DOMESTIC
EPC

9H Christchurch Terrace
LONDON
SW3 4AJ

Keeping you informed about the energy efficiency of your home

Report Reference No:2514413

Date: 04 July 2011

Energy Performance
Certificate enclosed

NHER

Contents

9H Christchurch Terrace, LONDON, SW3 4AJ

About this report

An Energy Performance Certificate (EPC) is required by law when a home is built, sold or let. The EPC provides information on the energy efficiency of the building fabric (the walls, floor, roof and windows etc.) and the heating, water heating and lighting installed. This is so that a prospective purchaser or tenant can see how energy efficient the home is and can compare it to other properties that they may be considering. The EPC does not take into account the actual running costs of the home, as different people have different patterns of occupation, and thus energy use – some people work full time, others may work part time and others may work from home; each using the energy in the home in a different way. The EPC will make assumptions about the occupancy depending on the size of the home. In this way, the EPC can be compared to the fuel consumption figures provided by car manufacturers – they are indicative and for guidance only but they do give the consumer a clear comparison between different models of car. The EPC gives you three key pieces of information:-

- The actual energy efficiency on a scale from A- G, with A being the most energy efficient (like fridges and dishwashers etc.)
- The environmental impact of the property
- Recommendations and cost effective ways to improve the energy efficiency of the property

Producing the Energy Performance Certificate

Comparing the energy efficiency of different homes is a bit like comparing apples and pears – even a street of seemingly identical houses could all be different. Some may have conservatories, some may have loft conversions, some may have extensions and some may be exactly as they were built – the calculation methodology for the EPC provides a way to compare the energy efficiency implications of all these different features in a meaningful way. The EPC is prepared by collecting certain key information about the property. This information is collected by an accredited Energy Assessor who carries out a visual inspection. The Energy Assessor will have visited the property, had a good look around both inside and out and measured the property to calculate the floor area and the room height, but they will not drill into walls to check for cavity insulation etc. Then the assessor will input the data into a government approved software programme, which generates the energy rating. All EPCs are generated using the same calculation methodology even if they are produced by different energy assessors using different proprietary software. That way you can be certain that the EPC gives you comparable information which you can use to evaluate different properties. To read more about how the EPC is produced see Appendix D

About the Energy Assessor

The EPC is produced by an energy consultant who is an approved energy assessor and a member of the NHER Accreditation Scheme, operated by NES Ltd. To join the NHER Accreditation Scheme and be approved to produce domestic EPCs, the energy assessor will :-

- Hold the required vocational qualification to be a Domestic Energy Assessor
- Have been checked against the criminal records bureau database
- Have in place an complaints procedure
- Carry appropriate insurance (both professional indemnity and public liability)
- Maintain their competence by a programme of approved life long learning
- Be audited by the NHER Accreditation Scheme, so that you can be sure that the EPC they produce is accurate

About the NHER Accreditation Scheme

National Energy Services Ltd (NES) is the UK's home for independent energy assessors and low carbon building professionals. For more than 20 years NES has championed the benefits of energy certificates for buildings and we are passionate about promoting the highest standards. That way you can have confidence in the energy certificates our members produce and confidence to act on the recommendations they provide. NES owns and operates the NHER Accreditation Scheme and the SAVA Certification Scheme and is based in Milton Keynes at the National Energy Centre, a building designed to high energy efficiency standards. NES is a trading subsidiary of the National Energy Foundation, an independent charity set up in 1988 to promote energy conservation and provide help to improve energy efficiency in buildings. If you want to find out more about the services offered by NHER and SAVA members, visit our website www.nesltd.co.uk

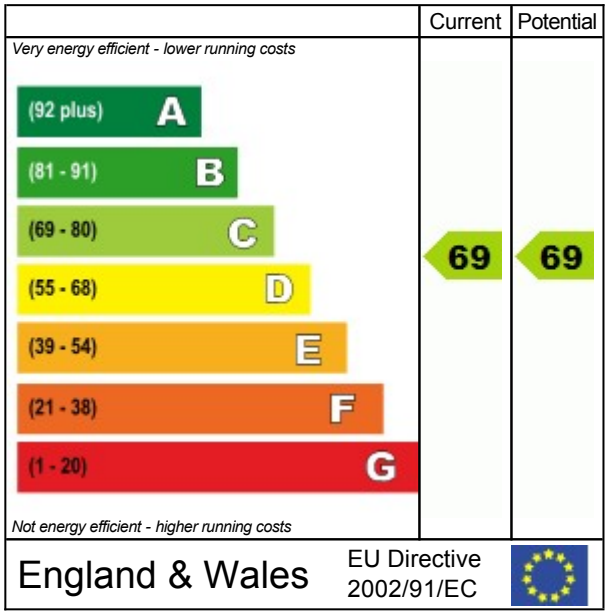
Energy Performance Certificate

9H Christchurch Terrace
LONDON
SW3 4AJ

Dwelling type: Top-floor flat
Date of assessment: 04 July 2011
Date of certificate: 06 July 2011
Reference number: 0989-2884-6438-9209-3135
Type of assessment: RdSAP, existing dwelling
Total floor area: 70 m²

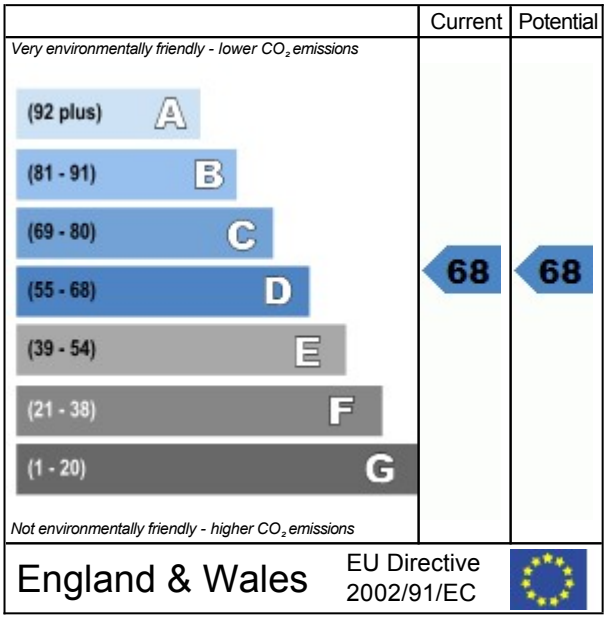
This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO_2) emissions.

Energy Efficiency Rating



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating, the more energy efficient the home is and the lower the fuel bills are likely to be.

Environmental Impact (CO_2) Rating



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO_2) emissions. The higher the rating, the less impact it has on the environment.

Estimated energy use, carbon dioxide (CO_2) emissions and fuel costs of this home

	Current	Potential
Energy use	203 kWh/m² per year	203 kWh/m² per year
Carbon dioxide emissions	2.8 tonnes per year	2.8 tonnes per year
Lighting	£39 per year	£39 per year
Heating	£451 per year	£451 per year
Hot water	£99 per year	£99 per year

The figures in the table above have been provided to enable prospective buyers and tenants to compare the fuel costs and carbon emissions of one home with another. To enable this comparison the figures have been calculated using standardised running conditions (heating periods, room temperature, etc.) that are the same for all homes, consequently they are unlikely to match an occupier's actual fuel bills and carbon emissions in practice. The figures do not include the impacts of the fuels used for cooking or running appliances, such as TV, fridge etc.; nor do they reflect the costs associated with service, maintenance or safety inspections. Always check the certificate date because fuel prices can change over time and energy saving recommendations will evolve.

Remember to look for the Energy Saving Trust Recommended logo when buying energy-efficient products. It's a quick and easy way to identify the most energy-efficient products on the market.

This EPC and recommendations report may be given to the Energy Saving Trust to provide you with information on improving your dwelling's energy performance.

About this document

The Energy Performance Certificate for this dwelling was produced following an energy assessment undertaken by a qualified assessor, accredited by the NHER Accreditation Scheme, to a scheme authorised by the Government. This certificate was produced using the RdSAP 2009 assessment methodology and has been produced under the Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007 as amended. A copy of the certificate has been lodged on a national register.

Assessor's accreditation number:	NHER001527
Assessor's name:	Mr Panos Papasavva
Company name/trading name:	Mr Panos Papasavva
Address:	2 Mount Pleasant, Cockfosters, Barnet, Hertfordshire, EN4 9EP
Phone number:	07960744350
Fax number:	
E-mail address:	ppano@hotmail.co.uk
Related party disclosure:	No related party

If you have a complaint or wish to confirm that the certificate is genuine

Details of the assessor and the relevant accreditation scheme are as above. You can get contact details of the accreditation scheme from their website at www.nesltd.co.uk together with details of their procedures for confirming authenticity of a certificate and for making a complaint.

About the building's performance ratings

The ratings on the certificate provide a measure of the building's overall energy efficiency and its environmental impact, calculated in accordance with a national methodology that takes into account factors such as insulation, heating and hot water systems, ventilation and fuels used. The average Energy Efficiency Rating for a dwelling in England and Wales is band E (rating 50).

Not all buildings are used in the same way, so energy ratings use 'standard occupancy' assumptions which may be different from the specific way you use your home. Different methods of calculation are used for homes and for other buildings. Details can be found at www.communities.gov.uk/epbd

Buildings that are more energy efficient use less energy, save money and help protect the environment. A building with a rating of 100 would cost almost nothing to heat and light and would cause almost no carbon emissions. The potential ratings on the certificate describe how close this building could get to 100 if all the cost effective recommended improvements were implemented.

About the impact of buildings on the environment

One of the biggest contributors to global warming is carbon dioxide. The way we use energy in buildings causes emissions of carbon. The energy we use for heating, lighting and power in homes produces over a quarter of the UK's carbon dioxide emissions and other buildings produce a further one-sixth.

The average household causes about 6 tonnes of carbon dioxide every year. Adopting the recommendations in this report can reduce emissions and protect the environment. You could reduce emissions even more by switching to renewable energy sources. In addition there are many simple everyday measures that will save money, improve comfort and reduce the impact on the environment. Some examples are given at the end of this report.

Directgov

Click www.epcadviser.direct.gov.uk our online tool which uses information from this EPC to show you how to save money on your fuel bills.

Further information about Energy Performance Certificates can be found under Frequently Asked Questions at www.epcregister.com

Recommendations

None

Further measures to achieve even higher standards

The measures listed below should be considered if aiming for the highest possible standards for this home. However you should check the conditions in any covenants, planning conditions, warranties or sale contracts. The indicative costs are representative for most properties but may not apply in a particular case.

	Indicative cost	Typical savings per year	Ratings after improvements	
			Energy efficiency	Environmental impact
1 Replace single glazed windows with low-E double glazing	£2,500 - £6,500	£43	C 71	C 71
2 50 mm internal or external wall insulation	£5,500 - £14,500	£106	C 77	C 78
Enhanced energy efficiency rating			**C 77**	
Enhanced environmental impact (CO_2) rating				**C 78**

Improvements to the energy efficiency and environmental impact ratings will usually be in step with each other. However, they can sometimes diverge because reduced energy costs are not always accompanied by a reduction in carbon dioxide (CO_2) emissions.

Summary of this home's energy performance related features

The table below gives an assessment of the key individual elements that have an impact on this home's energy and environmental performance. Each element is assessed by the national calculation methodology; 1 star means least efficient and 5 stars means most efficient. The assessment does not take into consideration the physical condition of any element. "Assumed" means that the insulation could not be inspected and an assumption has been made in the methodology based on age and type of construction.

Element	Description	Current performance	
		Energy Efficiency	Environmental
Walls	Solid brick, as built, no insulation (assumed)	★☆☆☆☆	★☆☆☆☆
Roof	Flat, insulated	★★★☆☆	★★★☆☆
Floor	(other premises below)	-	-
Windows	Single glazed	★☆☆☆☆	★☆☆☆☆
Main heating	Boiler and radiators, mains gas	★★★★☆	★★★★☆
Main heating controls	Programmer, room thermostat and TRVs	★★★★☆	★★★★☆
Secondary heating	None	-	-
Hot water	From main system	★★★★☆	★★★★☆
Lighting	Low energy lighting in all fixed outlets	★★★★★	★★★★★
Current energy efficiency rating		**C 69**	
Current environmental impact (CO_2) rating			**D 68**

Low and zero carbon energy sources

None

Renewable Heat Incentive

You could receive 20 years of RHI payments and help reduce carbon emissions by replacing your existing heating system with one that generates renewable heat and, where appropriate, having your loft insulated to 150 mm and cavity walls filled. The energy required for space and water heating shown below would form the basis of the payments. The Department of Energy and Climate Change has up-to date information on technologies supported and the support levels at www.decc.gov.uk/rhi.

This dwelling: Loft insulation not applicable, Cavity walls not present.

Heat demand for RHI	Existing dwelling	With loft insulation only	With cavity insulation only	With loft and cavity insulation
Space heating (kWh per year)	7,979	-	-	-
Water heating (kWh per year)	2,551			

About the cost effective measures to improve this home's performance ratings

Not applicable

About the further measures to achieve even higher standards

Further measures that could deliver even higher standards for this home. You should check the conditions in any covenants, planning conditions, warranties or sale contracts before undertaking any of these measures. If you are a tenant, before undertaking any work you should check the terms of your lease and obtain approval from your landlord if the lease either requires it, or makes no express provision for such work.

1 Double glazing
Replacing single-glazed windows with double glazing will improve comfort in the home by reducing draughts and cold spots near windows. Building Regulations apply to this work.

2 Internal or external wall insulation
Solid wall insulation involves adding a layer of insulation to either the inside or the outside surface of the external walls, which reduces heat loss and lowers fuel bills. Further information can be obtained from the National Insulation Association (www.nationalinsulationassociation.org.uk).

What can I do today?

Actions that will save money and reduce the impact of your home on the environment include:

- Ensure that you understand the dwelling and how its energy systems are intended to work so as to obtain the maximum benefit in terms of reducing energy use and CO_2 emissions.
- Check that your heating system thermostat is not set too high (in a home, 21°C in the living room is suggested) and use the timer to ensure that you only heat the building when necessary.
- Make sure your hot water is not too hot - a cylinder thermostat need not normally be higher than 60°C.
- Turn off lights when not needed and do not leave appliances on standby. Remember not to leave chargers (e.g. for mobile phones) turned on when you are not using them.
- Close your curtains at night to reduce heat escaping through the windows.
- If you're not filling up the washing machine, tumble dryer or dishwasher, use the half-load or economy programme.
- Check the draught-proofing of windows and replace it if appropriate.
- If you have unused open chimneys consider blocking them off (making provision for a ventilation opening and a cowl on top of the chimney to avoid dampness).

For advice on how to take action and to find out about offers available to help make your home more energy efficient, call 0800 512 012 or visit www.energysavingtrust.org.uk.

FACTSHEET

Energy Performance Certificates for Homes...Explained

What is an Energy Performance Certificate?

The Energy Performance Certificate (EPC) is a European Union (EU) initiative as part of the drive to improve energy efficiency across the EU member countries. An EPC provides two key pieces of information:

- The energy efficiency of a property
- The environmental impact of a property

The EPC provides a rating of a property's energy efficiency and displays this as a graph, similar to those found on kitchen appliances.

Ratings come on a scale of A-G, with A being the best rating. This means that home owners and occupiers can compare the energy efficiency of different properties in a similar way to comparing the energy performance of fridges or freezers.

The EPC also includes a Recommendation Report which lists the potential improvements that can be made to a property in order to:

- Cut fuel bills
- Improve energy efficiency
- Help cut carbon emissions

The EPC is split into the following four sections:

1. The performance and environmental impact of the property
2. Estimated energy use based on standard occupancy assumptions
3. A summary of energy performance features
4. The recommendations for improving the energy efficiency

When is an EPC required?

Since 2009, as part of the Energy Performance of Buildings Directive (EPBD) issued by the EU, all buildings in the UK that are constructed, sold or offered for rent need an EPC.

- An EPC is required whenever a property is marketed
- The EPC is valid for 10 years
- This applies to all sellers hoping to sell their property and to landlords offering a property for rent

How is an EPC produced?

An EPC can only be produced by a Domestic Energy Assessor (DEA) or a Home Inspector (HI) who is a member of an approved Government Accreditation scheme. The energy assessor will visit the property to determine the energy related features. These are then entered into a computer program which has a calculation model developed by the government and is known as Reduced Data Standard Assessment Procedure (RDSAP)

RDSAP is a cost-based rating system which uses pre-determined assumptions. It does not look at the appliances, but rather the performance of the building itself in areas such as heating and lighting. In other words, it provides an energy efficiency rating for the property itself rather than an occupancy rating.

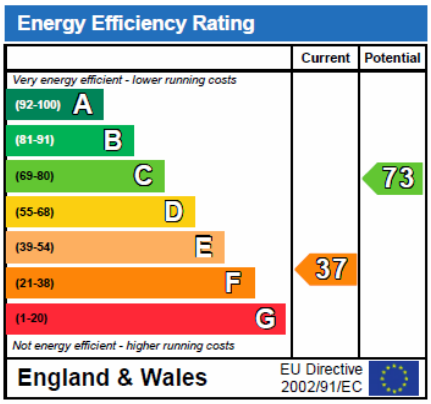
When collecting the RDSAP data the energy assessor will need to determine the following:

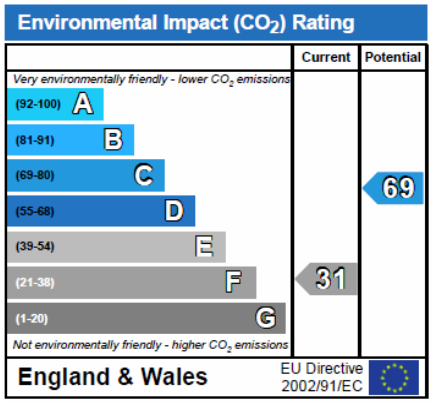
- Property type
- Age of property
- Type of construction
- Property dimensions
- Room and water heating systems
- Insulation levels
- Windows and glazing types
- Types of lighting

This information will be entered into the calculation software and an EPC will be produced.

Performance Rating

The EPC displays the Energy Efficiency Rating and Environmental Impact Rating as shown below.





The performance of a property is rated in terms of the energy used per square metre of floor area; the energy efficiency based on fuel costs; and the environmental impact based on CO_2 emissions. The numbered arrows show the current rating based on the existing energy performance of the property and the potential rating if the suggested improvements are implemented.

Estimated energy use

The estimated energy (see table below) shows the estimated energy use, CO_2 emissions and fuel costs of the dwelling. The figures in the table are based on standardised assumptions about occupancy, heating patterns and geographical location. This means that the figures displayed will be different to the **actual** fuel cost.

The reasons for this are:

- RDSAP uses a standard heating pattern of 9 hours each weekday and 16 hours a day at the weekend. It further assumes that the main living area is heated at 21°C and the remainder of the dwelling at 18°C. This may be different to the actual heating pattern of the person living there, but it enables properties to be compared on a like for like basis
- The model assumes that the number of occupants is proportional to the floor area of the dwelling and hot water usage is calculated using the same proportions. Therefore, if a single person is living in a five-bedroom house, the energy used for hot water in the model and displayed on the EPC will be higher than the actual usage. This procedure allows all properties to be compared on an equal basis
- The model assumes that all properties are based in the middle of England and uses the average outside temperature of that region for the heating calculations. A property in the southwest of England is likely to require less energy for heating than a comparable property in the northwest and this would be reflected in the actual energy bills
- If the property has two space heating systems (a main heating system such as a gas boiler with radiators) and a secondary or 'top-up' heating system (e.g., an open coal fire), the model assumes that up to 15% of the space heating is provided by the secondary system. The efficiency of the secondary system is likely to be much lower than that of the main system and will therefore push the energy costs up. It may be that the secondary system is rarely used and would not contribute to 15% of the space heating, but so as to compare properties fairly, these are the standard assumptions made in the model
- The energy use displayed in the EPC includes the energy consumed in producing and delivering the fuel to the dwelling, and thus will be greater than the energy actually used in the dwelling

Estimated energy use, carbon dioxide (CO_2) emissions and fuel costs of this home

	Current	Potential
Energy Use	453 kWh/m² per year	178 kWh/m² per year
Carbon dioxide emissions	13 tonnes per year	4.9 tonnes per year
Lighting	£81 per year	£65 per year
Heating	£1173 per year	£457 per year
Hot water	£219 per year	£104 per year

Summary of energy performance related features

The summary of energy performance related features section of the EPC shows the most crucial energy related elements of the property in the form of a table. The table is broken down into the different elements of the property such as:

- Wall construction type
- Roof construction type
- Floor construction type
- Windows and glazing
- Main Heating system present
- Main heating controls
- Secondary heating system
- Water heating
- Low energy lighting

The table then shows how each of the different elements of the property are performing in terms of their current energy efficiency and environmental performance. The descriptions provided are based on the data that has been collected specific to the property's thermal and heating elements. These descriptions are shown as stars where 1 star means least efficient and 5 stars means most efficient.

★☆☆☆☆
★★☆☆☆
★★★☆☆
★★★★☆
★★★★★

In some cases, due to the RDSAP calculation methodology, some of the elements have to be assumed. Floors are a typical example of this as it is usually not possible for the energy assessor to identify whether any additional floor insulation is present. This is because the survey is non invasive and the assessor cannot use a drill to lift floorboards or pull back carpeting.

Some of the descriptions could lead to concern for the homeowner and it is important to understand the reasoning behind these. For example, the energy efficiency of the hot water system may be given a 'Poor' rating because of the cost associated with electricity compared to the cost of gas. The environmental impact may also rate as 'Poor' due to the carbon emissions associated with electricity generation. This **does not** mean that the system is of poor quality, poorly manufactured or poorly installed.

Recommendations

The recommendations section lists measures that can improve the energy efficiency and therefore the SAP rating of the property. The recommendations are separated into:

- Lower cost measures—below £500 installation cost
- Higher cost measures—above £500 installation cost

The measures are assessed cumulatively in a predetermined order and are only included if they make a measurable change to the energy efficiency of the building.

The recommendations section also displays typical savings per year and shows the energy efficiency and environmental impact ratings as a result of these improvements.

Finally, there is a description of each recommendation and explains how it can be used to improve the energy efficiency of the home. It also gives advice on how the recommendation can be applied/ installed.

For example, if a recommendation was given to replace an existing boiler with a more energy efficient Band A condensing boiler, the accompanying text would read as follows:

"Band A condensing boiler

A condensing boiler is capable of much higher efficiencies than other types of boiler, meaning it will burn less fuel to heat this property. This improvement is most appropriate when the existing central heating boiler needs repair or replacement, but there may be exceptional circumstances making this impractical. Condensing boilers need a drain for the condensate which limits their location; remember this when considering remodelling the room containing the existing boiler even if the latter is to be retained for the time being (for example a kitchen makeover). Building Regulations apply to this work, so your local authority building control department should be informed, unless the installer is registered with a competent persons scheme, and can therefore self-certify the work for Building Regulation compliance. Ask a qualified heating engineer to explain the options."

Recommendations

The measures below are cost effective. The performance ratings after improvement listed below are cumulative, that is they assume the improvements have been installed in the order that they appear in the table.

Lower cost measures (up to £500)	Typical savings per year	Performance ratings after improvements	
		Energy efficiency	Environmental impact
1 Low energy lighting for all fixed outlets	£ 23	F 32	F 31
2 Hot water cylinder thermostat	£ 108	F 36	F 35
Sub-total	£ 131		
Higher cost measures			
3 Replace boiler with Band A condensing boiler	£ 286	E 48	E 46
Total	£ 417		
Potential energy efficiency rating		**E 48**	
Potential environmental impact (CO_2) rating			**E 46**

Further measures to achieve even higher standards

The further measures listed below should be considered in addition to those already specified if aiming for the highest possible standards for this home. However you should check the conditions in any covenants, planning conditions, warranties or sale contracts.

4 Solar water heating	£ 25	E 49	E 48
5 Replace single glazed windows with low-E double glazing	£ 72	E 52	E 51
6 50 mm internal or external wall insulation	£ 268	D 67	D 66
7 Solar photovoltaic panels, 2.5 kWp	£ 172	C 77	C 75
Enhanced energy efficiency rating		**C 77**	
Enhanced environmental impact (CO_2) rating			**C 75**

Further information

Further information on EPCs and the full EPBD legislation can be found at:

www.communities.gov.uk/ planningandbuilding/ theenvironment/ energyperformance/homes/ energyperformancecertificates/

http://epc.direct.gov.uk/index.html

www.energysavingtrust.org.uk

http://actonco2.direct.gov.uk/ actonco2/home.html

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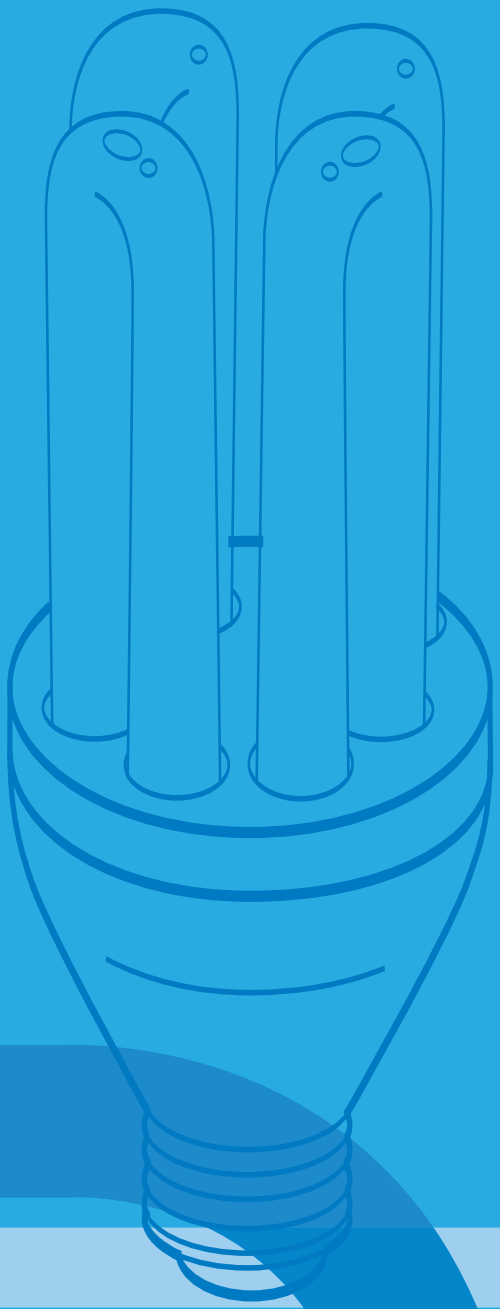
NHER SAVA



Energy Saving Fact Sheet | **Lighting**

CARBON TRUST

Making business sense of climate change

Save money on lighting for a brighter future

Employers are obliged to provide suitable lighting so that people can work safely and productively in a comfortable environment. However, it is possible to cut lighting bills by up to 30% through a variety of energy saving measures. You can't do without lighting, but this fact sheet will show you ways to save on lighting energy use.

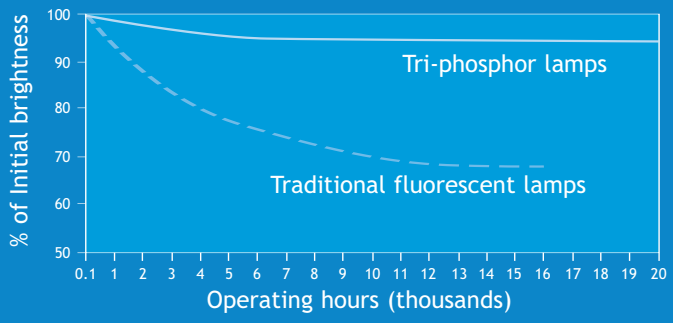
Energy wasting hot spots

Want to know where you can start saving energy on lighting? This chart shows the benefits of insisting on tri-phosphor coated fluorescent lamps. For many more helpful hints, simply call the Carbon Trust on 0800 085 2005.

fact:

Lighting can account for up to 40% of your company's total electricity bill. Reduce this and you'll also contribute to lower carbon emissions, a major cause of climate change.

Fluorescent lights with tri-phosphor coatings last longer and don't dim as much with age



Energy Saving Fact Sheet | **Lighting**

Fluorescent lighting

It is possible to save up to 30% in energy by using up-to-date fluorescent technology.

- **Get in trim.** Replace blackened, flickering, dim or failed tubes with tri-phosphor coated ones. Tri-phosphor coating provides a more natural, brighter light for the whole life of the tube. If the tubes are 38mm (1.5 inch), replace them with slimmer 26mm (1 inch) ones.
- **Up the frequency.** If you are replacing older lighting systems, install modern high-frequency ballasts. These reduce energy use and heat output, eliminate flicker and hum, extend lamp life and can allow dimming – all of which can encourage higher staff productivity.
- **Stay clear.** Don't forget to clean lights and fittings to make the best use of lighting. Replacing yellowed diffusers or fitting reflectors can also increase light output.

Operation and control

Some simple actions will help you reduce energy use at a stroke.

- **Switch off, fast.** Turn off lights with fast restrike times if an area is unoccupied for over ten minutes. This includes fluorescent lamps, which don't use large amounts of energy to switch on.
- **Use the sun.** Encourage staff to keep lights off where there is sufficient daylight. Clean windows and skylights regularly. If you can, angle blinds to reflect more light onto the ceiling or into the workspace.
- **Get in control.** Install additional switches so that fewer lights need to be on at the same time: labelling switches and lights can help. Consider controls such as 'zoning' (selective lighting), time switches, movement sensors and daylight linked controls.

Take action!

Start saving energy today

1. **Take a snapshot.** Look at all your lighting systems. Find out what you have and how it is being used.
2. **Prepare a 'good housekeeping' list** with easy actions such as turning off lights when not needed, keeping windows and light fittings clean and labelling light switches.
3. **Find out how much you are spending on lighting.** Count the number of lights; find out their wattage (often stated on the lamp) and how long the lights are on. Multiply these figures for an estimate of your lighting energy use. Multiply this by your electricity price to determine the cost.
4. **Look for improvements.** Identify old, failing or inefficient systems and plan for their replacement. Replace dim, flickering or failed lamps, preferably with more efficient alternatives. Update yellowing fittings and controls.
5. **Raise awareness.** Motivate staff to take simple actions to save on lighting costs and reduce environmental damage. The Carbon Trust has plenty of posters and stickers to help.

Call the Carbon Trust for a FREE Energy Awareness Pack.

The Carbon Trust 0800 085 2005 www.carbontrust.co.uk/energy

Lighting terms

Ballast — control circuits that limit the current when the lamp starts. Used with discharge lighting including fluorescent, sodium, mercury and metal halide.

Colour rendering — the ability of a lamp to show surface colours accurately.

Efficacy — efficiency of conversion from electricity to light in lumens/watt.

High bay lighting — industrial or retail lighting with dome-shaped luminaires mounted at 5m or more above ground. Used with 250W-1000W metal halide, mercury and sodium lamps.

Illuminance — light falling on a surface in lumens/m^2.

Lamp life — average life in hours.

Light output ratio — total light output from the luminaire to total light output from the bare lamp.

Luminaire — fitting that often screens the lamp and redirects light to where it's needed.

MBF/MBFR — high-pressure mercury lighting can be found in large lit areas. They have a long life but low colour rendering and relatively high running costs when compared with SON and metal halide lighting.

Restrike — time taken for a warm discharge lamp to reach 80% of maximum light output when power is interrupted.

SON — high pressure sodium lighting is the most efficient high bay lighting in general use, but poor colour rendering means it may not meet new lighting code recommendations.

Warm-up — time a lamp takes to reach 80% of maximum light output from cold.

Identify your lighting system

Knowing which system you have is the first step to making savings. Here are some simple tips to help you find out what lighting you have.

Fluorescent lighting

Tubes have a T prefix, such as T12, T8 or T5. The number is the tube diameter in eighths of an inch; a T12 is 12 eighths of an inch (1.5 inches) wide. T12s use 8% more energy than T8s, T5s can use significantly less.

How your lights behave — in the first few seconds they are switched on — can tell you what lights you have.

- Flickering or delayed start — replace T12s with T8s.
- Instant switch-on with fittings over 20 years old — replace fittings and lamps with high-frequency options.
- Instant switch-on with fittings under 20 years old — these operate at high frequency; but ensure you have good lighting controls.

High bay lighting

Check the time it takes for your lights to warm up and to regain full light output when turned off and on again. This tells you what lights you have:

- Instant warm up and restrike — tungsten or tungsten halogen, the least efficient, shortest life and most expensive to run.
- 5 minute warm-up and 10 minute restrike — metal halide, with good colour rendering and low energy.
- 5-7 minute warm up and 1 minute restrike — high pressure sodium lights (SON).
- 5-7 minute warm up and 2-7 minute restrike — high pressure mercury lights.

Commercial buildings

Most offices use fluorescent overhead lighting; but you can cut costs in other areas too.

- **Fit the task.** When using task lighting, such as at individual workstations, replace standard tungsten lamps with plug-in compact fluorescent lamps (CFLs) — you could save 75% in energy. These deliver the same amount of light at a lower wattage and last up to eight times longer. What's more, they reduce local heat gain for added comfort.
- **Cut the sparkle.** Spot and display lights in your reception may provide an attractive 'sparkle' effect, but they generate considerable heat and are expensive to run. Don't need the sparkle? Then use CFLs instead. In addition, if you have wall-mounted tungsten display or security lights, replacing these with metal halide lights or high wattage CFLs can save you up to 60% in energy.

Industrial lighting

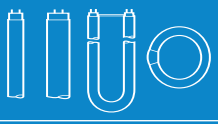
Low-level lighting offers greater control options and energy savings than high-bay (over 5m) lighting.

- **Low level.** Fluorescent lights are cost-effective, have relatively low wattage, emit less heat and can be easily controlled. Where you have rotating equipment, specify high-frequency fittings to prevent flicker and stroboscopic effect. Special reflectors for 'rack storage' installations can use 50% less energy than 'bare lamp' fittings which, unless suitably screened, do not comply with HSG38 'Lighting at work' glare requirements.
- **High bay.** At heights of over 5m, fewer lights are used but these are of a higher wattage. Your choice will depend on your needs. If you need good colour rendering, use metal halide lamps, however high pressure sodium lights have a longer life. Both have a long restrike time, limiting controls to timer switching.

Energy-efficient alternatives

How different lamp types compare

The table below shows you the most familiar types of lighting and where you can make energy savings.

Lamp Type	Average Life (hrs)	Energy saving opportunity	Savings
Tungsten filament lamps 	1000	Replace with equivalent light output 'energy saving lamps' (called Compact Fluorescent Lamps or CFLs) which last 8 times longer.	Up to 75%
Tungsten halogen display & security 	2000-4000	Replace with metal halide lamps in some instances Replace floodlights with high-pressure sodium or metal halide lamps according to colour rendering requirements	Up to 60% Up to 75%
Fluorescent tubes 	5000-15000	Replace 38mm diameter tubes with slimmer 26mm tri-phosphor versions. Specify tri-phosphor coating (clearly labelled on the packaging) for all new tubes	Up to 10% Up to 30%
High intensity discharge lamps 	Varies	Select lights on applications — all are better than tungsten halogen. Consider colour rendering — and time controls to prevent their operation out of hours. Replace any high pressure mercury lighting with metal halide lights.	Varies

Types of control

There is a wide range of lighting controls to help you reduce energy.

- **Switches.** Situate these in the same space as the lighting they control and in adequate numbers to allow lights to be switched on selectively.
- **Zoning.** Where possible zone by areas of activity and turn lights off in unoccupied areas. Use switches to control lights in bands parallel to the windows so lights closest to the windows can be switched off when there is adequate daylight.
- **Timers.** These can turn lights off automatically after a preset period — particularly effective for lighting small storage areas — or control both the on and off time, which is especially useful for external lighting. Some timers have multiple on and off switch times for added flexibility.
- **Movement detectors.** Switch lights on when they sense movement and switch them off after a set time. Suitable for larger storage areas and toilets.
- **Photocells.** These detect daylight levels and switch on lights accordingly, and so are ideal for external flood or car park lighting. Photocells can also enable high frequency fluorescent lights to be dimmed or switched off in internal spaces.
- **Combination control.** You can also provide overnight security at lowest cost using day-night and presence-detector-controlled tungsten lighting. These lights can be bought cheaply with all the required controls included. Set them to ensure lighting only comes on at night when they detect a presence within your site boundary.

CARBON TRUST

Making business sense of climate change

The Carbon Trust helps businesses and public sector organisations cut their energy costs to combat climate change through the provision of free, professional advice and assistance.

Want to find out more?

There are useful energy saving guides at **www.carbontrust.co.uk/energy** or by contacting the Carbon Trust on 0800 085 2005.

GIL153 ***How to install lighting controls***

GIL154 ***How to refurbish your lighting***

ILG007 ***Installers' guide to the assessment of energy-efficient lighting installations***

GPG160 ***Electric lighting controls – a guide for designers, installers and users***

We've got many more tips on lighting that will help you save energy and money. So give the Carbon Trust a call.

The Carbon Trust 0800 085 2005
www.carbontrust.co.uk/energy

The Carbon Trust is grant funded by the Department for Environment, Food and Rural Affairs, the Department of Trade and Industry, the Scottish Executive, the Welsh Assembly Government and Invest Northern Ireland.

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FACTSHEET

Electricity in the Home

Electricity in the modern home

Electricity has been used in domestic properties since the early 1920s following the invention of a cost effective and reliable lamp in 1907. But from its humble beginnings running a simple light bulb it has wormed its way into the very heart of our homes. It now allows us to mow the lawn, watch television, take a shower, wash clothes, cook and connect to the rest of the world via our personal computers and the internet.

Home owners usually take the electrical system for granted—and why not? Flick a switch and the light or the TV comes alive.

It generally requires very little or no maintenance on a year-on-year basis, never mind day to day. However, although electricity in the home appears to be inherently safe it should be remembered that Official Health and Safety figures show that unsafe electrical installations cause more than 750 serious accidents and 12,500 fires in homes each year.

Government introduction of Part P of the Building Regulations

Due to the large number of accidents, fires and deaths caused by poor installation, maintenance and general upkeep of electrical systems within domestic houses the government introduced legislation in the form of a document known as PART P of the Building Regulations. These regulations came into effect on 1 January 2005. The overall desired effect of the new regulations is to ensure the health and safety of the occupants and visitors within a domestic dwelling.

Who is allowed to carry out electrical work in a house?

1. **Part P registered electrician—full scope.**

As from 1 of January 2005 all electrical installations (including alterations and additions) must be carried out by a competent person. In order to be recognised as a competent person he/she must have received suitable and sufficient training, qualifications and experience and registered in one of the governments 'competent persons' schemes. Being a member of such a scheme allows the electrician to 'self certify' his work. This means he is able to design, install and test any work without notifying the local authority building control department prior to starting the work.

All Part P registered electricians must adhere to the exacting standards laid down in the Institute of Electrical Engineers (IEE) Wiring Regulations **BS767 1**.

2. **Part P registered electricians—limited scope.**

Some kitchen & bathroom fitting companies are deemed competent to carry out electrical work limited to the connection of their primary role, i.e. kitchen and bathrooms only.

3. **The home owner** is permitted to carry out small repairs and maintenance, generally extending to:
   - Replacing existing accessories, such as sockets & switches
   - Replacing a single length of damaged cable on a like for like basis.

What to expect from an electrician?

On completion of all work carried out by an electrician the home owner should be provided with a copy of a test certificate, which come in two forms:

1. **Minor works certificate** covering alterations or additions to the original wiring.

2. **Installation certificate** covering all major installation tasks such as installing a new circuit, maybe a shower or installing a new consumer unit.
All installation tasks **and** any minor works carried out in what are deemed as **'special locations'** (outdoors, kitchens, bathrooms or rooms containing a shower) must be notified to the Local Authority Building Control Department.

The electrician is responsible for doing this in conjunction with his Part P scheme provider. Within 6-8 weeks a Building Control Certificate should be received. The certificates will be required by a solicitor upon the sale of the property.

Why should I have my electrical system tested?

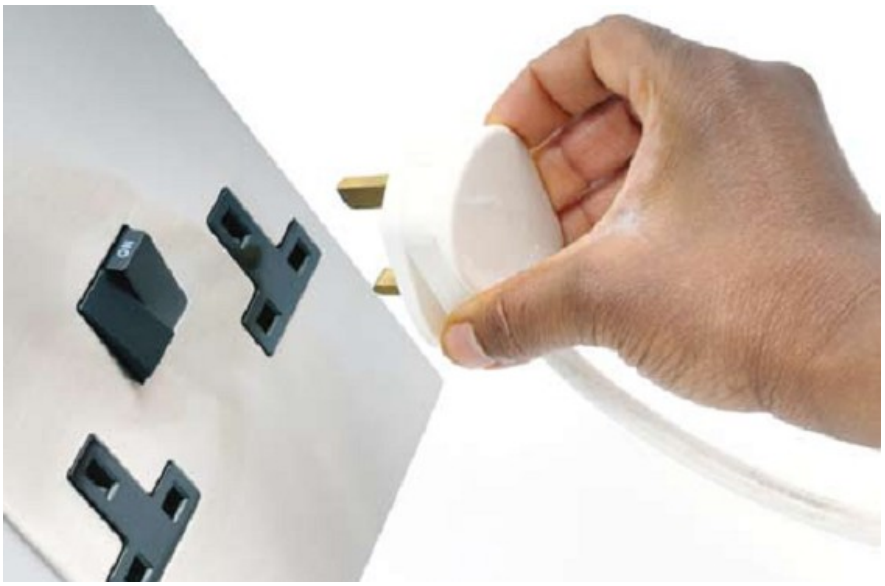
The vast majority of the electrical installation is built deep within the fabric of the building, hidden in the walls, the ceiling, the floors, loft space and even under the bath. The fuse box (now called a consumer unit) will be hidden in a dark cupboard at the bottom of the stairs behind the vacuum cleaner or the ironing board.

These items receive almost no attention from the day they were installed. All elements of the installation will deteriorate over time, nothing lasts forever. Cables become worn due to heat damage, rodents nibble away at the insulation, and screws work themselves loose and create bad joints. If your house was built in the 1970s its wiring is now getting on for 40 years old. As time has passed improvements and safety features have been built into the modern electrical installation. Is your house as safe as it could be?

The recommendation given by the Institute of Electrical and Electronics Engineers is that all domestic dwellings should be tested at a period not exceeding 10 years.

If you are moving home, you need to know about the electrics in your new property. Be extra cautious if the property is old as it runs a higher risk of having faulty wiring. Although the lights may work when you take a look at your new prospective home, it does not by any means ensure it is safe.

How old is the property? Has it been altered in any way since new? Who carried out the work? Did they really understand what they were doing?—It's easy to make an electrical circuit work, it's far more demanding to make the circuit work safely. It would be useful to know of any underlying deficiencies prior to moving in. Rewiring a house is a messy and expensive operation.



If some remedial electrical work is required, budget for it and get the work done before you have the walls skimmed and a new kitchen or bathroom installed. Remember: rewire first—decorate later. Don't put your life or your investment at risk; get an electrical survey of your new home before you sign on the dotted line.

Who should I contact to test my electrical installation?

Any full scope Part P registered electrician who holds the correct private indemnity insurance to carry out this type of work. The report is know as a Periodic Inspection Report.

What should I expect to gain from a Periodic Inspection Report?

This type of testing can take anything up to a day to complete. It covers every element of the condition of the installation from the suppliers fuse to the light bulbs. It is primarily concerned with the general condition of the fuse box/ consumer unit, fixed cables buried within the walls and floors, main earth bonding arrangements and accessories.

On completion you should be provided with a copy of the test certificate along with written advice explaining what work is required to bring the installation up to the required standard.

Further Information

Part P registration schemes:
http://www.napit.org.uk/

http://www.niceic.com/

Local authority building control:
http://www.labc.uk.com

CLG website:
http://www.communities.gov.uk

Planning portal website:
www.planningportal.gov.uk

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NHER SAVA

FACTSHEET

Gas in the home

Many people heat their homes and cook using mains gas and thankfully there are only a few accidents involving gas each year. However, while fortunately rare, in 2009-10, there were 223 incidents according to the national independent watchdog for work-related health, safety and illness the Health and Safety Executive (HSE). In many cases these accidents result in fatalities and for this reason the HSE takes issues relating to gas very seriously. There are two specific dangers associated with using gas in the home:

- Explosion and fire, which actually account for very few gas related incidences
- Carbon monoxide poisoning, which accounts for approximately 20 deaths each year

What is carbon monoxide and why is it a problem?

Carbon monoxide is a deadly poisonous gas, because when it enters the body, it prevents the blood from carrying oxygen to cells, tissues, and organs. The problem with carbon monoxide is that it is colourless, odourless and tasteless. Excess carbon monoxide is produced when normally safe-to-use carbon-based fuels including gas, oil, wood and coal do not burn properly.

Because you cannot see it, taste it or smell it, carbon monoxide can kill quickly without warning. Sadly, each year there are news reports recounting such tragedies. People die from carbon monoxide poisoning which is caused by appliances and flues that have not been properly installed, maintained or that are poorly ventilated.

Even if the level of carbon monoxide is too low to actually kill, it can still cause serious harm to health if breathed in over a long period. In extreme cases prolonged exposure can result in paralysis and brain damage.

How to keep safe

The HSE recommends that all gas appliances, including gas boilers, ovens, hobs and gas fires, should be regularly serviced in accordance with the manufacturer's guidelines at least once a year. Testing should be undertaken by a Gas Safe Registered Engineer.

A free gas safety check may apply to home owners on means tested benefits who:

- Are of pensionable age, disabled or chronically sick and either live alone or with others who are all of pensionable age, disabled, chronically sick or under 18
- Are living with others where at least one is under 5 years old

- Have not had a gas safety check carried out at the premises in the last 12 months
- Do not occupy premises where a landlord is responsible for arranging a check under regulations made under the Health and Safety at Work Act

You should contact your gas supplier for more information and to find out if you are eligible. They may be able to provide you with a free of charge gas safety check upon request.

You could consider installing an audible carbon monoxide alarm. They are cheap, easy to fit and are a good way to ensure you're immediately alerted to any carbon monoxide in your home.

Gas and rented accommodation

Landlords have specific responsibility when it comes to gas safety and they have legal obligations in relation to any gas supply and appliances at their rented property. Under the Gas Regulations the landlords must:

- Repair and maintain gas pipe work, flues and appliances so that they are kept in a good condition
- Carry out a gas safety check every year on each appliance to be done by a Gas Safe Register approved installer (you must give your tenants a copy of the gas safety record within 28 days of it being carried out or before they move in)

The landlord must also keep proper records. As a minimum, the record of a gas safety check must contain:

- A description of the location of each appliance or flue checked
- The name, registration number and signature of the individual carrying out the check
- The date on which the appliance or flue was checked
- The address of the property at which the appliance or flue is installed
- The name and address of the landlord (or his agent where appropriate)
- Any defect identified and any remedial action taken
- A statement confirming that the safety check completed complies with the requirements of the Gas Safety (Installation and Use) Regulations 1998

You are also obliged to show your tenants how they can turn off the gas supply in the event of a gas leak.

Gas Safe and Gas Safe Registered Engineer

The Gas Safe Register is the official gas registration body for the UK, Isle of Man and Guernsey appointed by the relevant Health and Safety Authority for each area. It is run by Capita Gas Registration which ensures that all their members are appropriately qualified to work with gas. The sole focus of the register is on improving and maintaining gas safety to the highest standards. There are around 120,000 gas engineers on the register.

Gas Safe Register replaced CORGI as the gas registration body in the UK and the Isle of Man on 1 April 2009 and Northern Ireland and Guernsey on 1 April 2010.

Remember that before you let your gas engineer into your home to work on your gas appliances you should check their Gas Safe ID card. If they don't show this to you when they turn up at your door then don't be afraid to ask to see it. You can also check that your engineer is Gas Safe registered by calling the Gas Safe Register on 0800 408 5500 or using their 'check an engineer service' online.

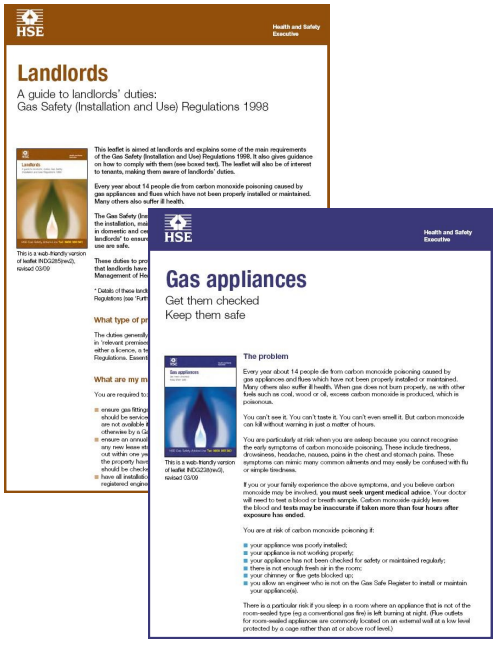
Buying a new home

In most cases, if you commission an independent surveyor to undertake an inspection and to report on the condition of a property prior to purchase, he/she will not be able to comment in detail on the gas appliances. This is because:

- The inspection will be visual only (the property belongs to the seller and an invasive inspection would not be tolerated)
- The gas appliances are rarely running at the time of the inspection and if they are, it is unlikely that the surveyor will be in the property long enough to get a clear impression of how well they are running
- The surveyor is unlikely to be a Gas Safe Registered Engineer.

For this reason it is sensible if you are selling a property to have a gas safety report on all the appliances you intend to leave in order to show copies to the potential purchasers, their surveyor and their conveyancer/solicitor.

If you are buying, ask the sellers to provide a gas safety report on the appliances and make sure the report is provided by a Gas Safe Registered Engineer.



Useful websites

www.hse.gov.uk/gas/index.htm

www.gassaferegister.co.uk/

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FACTSHEET

Photovoltaic panels–generating your own electricity

What are Photovoltaic panels and how do they work?

Photovoltaic (PV) panels work by capturing the sun's energy using photovoltaic (PV) cells. The cells convert the sunlight into electricity, which can be used to run household appliances and lighting.

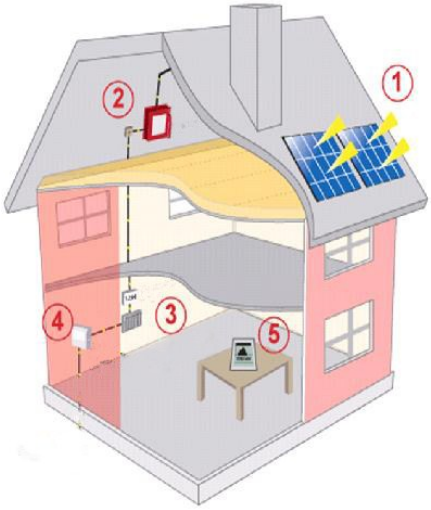
Solar PV panels (arrays of photovoltaic cells) generate renewable electricity from the sun by converting sunlight using what is called the 'photoelectric effect'. As energy is produced from daylight, not only from direct sunlight, panels generate electricity on overcast or sunny days.

Solar panels can supply a substantial proportion of the electricity needs of a typical household. Apart from reducing your electricity bill, any surplus electricity is sold directly back to the grid.

Solar panels provide clean, green electricity. They have no moving parts, require little maintenance and are designed to last for many years.

Photovoltaic panels are mounted onto your roof using a discrete framing system. The number of panels will depend on the size of your roof, how much electricity you want to generate, and how much you wish to invest in terms of installation costs.

The layout of the panels is also flexible and they can either be laid out in a portrait or a landscape configuration.



A typical installation as shown in the diagram above consists of the following:

1. PV panels are securely mounted onto your roof.
2. The PV panels are connected to an inverter, which is normally positioned in your loft space. The inverter converts the direct current (DC) generated by the panels to alternating current (AC) that is needed to power your lights and appliances.
3. A generation meter records how much electricity you are producing.
4. The electricity flows into your existing consumer unit, where it is either used to power your lights and appliances, or exported to the national electricity grid.
5. A real time display unit means that you can constantly keep up to date with the status of your system and enjoy the thrill of seeing your savings and income mount up.

Is my house suitable for a PV system?

Before installing a PV system, you might want to consider points.

Sunlight–The yield from the solar panels depends on the intensity and duration of light they receive, not necessarily direct sunlight. Therefore, even if it is overcast, solar PV panels produce electricity. However, shading from tall trees, buildings or chimneys can reduce the yield from the PV system.

Planning permission–You will need to check the local planning rules, although in most cases, installing a PV system is considered a permitted development and therefore planning permissions will not be required. However, if for example the home is in a conservation area, World Heritage Site or if it is a listed building, it will be necessary to consult your local authority.

Roof–Is your roof large enough? To ensure a good return on your investment, a roof size of at least 12 m^2 is recommended. You will also need to consider the orientation of your roof. The best performance is achieved if your roof faces West, South-West, South, South-East or East.

The roof must be strong enough to take the increase in weight from PV panels. This is usually not a problem with the average roof structure.

Electrical upgrading–PV systems should be installed by qualified electricians who will be able to identify any work that may need to be carried out prior to installation. Older fuse boxes may need to be replaced. In the majority of homes, only very minor upgrades are required and these can be carried out at the same time as the system is installed.

Access–Is the roof easily accessible? Is there sufficient space to erect scaffolding if needed?

What are feed-in-tariffs and how do they work?

The UK feed-in-tariffs (also known as the Clean Energy Cash Back) are a government-backed policy that has been introduced to encourage householders to generate their own electricity from renewable or low carbon sources.

The feed-in-tariffs reward you for the amount of energy your PV system generates regardless of whether you consume the electricity or not. It also pays you for the electricity you export to grid.

Benefits of feed-in-tariffs

You will be paid 43.3p for every single kWh of electricity that is generated by your solar PV system. Even if you use the generated electricity to power the appliances in your own home. By using the generated electricity in your home, you will also save around 13p for each kWh since you will not have to buy this electricity from you energy supplier, so in effect the total benefit is around 56p.

Any electricity that is not used in the home will be exported to the grid for which you will receive an additional 3.1p/ kWh.

The feed-in-tariffs (both generation and export tariff) are guaranteed for 25 years and each year they will increase by the Retail Price Index (RPI). Any income generate will be completely tax free.

It is important to remember that the feed-in-tariffs are only guaranteed if you install your solar PV system before April 2012.

For systems installed after April 2012, they will be reduced by 8.5% for each year that you delay. So there is a real incentive to install a solar PV system sooner rather than later.

Feed-in-tariffs in a nutshell

Generation Tariff–A fixed price for each unit of electricity generated by the system, whether used in the home or exported. This price is guaranteed for 25 years and will rise with the rate of inflation each year.

Export Tariff–A fixed price for each unit of electricity generated by the system that is exported to the National Electricity Grid. This price is guaranteed for 25 years and will rise with the rate of inflation each year.

Avoided Costs–The savings you make from reducing the electricity you need to buy from your supplier because you use your own generated electricity.

Costs and earnings

Prices will vary depending on the size of the system you choose, but they start from around £7500. Likewise, your earnings will depend on the size of the PV system. As an example, a typical installation produces approximately 2,000 kWh of electricity per year. If we assume that an average householder uses 50% of the generated electricity the system produces and sells the other 50% to the national electricity grid, they can expect to earn:

£866 from the Generation Tariff

£31from the Export Tariff

£130 from electricity bill

The total annual income would be **£1027,** while the total potential profit* over 25 years would be **£27,146**

*This is the total income and savings over the minimum lifetime of the system, less the original system cost.

Useful websites

For a quick quote check out the sunswitch cost calculator: www.sunswitch.co.uk

www.solarcentury.co.uk

For more info on the Feed-in-tariffs visit: www.energysavingtrust.org.uk/Generate-your-own-energy/Sell-your-own-energy

Prices quoted in this factsheet are correct as of April 2011.

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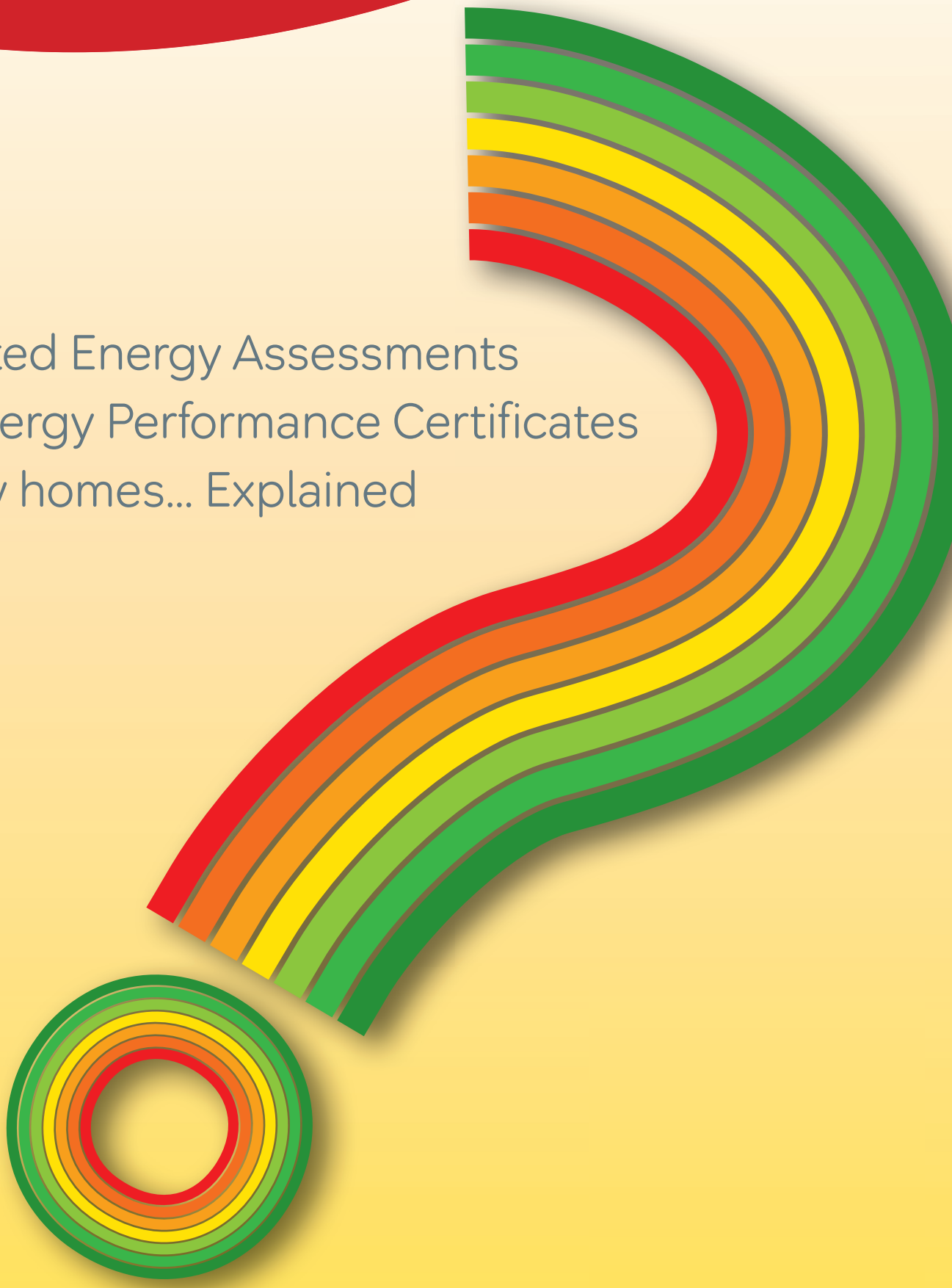
NHER SAVA

NHER
Accreditation Scheme

Predicted Energy Assessments and Energy Performance Certificates for new homes... Explained



A Predicted Energy Assessment and an Energy Performance Certificate are issued on new build dwellings and are part of many measures that are being applied across the EU member countries to improve energy efficiency in the built environment.

What is a Predicted Energy Assessment?

A Predicted Energy Assessment (PEA) is generated from the design plans of a new dwelling. It provides a predicted assessment of two key pieces of information.

- The energy efficiency of the proposed property on a scale from A – G (the most efficient being A and G the least efficient)
- The environmental impact of the proposed property, again on a scale from A – G (the most efficient being A and G the least efficient)

A PEA is required for all newbuild dwelling marketed off-plan and, if they are issued by an NHER On Construction Domestic Energy Assessor, they have a report reference number in the bottom right corner and are quality assured.

What is an Energy Performance Certificate?

The Energy Performance Certificate (EPC) is issued on a newbuild dwelling once the property is complete and will reflect the energy performance of the actual dwelling as built. On completion the EPC will replace the PEA and, as the EPC reflects the energy performance of the actual dwelling as built, may differ slightly from the PEA.

The EPC is also a much more comprehensive document than the PEA. As well as the energy efficiency of a property on a scale from A - G and, the environmental impact of a property on a scale of A-G, it also provides recommendations and cost effective ways to improve the energy efficiency of a property. The benefit is that, if acted upon, this can mean lower energy bills due to lower energy consumption, and in turn lower carbon emissions.

When is an EPC required?

All buildings in the UK that are constructed, sold, or rented are required to have an EPC as part of the Energy Performance of Buildings Directive (EPBD)

- A PEA or EPC is required when marketing a property. If an EPC already exists for a property, it can be included in the Home Information Pack (HIP) if it is less than three years old at the point of marketing. (Anyone involved in the sale of a home needs to comply with the Housing Act 2004 and Home Information Pack Regulations 2007 with respect to providing Home Information Packs.)

- Landlords must provide an EPC to prospective tenants when letting a property to them. The EPC is valid for ten years for rental purposes.

Why is an EPC important?

All PEAs and EPCs on new homes are produced using the same methodology. This means that all home owners and occupiers can compare the energy efficiency of different properties – in a similar way to comparing the fuel consumption of different cars.

Part of the EPC is a recommendation report which will list the potential rating that your house would achieve, if the changes were made. This information can be used to:

- Cut fuel bills
- Improve energy performance in the home
- Help cut carbon emissions

How is an EPC produced?

An EPC on new homes can only be produced by an On Construction Domestic Energy Assessor (OCDEA) who must be registered with a Government approved Accreditation scheme. The OCDEA will produce the assessment from plans and information from the developer. He is not required to visit the site but relies on the Building Control Authority to ensure the developer does what he said he was going to do. Details are entered into a computer programme which is a calculation model, developed by the Government, known as SAP (Standard Assessment Procedure).

SAP is a cost based rating system using pre determined assumptions which are standard across all dwelling types, dwelling sizes, and dwelling specifications.

There is no requirement for a PEA to be produced by an On Construction Domestic Energy Assessor, or by anyone with any other qualification. However the NHER Accreditation Scheme takes the production of this report seriously and includes them as a quality assured product in it's membership scheme.

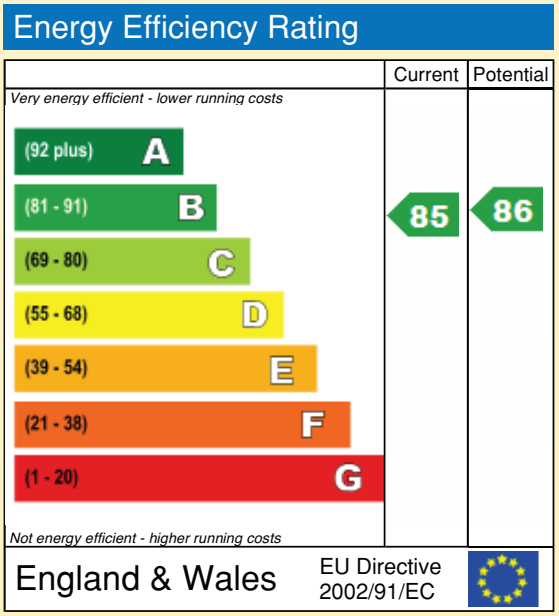
EPC Format

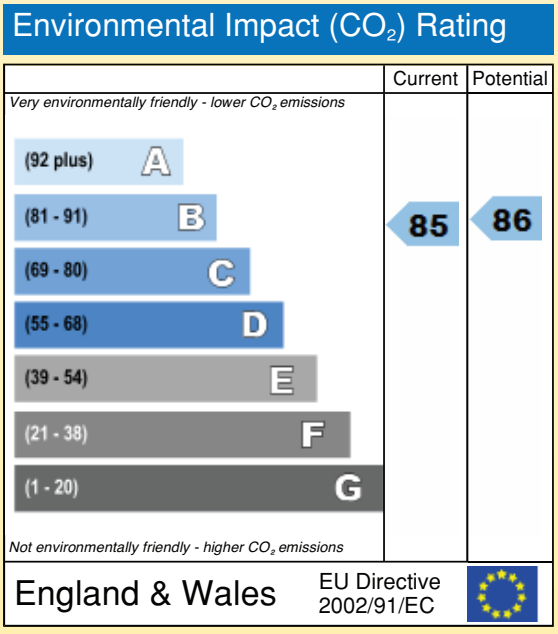
The EPC shows information relevant to the individual property in the form of tables and a graph similar to that seen on domestic appliances. The EPC is split into the following sections:

1. Asset Rating
2. Estimated Energy Use
3. Summary of energy performance features
4. Recommendations

1. Asset Rating:

The Asset Rating section displays the Energy Efficiency Rating and Environmental Impact Rating as shown below:





The performance of the property is rated in terms of the energy used per square metre of floor area based on fuel costs and environmental impact based on carbon (CO_2) emissions.

The numbered arrows in the Asset Rating display shows the current rating based on the existing energy performance of the property and a potential rating based on the suggested improvements being implemented.

2. Estimated Energy Use:

The estimated energy section shows the estimated energy use, carbon dioxide (CO_2) emissions and fuel costs of the dwelling as shown below:

Estimated energy use, carbon dioxide (CO_2) emissions and fuel costs of this home

	Current	Potential
Energy use	118 kWh/m² per year	110 kWh/m² per year
Carbon dioxide emissions	1.3 tonnes per year	1.2 tonnes per year
Lighting	£56 per year	£32 per year
Heating	£195 per year	£198 per year
Hot water	£82 per year	£82 per year

The figures in the table are based on standardised assumptions about occupancy, heating patterns and geographical location. This means that the figures displayed may be different to the actual fuel cost of any new owner. The reasons for this are:

a) SAP uses a standard heating pattern within the calculation. This is 9 hours each weekday and 16 hours a day at the weekend, and assumes that the main living area is heated at 21°C and the remainder of the dwelling at 18°C. This may be different to the actual heating pattern of the person living there, but it enables properties to be compared on a like for like basis

b) The model also assumes that the number of occupants is proportional to the floor area of the dwelling and hot water usage is calculated using the same proportions. Therefore if a single person purchases a 5 bedroom house, the energy predicted for hot water in the model and, displayed on the EPC, will be higher than the likely actual usage. Again this procedure allows all properties to be compared on a like by like basis

c) In addition the model assumes that all properties are based in the middle of England, and uses the average outside temperature of that region for the heating calculations. However, a property in the Southwest of England is likely to require less energy for heating than a comparable property in the Northwest – which would be reflected in the actual bills

d) If the property has 2 heating systems present, a primary or 'main' heating system; perhaps a gas boiler with radiators and a secondary or 'top-up' heating system; maybe an open coal fire, the model assumes that up to 15% of the heating is provided by the secondary system. The efficiency of the secondary system is likely to be much lower than that of the primary system and will therefore push the energy costs up. It may be that the secondary system is rarely used and would not contribute to 15% of the heating, but again, so as to compare properties fairly, these are the standard assumptions made in the model

e) The energy use displayed in the EPC also includes the energy consumed in producing and delivering the fuel to the dwelling, and thus will be greater than the energy actually used in the dwelling

3. Summary of energy performance related features:

The summary of energy performance related features section of the EPC shows the most crucial energy related elements of the property:

The table is broken down into the different elements of the property and displays its current energy efficiency and environmental performance. The descriptions are based on the data that has been collected from the plans and specifications specific to the property's thermal and heating elements these are Compliant, Average, Good, and Very Good.

Summary of this home's energy performance related features

The following is an assessment of the key individual elements that have an impact on this home's performance rating. Each element is assessed against the following scale: Compliant / Average / Good / Very good.

Element	Description	Current performance	
		Energy Efficiency	Environmental
Walls	Average thermal transmittance 0.29 W/m²K	Very good	Very good
Roof	(other premises above)	-	-
Floor	(other premises below)	-	-
Windows	Fully double glazed	Good	Good
Main heating	Boiler and radiators, mains gas	Very good	Very good
Main heating controls	Programmer, room thermostat and TRVs	Average	Average
Secondary heating	None	-	-
Hot water	From main system	Very good	Very good
Lighting	Low energy lighting in 25% of fixed outlets	Average	Average
Air tightness	Air permeability 7.0 m³/h.m² (assumed)	Average	Average
Current energy efficiency rating		**B 85**	
Current environmental impact (CO_2) rating			**B 85**

Thermal transmittance is a measure of the rate of heat loss through a building element; the lower the value the better the energy performance.
Air permeability is a measure of the air tightness of a building; the lower the value the better the air tightness.

4. Recommendations:

The recommendations section lists measures that can improve the SAP rating of the property. These are separated into:

- Lower cost measures - below £500 installation cost
- Higher cost measures - above £500 installation cost

The measures are assessed cumulatively in a predetermined order, and are only included if they make a measurable change to the energy efficiency of the building.

This section also displays potential savings per year, and shows the Energy Efficiency and Environmental Impact rating as a result of these improvements.

The Asset rating displays the potential ratings for lower and higher cost measures only.

Finally, there is a description of each recommendation, as well as how it can be used to improve the energy efficiency of the home. It also gives advice as to the application/installation of the recommendation.

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30/09/2009

FACTSHEET

Saving energy in the home

The energy used in our homes is responsible for over a quarter of all UK CO_2 emissions, the main greenhouse gas causing climate change. Making your home as energy efficient as possible will not only reduce CO_2 but will also save money on your fuel bills.

Insulation

Heating accounts for most of the energy used and the CO_2 emissions associated with the home, in fact nearly half of heat is typically lost through the walls and the roof. You can reduce this loss by insulating your walls and loft this could save £200 a year in a typical 3-bedroom property.

Installing cavity wall insulation can be done from the outside, but your building needs to have cavity walls and the work will need to be done by professional installers. You can insulate solid walls too, but this is a bigger and more costly job to do.

Loft insulation is easy to install and you can do it yourself. If you already have loft insulation, check how thick it is. Adding another layer to bring it up to the recommended 270 mm will save both energy and money being wasted.

You can find out more about how to insulate your home effectively in our fact sheets on *Insulation* and *Cavity Wall Insulation*.

Heating

Understanding how your central heating system works and setting your heating controls correctly should result in a more economical use of your heating system. Controls include:

- room thermostat
- radiator valves with thermostats
- boiler thermostat
- heating programmer

The room thermostat controls the temperature of the whole of the home based on the room it is in. Once the set temperature has been reach, it sends a signal to the central heating pump and boiler to stop firing and circulating water around your pipes to your radiators.

The optimal temperature setting depends on you and your situation. Typically, for pensioners and families with young children the room thermostat should be set to 22^0C and to 18^0 to 21^0C for everyone else. Consider that turning down the room thermostat by just 1^0C could cut heating bills by up to 10 per cent. Note that turning up the room thermostat will not heat the room up faster, it will make the room hotter!

The radiator thermostat is attached to the radiator and allows you to have different temperatures in each room.

The boiler thermostat is located on the boiler and controls the temperature of the hot water flowing around the pipes to the radiators. It should be set to HIGH throughout the year. This will result in the water flowing around the radiators being at a high temperature and enabling the room to get up to the temperature requested by the radiator thermostat quickly. Once this happens the boiler will stop firing and this means you will be saving fuel.

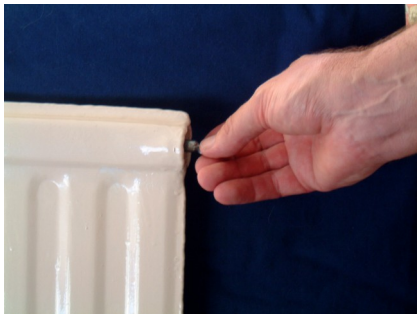
The heating programmer allows you to set times for your heating and hot water to make sure they are on when you need them.

Consider upgrading your G-rated boiler to an A-rated equivalent; your household heating bill could drop by, on average, around £235 a year. A high-efficiency condensing boiler works on the principle of recovering as much as possible of the waste heat which is normally wasted from the flue of a conventional (non-condensing) boiler. High-efficiency condensing boilers convert 86% or more of their fuel into heat, compared to 65% for old G rated boilers.

Radiators

Sometimes air gets trapped inside the radiator. The top of the radiator will feel cold to the touch and the bottom warm. To fix this you can 'bleed' the radiator by opening the valve at the topside of the radiator–very slowly–with a radiator key until all the air has escaped. When you do this, make sure the heating has been switched off for a while to avoid any possibility of scalding.

A radiator can loose up to 40% of its heat through the wall behind it. To reduce this substantial heat loss a reflector can be fixed. It is available in a roll from DIY stores or building merchants, and can be cut to size and fitted behind radiators using wallpaper paste or adhesive strips.



Hot water

60°C is the optimal temperature for the hot water cylinder; this is an energy efficient temperature at which bacteria such as those associated with Legionnaire's do not survive.

Make sure your hot water tank and pipes are insulated (see our fact sheet on *Insulation*. A 75 mm thick hot water cylinder jacket will save you around £35 and about 190 kg of CO_2.

Try this...

Draught-proofing

Draught-proofing is a DIY measure that is a cost-effective way of increasing comfort and reducing heating bills. Depending on the age of the property around 15-20% of all heat in the average home escapes through ventilation and draughts.

Draught-proofing your home could have an annual saving of around £30, with a CO_2 saving of 150 kg per year.

Draught-proofing measures	
Doors	Add compression strips to form a good seal when door is shut.
Windows	Fitting low friction 'wiper blades' creates a good seal while the windows should still open. Alternatively use self-adhesive foam draught sealant.
Gaps in floors and skirting	Adhesive sealant can be applied to fill and seal any gaps or joints.
Floors	Good thick carpet with cork-board underneath can improve comfort levels with draughty floorboards.
Chimneys	Block chimneys using a chimney balloon (around £25).
Curtains	Keep the dwelling warm on winter evenings and cool on hot summer days.

Lighting

Compact Fluorescent Lamps (CFLs) use around 50 to 80% less electricity than incandescent bulbs, and could last up to 10 times longer. Compared to the use of incandescent bulbs CFL's can save around £60 over the lifetime of the bulb. Incandescent bulbs are now gradually being phased out, and will not be available after 2012.

You could also replace traditional light bulbs with halogen bulbs. These are not as efficient as CFLs, but they still use between 25 and 40 per cent less energy than traditional light bulbs.

Most energy saving bulbs are not fully compatible with dimmer switch circuits yet (although manufacturers are currently working on improving designs). A standard dimmer switch will simply make the bulb flicker. You need to check with the manufacturer to ensure that the bulb you plan to use is fully dimmable.

Leaving lights on unnecessarily costs the UK around £140 million a year. It is a misconception that leaving on fluorescent lights (compact and strip-lighting) is better than turning them off. A general rule of thumb is to turn them off if you leave a room for more than a few minutes; this way the lifespan of the bulb is not reduced.

CFL's contain a small amount of mercury and should not be thrown into the normal rubbish or into household recycling bins, instead they can be recycled at your local waste and recycling centre.

Standby mode

Estimated annual CO_2 emissions from devices left on standby	
Stereos	1,600,000 tonnes
Videos	960,000 tonnes
TVs	480,000 tonnes
Consoles	390,000 tonnes
DVD players	100,000 tonnes
Set top boxes	60,000 tonnes
Source: Energy Saving Trust	

The average household leaves about 12 gadgets charging or on standby. Appliances left on standby still use around 85% of energy to keep them powered down. Leaving appliances on standby also significantly reduces the life of your appliances long-term.

Appliances like mobile phones, laptops and iPod chargers still consume power when plugged into the wall, even when switched off at the plug. Turning an appliance off at the mains rather than leaving them on standby can have significant cumulative savings and the average house can save £37 a year.

Smart-adapter mains plugs give control over standby modes for TVs and PCs. They contain a sensor that switches off all peripherals when the main unit is turned off.

Devices called energy usage monitors give real-time electricity consumption information. They show you exactly how electricity is being used in the home and therefore give you more control over electricity consumption by showing you where you could make cutbacks. The energy usage monitor can help you save money and reduce the CO_2 emissions in your home.

Appliances

White goods

Dishwashers, washing machines and tumble-dryers are three of the most power-hungry appliances in the home. A good way to improve energy efficiency is to invest in A-rated appliances (look for the Energy Saving Trust *energy saving recommended* logo).

Defrosting fridges and freezers regularly keeps them running optimally. It might be worth noting that a large floor-standing A-rated fridge\freezer is likely to use more energy in total than a smaller less efficient fridge\freezer. If you have a big freezer keep it full and fill any gaps with containers filled with water. This will help to keep the rest of the food cold without wasting money keeping empty space cold.

When loading up a freezer or fridge don't keep the doors open for long or the cold air will escape.

Wash your clothes at 30 degrees in an energy efficient washing machine; modern detergents are designed to wash effectively at lower temperatures. Wait until you have a full load before you do a wash.

Dry your clothes on an outside line instead of using the tumble dryer. The running costs of a tumble dryer could be up to £70 per year, using between 2-5 kWh per cycle.

Kettle

Government research has shown that if everyone boiled only the water they needed to make a cup of tea instead of filling the whole kettle every time, we could save enough electricity to run practically all the street lighting in the UK.

Use the volume indicator on the side of the kettle, or alternatively fill the kettle from a mug or measuring jug rather than from the tap. This allows you to measure accurately the amount of water you are boiling to avoid wasting energy.

De-scaling the kettle regularly means it will boil more quickly, so using less electricity.

The 'Eco Kettle' is a kettle with a water reservoir that fills the exact amount of hot water that you really need.

Cooking

Selecting an appropriate size of saucepan, not overfilling with water and using the lid while cooking can save up to half of the energy used for cooking on an electric hob.

Using a microwave to cook a baked potato uses 10 times less energy than a standard electric oven. Research by the UK Market Transformation Programme shows that 1/5 of all cooking tasks could be moved from an electric oven to a microwave, saving time and money.

Summary

By acting now, we can reduce our energy consumption while maintaining comfort and convenience and saving money.

By switching our consumer demand to products that consume less energy, we can help save the environment.

Useful websites

http://actonco2.direct.gov.uk/home.html

http://www.mtprog.com/

http://www.sustainable-energyacademy.org.uk

http://www.energysavingtrust.org.uk

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FACTSHEET

Renewable Energy

Introduction to Renewable Energy

In 2006 the UK Government set a target that 20% of the UK's electricity supply should come from renewable energy sources by 2020. Renewable energy is also an integral part of the government's longer-term aim of reducing Carbon Dioxide (CO_2) emissions by 80% by 2050 (i.e., 80% reduction measured against 1990 levels).

In order for these targets to be reached, micro-generation must play a lead role. Micro-generation is the term used for the generation of both heat and electricity by householders from renewable energy systems. The most common renewable energy technologies employed in the UK by householders are:

- Biomass
- Ground Source Heat Pumps
- Solar Thermal
- Solar Photovoltaics (Solar PV)
- Wind Energy Conversion Systems.

These renewable energy technologies not only provide low and zero carbon energy but can reduce home energy bills and add value to your home.

Micro-generation technologies do require an initial capital investment that can make the conventional alternatives of oil gas and coal seem more attractive. However, in addition to the benefits listed above, most well designed and installed renewable systems will save you money within their lifetime as energy prices continue to rise.

In addition, as there are many organisations offering grants toward the installation of renewable energy systems, the financial return on these systems can be significant. This fact sheet provides a brief over view of the most popular renewable energy technologies that micro -generation systems comprises. For more comprehensive information, please see the list of useful website overleaf.

Renewable Energy Technologies

Biomass

Biomass is the collective term for plant or animal matter that can be digested or burned to release energy. In contrast to conventional fuels (oil, gas and coal), biomass forms quickly and absorbs as much CO_2 during its formation as it emits during combustion. This leads to biomass having the potential to be a very low-carbon sustainable fuel.

For domestic applications, biomass typically takes the form of wood products (logs, pellets or chips) and can be used to provide both space and water heating in stoves or boilers for entire houses or single rooms.

The cost of Biomass systems varies significantly depending on a variety of factors. A wood-pellet boiler that would provide both space and water heating for a typical three or four bedroom semi-detached house would cost approximately £8,000 installed.

Ground Source Heat Pumps

Ground Source Heat Pumps (GSHP) can be a very efficient and effective central-heating system. GSHP extract heat from beneath the surface of the ground via collectors laid in horizontal trenches or vertical boreholes. The GSHP system then transfers the extracted heat to heat your home. GSHP typically provide between 3 and 4 units of heat energy for every 1 unit of electricity consumed.

The cost of GSHP systems varies significantly depending on a variety of factors. For example, the typical cost of a GSHP with vertical boreholes necessary for a 3 or 4 bedroom semi-detached house, is in excess of £ 10,000 installed—although costs do vary greatly depending on the type of installation.

Solar Thermal

A solar thermal system captures energy from the sun and transfers it as heat to your domestic hot water supply. They are generally mounted on roofs with a southern aspect.

In most areas, planning permission is not required for solar thermal systems, provided that the building on which it is to be mounted is not a listed building or in a conservation area. It is wise to check with your local authority to ensure that this is the case for your property.

A typical solar thermal system for a four-person household, has a collector area of 4 m^2, can supply half of a home's annual hot water demand and costs approximately £3,500.

Solar Photovoltaics (PV)

Solar Photovoltaic (Solar PV), like solar thermal, are generally mounted on a roof with a southern aspect and convert solar radiation into electricity. They are comprised of 'cells' of a semi-conductor material (most commonly silicon) and can be encased in a frame as a panel or integrated into a roof as 'solar-tiles'.

A typical PV array (10-30m^2) could supply up to half a home's electricity and would cost £6,000 installed. As with solar thermal they tend not to require planning permission in most instances and require little maintenance due to the lack of moving parts.

Wind Energy Conversion Systems

Wind Energy Conversion Systems (WECS) convert kinetic (movement) wind energy into electricity. Most commonly this is done with a 'wind turbine'. For domestic applications, 'micro' or 'small-scale' turbines can be installed on the roof of the building itself or mounted on a free-standing mast.

Buildings, trees and other obstacles reduce the speed of the wind and cause it to become turbulent. This can greatly reduce the efficiency of the turbine. For this reason it is important that turbines are sited as high as possible and in a location that is as open to the prevailing wind as possible. Small wind energy installations may require planning permission and you must consult the planning officials before considering installation.

WECS up to 1 kW will cost around £1500, whereas larger systems in the region of 2.5 kW to 6 kW can cost between £11,000 to £19,000.

Grants

Government grants and other incentives are available for the installation of renewable energy technology. For example, in Scotland grants are available to cover 30% of the cost of installing a renewable heating system at home, up to a maximum of £4,000.

In April 2010 the government introduced Feed in Tariffs, providing financial incentives for people to install electricity-generating technologies such as solar electricity panels and wind turbines.

Useful websites

Renewable energy technologies:
www.nef.org.uk/actonCO2/renewableenergy.asp

www.bwea.com/index.html

www.solar-trade.org.uk

www.gshp.org.uk

Grants:
www.energysavingtrust.org.uk/scotland/Scotland-Welcome-page/At-Home/Grants-and-offers/Energy-Saving-Scotland-home-renewables-grants

www.energysavingtrust.org.uk/Generate-your-own-energy/Sell-your-own-energy/Feed-in-Tariff-Clean-Energy-Cashback-scheme

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FACTSHEET

Carbon Footprint

Definition of carbon footprint

Carbon footprint is defined as the total amount of greenhouse gases produced to directly or indirectly support human activities, usually expressed in equivalent tons of Carbon Dioxide (CO_2).

Another way to think of it is that when you drive a car, the engine uses fuel that creates a certain amount of CO_2 when burned. The amount of CO_2 produced is directly attributed to the fuel consumption of the vehicle and also the distance travelled.

When you heat your house, whether it is using solid fuel, gas or oil, CO_2 will also be generated. Even a home that is heated using electricity will create a certain amount of CO_2 produced as part of the electricity generation process. However, this will vary depending on the type of power station that generated the electricity before it is delivered to you via the National Grid.

When you buy food and products from the shops there will most likely have produced CO_2 as part of the production processes.

Your carbon footprint is the sum of all CO_2 emissions that were created by your activities over a given time frame (is usually a year).

There are two parts to a carbon footprint, the primary footprint and the secondary footprint.

1. The primary footprint is a measure of our direct emissions of CO_2 from the burning of fossil fuels including domestic energy consumption and transportation including driving, flying or using public transport.

2. The secondary footprint is a measure of the indirect CO_2 emissions from the whole lifecycle of the products we use. This includes manufacturing and eventual breakdown CO_2 emissions. To put it bluntly the more we buy the more emissions will be caused by us.

Examples of carbon footprint

- For each (UK) gallon of petrol fuel consumed, 10.4 kg CO_2 is emitted.

- If your car consumes 7.5 litres of diesel per 100 km, then a drive of 300 km distance consumes 3 x 7.5 = 22.5 litre diesel, which adds 22.5 x 2.7 kg = 60.75 kg CO_2 to your personal carbon footprint.

Fuel type	Unit	CO_2 /unit
Petrol	1 gallon (UK)	10.4 kg
Petrol	1 litre	2.3 kg
Diesel	1 gallon (UK)	12.2 kg
Diesel	1 litre	2.7 kg
Oil (heating)	1 gallon (UK)	13.6 kg
Oil (heating)	1 litre	3 kg

Each of the following activities add 1 kg of CO_2 to your personal carbon footprint:

- Travel by public transportation (train or bus) a distance of 10 to 12 km (6.5 to 7 miles)

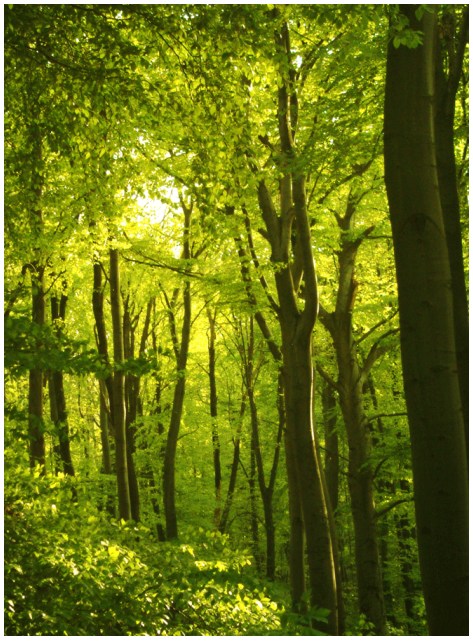
- Drive with your car a distance of 6 km or 3.75 miles (assuming 7.3 litres petrol per 100 km or 39 mpg

- Fly with a plane a distance of 2.2 km or 1.375 miles

- Operate your computer for 32 hours (60 Watt consumption assumed)

- Production of 5 plastic bags

- Production of 2 plastic bottles



Calculating your carbon footprint

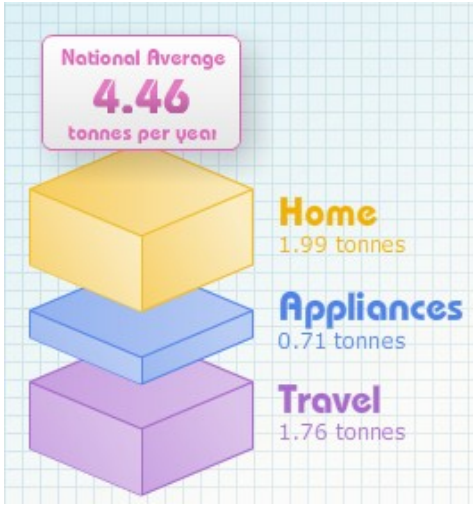
The quickest and easiest way to calculate your carbon footprint is to use a web-based online carbon footprint calculator. There are many that can be found on the internet and all of them are designed with ease of use in mind.

One such example can be found at the following web address:

http://carboncalculator.direct.gov.uk/index.html

Simply answer the various questions relating to energy use and travel and the calculator will give you a result expressed usually as either kilograms or tonnes of CO_2 per year.

Once you have your carbon footprint result you can usually see how much has been calculated for energy use, appliance use and travel. You can then see how you compare against the national average.



Reducing your carbon footprint

There are many ways to reduce your carbon footprint, most of which are very easy to achieve with little or no investment required and take up little or no time or effort.

Some things to help reduce your primary carbon footprint are:

- Turn off electrical devices and appliances that are not being used. Ask yourself, does that phone or laptop charger really need to be plugged in and switched on if it is not being used?
- Turn down your heating thermostat by 1 degree.
- Fill your dishwasher and washing machine with a full load. This will saves electricity, water and washing powders.
- Fill the kettle with only as much water as you need
- Do shopping in a single trip to cut down on travel
- Car share where possible
- Fit low energy light bulbs

Your EPC will also contain a list of recommendations that will help to reduce your carbon footprint as well as your fuel costs.

Some things to help reduce your secondary carbon footprint are:

- Recycle, recycle, recycle
- Don't buy bottled water if the tap water is safe to drink
- Don't buy over packaged products

Useful websites

http://actonco2.direct.gov.uk/home.html

http://www.energysavingtrust.org.uk/

http://www.worldwildlife.org/climate/whatyoucando-climate.html

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