided by CoP (2.88): **6,902 kWh**

Fuel standardised energy consumption by heat pump (6902x0.8): **5,522 kWh**

The energy savings are calculated by comparing the amount of energy that would be consumed by an electric heating system to the energy consumed by the heat pump.

The difference in this example, and therefore the energy saving is:

15,902 kWh - 5,522 kWh: <u>10,380 kWh per annum</u>

A heat pump that requires supplementary heating

5.37. Some heat pumps may only replace 70 - 80% of the total demand. If this is the case, then it must be assumed that the conventional system will fulfil the remainder. In this example, the heat pump can provide 80% of the space and hot water requirements. Supplementary heating will be provided by a gas boiler.

Annual kWh heat requirement with gas boiler: **16,313 kWh**

5.38. In this example, the heat pump would only be meeting 13,050 kWh of the demand and the remaining 3,323kWh would be met by the gas boiler.

The energy savings would therefore be calculated as follows:

Annual kWh heat requirement with gas boiler: **16,313 kWh**

Delivered energy to meet requirement (@78% efficiency): **20,914 kWh**

Fuel standardised delivered energy (x 0.35): **7,320 kWh**

To calculate the energy consumption of the heat pump this heat requirement should be divided by the CoP of 2.88.

Heat requirement (13,050) divided by CoP (2.88): **5,531 kWh (elec.)**

Fuel standardised energy consumption by heat pump (5,531x0.8): **4,425 kWh**

Twenty percent of the demand, 3,323 kWh will still need to be met by the gas boiler. In fuel standardised terms this equates to 1,163 kWh. This should be added to the energy consumption of the heat pump, to give a total energy consumption of 5,588 kWh.

The energy savings in this example are calculated by comparing the amount of energy that would be consumed by a gas boiler to the energy consumed by the combination of heat pump and gas boiler.

The difference in this example, and therefore the energy saving is:

7,320 kWh - 5,588 kWh: <u>1,732 kWh per annum</u>

Monitoring Requirements for Heating Measures

5.39. Quality of installation monitoring for heating measures must be undertaken on a sample size as specified by Ofgem. The monitoring must be undertaken by a suitably qualified person, and must check that the heating measure has been installed in line with the relevant standards. Any deficiencies in quality of installation identified must be rectified.

6. Energy Efficient Appliances

6.1. Efficient cold and wet appliances provided by EEC schemes must be at least 'A' rated, and must also have achieved 'Energy Efficiency Recommended' status, awarded by the Energy Saving Trust's Endorsement Programme. A list of Energy Efficiency Recommended products can be viewed on the Trust's website, at the following link: http://www.saveenergy.co.uk/. Energy Suppliers should contact the Trust if further details of the Endorsement Programme are required or if an appliance they wish to use in a scheme does not appear on the Trust's website. The Energy Efficiency Recommended application process for new appliances is straightforward, and qualifying products that have not yet applied can quickly and easily do so.

6.2. DEFRA have stipulated that a multiplying factor of 1.6 should be applied to the energy savings arising from appliance schemes involving cold and wet appliances. This factor is applied to the savings to account for the market transformation effects of energy efficient appliance schemes, and is automatically incorporated into the cold and wet appliance section of the EEC Scheme Spreadsheet.

6.3. This section explains the methodology for calculating savings for cold and wet appliance schemes. Two principal delivery mechanisms are detailed:

- an incentive to purchase a more efficient appliance; and
- a trade-in of a working appliance.

6.4. Fridgesaver schemes, a variation of trade-in schemes targeted specifically at priority group households, are also detailed. Unlike standard trade-in and incentive schemes, fridgesaver schemes only involve cold appliances.

6.5. Table 5 shows annual energy savings for cold and wet trade-in and incentive schemes. The figures are based on average ‘A’ rated appliance energy consumption, average sales weighted energy consumption and the energy consumption of existing appliance. A supplier may claim these average energy savings or calculate model specific savings using the methodology outlined in

the incentive and trade-in sections. The methodology for calculating energy savings for fridgesaver schemes is outlined in the fridgesaver section.

Table 5: Average energy consumption (kWh/a) by appliance and energy label

	'A' rated	Sales weighted average	Existing appliances	Incentive	Trade-in
Fridge Freezer (Standard)	259	438	785	179	526
Fridge Freezer (Frost Free)	295	516		221	490
Chest Freezer	150	306	559	156	409
Upright Freezer	193	353	594	160	401
Refrigerator (Icebox)	138	214	390	76	252
Refrigerator (Larder)	127	227		100	263
Washing Machine	165	210	237	45	72
Dishwasher (full size)	228	297	415	69	187
Dishwasher (slim line)	176	233	N/A	57	-
Dishwasher (tabletop)	140*	244		104	-

Source: GfK Q4 2001 sales data for the average 'A' rating and sales weighted average; DEFRA Market Transformation Programme website 2002.
Existing appliances assume a new appliance was purchased in 1990 (Lower Carbon Futures, Environmental Change Institute, Oxford, 2000)
*Currently only one A rated model available.

Incentive schemes

General Information

6.6. Customers in the market for a new appliance, normally buy the average product currently sold within the range of energy labels. In this scenario they are incentivised to purchase a more efficient appliance. The savings will be the difference between the sales weighted average consumption and the consumption of the promoted product.

Calculation example

6.7. 'A' rated frost free fridge freezer = 295 kWh/a consumption

Sales weighted average for frost free fridge freezer = 516 kWh/a

Energy Saving = 516 - 295 = 221 kWh/a over a 15 year lifetime

The savings figure to be entered into the EEC Scheme Spreadsheet will therefore be 221kWh/a. DEFRA's 1.6 factor will automatically be applied to this figure.

Non Priority Group Lifetime

- The lifetime for freezers or fridge-freezers is **15 years**.
- The lifetime for refrigerators/larders is **12 years.**
- The lifetime washing machines and dishwashers is **15 years.**

Priority Group Lifetime

- The lifetime for freezers or fridge-freezers is **15 years**.
- The lifetime for refrigerators/larders is **15 years.**
- The lifetime washing machines and dishwashers is **15 years.**

6.8. This is based on the assumption that these priority customers will have used the appliance for a longer time period prior to replacement.

Trade-in schemes

General Information

6.9. Under trade-in schemes, customers are able to trade in a working appliance for a more efficient appliance. To qualify, the appliance is assumed to be working at the time of trade in and then be destroyed (in an environmentally acceptable manner) to avoid entry into the second hand market. The savings will be the difference between the average consumption of the existing population of that particular product and the more efficient product.

6.10. There is a two-fold saving - firstly, by removing the existing, inefficient appliance from the market, the consumption over the remainder of the product life is avoided; and secondly, a more efficient appliance is purchased than would normally be the case. Estimating the remaining lifetime of the existing appliance is subject to considerable uncertainty. On the one hand, it could be argued that

only very old appliances will be traded in, so the lifetime will be relatively short. On the other hand, once an appliance enters the second hand market, its lifetime will tend to be longer than the normal average lifetime. This is borne out by data from Fridgesavers.

6.11. The Energy Saving Trust has analysed a number of scenarios taking account of the two elements of savings. Their conclusion is that a simple basis for estimating the total savings from trade in schemes is to apply the savings from 'existing appliance' to the promoted product for two thirds of the appliance life.

Example calculation

'A' rated frost free fridge freezer provided by the scheme = 295 kWh/a consumption

Existing frost free fridge freezer = 785 kWh/a consumption

Energy saving = 785 - 295 = 490 kWh/a over a 10 year (15 year lifetime for a fridge freezer discounted by 1/3) lifetime.

The savings figure to be entered into the EEC Scheme Spreadsheet will therefore be 490kWh/a. DEFRA's 1.6 factor will automatically be applied to this figure.

Non Priority Group Lifetime

- The lifetime for freezers or fridge-freezers is **10 years**.
- The lifetime for refrigerators/larders is **8 years.**
- The lifetime washing machines and dishwashers is **10 years.**

Priority Group Lifetime

- The lifetime for freezers or fridge-freezers is **10 years**.
- The lifetime for refrigerators/larders is **10 years.**
- The lifetime washing machines and dishwashers is **10 years.**

6.12. This is based on the assumption that these priority customers will have used the appliance for a longer time period prior to replacement.

Fridgesaver schemes

General Information

6.13. Should suppliers decide to implement a copy of the previously run national Fridgesavers scheme, or run an appliance scheme that targets priority customer groups, there are some differences in energy savings to other appliance schemes based on detailed energy monitoring that has been carried out on the appropriate customer groups.

6.14. First, the appliance being traded in must meet the requirements of the scoring protocol system, as shown in Table 6. Secondly to qualify for the revised energy savings, the customers targeted must be in receipt of certain benefits and tax credits, as set out in the Statutory Instrument for EEC (entitled 'The Electricity and Gas (Energy Efficiency Obligations) Order 2001').

6.15. When calculating the energy saving of the new appliance the scheme will provide, suppliers should first determine its energy consumption by referencing the appliance's energy label. EESoP 1 and 2 energy monitoring showed that this figure should then be multiplied by a factor of 0.71875 to give the revised energy consumption figure. (The 0.71875 factor was derived from an energy monitoring exercise carried out during SoP1.)

6.16. Energy monitoring has shown that the energy consumption for fridges / fridge freezers that meet the scoring protocol requirements below and are owned by a priority customer are as follows.

Energy consumption for standard fridge freezers = 983 kWh/a

Energy consumption for refrigerators = 603 kWh/a

Example calculation

The supplier's scheme provides a fridge freezer with a manufacturers claimed energy consumption of 250 kWh/a. The figure to use when calculating the energy savings from the scheme would be:

250 x 0.71875 = 179.68 kWh/a

This figure should then be compared to the appliance being traded in.

983-179.68 = 803.32 kWh/a

Priority Group Lifetime

- The lifetime for freezers or fridge-freezers is **15 years**.
- The lifetime for refrigerators/larders is **15 years.**

Fridgesavers scoring protocol system

6.17. For appliances to be valid for the revised energy consumption figures detailed above, they must score 3 or more using the scoring system illustrated in Table 6.

Table 6 Fridgesavers scoring protocol system

Fridge Freezers	Score
Fridge compartment	
Door	
Minor damage to seal	1
Major damage to seal	2
Door not closing properly	2
Internal damage	1
External damage	1
Body (walls excluding door)	
External damage	1
Internal damage	1
Thermostat not working/missing/damaged	1
Fittings damaged/missing (e.g. shelves/vegetable box)	1
Icing up	1
Freezer compartment	
Door	
Minor damage to seal	1
Major damage to seal	2
Door not closing properly	2
Internal damage	1
External damage	1
Body	
External damage	1
Internal damage	1
Refrigerators	Score
Door	
Minor damage to seal	1
Major damage to seal	2
Door not closing properly	2
Internal damage	1
External damage	1
Body (walls excluding door)	
External damage	1
Internal damage	1
Thermostat not working/missing/damaged	1
Fittings damaged/missing (e.g. shelves / vegetable box)	1
Icing up	1
Icebox	
Icebox door missing	3
Icebox door does not close	2
Icebox door has crack / hole	2

Cold appliance disposal

6.18. Due to new European legislation concerning ozone depleting substances and their disposal, appliance retailers or delivery agents will no longer remove the old appliance when delivering the new one. Until such a time as this situation is resolved, the appliance will have to remain with the customer. There is considerable risk of these appliances entering the second hand market, even when collected by a Local Authority. To ensure that this does not happen the appliance must be disabled by the following method:

- the appliance's electricity supply cable must be cut, as close to the body of the appliance as possible, or alternatively pulled out of the appliance;
- the gasket (the seal running around the door) must be removed. As this may mean that the door cannot close, the door should be taped or tied shut.

6.19. Despite the new legislation, Local Authorities will still have a responsibility to remove domestic appliances from customers' homes. The energy supplier should provide the customer with the relevant contact details.

Jug Kettles

General Information

6.20. The energy savings derived from the provision of a jug kettle have been calculated as the result of energy monitoring carried out under EESoP I. The result of this monitoring has shown the saving to be 71.9 kWh per annum, if the following criteria are followed:

- The customers targeted should fall within the priority group or be a pensioner.
- The jug kettle must replace a traditional electric kettle (i.e. a kettle that does not have a water meter on the side)

- Advice on the use of the new kettle should be provided (e.g. that the kettle can be used for boiling just one cup of water)

6.21. The DEFRA factor of 1.6 as used for cold and wet appliances does not apply to jug kettles.

Lifetime

6.22. A lifetime of 8 years should be assumed for kettles.

7. Combined heat and power (CHP)

General Information

7.1. Ofgem has provided a separate spreadsheet for the calculation of the energy savings arising from the installation of CHP systems, which includes instructions to explain the methodology used.

7.2. Opportunities for EEC CHP schemes are likely to arise as a result of the government funded Community Energy Programme. It is possible that a different methodology for calculating and apportioning energy savings will be required when Community Energy projects link up with EEC schemes. Further guidance on the interaction between EEC and the Community Energy Programme will be provided when the details of the Community Energy Programme have been finalised.

7.3. Further details on the Community Energy Programme can be found at http://www.est.co.uk/communityenergy/index.cfm.

8. Fuel switching

General Information

8.1. Energy savings have been calculated for situations where a supplier provides funding that allows domestic customers to switch the fuel of their heating systems. These schemes are generally expected to involve the conversion from electric heating to an efficient gas heated system, but may also involve converting from other fuels such as oil or coal. The spreadsheet entitled 'Energy use data for fuel switching projects.xls' contains the data necessary for these calculations. There are two worksheets entitled 'Existing Systems' and 'Replacement Systems'.

8.2. The energy savings are based on the comparison between the energy consumption of the existing heating system and the replacement system, in fuel standardised terms. The replacement system must incorporate an A or B SEDBUK rated boiler.

Lifetime

8.3. A lifetime of 15 years is assumed for fuel switching.

9. New or innovative measures

9.1. Suppliers are encouraged to develop schemes involving new or innovative measures that do not currently have an EEC score. Where a supplier wishes to adopt a new or innovative measure, Ofgem requires the supplier to provide independent verification of the energy savings. The procedure is outlined in Appendix 4 of this document.

10. Energy service schemes

10.1. DEFRA's Statutory Instrument for EEC refers to 'energy services action' as one way of delivering energy efficiency measures to customers. Energy services action is defined as an action that:

a) includes at least two activities that are qualifying action under EEC, of which one:

- may reasonably be expected to improve the insulation of the walls or loft of the domestic premises concerned; or
- may reasonably be expected to improve the efficiency of the principal system for heating those premises; or
- consists of the supply to those premises of electricity, heat, gas or liquid in circumstances such as from CHP; and

b) is undertaken in pursuance of an agreement between the supplier or a person acting on its behalf, and a domestic consumer, the terms of which also require the supplier:

- to undertake an assessment of the energy efficiency of those premises;
- to provide advice to the consumer as to the means by which the energy efficiency of those premises may be improved, taking into account his circumstances and any other occupant of the premises; and
- to offer the consumer the option of making an arrangement with the supplier for deferring the whole or any part of the cost to the consumer of the activities for which the agreement provides.

10.2. Energy efficiency measures that are delivered under the terms laid out above are eligible for an uplift in energy savings amounting to an extra 50% of that normally expected to be achieved. The uplift from qualifying energy service action will apply to no more than 10% of a supplier's target.

10.3. If a supplier wishes to submit an energy services scheme, they must ensure that the relevant spreadsheet type has been selected on the scheme summary

worksheet. An "Energy Services with Uplift" scheme spreadsheet must not exceed 10% of a supplier group's target. If a supplier wishes to submit an energy services scheme which will exceed 10% of a supplier group's target then the scheme must be submitted on two different spreadsheets, one for the "Energy Services with Uplift" element and one for the "Energy Services Without Uplift" element.

10.4. It is strongly advisable for all energy services schemes to separate the energy services activity on to two spreadsheets, one for "Energy Services with Uplift" and one for "Energy Services without Uplift". If a supplier has completed energy services work equal to 10% of their supplier group target, the supplier group will be accredited with the full uplift in savings regardless of whether the scheme was submitted on an “Energy Services With Uplift” or “Energy Services Without Uplift” spreadsheet.

10.5. The first point in 10.1 (b) above states that suppliers must undertake an assessment of the energy efficiency of the premises. An example of the kind of questionnaire that could be used is shown in Appendix 5 of this document.

Appendix 1 BRE Report - 'Energy Efficiency Commitment: BREDEM calculation of energy saving matrix' (October 2001)

Executive Summary

The 'Energy Efficiency Commitment' scheme (EEC), to be introduced in 2002, will build on the achievements of the present 'Standards of Performance Energy Efficiency 2000-2002' scheme for promoting and funding energy efficiency in domestic dwellings. As for the Standards of Performance 2000-2002 scheme, the Energy Supply Licence obligations for EEC will allow electricity and gas energy efficiency measures, and also energy efficiency improvements for oil and coal heated dwellings.

- For the purposes of advising DEFRA in setting target energy savings, the Energy Saving Trust requires information about the energy savings resulting from a range of energy efficiency measures, for a variety of dwelling types.

- BRE has provided and updated this information for past schemes using the BRE Domestic Energy Model (BREDEM), which is uniquely suited to this type of application. The energy savings for various measures and house types have been tabulated and presented in the form of a matrix.

- This report describes background information to the calculations, and the various assumptions that have been made. The energy savings are given for eight typical dwelling types. Each dwelling type is tabulated for a number of different floor areas, notionally related to the number of bedrooms. The 'base parameters' for the calculations (e.g. amount of insulation, heating controls, etc.) are for a typical existing dwelling, and are drawn from extensive survey data which BRE has access to.

- The results are consistent with the previous matrix (Feb 2000), and incorporate three recent developments: (1) Cavity wall insulation savings are calculated for a cavity width of 65mm (previously 50mm). (2) Loft

insulation saving results have been extended to include an additional depth category, 250mm. (3) The boiler efficiency used for gas central heating is an estimate of the average of the current stock, which recent work has indicated as 69%. (The BREDEM calculations include a penalty for a proportion of the stock not having a boiler interlock, and use a value of 67%). In the previous Standards of Performance scheme the efficiency assumed was that predicted for 2010 of 75%.

- The matrix of these energy savings is presented in Annexe 3. Many parameters affect energy savings, so, in general, the parameters selected for tabulation are among those which have the most significant effect on the energy saved, given the assumptions made.

- These various assumptions, about the dwelling type, size, level of insulation, heating type, and other parameters used in the BREDEM calculation, must be kept in mind when using the values in the matrix. The savings in the matrix are typical for the situations described, but may be very different for situations which differ significantly from the assumptions made.

1.Introduction

The 'Standards of Performance for Energy Efficiency' scheme in the UK, now called the 'Energy Efficiency Commitment' (EEC), requires Energy Suppliers to fund energy efficiency schemes. To enable targets to be set, and individual projects to be evaluated, information about typical energy savings from a range of energy efficiency measures, for a variety of domestic dwelling types and constructions is required. This is provided in this report.

BRE has provided and updated this information for previous Standards of Performance schemes, most recently in February 2000 for 'Standards of Performance 2000-2002'. The BRE Domestic Energy Model, BREDEM, was used to calculate the energy consumption, and hence savings. A matrix was developed which tabulated the savings resulting from a range of energy efficiency measures, for a variety of typical domestic dwellings.

BREDEM is a well established and thoroughly verified model which has been developed and tested by BRE over the past 16 years, and is uniquely suited to this type of requirement. The new 'Energy Efficiency Commitment' requires similar information to that provided for the previous schemes. As for 'Standards of Performance 2000-2002', 'Energy Efficiency Commitment' obligations will allow electricity and gas energy efficiency measures to be implemented, and also energy efficiency improvements for oil and coal heated dwellings. As a result, the information in the matrix shows the savings resulting from energy efficiency measures related to electric, gas, oil and coal heated dwellings.

The results in the matrix for gas and electrically heated homes are consistent with those for 'Standards of Performance 2000-2002', and incorporate the following three developments.

Recent data indicates 65mm as an appropriate value for a typical cavity width in these calculations. Cavity wall insulation energy savings have therefore been calculated using 65mm cavity width. (This replaces the calculations based on 50mm in the previous report)

A loft insulation depth of 250mm is gaining acceptance in terms of cost effectiveness; for example, this depth will be necessary to meet the proposed

Elemental Method U-values in the draft Part L of the Building Regulations. Following this development, loft insulation results now include savings for installations to 250mm.

Calculations for gas central heating are based on a boiler efficiency which is an estimate of the average of the existing stock, of 69%. (The BREDEM calculations include a penalty for the proportion of the stock which do not have a boiler interlock, and as a result, a value of 67% is used in the calculations). In the previous Standards of Performance scheme an efficiency of 75% was used, representing the estimated efficiency in 2010.

2. Description of the project

2.1 Aim

The aim of this work is to indicate the delivered energy savings associated with a range of typical energy efficiency measures for various typical dwelling types and sizes.

The energy savings are presented as a matrix of measures, dwelling types and sizes, taking account of factors which have a significant effect on the energy saved. Factors which have smaller effects on the amount of the delivered energy saved are generally not tabulated in the matrix.

2.2 Base Parameters

2.2.1 Dwelling Types

The energy savings are based on the following eight dwelling types. These cover the main dwelling types found in Great Britain, which is the area relevant to the Energy Efficiency Commitment scheme.

Flat with 3 external walls	Semi-detached bungalow
Flat with 2 external walls	Detached bungalow
Mid-terrace house	Semi-detached house
End-terrace house	Detached house

BRE has developed drawings of typical dwellings of these types, and the dimensions of the external walls, roof, floor, windows and doors are used in the BREDEM calculations. For each dwelling type, the energy savings are calculated for the 'base case' floor areas from the drawings. These are then adjusted in the ratio of the floor areas to give savings for other dwelling sizes. The effect of top, mid and ground-floor flats has also been considered, and this is discussed in Annex 1.

The base parameters for the calculations are those for a typical existing dwelling, unless otherwise stated or required by the calculation. These parameters include the following, and were chosen on the basis of extensive survey data which BRE has access to.

2.2.2 Insulation levels

- Roof insulation U-value 0.25 (150mm insulation depth)
- Wall insulation U-value 1.5 (unfilled cavity wall pre-1976)
- Single glazed wooden frame windows with draught-stripping on all external doors and windows

2.2.3 Heating systems (see Annexe 2 for further detail)

(a) Gas and oil central heating

- Hot water heated from the boiler in a separate tank.
- Boiler efficiency of 69% assumed for gas central heating. For the BREDEM calculations a penalty for a proportion of the stock not having boiler interlock is included, and a value of 67% is used.
- Boiler efficiency of 77% assumed for oil central heating, with a penalty for no interlock reducing this to 76%.
- Boiler with radiators, room thermostat control and boiler interlock. (Boiler interlock turns the boiler off when there is no demand for heat).
- Cylinder thermostat present, primary pipework not insulated.

In addition to the calculations for gas central heating, one set of calculations estimates savings from replacing a gas room heater; details for this are given later.

(b) Electric storage heating

- Hot water heated in a tank by electric immersion heater.

- Modern (slim) storage heaters with manual charge control.
- 10% of the space heating is supplied by on-peak electric.

(c) Solid fuel central heating

Note that estimated efficiency is approximate and varies greatly with type (see annexe 2)

- Assumes an open coal fire with back boiler (efficiency 55%) and radiators and whole house heating.
- Hot water heated from the back boiler in a separate tank.

2.2.4 Heating pattern

The calculated savings are for a standard heating pattern (morning and evening during the week, all day at the weekend), and whole house heating (except for gas room heater savings, for which details are given later).

2.3 Savings Matrices

2.3.1 Loft insulation

The effect of the different wall types (solid or cavity) is small; less than 2%.

The effect of the number of external walls (e.g. a flat with 2 external walls compared with 3 external walls, a mid-terrace compared with end-terrace) is also small; less than 5%.

- The matrix shows savings for the different dwelling types (with the 2 flat types described above - but note that only a top-floor flat is appropriate) and sizes.
- The savings for loft insulation improvement to 150mm, 200mm and 250mm depth include insulation of, and draught-sealing, the loft hatch. (Even where there is draught-sealing before installation, it is likely to be in need of replacement). The U-values used take account of thermal bridging by the joists, and represent laying between the joists at all depths (this allows for safe access to the loft). This is a conservative

assumption, which can be considered to take account of the effect of compacting and/or dislodging, for example due to boarding the loft, on the insulation performance.

2.3.2 Cavity wall insulation

Cavity wall savings are clearly affected by both the U-value of the cavity wall filled, and the number of external walls.

A pre-'76 U-value of 1.45 W/m^{2}K was calculated for a wall with a brick outer leaf, 65mm cavity, and brick inner leaf finished with a dense plaster, thought to be typical of post-war construction. This gives a U-value of 0.466 W/m^{2}K when the cavity is filled with blown mineral fibre.

Post-'76 Building Regulations required U-values of 1.0 W/m^{2}K; such a 65mm cavity wall gives a U-value of 0.407 W/m^{2}K when filled with blown mineral fibre.

- The matrix shows savings for the different dwelling types and sizes. The results for flats may be applied to top-floor, mid-floor, and ground-floor flats, since the difference in results is less than 1%.

2.3.3 Solid wall insulation

As with cavity walls, savings are affected by the before and after U-value and the number of external walls.

A solid wall is assumed to have a U-value of 2.1 W/m^{2}K before it is insulated. Internal or external insulation can be applied to decrease the U-value. Two values were used for insulated walls, 0.45 and 0.37 W/m^{2}K. Using mineral wool, thicknesses of 80 and 100mm respectively would be needed to achieve these reductions in heat loss. Using other insulants this thickness could be significantly less (see notes to the matrix for details).

The matrix shows savings for the different dwelling types and sizes. The results for flats may be applied to top-floor, mid-floor, and ground-floor flats, since the difference in results is less than 1%.

2.3.4 Draught-stripping

These are obviously affected by the dwelling type and size. Draught-stripping of windows and external doors is calculated. Draught-sealing the hatch gives savings from BREDEM which are 15% of the saving in the matrix for draught-stripping windows and external doors.

BREDEM takes account of draught-stripping by modifying the amount of air infiltration, by an amount based on work carried out in the 1980's. This work found that there are a large range of air infiltration routes (such as dry lining on dabs or battens, cracks, gaps and joints in the structure, joist penetrations of external walls, timber floors, internal stud walls, electrical components and service ducts, and areas of unplastered masonry).

Openable doors and windows are therefore only one of many routes. Results were obtained for good quality draught-stripping of openable doors and windows (excluding the kitchen and bathroom, as is normal practice), for a representative range of dwellings. The BREDEM calculations for the matrix are consistent with these results.

Because of the nature of air infiltration measurements, it is impossible to be precise about what should be taken as a baseline, that is, the air infiltration before draught-stripping. For this work it was agreed that the savings should be based on initial ventilation rates at the higher end of the range, consistent with the data available. This reflects the principle that Energy Efficiency Commitment should be targeting draught-stripping at such properties. In addition, the BREDEM ventilation algorithm assumes that if air infiltration is low, occupants will open windows. Because of this, draught-stripping savings become small if too low an air infiltration baseline is used.

A higher baseline is readily achieved by selection of a number of options in the ‘ventilation’ and ‘location’ BREDEM inputs. Under the 'ventilation' inputs, two extract fans and one unrestricted chimney were assumed for all cases. For the ‘location’ inputs, ‘sheltered on 1 side’, and 'above average site exposure' was selected in all cases; although it may not be realistic for a mid-terrace house or a

flat with two outside walls, it may be taken as a proxy for a number of other contributing factors, such as a leakier-than-average structure.

The matrix shows savings for the different dwelling types and sizes. The results for flats may be applied to top-floor, mid-floor, and ground-floor flats.

2.3.5 Hot water tank insulation

Different types and sizes of dwellings have little effect. Less than 3% differences were obtained. For all dwelling types, the energy savings are as follows, using boiler efficiency values given in Annexe 2.

(a) Gas centrally heated dwellings

None to 75mm jacket 2370 kWh/yr.

25mm to 75mm jacket 1010 kWh/yr.

50mm to 75mm jacket 260 kWh/yr.

Taking account of the relative numbers of dwellings in the building stock with 50mm, 25mm, and no tank jacket (Domestic Energy Fact File, 1998) gives a weighted average of

800 kWh/yr (this is tabulated in the matrix at Annexe 3).

(b) Electric storage heated dwellings:

None to 75mm jacket 1310 kWh/yr.

25mm to 75mm jacket 580 kWh/yr.

50mm to 75mm jacket 140 kWh/yr.

Taking account of the relative numbers of dwellings in the building stock with 50mm, 25mm, and no tank jacket (Domestic Energy Fact File, 1998) gives a weighted average of

450 kWh/yr (this is tabulated in the matrix at Annexe 3).

(c) Oil centrally heated dwellings:

None to 75mm jacket 2090 kWh/yr.

25mm to 75mm jacket 890 kWh/yr.

50mm to 75mm jacket 230 kWh/yr.

Taking account of the relative numbers of dwellings in the building stock with 50mm, 25mm, and no tank jacket (Domestic Energy Fact File, 1998) gives a weighted average of

700 kWh/yr (this is tabulated in the matrix at Annexe 3).

(d) Solid fuel heated dwellings:

For an open fire with back boiler when heating water with an efficiency of 55%, the following results were obtained

None to 75mm jacket 2620 kWh/yr.

25mm to 75mm jacket 1120 kWh/yr.

50mm to 75mm jacket 270 kWh/yr.

Taking account of the relative numbers of dwellings in the building stock with 50mm, 25mm, and no tank jacket (Domestic Energy Fact File, 1998) gives a weighted average of

880 kWh/yr (this is tabulated in the matrix at Annexe 3).

2.3.6 Floor insulation

Calculations are for 100mm depth of insulation (mineral fibre 0.04 W/m^2C). This is often the maximum practicable depth, and insulating to this depth is considered worthwhile considering the disruption and labour cost associated with installing this measure. Different wall types have a small effect, less than 7%. However, house size and type have a significant effect.

The matrix shows savings for the different dwelling types (note: only a ground-floor flat is appropriate) and sizes.

2.3.7 Block skirting gaps and seal floorboards

Different wall types have a small effect, less than 8%. However, dwelling size and type have a significant effect.

The matrix shows savings for the different dwelling types and sizes. The results for flats may be applied to top-floor, mid-floor, and ground-floor flats.

2.4 Gas and Oil Matrices

2.4.1 Hot water tank thermostat and primary pipe insulation

Different types and sizes of dwellings have little effect. Boiler efficiencies used are described in Annexe 2.

Modelling a boiler of 69% efficiency, reduced to 67% for gas and 77%, reduced to 76% for oil to allow for a proportion of boilers in the existing stock with no boiler interlock (see Annexe 2), gives the following results.

Gas:

If there is no tank thermostat or primary pipe insulation,

- the saving from one of these measures is 560 kWh/yr
- the saving from both of these measures is 800 kWh/yr

If one measure is installed, the saving from the other measure is 240 kWh/yr.

Oil:

If there is no tank thermostat or primary pipe insulation,

- the saving from one of these measures is 490 kWh/yr
- the saving from both of these measures is 700 kWh/yr

If one measure is installed, the saving from the other measure is 210 kWh/yr.

2.4.2 Boiler replacement, efficiency and controls

A generalised calculation method is given for flexibility, which enables estimated savings to be calculated using appropriate boiler efficiencies and heating system controls. Either an average seasonal efficiency, or a seasonal efficiency of an individual boiler, may be used. Both of these are now available as a result of the new SEDBUK (Seasonal Efficiency of Domestic Boilers in the UK) method, which is described in Annexe 2.

- The matrix shows the 'heat required', given a particular set of heating controls, for each dwelling type and size (see Annexe 1 regarding flat types). The 'heat required' divided by the boiler efficiency value will give the delivered fuel consumption. The difference of two such calculations, firstly for the initial heating controls and efficiency value, secondly for the new heating controls and efficiency value gives the energy saving.

The energy saving from changing either the heating controls alone, or the boiler alone, may of course be calculated by keeping the other the same. Note that the 'heat required' includes energy for hot water as well as heating, since this is also affected by the boiler efficiency.

For an initial boiler efficiency value E1, and a new boiler efficiency value E2, the energy saving is then as follows.

([*heat required with initial controls*] / E1) - ([*heat required with new controls* / E2)

Note that if the boiler has no interlock (that is it continues to run when there is no demand for heat), the efficiency value must be reduced by 5 percentage points. Thus for a boiler efficiency of 69% with no boiler interlock, an efficiency of 64% must be used in the above calculation.
For example, the delivered energy saving resulting from replacing

- a gas boiler with no controls or programmer only (efficiency 69% reduced by 5 percentage points because there is no boiler interlock),

- by a new boiler with efficiency 80% and new controls (with a boiler interlock, i.e. there is no 5 percentage point penalty) is then as follows.

([*heat required with no controls*] / 0.64) - ([*heat required with new controls* / 0.8)

Recent work suggests that the average seasonal efficiency of gas boilers in the existing housing stock is around 69%. (The penalty for no boiler interlock must be applied to this if appropriate). Existing oil boilers are likely to be more efficient, the average seasonal efficiency in the housing stock being currently around 77%.

As regards new boilers currently being installed in the UK, information from the SEDBUK project (Annexe 2) has shown that a typical efficiency is 88% for condensing gas boilers, and 78% for non-condensing boilers. For oil, typical condensing boiler efficiency is 92% and non-condensing, 85%. These efficiencies, and/or the seasonal efficiency of an individual boiler from the SEDBUK internet site (www.sedbuk.com), can be used in the equation above as required.

'Heat required' is tabulated in the matrix for the following control options. Note that all controls packages may or may not have a programmer (no energy savings are attributed to this).

- None: No controls, and no hot water tank thermostat
- Package A: Only hot water thermostat
- Package B: Roomstat *
- Package C: Roomstat and TRVs *
- Package D: TRVs without a roomstat (note that boiler interlock is not possible unless a flowswitch is present)*
- Package E: Delayed start roomstat and TRVs *
- Package F: Intelligent heating controls and TRVs *

**these control options include a hot water tank thermostat*

TRVs are assumed to be fitted on all radiators in the property

For ‘Commitment’ target setting purposes, it is necessary to assume a basis from which gas and oil heating controls are upgraded. A situation of ‘Limited Controls’ has therefore been defined. Central heating systems in existing dwellings have the following controls.

- 16% have no thermostatic control.
- 53% have a wall thermostat (no TRVs)
- 14% have TRVs (no wall thermostat)
- 15% have a wall thermostat and TRVs

The 'Limited Controls' case (Package L) was defined by taking an average, weighted by the above values of 16 and 53%, of the 'heat required' for (a) 'no controls' and (b) 'Programmer and roomstat'.

2.4.3 Renewing gas room heaters

Different dwelling types and sizes (see annex 1 regarding flat types) have a significant effect on the savings from replacing an old gas fire, efficiency 50%, with a new gas fire with an open flue, efficiency 60%. A dwelling with typical insulation was assumed.

The aim is to estimate savings for replacing one gas fire; hence whole house heating is not appropriate. Savings were calculated for two situations.

(a) Only the living area is heated by the gas room heater.

(b) The dwelling is heated by gas central heating, with a gas room heater providing 50% of the heat to the living area. This is a common configuration where a gas room heater is present.

2.4.4 Radiator foil

An assessment of the savings has been undertaken by BRE which is based on test data, and which provides a best estimate of savings at present. This has been used to inform the savings credited to this measure in the present Standards of Performance. However, at present the savings credited go beyond the results of the BRE assessment, to allow further installation and monitoring to take place.

Depending on the results from this monitoring, the assessment of savings by BRE will be revised if appropriate for use in the evaluation of individual EEC schemes.

2.5 Electricity Matrix Only

2.5.1 Storage heater controls

The energy savings from 6 types of electric storage heater controls have been investigated, and the results expressed as a percentage of the space heating energy for a dwelling. The values in the matrix are derived by applying these percentages to the space-heating requirement for each dwelling type, as calculated using BREDEM.

The savings that result from storage heater controls are therefore directly related to the delivered energy required to heat the dwelling. Dwelling type, size, and the level of insulation will affect the savings (see Annexe 1 regarding flat types). Savings in the matrix are calculated for three wall types with different U-values, solid wall, cavity wall pre-76 and cavity wall post-'76, for a dwelling with a typical level of loft insulation (150mm).

2.6 Solid Fuel Matrix

By their nature, most solid fuel heating systems are not controllable other than manually; therefore no attempt to attribute savings to controls is made.

3. Conclusion and recommendations

A matrix has been developed which tabulates the estimated energy savings for a large range of energy measures, and typical dwelling types and sizes. In general, factors which have a significant effect on the savings have been tabulated. In an exercise of this kind, assumptions have to be made about various parameters (for example, the heating pattern), and typical values have been used, the most important of which have been stated at the start of this report.

These assumptions need to be kept in mind when using the values in the matrix. The savings given are typical for the situations described, but may be very different for situations which differ significantly from the assumptions made.

4. References

The Government's Standard Assessment Procedure for Energy Rating of Dwellings. SAP 1998. Published on behalf of DETR by BRECSU, BRE.

Domestic Energy Fact File, 1998. L D Shorrock and G A Walters. BRE Report 354.

SEDBUK (Seasonal Efficiency of Domestic Boilers in the UK. www.sedbuk.com

Annexe 1 - Effect of flat type on savings

A flat of a given size and shape can be top-floor, mid-floor, or ground-floor, with different numbers of external walls. Each combination of these parameters will result in a different energy consumption.

Moreover the savings from different energy saving measures are affected by different parameters. For example, the number of walls affects the savings resulting from cavity wall insulation, floor insulation and draught-stripping, but does not significantly affect savings resulting from the other insulation measures considered.

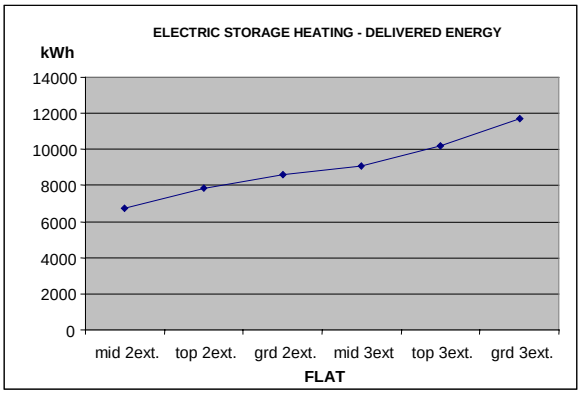
Energy Efficiency Measure	Top/Mid/Ground Floor Flat	Number of External Walls
Loft insulation	Top-floor flats only	Insignificant effect
Floor insulation	Ground-floor flats only	Significant effect
Cavity wall insulation	Insignificant effect	Significant effect
Draught stripping	Insignificant effect	Significant effect
Double glazing	Insignificant effect	Insignificant effect
Seal skirting and floorboards	Insignificant effect	Insignificant effect
Boiler replacement, efficiency & controls	See below	
Renewing gas room heaters		
Storage heater controls		

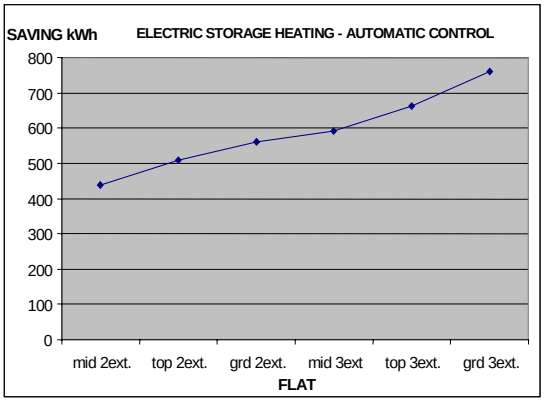
The energy savings resulting from the last three measures in this table, that is

- boiler replacement, efficiencies and controls
- renewing gas room heaters
- electric storage heater controls

are dependent on the space heating energy consumption of the flat. The savings will therefore be affected both by the number of external walls, and whether it is a top, mid, or ground floor flat.

The following graphs show, for an electric storage heating system, the effect of both of these factors on (a) the space heating energy consumption, and (b) the saving achieved by automatic controls.





- It can be seen that the number of external walls has a significant effect on energy consumption and savings. The effect of whether it is top, mid or ground floor is less significant. Therefore, in the matrix, separate results have been calculated for flats with two, and three external walls.

- It can also be seen that the top-floor flat is intermediate in energy consumption between the ground-floor and mid-floor flat, and the difference is relatively small (especially in relation to the effect of the amount of loft and wall insulation). For the matrix, calculations have therefore been undertaken for top-floor flats only. Savings for mid-floor and ground-floor flats will be similar.

(It could be argued that mid-floor flats should be used on the basis that these are the most common type, however, while this is true in high rise buildings, there are a large number of blocks which are three or fewer storeys high for which this is not true.)

Graphs of energy consumption and savings relating to the replacement of boilers, boiler controls, and gas room heaters show the same results, and the same conclusions can be drawn. For this reason, the energy savings resulting from the measures:

- boiler replacement, efficiencies and controls

- renewing gas room heaters

- electric storage heater controls

have been calculated for the two cases:

- top-floor flat with 2 external walls
- top-floor flat with 3 external walls

It should be appreciated that the savings resulting from these three measures are significantly dependent on the heat required and therefore the level of insulation in the dwelling (as well as other factors such as the heating pattern). This contrasts with insulation measures (for example, loft insulation) where savings are not strongly dependent on the level of insulation in the rest of the dwelling, except for very poor, or very good, insulation levels.

The savings for the three measures above have been calculated using the base parameters specified on page 2 of this report.

Annexe 2 - Boiler efficiencies and SEDBUK

Gas and oil boilers

A method for estimating a realistic 'seasonal' domestic boiler efficiency, representing an average efficiency in domestic conditions over a seasonal cycle in the UK, has been incorporated into the calculation of SAP energy ratings (Appendix D of SAP 1998). The method involves a number of equations that use the measured full load and part load efficiency of a boiler to estimate its seasonal efficiency in typical UK conditions.

The method results from a research project supported by DETR, BRECSU, British Gas Research & Technology, and manufacturers of boilers and other products for the heating industry. The method has been agreed by all those involved, and is referred to as 'SEDBUK' (Seasonal Efficiency of Domestic Boilers in the UK).

SEDBUK values for many boilers currently available have been published on an internet web site www.sedbuk.com. In addition, from real product data that BRECSU holds, it has been possible to use SEDBUK to estimate typical UK seasonal efficiency values of different types of boilers.

Typical values for gas boilers that will be being sold and installed are as follows.

Non-condensing gas boiler - 78%

Condensing gas boiler - 88%

For oil fired boilers typical values are:

Non-condensing oil boiler - 85%

Condensing oil boiler - 92%

The energy savings calculated in Annexe 3 of this report use estimates of the average seasonal efficiency of gas and oil boilers in the existing UK stock. BRE's UK National Boiler Energy Model indicates this being 69.2% for gas and 77.4%. For BREDEM calculations, a penalty of 5 percentage points is deducted where there is no boiler interlock. There is very little data on the proportion of the

existing stock that do not have interlocks. However, about 30% of boiler systems do not have a room thermostat, and this indicates that at least 30% do not have any interlock. Estimating that about 50% of boiler systems do not have an interlock indicates an average penalty of 2.5 percentage points for gas. This results in a rounded value of 67%, which is used in the BREDEM calculations. For oil, it is estimated that a higher percentage of systems have and interlock, around three quarters. This indicates a suitable reduction of 1.25%, giving a rounded value of 76%.

Values used in this matrix are therefore

- Gas 69%, reduced by 2% to 67%
- Oil 77%, reduced by 1% to 76%

Solid fuel heating

There are many different configurations for solid fuel heating. For example, an open or closed fire may have a back boiler, in which case this may supply radiators, or alternatively an independent solid fuel boiler may supply a central heating system. Estimated efficiency values are approximate and vary depending on the configuration, from 32% for an open fire with no throat restrictor and no back boiler, to 65% for a closed fire with a back boiler, or an independent boiler with an autofeed system.

In addition BREDEM calculations take account of 'responsiveness' on a scale of 0 (unresponsive) to 1 (responsive). Open and closed solid fuel fires are attributed a responsiveness of 0.5, while independent boilers are attributed a responsiveness of 0.75.

Note that this variability in evaluating energy for solid fuel systems is exacerbated when considering cost and energy CO_2 emissions (these are not calculated in this report). Open fires may use house coal, or smokeless fuel if required, which have different costs and CO_2 emission values (£4.25/GJ and £7.11/GJ, and 81 kg CO_2/GJ and 109 kg CO_2/GJ respectively; SAP 1998 values).

The most common solid fuel heating system is an open fire with a back boiler and radiators, though closed fires with back boiler and radiators are also

common, and also open and closed fires of all other configurations. There are a smaller, but still significant, number of independent boilers supplying central heating systems.

For the calculations in this matrix, approximate typical values of efficiency and responsiveness have been used. That is,

- a responsiveness of 0.5 and an efficiency of 55%, which corresponds to an open coal fire with a back boiler

Appendix 2 HSE advice on potential risks to safety of combustion appliances from the installation of cavity wall insulation (May 2000)

What is the purpose of this advice?

This advice:

- highlights the potential hazard of cavity wall insulation work adversely affecting the safety of combustion appliances and the importance of ensuring air supply vents and flues are always checked by a competent person after this work
- gives general guidance on the action required, further details of which are given in the Cavity Insulation Guarantee Agency (CIGA) guide 'Flues, Chimneys and Combustion Air Ventilators'
- is addressed to all concerned with the management, control and installation of cavity wall insulation under energy efficiency schemes
- is targeted both at those involved with the installation of cavity wall insulation and the running of specific schemes such as DEFRA's Home Energy Efficiency Scheme (HEES), those run by Energy Suppliers and Transco (Affordable Warmth)), as well as initiatives run by local authorities
- updates and replaces an earlier HSE advice sheet on this subject.

What is the hazard?

This guidance is about the way in which incorrect installation of cavity wall Insulation can adversely affect the safety of gas, oil and solid fuel appliances. The main concerns are:

(a) possible blockage of air supply vents with insulation material if the vents are not ducted across the cavity, and

(b) possible flue damage (eg by accidental drilling) or blockage (ie by insulating material entering a flue through the damaged area).

Either, or both of these could cause appliances to operate unsafely, and produce amounts of carbon monoxide (CO) that could cause death of occupants.

These are not just theoretical risks. Although the industry safety record is accepted to be generally very good, a few residents recently had their ventilation/flues completely blocked by insulation material, as a result of cavity wall insulation work, and this was not detected in the normal way by the installer because the established industry safety procedures were not followed. This presented a major potential risk of CO poisoning to these tenants, and it was fortunate that the problem was otherwise noticed, as death or serious injury might have resulted.

What action is required?

In view of the above, there is an urgent need for all parties involved to give early consideration to the possible effects that the insulation work might have for the safety of appliances in the houses they are working on, however they are fuelled. Any guidance and contract conditions should call for safety management systems that include thorough checks before work starts, eg on whether air vents are sleeved through the cavity wall, and the type/location of appliances and run of flues provided for them. This is essential to identify appliances and flues 'at risk' and for planning work to minimise the risk of damage or blockage.

It is particularly important that landlords such as local authorities are forewarned of any work to be carried out, so that they are given the opportunity to carry out their own checks on work to discharge their own legal responsibilities to their tenants.

What precautions are necessary?

The following is a summary of the main areas to be addressed. Detailed guidance is given in the Cavity Installation Guarantee Agency (CIGA) Best Practice Guidance document and relevant British Standards on cavity wall insulation. Further information regarding safety checks on gas appliances may be obtained from the Council for Registered Gas Installers (CORGI).

(a) safety management.

All cavity wall insulation work must be properly managed and controlled to ensure safe systems of work are used, which effectively address the risks involved. Suitable guidance and training should be given to all concerned that stresses the possible effects of the work for the safety of occupants from interference with ventilation and flueing, and the action required to address these risks (see below).

(b) safety checks after installation of cavity wall insulation.

Before combustion appliances are recommissioned/retaken into use, the following checks for safety should be carried out:

(i) Air supply vents

A visual examination should be carried out of all air vent openings, whether for supply of combustion air to appliances or for cooling air of compartments housing appliances, to ensure there is no blockage or interference by insulating material. This applies to air vents serving all types of combustion appliance, whether flueless, open-flued or room sealed. Further information on air supply requirements is given in Approved Document J 'Heat Producing Appliances' under the current Building Regulations (and Technical Standards in Scotland). Further information in respect of air supply requirements for gas appliances is contained in British Standard 5440 Part 2: 2000.

(ii) Flue examination/testing

The following examinations and tests should be carried after installation of cavity wall insulation, except for those flues **known** not to be at risk of damage or

blockage from cavity wall insulation work (eg where no part of a flue is run along or adjacent to a cavity wall). A decision on this should be made by a competent person after inspecting the flue run. In **any** case of doubt, it should be assumed that flue damage/blockage is possible, and that examinations/tests need to be carried out. These are identified below.

Appliances other than room sealed appliances

The flue should be visually examined for any damage or blockage caused by the cavity wall insulation work, which would prevent safe transfer of combustion products to the open air. This will involve external visual examination of the flue along its whole length, including loft spaces.

After the visual examination, further assessment should be made to establish whether there is any indication of possible flue damage or blockage. This will involve a smoke spillage test (to check that combustion products are being safely removed with the appliance connected) and visual inspection for any signs of incomplete combustion (eg yellowing of burner flame and soot deposits). Further investigation, including a flue flow test (to establish whether combustion products are capable of being safely transferred to the open air) **must** be carried out if there is **any** doubt or suggestion of flue damage or interference.

Further information on flue requirements, including examination/testing, is given in Approved Document J 'Heat Producing Appliances' under current Building Regulations (and Technical Standards in Scotland). Further information on flues for gas appliances is contained in British Standard 5440 Part 1: 1990[1].

Room sealed appliances

No flue flow or spillage test is required for room sealed appliances, however, a visual external examination of the flue path (eg to ensure there is no flue damage) and checks as in (i) earlier, on air vents providing cooling air for any compartment housing such an appliance are still required. Further information is given in the CIGA guide.

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[1]Under revision when this advice was prepared. Revised standard expected to be published later this year (2000).

(iii) Examination of appliance safe functioning.

After any 'work' on an appliance, including 'disconnection' and 'reconnection', it should be checked that the appliance functions safely. Examinations for gas appliances are specified in regulation 26(9) of the Gas Safety (Installation and Use) Regulations 1998 (GSIUR).

Action in case of a 'dangerous appliance'

Where there is any doubt about safety, arrangements should be made for the appliance to be disconnected (with the owner's consent, as necessary) and a warning notice attached, pending further investigation and remedial work. If the owner does not agree to disconnection of a dangerous gas appliance, Gas Emergency Freephone 0800 111 999, or in the case of LPG the gas supplier, should be contacted for further action to make safe.

Who may carry out safety examinations?

The examinations described earlier must only be carried out by a person who has been adequately trained and possesses the required competence, eg for proper conduct and interpretation of safety checks. The smoke spillage test is appliance specific and specialist training is essential to perform this correctly, in accordance with manufacturers instructions.

In the case of gas, any disconnection of appliances (eg as normally required for the flue flow test) constitutes 'work on a gas fitting'[2] and may only be carried out by a CORGI registered installer, holding a current certificate under the 'ACoPS' or Accredited Certification Scheme (ACS), covering the work involved. Further advice may be obtained from CORGI (tel: 01256 372200).

[2]'work in relation to a gas fitting' as defined in GSIUR covers a wide range of activities including (but not limited to) installing; disconnecting; removing; re-connecting; or (where a fitting is not readily movable), changing its position. However, it does not cover separate activities which might affect gas safety but are not directly associated with a gas fitting/appliance, such as installation of cavity wall insulation.

May carbon monoxide detectors be used?

If carbon monoxide detectors/alarms are used, they must **never** be regarded as a substitute for primary safeguards, eg safe installation and maintenance of gas appliances. Similarly, use of CO detectors must **not** be regarded as a substitute for flue/combustion air checks by a competent person, after completion of cavity wall insulation (as earlier). If detectors are used as part of a safety check regime, they must only be used to **indicate or confirm a hazardous situation**; they must **never** be relied upon to prove safety or to contradict evidence of a possible problem, where a flue spillage test is inconclusive or suggests flue blockage.

What are the relevant legal requirements?

The main legal requirements for protection of the general public and employees in these situations are the general provisions of the Health and Safety at Work etc 1974 (HSWA), and related legislation, including the Management of Health and Safety at Work Regulations 1999, which require a 'risk assessment' and plan of protective measures to be drawn up, as well as appointment of competent persons to ensure that safety requirements are effectively met.

In the case of gas, specific requirements also apply under the Gas Safety (Installation and Use) Regulations 1998. In particular, regulation 8(1) effectively prohibits any person from making an alteration to premises[3] (including cavity wall insulation) which would adversely effect the safety of a gas fitting installed at those premises and cause it no longer to comply with the Regulations, eg because combustion air supply or fluing is no longer adequate.

These duties for ensuring safety of combustion appliances extend beyond installers themselves to include managing contractors and others involved in planning heat efficiency schemes. Further information on controls and responsibilities under GSIUR is given in the Health and Safety Commission (HSC) Approved Code of Practice 'Safety in the installation and use of gas fittings

[3]The prohibition extends to a wide range of activities which might affect the safety of a gas appliance (or gas storage vessel) on the premises, including installation of double glazing, building extension, modifications to chimneys etc.

and appliances', (ISBN: 0-7176-1635-5) available from HSE Books (tel 01787 881165)

Appendix 3 Guidance on VAT efficiency

Energy Suppliers should be aware of the specific VAT rules applying to energy efficiency measures. The following is a copy of a guidance note issued by HM Customs and Excise on 21st March 2000:

BN 39/00 VAT: New reduced rate for the installation of energy saving materials in all homes.

Who is likely to be affected?

People having energy saving materials installed in their home and the builders doing the work.

Builders and other businesses installing central heating and home security goods in the homes of less well off pensioners and heating system measures in the homes of the less well off under grant funded schemes.

General description of the measure:

VAT at 5% has applied to the grant funded installation of energy saving materials since 1998. This measure extends the reduced rate to include:

- the installation of energy saving materials in all homes;
- the grant funded installation, maintenance and repair of central heating systems and home security goods in the homes of qualifying pensioners;
- the grant funded installation of heating system measures in the homes of the less well off.

Energy saving materials which may be installed in all homes at the reduced rate are:

- insulation for walls, floors, ceilings, roofs or lofts, or for water tanks, pipes of other plumbing fittings;
- draught stripping for windows and doors;

- central heating controls, including TRV's
- electric dual immersion water heaters with foam insulated water tanks;
- hot water system controls;
- solar panels

The reduced rate will apply to energy saving materials installed in:

- owner occupied homes;
- homes rented from private landlords;
- homes rented from local authorities and housing associations;
- caravans
- residential boats
- residential buildings such as old people's homes, children's homes and nursing homes;
- non-business charity buildings.

The reduced rate for the grant funded installation, maintenance and repair of central heating systems in the homes of qualifying pensioners includes:

- installation of a gas fired boiler plus radiators and pipe work;
- maintenance and repair of grant funded central heating systems;
- maintenance and repair of central heating systems installed by the qualifying pensioner.

The reduced rate will apply to heating system measures fitted in the homes of the less well off under government funded grant schemes. 'Heating system measures' are:

- gas room heaters with thermostatic controls;

- electric storage heaters
- closed solid fuel fire cassettes
- electric dual immersion water heaters with foam insulated tanks
- gas fired boilers
- oil fired boilers
- radiators

Finally, the reduced rate will apply to qualifying security goods that are installed, in the homes of qualifying pensioners, at the same time as energy saving materials or central heating systems. 'Qualifying security goods' are:

- locks and bolts for windows
- locks, bolts and chains for doors
- spy holes
- smoke alarms.

The reduced rate does not apply to d.i.y. installations.

Operative date:

The changes apply to supplies made on or after April 2000.

Current and proposed revisions:

The reduced rate for energy saving materials is in Schedule A1 to the Value Added Tax Act 1994. This will be amended to reflect the changes.

Appendix 4 New or Innovative Measure Procedures

These guidelines specify the information required by the Energy Saving Trust from product manufacturers or energy suppliers that wish to have a new energy saving product assessed for use in the Energy Efficiency Commitment 2002-05 (EEC) or EST energy efficiency programmes. Assessment of energy savings refers solely to the fact that a product is acceptable to EST for use in energy efficiency schemes.

The EST assesses new energy efficiency products to verify their energy savings. This recognition of measure savings by EST does not permit the use of any logo or device for product endorsement, nor does it mean that EST, Ofgem or the Department of Environment, Food and Rural Affairs (DEFRA) recommends the product in any way. If product endorsement is sought via the use of the "Energy Efficiency Recommended" logo, a separate application procedure direct from the Energy Saving Trust is required.

As part of the EST's role as Ofgem's advisory agent, Ofgem can also use this information to determine possible energy savings under the EEC. EST approval does not guarantee that new products will be used by suppliers in delivering their EEC programme.

The Energy Efficiency Commitment 2002-05

The Energy Efficiency Commitment (EEC) is a three-year programme that requires obligated suppliers to meet an overall energy saving target of 62TWh by improving energy efficiency within households.

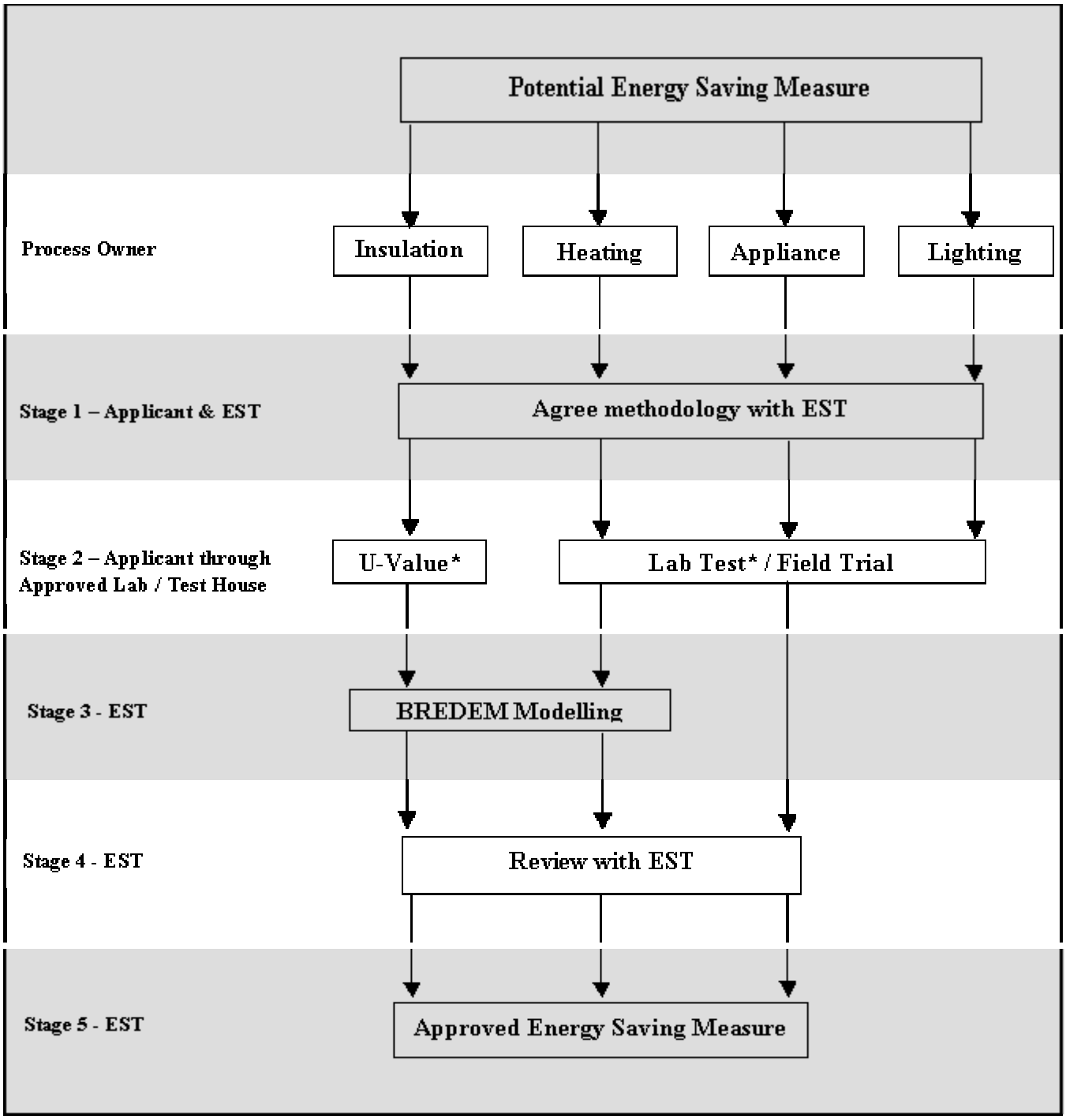
The overall target is set by the DEFRA and is administered by Ofgem. The EEC requires energy suppliers with at least 15,000 domestic customers to develop and implement schemes, approved by Ofgem, aimed at making improvements in energy efficiency. At least 50 per cent of the energy savings must result from schemes targeted at customers receiving income-related benefits or tax credits. The EEC is instrumental in the Government's Climate Change Programme and is highlighted in the Fuel Poverty Strategy. Because suppliers have flexibility in the measures they use to meet their energy saving targets they have shown an interest in the new measures that are coming to market.

The savings attributed within EEC are calculated *ex-ante* or in advance of the measures installed, as opposed to *ex-post* or after completion. Therefore, it is necessary that the savings themselves, as well as the calculations and assumptions behind them are as robust as possible. Where savings are obtained without field trials (generally for insulation and some heating measures), the BREDEM-12 model will be used to ascertain savings.

Overall Procedure Flow Chart

The procedure for product approval depends on the product type as illustrated in the flow chart overleaf:-

Table 1: Flowchart of approvals process



Information on Approved Laboratories and Test Houses is shown in Appendix A. When viewed electronically the hyperlinks are active to provide more information via the UKAS website.

Stage 1

Applicant to contact the Energy Saving Trust to agree methodology and testing requirements as follows:

Mr Martin Brooks,
Energy Saving Trust
21 Dartmouth Street
London
SW1H 9BP
Tel: 020 7222 0101
Email: newproducts@est.co.uk

Stage 2

Applicant to arrange for suitable testing through approved Test House, laboratory testing process or Field Trial process as agreed with EST. Appendix A provides details of Approved Laboratories and Test Houses.

Stage 3 and 4

Applicant to submit results from product testing to EST. The EST reviews the test results and/or undertakes energy modelling (as necessary). The possible EEC accreditation score is calculated and passed to Ofgem for information. If there are any legal implications for a measure the EST will liase with Ofgem before any testing takes place.

Stage 5

Should a product be suitable for approval, the EST will issue a letter to the applicant stating that the product is acceptable as an energy saving measure (see sample in Appendix B). The EST in its advisory role will also notify Ofgem and energy suppliers of the energy savings accreditable for the new measure.

Procedure for Each Product Type

Standard Information Requirements For All Product Types

Details of the following must be provided and justified where appropriate for all measure types before an application for approval of savings can be considered.

- Typical product and installation costs of the measure
- Details of any Standards (British/European/Industry) to which the product and its installation conform to or must conform to.
- Details of any requirements for specific skills/equipment for professional installation and for DIY installation (if appropriate).
- Typical product/measure lifetime.
- Information on the likelihood of any drawbacks or potential problems associated with the installation and/or use of the product (e.g. end of life disposal problems, energy/natural resource intensive production methods etc).
- An indication of any other benefits that could be accrued through the installation of the product/measure.
- Details of comparisons with 'standard'/non-energy saving products should be provided where possible/relevant.
- Typical installation and any specific usage instructions.

Specific Information for individual Product Types

In addition to the previous information, specific details are also required for individual product types as listed below: -

Thermal insulation measures

Verification of the thermal conductivity (lambda value) of the product is required. This verification must be provided in the form of a test certificate from a UKAS accredited testing laboratory or another approved by the EST (see Appendix 1). Should a product possess a British Board of Agrément (BBA) certificate, the stated thermal conductivity on this Certificate will be used.

Before undertaking any work, the methodology for the tests or field trials must be agreed with the EST. This is to ensure that the subsequent results are suitable for use in BREDEM-12 energy modelling. This will provide energy savings for the standard dwellings and fuel types used within the EEC.

Once the thermal properties and standard thickness installed have been established, EST will undertake energy modelling using the BREDEM-12 model and existing EEC assumptions to enable assessment with existing EEC measures to be made. This will provide energy savings for the standard dwelling and fuel types used within the EEC.

The savings listed in the EEC Technical Manual and EEC Matrices are for 'generic products', for example, for loft insulation the savings provided are for mineral fibre (thermal conductivity of 0.04W/mK). Should an insulant have a similar thermal conductivity and if it is used in a similar way to the 'generic' insulant then the product can be approved without further energy modelling and the existing savings provided in the EEC Matrix can be used. However, should the thermal properties or method of use be different, revised savings figures to take into account the different thermal properties of the insulant or use should be calculated and used instead.

Heating Measures

Verification of the heating energy savings is by laboratory test or field trial is required. This must be provided in the form of a test report from a UKAS accredited testing laboratory or another approved by the EST.

Before undertaking any work, the methodology for the tests or field trials must be agreed with the EST. This is to ensure that the subsequent results are suitable for use in BREDEM-12 energy modelling. This will provide energy savings for the standard dwellings and fuel types used within the EEC.

Appliances

Verification of the electrical savings by laboratory test or field trial is required. This evidence must be provided in the form of a test report from a UKAS accredited testing laboratory or another approved by the EST.

Before undertaking any work, the methodology for the tests or field trials must be agreed with the EST. This is to ensure that the subsequent results are suitable for use.

Lighting

To have a lighting measure (CFLs and Luminaires) on the EST approved list please refer to the latest version of the EST Test Specifications (available from James Russill at the above address). The EST will seek assurance that all lamps meet the relevant standards for: Safety, Quality, Lifetime and lumen output.

For any other lighting related measure, the information requirements would follow that of electrical measures.

All Products

Once the energy savings from the product have been verified and discussed with the applicant and the product approved, the EST will issue a letter to the applicant stating that the product is acceptable as an energy saving measure. The EST will also notify Ofgem and energy suppliers of the new measure and the energy savings accreditable.

Cost of Applications

In line with the existing test requirements for Compact Fluorescent Lamps (CFLs), the Energy Saving Trust will levy a £1,000 per product administration fee for each test procedure; this must be received prior to the application being processed. This fee is charged to cover internal costs of processing applications such as participant liaison, review of test results, modelling/calculation of savings and attending meetings etc. This fee does not cover any costs incurred as a result of any laboratory testing or field trials that may be required as part of Stage 2 of the approvals process.

In the event that a product does not require energy modelling for the calculation of savings since it's thermal properties are similar to existing products, then a reduced administration fee of £500 will be levied. The full administration fee is to be paid upon application and any reduced fee will apply once the EST has ascertained that no modeling work is required.

Approved laboratories and Test Houses

This list contains details of UKAS and other EST approved laboratories and test houses.

For updated information on UKAS accredited laboratories please visit www.ukas.org

Testing for Electrical Energy Consumption

ITS Testing & Certification

Davy Avenue, Knowlhill, Milton Keynes, MK5 8NL

+44 (0)20 7770 7759

EA Technology Ltd.

Capenhurst, Chester, CH1 6ES

+44 (0)151 339 4181

Testing of Insulation/Construction Materials

CERAM

(CERAM Research Limited), Queens Road, Penkhull, Stoke-on-Trent, Staffordshire, ST47LQ

+44 (0) 1782 764444

British Board of Agrement

PO Box 195, Bucknalls Lane, Garston, Watford, Hertforshire, WD259BA

+44 (0)1923 665300

Building Investigation and Testing Services (Redhill) Ltd

Trowers Way, Holmethorpe Industrial Estate, Quarryside Business Park, Redhill, Surrey, RH12LH

+44 (0)1737 765432

BSI Product Services

Maylands Avenue, Hemel Hempstead, Hertfordshire, HP24SQ

+44 (0) 1442 230442/278535

Pattinson & Stead

Westside House, Marton, Middlesborough, Cleveland, TS78BG

+44 (0) 1642 317034

BRE

Bucknalls Lane, Garston, Watford, WD259XX

44+ (0)1923 664334

Thermal testing of construction materials

CERAM

(CERAM Research Limited), Queens Road, Penkhull, Stoke-on-Trent, Staffordshire, ST47LQ
+44 (0) 1782 764444

Stanger Testing Services Ltd

Cambuslang Laboratory, Bogeshole Road, Cambulang, Glasgow, G727DD
+44 (0) 141 641 3623

British Board of Agrement

PO Box 195, Bucknalls Lane, Garston, Watford, Hertforshire, WD259BA
+44 (0)1923 665300

Building Investigation and Testing Services (Redhill) Ltd

Trowers Way, Holmethorpe Industrial Estate, Quarryside Business Park, Redhill, Surrey, RH12LH
+44 (0)1737 765432

Marley Building Materials

Birmingham Laboratory, Canton Lane, Hams Hall Distribution Park, Coleshill, Birmingham, B461AQ
+44 (0) 1675 468 038

University of Salford

Thermal Measurement Laboratory, School of Acoustics and Electronic Engineering , Salford, M54WT
+44 (0) 161 295 5172/3114

National Physical Laboratory

Queens Road, Teddington, Middlesex, TW110LW
+44 (0)20-8943 6880

IRTU

17 Antrim Road, Lisburn, BT28 3AL
+44 (0)28 9262 3000

Heating and Fossil fuel burning appliances

Advantica Technologies Ltd

Certification Services, Ashby Road, Loughborough, Leicestershire, LE113GR
+44 (0)1509 282066

BSI Product Services

Maylands Avenue, Hemel Hempstead, Hertfordshire, HP24SQ

+44 (0) 1442 230442/278535

GASTEC at CRE LIMITED

PO Box 279, Cheltenham, Gloucestershire, GL524ZJ

+44 (0)1242 677877

ITS Testing & Certification Ltd

Unit D, Imperial Park, Randalls Way, Leatherhead, Surrey,

+44 (0)1372 370900

BSRIA Limited

Old Bracknell Lane West, Bracknell, Berkshire, RG127AH

+44 (0)1344 426511

ITS Testing & Certification Ltd

ITS House, Cleeve Road, Leatherhead, Surrey, KT227SB

+44 (0)1372 370900

ITS Testing & Certification Ltd

Blackwood EMC Facility, Unit 8, Woodfield Business Park, Pontlanfraith, Blackwood, Gwent, NP12 2DG

Energy Saving Trust
21 Dartmouth Street
London SW1H 9BP
Tel: 020 7222 0101
Fax: 020 7654 2444
Web Site: http://www.est.org.uk

Date

To whom it may concern

Recognition of XXXXXXXXXX as an Energy Saving Measure.

The Energy Saving Trust have recognised XXXXXXX as providing energy savings when installed according to the manufacturers instructions. The lifetime of the energy savings has been set at XX years.

Please note that this letter does not constitute an endorsement or recommendation of this product in any way, purely recognition that it can be used as an energy saving measure.

For further information regarding these savings please contact the Energy Saving Trust at the above address.

Yours faithfully

Martin Brooks

Accreditation Manager

Appendix 5 Energy Efficiency Assessment Questionnaire

A. CUSTOMER DETAILS

A1. Title: Mr ☐ Mrs ☐ Ms ☐ Miss ☐

Other ☐

A2. First Name / Initial: ☐

A3. Surname: ☐

A4. Address: ☐

☐

☐

A5. Postcode: ☐☐☐☐ ☐☐☐☐

A6. Contact tel. no: ☐

● **A7. In what year was your house built?** (Mark one.)

Before 1900	☐	1966 – 1975	☐
1900 – 1918	☐	1976	☐
1919 – 1929	☐	1977 – 1980	☐
1930 – 1944	☐	1981	☐
1945 – 1949	☐	1982 – 1990	☐
1950 – 1964	☐	1991 – 1995	☐
1965	☐	1996 or later	☐

● **A8. Property type?** (Mark one.)

Detached	☐	Mid terrace with passage	☐
Semi-detached	☐	Top floor flat	☐
End terrace	☐	Middle floor flat	☐
Mid terrace	☐	Ground floor flat	☐

● **A9. Do you own your home or do you rent?**

Own / buying on mortgage	☐
Renting from council	☐
Renting from housing association	☐
Renting privately	☐
Tied house / other	☐

B. PROPERTY DETAILS

IF YOU LIVE IN A FLAT

B1a. What type of building is it in?

Tower block (six or more storeys)	☐
Custom block (five or less storeys)	☐
Above shop or office	☐
Divided house	☐

B1b. Is there a roof directly above your flat?

Yes, sloping (pitched)	☐
Yes, flat	☐
Yes, part sloping (pitched) and part flat	☐
Only part of the flat has a roof	☐
No	☐

FOR ALL TYPES OF HOME

● **B2. Does your home have a loft?**

Yes ☐ No ☐

B3. If yes, is there a heated room that's in regular use within the loft?

Yes ☐ No ☐

B4. How many floors does your home / flat have? (Excluding loft rooms or cellars.)

One (e.g. bungalow)	☐	Four	☐
Two	☐	Five	☐
Three	☐	More	☐

B5. How many bedrooms do you have?

One	☐	Three	☐	Five	☐
Two	☐	Four	☐	Six	☐
				More	☐

B6. How many living or dining rooms do you have? (Include study / playrooms etc.)

None	☐	Two	☐	Four	☐
One	☐	Three	☐	More	☐

B7. Is your building listed or in a conservation area?*

Yes, listed ☐ Yes, conservation area ☐

No ☐

C. INSULATION DETAILS

● **C1. How much loft insulation do you have?***

(If this is going to prove difficult, please take an educated guess. You can use the ruler provided to help you visualise the depth of insulation.)

None	☐	150mm (6 inches)	☐
25mm (1 inch)	☐	200mm (8 inches)	☐
50mm (2 inches)	☐	No Loft	☐
75mm (3 inches)	☐	Don't know	☐
100mm (4 inches)	☐		

C2. Does your loft have any flooring?*

Yes ☐ No ☐

● **C3. What type of outside walls do you have?***

- Solid brick ☐
- Solid concrete ☐
- Solid stone ☐
- Cavity – insulated ☐
- Cavity – uninsulated ☐
- Mixed ☐
- Modern timber framed ☐
- Don't know ☐

C4. Which type of windows do you have?

- All single glazed ☐
- Some double or secondary glazed ☐
- Most double or secondary glazed ☐
- All double or secondary glazed ☐

● **C5. Is there any draught proofing on windows and external doors? (Assume sealed double glazed windows to be draught proofed.)**

- None draught proofed ☐
- Some draught proofed ☐
- Most draught proofed ☐
- All draught proofed ☐

D. HEATING AND HOT WATER

● **D1. What is your main heating system?**

- Boiler and radiators ☐
- Electric storage heaters ☐
- Warm air system ☐
- Room heaters or fires ☐
- Other ☐

● **D2. What is your main heating fuel?**

Mains gas ☐ Solid fuel ☐
Electricity ☐ Bottled gas ☐
Oil ☐ L.P.G. (bulk) ☐

D3. Do you have a separate fire that you use regularly?

Yes, electric ☐ No ☐
Yes, solid fuel ☐ Yes, gas ☐

● **D4. What heating controls do you have?***
(Mark all that apply.)

- None ☐
- Programmer / timer ☐
- Room thermostat ☐
- Thermostatic radiator valves ☐
- Storage heater dials ☐

● **D5. If you have a boiler, how old is it?**

- Less than five years old ☐
- Five to ten years old ☐
- Eleven to fifteen years old ☐
- Over fifteen years old ☐

D6. Which of your radiators have foil behind them?*

None ☐ All ☐ Some ☐

D7. Do you have a condensing boiler?*
(If you are not sure, please mark 'no'.)

Yes ☐ No ☐

● **D8. How is your hot water usually provided?***

- From central heating system ☐
- Gas instantaneous / combi boiler ☐
- Electric instantaneous ☐
- Electric immersion (on peak) ☐
- Electric immersion (off peak) ☐
- Dual electric immersion ☐
- Gas, oil or coal range (e.g. AGA-Rayburn) ☐
- Back boiler ☐
- Other ☐

D9. How would you describe your hot water tank insulation?

- No tank ☐
- Solid foam insulation ☐
- Jacket (no gaps around jacket) ☐
- Jacket (with gaps around jacket) ☐
- No insulation ☐

D10. If you have a hot water tank, is there insulation on the pipes between the boiler and the tank?

Yes ☐ Can't see pipes ☐
No ☐ Don't know ☐