

HOME ENERGY STRATEGY UPDATE: 2009



Clean Energy





CLEAN ENERGY

Home Energy Strategy 2007-2011

Plymouth City Council

September 2007 | updated October 2008

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EXECUTIVE SUMMARY

This document replaces the existing 1996 Home Energy Strategy. It is a reference point with background information and will be updated annually.

The strategy addresses three key threats: climate change, peak oil and fuel poverty. Of these, fuel poverty is regarded to be the most immediate threat and one that will be the priority for action.

Homes are likely to see an increase in structural damage from flooding, increased frequency and ferocity of storms and subsidence and heave. In the longer term rising sea levels will make parts of the city uninhabitable. We must therefore adapt to climate change as well as reduce carbon dioxide emissions.

Most economists agree that we are entering a period of decline in the availability of oil and gas at a time when population growth and developing economies (principally India and China) are increasing demand for energy. Energy prices will rise inexorably and there are likely to be scarcities.

In order to mitigate these long term threats it is necessary to have a long term vision - to 2050 and beyond. The vision must accept a gradual shift away from dependence on fossil fuels and offers a 'clean energy' future. The vision presented here for Plymouth is based on enabling a shift to decentralised energy, whether based on local combined heat and power networks or using our homes to generate the energy we need. Although the clean energy vision will not be achieved before 2050 it is important that we make a start now by building the energy infrastructure and ensuring new homes are built to the highest possible standards. In the mean time we must improve the energy efficiency of existing homes and encourage people to use energy wisely.

It is important to recognise that at the beginning of the 21st century many Plymouth residents suffer poor health and are dying prematurely partly because their homes are cold and damp. People living on a low income and in homes that waste heat through the building fabric are 'fuel poor'. Tackling fuel poverty is an immediate target for action.

The Government have set targets for housing energy efficiency, greenhouse gas emissions, renewable energy production and fuel poverty. Targets will be met through legislative, regulatory and fiscal instruments, with the council having a key role in delivery. Plymouth City Council will ensure that a fair proportion of national resources are attracted to the city and targeted at people and areas of greatest need. We will co-ordinate, measure and monitor activity to ensure best value. The council will implement a marketing action plan that aims to change behaviour, inform, educate, and advise local residents.





The Government introduced a new set of national indicators in 2008 - NI 186 (carbon dioxide emissions) and NI 187 (fuel poverty). The council will establish benchmarks and measure progress from 2009/10. Other national policy drivers include Decent Homes, the Housing Health and Safety Rating System, Building Regulations and Code for Sustainable Homes.

Gas and electricity consumption and carbon dioxide emissions in the housing sector in Plymouth are below national average. This is due to the mild climate, although fuel poverty is also a factor. About a quarter of homes in the city lack basic energy efficiency measures such as loft and cavity wall insulation. These are a priority for the period to 2015. A third of homes are of solid wall construction and require expensive and disruptive intervention to make them energy efficient; it is unlikely that we will be able to tackle these on a large scale until 2012.

The OVERALL AIM of this strategy is to reduce carbon dioxide emissions in the housing sector. Within this context we have three aims:

AFFORDABLE ENERGY. Improve the health and well-being of fuel poor people and those with cold-related illness that live in energy inefficient homes.

ENERGY CONSERVATION. Encourage the fuel rich to reduce energy consumption and developers to build new homes to a high energy efficiency standard.

SUSTAINABLE ENERGY. Encourage developers and homeowners to incorporate renewable energy into their

homes and promote other forms of decentralised energy such as Combined Heat and Power.

Key objectives for 2009:

- Establish baselines and annual improvements for NI 186 and NI 187.
- Develop an action plan and policies to deliver aims.
- Provide support to enable officers and partners to deliver aims.
- Develop and implement a marketing strategy to achieve the aims through education, information, advice and promotion.
- Develop projects that contribute to the delivery of aims; establish examples of good practice and test new ideas.
- Ensure all new housing is built to the highest possible standards of energy efficiency and that will adapt to the effects of climate change.



BACKGROUND

Home Energy Conservation Act

The Home Energy Conservation Act (HECA) created Energy Conservation Authorities (ECAs) who are required to develop a strategy for improving the energy efficiency of the housing stock (1). The strategy set the baseline at April 1996 and quantified the measures required to meet the target. The HECA target is to improve the energy efficiency of pre-1996 housing by 30% over a 10-15 year period.

Comprehensive advice was provided to ECAs to help achieve the target (2). Two types of action would be required: measures and marketing. Physical measures such as loft and cavity wall insulation will have a direct impact on the target, but in the private sector the council is likely to have more influence by means of education, information, advice and promotion – or marketing for short.

National Indicators

The two national indicators addressed by this strategy are NI 186 and NI 187. NI 186 measures per capita carbon dioxide emissions in three sectors, one of which is housing. NI 187 relates to fuel poverty, but counts only those fuel poor households who are in receipt of income-related benefits, which is approximately 60% of the total. The council is required to measure NI 187 annually.

Decent Homes

'Decent Homes' is often referred to as a 'standard' but in reality is a threshold that is so poor as to trigger action by the local authority (3). A non-decent must be improved. Good practice guidance suggests "...a SAP rating of 75 should be regarded as a minimum to be exceeded wherever technically and financially feasible." (4, p.7). The Government (3, p.24) gives an indication of standards:

"Landlords must comply with the current Building Regulations... when carrying out works... and in general should use the Regulations as a guide as far as possible."

In order to be 'decent' a home must:

- meet current statutory minimum standards for housing
- be in a reasonable state of repair
- have reasonably modern facilities and services
- provide a reasonable degree of thermal comfort

A home will fail the thermal comfort criteria if it does not have 'efficient' heating serving two or more rooms plus some form of insulation.

Housing Healthy and Safety Rating System

The HHSRS replaced the fitness standard in April 2006. It provides a framework for assessing health and safety risks in the home (5). The intention is that any home should provide a safe and healthy environment for occupiers and visitors. The HHSRS considers 29 hazards, of which the energy related are:

- excess cold (including damp & mould growth)
- excess heat
- fire electrical hazards
- carbon monoxide and fuel combustion products
- falls associated with baths, stairs and steps, between levels or on the level

A SAP (energy rating) of 35 or less is a proxy for a category 1 'excess cold' hazard (3, p.18).

Building Regulations Part L

The current version of Part L (Conservation of Fuel and Power) came into force in April 2006. The energy performance of new homes is raised by 20% over 2002 Building Regulations (6). Homes built to 2006 standards should achieve a SAP of over 90. Part L1A applies to new homes and L1B to refurbishment. Part L1B recognises that when changes are made to an existing dwelling, opportunities arise for making energy efficiency improvements to the whole property. For a full description see (7).

Code for Sustainable Homes

The Code came into effect in April 2006 and is currently voluntary. It is intended as a single national standard to enable a step change to zero carbon construction by 2016 (8). The Government intends to make assessments under the Code mandatory in future. The code has six 'levels', with each level requiring a higher reduction in carbon dioxide emissions over 2006 Building Regulations:

- Level 1: 10% better than 2006
- Level 2: 18%
- Level 3: 25%
- Level 4: 44%
- Level 5: 100%
- Level 6: 145% (zero carbon)

Zero Carbon homes by 2016

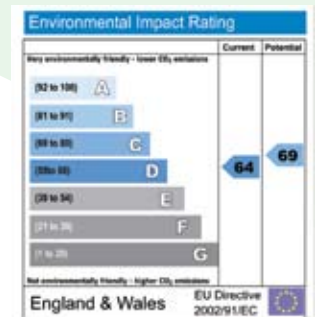
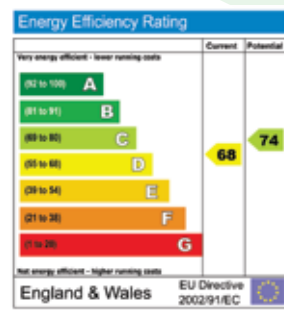
The Government have established a goal of ensuring that all new homes are 'zero carbon' by 2016. A 'zero carbon' home is defined as one where net carbon emissions from all energy used in the dwelling is zero. This includes heating, hot water, ventilation, lighting, cooking and all appliances. Heat and power can be generated in the home or development, or through a local community system such as CHP, but must be based on renewable energy. A technical brief (9) provides further guidance.

Building a Greener Future

The Government published a Policy Statement in 2007 (40) that confirm its three-stage approach to improving Building Regulations Part L. From 2010 Code level 3 will be required, from 2013 Code level 4 and by 2016 Code level 6. The Statement stresses the importance of local authorities, house builders, the construction products industry and others working in partnership to achieve zero carbon by 2016.

Energy Performance Certificates

When homes are sold or relet they will require an Energy Performance Certificate (EPC). Once issued, certificates have a life of ten years. They provide an energy label similar to that given on electrical appliances such as fridges and washing machines - see extract below.



Planning Policy Statement 1

National planning policy PPS1 relates to sustainable development and states that the development plans of local authorities should "...contribute to global sustainability..." in a number of ways, including policies which reduce energy use and "...promote the development of renewable energy resources." (37, p.6). There is a particular emphasis on climate change adaptation and mitigation. Development plan policies should ensure that new developments make efficient use of resources, for example "...building housing at higher densities on previously developed land..." (37, p.9). Supplementary guidance to PPS1 (38) stresses

the importance of decentralised and renewable energy in developments and the need for policies that meet a “significant proportion” of energy needs on site.

Planning White Paper

The Planning White Paper - Planning for a Sustainable Future (39) - provides a “wide ranging package of reforms” aimed at combating climate change and building sustainable communities. It states an intention to introduce legislation to set out the role of local planning authorities in tackling energy efficiency and climate change. It recognises that planning permission has been a barrier to the uptake of domestic renewable energy technologies such as solar panels. It proposes that “...broadly all forms of householder microgeneration should be permitted without the need to apply for planning permission...” (39, p.108). There is an emphasis on reducing greenhouse gas emissions, encouraging decentralised energy systems, enabling renewable energy developments and designing developments so as to minimise energy consumption and resource depletion.

In 2008 the Government published “Changes to Permitted Householder Development Rights for Householder Microgeneration” (43). This enables householders to install photovoltaic, solar thermal, ground and water-source heat pumps and combined heat and power without planning permission. There are certain restrictions - in relation to conservation areas for example.

Regional Spatial Strategy

Key policies are renewable electricity and renewable heat targets (RE1 & RE3); developments of 10 or more dwellings to produce 10 per cent of energy from on-site generation (RE5); all new housing development and refurbishment to meet Level 3 of the Code for Sustainable Homes, with all large scale development to meet Level 5 (Development Policy G) (28).

Regional Economic Strategy

One of five key themes is the energy challenge facing the region. As part of the strategic vision the Strategy states that “...the region is committed to meeting, and perhaps even exceeding, the national targets for CO² emissions and renewable energy generation.” (29, p.14). The Strategy also points out the opportunities that exist for meeting increased demand for energy services in the regional economy: “Environmental technologies and services, such as renewable energy, represent a huge global market where the South West can become a leader.” (29, p.16).

Regional Housing Strategy

The strategic aim is “...to improve the quality of social and private sector housing stock, with a particular emphasis on good design, energy efficiency, reducing fuel poverty and health inequalities.” (30, p.38).

The strategy is delivered by five groups, including sustainable construction and the quality of the existing stock. Relevant outcomes are: (i) the average SAP of the housing stock should be 65 or over by 2016 with vulnerable households reaching this target by 2010; (ii) 50 per cent of new developments should meet the Code for Sustainable Homes standard; (iii) no homes in the social rented sector will fail Decent Homes by 2010; 70 per cent of vulnerable households in the private sector will live in Decent Homes by 2010.

Fuel poverty

Fuel poverty is defined as the inability to provide heating for a home without spending a high proportion of income on doing so. The Government’s definition of a fuel poor house is one which needs to spend more than 10 per cent of total household income to achieve satisfactory heating: 210^o in the living room and 180^o in other occupied rooms (10).

The principal causes of fuel poverty are low income, energy

prices and energy inefficient housing. Underoccupation can also be a contributory factor. For example, an elderly person living alone in a three or four bed house might find it expensive to heat the home, even on a reasonable income.

The solutions involve financial or energy efficiency measures – or a combination. Financial measures include income maximisation, including benefits and fuel supplier advice. Energy efficiency measures include insulation and heating. Education and advice are very important. For example, the benefit of providing state-of-the-art heating controls are unlikely to be realised unless people are shown how to use them.

Plymouth City Council published a fuel poverty strategy in 2003: Action for Warmth and Health (11). The action plan is implemented, monitored and updated by the Affordable Warmth Group, which includes experts from in energy efficiency, energy advice, income maximisation and public health amongst others. Fuel poverty actions are included in Plymouth's Housing Strategy (12), Income Maximisation Strategy (13) and Local Area Agreement.

Health and housing

Living in a cold damp home that may have mould growth can cause or exacerbate a number of illnesses. For example, temperatures below 160°C for any period results in reduced resistance to respiratory disease. If temperatures are between 9 and 120°C for two hours or more core body temperature will drop, blood pressure will rise and there is increased risk of cardiovascular disease. At temperatures below 50°C there is a risk of hypothermia (15).

A large number of conditions are made worse by living in a cold home. For example, the pain associated with arthritis can become more acute. Problems of social isolation and impaired mental health become more severe – this may simply result from the reluctance of a person to invite others into their cold and damp home.

Child health is affected, and attendance at school often suffers, leading to lower educational attainment than might otherwise be the case.

There are an estimated 30-40,000 'excess winter deaths' each year in the UK (15). This is considerably higher per head of population than any other country in Europe. It is estimated that around 80 per cent of these deaths are related to the cold and are therefore preventable. It is thought that as temperatures rise (due to climate change), the number of excess winter deaths will reduce. However, as energy prices rise it is likely that more people will be unable to heat their homes adequately.

A new and increasingly significant problem related to climate change is death from the heat. In a heatwave in August 2003 deaths among people in London aged over 75 rose by 60 per cent. This prompted the NHS to publish the 'Heatwave Plan for England' in 2004 (16).

Climate change

Climate change is widely recognised as being one of the greatest environmental challenges facing the world today. The Royal Commission on Environmental Pollution report Energy - The Changing Climate (2000) summarises the problem in these terms (17):

"One effect of energy supply has now come to assume special importance, though it was barely in the consciousness of politicians or the public 20 years ago. This is human-induced climate change which is threatening to impose very significant shifts in temperatures, rainfall, extremes of weather and sea levels in this century and those that follow. The principal cause is that the concentration of carbon dioxide in the atmosphere has been rising, mainly because of humanity's growing use of fossil fuels, and trapping more solar warmth. The concentration of carbon dioxide is already higher than at any time for millions of years and we seem to be experiencing the first effects."



The economic impact of climate change was comprehensively documented in the Stern Review (2006). The central conclusion is that “There is still time to avoid the worst impacts of climate change, if we take strong action now.” The report quantifies the cost of not taking action (18):

“...if we don’t act, the overall costs and risks of climate change will be equivalent to losing at least 5% of global GDP each year, now and forever. If a wider range of risks and impacts is taken into account, the estimates of damage could rise to 20% of GDP and more.

In contrast, the costs of action – reducing greenhouse gas emissions to avoid the worst impacts of climate change – can be limited to around 1% of global GDP per year.”

The scientific basis of climate change is well known and based on fundamental laws in physics and chemistry. The ability of the biosphere to absorb carbon is currently

estimated at 4 billion tonnes per year, and is expected to fall to about 2.7 billion tonnes by 2030. As with most predictions, this is subject to change as knowledge increases and actual events are taken into account.

Since the industrial revolution there has been a marked (and measurable) increase in the quantity of carbon dioxide in the atmosphere attributed directly to human activity.

Carbon dioxide concentrations are higher now than they have been for about 650,000 years, based largely on studies of Antarctic ice cores. The concentration of carbon dioxide in the atmosphere was about 280 parts per million (ppm) at the time of the industrial revolution (late 18th century) and is about 380 ppm today. Together with the other greenhouse gases (such as methane) total concentrations are about 440 ppm.

The primary international response to climate change is the Kyoto Protocol. The UK agreed to a reduction in greenhouse gas emissions of 12.5 per cent over 1990 levels by 2008-2012. The UK Government set a domestic goal of reducing carbon dioxide emissions by 20 per cent by 2010. However, this was revised in the 2006 Climate Change Programme to 15-18 per cent. The commitment to achieve a target of “...some 60 per cent by about 2050...” remains in place (19).

Peak oil

The ‘peak oil’ phenomenon is increasingly discussed by economists and energy experts. Oil (and gas) production can be described graphically as a ‘bell curve’ familiar to economists as ‘Hubbert’s Peak’. Eventually, production of a finite resource will reach a peak. Oil is plentiful on the upward slope and becomes increasingly scarce and expensive on the downward slope.

There is plenty of oil and gas left – perhaps enough for 40 or 50 years or even more. However, the annual rate of extraction is likely to fall. A cut in production of just 5 per

cent in the 1970s 'oil shock' brought about power cuts, the three day week, electricity rationing and, arguably, the fall of the Heath government. This was a temporary shortfall in production brought about by the OPEC producers. The shortfall in production after peak oil will be permanent.

Peak oil is worrying enough, but add the following and the situation becomes even bleaker:

- World population is increasing, creating greater total demand for energy.
- In the western world, energy consumption per person is increasing, and there are ever more gadgets that use electricity – everything from digital TV tuners to mobile phone chargers.
- The fast growing economies of countries like China and India are making substantial demands on energy that hardly existed only a decade ago.

Peak oil will have a dramatic effect on western economies. The only matter of debate is when peak oil occurs. Some say it has already happened, others that it is a few years away – 2008-2012 is often quoted. A general consensus is building amongst analysts that there are likely to be more 'energy wars' as nations fight to secure supplies. Global water shortages are also increasing tensions, in Israel/Palestine and Kashmir for example. Europe has already witnessed a hint of what might come, when Russia exercised its power as the world's largest supplier of gas to cut supplies to the Ukraine in 2005. Germany, the Netherlands and other countries were affected by reduced gas supply during a cold spell. The UK is becoming increasingly dependent on imported energy. Some of this is from 'reliable' sources such as Norway. Other sources are in politically volatile or sensitive areas, such as the Middle East, Russia and Uzbekistan.



Renewable energy

All renewable energy technologies are expensive, even with grant aid. Carbon savings can be achieved at less cost per tonne of carbon saved using other methods, including energy efficiency and energy conservation.

The Government provide grants for householders under the Low Carbon Buildings Programme. Grant funding from the council is not currently provided but would be welcomed, and should be targeted at fuel poor households. By this means a proportion of household energy costs will be removed, as the energy is essentially free once the technology is installed.

Not all renewable energy technologies are appropriate for an urban area such as Plymouth. Small-scale hydro and large wind turbines are unlikely to feature. Appropriate technologies include:

- solar thermal (hot water systems)
- photovoltaics (PV - solar electricity)
- micro-wind
- biomass (e.g. woodchip stoves)
- heat pumps (ground, air, water)

These technologies are unlikely to fully meet the electrical, heating or hot water needs of a typical house. The only exception might be biomass boilers linked to central heating and hot water systems, where all heating needs will be met.

POLICY: Renewable energy technologies should be installed only when all other more cost-effective measures – such as insulation – have been applied.

Renewable energy technologies will play a much bigger role in the longer term, as installation costs fall and the price of fossil fuels rise. Furthermore, the ongoing development

of hydrogen fuel cell technologies will make renewables more attractive and useful. This is because renewable energy can be used to separate hydrogen from oxygen in water to produce a hydrogen fuel that can be stored and transported.

Hydrogen can be used as a fuel in cars and other vehicles, and is already used in a small number of experimental buses operated by London Transport. Some world cities, such as London and Munich, have already taken steps to achieve the shift from a carbon to a hydrogen economy.

Combined Heat and Power

The most significant technology in terms of carbon reduction is Combined Heat and Power (CHP). Even when burning fossil fuels CHP is the most cost-effective method of reducing carbon emissions on a net present value basis, and taking into account the lifetime costs of alternatives.

CHP requires a heat main to distribute heat around a city. The heat distribution network will take heat from a variety of sources, reinforcing energy security and providing diversity of supply. Plant might be gas or oil fired, or use a variety of renewable fuels such as biodiesel, woodchip or food waste. Schools, homes, shops and others can connect to the heat network once constructed.

CHP offers security and diversity of supply and is decentralised energy. Energy in the form of heat and electricity is produced where it is needed, reducing distribution losses and providing opportunities for local business and employment.

Energy rating

The most well known energy rating systems are SAP and NHER. Both are based on BREDEM – the Building Research Establishment Domestic Energy Model. SAP is the government approved Standard Assessment Procedure and is currently in its third major revision - SAP 2005.

SAP is independent of location. Two properties built to the same specification in Aberdeen and Plymouth will therefore have the same SAP rating.

SAP 2005 has a scale of 0-100, although a rating higher than 100 is possible. A SAP of 100 equates to a zero energy cost home. A SAP of over 100 would be given to a home that is a net exporter of energy.

NHER is the National Home Energy Rating and is more comprehensive than SAP. For example, location is taken into account. Thus the identical homes in Aberdeen and Plymouth would have the same SAP, but the Plymouth home would have a higher NHER.

Energy efficiency measures

It is important to understand what is meant by an 'energy efficiency' measure. These are essentially measures that improve the energy efficiency of a home and pay for themselves within their lifetime.

Loft and cavity wall insulation are energy efficiency measures and can be installed at any time. The cost of installing them will be met by reduced energy bills over a period of time – the payback period. These measures are cost-effective in terms of the cost in £ per tonne of carbon dioxide saved. Other cost effective measures include hot water pipe lagging, hot water cylinder jackets and heating controls. Measures such as these are approved by the Government for schemes such as Warm Front and CERT.

The amount of carbon saved by each measure varies according to the type, age and size of home, the behaviour of occupants and other factors.

Double glazing is considered by some to be an energy efficiency measure but in fact is not, hence the reason it has never (effectively) been funded by schemes such as Warm Front and CERT. If you wanted to improve the energy efficiency of a house you would not install double

glazing. It is extremely expensive and will never pay for itself in reduced energy bills. You would install double glazing when existing windows are beyond economic repair. Having done so, there would of course be



an improvement in energy efficiency. The same argument applies to replacing a roof. You would not replace a roof to improve energy efficiency, but if the roof needed to be replaced it would be beneficial to incorporate energy efficiency into the specification.

Most heat is lost through the walls and the roof, with only 10-15% lost through windows. Hence the focus of any energy efficiency programme is concentrated on loft and wall insulation. This is where the greatest impact is obtained for the minimum expenditure. When – and only when – a home is fully insulated does it become prudent to consider renewable heating options such as solar thermal and heat pumps. As heating bills reduce lighting and appliances become important targets of action.

Hard to Treat properties

'Hard-to-treat' properties are essentially homes that are of solid wall construction or not on the gas network, and are sometimes referred to as 'hard to heat'. Some of the most cost effective energy efficiency and heating improvement measures cannot be applied. For example, a solid wall property cannot have cavity wall insulation. The most effective interventions would be external or internal wall insulation, both of which are very expensive and disruptive. Furthermore, it may not be possible to apply external wall insulation (typically some form of cladding) to certain listed properties or homes in conservation areas.

Most solid wall properties were built before 1930. There are a considerable number of these in Plymouth. There are very

few properties off the gas grid however. Whilst there are a number of homes that do not have a gas supply, gas is generally available in the street or elsewhere nearby.

There are two key issues with regard to hard to treat properties from a policy point of view:

- The number of homes that require cavity wall insulation is reducing, making it harder to achieve energy and carbon targets. At some point in the next three years we must consider how we are to tackle hard to treat homes in order to meet targets in the near future.
- The cost of improving hard to treat properties is very high and the assistance available from CERT is currently negligible and unlikely to be taken up in great numbers.

Heating controls

One of the most important heating measures is a heating controls package. This can either be installed as an upgrade as part of a boiler installation, or as an extra package in its own right. CERT funding is available for this purpose. Heating controls can be upgraded at any time, but it is most cost effective to do so when the boiler is being replaced or a heating system upgraded.

A heating controls package should include:

- programmer that can time heating and hot water separately
- room and hot water cylinder thermostats
- zone controls for larger dwellings
- motorised valves for independent control of heating and hot water
- conversion to a fully pumped system where necessary

ENERGY PROFILE

This chapter provides a statistical context for energy use in Plymouth, including an outline of energy consumption, carbon dioxide emissions, energy prices and energy profile of the housing sector. We quantify the extent of measures required and explain the type of measures that are needed to meet targets.

Energy efficiency improvements since 1996

The energy efficiency of housing in Plymouth improved by 18 per cent between 1996 and 2006 (23). In 1996 the cost of achieving the HECA target - a 30% increase by 2011 - was put at £109 million. At the time of writing the HECA target is unlikely to be met, principally because a high proportion of cost-effective measures have been completed, leaving hard-to-treat properties that require expensive intervention.

PLYMOUTH HOUSEHOLDS

Population (2005 est.)	246,100
Number of households	106,000
Number of gas consumers	99,100
Number of electricity consumers	112,400

Energy consumption

In a typical household about three quarters of energy is used for heating and hot water (usually gas) whilst a quarter is for everything else (mainly electricity). The weather can have a substantial impact on energy consumption: a mild winter will result in lower annual energy consumption.

Domestic energy sales in Plymouth (2006) were 2,045.7 GWh, or 19,120 kWh ('units') per household. This is less than the national average due to the mild climate.

ANNUAL DOMESTIC ENERGY CONSUMPTION 2005 PLYMOUTH (GWH)

Gas	1,394
Electricity	458
Coal	9.7
Oil products	107
Total	2,045.7

Carbon dioxide emissions

Total carbon dioxide emissions in Plymouth are estimated at 1,423 kilotonnes (2005), of which 523 kt result from the housing sector. Housing emissions are 2.13 tonnes per person or 4.9 tonnes per household. This provides a useful benchmark.

CARBON DIOXIDE EMISSIONS 2005 - PLYMOUTH (TONNES)

	Tonnes	%
Industry & commercial	617	43.4
Domestic	523	36.8
Road transport	283	19.9
Total	1,423	100.1

source: BERR (2008)

Plymouth is responsible for about 4 per cent of south west domestic carbon dioxide emissions, but has 4.8 per cent of the population. Only two of the forty-five councils in the south west have lower carbon dioxide emissions than Plymouth (Exeter and Weymouth & Portland). It could be argued therefore that Plymouth is already 'doing its bit' and is in the top quartile of local authorities in this regard.

DOMESTIC CARBON DIOXIDE EMISSIONS 2005 - PLYMOUTH (TONNES)

	Tonnes	%
Electricity	238	45.4
Gas	254	48.5
Oil	23	4.4
Solid fuel	2	0.4
Other	7	1.3
Total	524	100

source: BERR (2008)

Appliances

Electricity consumption is rising, principally due to the increased number of electrical ‘gadgets’ available for the home. Recent years have seen substantial increases in the ownership of digital TV tuners, DVD players and computers with broadband. Whilst more people are purchasing ‘A’ rated appliances, the potential benefit of this is wiped out by the increase in the number of appliances. Furthermore, whilst the energy efficiency of refrigerators has increased enormously in recent years, so has their size. We may have a more energy efficient fridge, but if it is half as big again as the one we replaced we are back to square one!

APPLIANCE OWNERSHIP 2005 - PLYMOUTH

	Households	%
Television	99,300	97
Washing machine	92,750	90
Video recorder	82,500	80
DVD player	68,200	67
Fridge-freezer	66,300	65
Fridge	59,600	58
Freezer	52,600	51
Tumble drier	52,600	51
Digital TV tuner	46,100	45
Dishwasher	26,600	26

source: Plymouth City Council Energy Survey (2005)

Gas and electricity prices

A high proportion of Plymouth residents pay more for fuel than they need to. The price we pay per unit of energy is largely determined by three factors:

- payment method
- dual-fuel tariff
- out-of-area supplier

The lowest energy bills will generally be for those who have a dual-fuel tariff with an out-of-area supplier and who pay by direct debit. An out-of-area supplier is any company that was not the former Public Electricity Supplier for the region. This is EDF (formerly SWEB) for electricity and British Gas for gas.

AVERAGE UNIT COST OF ENERGY IN 2007 (PENCE)

	Plymouth	Great Britain
GAS Direct Debit	2.77	2.76
GAS Prepayment	3.25	3.27
ELECTRICITY Direct Debit	11.21	10.58
ELECTRICITY Prepayment	12.03	12.15

source: BERR (24)

The unit cost of gas in Plymouth in 2007 ranged from 2.56p (direct debit) to 3.35p (prepayment), and of electricity from 10.06p (direct debit) to 18.3p (direct debit). For a typical household annual average gas bills ranged from £460 to £603 and electricity bills from £332 to £664. It is clear that there is still a great deal of work to do to enable people to obtain the lowest prices.

Home energy rating (SAP)

In general, energy efficiency standards are higher in the council rented sector, where the average SAP (at April 2006) was 78, compared to the national average of 51.

- 3% of council stock has a SAP rating of 35 or less
- 60% have a SAP of 65 or less

The council has invested steadily in energy efficiency improvements leaving very few homes without loft and cavity wall insulation. Furthermore, every home has some form of heating, apart from those who have been offered heating but have turned it down.

The average SAP rating of properties in the private sector is 59, about the same as the national average of 58. Just over 6 per cent of homes in the private sector in Plymouth have a SAP rating of 35 or lower, making these a priority for action (26).

Hard-to-treat homes

Homes built before 1930 are usually of solid wall construction and are known as ‘hard-to-treat’ because improving energy efficiency is costly and disruptive. There are 39,000 homes in Plymouth of this age, representing 36% of the stock. Improvement options include external insulation (e.g. thermal render) or internal insulation (e.g. dry lining). These solutions can be applied only in a limited number of cases due to the impact on the appearance of the home.

Likewise, homes that are listed or in conservation areas may be impossible to treat, at least to current standards, and so may remain energy inefficient for some time to come.

Fuel poverty in Plymouth

Fuel poverty is difficult to quantify, as it depends on knowing household income, energy consumption and the energy rating of the home. Together, these would tell us the notional cost of heating a home to a standard heating regime (the SAP rating) and whether this is greater than 10% of household income. Actual energy bills would enable us to compare the amount spent on energy with

the amount needed to heat the home adequately. In practice this information is not available to us, so a range of indicators are used.

In 2003 there were over 7,800 fuel poor households in Plymouth according to the national Fuel Poverty Index (32). This is based on data from the 2001 census and the 2003 English House Condition Survey. There has been a substantial increase nationally in the number of fuel poor households, which has almost certainly reflected in the numbers in Plymouth, which we estimate are likely to be closer to 10,000 in 2008. In 2006 there were 3.5 million households in fuel poverty across the UK. (34 p.2).

Where are fuel poor households in the city? This is an important question as; evidence has shown that concerted local action by a number of agencies working together is most likely to remove households from fuel poverty (35) (36). We need to know where to target expensive interventions such as door-to-door canvassing to increase the uptake of energy efficiency grants. The map shows levels of fuel poverty based on the Fuel Poverty Index. The darker areas show the greatest concentrations of fuel poverty.



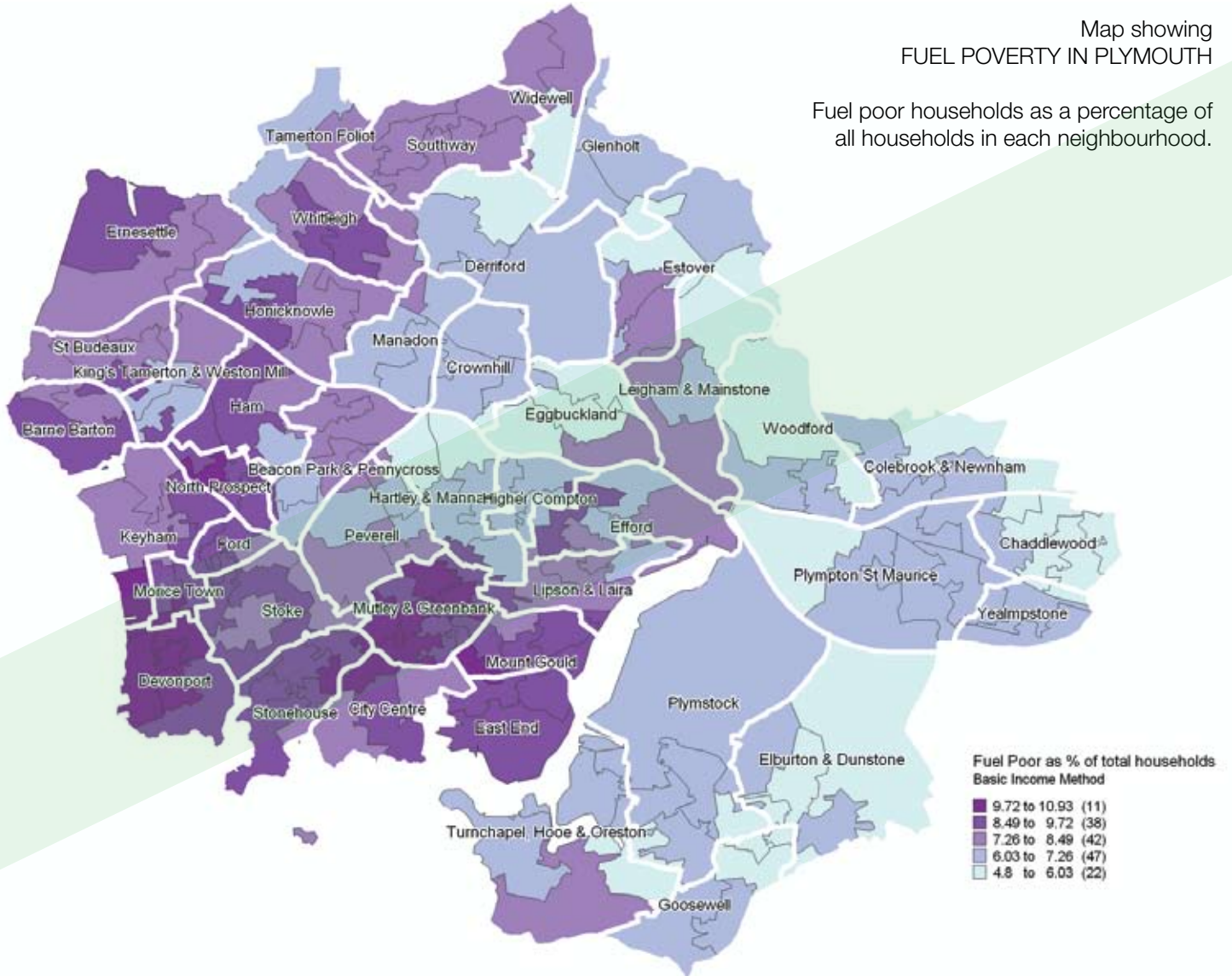
Heating costs

Fuel switching (from electricity to gas) is an important heating measure and should be a priority for funding programmes. It is especially important for fuel poor households, where expensive forms of heating such as electric night storage heaters and electric fires predominate.

- about 9,750 homes in Plymouth have night storage heaters

Map showing FUEL POVERTY IN PLYMOUTH

Fuel poor households as a percentage of all households in each neighbourhood.



- about 11,000 homes have room heaters (e.g. coal fires, gas fires, electric fires) as their only source of heating
- about 14,290 homes have electric heating



These homes are a priority for new heating systems and should usually be provided with gas central heating. If half of all the homes that have room heaters were provided with full gas central heating the cost would be about £19.3 million. A proportion of this could be met by Warm Front, but the bulk would be met by householders as they come to replace heating systems that are beyond economic repair.

Electric heating is very expensive, even when using Economy 7 (or similar) tariffs. Replacing electric heating in fuel poor households should therefore be a priority. Electric heating is also very carbon intensive. Its replacement with other fuels is a priority in order to maximise carbon dioxide savings.

The Council subscribes to the Sutherland Tables, which is the authoritative guide to comparative heating costs updated twice a year. The latest available tables (October 2008) gives the following costs for heating a typical 3-bed house in Wales/South West:

- Electric night storage heaters (heating) with immersion heater (hot water) using EDF economy 7 direct debit tariff: £1,087 per year.
- Gas central heating with condensing boiler and hot water cylinder with EDF direct debit tariff: £732 per year.

The absolute cost of heating given in the tables is interesting but it is the relative costs that are important, especially when advising members of the public. The example above dramatically indicates the very high cost of electric night storage heating compared to gas with a condensing boiler.

Many people in Plymouth - especially the fuel poor - rely on room heaters to keep warm. The annual cost of heating just one typical room with an electric fire is £355. A gas wall heater is not much cheaper at £320, whilst an open fire burning grade A housecoal costs £288.

Measures required to meet targets

In order to achieve national and local objectives it will be necessary to substantially increase the rate at which energy efficiency measures are installed. Insulation measures – principally loft and cavity wall insulation - will continue to dominate. These are inexpensive and have short payback periods, with grants and other financial incentives readily available.

The first priority for Plymouth City Council is to complete the remaining cost-effective measures by 2011. The council will achieve this through a substantial marketing effort and provision of financial incentives to remove barriers to take up.

INSULATION MEASURES REQUIRED 2006

Homes requiring loft insulation	14,000
Homes requiring cavity wall insulation	38,000
Net cost of insulation measures	£5.5m
Potential annual energy savings	135 GWh
Potential energy bill savings	£3.3m
Potential lifetime CO ² savings	1.14m tonnes

source: Private Sector Stock Condition Survey

A second priority will be to improve heating systems. This will largely be funded by householders themselves and by



Government grant for households on benefits. The council can assist through marketing, notably by promotion of grants and provision of independent advice. The council can assist further by providing financial incentives to remove barriers to the uptake of grants and assisting those on low incomes who do not qualify for Warm Front.

The third priority is to increase the uptake of microgeneration technologies, largely funded by householders and Government grant. The council can help by removing barriers. Some of the most important barriers are lack of knowledge, suitability for the home in question, fear of 'cowboy' installers and price. Provision of advice and information will help.

Renewable energy

The Government is committed to meet 10% of electricity from renewables by 2010 and 20% by 2020 (20). In March 2007 the EU agreed a binding target of 20% of energy from renewables by 2020. Note this binding target is for energy and not electricity, and therefore includes heat and transport.

In 2005 the UK had an installed capacity of renewable electricity sites of 4,543 MWe (including municipal solid waste combustion) and generated 16,919 GWh of electricity (21). This was just 4.15% of total demand - 407,265 GWh.

Heat is considerably more important than electricity in the housing sector. In 2005 however total heat production from renewables was only 5,635 GWh, with domestic wood combustion being by far the most important fuel.

Renewable energy has had a negligible impact on Plymouth to date. Only 23 households received a Clear Skies grant between 2003 and 2006, mainly for solar hot water systems. Clear Skies was replaced with Low Carbon Buildings Programme grant in 2006.

The council undertook a study in 2007 which quantified the potential for renewable energy in the housing sector in Plymouth (40). The study showed that Plymouth's policy of meeting 10% of energy needs from renewable energy (increasing to 15% between 2010 and 2016) is viable.

Biomass is identified as playing a key role "...and will be instrumental in moving beyond an on-site renewables requirement towards low or zero carbon development." (40, p.8). The study placed emphasis on the role of Energy Services Companies in reducing the additional capital cost burden of renewable energy technologies.



VISION

In this chapter we outline threats and opportunities, targets, the clean energy vision, strategic aims and outcomes. We explain the role of the local authority in helping to deliver aims and outline Plymouth City Council policy.

Threats

A 'do nothing' approach to energy policy is very risky. Energy is critical to our way of life. Without it there would be no clean water pumped to our homes, no easy means of keeping warm in winter, no television, no lights, no refrigerator or washing machine. We would not be able to charge our mobile phones, access the internet or obtain cash from an ATM. We take energy for granted. Most of us do not even know how much energy costs, largely because it has been inexpensive until recently.



A 'carry on as we are' strategy will result in the following:

- Increased concentration of greenhouse gases in the atmosphere, leading to further global warming and unpredictable but increasingly dramatic effects on climate – locally as well as globally.
- Increase in the number of violent storms, leading to increased risk of damage to homes.
- Sea-level rise which could flood parts of Plymouth by 2050.
- Increased risk of flooding and damage to homes; floods occurring more frequently.

- Longer drier summers and wetter winters in Plymouth, leading to increased risk of subsidence and heave causing damage to houses.
- Continuing rise in energy prices as oil and gas exceed peak production – more people in Plymouth unable to keep warm in winter as a result.
- Continued loss of habitat for species locally and globally – continued mass extinctions as we use more land to meet our food and energy needs.
- Continued pollution of air, land, rivers and sea by fossil fuel production, transportation and use in inefficient power stations.
- Increase in poor health and excess winter deaths in Plymouth, leading to winter bedblocking and increased NHS costs.
- Reduced attendance and attainment at school as children are affected by living in cold, damp homes.

Opportunities

A 'clean energy' strategy offers many opportunities, some of which are listed below.

- Comfortable, healthy homes which maximise natural lighting and ventilation.
- Minimal risk of allergies and asthma attacks, especially in children.
- Clean energy – little or no harm to the environment.
- Improved health – reduced risk of cardiovascular and other conditions due to cold and damp.
- An end to energy waste – minimise energy loss through the building fabric – low energy appliances.

- An end to fuel poverty and the misery and social exclusion caused by living in a cold damp home.
- Increased life of home – reduced risk of damage to structure caused by condensation, damp and mould growth.
- Improved energy security – wide variety of fuels in use, reduced dependence on imported fuels, reduced dependence on national grid.
- Local production of energy – opportunities for local ownership and employment.
- Social equity – enhanced opportunity to use no more than our fair share of global resources; responsible for no more than our fair share of carbon emissions.

Targets

Key national Government targets are listed below. These apply as much to Plymouth as they do to the rest of the country; we do not therefore propose local variations.

- improve the energy efficiency of the housing stock by 30% over 1996 levels by 2011
- eradicate fuel poverty in vulnerable households by 2010, and in all households by 2016-18
- reduce domestic carbon dioxide emissions by 16% by 2010 and 30% by 2020 against a 1990 base
- reduce domestic carbon dioxide emissions by 80% by 2050 against a 1990 base

POLICY: Plymouth targets are the same as national targets. However, we will place emphasis on the achievement of the fuel poverty target ahead of the others in the immediate period (2008-11).

MEETING TARGETS: NATIONAL SCHEMES

The Government has established a number of mechanisms to meet targets. These include better billing, real-time

displays in households, improved energy advice, availability of energy efficient appliances, zero carbon homes, CERT and Warm Front. Together these are expected to result in the required annual savings of 5.7 to 10.3 million tonnes of carbon in the housing sector by 2020 (20, p.284).

The cost of achieving targets will be met by a variety of individuals and organisations. For example, whilst the Government intends to work with manufacturers to make appliances more energy efficient, the cost will be met by individuals as they purchase goods. Likewise, the cost of smart metering will be met by energy utilities, with costs no doubt being passed onto the customer.

Warm Front

Warm Front is the principal Government grant scheme for heating and insulation measures. It is aimed exclusively at people on benefits and is operated by Eaga Ltd. Government expenditure on Warm Front grant was £350 million in 2007/8. The Government announced (September 2008) that the budget for 2008-11 would be about £874m, or roughly £291m a year - a reduction over 2007/8. Warm Front expenditure in Plymouth in 2007/8 was £2.132m.



A serious problem with the Warm Front scheme relates to the very high cost of certain heating measures and the 'excess charge' placed on householders in receipt of benefits. A quality assurance assessors report for Government in 2007 (41) lacks credibility based on the evidence of excess charges placed on Plymouth residents. The report states that Warm Front prices are "very competitive" and were "unlikely to be undercut" - statements which are easily contested based on evidence,

including the comparative costs of heating provision on Warm Front and Healthy Homes schemes.

Had the council taken the decision to fund the excess charge the cost would have been greater than the combined budget for Plymouth Healthy Homes and Insulate Plymouth.

POLICY: We will make referrals to local CERT-funded schemes in the first instance and to Warm Front in the last instance, and then in general only for heating measures.

POLICY: Plymouth City Council does not provide funding for Warm Front 'top-ups'. In exceptional circumstances we will provide 50% of the excess charge where a Warm Front customer would have qualified for Plymouth Healthy Homes grant on medical grounds.

Carbon Emissions Reduction Target

CERT is an obligation placed on energy companies to reduce carbon dioxide emissions. The expected budget for 2008-11 is about £1.5 billion, or about £500m per year. Approximately 40% of carbon savings should be made in 'priority group' households - those in receipt of benefit or aged over 70. The remainder of the population is in the 'able to pay' group. In general, the priority group have insulation measures installed free of charge and the able to pay group benefit from substantial discounts on the 'real' cost.

Low Carbon Buildings Programme

The Government have provided £18 million for phase 1 of the LCBP, not all of which is aimed at the housing sector. The local authority has an important role in marketing this scheme and encouraging local residents to apply for the grant. Evidence indicates that national grants are attracted to areas where the local authority provides additional grant

support; the council has no plans to provide additional grant at this time.

Winter Fuel Payments

These are often overlooked in commentaries on energy efficiency expenditure. There is a good reason for this: the payment is not means tested and is paid to everyone over a certain age. The money may be spent on fuel bills, but could be spent on anything – we simply don't know. The cost to the Exchequer £1,994 million in 2005/6, considerably more than Warm Front, CERT and the LCBP put together.



Increased funding to meet targets

Although Government is increasing funding to 2010, we believe this is insufficient to meet national targets. The South West Low Carbon Housing and Fuel Poverty Strategy (42) has estimated that an increase in installation rates of up to 4-fold is required by 2010.

MEETING TARGETS: PLYMOUTH SCHEMES

Insulate Plymouth

This has an annual budget of £10,000 and is a partnership between the council and local installers Miller Pattison. The council establishes the parameters within which the scheme operates, undertakes quality control checks and monitors progress. The scheme provides loft and cavity wall insulation and is highly targeted, being promoted largely through the use of door-to-door canvassing. It is aimed at the 'able to pay' sector but is open to everyone. The scheme is funded largely by CERT with customer and council contributions.

Plymouth Healthy Homes

This scheme has an annual budget of £60,000 and is a partnership between the council, Westcountry Energy Action, the NHS and Care & Repair. It provides insulation and central heating to people who are NOT in receipt of benefits and who have a cold-related medical condition.

In the third and fourth quarters of 2008/9 we intend to experiment with provision of solid wall insulation, ventilation and radiator reflector panels. The scheme is funded by the council and CERT with small contributions sometimes required from customers.



measures is available across the county which facilitates joint marketing. This package includes loft and cavity wall insulation, energy advice, home safety and fire checks, benefit entitlement checks and other measures.

The main scheme sponsor (E.ON) funds a 'community reward' which encourages community groups and volunteers to make referrals to the scheme. The warm zones offer is available to everyone living in Plymouth, but the marketing and community-based activity takes place in the Warm Zone. The scheme became operational in October 2008.

VISION FOR PLYMOUTH

To achieve a clean energy future which minimises energy waste, reduces our adverse effect on climate change and global ecosystems, reduces our dependence on imported energy and in which every person living in the city can benefit.

The vision of a clean energy future is unlikely to be achieved before 2050, but we need to start work on delivery now. The decisions we make today will make the vision easier or more difficult to achieve. It is important therefore that these decisions are the right ones. For example, the homes we build now will still be occupied at the end of this century and beyond. It is important that they are built with the vision in mind, or they may have to be abandoned before 2050.

If we are to achieve the vision we will need to gradually reduce dependence on fossil fuels – 'dirty' energy – such as gas, coal and oil. This will be achieved in part through energy efficiency - which seeks to end the waste of energy - and energy conservation, where we encourage people to use only the energy they need. Fossil fuels will be replaced with 'clean' energy, largely from renewable sources such as wind, wave, tidal and sun. In order to ensure that everyone in the city can benefit we need to ensure that energy is affordable to everyone - that everyone has access to the energy they need.

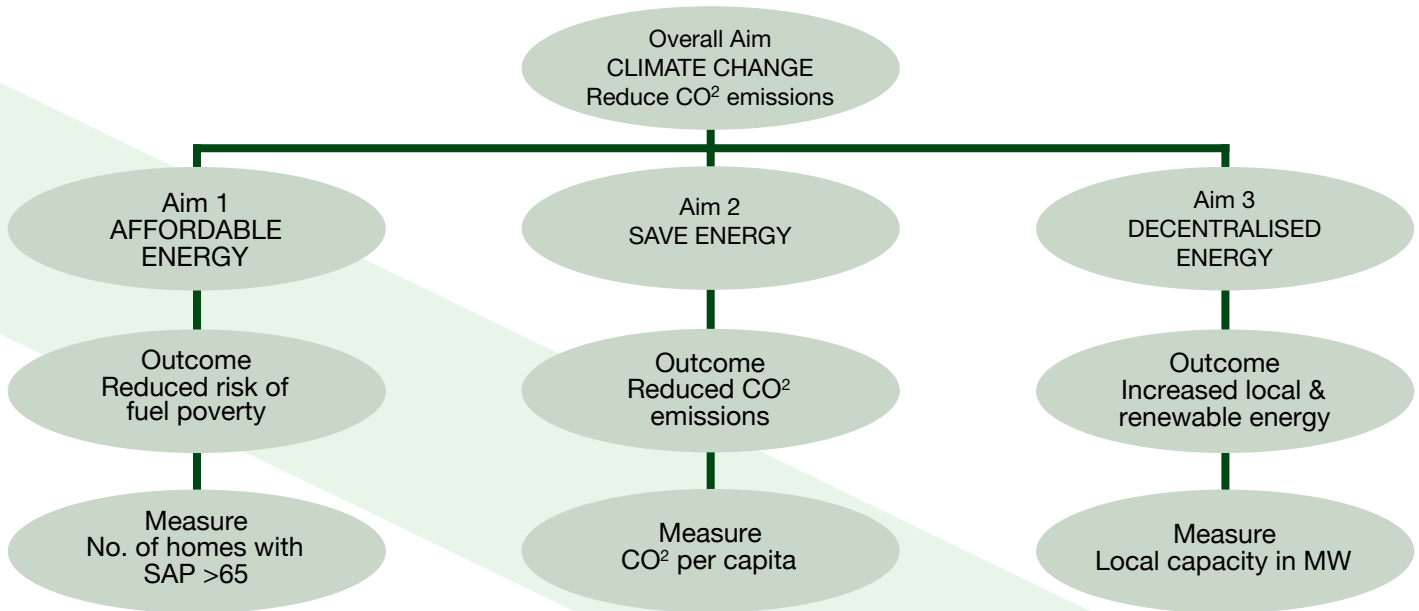
HEAT Plymouth

This is a minor scheme that provides insulation measures and which is supported by the council by means of endorsement only. The scheme is promoted by periodic blanket mailshots to areas of Plymouth outside the Warm Zone. There is no cost to the council but we benefit from data provided by the scheme operators. The scheme is funded almost entirely from CERT and customer contributions.

Plymouth Warm Zone/Devon Warm Zones



All ten Devon councils have worked together to set up Devon Warm Zones in order to benefit from economies of scale and joint working. A basic package of



A decentralised energy infrastructure, where energy is produced closer to the point of use, is not only inherently more efficient but will benefit local communities. Homes will produce more of their own energy, and communities will have the opportunity to produce energy for local heat and power networks. Local communities will have a say over how local energy is produced, distributed and priced, through involvement in Energy Services Companies.

As a result our energy supplies will be more secure and less dependent on imports. There will be substantial training and employment opportunities in order to deliver energy efficiency measures and manufacture, install and maintain the energy infrastructure.

The vision is a long term goal. The AIMS represent broad and general statements of intent, whilst OBJECTIVES are more focussed and outcome based.

AIMS

Overall aim: to reduce carbon dioxide emissions in the housing sector.

Everything we do to improve energy efficiency and tackle fuel poverty should aim to reduce carbon dioxide emissions. This is not always easy in a fuel poverty context where sometimes it is necessary to increase energy consumption. Overall per capita carbon dioxide emissions should reduce, in line with targets set for national indicator 186.

Aim 1 AFFORDABLE ENERGY

Improve the health and well-being of fuel poor households and those suffering cold-related illness who live in energy inefficient homes.

Those suffering cold-related illness may not be fuel poor, but will be living in homes that are 'hard to treat' and

therefore likely to be cold and damp. The role of the council will be to identify fuel-poor households, provide access to grants for energy efficiency measures, ensure people are claiming appropriate benefits and enable people to access the most favourable energy tariffs.

Aim 2 SAVE ENERGY

Encourage the fuel rich to reduce energy consumption and developers to build new homes to a high energy efficiency standard.

The 'fuel rich' are essentially those who are not fuel poor and for CERT funding purposes the 'able-to-pay' sector. The role of the council will be to encourage the uptake of energy efficiency measures and provide advice on conserving energy. The energy conservation message applies also to those who are 'fuel poor'. It is also important to ensure that the homes we build now are constructed to the highest possible standards of energy efficiency.

Aim 3 DECENTRALISED ENERGY

Encourage developers and homeowners to incorporate renewable microgeneration into their homes and promote combined heat and power.

The role of the council will largely be to use the planning system to require higher standards and to ensure those standards are met through testing of homes on completion. The council can help to remove the barriers to the uptake of renewable energy and will explore the feasibility of working with the private sector to establish Energy Services Companies.

Outcomes

The aims will result in outcomes which will help to achieve national, regional and local targets and provide economic, environmental and social sustainability.

- Improved energy efficiency of the housing stock.

- Reduced number of fuel poor households.
- Reduced carbon dioxide emissions.
- Reduced dependence on fossil fuels and therefore imports, thereby improving energy security.
- Increased longevity of the housing stock due to reduced risk of damage caused by condensation, damp and mould growth.
- Increased value of property resulting from investment in energy efficiency and renewable energy measures and leading to a higher rating on the Energy Performance Certificate.
- Reduced number of people experiencing cold-related illness exacerbated by living in a cold, damp home.
- Greater awareness and knowledge of energy efficiency, energy conservation and renewable energy.
- Reduced energy bills leading to higher disposable incomes for expenditure in the local economy.
- Increase in the number of local people trained to install insulation, heating and renewable energy measures, and to provide advice and make referrals.
- Increased opportunities for local business to develop manufacture and install sustainable energy materials and technologies.

Delivering aims: the local authority role

Since the Government have established the policies and mechanisms for achieving national targets, what is the role of the local authority?

It is important to ensure that Plymouth attracts its 'fair share' (or more) of CERT, Warm Front and other national funding. These funding streams work best when they are co-ordinated, promoted and targeted by local government through local partnership schemes.

Provision of match-funding by the council will achieve two

things: (i) it will attract higher levels of Warm Front and CERT funding, and (ii) it will enable the council to adopt a more holistic approach to delivering energy efficiency and to meet local priorities. This requires financial input from the council to add value to national funding.

The council has an important role in enforcement of national policy, such as Building Regulations and the Housing Health and Safety Rating System.

Whilst the substantial effort of the council should be directed at the existing housing stock (and therefore refurbishment), there is also an important role in ensuring that future housing developments meet the highest possible standards. This will largely be achieved through the council's role as the local planning authority.

The following are a selection of key roles:

- raise awareness in the local community
- changing behaviour through education, advice, information and promotion
- referrals to national and local grant and discount schemes
- development and promotion of 'council approved' CERT scheme
- development and operation of grant and discount schemes funded by the Council, perhaps in partnership with other agencies
- data gathering and analysis
- prioritisation and targeting of scarce public resources
- identification of 'hard-to-reach' and 'fuel poor' households
- organisation of and participation in local events build local partnerships to deliver services and raise awareness

- completion of statutory returns
- lobbying Government and other agencies to improve policy and service delivery
- encourage developers to build new homes to high standards
- encourage private landlords to improve homes to high standards

The key objective of improving energy efficiency will be achieved largely through marketing and measures. 'Marketing' means advice, information, education and promotion. An important objective of marketing is to increase the uptake of measures. 'Measures' refers to the council role of improving energy efficiency directly by means of grants, discounts and other support.



Marketing and measures will be co-ordinated by the Home Energy Team. However, activity will be undertaken by numerous staff in all departments of the council, by external agencies and by a range of partnerships.

In addition to marketing and measures, the council also has an important role in the co-ordination and monitoring to ensure activity is cost-effective, relevant, targeted and meeting needs.

Co-ordination is important because there are many agencies that have a role in achieving objectives or could potentially have a role. If activity is not co-ordinated there is a risk of duplication of effort and financial resources, or activity directed in well-meaning but relatively unproductive ways.

Monitoring is important because it will ensure that financial and people resources are achieving aims efficiently. We

need to be able to prioritise and to ensure that what we do is efficient in financial and carbon terms. We need to know our starting point or 'base position' against which improvement is measured. We need to be able to measure improvements to ensure that we are focussing on activity that maximises carbon reduction with the resources available. We need to ensure that the outcomes are as expected, for example, that homes are made 'fuel poverty proof'.



Plymouth policy

POLICY: Any scheme benefiting from a council grant that seeks to improve energy efficiency should aim for a minimum SAP rating of 69.

This SAP rating will place the property at the bottom of band 'C' on an Energy Performance Certificate. It will considerably reduce the risk of fuel poverty from an energy efficiency point of view. From 2009 National Indicator 187 will monitor the number of homes with a SAP greater than 64 and there is likely to be a target to this effect in the Plymouth LAA.

The target SAP rating may not be achieved by an initial intervention. For example, a home with SAP 40 may be improved to SAP 58 through insulation measures alone, but not reach (or exceed) the target until it is necessary to replace the boiler when it is beyond economic repair. We would not replace the boiler unless it is beyond economic repair, on sustainability grounds.

An important implication of this policy is that the council will measure the 'before and after' SAP rating of each property benefiting from a council grant - and encourage others to do so. In order to achieve this we will need to train staff to undertake energy surveys, encourage installers on schemes promoted by the council to undertake basic energy surveys

and provide software to calculate SAP ratings.

POLICY: The council will adopt a holistic approach to energy efficiency improvements by considering insulation, heating and ventilation together. If resources are limited the council will provide insulation first.

Any scheme funded by the council that installs energy efficiency measures should adopt this holistic approach.

POLICY: The council will, as far as possible, use local installers for insulation, heating and renewable energy measures in association with schemes funded by the council.

The council wishes to maximise the benefit of investment in energy efficiency measures in the local economy.

The **Local Development Framework** core strategy addresses the need for action on climate change and a reduction of carbon dioxide emissions. Key policies include:

Strategic Objective 1: to deliver a vision for Plymouth's strategic role within the south west region that will be set firmly within the context of delivering sustainable communities and work towards carbon neutrality.

Strategic Objective 11: to promote renewable energy and address the causes and potential impacts of climate change.

Policy CS20: to promote development which makes best use of natural resources, including use of renewable energy and high standards of insulation.

The **Sustainable Communities Strategy** has four 'visionary goals' (31):

- a HEALTHY place to live and work
- a WEALTHY city which creates and shares prosperity

- a SAFE and strong city
- a WISE city – a location for learning, achievement and leisure

HEALTHY. Many people in Plymouth live in homes that are energy inefficient, largely due to inadequate heating and insulation. Warmth is quickly lost through the building fabric. If the people living in this home are on a low income they are unlikely to be able to afford to maintain adequate levels of warmth. Condensation, damp and mould growth may result, leading to poor health and a range of cold-related illnesses. Elderly and disabled people are especially vulnerable and may be admitted to hospital during the winter or spells of bad weather. For some this may become an annual ritual. If a person returns home from hospital to a cold, damp home it is only a matter of time before their symptoms repeat and they are readmitted. It is essential therefore that priority is given to ensuring that homes are a healthy and safe place to live.



WEALTHY. Reducing energy consumption through energy conservation and energy efficiency will reduce energy bills. This will free up money that is able to circulate in the local economy. Investment in energy efficiency, better heating and microgeneration will have a positive impact on the Energy Performance Certificate rating of the home. This is likely to lead to increased value of the home and a higher sale price or equity value. An increase in activity to install energy efficiency measures and improve heating systems will largely be met through the expansion of local business

and an increase in training and employment opportunities. There will also be a requirement for innovation in sustainable energy technologies.

SAFE. The three most dramatic adverse effects of climate change on houses are increased risk of flood, storm damage and subsidence and heave. Reducing energy consumption and switching to renewable energy sources will result in reduced greenhouse gas emissions, thereby helping to mitigate the worst effects of climate change. However, these benefits will occur in decades to come, provided we act now. In the mean time it will be necessary to develop climate change adaptation objectives that enable people and homes to survive the adverse effects of climate change. A shift away from dirty energy – such as coal and oil for heating – will help to reduce local air pollution. The more we are able to encourage individuals and housebuilders to install clean energy technologies the more the environment will benefit.

WISE. Children who live in cold, damp and poorly ventilated homes that are expensive to heat tend to underperform at school. Quite apart from the difficulty encountered with undertaking homework, children in these conditions are more likely to suffer asthma attacks and other allergy symptoms, and are more likely to be absent from school due to cold related illnesses. A warm and comfortable home is not only healthier but more welcoming and therefore more conducive to sociability – having friends around. Pursuing a sustainable energy strategy will require innovation in technology, ideas, materials and methods. The opportunities to develop and market these will increase as investment in measures increases.

OBJECTIVES

We outline the objectives for the three years to 2010/11 that will put us on track towards achieving the long term vision described in the previous chapter. The objectives are SMART - specific, meaningful, appropriate ('fit for purpose'), realistic and testable (measure of progress). These objectives will be converted into an Action Plan and updated annually.

Whilst the objectives are designed to meet all three strategic aims the priority for action in this period is aim 1 – the alleviation of fuel poverty.

The six objectives are:

- Establish the base position and targets for NI 186 and NI 187.
- Develop strategies and policies to deliver aims.
- Provide support to enable officers and partners to deliver aims.
- Develop and implement a marketing strategy.
- Develop and deliver energy efficiency schemes and related projects.
- Ensure all new housing is built to the highest possible standards of energy efficiency and that will adapt to the effects of climate change.

Objective 1: establish base position & targets

The council is required by the Government to submit baseline data in relation to National Indicator 187 before April 2009. Since this indicator is in the Local Area Agreement it is important that the baseline is as accurate as possible in order to establish realistic (but challenging) targets. Future performance will be measured against the baseline and targets.

Whilst this is the critical target we need to keep in mind the requirement to collect data for other purposes. For example, we need to measure the contribution made by energy efficiency schemes managed by the council towards the reduction in per capita carbon dioxide emissions. This will be helpful in benchmarking national indicator 186 in relation to the domestic sector.

Key tasks:

- Undertake an energy survey using Government approved methodology to determine the baseline for NI 187. January 2009.
- Analyse NI 187 survey data and submit to Government. March 2009.
- Establish a realistic target in relation to NI 187 and publish in the Local Area Agreement. May 2009.
- Develop a method for ensuring that basic energy surveys are undertaken for all schemes operated and promoted by the council. Undertake any training and software development that may be necessary to obtain and calculate energy ratings. May 2009.
- Upgrade council's energy database ('UNO') with latest data and ensure automatic input of data from all key schemes. From June 2009.
- Undertake an energy survey to measure progress in the previous 12 months; report to Government; adjust targets as necessary. January 2010.

Objective 2: develop strategies & policies

This objective is about establishing the framework, targets, processes, policies and guidance that will enable the delivery of the aims of this strategy. It sets out to develop policies that will achieve aims but also includes matters related to climate change, energy and fuel poverty, such as

the use of sustainable building materials and methods.

Key tasks:

- Publish a Home Energy Strategy Action Plan (based on the objectives in this strategy), to be updated annually. January 2009.
- Monitor national and regional policy developments, best practice and funding opportunities. Update council policy and delivery mechanisms as appropriate. Ongoing.
- Ensure all local strategies incorporate energy efficiency, climate change and fuel poverty objectives where appropriate. Ongoing.
- Publish a revised fuel poverty strategy. October 2009.

Objective 3: support officers & partners

This objective is delivered primarily by the Home Energy Team and external partners such as Westcountry Energy Action and NEA.

Key tasks:

- Deliver a staff awareness programme to include training, seminars, site visits and regular email newsletters ('ezines'). Ongoing.
- Respond to enquiries from council staff and staff in partner agencies, providing technical support and advice as required. Ongoing.
- Maintain an up-to-date library of key literature, including DVDs and CD-ROMs; obtain samples of products; make available to council staff. Ongoing.
- Provide forums for partners to exchange ideas and knowledge and to develop and implement policy. Ongoing.

The Home Energy Team works with external partners to design and deliver training courses aimed at key staff, such

as social workers, health visitors and district nurses.

EXAMPLE

In October 2008 twelve council staff will be trained to undertake RDSAP surveys and have access to online software to calculate energy ratings, largely for homes in the owner-occupier and private rented sectors.

A number of forums and committees exist to raise awareness, co-ordinate activity and deliver policies. These include the Affordable Warmth Group and the Environment and Sustainability Partnership. These help maintain important contacts between partners. For example, the Affordable Warmth Group brings together the Home Energy Team, the Social Inclusion Unit, Money Advice Plymouth, Westcountry Energy Action, the Public Health Development Unit, Eaga and others.

Objective 4: marketing strategy

Marketing is a critical local government activity since the council is known and trusted within the community. It is important to change attitudes and behaviour and to remove barriers to action. Marketing is critical to ensure that Plymouth residents receive their 'fair share' of national resources - through maximising awareness and uptake.

Key tasks:

- Update and extend the council's energy website at www.plymouth.gov.uk/energy. Ongoing.
- Respond within ten working days to enquiries submitted to the public email address energy@plymouth.gov.uk. Ongoing.
- Provide speakers and exhibition materials on request to key local events and groups. Ongoing.
- Write regular press releases, undertake media interviews and respond to media requests for information. Ongoing.

- Develop and update a range of marketing materials to include leaflets, information sheets and posters and ensure maximum exposure. Ongoing.
- Update the marketing strategy every three months, ensuring a mixture of campaigns aimed at both the 'fuel poor' and the 'fuel rich'. Ongoing.

EXAMPLE

In 2008 the Home Energy Team produced a short film on DVD – the 'Wright's and Wrong's' – which encourages people to use energy wisely. This is distributed alongside the CD-ROM version of this strategy.

Whilst various sections within the council will have responsibility for delivering this objective, a very important role is played by Westcountry Energy Action (WCEA). WCEA deliver Energy Saving Trust Advice Centre services across Devon and are based in Plymouth. They provide a free telephone number (0800 512012) where anyone can obtain free energy advice. WCEA is an invaluable referral agency for schemes such as Plymouth Healthy Homes.

Objective 5: scheme development & delivery

The council is responsible for three schemes operating in the city: Plymouth Healthy Homes, Insulate Plymouth and Devon Warm Zones. All three are operated in partnership with external agencies and all three benefit from council funding. We enable a fourth scheme - HEAT Plymouth - to use the council logo to maximise uptake but provide no funding.

Key tasks:

- Establish customer care policy, including customer satisfaction monitoring, for the Plymouth Healthy Homes scheme. March 2009.
- Develop customer satisfaction monitoring for Insulate Plymouth and Devon Warm Zones with partners on those schemes. December 2008.

- Monitor outcomes of the principal schemes operating in Plymouth on a monthly basis, to include reductions in energy consumption, energy bills and carbon dioxide emissions. Ongoing.
- Ensure continuous improvement of schemes managed or promoted by the council based on best practice and customer comments. Ongoing.
- Ensure council resources are directed largely at fuel poor households through targeted marketing. Ongoing.
- Develop ideas for new schemes to implement in the city based on an evaluation of schemes operating elsewhere or ideas in development. Ongoing.

The following examples give a flavour of the type of scheme that is delivered successfully elsewhere and which could be applied in Plymouth, subject to funds becoming available.

- School curriculum project. These build energy projects into the curriculum, provide training for teachers, school governors and parents and can be linked to projects which improve the energy efficiency of the school as well as the homes in which the children live.
- Community ESCO. An energy services company managed with a local community that provides heat, light and power at competitive rates. Such an energy club could also provide energy efficiency measures, fixed monthly outgoings and other benefits such as broadband. Such a project could be developed in partnership with organisations such as credit unions. An initial step would be to undertake qualitative research to determine likely levels of interest in such a scheme.
- Microgeneration advice/grants. The council could, as a trusted body, offer advice to individual householders who are interested in installing microgeneration technologies. These would include solar thermal, photovoltaics, heat pumps, micro wind and biomass systems. The council could also seek to increase

uptake through marketing and grants to supplement those provided by the Government.

Objective 6: high standard new-build

This objective is currently met primarily through the planning system, section 106 agreements, building control and the Housing Strategy and Renewal Team.

Evidence shows that an unacceptably high proportion of new homes do not even reach the minimum standards laid down in Building Regulations Part L. These homes will not therefore achieve the carbon targets that are expected of them. Since they will be in use well into the 22nd century it is imperative that this situation is rectified. The only way of checking that homes meet their design specification is to undertake an air pressure test, perhaps linked to the use of thermal imaging to identify areas of heat loss. This is a potential role for Building Control.

Key tasks:

- Encourage housing associations and developers to build to a minimum standard of Code for Sustainable Housing level 3. Ongoing.
- Encourage house builders to construct exemplar homes in the city to a known high standard, such as 'zero carbon', 'zero heating', 'autonomous' or Code level 5 or 6. Ongoing.
- Ensure that developers undertake a CHP/community heating feasibility study for all new developments of 50 homes or more. Ongoing.
- Explore the feasibility of Building Control undertaking sample checks on new housing to ensure compliance with Building Regulations, to include air pressure testing. September 2009.

The council is encouraging developers to consider providing Combined Heat and Power infrastructure for major developments. The council will also explore the

feasibility of using planning policy to require developers and housing associations to consider CHP for every development over a certain size.

PARTNERS

Westcountry Energy Action

WCEA provide advice services locally for the South West Energy Saving Trust Advice Centre and a range of other services. WCEA provide the bulk of referrals for Plymouth Healthy Homes. They also provide a range of low cost or free training for council staff. WCEA are a key partner in the Devon Warm Zones scheme, where they have responsibility for key operational areas such as referrals and call centre services. www.wcea.org.uk.

NEA

National Energy Action is the 'campaigning for warm homes' charity. NEA helped develop Plymouth's Affordable Warmth Strategy, and continues to be involved in its implementation through membership of the Affordable Warmth Group. The council will continue to provide funding towards the cost of the Devon Affordable Warmth Officer, whose principal role is in relation to delivery of Devon Warm Zones, and who is employed by NEA. www.nea.org.uk.

Public Health Development Unit

The Home Energy Team works closely with the NHS Trust via the Affordable Warmth Group and the Healthy Homes Steering Group. We have undertaken joint promotions such as a successful 'flu jab' mailing that generated referrals for Plymouth Healthy Homes. We intend to develop further joint projects in the future.

Eaga Ltd.

Eaga is the company appointed by Government to operate the Warm Front grant scheme. Eaga is represented on local energy groups, including the Affordable Warmth Group. www.warmfront.co.uk.

Devon HECA Group

Every local government home energy officer is a member of this group and all ten Energy Conservation Authorities are represented at meetings. The group is a professional development and networking body invaluable for energy officers. Opportunities exist to develop new schemes jointly with other ECAs. The Group is responsible for the strategic overview of Devon Warm Zones via the DWZ Steering Group, and manages the workplan of the Devon Affordable Warmth Officer.

MEASURING SUCCESS

The following are key indicators that we are required to measure for national indicators:

- number of households in receipt of benefits who live in homes with (i) a SAP rating of 35 or less and (ii) a SAP of 65 or higher
- per capita carbon dioxide emissions in the domestic sector

The following are suggested measures of success that will demonstrate compliance with policies in this Strategy. They are in line with indicators suggested by the regional Low Carbon Housing and Fuel Poverty Strategy.

- Number of homes refurbished to a SAP of 65.
- Number of homes with loft and cavity wall insulation.
- Number of hard-to-treat properties treated.
- Number of homes built to Level 3, 4, 5 & 6 of the Code for Sustainable Homes.
- Level of benefit take up.
- Level of funding take up (e.g. Warm Front; EEC).

The Home Energy Team measure the success of energy efficiency schemes in the city. We measure the following:

- quantity of measures & households benefiting
- cost of measures
- notional energy saving
- notional carbon dioxide saving
- notional saving in annual energy bills

In order to measure success it is important that we have the necessary tools. This will include software to measure the energy rating of a home, training of key staff to become accredited to issue home energy ratings, and provision of an energy database of the entire housing stock.



APPENDICES

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2 Glossary of Terms

BRE	Building Research Establishment
CEEF	Community Energy Efficiency Fund
CERT	Carbon Emissions Reduction Target (formerly EEC)
CHP	Combined Heat and Power
DCLG	Department for Communities and Local Government
DECC	Department for Energy and Climate Change
Defra	Department for the Environment, Food and Rural Affairs
DTI	Department for Trade and Industry
EEAC	Energy Efficiency Advice Centre
EEC	Energy Efficiency Commitment (to become Carbon Emissions Reduction Target from 2008)
EPC	Energy Performance Certificate
EST	Energy Saving Trust
HECA	Home Energy Conservation Act
NEA	National Energy Action
NHER	National Home Energy Rating
SAP	Standard Assessment Procedure

NOTES



