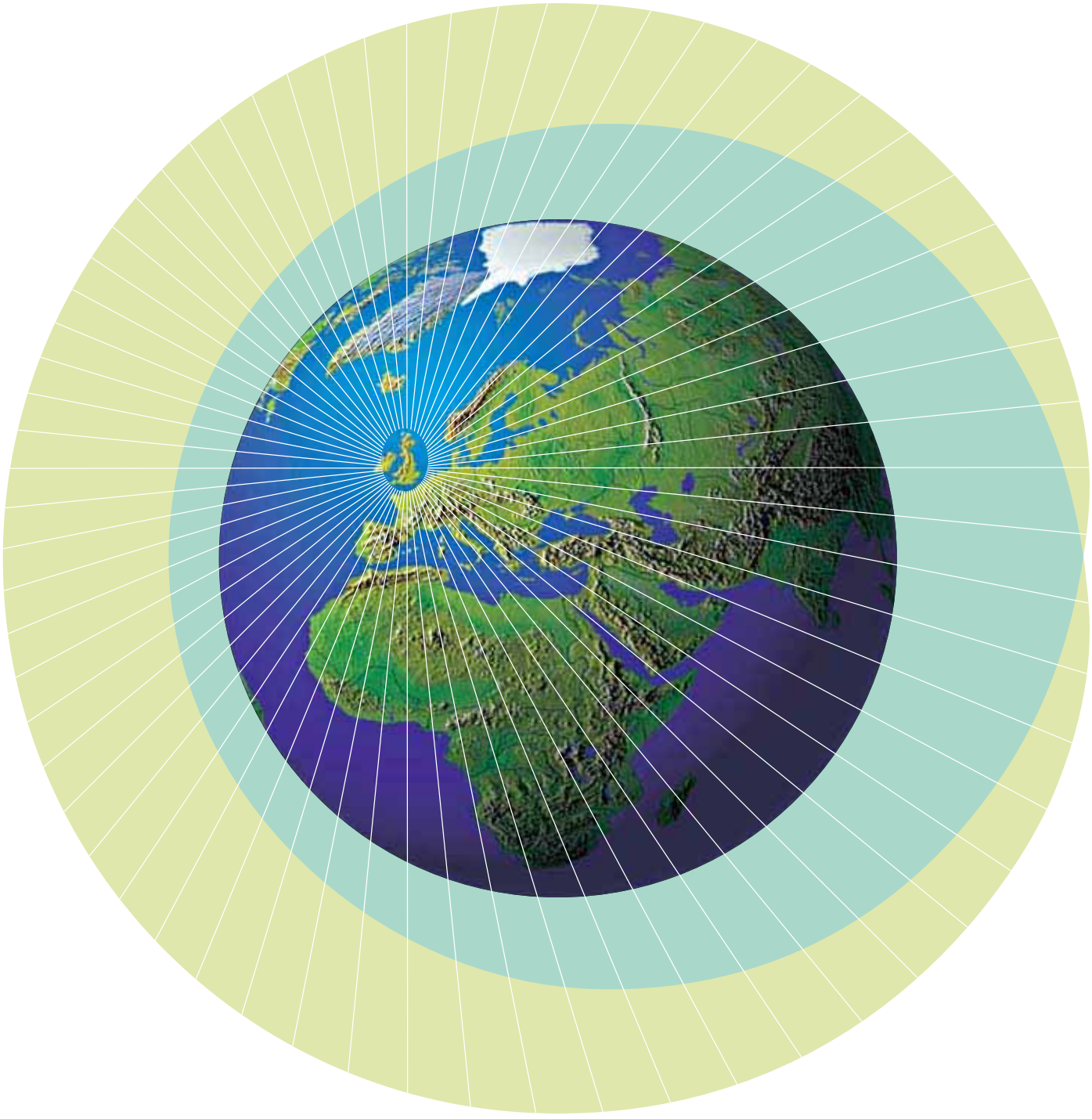
HM Government



DEPARTMENT OF ENERGY & CLIMATE CHANGE

Communities and Local Government

HEAT AND ENERGY SAVING STRATEGY

Consultation

FEBRUARY 2009

Department for Energy and Climate Change
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If you require this publication in an alternative format, please contact the Department for Energy and Climate Change.

Full text of the consultation, Executive Summary and Partial Impact Assessment can be found at http://decc.gov.uk/consultations/. If you wish to obtain a hard copy of this consultation, please contact hes.consultation@decc.gsi.gov.uk

www.hes.decc.gsi.gov.uk is an interactive site, and you can respond to the consultation electronically from the site.

Please send your responses to:
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Ongoing Engagement

DECC intends these to be active consultation processes. In addition to inviting consultation responses, we will also be holding a number of engagement events. Details can be found at www.decc.gov.uk/consultations/

February 2009

ISBN: 978-0-1085-0815-8

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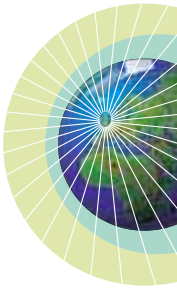


Foreword

We need not just a small improvement in the energy efficiency of each home and business in Britain, but a radical shift in our ambition.

Why? To save money for families. Households are, on average, losing up to £300 a year because of poor energy efficiency. Just replacing the million oldest boilers could save each of those million homes £200 every year.

We need a radical shift to help to ensure our energy security. As we become more dependent on imported fossil fuels, the best way to meet our energy requirements is to reduce our consumption of energy.

Above all, we need a radical shift to play our part in tackling climate change – to stick within our carbon budgets, to meet our part of a cross-Europe commitment on renewable power, and to show the world that a low carbon economy is possible. Heating and powering our homes produces more than a quarter of Britain's CO_2 emissions.

If we mobilise our efforts and give households the support they need, we can make sure that every house can have loft and cavity wall insulation by 2015, that seven million homes will have been offered 'whole house' heat and energy efficiency solutions by 2020, and, by the same year, that household emissions are a third lower than today. By 2050, to reduce total greenhouse gas emissions by 80%, the only option is for all homes and buildings, in their heat, light and power, to be not just low carbon but approaching zero carbon.

With a shift of this scale, Government action cannot leave fairness to chance.

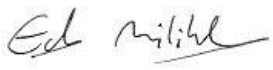
We believe fairness is both right in itself and the only way to achieve the changes we need. Elderly people, many on low incomes, many less able to arrange the changes to their homes themselves, must be given extra help. Households in poverty are often less able to spend in advance to save in the long term. Tenants, too, face particular issues: a fair deal means making sure that they too can reduce their energy bills and cut their carbon emissions.

All of this will need Government action. Like the switch from manufactured Town gas to the natural gas of the North Sea in the 1970s, it will mean changes house to house, street to street.

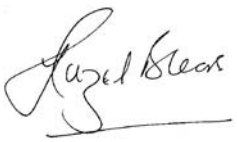
It also needs action by people. Individual households will take decisions about their own homes. Communities can act together to make choices about changes like district heating, or inspire and encourage each other to be more energy conscious. Businesses, large and small, can choose the most energy efficient premises.

This consultation is one of three that together seek views on a radical new Heat and Energy Saving Strategy. This work will help to ensure that we have the most open conversation we can about the scale of the challenge and the options that face us. As part of this consultation, nine groups of households, meeting in England, Wales and Northern Ireland, will look in depth at what can be done. They will talk to businesses and neighbours and will visit exemplar projects to give a citizen-led view.

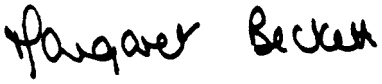
With ambition to match the scale of the challenge, with a strong emphasis on fairness, and with action from Government and communities, a radical shift in Britain's energy efficiency is possible. This conversation will set us on the path.



Ed Miliband
Secretary of State for Energy and Climate Change

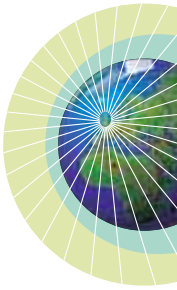


Hazel Blears
Secretary of State for Communities and Local Government



Margaret Beckett
Minister for Housing and Planning

Executive summary



This consultation on the Government's Heat and Energy Saving Strategy sets out an aim for emissions from existing buildings to be approaching zero by 2050. This means increasing the scope and ambition of our energy saving measures, as well as decarbonising the generation and supply of heat. To support this, it sets out the following key policy proposals:

- All homes to have received by 2030 a 'whole house' package including all cost-effective energy saving measures, plus renewable heat and electricity measures as appropriate. All lofts and cavity walls will be insulated where practical by 2015.
- Comprehensive information and advice to be made available to help people make changes to save energy and save money – including widespread availability of home energy advice by accredited advisers.
- Development of new ways to provide financial support so people can make more substantial energy saving and renewable energy improvements to their homes through mechanisms that allow costs to be more than offset by energy bill savings.
- Consideration of whether a new delivery model is needed, to allow a more coordinated approach to rolling out improvements to homes and communities, house-by-house and street-by-street.
- Consideration of widening requirements under Building Regulations to carry out energy saving measures alongside certain types of building work, and consideration of a new voluntary code of practice with the building trade on energy efficiency and low carbon energy.
- A new focus on district heating in suitable communities, and removing barriers to their development.
- Encouragement of combined heat and power and better use of surplus heat through carbon pricing mechanisms.

Taken together, the policies in this consultation will aim to reduce annual emissions by up to 44 million tonnes of CO_2 in 2020 – the equivalent of a 30% reduction in emissions from households compared to 2006 – making a significant contribution to meeting our carbon budgets.

1. The Government's strategy for saving energy and decarbonising our heating, now and into the future, has four main objectives:

   - to help more people in these difficult economic times, and over the long term, to reduce their energy bills by using less energy;
   - to reduce the UK's emissions and increase our use of renewable energy in line with the demands of our carbon budgets, our renewables target and our ultimate target to reduce greenhouse gas emissions by 80% by 2050;
   - to help us to maintain secure, diverse energy supplies; and
   - to take advantage of the economic opportunities presented by the shift to a low carbon economy in the UK and in the rest of the world, helping us during the current economic downturn and over the long term.

2. We need to achieve these objectives in a fair way. The changes we intend to make will bring opportunities to save energy and save money. We must ensure that all consumers are able to access these change so that everyone can reap the benefits of the move to a low carbon economy.

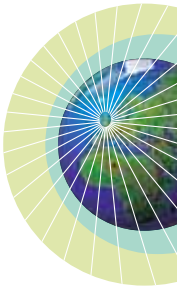
3. We have already achieved a great deal. The Government's existing programmes have, each year, saved enough gas to heat 330,000 homes and from 2016 all new homes will be zero carbon. However, we know there is still more to do. That is why, in September 2008, the Prime Minister announced a new package of proposed measures which could help families to reduce their fuel bills, by £300 per year.

4. By 2015, we aim to have insulated all the lofts and cavity walls where it is practicable to do so. However, this will not be enough to achieve the ambitions for our 2050 target of cutting emissions by 80%. The difficulty in removing carbon emissions from some sectors of the economy means that we have to plan to be even more ambitious in other sectors where decarbonisation is more feasible, such as buildings.

5. Once we have exhausted the opportunities to take the easier actions, such as insulating lofts and cavity walls, the task will become harder. We will have to make more substantial changes to homes – such as small-scale energy generation and solid wall insulation. So we need to increase our level of ambition, and we need to start building capacity to do this more challenging work now. We aim to help some seven million homes to take up these substantial changes by 2020.

6. These new ways of using energy in our homes will require a new approach to delivering our policies. The current delivery model, the Carbon Emissions Reduction Target, (CERT) has seen energy suppliers under an obligation set by the Government to achieve certain emissions reductions. Suppliers have mainly achieved this by installing the simpler energy efficiency measures into individual households. We propose that this model continues, under CERT, until 2012. However, beyond this we will need to use a more coordinated, community-based approach, working door-to-door and street-to-street to cover the needs of the whole house. The proposed new Community Energy Savings Programme (CESP), to be launched this year, will be a pilot for this more coordinated approach.

7. As a first step, we want all householders to have access to comprehensive Home Energy Advice, providing reliable information and advice about how to improve the energy performance of their homes in the most cost-effective way.



8. We will then need to ensure that our systems for delivering these measures on the ground are appropriate for the new approaches we need. Therefore we are asking for views and supporting evidence on options for a new delivery model, which include amending the current supplier-led approach and considering a single coordinating body. A new approach could allow greater coordination and targeting of packages of energy saving and renewable energy measures, to meet the needs of a whole house or community. A new model could make it easier for householders to understand and access the support available. It could stimulate greater competition by encouraging new companies to enter the market to provide energy services. It could also encourage more effective partnerships with local authorities and communities on larger projects covering whole streets and neighbourhoods.

9. The shift from installing low-cost insulation to more significant improvements to homes will also require a new approach to financing these energy saving measures. While these improvements can help people to save money on energy bills in the long term, initial costs can be high. This consultation therefore puts forward proposals for new finance models that spread the costs of the investment over time, so that savings on bills more than offset the cost of repayments. This will require new ways of allowing the finance to stay with the house that benefits from the energy efficiency improvements, even if the original owner moves. We are also considering how we could work with private landlords to help them improve properties to benefit their tenants. All of this will need to link to the new financial support we are providing for renewable heat and small-scale renewable electricity generation.

10. We believe that new approaches to delivery and finance mechanisms are essential to achieve the necessary step change in how we use energy. However, there is also a role for regulation. We already have regulatory mechanisms to set minimum standards for our buildings and the electrical products we use. The Government's priority will be to ensure these are effective and properly enforced. We will return to the question of further regulation, if necessary, at the end of the first carbon budget period in 2012.

11. The first step will always be to find ways to save energy. Even so, we will continue to need to heat our homes and businesses. So we also need to look at decarbonising the way we generate heat. This will mean new ways of providing low carbon heat to whole communities, using surplus (or waste) heat more effectively and generating heat and power together.

12. Modern district heating offers the potential to cut energy bills and reduce CO_2 emissions, and we want to help district heating networks to develop in those communities where it makes sense. The Government wants to ensure that local government plays a full role in the development of renewable and low carbon heat and electricity. We will be convening a Summit on Community Energy and Heating with local government leaders to facilitate the development and expansion of district heating, and convening a Heat Markets Forum to ensure an appropriate market framework is in place.

13. Combined heat and power (CHP) generation is supported by a number of policies, such as the EU Emissions Trading Scheme (ETS), exemption from the Climate Change Levy and the Renewables Obligation. CHP will also benefit from the forthcoming financial support for renewable heat. We will look to ensure that this range of carbon pricing mechanisms provides sufficient support to CHP.

14. Overall, our new increased ambition and the measures we propose in this strategy will put us on the path to reduce emissions from buildings by more than 80% by 2050, in a fair and affordable way.

15. Taken together, the policies in this consultation will aim to reduce annual emissions by up to 44 million tonnes of CO_2 ($MtCO_2$) per year by 2020. This is the equivalent to a 30% reduction in emissions from households compared to 2006. Together with the proposed increase to the Carbon Emissions Reduction Target and the proposed new Community Energy Saving Programme, we aim to reduce emissions by up to 50 $MtCO_2$ per year by 2020.

16. This programme will offer major economic opportunities for British business during this difficult economic time and over the long term. If the level of ambition set out above is achieved, then there will be approximately 34,000 jobs installing and maintaining whole-house packages[1]. The wider low carbon environmental goods and services sector currently employs over 880,000 people in the UK. This is expected to increase to over one million by the middle of the next decade[2].

17. Proposals in this document are forecast to reduce our demand for imported fossil fuels. For example, demand for gas will fall by 12% by 2020. This will contribute to the objectives of the new Department of Energy and Climate Change (DECC) of reducing our carbon emissions and maintaining secure and sustainable energy supplies.

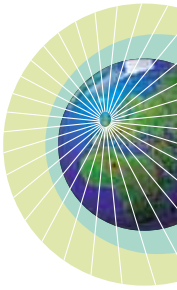
18. All sections of society need to work together to achieve these aims – individual householders, communities, businesses, the public sector and industry. This consultation covers all these sectors, although much of the emphasis is on existing domestic buildings, where we need to increase our ambitions for saving energy and reducing emissions. The Government recognises that it will need to lead this process, both through its own actions and by ensuring that the social stock leads the way, as it has done through the Decent Homes Programme for energy efficiency to date, and to provide for incentives to support the change.

19. This consultation is being jointly conducted between the Department of Energy and Climate Change and the Department for Communities and Local Government. We are also grateful to the UK Green Building Council for their work pulling together a wide range of stakeholder ideas and views in preparation for this consultation, and particularly for their report *Low carbon existing homes*.

1 These jobs are related to installation and maintenance only and do not take into account jobs in the supply chain or impacts on jobs in the wider economy .

2 **Innovas** (2009) Low Carbon and Environmental Goods and Services: an industry analysis, www.berr.gov.uk

20. This is the first in a series of consultations with other departments on key issues on climate change and energy that will lead to the publication, later this year, of our overarching plan for how we meet our carbon budgets. We want to hear your views on the proposals in this document.



21. The key proposals in this consultation document are summarised below.

Chapter 1 – Introduction

This chapter sets out in more detail the context for this strategy and the ambitions summarised above. It describes the challenges we will have to overcome to meet these ambitions, and our broad approach for doing so. We invite your views both on the level of our ambition and our broad approach for achieving it.

Chapter 2 – Helping people to change behaviour and take action

This chapter sets out how we can ensure that people have the information, technology and motivation to change their behaviour and take action to save energy. Some support is already available, for example through the Act on CO_2 advice line and devolved equivalents. Energy Performance Certificates provide information on the energy efficiency of a property, its potential efficiency and what it would take to achieve that potential. Smart meters – which provide detailed, real-time information on energy use – will be rolled out to all homes, to give consumers and energy suppliers better information about energy use in individual households.

However, there is more that the Government can do. We want to move to an approach where the energy needs of a 'whole house' are considered systematically. We plan to expand the availability of Home Energy Advice and to train Domestic Energy Assessors to provide this advice, and we will consider developing accreditation for professionals providing advice and installation of energy efficiency measures.

Chapter 3 – Financing energy saving and low carbon energy

As we move to more difficult energy saving and energy generation measures, with higher initial costs, we will need to supplement or combine other subsidies with other financing mechanisms. These will allow the costs of these measures to be more than offset by the energy bill savings. Finance needs to be easy to understand, comprehensive and flexible, covering insulation and renewable energy, depending on the household. It must also have proper protection and safeguards for consumers.

We are also seeking views on how the Renewable Heat Incentive could provide different levels of support for different technologies or sectors (e.g. households, communities and industry), whether the Renewable Heat Incentive should be made available as an upfront payment for small-scale renewable heat technologies, and how to maintain demand for renewable heat before the Renewable Heat Incentive comes into operation.

Chapter 4 – Delivery

The new challenges of delivering more substantial energy efficiency measures and low carbon energy to all types of buildings mean we need to rethink how we deliver energy improvements to people on the ground. As we start to roll out more substantial and more costly measures, it becomes even more important to focus on the needs of the poorest and most vulnerable people in society, to ensure a fair outcome.

Under the current strategy for delivering energy efficiency, the Carbon Emissions Reduction Target (CERT), energy suppliers have a statutory obligation to achieve an overall carbon emissions reduction target. While suppliers have been able to meet this target, mainly by concentrating on the simpler energy efficiency measures such as loft insulation, we need to consider whether this model will be appropriate for meeting the new challenges. This consultation proposes continuing the existing supplier-led CERT model up to December 2012. However, for the longer term we will need to consider a more coordinated, community-based approach, which can cover the needs of the whole house. The proposed new Community Energy Savings Programme, to be launched this year, will be a pilot for this kind of model. Therefore we are asking for views and supporting evidence on a number of options for a new delivery model, which include amendments to the current supplier-led approach and consideration of a single coordinating body. Our aim, in examining these options, is to provide a more coordinated and systematic approach to the provision of a wide range of energy saving and low carbon energy measures to households.

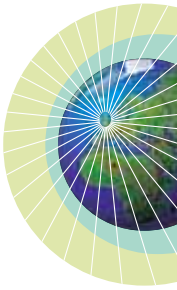
Chapter 5 – Stronger incentives to move to a low carbon future

We believe that our new proposals on finance and delivery can ensure that we achieve our ambitions. However, there may still be a case in the future for strengthening legal standards for some or all of the existing building stock, in order to promote higher standards. Firstly, we want to ensure that existing regulation is as effective as possible and achieves the desired outcomes. So the Government will examine how existing tools, such as Energy Performance Certificates and Building Regulations, can encourage the take-up of opportunities to improve the energy efficiency of buildings. This will include considering widening requirements under Building Regulations to include energy saving measures alongside certain types of building work, so long as it is cost effective to do so.

We are considering working with representatives of the building trade to design a voluntary code of practice on energy efficiency and low carbon energy. Another option would be to increase awareness of Energy Performance Certificates. In addition, the Government is considering the recommendations of the Rugg review of the private rental sector, which, if implemented, could improve energy efficiency in this sector. As part of this process, the Government will keep the need for new regulation under review, returning to the question of regulation at the end of the first carbon budget period if sufficient progress is not made using other tools.

Chapter 6 – District heating

As well as a whole-house approach to energy efficiency, we need also to consider community and larger-scale solutions for clean and efficient generation of the heating we use. If we are to achieve the UK's goals for saving energy, reducing emissions of CO_2 and maintaining energy security, we need to produce and use heat more efficiently.



District heating offers the potential to cut energy bills and reduce CO_2 emissions. However, the networks are expensive to install and the lack of experience of district heating in the UK, coupled with lengthy payback periods, mean that district heating is not currently attractive in the present commercial and regulatory environment. We are setting out a suite of possible measures aimed at tackling key barriers to district heating. These include considering changing regulation, enhancing the role of local authorities and improving the supply chain. We will convene a Local Authority Summit on Community Energy and Heating, as an opportunity for local authorities, community energy generation experts and central government policy makers to share experience and emerging ideas on how to realise the benefits of generating and saving energy at the community level. We are also proposing to set up a Heat Markets Forum, with representatives from Government, the energy industry and consumers, to assess the various types of arrangements for heat supply and to identify areas where we may need to do more to protect consumers or to build market confidence, for example through developing industry codes. Increased supply of district heating to residential consumers is a particular area that the forum will consider.

Chapter 7 – Combined heat and power and surplus heat

Generating heat and electricity together is more efficient than generating them separately. We also want to see surplus, or waste, heat from power generation or industry put to good use. Chapter 7 explains the Government's strategy for supporting combined heat and power and surplus heat in the future, through incentives for renewable heat and electricity generation and the EU Emissions Trading System. We wish to ensure that existing carbon pricing mechanisms provide sufficient support to combined heat and power. We are open to further proposals to improve this framework.

Chapter 1
Introduction

Chapter summary

This document addresses four key objectives: helping people reduce energy bills by using less energy; reducing the UK's emissions in line with our carbon budgets and our target to reduce emissions by 80% in 2050; maintaining secure and diverse energy supplies; and allowing the UK to make the most of the economic opportunities presented by the shift to a low carbon economy. This document focuses on reducing emissions from the existing building stock, primarily people's homes. Households account for over a quarter of the UK's CO_2 emissions.

We have already achieved a great deal and put in place a wide range of policies to promote energy savings and low carbon energy. However, if the UK is to achieve its targets on emissions reductions and renewable energy, we will have to move beyond relatively inexpensive and easy energy efficiency measures and consider more radical ways of saving energy. We will also need to 'decarbonise' the generation and supply of heat. To achieve its aims, the Government recognises the need to enable people and communities to play a greater role.

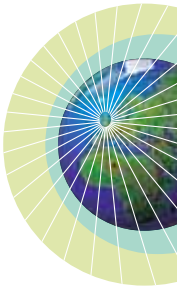
By 2050, emissions from buildings need to be minimal if we are to reduce the UK's overall emissions by 80%. To reach this point, we need to raise our ambition. Our proposal is that, by 2015, all lofts and cavity walls should be insulated, where it is practical to do so. By 2020, we want seven million homes to have had the opportunity to take up a 'whole-house' package of measures going beyond simple insulation. By 2030, our aim is that all buildings will have received such a package, that covers all of the cost-effective measures available for that property at the time.

This chapter sets out the challenges we will have to overcome to meet these ambitions, and our broad approach for doing so. We invite your views both on the level of our ambition and our strategy for achieving it.

Objectives

1.1 The Government is determined to help the people of this country through these difficult economic times. Despite recent falls, higher global energy prices mean that families and businesses in Britain face increased energy

bills. Without Government action, the most vulnerable members of society will suffer most from energy price rises, and we know that there are increasing numbers of people in fuel poverty.



1.2 We have set stretching targets to reduce our CO_2 emissions. The Climate Change Act 2008 commits the UK to making at least an 80% cut in greenhouse gas emissions by 2050. Under the Act, we are required to set the first three of our five-year carbon budgets by 1 June 2009, taking into account the advice of the Committee on Climate Change. To do this most cost effectively, we will need to consider how we reduce emissions across all sectors, including the use of heat and energy in households and businesses. We have also committed the UK to meeting its share of the European target for 20% of Europe's energy to come from renewable sources by 2020.

1.3 We will not shy away from these important targets even in the face of the current economic difficulties. However, our climate policies must be fair. Where possible they must reduce energy costs for homes and businesses. Where this is not possible we must ensure that the costs are spread fairly across the population. We must also make the most of the economic benefits that can come from the move to a low carbon economy.

1.4 In this context, we have four key objectives for the strategy described in this consultation:

- To help more people to use less energy and to reduce their energy bills. We have already announced new action to help people pay their energy bills in the short term. This included a new £1 billion package of measures, announced in September last year, to help families to permanently cut their bills. With this strategy, we want to build on these immediate actions to put in place policies for the longer term.

- To reduce the UK's emissions through using less energy and decarbonising our heat supply and increasing our use of renewable energy, to help us to meet our carbon budgets, our targets for renewable energy and to reduce emissions by 80%.

- To reduce our reliance on imports of fossil fuels, to help us to maintain secure, diverse energy supplies. As the UK's own supplies of fossil fuels decline, we will increasingly need to rely on imported fuels.

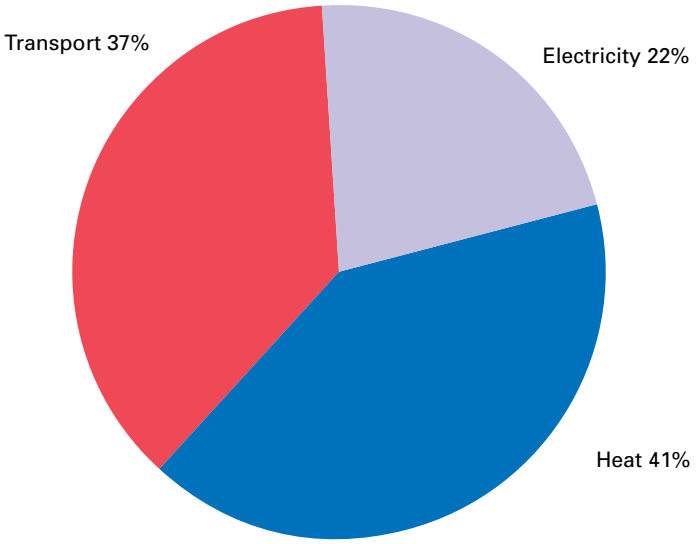
- To take advantage of the economic opportunities presented by the shift to a low carbon economy in the UK and in the rest of the world.

1.5 In order to meet our objectives, we need a comprehensive, long-term strategy to save energy and revolutionise how we heat our homes, businesses and industries. The Government wants local authorities to be able to play a full role in this agenda, planning and promoting work to save energy, and to develop renewable energy. Local people and communities can play a particularly important role in helping to decide how to tackle the challenges, change behaviours and solve the complex problems that we will need to address to meet our ambitious targets for reducing emissions and increasing our use of renewable energy. We want to support their contributions and innovations by supporting them as they play a greater role in shaping and delivering our responses.

Energy use in the UK

1.6 Overall, final energy demand in UK, excluding international aviation, is around 1630 terawatt hours (TWh) each year. (Figure 1.1 shows how energy is used in the UK.) With existing policies and those announced in the Energy White Paper 2007, we expect projected final energy demand to be around 1500 TWh by 2020[3]. We want to go even further: this Heat and Energy Saving Strategy seeks views on how we can achieve a further reduction in electricity, gas and oil energy demand of up to 7%.

Figure 1.1: Total UK energy consumption in 2006



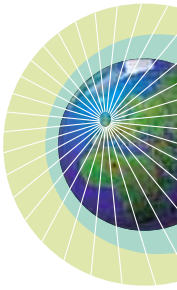
1.7 Reducing our overall energy consumption will bring down the costs of meeting our renewables target, because we will need less new renewables to meet the target. Even some of the more expensive energy saving measures are cheaper than more renewable generation plant.

1.8 Heating accounts for 47% of the UK's CO_2 emissions and 60% of average domestic energy bills. In homes, we use it to keep warm, for hot water and for cooking. In other buildings, it can be used for the same purposes, and also for industrial processes. Conserving heat will be the first, and often most cost-effective, step. We can achieve this by simple changes in behaviour, such as turning down the thermostat by as little as one degree. There are also improvements that we can make to the fabric of our buildings to save heat, for example installing insulation. However, if we are to meet our targets to reduce CO_2 emissions, we have to find new ways to generate and supply heat for our homes, businesses and industries.

1.9 The UK has also increased its use of cooling, both in commercial and domestic buildings. Electrical air conditioning now accounts for 4% of final electricity consumption and is predicted to rise further with rising global temperatures. Cooling demand in the service sector alone could account for

3 This figure is based on central assumptions, including on economic growth

6% of final electricity consumption by 2020[4]. In the commercial sector, cooling consumes more energy than heating, and climate change is likely to lead to even more demand for cooling both in homes and workplaces.



1.10 There are already examples of households, businesses and industries that are leading the way in saving energy and reducing their emissions. We want this kind of warm, energy efficient, low carbon building to become the norm, rather than a novelty.

What we have already achieved

1.11 Working together, individuals, communities, energy suppliers and the Government have made major strides in saving energy. We set out some of the Government's major initiatives on energy saving in Box 1.1.

Box 1.1: Government action on energy saving

Information, coordination and advice

The advice line **Act on CO_2** provides people in England with comprehensive advice on how to reduce their carbon footprint. It offers tailored, free, impartial advice from the Energy Saving Trust. Its advice covers energy efficiency, small-scale generation and renewable energy, water efficiency and waste reduction and helps consumers to take advantage of other support measures such as CERT. The **Carbon Trust** and **Business Links** provide support to businesses to accelerate the move to a low carbon economy.

The **Energy Performance Certificate (EPC)** provides information at the point of sale or rent on the current energy efficiency of a property, its potential efficiency and the measures required to achieve that potential. The EPC rates properties on a scale of A to G, allowing potential buyers or tenants to compare the energy efficiency of properties. Public sector buildings are also required publicly to show a Display Energy Certificate which makes clear the actual operational energy use of the building.

Carbon pricing

The **EU ETS** imposes a cap on emissions for those sectors within its remit. Most emissions from electricity are covered by the ETS, but most emissions from heat are outside the ETS. The EU climate and energy package includes several proposals to improve the long-term certainty of the EU ETS so that it will deliver significant abatement of CO_2 emissions.

4 **Department for Environment Food and Rural Affairs:** Policy Brief: Improving the Energy Performance of Air-Conditioning Products, (2008) *July* http://www.mtprog.com/spm/files/download/byname/file/2006-07-10%20Policy_Brief_Air_Con_doc%20fin.pdf

The **Climate Change Levy** taxes the use of energy in industry, commerce and the public sector, to encourage energy efficiency. **Climate Change Agreements** allow energy intensive business users to receive an 80% discount from the Climate Change Levy, in return for meeting targets.

From April 2010 the **Carbon Reduction Commitment** will come into force as a mandatory emissions trading scheme for large commercial and public sector organisations, not currently covered by a targeted, quantity based climate change instrument.

Working through energy suppliers

The **Carbon Emissions Reduction Target (CERT)** came into effect on 1 April 2008. CERT is an obligation on energy suppliers to achieve targets for promoting reductions in carbon emissions in the household sector. It is the principal driver of energy efficiency improvements in existing homes in Great Britain. CERT marks a significant strengthening of our efforts to reduce household carbon emissions, doubling the target under its predecessor, the Energy Efficiency Commitment. We are currently consulting on how to implement the tighter CERT targets we announced in September 2008. CERT will be superseded by a new scheme – Chapter 4 sets out when this change could happen and options for how this new scheme could work.

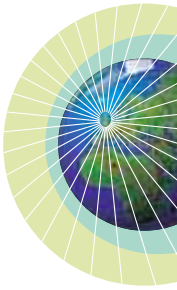
The new £1 billion **fuel bills package** announced in the autumn of 2008 will also provide immediate help for householders who are struggling to pay their fuel bills. A new £350 million **Community Energy Saving Programme** is proposing to offer free and discounted energy efficiency measures including central heating and insulation in around 100 low-income communities across Great Britain. This could also support initiatives for community heating.

Public spending and procurement

The **Warm Front** scheme provides a grant towards the cost of central heating and energy efficiency measures to vulnerable, low-income households. Over 1.8 million people in England have received assistance since 2000. The 2008 Pre-Budget Report[5] announced £100 million of new funding for Warm Front, taking the total funding for the current spend period to over £950 million.

The **Decent Homes** programme has had a significant impact in terms of improving the energy efficiency of the social housing stock and helping to reduce fuel bills. The Decent Homes standard includes a criterion for thermal comfort. As a result, the programme has generated a substantial investment in insulation and other energy efficiency measures at a cost of £5.6 billion since 2001. Overall, the energy performance of buildings in the social sector is better than that of the private rented and owner-occupier sectors.

5 **HM Treasury:** Pre Budget Report, (2008) November
http://www.hm-treasury.gov.uk/prebud_pbr08_repindex.htm



The Government has set mandatory standards for products ('**Quick Wins – Buy Sustainably**') that are bought by central Government Departments. The UK implementation of the Energy Services Directive will include a voluntary agreement with other public authorities (e.g. local authorities and the NHS) to buy to the same standards as in 'Quick Wins – Buy Sustainably'.

Salix Finance is a public funded company set up to accelerate public sector investment in energy efficiency technologies through invest to save schemes.

Regulation

Building Regulations set standards for the energy efficiency of new buildings, and for building work to existing buildings. From 2016, new homes will have to meet zero carbon standards, and Government has an ambition for non-domestic buildings to meet zero carbon standards from 2019. The Government recently consulted on the definition of zero carbon homes[6].

Regulation for **product standards** occurs at European level. Labelling requirements for some electrical equipment are already in place, and minimum standards have been agreed for products including general lighting, external power supplies (i.e. adaptor and chargers for computers, mobiles phones, etc) and office and street lighting. In the next 12 to 24 months, we will add standards for more products such as TVs, information and communication technologies and some industrial products.

The Government is currently designing a set of **Voluntary Agreements** with the suppliers of energy to SMEs which seek to promote energy services and savings. These could include accelerated rollout of advanced metering; better information to customers on consumption and potential actions; energy services deals; and subsidised equipment and appliances.

1.12 These policies have had considerable success. More than five million condensing boilers have been installed in homes since 2005. Since 2002, 4 million lofts and cavity walls have been insulated. We also estimate that around 100,000 homes have installed small-scale renewable energy generation technologies.

1.13 With the proposed 20% increase in the CERT target announced last year, CERT might save 184.8 $MtCO_2$ over its lifetime, or 5.4 $MtCO_2$ per year. This reduction is equivalent to the annual CO_2 emissions from 940,000 homes. We also expect CERT to stimulate around £3 billion of investment from energy suppliers in carbon reduction measures.

1.14 Nearly half of all energy consumed in the UK is for heating. Government policy has traditionally concentrated on the fuels that generate heat for homes, businesses and industry. Recognising the importance of heating as a policy

6 **Communities and Local Government:** Definition of Zero Carbon Homes and Non-Domestic Buildings: Consultation, (2008) December http://www.communities.gov.uk/planningandbuilding/theenvironment/zerocarbonhomes/

area in its own right, in January 2008, the Government published a Call for Evidence on heat[7]. This sought views on Government analysis and on policies, existing and potential, that might reduce the CO_2 emissions from heating and cooling. In all, 127 organisations and individuals responded to the Call for Evidence. We have analysed these responses and have taken them into account in preparing this document. (The submissions and summaries of collated results are available on the website http://heatevidence.dialoguebydesign.net.)

1.15 Our policies on renewable heat build on proposals we set out in the June 2008 Renewable Energy Strategy Consultation. Responses to that consultation will help us in developing our final strategy for meeting our renewable energy target, which we will publish in the Spring.

Our ambition

1.16 Despite these successes, there is still more to do. While the consultations on the increase to CERT targets and the Community Energy Savings Programme (CESP), which we have launched alongside this consultation, set out the Government's proposals for meeting our immediate goals, this consultation seeks views on our longer-term strategy for heat and energy saving.

1.17 According to the independent Committee on Climate Change[8], if we are to reduce the UK's greenhouse gas emissions by 80% by 2050, we will have to eliminate emissions from households almost entirely. This is illustrated in Figure 1.2.

1.18 The Government has already committed the UK to making all new homes zero carbon from 2016. It has also set out its ambition to do the same for other new buildings from 2019. But if we are to achieve our targets, we will have to reduce emissions from existing buildings by at least 80%. We will aim for emissions from existing buildings to be minimal by 2050.

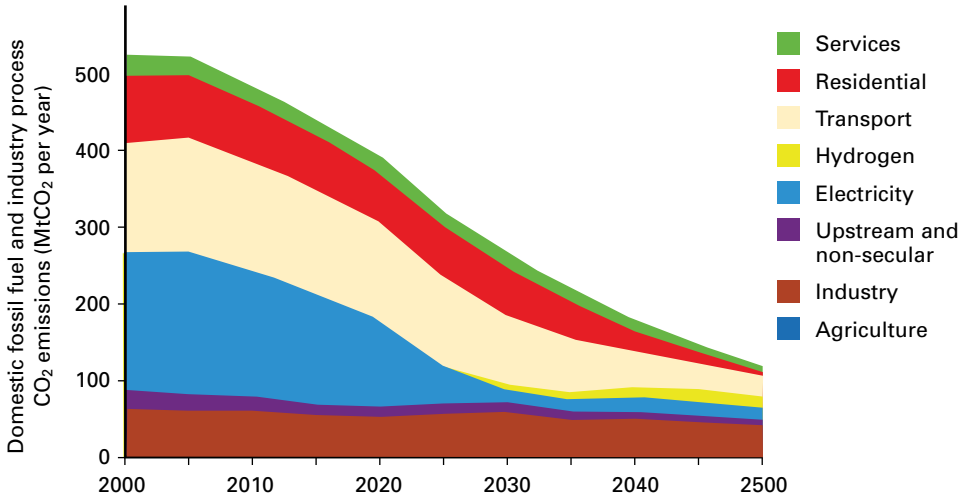
Pathway to 2050

1.19 We need to begin to establish a path that will get us to that radical long-term objective. We do not know yet which technologies will provide the best approach to our 2050 ambition. However, we know that a significant number of energy efficiency measures already pay for themselves and will be needed in any plausible pathway to a low carbon future. We already know that by 2020 we will need to meet our share of the EU renewable energy target. Along the way, we will also have to meet binding carbon budgets.

7 **Department for Business Enterprise and Regulatory Reform**: Heat Call for Evidence, *(2008) January* http://www.berr.gov.uk/files/file43609.pdf

8 **Committee on Climate Change:** Building a Low Carbon Economy – The UK's Contribution to Tackling Climate Change, *(2008) December* http://www.theccc.org.uk/reports/

Figure 1.2: UK CO_2 emissions by sector to 2050 on an 80% emissions reduction path[9]



1.20 However, we also need to set out specific milestones for how we believe we can minimise emissions from existing buildings by 2050. This pathway is summarised in Box 1.2 , and described in more detail in paragraph 1.21 to 1.25.

Box 1.2: Indicative pathway to 2050

2015 All lofts and cavity walls will be insulated, where it is practical to do so and the householder wants it. Capacity to deliver more substantial measures in volume is developed and proven.

2020 Up to 7 million homes will have had the opportunity to take up more substantial 'whole-house' changes. These packages will go beyond the simple loft and cavity wall insulation measures to include things like solid wall insulation or small-scale renewable energy generation.

All homes to have smart meters.

2030 Our aim is that all homes and other buildings will have received a package that covers all of the cost-effective measures available for that property at the time.

2050 Emissions from buildings are as close to zero as possible.

9 Committee on Climate Change, 2008, MARKAL modelling based on CCC assumptions

1.21 When launching the home energy saving programme in September 2008, the Prime Minister set out the Government's aim to insulate all Britain's homes, where practical, by 2020[10]. We now want to go faster, so that the lofts and cavity walls of every home will have been insulated by 2015[11], where it is practical to do so and where householders want it[12].

1.22 It would not be practical or sensible to expect suppliers and installers to switch suddenly from the easier to the more substantial improvements when, around 2015, they have exhausted the lower-cost ones. Industry needs to be able to plan with certainty both for the delivery of the remaining easy measures, and for the new approaches.

1.23 This means that we need to start to build capacity and skills to provide these new approaches now, and steadily increase delivery, so that by 2015 we are rolling out the new approaches in the large volume needed, using well-developed and proven approaches. The new CESP programme is intended to try out some of these approaches, including implementing measures at community-scale as well as in individual households. We intend that, by 2015, 400,000 households a year will be able to access a comprehensive package of home energy improvements. For some houses, such as those that are relatively new or have benefited from our programmes of cavity wall and loft insulation, this might involve renewable heat technology and some smaller improvements, to heating controls, for example. For others, older and less well insulated homes, this offer would include more significant changes, such as solid wall insulation[13]. Our policies and support measures will, as set out below, focus on the needs of the whole house.

1.24 By 2020, we need to be making even faster progress. By that year, we intend that 1.8 million households a year will be able to access these 'whole-house' packages of improvements[14]. Overall, we intend that by 2020 up to seven million households will have been able to take up such packages of measures[15].

1.25 Building on this, our aim is that by 2030 all homes and other buildings will have received a 'whole-house' package of measures that covers all of the cost-effective energy efficiency measures available for that property at the time, as well as renewable heat and electricity measures needed to meet our renewable energy aims. Cost-effective here means that the measures will, when installed in a coordinated package, pay for themselves over their lifetime through reduced energy bills.

10 **Number 10:** Number 10 Website http://www.number10.gov.uk/Page16807

11 This means insulating the lofts of another seven million homes, and the cavity walls of another four million, above and beyond the commitments we have already made.

12 Loft insulation here is defined as being filled to 150 mm. We will not have filled all lofts to the 270 mm sometimes recommended, as in many cases it will not be cost effective to increase existing insulation to this level.

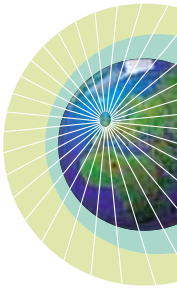
13 Up to 120,000 homes would receive these improvements up to 2015.

14 500,000 homes of these may be in the harder to treat category.

15 These figures are based on preliminary analysis for the roll-out of renewable heat technologies to households and do not take into account the full potential of the industrial sector which could offer more cost effective opportunities of delivering a 15% renewables target.

Ensuring fairness

1.26 We can achieve the changes we need only if we do so fairly. This is already a core part of the Government's strategy on energy saving. To ensure a fair distribution of the benefits, existing programmes such as Warm Front, Decent Homes and CERT (see Box 1.1) are already wholly or partially aimed at low-income groups and those in social housing. The Prime Minister's Fuel Package, announced in September 2008, will ensure that we step up our immediate efforts. Part of this package, the Community Energy Savings Programme (CESP), is designed to ensure installation of energy efficiency measures and heating technologies in the poorest communities in England, Scotland and Wales.



1.27 Anyone who opts even for the smallest measures outlined in this consultation, such as low-cost energy efficiency measures, can benefit from lower fuel bills. There will be significant savings for those who have their whole house assessed and who install the best energy saving and heating measures. We need to ensure that everyone can access these benefits, save money and reduce their carbon footprint, and not just those who can pay an up-front lump sum. Our proposals on finance (see Chapter 3, Financing energy saving and low carbon energy) will help households to offset the costs of installing energy saving measures against the savings that they will see on their bills, so that they can spread the costs of these measures over time.

1.28 We will work with communities and local authorities to ensure that those on low incomes and in social housing can benefit from energy saving measures and, where appropriate, renewable heating technologies. Some social housing providers are already installing renewable energy technologies, such as heat pumps and biomass boilers, which, combined with the energy savings measures, should reduce fuel bills significantly. Proposals in this consultation for better advice on home energy and new delivery options should make it easier for more people to access these measures.

The role of energy services

1.29 The Government has made it clear that we want to encourage the development of an energy services market. This means Energy Services Companies (ESCos) providing their customers with the warmth, light and power they need, as efficiently as possible, rather than simply selling more and more units of energy in order to make a profit. This means providing a comprehensive energy service to customers, including energy efficiency and options for generating low carbon energy.

1.30 Facilitating such long-term changes in the energy markets should form part of our overall approach to achieving our ambitions on heat and energy efficiency. More detail on how different options in this consultation affect the development of an energy services market in Chapter 3 on finance and Chapter 4 on delivery.

Q1: Do you agree with the level of ambition and the indicative pathway set out in this chapter? If not, why, and what alternative would you suggest?

Achieving our ambitions

1.31 There are major challenges that we need to address if we are to achieve these ambitions. These are summarised below.

Immediate challenges

1.32 We need to raise awareness of the help on offer. Although the Government has put in place a number of schemes to help people to save energy and to reduce their emissions, many people are still not be aware of the support that they can receive and the new technologies available to them. People may be interested in leading more climate-friendly lifestyles, but are unsure how to get started.

1.33 We want to engage householders and businesses in the task of saving energy and reducing emissions, and make it easier for them to take action. Although there are financial savings to be had, people may be put off changing how they use energy if they think it will involve too much time or hassle.

1.34 We need to minimise the disruption from installing energy saving and low carbon energy measures, which can discourage households from taking action. For example, even relatively simple energy saving measures, such as loft insulation, create some disruption in having to clear out the loft space and have installers come into the home to do the work.

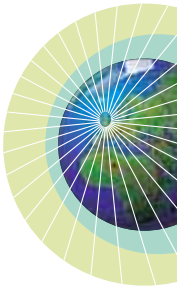
1.35 We want to ensure that people understand the benefits in terms of increased comfort and reduced bills that some new technologies can offer, against the perception that they could reduce the value of properties. For example, external solid wall insulation may be considered less attractive than the original external walls. People may also lack information about the quality or reliability of new technologies such as heat pumps.

1.36 We also need to tackle specific issues in rented properties and some leased business premises. In these properties, landlords have little incentive to make energy saving improvements to buildings because they would not benefit from lower energy bills, which are paid by the tenants. There are complex building management arrangements in business premises.

Longer-term challenges

1.37 We need to help households and businesses who want to do more minimise or remove the high up-front costs of installing the more innovative energy saving and generation technologies. We also need to coordinate the installation of energy saving and low carbon energy measures across whole streets or communities, rather than targeting individual houses. Householders, businesses and installers will also need to consider how to sequence the work, for example, whether it makes sense to install low carbon heating technology in a building that has not been properly insulated.

1.38 There are also specific challenges which we need to overcome for the larger-scale heat infrastructure, such as CHP and district heating, that we will need if we are to decarbonise our heating supply. These barriers include the difficulties investors face in raising the capital needed to fund such large-scale developments and the absence of an established market for buying and selling heat.



1.39 Whatever action we take must be done in a sustainable way. In particular, we must consider the impact of the changes to our climate we already know will happen.

Key principles for our policies

1.40 With these challenges in mind, four key principles have guided our development of specific policies for overcoming the challenges outlined above:

- **Urgency:** we are already working to deliver simple insulation measures as quickly as possible. We now need to expand our ability to deliver other energy saving and heat measures. We aim to do that as quickly as we can. Households, businesses and industry will all need to play their part to save energy and to reduce carbon emissions from heat.

- **Enabling people:** we need to make it easy for people to make changes – this includes making it easy to obtain advice and information and minimising the upfront costs, so that people can pay as they save. It also means helping people to make changes when it is easiest to do so, such as when people are moving house or refurbishing their current home and ensuring the advice and work people receive is of good quality.

- **Fairness:** we need to ensure that everyone, whatever their income, can implement measures to reduce their energy bills and carbon emissions, and that the costs involved are spread fairly across the population. We must tackle fuel poverty and cut emissions.

- **Better regulation:** to ensure that the Government carefully considers the best approach to delivering its priorities, and how to achieve its aims in the most cost-effective way, we are applying the principles of better regulation.

Treating the whole house

1.41 A key plank of our approach is to consider energy needs of the 'whole house' (see Box 1.3). We need to put together a more comprehensive programme of work for a whole house, rather than the current of installing individual measures one at a time.

Box 1.3: The whole-house approach

In this document, a 'whole-house' approach means considering a household's energy needs and CO_2 impacts as a whole, and establishing a comprehensive package of measures to address them. Our aim is to include all the measures available, at the time of assessment, that are suitable for a property and which pay back through energy bill savings over their lifetime when installed as part of a coordinated package, so that, when completed, a home meets the 2030 aim. It will also include renewable energy measures where appropriate to the property.

Rather than looking for the cheapest options, such as loft insulation, all potential improvements to the energy performance of a house are considered and planned at the same time. Under a whole-house approach, the measures identified could be installed at once if that proves to be the most cost-effective way to do it. Alternatively, an incremental approach to installation could piggyback on work that the householder is already planning.

A key benefit of the whole-house approach is that it ensures that the needs of the property are assessed as a whole, that they happen in the right order, and that disruption is minimised. For example:

- the process would begin with a full 'energy audit' to look at how the household uses energy;
- all the relevant, cost-effective measures would be identified, including the most effective installation sequence to ensure that, for example, oversized heat technologies are not installed in a poorly insulated home;
- in some cases, it may prove more cost effective to install all the identified measures at the same time. A more phased approach might be more suitable in others cases. The method and timing of installation will depend on the needs and preferences of the householder.

The whole-house approach will be tailored to each property. The proposed solutions could include technologies such as solar heating, heat pumps, district heating, floor insulation, solid wall insulation or biomass boilers.

1.42 These whole-house approaches will need to look at the range of technologies that can help to save energy and reduce emissions. Some examples of these new technologies for saving energy and generating low carbon heat are explained in Box 1.4.

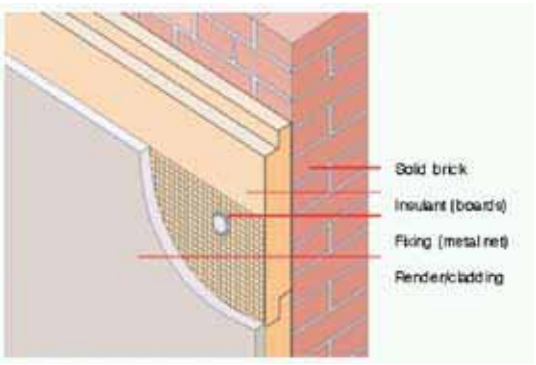
Box 1.4: Energy saving and low carbon heating technologies

Solid wall insulation

Where properties do not have cavity walls to insulate, solid wall insulation can be used. This is either applied to the outside of the property, in the form of a render, or on the internal walls, either by fitting a false wall and filling the gap with insulation or by fitting a layer of plasterboard with a backing of insulation. Solid wall insulation on internal walls needs to be at least 6 centimetres thick.

Internal solid wall insulation

External solid wall insulation

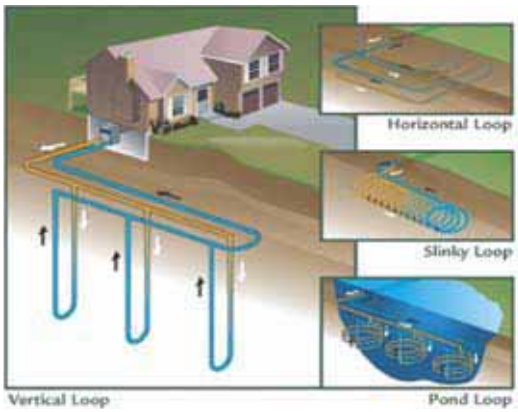


Smart meters

PRI's Home Energy Controller – an in home display combining dual fuel energy displays with advanced payment options and heating controls

Smart meters allow energy suppliers to communicate directly with their customers, removing the need for meter readings and ensuring entirely accurate bills with no estimates. Consumption information can be provided to domestic customers through an integrated, in-home display. Among other potential benefits, they could offer gas and electricity customers accurate bills and provide information that could help them use less energy and encourage energy efficiency.

Heat pumps



Heat pumps work by extracting heat from the ground (see picture) or the air, to be used in space or water heating. They can also be operated in reverse to provide cooling to buildings.

All heat pumps require electricity, and the ratio of electricity used to heat generated, together with the carbon intensity of the electricity, will determine how much CO_2 is saved. Typically, heat pumps will provide two to four times as much heat as the electricity they use.

Solar water heating

Solar water heating systems use heat from the sun to provide hot water. They will typically meet half of a household's hot water needs over the course of the year.

Biomass

Biomass is organic matter of recent origin, such as wood or straw. It can be burned in boilers at domestic or large scale, as an alternative to fossil fuels.

Picture courtesy of Wood Energy Ltd

Combined heat and power

A combined heat and power (CHP) system captures and uses the heat produced as a by-product of electricity generation instead of wasting it, and is therefore a more efficient use of the fuel used. CHP can be fuelled by fossil or renewable fuels, and can operate at all scales from large power stations to domestic CHP generators.

District heating

A heat exchanger for use in district heating

District heating, also known as community heating, is the supply of heat to a number of building from a centralised heat, or CHP, generator through a pipe network carrying hot water or steam.

The roles of individuals, businesses, communities and the Government

1.43 Individuals, businesses, communities and the Government will all have important roles in achieving our ambitions to minimise emissions from existing buildings. Our overall philosophy is to bring together all elements of society in making the radical changes that we need.

1.44 The simplest and often most cost-effective way to achieve significant savings in money and energy is for individuals and businesses to change their behaviour. For example, turning the thermostat down by one degree could reduce emissions and cut energy bills by up to 10% per household[16]. Many people are willing and able to go further, for example, by installing insulation and making other improvements to the fabric of their homes and businesses.

1.45 However, people can often achieve more working together than they can alone. There is therefore an important role for people working together with friends and neighbours and in their local community. Communities can become engaged in different ways to tackle climate change and to improve local sustainability. There are strong links between action to build communities and action to respond to climate change.

1.46 The Government wants to see a significant increase in energy saving and energy generation in communities and by communities. Such projects present real opportunities to build on the achievements of initiatives like the New Deal for Communities, Community Empowerment Networks and neighbourhood management schemes, which have empowered communities to shape the quality of services they get and to regenerate the places where they live. They offer real opportunities to join up our wider goals for tackling climate change, regeneration and community empowerment at the local level. That is why the new Community Energy Saving Programme is proposing to roll out community action initiatives to around 100 low-income areas across Great Britain.

16 **Direct Gov:** Guide to Greener Living Website
http://www.direct.gov.uk/en/Environmentandgreenerliving/Greenerlivingaquickguide/DG_064391

1.47 Central, devolved and local government, and Government agencies also have a role to play at national, regional and local level in helping individuals and communities to save energy and reduce their carbon emissions. In particular, the Government's role is to ensure fairness, and to help those who may be less able to act, for practical or financial reasons.

1.48 Through the national policy framework, the Government has set out a clear expectation that regional development agencies (RDAs) and local authorities will take strategic action to tackle climate change. RDAs and local authorities can play a key role in devising energy plans that make sense for particular localities, and in bringing people and communities together to save and generate energy to reduce their CO_2 emissions. The response to date has been encouraging. Including climate change in the local authority performance framework has seen more than 130 out of 150 Local Area Agreements (LAAs) set carbon reduction targets against indicators. In future, the new integrated Regional Strategies developed by the RDAs and local authorities should include specific plans for carbon reduction and renewable energy. These, alongside other features in the planning system, can give local authorities the tools to develop an in-depth understanding of the potential for carbon reduction and renewable and low carbon energy generation in their area. It is essential that this ambition is based on evidence and that good practice is mainstreamed.

1.49 The Local Government Act (Miscellaneous Provisions) Act 1976, as amended by the Energy Act 1989, includes a provision preventing local authorities from selling electricity which is produced otherwise than in association with heat. The Government wants local authorities to be able to play a full role in action to develop renewable heat and electricity, so will consult soon on whether and how those restrictions should be changed, with any amendments enacted through secondary legislation.

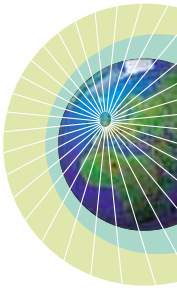
1.50 The new Homes and Communities Agency (HCA) was established on 1 December 2008, and is the Government's key housing and regeneration delivery agency in England. The HCA has a significant role in improving the quality and environmental performance of existing housing. It is responsible for the Decent Homes programme and, over the current spending review period, it will also manage the £2.4 billion Arms Length Management Organisations (ALMO) programme to ensure that the 350,000 non-decent council homes they owned in 2007 are made decent as planned. The Government will consider with HCA how it can support the delivery of the ambitions set out in this strategy.

1.51 The Government and the wider public sector can also lead the way with its own actions. For example, we have set targets to reduce the carbon emissions from the Government estate by 30% by 2020 and to improve energy efficiency per square metre by 30%[17]. The Sustainable Procurement Action Plan[18], published in March 2007, set out the Government's commitments on sustainable procurement. The Welsh Assembly Government's Sustainable Development Scheme, which is a requirement of

17 Both targets relative to 1999/2000 levels

18 **Department for Environment Food and Rural Affairs:** UK Government Sustainable Procurement Action Plan, *(2007) March*
http://www.defra.gov.uk/sustainable/government/publications/pdf/SustainableProcurementActionPlan.pdf

the Government of Wales Act 2006, sets out how the Assembly Government will promote sustainable development in the exercise of its functions. Sustainable procurement was a key focus of the Assembly Government's current Sustainable Development Scheme and Action Plan, and is a strong theme in the current consultation One Planet: One Wales – A consultation on a new Sustainable Development Scheme for Wales.



1.52 The Government will show leadership by ensuring that social housing meets, and where possible exceeds, the aims it is setting for all housing on energy efficiency and low carbon energy.

Economic benefits

1.53 The ambitious energy efficiency and low carbon heat policies outlined in this document are helping to create a thriving low carbon technology sector in the UK. If the level of ambition set out above is achieved, then there will be approximately 34,000 jobs installing and maintaining whole-house packages. The wider low carbon environmental goods and services sector currently employs over 880,000 people in the UK. This is expected to increase to over one million by the middle of the next decade[19]. The Government will publish a consultation document seeking views on how it can help businesses and communities to take advantage of this move to a low carbon economy.

1.54 There are also opportunities for innovation in developing energy saving and low carbon heat technologies. The Energy Technologies Institute, which is jointly funded by the Government and industry, is analysing opportunities for innovation in the heat sector with a view to carrying out further work in this area. The Prime Minister also recently announced a 'Retrofit for the Future' competition. This will encourage companies to bid for a share of £10 million in Government funding to develop innovative solutions to improve the environmental sustainability of existing buildings and reduce costs.

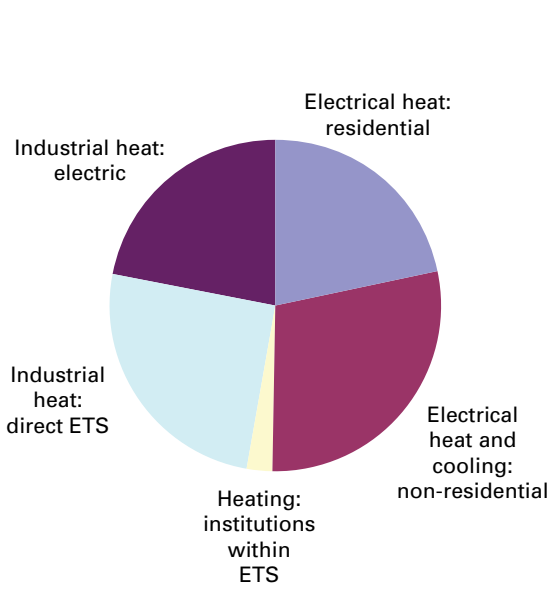
1.55 There will also be wider economic benefits as homes and businesses become more efficient. Lower energy bills will help to improve the competitiveness of British businesses. The benefit of these lower energy bills will also be felt more widely as the savings spread through the economy to consumers, employees or shareholders as lower prices, higher wages or higher profits.

Box 1.5: The role of carbon markets

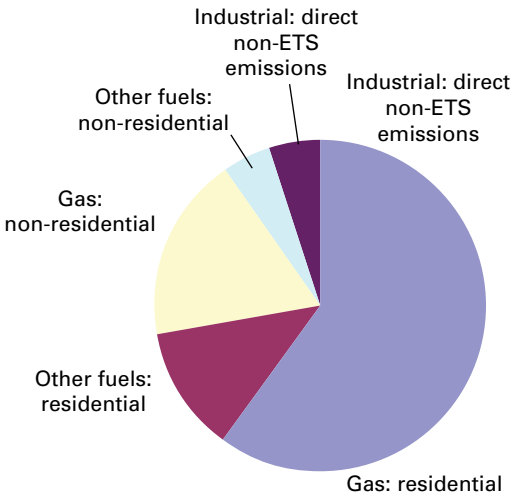
The Government's approach to managing the UK's emissions and carbon budgets differs between those sectors that are within the EU Emissions Trading Scheme (ETS) and those that are outside it. Emissions related to heat fall in both sectors. Large-scale industrial heat emissions are covered by the ETS, as are emissions related to electric heating, because power stations are in the ETS (see Figure 1.4).

19 **Innovas** (2009) Low Carbon and Environmental Goods and Services: an industry analysis, www.berr.gov.uk

Figure 1.3: Heat-related emissions in domestic, services and manufacturing sectors within and outside the EU ETS, 2006[20]



Heat in the ETS



Heat outside the EU ETS

For sectors within the EU ETS, the scheme will impose a cap on emissions. The EU climate and energy package includes several proposals to improve the long-term certainty of the EU ETS so that it will deliver significant abatement of CO_2 emissions. For sectors outside the ETS, the Government is responsible for ensuring that the policies that it puts in place comply with carbon budgets.

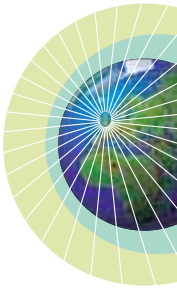
In the longer term, an alternative option would be to bring more of the emissions associated with heat into a carbon market by including it in the ETS across Europe or by UK-only arrangements. Broadening the scope for carbon markets to include all emissions related to heat could increase coverage of these markets to around two thirds of total UK CO_2 emissions (56% of total greenhouse gas emissions). In line with the recommendations of the Stern Review, such a move would be a step towards establishing a single carbon price across the economy and would deliver greater certainty over carbon budgets.

However, while heat-related emissions outside the ETS are a major contribution to the UK's emissions of CO_2, the emissions come from a large number of small emitters, such as household users of gas for heating and cooking. If all heat users had to participate in the carbon market, the disruption and cost would be significant and could outweigh the benefits[21]. When setting and managing carbon budgets, the Government will keep under review the potential role for market-based instruments, including trading, in managing emissions that are currently outside the scope of the EU ETS.

20 **Department for Environment Food and Rural Affairs:** Sector Level Summary of 2007 EU ETS Results in the UK, (2008) May http://www.defra.gov.uk/environment/climatechange/trading/eu/pdf/sectorlevel-ukresults-2007.pdf

21 **Department for Environment Food and Rural Affairs:** Assessment of the Potential Effectiveness and Strategic Fit of Personal Carbon Trading, *(2008) November* http://www.defra.gov.uk/environment/climatechange/uk/individual/carbontrading/pdf/pct-economic-analysis.pdf. Looks at the arguments for and against carbon trading at an individual level. The report quotes estimates for set up costs of between £700 million and £2 billion and running costs of between £1 and £2 billion a year.

1.56 In the short term, the Government believes that the difficulties of extending carbon trading to more of the heat sector, without creating unsustainable increases in energy prices, mean that other policies are preferable, such as those set out in this document.



Q2: Do you agree with the Government's policy approach set out in paragraphs 1.31 onwards to achieving our ambitions on heat and energy saving?

Scope of this document and its territorial extent

1.57 This Heat and Energy Savings Strategy does not consider energy efficiency measures in relation to the transport sector. These are the subject of separate work to develop a strategy for reducing greenhouse gas emissions from transport. To inform the development of the strategy, the Department for Transport (DfT) is undertaking analysis to determine the abatement potential of possible options for reducing greenhouse gas emissions from transport, and their related costs. The results of this work will help to inform the Government's proposals and policies for reducing greenhouse gas emissions, including those to meet its carbon budgets to 2022, which will be published soon after the budgets are set.

1.58 The Government has taken a number of actions to help people to use less electricity, mainly through more efficient electrical products. These include using public procurement to stimulate a market for more efficient products, setting mandatory minimum standards and requiring energy efficiency labelling. The Government's Market Transformation Programme (MTP) supports the development and implementation of UK Government policy on sustainable products. In July 2008, the MTP published its Policy Analysis and Projections[22] which set out how the environmental performance of products such as light bulbs, refrigerators, boilers, ICT (information and communications technologies) equipment and consumer electronics will need to improve between now and 2020. Inefficient light bulbs will be phased out by the end of 2012. Chapter 5 looks further at regulating electrical products. However, given the work already happening in this area, this strategy does not propose new policies on product standards.

1.59 The Devolved Administrations have particular roles to play in developing and delivering policies on energy saving and heat. We set out the respective roles of the Devolved Administrations in Chapter 9. Many of the policies and arrangements described in this paper and most of the proposals in this document apply to England and Wales. Although many of the policy areas in this document are devolved to Scotland, Scottish Ministers will consider responses to this consultation in developing their policies, particularly those from Scottish stakeholders. The proposals do not apply to Northern Ireland, although the UK Government and Northern Ireland Assembly will work closely together on these issues.

22 **Department for Environment Food and Rural Affairs:** Market Transformation Programme, *(2008) March* http://www.mtprog.com/spm/files/download/byname/file/10_07_08%20PA&P%2008%20v1.pdf

Chapter 2
Helping people to change behaviour and take action

Chapter summary

Changing routine behaviour is the quickest way of beginning to address the challenges we face in improving our use of energy. Substantial savings can be made by providing much better information and support to help people manage their energy use. To make the biggest savings, though, we also need to move beyond relatively inexpensive and easy energy efficiency measures to more radical ways of saving energy. By making these changes, we could save between a third and a half of all the energy used in our homes. This is a huge opportunity, but also a challenge. It will depend on a step change in how we all think about how we use energy, and services to make the 'whole-house' approach far more widely available.

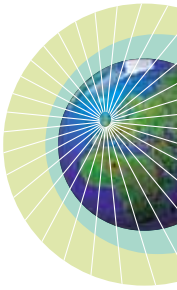
There is already support to help people to save energy and reduce emissions, through, for example, the Energy Saving Trust, the Act on CO_2 advice line, and their devolved equivalents, and from energy suppliers. However, there is more that the Government can do to ensure that people have the advice and tools they need. For example, we should consider how we can make more effective use of non-governmental channels to help to deliver a consistent message about the benefits of reducing our energy use.

But we need to go further still, to assess systematically the energy needs of the whole house working house-by-house and street-by-street. We therefore plan to roll out a Home Energy Advice service providing tailored in-home advice, and train Domestic Energy Assessors to provide this advice.

We plan to create an incentive for energy suppliers to provide Real Time Displays of energy consumption. These will provide consumers with real-time feedback on energy use. We also intend to mandate the installation of smart meters in every home.

We need to identify suitable trigger points for offering advice and support, for example when renovations are carried out, and we will consider developing accreditation for professionals providing advice and installation of energy efficiency measures.

Businesses and the public sector can also receive substantial benefits through energy saving behaviour. Support is already available to businesses and public sector through the Carbon Trust and Business Links and their devolved equivalents. We must ensure that these services fully meet the needs of the diverse organisations and buildings in the non-domestic energy sector.



The need for changes in our behaviour and homes

2.1 The Government can develop targets for saving energy and reducing emissions, and can put in place policies and incentives to help to achieve them. Reaching these targets, though, will require all of us to make changes to how we use energy, and a major programme of investment to improve our homes. By making these changes, we could save between a third and a half of all the energy used in our homes[23], and also lessen the need for other more costly ways of saving energy. However, recent Defra research found that, although most people are aware of climate change, a far smaller number have changed their behaviour as a result. Only 20% of people identified specific energy efficiency measures as a way of reducing their personal contribution to climate change[24]. Building an energy saving culture will therefore require a fundamental shift in attitudes and behaviour. This includes ensuring that energy saving measures lead to real reductions in energy use, rather than simply spending the money saved on using more energy.

2.2 The Government cannot achieve such a significant cultural change alone. We will need to engage with a range of bodies, creating a coalition that can reach out to the whole population through various channels, for example, schools, churches, and other local community groups.

2.3 We need to make it easier for people to take action as they become increasingly engaged in the benefits of saving energy. In doing this, we have to recognise that people have very different motivations, lifestyles and personal circumstances. As well as encouraging individual action, we will need to work with and through communities, to create a sense of common ownership and shared action.

23 **Enviros:** (2008) The Potential for Behavioural and Demand-side Management Measures to Save Electricity, Gas and Carbon in the Domestic Sector, and Resulting Supply-side Implications http://www.defra.gov.uk/environment/climatechange/uk/energy/energyservices/documents/decc-save-energy-implications.pdf

24 **Department for Environment Food and Rural Affairs:** Public Attitudes to Climate Change, (2008) *March* http://www.defra.gov.uk/environment/climatechange/uk/individual/attitudes/pdf/ccresearch-toplines7-0803.pdf

Where can we save energy?

2.4 Providing information and tools for people to use energy more efficiently can enable major savings. The Committee on Climate Change recently identified changes in routine behaviour as some of the most cost-effective ways of reducing CO_2 emissions[25]. For example, some 10 million homes do not have modern boiler controls or thermostatic radiator valves to manage their heating property. These devices can pay for themselves in one year through savings on fuel bills.

2.5 Changing the way people use energy will involve a combination of changes in routine behaviour, and the use of advice and technology to help them to understand and manage their energy use. We set out the potential of some of these energy saving tools and actions in Table 2.1.

Figure 2.1: Saving energy by helping people to change behaviour[26]

Tools to help people to use less energy	**Potential impact**
Fit boiler controls and thermostatic valves to radiators	1.5 $MtCO_2$ per year[27]
More informative and accurate energy billing	Energy savings of up to 1-3%, if people are engaged and use the information[28]
Real time displays of electricity use	Energy savings of up to 25%[29]
Home Energy Advice	Energy savings of 20 to 30% where people act on the advice and install physical measures[30]
Behaviour change[31]	**Potential impact**
Turn the thermostat down one degree	Saves up to £65 a year on energy bills
Run washing machines at 30 degrees centigrade.	Uses 40% less energy than at 40 degrees and is generally as effective
Switching all appliances off completely rather than leaving on standby	Saves up to £37 a year on energy bills

25 **Committee on Climate Change:** Building a Low Carbon Economy – The UK's Contribution to Tackling Climate Change, *(2008) Dec* http://www.theccc.org.uk/reports/

26 These savings cannot be summed, as, for example, more informative billing and real time displays may promote similar behaviour changes.

27 **Enviros:** The Potential for Behavioural and Demand-Side Management Measures to Save Electricity, Gas and Carbon in the Domestic Sector, and Resulting Supply Side Implications, (2008) *November* http://www.defra.gov.uk/environment/climatechange/uk/energy/energyservices/documents/decc-save-energy-implications.pdf

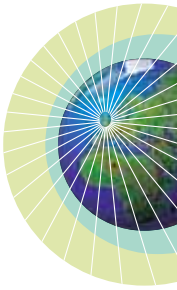
28 **Department for Business Enterprise and Regulatory Reform:** Consultation on Energy Billing and Metering, (2007) *August* http://www.berr.gov.uk/files/file40456.pdf

29 **Darby, Sarah:** Environmental Change Institute, The Effectiveness of Feedback on Energy Consumption, (2006) April http://www.defra.gov.uk/environment/climatechange/uk/energy/research/pdf/energyconsump-feedback.pdf

30 **Darby, Sarah:** Environmental Change Institute, Making it obvious: designing feedback into energy consumption (2001) quoted in Enviros (see footnote 22) and **London Green Homes Service:** London Green Hmes Services Website http://www.greenhomesconcierge.co.uk/services_benefits/summary_of_benefits.aspx

31 **Energy Saving Trust:** Energy Saving Trust Website http://www.energysavingtrust.org.uk

2.6 To make the most of this potential, we need to ensure that people receive straightforward advice on how to use the tools effectively. It is not enough just to provide the technology, such as smart meters. It is how people respond to the information and use new tools that matters. We also need to do more to communicate the benefits of taking these actions, so that they become a matter of routine. For the message to have maximum impact, it needs to come not just from Government but also from groups closer to people and their community, where it may be likely to have more resonance.



What support do households receive?

2.7 Support to households is already available through the Energy Saving Trust, the Act on CO_2 campaign and their devolved equivalents. Energy suppliers, retailers, local authorities, and environmental and consumer interest groups also supply information about how people can change behaviour to save energy in the home. The Government's current policy framework focuses on the first three of these to advise households and provide information on saving energy. Box 2.1 explains their roles.

Box 2.1: Sources of advice on energy saving

The **Energy Saving Trust** is a non-profit organisation funded by the UK government, devolved administrations and the private sector. The Trust offers free, impartial advice to homes, communities and local authorities on easy ways to save energy, as well as more substantial home improvements. The Trust:

- manages the Act on CO_2 Advice Line in England, which includes a network of 21 advice centres offering consumers a one-stop-shop for advice and information on energy efficiency, microgeneration, personal transport, water efficiency and waste reduction;
- provides advice on energy efficient products, and accreditation through the Energy Saving Recommended logo; and
- runs Community Action for Energy (CAfE), a network that promotes and facilitates community based energy projects in the community.

The Energy Saving Trust has estimated that it has stimulated annual carbon savings of approximately 1.1 million tonnes CO_2 and lifetime savings of 15.9 million tonnes CO_2 in 2006/07, for a cost of approximately £1.30 per tonne.

Act on CO_2, 'help Wales reduce its carbon footprint', and SCOTTISH CAMPAIGN, are major Government-led campaigns, aiming to engage citizens on climate change issues and to show people where their actions can make a real difference. As research has shown that citizens in devolved nations are more likely to respond to nation specific communications campaigns. Campaigns in the devolved nations are managed by the Devolved Administrations.

As well as the advice line, Act on CO_2 (and devolved equivalents) provide an online carbon calculator, which calculates personal carbon footprints and provides advice on how to reduce them. It can then refer people on to the Energy Saving Trust for more information on specific measures, such as insulation. The Government and the Energy Saving Trust are working together on Version 2 of the calculator, due to be launched in spring this year, that will allow more precise calculation of emissions from domestic, short-haul and long-haul flights, inclusion of emissions from public and other communal transport and the creation of tailored individual action plans showing average savings of CO_2 and money.

Since the launch of the Act on CO_2 campaign in England in June 2007, over half a million people have worked out their carbon footprint. Some 62% of the people who used the service say that they have taken action, or plan to do so, as a result of the campaign.

Energy suppliers are developing their products and services in response to customer demand, and are under an obligation through CERT to meet targets for the installation of carbon saving measures in households. Suppliers promote measures to consumers to meet these obligations by providing information with bills, on the internet, through the Energy Saving Trust, local authorities and third party installers. Suppliers already hold detailed information about the energy use of consumers through their metering and billing. This is a potential source of information that could enable suppliers to provide targeted advice on behaviour change and to gather feedback on how effective that advice is.

Better labelling of appliances

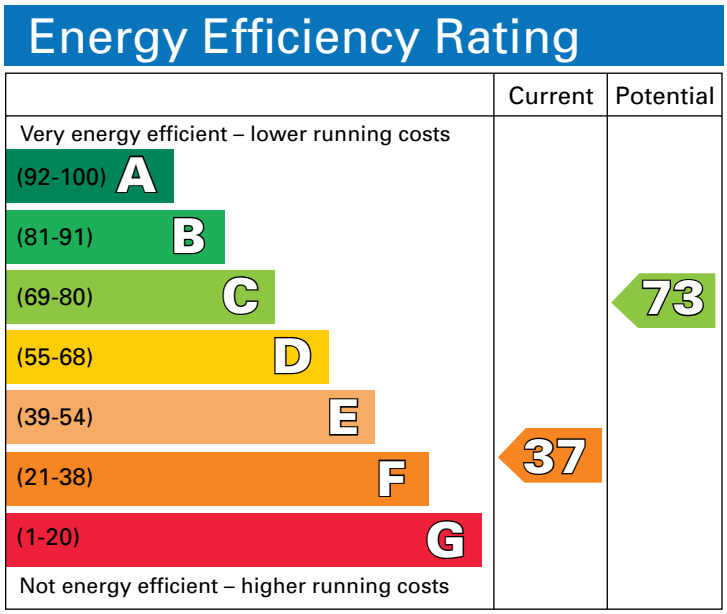
2.8 The Government is helping people by arguing strongly in Europe for the review of the Energy Labelling Directive, known as the 'A to G' label, to ensure that new, even more efficient products are highlighted as such on the label. For example, the Energy Saving Trust recommends that an efficient fridge-freezer can save £20 to £30 a year on electricity bills while an efficient dishwasher can save £20 a year. One energy saving bulb alone could save £3 to £6 a year and, depending on how long lights are on, could save around £45 to £70 before it needs replacing.

Energy Performance Certificates

2.9 In addition to this advice, homebuyers and potential tenants are provided with an Energy Performance Certificate (EPC) when they are looking to buy or rent a property. Prepared by qualified domestic energy assessors, an EPC rates the energy efficiency of a property from A to G (see Figure 2.2). These are similar to the labels now provided with domestic appliances such as refrigerators and washing machines. An EPC includes a report that lists recommendations for cost-effective improvements and other measures, such as low and zero carbon generating systems, that could improve the energy rating of the property, cut energy bills and reduce carbon emissions. A second rating also shows what could be achieved by implementing all the recommendations. The EPC scheme allows potential buyers and tenants to compare the energy efficiency of properties. Although we would not expect energy efficiency to

be the main selling point for homes, we would expect it to be increasingly reflected in the market price over time. This effect has already been found elsewhere in the world to some degree, for example in parts of Australia[32].

Figure 2.2: Example of an Energy Efficiency Rating chart from an EPC



2.10 The EPC has potential for facilitating whole-house approaches to energy saving. In trials of the EPC before its roll-out, nearly a third of buyers envisaged carrying out the EPC's recommendations, creating an average saving of 0.55 TCO_2 for each household that implements changes[33]. Obtaining an EPC could be an appropriate moment for receiving further advice and support to help people make the changes recommended. Chapter 5 contains more detail on options for making more use of EPCs. Further research is underway to examine the impacts of the roll-out of EPCs.

What more do we need to do to?

2.11 To deliver our ambitious long-term goals for heat and energy savings, we need to offer more comprehensive packages of support to tackle the barriers to people taking action. In particular, we need to ensure that people receive tailored, comprehensive advice about their options for saving energy and their carbon footprint, with relevant advice and support available to households, communities and businesses. It needs to be easier for households to make the step from awareness to action.

2.12 We must also find new, more interactive ways of engaging with the public on this issue. We will start this process through our dialogue 'The Big Energy Shift' which runs parallel to this consultation. The dialogue engages the public

32 **Australian Government:** Energy Efficiency Rating and House Price in the ACT, (2008) Figure 2.2: An example of an Energy Efficiency Rating chart from an http://www.nathers.gov.au/about/publications/eer-house-price-act.html

33 **Communities and Local Government:** EPC Regulatory Impact Assessment, *(2007) June* http://www.communities.gov.uk/documents/planningandbuilding/pdf/323825.pdf

in discussing the policy options that will help them take action. It is being coordinated through a broad set of partnerships, reflecting the scale of the changes needed across the country. There are four separate strands to the dialogue:

- households and communities – a dialogue with nine citizens' forums in neighbourhoods in England, Wales and Northern Ireland;
- public sector – a dialogue with central government and wider public sector procurers, property and sustainability teams;
- businesses and small and medium-sized enterprises; and
- supply chain – run by Energy Efficiency Partnership for Homes.

2.13 The level of engagement during the dialogue will be intense. More than 30 separate events are planned between February and early April in England, Wales and Northern Ireland. These activities will culminate at an event in London and through our online citizen-to-citizen web platform. Together, they present the opportunity for the Government and the public to talk about the big shift that we will need in how we heat and power our homes and buildings in the future.

2.14 Responses to the current consultation will inform the development of a comprehensive and long-term approach to behaviour change, designed to support both the short-term and long-term shifts necessary to achieve our goals.

Q3: How can the Government encourage people and communities to change behaviour to save energy? What is the appropriate balance between changing attitudes, and providing advice and information?

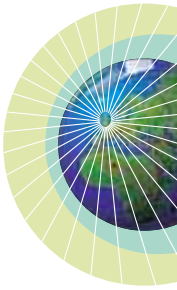
Further support to help people to reduce energy demand

2.15 Engaging the public and helping people to understand the simpler changes that they can make individually is important, but is only part of the story. We need to harness technology that enables far more efficient management of energy use in the home, and help people make comprehensive assessments of the needs of their whole house. Only in this way can they make the home improvements that can vastly reduce their energy use.

2.16 Many householders will find it a challenge to look at the complex aspects of generating, using and saving energy. Information and advice services, therefore, need to evolve if they are to provide comprehensive support that guides people through the process. The Government is taking immediate action here. It is also proposing ways of providing far more comprehensive support to people, starting by making face-to-face, in-house advice from accredited advisors far more widely available.

Increasing availability of Home Energy Advice

2.17 The feasibility of different energy saving measures will vary from house to house. People therefore need support and advice that is tailored to their individual circumstances and locations. Home Energy Advice would include a visit from well trained and independently accredited expert Domestic Energy Assessors. The Energy Saving Trust currently offers a free Home Energy Check on its website[34]. This offers some advice that is relevant to a particular home's characteristics, however home energy advice could go much further, with a visit from a trained, expert energy adviser. This would cover:



- an assessment of the property's energy efficiency;
- advice on saving energy through behaviour change and measures to improve and maintain the property's energy efficiency and its heating system, and the potential for low and zero carbon technologies, such as heat pumps or solar water heating;
- help in locating reliable installers to make the improvements; and
- guidance on the best order for making the different improvements and how to minimise disruption.

2.18 Plans to make Home Energy Advice more widely available would need to be integrated into any long-term delivery options that we may pursue (see Chapter 4).

2.19 Schemes such as the London Green Homes Concierge and Green Streets (see Box 2.2 below) have found that face-to-face support is likely to lead to better advice and stronger commitment from the occupier to act on that advice. We are consulting alongside this document on a proposal that will enable energy suppliers to offer home energy advice under the CERT scheme. However, while we expect that some homes will benefit from advice under CERT, there is the potential for many more households to benefit.

2.20 For home energy advice to succeed in providing householders with the motivation and confidence to make significant changes to the efficiency of their homes, the advisers providing the audits must be independent and trusted. Domestic Energy Assessors (DEAs), who currently provide EPCs, are well-equipped to fulfil this role. They already provide basic behavioural advice. There are currently 8000 qualified and accredited DEAs. There is, therefore, already a large cadre of qualified energy assessors who could take on this work. DEAs must belong to an accreditation scheme, providing reassurance to the consumers that advisors are competent and provide independent, impartial advice. The scheme also provides a route for consumers to complain and seek redress if something goes wrong.

2.21 The Government is keen to expand the role of DEAs in this way so that they can provide Home Energy Advice and detailed behavioural advice both to occupiers and the wider community. We are currently developing a new National Occupational Standard which will set out the skills and competences required for this new role. This will underpin the training required so that

34 **Energy Saving Trust:** Energy Saving Trust Website http://www.energysavingtrust.org.uk

advisers can provide behavioural advice on ways of improving energy efficiency and energy savings products to individual householders. With additional training, advisors will also be able to advise the wider community on energy reduction and sustainability, and renewable energy technologies. Where this training is provided as a Level 3 National Vocational Qualification, it will be funded through the Learning and Skills Council's Train to Gain scheme in England, and will be free to those studying for it. We are also exploring the scope for this training to be delivered as part of the continuing professional development of DEAs. In the CERT consultation, we are proposing that the DEA qualification should form the basis for the provision of advice under CERT.

Q4: How can home energy audits be made most useful, and do you agree that the Government should use Domestic Energy Assessors, who have been suitably trained, to deliver them as widely as possible?

Opportunities for engagement with households

2.22 We need to do much more to ensure the kind of practical advice we have described is provided to households at times when it will be most convenient and cost effective to think about measures to save carbon and energy, and when changes in circumstances may make greater energy efficiency and comfort particularly desirable. Examples of opportunities to engage households might include:

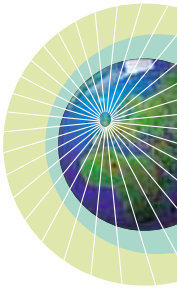
- when buildings are refurbished for use by elderly or disabled people. As these are likely to be comprehensive refurbishments, there is an opportunity to look over the whole house, and improved energy efficiency and comfort may be particularly important in some more vulnerable households, providing the changes are cost effective;
- during a major refit – Chapter 5 sets out how we will consider the case for developing requirements in this area under the Building Regulations;
- when a home is bought or being rented out, as people often make substantial changes soon after moving into a house, and landlords may like to undertake work in between tenancies when the house is empty; or
- when circumstances change, such as when people retire or have children, and thermal comfort becomes particularly important.

National data on buildings and energy

2.23 Good data is needed if we are to provide advice in the right places, and to know where the biggest and quickest savings can be made. DECC is developing pilots of a new National Energy Efficiency Data Framework to link information from existing databases for the entire building stock[35]. The framework will bring together data from energy suppliers, buildings, installers

35 **Department of Energy and Climate Change:** Non-domestic Energy Efficiency Data Framework *(2009), January* http://www.defra.gov.uk/environment/climatechange/uk/energy/energyservices/documents/need-report090129.pdf

and other sources. This should provide a comprehensive source of information on building energy use and performance which can be used, with appropriate confidentiality and data protection safeguards, for analysis and reporting in aggregate form, or for feedback to energy users.



2.24 This approach should enable comparison of performance against benchmarks, and help to identify where energy can be saved and efficiency improved. Such information is also expected to be valuable for monitoring and evaluating the effectiveness of different policy measures, for example the progress of local initiatives in saving energy, so that we can learn from our experience and improve schemes where necessary.

Smart meters and better billing

2.25 We need to harness technology that can help people to manage their energy use better. The Government has already announced that it intends to use CERT to to provide incentives for energy suppliers to provide real-time displays to consumers, and to mandate the installation of smart meters in every home. It has announced an indicative timetable for the completion of a domestic roll-out of smart meters by 2020. The data collected by smart meters, combined with an appropriate real-time display, can provide consumers and their energy suppliers with detailed and accurate real-time feedback on energy use. Smart meters will allow consumers to understand how they are using, and whether they are wasting, energy and allows suppliers to offer consumers new services tailored to their particular needs. For example, smart meters could:

- ensure that consumers receive entirely accurate bills;
- give consumers real-time feedback on their electricity consumption, and daily information on gas use when combined with a display unit installed in the home;
- allow suppliers to offer tailored energy advice and products to households; and
- allow suppliers to offer their customers tariffs that vary according to the time of day.

2.26 Smart metering will be an important part of achieving the savings from many other measures, such as more efficient appliances and home energy advice. The information they provide will be important not just in encouraging behavioural change, but also in providing customers with more detailed information on which they can base decisions, such as buying new appliances or fitting insulation.

2.27 More accurate bills containing additional information can promote savings by giving householders a better understanding of how they use energy, and how changing their behaviour can lower their bills. Since January 2009, all domestic gas and electricity bills have contained comparisons of current

consumption with that of the same period in the previous year. In due course, smart meters can help to provide entirely accurate bills with more detailed information about use.

2.28 It will also be important to provide motivation for people to act on the information that such technologies as smart meters provide. Although the final functionality of smart meters for domestic consumers remains to be decided, subject to specification of the meter they could provide for time-of-use tariffs, under which the price of electricity varies during the day, and for approaches to demand side management to help to reduce peak demand.

2.29 The roll-out of smart meters will provide an opportunity to provide consumers with energy saving advice. As we move forward with our plans on smart metering and develop our delivery framework for broader energy efficiency measures, we will look to maximise these opportunities.

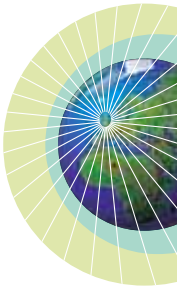
Accreditation of installers

2.30 Some measures recommended in a home energy audit or EPC, such as solid wall insulation or renewable heat technologies, will create disruption for the householder during installation. They may also require significant alteration to the fabric of the building and there are likely to be considerable costs involved when tackling the needs of the whole house. Therefore, householders must have confidence in the quality of the workmanship they receive. One way to provide this reassurance would be to develop an accreditation scheme for installers of energy efficiency measures. There are already similar schemes for installation and repair of gas fittings and appliances (CORGI) and for microgeneration products. The Microgeneration Certification Scheme, which deals with the production of heat and/or electricity on a small scale from a low carbon source, covers both microgeneration products and installers. An accreditation scheme could also help to raise awareness and promote energy efficiency as a marketing tool for installers and suppliers.

Q5: Should the Government work with industry to develop accreditation standards for advice about, and installation of, energy efficiency technologies? What would be the best model for such a scheme, and why?

Community engagement

2.31 Community engagement will be a vital part of our strategy. We will need to encourage greater collaboration within and between communities in order to deliver our ambitious long-term goals on energy use. Community action can help to engage people in the process, making them more likely to take action. It can also reduce the cost by tackling whole areas of similar houses at once. A number of projects are already piloting a community approach to behaviour change, such as the Green Streets project (see Box 2.2).



Box 2.2: Community approaches – the Green Streets project

The 'Green Streets' project, run by the Institute for Public Policy Research and British Gas, is a one-year competition being run between 64 households across the UK – eight houses each from one street in eight different cities. The street that delivers the greatest carbon savings across the year will receive a prize of £50,000 to spend on a community project of its choice. British Gas provided each street with £30,000 worth of energy saving measures – such as insulation, A++ rated appliances, solar thermal and photovoltaic panels. Households jointly decided how to allocate this budget, and were supported by a dedicated British Gas energy efficiency advisor for the duration of the competition.

The Green Streets project generated enthusiasm from participants and shows how we can tap into local pride to encourage communities to make significant changes in the way they use energy. As of the interim report in July 2008, there were substantial energy savings for the first five months of the project. Most streets achieved between 15-25% energy saving, with a corresponding average 20% decrease in CO_2 emissions. Furthermore, evidence suggests that energy savings are being sustained, implying that people are maintaining lower energy lifestyles. Even houses that did not have major heat measures installed still exhibited significant savings.

Changes in energy use appear to be related to how easy or difficult householders feel it is to make behavioural changes. Furthermore, the element of competition between streets, rather than between households on the same street, played an important motivational role. The competition itself also increased community cohesion.

2.32 As part of its 2008 Home Energy Saving Programme, the Government announced a package of proposed measures, including the Community Energy Saving programme (CESP), being consulted on in parallel to this consultation. This will roll-out community level initiatives in some 100 low-income areas over the period 2009-2012. A new obligation on energy suppliers and electricity generators will provide £350 million to help to bring together partnerships of local councils, voluntary organisations, energy suppliers and electricity generators to offer energy saving measures, including central heating and insulation. CESP could also support community heating initiatives. The programme could benefit up to 100,000 homes over the next three years.

2.33 Just as households need whole-house information, communities need advice on all the options available to them, so that they can make informed choice as to the best way forward. This will mean combining advice on how to save energy with how to generate low carbon energy at community scale. The Consultation on the UK Renewable Energy Strategy[36] suggested an online energy information hub on distributed energy under the brand of Act on CO_2. This would offer advice on all aspects of distributed energy, renewable and low carbon, and electricity and heat.

36 **Department for Business Enterprise and Regulatory Reform:** UK Renewable Energy Strategy Consultation Document, *(2008) June* http://renewableconsultation.berr.gov.uk/

2.34 To facilitate community engagement in such schemes, as discussed above, Domestic Energy Advisers will receive training so that they can advise groups and communities. They will be trained to provide accessible, local advice that can help to bring communities together to save energy and to reduce their CO_2 emissions.

Supporting businesses

2.35 Businesses and the public sector also have much to gain from adopting energy saving behaviour. It is particularly important that businesses can access specific, relevant advice on energy, as their premises and energy use patterns are extremely diverse. It is also important to understand how businesses can be motivated to save energy and be empowered to take action. Many business premises are rented rather than owner-occupied and have complex building management arrangements. This creates a problem of split incentives: the owner of the building is not necessarily the organisation that occupies it. So, the power to make changes to the building's fabric rests with one party, while someone else enjoys the benefits of lower energy bills. We are commissioning research to better understand the environmental behaviours of SMEs when it comes to environmental issues. We will also be informed by the Carbon Trust's study of energy efficiency in non-residential buildings, due for publication shortly.

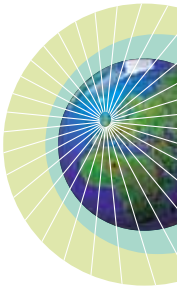
The Carbon Trust and Business Links are the main sources of advice and support to businesses and public sector organisations who wish to save energy and lower their CO_2 emissions. The Carbon Trust's aim is to accelerate the move to a low carbon economy, by working with organisations to reduce carbon emissions and to develop commercial low carbon technologies. For example, it provides Energy Efficiency Loans to small and medium sized businesses, which help to overcome barriers to obtaining capital. The Carbon Trust estimates that its work helped businesses to identify lifetime savings of 4.6 $MtCO_2$ in 2007-08, and implement savings of 1.6 to 2.3 $MtCO_2$[37].

2.36 A first step in helping organisations to improve their energy efficiency is for them to understand their energy consumption, and how it compares to that of others. Unfortunately, there is only limited data on energy efficiency in the business sector. This lack of understanding of the condition of the building stock, energy consumption and opportunities for savings makes it difficult to understand the impact of policies on energy use and to direct new policies accordingly. The National Energy Efficiency Data Framework will begin to fill this gap.

2.37 Non-domestic customers can also benefit from better information about their energy use. The Government announced in Budget 2008 that it would require energy suppliers to provide advanced meters for larger non-domestic consumers of electricity and gas within the next five years. Approximately 200,000 non-domestic sites will benefit from such meters. The Government

37 **Carbon Trust:** Annual Report 2007/08 *(2008), September* http://www.carbontrust.co.uk/Publications/publicationdetail.htm?productid=CTC735&metaNoCache=1

has also recently consulted on providing smart or advanced meters to small and micro businesses, with a view to determining the most appropriate and cost-effective metering technologies for these sectors.



2.38 Various systems already allow people to compare the energy efficiency of their buildings against a standard. For example, the Buildings Research Establishment (BRE) runs BREEAM, the BRE Environmental Assessment Method, which looks at the relative environmental performance of building design, construction and operation. It rates buildings on a scale of: pass, good, very good or excellent. As these assessments become more widespread, and as Energy Performance Certificates are rolled out, prospective tenants will be better able to make informed choices about property leases. They will be able to take into account the energy performance of the building. However, at present buildings with better energy performance do not command higher rents. Better and more widespread information through the EPC may begin to change this.

2.39 Another way of encouraging better environmental performance in leased buildings is with 'green leases'. These require either the landlord, tenant or both to operate in a more sustainable way. Australia has seen green leases adopted as a result of tenant-led pressure, particularly by the public sector[38]. An important element of the green lease is its role in developing communication between the landlord and tenant, in order to promote active engagement for active energy management. Green leases are currently rare in the UK, but could be useful in overcoming the tenant-landlord barrier in the non-residential sector.

2.40 Finally, there may be more that could be done to help businesses play their part in behaviour change more generally, for example through supporting businesses in encouraging behaviour change amongst their employees.

Q6: Are the information, advice and support services provided by the Government to businesses effective in encouraging them to reduce their energy use and their CO_2 emissions?

What other types of support services are useful and how can these be provided cost effectively?

Is there scope to do more on behaviour change through businesses and their employees? Please support your suggestions with evidence.

38 **Centre for Research in the Built Environment:** Incorporating Environmental Best Practice Into Commercial Tenant Lease Agreements: Good Practice Guide – Part 1, *(2007) January* http://www.greenleases-uk.co.uk/publications.php

The role of the public sector

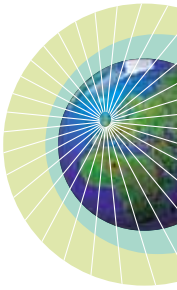
2.41 The Government has made it clear that it expects central government and the wider public sector to demonstrate leadership in adopting energy saving behaviour. The public sector is responsible for 8% of UK carbon emissions, and the sector has the potential to transform entire marketplaces through its purchasing power, estimated to be worth up to £150 billion annually. Reducing emissions also offers the prospect of better value for money for the taxpayer: in 2006-07 the public sector spent some £4 billion on energy.

2.42 Central government departments have committed to procure buildings in the top quartile of energy performance[39]. More broadly, we have set targets to improve energy efficiency per square metre on the Government estate by 30% relative to 1999/2000 levels. A number of tools should help the public sector to achieve its ambition, including the introduction of Energy Performance Certificates and Display Energy Certificates, the availability of loans from Salix, and advice through the Carbon Trust's Public Sector Management programme. In the future, the public sector might also be able to use green leases to support the aims of energy efficient building procurement. The forthcoming Government consultation will seek views on how the public sector can play a key role in the low carbon economy.

Q7: Are the existing commitments for public sector buildings sufficient for the public sector to fulfil its role in driving improvements and leading by example?

39 **Department for Environment Food and Rural Affairs:** UK Energy Efficiency Action Plan, (2007) http://www.defra.gov.uk/environment/climatechange/uk/energy/pdf/action-plan-2007.pdf

Chapter 3
Financing energy saving and low carbon energy



Chapter summary

Advice and information will enable people to understand their options to save energy and reduce their household's emissions, and to make informed choices about what action is best for them and their family. Many of the measures available will pay for themselves in reduced energy bills. However, financial support is likely to be needed to encourage people to act now and to ensure that they are able to take up the opportunities to save energy and save money.

By the middle of the next decade, the majority of people will have taken advantage of the cheaper energy saving measures available, with the help of the Carbon Emissions Reduction Target (CERT) obligations and predecessor schemes. As we look to more significant changes to homes, with higher up-front costs and longer-term energy savings, some households may be able to invest their own money in order to make savings in the long term, but this will not be possible for everyone.

The Government is determined that opportunities to save energy should be available to everyone. We are therefore consulting on options to encourage and enable households to install energy saving and renewable technologies by providing financial mechanisms which spread the costs of these measures over time, so that the costs are more than offset by savings on bills. These finance mechanisms could include subsidies where necessary and effective. This chapter sets out options for how this kind of financing for energy saving and low carbon energy measures could work.

We have already taken the enabling powers to create new financial incentives to promote renewable heat, the Renewable Heat Incentive (RHI), and small-scale electricity, the feed-in tariff. With the Carbon Emissions Reduction Target, we also have in place incentives to promote the uptake of some kinds of energy efficiency equipment. We want to explore further ways to help households with the up-front costs of energy saving and low carbon energy generation measures, and ensure that different financial instruments are joined-up and easily understandable and accessible.

This chapter also outlines the Government's broader thinking on renewable heat and RHI, and seeks views on whether and how the RHI could provide different levels of support for different sectors or technologies. It also seeks views on whether the RHI should be made available as an up-front payment for small-scale renewable heat technologies, and how to maintain demand for renewable heat before the RHI comes into operation.

Investing to save – the costs and benefits of energy saving and low carbon energy technologies

3.1 A comprehensive energy efficiency insulation package can lead to large energy bill savings: for example in a standard three-bedroom semi-detached property, external solid wall and floor insulation, and glazing could save £430 a year, once installed. Installing renewable heat technologies can also yield large savings: for example solar water heating could save between £130-£300 per year once installed, depending on the fuel that it replaces.

3.2 However, as set out in previous chapters, consumers are discouraged by a number of factors, including high up-front costs, even if they will save money in the long run. The package of insulation described above costs around £5800, meaning that it would take over 14 years for the savings to pay back the investment. Installing solar water heating costs around £2500, meaning that the payback period is between 9 and 18 years[40].

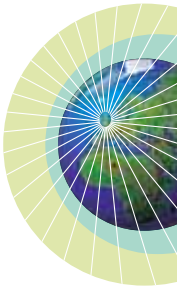
3.3 There are two key financial benefits to consumers who invest in energy saving or low carbon or renewable energy for their home. Firstly, they will save money through reduced energy bills while they live there. Secondly, their home may be more attractive when they come to sell it, so that it sells more easily or at a premium.

3.4 If someone lives in a house for a long time, the first of these benefits is most important. If someone is not sure they are going to live somewhere for so long, they will be more concerned about whether they will be able to recoup the costs of their investment when they sell their property.

3.5 Installing insulation and low carbon energy measures reduces the running costs of a home and improves its comfort. As a result, other things being equal, these investments should add to the value of a home and therefore people would be able to recoup some or all of their investments when they sell.

40 **Department for Business Enterprise and Regulatory Reform:** NERA Renewable Heat Phase II Report, (2008) *September*
http://renewableconsultation.berr.gov.uk/download?filename=NERA-Renewable-Heat-Phase-II-Report.pdf

Reflecting energy performance in the property market



3.6 As noted in Chapter 2, there is some evidence from other countries that more energy efficient properties are worth more, both for homes and non-domestic buildings, but this evidence remains tentative. In the UK, with the relatively recent introduction of the Energy Performance Certificate and the Code for Sustainable Homes, it may be too early to expect similar effects. We believe that at present energy performance may not be properly reflected in the value of a property[41]. The Government is interested in exploring further how far energy performance is factored into market prices, and how it can encourage this to happen.

3.7 Property professionals, such as surveyors and estate agents, play a key role in informing judgements of market value. They are well used to incorporating other aspects of building condition in valuations. Historically, however, they have not in general covered energy efficiency and supply. There is increasing recognition that this may be a way in which they can provide more value to their clients and drive up demand for sustainable buildings.

3.8 As a result, the Government will work with the Royal Institution of Chartered Surveyors and other stakeholders during the consultation period to explore the extent to which energy performance is reflected in the value of a property and the effect on the market prices of homes and non-domestic buildings as a result of the installation of different energy efficiency and renewable heat and energy technologies.

Subsidising the cost of energy saving and low carbon energy measures

3.9 Households already have access to financial support that will help them to save energy and save CO_2. Under CERT, energy suppliers are already providing households with subsidised insulation measures such as loft or cavity wall insulation. Less well-off households receive larger discounts. We expect this approach to continue so that everyone will be able to access energy efficiency and low carbon heat measures, regardless of income.

3.10 Suppliers recover the cost of these subsidies across all consumer bills. On average each household currently pays an additional £35 per year for their gas and electricity to pay for the CERT subsidies. Since the start of the Energy Efficiency Commitment (EEC), two million cavity walls have been insulated. Each cavity wall insulated saves £148 per year, assuming that householders keep their homes at the same temperature as before[42].

3.11 CERT generally focuses on cost-effective measures such as loft and cavity wall insulation. Further savings can be achieved from measures such as solid wall insulation and small-scale energy generation technologies but these have

41 **Australian Government:** Energy Efficiency Rating and House Price in the ACT (2008)
42 Estimate for a standard three-bedroom semi-detached house (DECC)

higher up-front costs and take considerably longer to pay back. The subsidies available as a result of CERT for such measures still leaves a large balance for householders to cover.

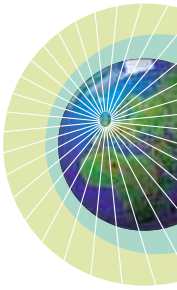
Figure 3.1: Consumer contribution to energy efficiency measures under current CERT model

Energy efficiency measure	Cost	Subsidy under CERT	Balance householder expected to pay
Cavity wall insulation	£461	50%/£230	£230
Professional loft insulation	£346	50%/£173	£173
Energy efficiency measure	**Cost**	**Possible subsidy for more expensive measures**	**Balance householder might be expected to pay**
External solid wall insulation	£4447	50%/£2223	£2223
Photovoltaic panels (2.5 kW)	£6554	50%/£3200	£3200

3.12 The new financial incentives planned to promote renewable heat generation (the RHI) and small-scale low carbon electricity generation (feed-in tariffs, or FITs) will help households who wish to generate their own low carbon energy to overcome some of the up-front costs of installations. This support for household energy generation, as well as existing subsidies for energy efficiency, will help to make 'whole house' packages of measures, combining insulation and small-scale generation, more accessible. There is further discussion of the development of the RHI below.

3.13 The Government will need to consider the future design of energy efficiency subsidies in the light of the RHI and FIT. Currently energy suppliers may install small-scale generation technologies and count them towards their CERT targets. There is a question about whether this should remain the case once these technologies are also supported through the RHI and FIT. A degree of double incentivisation (where suppliers are rewarded for taking actions within CERT, yet also benefit from the RHI or FIT) might be justifiable if this drove rapid uptake in desired measures. Alternatively, an argument could be made for keeping each support mechanism focused on distinct outcomes (i.e. energy efficiency/renewable heat/small-scale renewable electricity generation). The final arrangement will need to offer householders holistic, understandable and accessible options on reducing their energy use.

Q8: **What will be the most effective way for Government to develop RHI and FIT policy so that combined financing packages of insulation, renewable heat and small-scale low carbon electricity technologies might be offered?**



The need for additional financial options

3.14 Many of the energy efficiency and low carbon energy technologies available will pay for themselves in reduced energy bills. However, financial support is likely to be needed, to encourage people to act now, and to reflect the wider social benefits of reduced energy consumption such as carbon reductions. This will also lower cost of meeting our targets for renewable energy generation. Some level of subsidy is likely to be needed to support major energy efficiency and heat measures for the foreseeable future. In particular, the Government's commitment to fairness and tackling fuel poverty means that we will continue to ensure additional support is in place for lower-income households, whether through a mechanism like CERT or another route.

3.15 In developing policies for funding energy saving and low carbon heating technologies, the Government strives to ensure that everyone has the opportunity to benefit from energy saving and low carbon heating technologies regardless of income. This ambition is currently supported by programmes like Warm Front and the new £350 million Community Energy Saving Programme (CESP), which will offer free and discounted energy efficiency measures and heating for low-income households and communities. In this chapter we look generally at financing energy saving and low carbon energy; the social aspects of future supplier obligations are considered in Chapter 4.

3.16 However, using subsidies alone may not be the most efficient way to ensure all homes have access to low carbon heating and energy savings measures. Subsidies for energy saving and low carbon technologies will have to be paid for, whether that is through taxes or through energy bills as a result of mechanisms such as CERT and RHI. High subsidies for expensive measures therefore mean that all households are paying for a few to receive large benefits in terms of long-term reductions in fuel bills – although the whole of society can benefit from the wider benefits such as reduced carbon emissions and the lower cost of meeting renewable energy targets. It will therefore be fairer and more economically efficient to encourage households to contribute their own money to investing in energy saving measures, if they are able. This would enable more of our resources to be focused on the less able to pay and would ensure that those who benefit in the long term also bear the costs.

3.17 The more that people are able to finance some of the changes themselves, the lower the subsidies that are needed from others. For example, if 100,000 households per year part-financed a £5800 package of insulation measures for their homes between 2012 and 2020, this could save a total of £776 million in subsidies[43].

Objectives for a financing system

3.18 For a financial agreement to be attractive and fair to consumers it will need to:

- reduce or eliminate the up-front cost to the consumer of installing the more expensive measures given evidence about the impact of up-front costs on household decisions;
- save households money on their energy bills[44];
- ensure agreements fit within the appropriate regulatory frameworks, and where financial products are involved, ensure the financing payments made by householders are sustainable and agreements are based on responsible lending practices;
- allow for people to change energy supplier; and
- be simple to access and easy to understand.

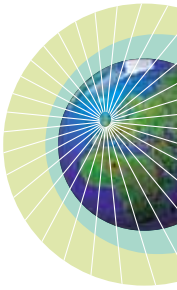
3.19 Normal commercial finance, with no subsidy, is unlikely to be attractive, because the cost of the loan is likely to be much bigger than energy bill savings. A commercial loan to cover the £5800 package of solid wall insulation, floor insulation and glazing would cost £1500 a year in repayments with 9% interest rate and five-year term. The expected energy bill savings from the package are around £430, meaning the householder is faced with a net cost of over £1000 a year.

3.20 There are different ways in which such finance could be made more attractive. Finance could be subsidised (e.g. through CERT type subsidies) to make it cheaper, or the term of the loan could be stretched out so the monthly repayments are smaller but over a longer period of time. Subsidising the £5800 loan to ensure the household's repayments fall to £430 would require a subsidy of around £4000 if the loan period remained at five years. Stretching out the loan term to 25 years would also bring down the annual repayment costs to around £430. A combination may be required to meet the different needs of households.

43 An insulation package which includes solid wall insulation, floor insulation and more expensive glazing (C-rated) rather than standard (E-rated). If energy suppliers' part funded this package with a £600 subsidy and encouraged householders to contribute the rest, this could free up resource which would otherwise have been spent fully funding solid wall insulation at 100%.

44 Energy bill savings will depend on household behaviour as well as external factors out of the consumers' control such as the global price of fuel. It will be crucial for financing packages to be accompanied by best practice guides to inform customers how to ensure they see the full benefit of their energy saving measures i.e. by reducing their demand for heating.

3.21 There are some difficulties with stretching loan periods over a longer period of time than normal commercial loans (standard agreements last five to ten years).



- The median length of time people stay in a house is just under nine years[45]. If a person took out a loan to pay for energy efficiency improvements to their home, but moved house before the money was repaid, they would have to pay off the outstanding debt before moving or make arrangements to pass the loan on to a new occupier.

- Given the frequency with which people move house, it may be that they are unwilling to take on long-term loans for energy improvements to their homes if they are not there long enough to recoup the benefits. There is a process for moving debt from one person to another, but it requires the agreement of all parties, which could be complex.

- Lenders decide whether to lend money to an individual on the basis of that individual's circumstances and credit worthiness. The Government continues to support this approach. Lenders will not necessarily agree to transfer the loan to another individual who takes over the property. Equally, the new occupier may not want to take on a new debt. In these circumstances the previous occupier would have to pay back the balance of the loan in one go when they move and people may be unwilling to take on this risk.

3.22 Stakeholders have suggested a number of different ways to approach financing in order to resolve some of these difficulties. These suggestions are explored below. The Government is not, at this stage, committing to pursue a particular option. The delivery of any finance options will have to fit into wider models for delivery which are explored in Chapter 4.

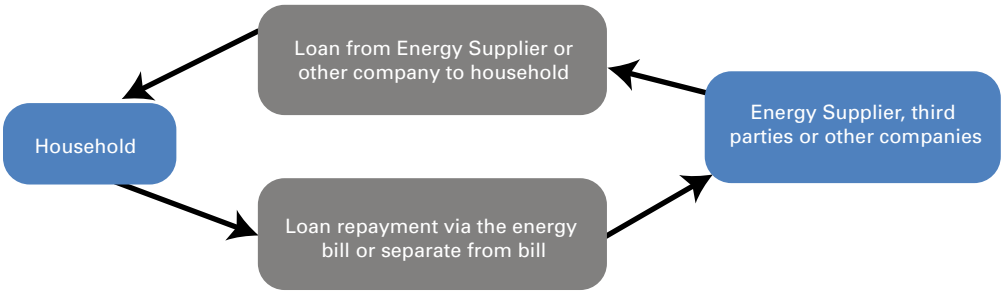
Standard finance model

3.23 One option is for companies such as, but not restricted to, energy suppliers to offer consumers a financing package to cover the installation of energy efficiency and low carbon energy measures. These companies could use one or more of the different Government subsidies available, including CERT, the RHI and the FIT for small-scale electricity, to offer subsidised finance packages to consumers, potentially covering energy saving and energy generation measures. Loans would be covered by normal consumer credit terms. Suppliers may wish to work with third party lenders, such as banks, to help provide the funds and administration of such a scheme.

45 **Communities and Local Government:** Housing in England 2006/07 (2008), September http://www.communities.gov.uk/housing/housingresearch/housingsurveys/surveyofenglishhousing/

Figure 3.2: Standard finance model

Households would be offered an energy efficiency and/or low carbon energy package by their energy supplier or by another company working with them. The company would draw up a contract outlining financing arrangement, length of repayment period and estimated energy bill savings as a result of the measures. The household would need to agree to the terms and conditions set out in the contract, and to allow repayments to be collected via their energy bill or through other payment methods



3.24 If all other aspects of the system for delivering energy savings to households stay the same, we expect that suppliers will start to explore similar approaches as they exhaust cheaper measures, such as loft and cavity wall insulation, and face tougher targets.

3.25 A number of issues arise with this model if finance needs to be structured over a longer period of time as the finance would be structured along the lines of normal consumer credit loans:

a. Consumers moving house. Lenders have traditionally been reluctant to offer finance for long periods of time for home improvement measures unless they can secure the amount on some collateral[46].

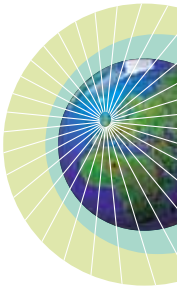
b. Consumers switching energy suppliers. Suppliers may need to amend their databases to allow the customer to switch supplier while still continuing repayments.

3.26 It is therefore likely that there would need to be a significant subsidy provided to make the standard model for financing attractive. For the package of insulation measures in paragraph 3.20 above, a subsidy of around £4000 would be required to ensure repayments are low enough to be offset by annual energy bill savings. These subsidies could come from funding from a CERT type of energy efficiency obligation, Feed in Tariffs and/or the Renewable Heat Incentive, where appropriate[47]. For the standard model to

46 Typically the collateral is the equity in the property. Some secured loans allow for individuals to release equity from their property as a way of funding energy improvements. However, this option will not be appropriate for all consumers.

47 FIT and RHI will not cover insulation. However, companies could package together insulation and renewable heat technologies to offer combined deals to consumers – for example, installing solid wall insulation using CERT subsidies and a ground source heat pump using RHI subsidies.

work in this way, we would need to ensure Feed in Tariffs and the Renewable Heat Incentive are designed so both energy suppliers and other companies could pull together attractive packages for households.



Innovative financing

3.27 Standard finance arrangements may not generate the desired level of energy efficiency and low carbon heat improvements. The Government is considering whether it should develop approaches that overcome the barriers preventing longer-term finance for energy saving and low carbon energy technologies, such as the ability to transfer contracts to future inhabitants. These approaches would offer a distinct advantage over a standard model based on consumer loans. We want to use this consultation to explore these options further.

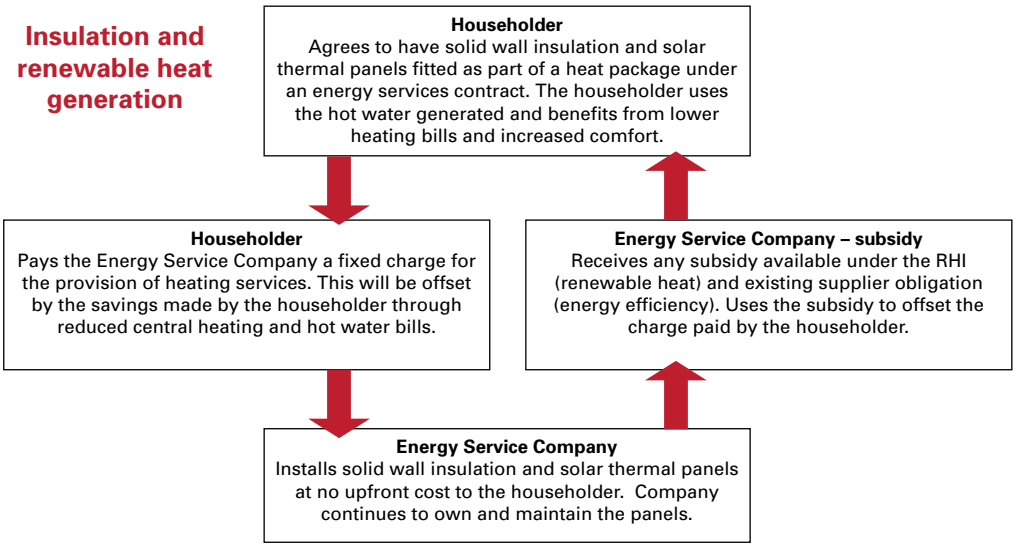
Service charging for energy efficiency and low carbon energy equipment: an ESCo model

3.28 One option is for companies to install low carbon energy generation and energy saving equipment and charge consumers for the use of their service over a defined contract period. Companies would own and maintain the technology in exchange for consumers signing up to a service contract. Consumers are used to paying service charges for equipment and the services that the equipment provides; for example, consumers pay water companies for the water they provide and the maintenance of the infrastructure. These are ongoing charges which can be passed on to future inhabitants when consumers move.

3.29 Companies could package together the different Government subsidies available, including CERT and the RHI, and offer energy service contracts to consumers covering the installation and ongoing maintenance of the equipment. The contract could also set out the expected energy bill savings, which should net off against the monthly service charge. There would be a minimum contract period for the companies' cost recovery.

3.30 Some companies already offer a customised service to the household sector. For example, Earth Energy is an accredited installer of ground source heat pumps who specialise in the registered social landlord sector. They offer the equipment with full asset leasing finance to cover the cost of capital with payments spread over a period that suits each consumer's financial requirements. The role for the Government may be to encourage such companies into the owner-occupier sector and help them tackle the existing barriers for expansion.

Figure 3.3: An example of a possible Energy Service charging agreement for insulation and renewable heat generation



3.31 There are a number of issues which will need to be addressed with service charging for energy efficiency and low carbon energy generation technologies. These include:

a. Consumers switching energy suppliers. Occupiers would still need to be able to switch suppliers and maintain payments. Alternatively, companies could offer service contracts separate from the supply of energy.

b. Moving technology. Some energy efficiency and energy generation technologies would lend themselves to an energy service model better than others, predominantly due to relative ease of installation (and removal).

c. Future renovations to the house. The service contract might need to set out terms and conditions stating that any future renovations to the house (e.g. an extension to the house) that may affect the installation owned by the energy service company could only go ahead with the agreement of the energy service company. Under this type of arrangement, the consumer might have to pay off a predetermined sum to break the contract terms to compensate the energy service company.

3.32 The repayments to the companies could come off the energy bill, or a separate bill could be arranged. The energy bill savings should outweigh the repayment costs, until the full amount is repaid.

Role of the Government

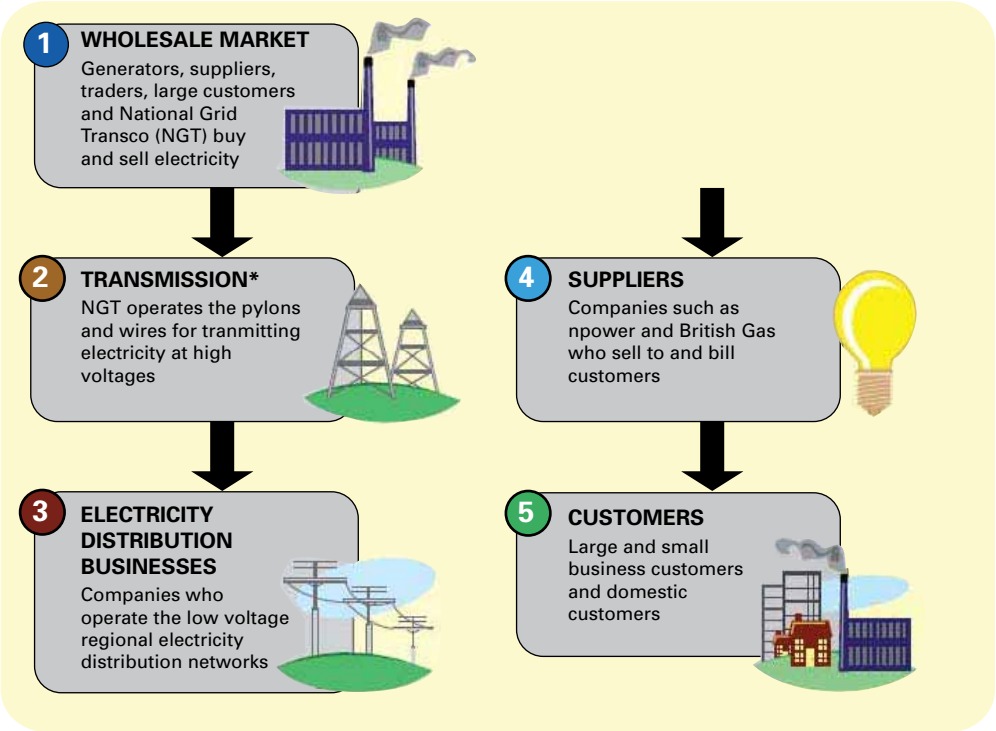
3.33 There may not be a need for Government intervention in the market. There are, however, a number of regulatory issues that the Government will need to work through. These include ensuring the structure of subsidies and incentives allows competition in this potential energy services market; ensuring there are regulatory safeguards for consumers so energy service contracts are not mis-sold; and ensuring it is possible to pass on service contracts as with other utilities. If service contracts can be developed so they are automatically transferable to future inhabitants, this type of model would

offer a distinct advantage over a model based on standard consumer credit loans. It would be easier for finance to be spread over a longer period of time giving even better terms to consumers. We may wish to consider ensuring the service contract automatically passes on to the next inhabitant, as happens with water contracts

Service charging: ESCos using Distribution Network Operators

3.34 There are many options for who could provide energy services including energy suppliers, third parties working with energy suppliers or bodies which have a permanent connection to properties[48] such as Distribution Network Operators. All these models would have an advantage over the standard finance model in that it will be easier to transfer the finance arrangements to future inhabitants if the consumer decides to move. The ability to transfer finance arrangements would enable companies to be spread payments over a longer period of time giving better terms to consumers.

Figure 3.4: Distribution Network Operators (or Distribution Businesses)



3.35 Distribution Network Operators (DNOs) are the companies that own and manage the local networks that energy suppliers use, for example the networks used for transmitting electricity from the national grid to homes. They are funded through a network charge that is part of each energy bill. There are 14

48 Other companies or bodies that have a permanent relationship with the house, such as local authorities, Gas Distributors or Water Companies, could offer a similar facilitation service. Berkeley City Council in the United States is currently piloting such a scheme. This consultation explores energy services facilitated via DNOs.

distribution companies operating in 14 licensed distribution areas. The 14 DNOs are owned by seven different groups. All energy customers pay a network charge as part of their energy bills.

Investment funded through the network charge

3.36 Companies could utilise the DNOs' permanent association with the house by offering consumers longer-term energy service contracts, and make arrangements for payment to be embedded within the energy bill, much as DNOs do for current network infrastructure investment. Network charges already vary by property, and so this would be an extension of that system. If a householder agreed to the installation of an energy efficiency or low carbon energy package, they would agree to an additional element added to and collected with their network charge. The level of the charge could be proportionate to the cost of the work done in that property.

3.37 As the cost of the energy service package received by the household is incorporated within its network charge, it may be more straightforward to pass it on to future occupiers than with other models. When the initial occupier moves out, the new occupier would continue to pay the higher network charge assigned to that house for the period permitted by the regulator. This already happens, as network charges can vary by property regardless of occupier. If an occupier decides to change supplier the DNO would be informed and would let the new energy supplier know the household has been assigned a higher network charge reflecting the investment that has been made. Consumers would need to be aware that any future renovations to their home that affects the installation could have consequences on the energy bill savings that they are predicted to generate.

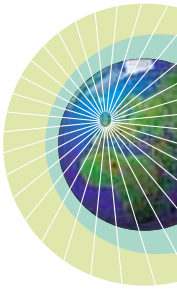
3.38 The DNOs could conduct the work themselves, or let suppliers or Energy Services Companies (ESCos) do the work and simply provide a finance stream. Because parts of DNO businesses are regulated monopolies, they can potentially access capital at lower interest rates than other companies, because they are seen to be less risky. This may mean that the costs householders have to repay could be lower in the DNO model than other models, although this is not certain. Changing the scope of DNOs business to include the installation of energy efficiency and low carbon energy measures may affect they cost of capital they face for those activities.

Issues to be addressed with using network charges

3.39 While a number of stakeholders have supported the use of DNOs to provide finance streams to households for energy saving and low carbon energy, we need to recognise that this would be a major change, raising significant issues and risks, which we are keen to explore as part of this consultation. If DNOs undertook this investment on behalf of energy suppliers or ESCos, a new billing system would be required. This is because it is the suppliers, not DNOs, who collect the money from customers via their existing billing systems.

3.40 Some of the approaches described above would require changes to primary legislation. The licence conditions of DNOs would need to be amended to allow them to offer such services. Industry codes would need to be altered to reflect the new areas of operation for DNOs and/or energy suppliers. All

arrangements will need to be compliant with financial regulatory consumer credit competition and state aid rules, and we would need to ensure that data could be shared appropriately.



Wider issues

3.41 The Government would want to consider options for structuring any of these financing models so that low-income households could be given additional help to access higher cost measures. At present, energy suppliers simply attach a higher subsidy to priority group households.

3.42 Decisions on which of these models is most appropriate will depend on the final shape of the overall delivery system for household energy efficiency and low carbon energy measures. Options for this delivery system are discussed in Chapter 4. In particular, financing options relying mainly on energy suppliers are most compatible with delivery options where suppliers have a central role.

Q9: What action, if any, should the Government take to enable finance to be arranged for the higher cost energy efficiency and low carbon measures? Are there other options the Government should consider? Please provide evidence to support your response.

Financing for business and the public sector

3.43 We need to complement advice on energy use with the financial support needed to encourage action in businesses and public sector organisations. Access to up-front capital was found to be a leading barrier to energy saving behaviour in businesses in one third of cases[49]. The Government has already put in place policies to provide extra support.

Financial support

3.44 The Carbon Trust offers Energy Efficiency Loans to small or medium-sized enterprises. Loans are interest-free, provided on an unsecured basis, and are for £5000 to £200,000 in England, Scotland and Wales and up to £400,000 in Northern Ireland. Repayments are offered on a 12-48 month basis. The Carbon Trust does not specify which equipment qualifies for a loan, but the measure must result in a saving of at least 2.57 tonnes of CO_2 per annum per £1000 loaned. In September 2008, as well as doubling the maximum size of the loans from £100,000 to £200,000, the Carbon Trust increased the overall budget by 45% to £31 million[50].

49 OC&C Interview Programme for the Carbon Trust (2006).

50 **Carbon Trust:** Carbon Trust Delivers Credit Boost for Small Companies *(2008) September* http://www.carbontrust.co.uk/News/presscentre/290908_Changes+to+the+EEL+Scheme.htm

3.45 In 2007-08 the Carbon Trust offered 722 loans worth over £21.5 million, and leveraged a further £23 million in private funds. Loans allocated in 2007-08 will reduce emissions by over 60,000 tonnes of carbon dioxide per year, and result in cost savings of nearly £9 million a year[51]. A National Audit Office review[52] found that 96% of loan applicants would not have purchased energy efficient equipment when they did without the scheme, and that it was highly cost-effective.

3.46 However, this scheme has still only reached a very small proportion of the million or so SMEs in the target sector. A survey by British Chambers of Commerce found only 1% of respondents had used the loans service[53].

3.47 The public sector also has access to ring-fenced, interest-free, conditional grants to invest in energy efficiency technologies, through Salix. Administered by the Carbon Trust, Salix works across the public sector with local authorities, NHS Foundation Trusts, Higher and Further Education Institutions and central Government. The 'invest to save' schemes generally pay for themselves within 50% of their useful life, bringing real energy bill savings for the organisation[54].

Other finance measures

3.48 Given the untapped potential of SMEs to save energy and lower their emissions, we may wish to consider extending the finance opportunities for households, considered above, to SMEs. Around half of all small businesses work from home, so they could potentially get access to any finance initiatives available to homes as an owner/occupier. However it should be recognised that the energy supply market is much more varied in the non-residential sector than the residential, with many more supply companies operating. Nevertheless, Energy Services Companies are already providing finance for energy saving measures as part of energy service contracts with some larger businesses. It is possible that the Voluntary Agreements being developed with energy suppliers under the Energy Services Directive could help develop the energy services market in the SME sector.

Q10: What should the Government do beyond these initiatives to promote investment in energy saving and low carbon energy technologies in business and the public sectors?

Supporting renewable heat

3.49 Any new finance mechanisms for households and businesses will, as discussed above, need to link in with other financial support systems, including the Renewable Heat Incentive (RHI). The Government included

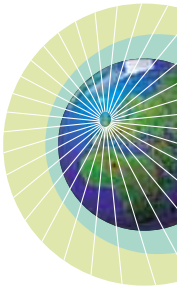
51 Ibid

52 **National Audit Office:** Accelerating the move to a low carbon economy (2007) *November*

53 **British Chambers of Commerce: ,Business and the Environment:** Challenges Ahead (2008) http://www.britishchambers.org.uk/6798219247040024540/BCC_Environment%20Survey_2008.pdf

54 **Salix Finance:** Salix Finance Website http://www.salixfinance.co.uk

broad enabling powers in the Energy Act 2008 to allow the establishment of the RHI, and we are now seeking views on some of the key aspects of its design.



3.50 Heat generated from renewable energy sources currently accounts for only 0.6% of our total heat demand. To meet our 2020 renewable energy target we may need, under some scenarios, to generate around 14% of our heat from renewable sources. Box 1.4 in the Introduction to this document describes some of the key renewable heat technologies that will help us achieve our goals on renewable energy. However there are a range of financial and non-financial barriers that will need to be overcome to achieve this.

The Renewable Heat Incentive

3.51 It is clear that, without financial support, renewable heat will not be forthcoming on the scale we need. We already provide such support for renewable electricity and renewable transport fuels through the Renewables Obligation and the Renewable Transport Fuels Obligation.

3.52 The Prime Minister said on 19 November 2007 that 'meeting our 2020 renewable energy target will also require greater use of renewables to heat our homes and our buildings, so we will introduce new measures to bring forward renewable heat'. The Government explored possible types of financial support for renewable heat in the Heat Call for Evidence in January 2008 and the consultation on the Renewable Energy Strategy (RES) in June 2008. The RES consultation set out two possible support mechanisms: a Renewable Heat Incentive (RHI), which would give a guaranteed payment for renewable heat generated; and a Renewable Heat Obligation, similar to the Renewables Obligation for renewable electricity. Most respondents to the RES consultation made it clear that the priority is to provide effective, practical support for renewable heat as soon as possible and supported the Government's emerging thinking to support an RHI.

3.53 The incentive will apply to eligible renewable heat generators at all scales across Great Britain, whether it is in households, communities or at industrial scale.

The way ahead: developing the RHI

3.54 Now that the broad enabling powers to establish the RHI are in place, the Government's priority is to develop the detailed regulation and administrative systems to underpin the deployment of the RHI. Our aim is to make the RHI as accessible, flexible and user-friendly as possible to potential investors in renewable heat at all scales. Our current expectation is that the RHI will take broadly the form that we set out in the consultation on the Renewable Energy Strategy[55].

55 In Box 4.2, page 119

3.55 At present, renewable heat technologies vary widely in the amount of support they require to make them commercially attractive. The same technology at different scales may also require different levels of support. In order to avoid over-subsidising some of the less expensive technologies, we expect that the scheme will provide different levels of support across the renewable heat sector. Levels of support could be differentiated in a number of ways, for example:

- by technology; and/or,
- by customer group – for example households, communities or industrial heat users.

Q11: Should levels of support through the Renewable Heat Incentive vary by technology and/or customer group? Are there any other ways of differentiating levels of support under the RHI?

3.56 There will be full consultation on the details of the RHI, including levels of any banding, later this year.

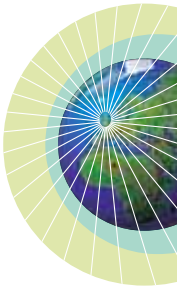
3.57 In order to develop our thinking on the detail of the RHI scheme, we are conducting further analysis on how effective different structures for the RHI might be in encouraging more renewable heat generation, and how they might affect the non-renewable heat market in the UK. Throughout this process, we will continue to engage closely with both large- and small-scale heat users, who have made a huge contribution so far to the development of renewable heat policy.

3.58 Funding for the RHI will come from a levy on suppliers of fossil fuels for heating. As a first step, the Government will examine the different options for how the levy will be applied and the different impacts of this on both the fossil fuel suppliers and consumers. We need to set out clearly the timetable and scope for setting the levy rates as well as who it will apply to, in order to reduce uncertainty for the energy industry in general and particularly potential investors in fossil fuel energy generation. We will aim to set out as much information as possible on issues such as who will pay the levy; how they will be notified; and how payment will be made, as well as possible exemptions.

3.59 We also need to ensure that the levy is structured to minimise administrative costs. In some areas of the fossil fuel heating market – for example the relatively small solid fuel heating sectors – we may wish to arrange levy collection at a point appropriate in the supply chain so that levies are collected from larger companies supplying the fuels to smaller distributors, in order to simplify collection arrangements and reduce overheads.

Q12: How can we introduce the levy to fund the Renewable Heat Incentive so as to minimise suppliers' administrative costs and reduce uncertainty among suppliers of fossil fuels for heat?

The RHI for households



3.60 We know that there is significant potential for increasing our use of renewable heat at industrial and large scale, and that this will in turn make an important contribution to reducing emissions and maintaining secure energy supplies. However, there are particular issues to resolve at household scale, to ensure that the delivery of support offered to households to lower their carbon footprints is joined up as effectively as possible. We want to ensure that these financial incentives, taken together, maximise the opportunities to save energy and reduce emissions.

3.61 As with the more expensive energy efficiency measures, one of the greatest barriers to homes generating their own renewable heat is the initial capital cost. Although these technologies can save households money in the long term, particularly for households with more expensive forms of heating than mains gas, the payback periods can be long. Some households may not be able to afford or have access to the necessary amount of money required to buy and install the equipment.

3.62 The underlying principle of the RHI is that it should reward the actual generation and use of renewable heat, rather than, say, the purchase of equipment that may be used rarely. It may be more effective and administratively simpler for RHI support to be provided as an up-front lump sum in certain circumstances, e.g. for particular technologies or below particular cost or output thresholds, rather than as a stream of income over a period of time. Arrangements to deliver payments in this way could be included in the design of the scheme. Alternatively, third parties such as financial institutions could deliver up-front payments or discounts on the cost of renewable heat technologies, in return for receiving the RHI payments when the renewable heating system is up and running. As explored above, we are keen to consider market based options that allow for innovation rather than forcing a particular type of payment.

3.63 We are interested in your views on the need for the scheme to include up-front payments as a feature, how such a scheme could be introduced and in which circumstances it should apply.

Q13: Do you think that financial institutions, such as banks or other loan companies, would be an effective way of assisting potential small-scale heat generators (such as householders) with financing of the initial capital cost of renewable installations?

What other considerations, if any, should be taken into account when determining eligibility for an up-front payment (for example, only generators with equipment below a certain size can apply, such as domestic customers)?

Maintaining demand for renewable heat ahead of RHI deployment

3.64 The RHI, when it is operational, could create an important new renewable heat sector in the UK's energy market. However, we start from a very low level of renewable heat, so the UK renewable heat industry is relatively small. There is a risk that potential investors in renewable heat will wait for the RHI to be available, causing a short term reduction in demand.

3.65 The Government will work closely with the industry and other stakeholders to sustain demand for renewable heat during this period before the start of the RHI. Options under consideration to achieve this include utilising existing and planned incentive mechanisms in the interim period, such as the Bio-Energy Capital Grants Scheme for biomass plants.

Q14: How can we maintain demand for renewable heat technologies before we introduce the Renewable Heat Incentive?

Support for renewable cooling

3.66 By making use of renewable (or indeed low carbon) heat to provide cooling as well as heating, a further reduction in primary energy consumption can be achieved[56]. Low carbon cooling is discussed further in Chapter 7.

3.67 Where cooling is a product of renewable heat generation, this falls within the overall scope of the RHI provisions. Decisions on eligibility will be subject to the final design of the scheme.

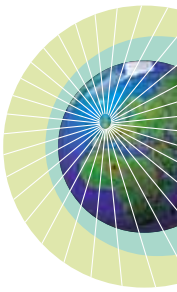
Next steps

3.68 We expect to have the RHI in place by April 2011. Under the enabling powers in the Energy Act 2008, the detail of the RHI will be set out in regulations. Prior to the regulations being laid before Parliament, we intend to consult on our proposals for the RHI scheme to ascertain views from our stakeholders. Once the consultation is complete and responses analysed, we will draft the regulations and put the practical aspects of the scheme into place.

Constraints on developing renewable heat

3.69 The RHI will provide incentives for the renewable heat industry and consumers to overcome some known problems, because it offers a financial reward for generating heat from a renewable source. However, as the Government made clear in the consultation on the Renewable Energy Strategy, it will take more than just financial support to ensure that renewable heat is deployed to its full potential. We must also tackle non-financial barriers and constraints to renewable heat, such as issues of air quality, upgrading of biogas for biomethane (see below), and lack of awareness/information on renewable heat technologies.

56 **Department for Environment Food and Rural Affairs:** Analysis of the UK potential for Combined Heat and Power, *(2007) October* http://www.defra.gov.uk/environment/climatechange/uk/energy/chp/pdf/potential-report.pdf



3.70 The Government is undertaking further analysis of the impact that widespread use of biomass heat might have on air quality and, as discussed in the consultation on a Renewable Energy Strategy, is considering options to ensure that the impact on air quality is minimised.

3.71 Biogas can be produced from biological waste (such as household food waste) and burnt to produce heat or electricity. It can be upgraded to make biomethane, which can be injected directly into the national gas grid. These technologies can play an important role in helping to achieve our ambitions on renewable heat. We will also carry out further work with the industry to overcome the particular challenges faced by these technologies. Given the special characteristics of this technology, the enabling powers in the Energy Act explicitly allow the RHI to support the production of biogas and biomethane. The powers also allow for the current definition of biogas to be amended through secondary legislation to take account of the development of new technological processes.

3.72 We also want to consider how best to raise awareness of renewable heat technologies among potential investors, at all scales from householders to larger-scale commercial and industrial plant. This could include direct engagement with public sector bodies at local authority level and below.

Chapter 4
Delivery

Chapter summary

The progress we have made on energy efficiency represents a significant advance. However, we are now moving into a new phase. We need to deliver energy efficiency measures to all types of building. Alongside this we also need to roll out low carbon heat infrastructure. We need to deliver at a larger scale in a predictable way, so that industry can plan. As we start to roll out bigger and more costly measures, it becomes even more important that we focus on the needs of the poorest and most vulnerable, to ensure a fair outcome.

Moving to a focus on whole houses and communities, rather than individual measures, presents a new set of challenges. Therefore, it is time to consider afresh our longer-term approach to delivering household energy efficiency, and how this fits with the policies in place for businesses and for heat infrastructure.

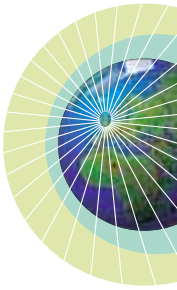
The Government recognises the importance of certainty for industry, and, with regard to household energy efficiency, has already set out the structure of CERT up to March 2011, to provide this assurance in the short to medium term. We propose extending CERT to December 2012. However, for longer-term and increasingly ambitious delivery challenges, we need to assess whether the current model for delivering household energy efficiency will be fit for purpose, or whether alternative frameworks could better meet these changing needs, including coordinating delivery through a central body.

Current delivery landscape

Household energy efficiency

4.1 The current mechanisms for delivering energy efficiency in households centres on an obligation upon energy suppliers to install energy efficiency measures in homes, the Carbon Emissions Reduction Target (CERT), accompanied by Building Regulations for major works, products standards, Energy Performance Certificates, information and advice from the Energy Saving Trust, and grants and subsidies.

4.2 We announced in October that smart meters would be rolled out to all households. This programme will also provide an opportunity to provide consumers with energy saving advice. As we move forward with our plans on smart metering and develop our delivery framework for broader energy efficiency measures, we will look to maximise these opportunities.



Energy efficiency of social housing

4.3 Some housing authorities and Registered Social Landlords are already at the forefront of addressing, through their refurbishment programmes, the combined issues of reducing energy demand, reducing the carbon impact of energy use, and adapting social sector homes to protect their tenants from the impacts of climate change that we know we will face. The Decent Homes Programme, and its devolved equivalents, together with CERT, have already done a lot to improve energy efficiency. Taken as a whole, the social sector is now more energy efficient than the rest of the housing stock and it is increasing its energy performance more quickly.

4.4 The Government has, in its response to the Communities and Local Government Select Committee, committed itself to considering the investment needs of the social stock in England in further reducing emissions. As set out above, the Government will show leadership by ensuring that social housing meets, and where possible exceeds, the aims it is setting for all housing on energy efficiency and heat and electricity supply. Initial work in this area is taking place through the Review of Council Housing Finance, and, in the context of the new social housing regulator, the Tenant Services Authority. We are considering the need to identify aspirational standards or benchmarks for energy saving and emissions reductions in refurbishment, for different social sector property types in England. Some stakeholders have suggested that this could be a useful tool in guiding social landlords to deploy the most appropriate and cost-effective technologies in their maintenance and refurbishment programmes. In the short term, we would expect authorities and Registered Social Landlords to work with energy suppliers and generators to begin to deploy whole-house, innovative approaches to refurbishment of their stock, for example by participating in the Community Energy Saving Programme.

Business and the public sector

4.5 For energy efficiency in the business and public sectors, the delivery landscape similarly includes Building Regulations, products standards, Energy Performance Certificates, and, in the public sector, Display Energy Certificates showing operational energy use. It also includes information, advice and financial support from the Carbon Trust and Business Links, and the devolved equivalents. There are additional drivers for business, such as the EU Emissions Trading Scheme, the Climate Change Levy which taxes energy use, and the Climate Change Agreements. The public sector has a separate set of targets, including the Sustainable Operations on the Government Estate target, and initiatives in the health, local government and education sectors, and a requirement overall for the public sector to fulfil an exemplary role.

4.6 In addition, a package of policy instruments will be coming into force over the next few years. These are expected to have a significant impact on energy consumption in the non-domestic sector, both directly, for example through

cap-and-trade measures like the Carbon Reduction Commitment, and indirectly, through the introduction of smart metering to businesses, which will improve knowledge and understanding of energy consumption. The Government is also negotiating a set of voluntary agreements with the energy suppliers to SMEs, as part of fulfilling the European Energy Services Directive. It is also exploring the potential for a stakeholder consortium to develop technologies for retrofitting existing buildings.

Heat supply

4.7 The Government also has policies in place to encourage householders and businesses to move to renewable and low carbon heating. These policies are mainly in the form of grants to encourage people to choose low carbon heat technologies, primarily when they are replacing a boiler. Households, public sector buildings and charities can apply for grants for energy generating technologies, both heat and electricity, for example through the Low Carbon Buildings Programme. Households can also receive support for microgeneration technologies through CERT. The Warm Front Scheme and devolved equivalents can also install more efficient heating systems in eligible households.

The current household energy efficiency model has delivered

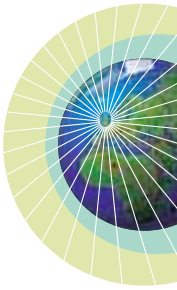
4.8 Our current model for delivering energy efficiency to households has done well and has already delivered substantial energy savings. Targets have been met in all periods of the supplier-led obligation thus far – between 2005-2008 energy suppliers delivered 187 terawatt hours (TWh) of energy savings against a target of 130 TWh. Household gas demand fell by 12% between 2004 and 2007. Improved energy efficiency played a significant part in this. An independent evaluation of the Energy Efficiency Commitment 2005-2008[57] concluded that suppliers delivered their obligation very cost effectively. All consumers benefitted by £9 over the lifetime of the measures for each £1 raised, with low-income consumers benefiting by £17 for each £1 raised from them. Suppliers have been innovative in their approach to delivering measures, for example by working in partnership with local authorities, appliance retailers and manufacturers.

4.9 It is essential to maintain current progress and keep up momentum. Energy suppliers and the energy efficiency supply chain need sufficient certainty to invest in capacity over the next few years.The Government understands the importance of giving long-term signals to industry as part of this obligation-based policy. As such, it is keen to give advance notice of the future direction of any scheme.

Extending a CERT obligation to 2012

4.10 The current CERT scheme ends in March 2011. The Government is consulting separately on amendments to CERT, including a 20% increase in the overall carbon emissions reduction target. In the 2006 Energy Review and the 2007 Energy White Paper, the Government announced that an obligation of a similar type will continue beyond CERT, and at a level at least as ambitious as

57 **Eoin Lees Energy:** 'Evaluation of the Energy Efficiency Commitment 2005-08', report to DECC, December 2008



CERT. It also said that it would explore the possibility of changes in the design of the obligation, in particular a shift from a measures-based approach to one based on outcomes, such as an overall reduction in carbon or delivered energy from the household sector. This chapter suggests new options, including a departure from a supplier-led delivery model. However, in order to create certainty for energy suppliers and the energy efficiency supply chain, and to facilitate the smooth delivery of insulation and other measures that are central to the Government's objectives for household energy efficiency, we do not intend to make the transition to any new delivery model in 2011. We are therefore proposing to:

- continue with a measures-based CERT obligation until December 2012, to coincide with the end of the first five-year carbon budget period (2008-2012). The level of the energy supplier target during this period will be at least that under the current CERT including the proposed 20% increase;[58]
- guarantee carry-over for all excess CERT measures[59] beyond March 2011 with at least their current carbon score.

4.11 CERT 2011-2012 will need to take account of the evolving policy landscape, including the mandatory phase-out of incandescent lamps, the roll-out of smart meters and the introduction of a feed-in tariff and renewable heat incentive, and the Government's fuel poverty objectives, among others. Further research and analysis is required before the detailed arrangements including the target, priority group arrangements and any new measures and their scoring can be confirmed. Proposals for CERT after April 2011 will be delivered through a new or amended CERT Order and will be subject to statutory consultation in the usual way, during 2010.

4.12 The Government is also consulting on the proposed Community Energy Saving Programme (CESP). This is intended to establish a new obligation on energy suppliers and electricity generators to install energy saving measures in around 100 low-income communities. The detail of CESP is the subject of a separate consultation.

Q15: Do you agree with the proposal to continue with a CERT-type obligation until December 2012?

Do you also agree that the proposed CESP framework should run concurrently to the same end date?

58 i.e. no less than the pro rata equivalent of 185 $MtCO_2$ lifetime savings over three years.

59 i.e. measures in excess of those required to achieve the CERT obligation.

Challenges to the current household energy efficiency delivery model – why do we need to look at this again?

4.13 The Government recognises the importance of certainty for industry, and has already set out the structure of CERT up to 2011 to provide this assurance in the short to medium term. However, for longer-term delivery challenges with increased ambition we need to assess whether the current delivery model will be fit for purpose, or whether alternative frameworks will better meet these changing needs.

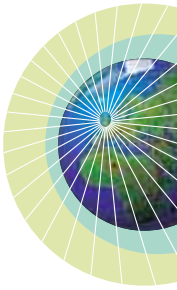
4.14 By giving suppliers certainty up to December 2012, we are able to step back and take a strategic view of what should happen after that date.

4.15 In the 2007 Energy White Paper, the Government announced an intention to continue with a supplier obligation until at least 2020. However, since then a number of things have changed.

- The renewable energy strategy is creating new incentives, such as the Renewable Heat Incentive (RHI).
- The Committee on Climate Change gave its advice on the first three carbon budgets in December 2008. The Government will need to set the first three budgets by 1 June 2009. We need to rethink our level of ambition.
- The European package on climate change also sets ambitious targets for 2020 – energy efficiency measures will be an important way of meeting the renewable energy target cost effectively.
- The establishment of the new Department of Energy and Climate Change (DECC) allows us to take an integrated look across the whole of energy and climate change, and to take a more strategic approach.

4.16 There are several reasons why the longer-term situation is different, creating a strong case for taking stock of the current delivery approach.

- By 2015-16, most of the lowest-cost energy efficiency measures will already have been installed. So if we are to meet set carbon targets, more expensive energy efficiency measures will have to be installed. We will increasingly need a delivery model which helps to transform how we use and conserve energy in our homes. Focusing on higher-cost measures such as solid wall insulation presents a delivery challenge because there are greater barriers to consumer take-up.
- As we move to higher-cost measures, the distributional impacts will also be more significant: fewer households would receive measures, with the cost spread across all consumers. The CERT scheme currently imposes £35 per year on each consumer's bill to pay for the measures. With more expensive measures, this is likely to increase by 2020. The delivery framework will need to take this into account.



- Since the incentive is for suppliers to meet their carbon reduction targets at the lowest cost, the current model has delivered incremental measures, and carbon savings. In the longer term, however, it may be more cost effective to take a whole-house approach (see Box 1.3) to ensure systematic, tailored consideration of the needs of each property. Requiring comprehensive improvements on a whole-house basis would present a completely different delivery challenge. The proposed new Community Energy Saving Programme should provide a test-bed for different approaches to delivery and greater community working.

- Similarly we need to ensure that energy efficiency and heat generation are considered together. There is a need to explore the potential for community scale projects, such as street-by-street energy saving installations and district heating. Suppliers currently focus on widespread delivery of incremental measures to individual properties. Community scale projects, such as district heating, could present big challenges to energy companies. This will apply equally to the proposed Community Energy Saving Programme, so we will be able to learn from experience gained through CESP as to how best to overcome this particular challenge.

- The current delivery model has a separate target for those in highest need. We may want to change or increase this targeting in the future. This requires detailed consideration of whether the energy suppliers are best placed to help achieve this.

- We are creating a range of new subsidies – for example the Renewable Heat Incentive (RHI) and the Feed-in Tariff (FIT). which would introduce an element of overlap with subsidies available through CERT. For example, microgeneration could qualify for support under the RHI as well as counting as an eligible measure under CERT. We need to ensure that all of our programmes are presented to consumers in a coherent and comprehensible way, and can be delivered effectively.

- Third party installers cannot compete with energy suppliers as the suppliers can offer measures at rates subsidised from fuel bills. This could restrict the development of an energy services market. Competition theory suggests that, while having a small number of operators in a market isn't necessarily bad for competition if it is brought about as a result of economies of scale, sufficient competition is still required to ensure that the savings brought about by these scale economies are passed on to the consumer.

4.17 We could consider a number of delivery models. To meet this bigger challenge, the Government wants an open dialogue about the options, ahead of a final strategy following this consultation. It is very important to us to hear our stakeholders' views. We appreciate this is a significant challenge and we need to hear and understand the detailed arguments for each case in order to develop our thinking and take this strategy forward. Any delivery options taken forward for further analysis of their potential impacts, following consideration of stakeholders' views, will be subject to more detailed consultation in the future.

Aims and principles of a delivery framework

4.18 In looking at these options, we will assess how well they meet the challenges set out above, as well as the extent to which the frameworks enable us to achieve the following objectives:

- create demand among households for energy savings measures to be installed;
- facilitate clear and coherent delivery of information and advice;
- allow for the measures to be paid for in a way that is perceived as fair and affordable and that targets priority groups;
- ensure the right, cost-effective measures are installed in the right buildings and places, in the most effective sequence, using a whole-house approach where it is appropriate;
- give certainty of outcome in terms of emissions reductions and renewable energy generation;
- encourage a positive customer experience; and
- consider the impact on energy suppliers.

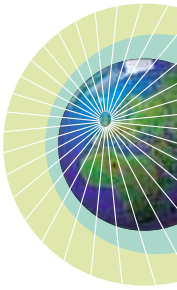
4.19 The framework needs to reflect the needs of those involved and be tailored to the needs of different types of customer. This includes owner-occupied housing, private rented housing, social rented housing, and also housing in different localities.

4.20 There is also a case for considering whether any new approaches to delivery might also apply to the business, not-for-profit and public sectors, and to SME organisations in particular. Having previously analysed the potential for a CERT-type scheme in the business sector, the Government had rejected this because of the difficulties in tailoring a supplier-led scheme to the business sector where there is a very large number of small energy supply companies compared to the domestic market, as well as wide varieties in energy use by customers, which would push up the administrative cost. There were also risks around a transfer of funds from residential customers to business customers. This type of cross-subsidy was not considered acceptable. However, in opening the question of alternative delivery frameworks there is also potential to explore whether any of these might extend to cover businesses, and SMEs in particular.

Working with local and regional government

4.21 Local and regional government will be key for successful and fair delivery. Local government is well placed to help to direct implementation, having a good knowledge of their locality, including the types of buildings found and the socio-economic status of residents in the area. Through the national policy framework, the Government has already set out its expectation for local authorities to act to tackle climate change, for example through the planning

process and use of climate change indicators in Local Area Agreements. More than 130 out of 150 Local Area Agreements in England include a carbon reduction target.



4.22 Some supply companies are already working with local authorities to deliver their CERT targets. The Local Government Association has set up a clearing house arrangement for local authorities to work with suppliers to deliver CERT (the CROSS funding partnership), for example. More than 60 councils are working with British Gas to promote home energy efficiency to householders who invest in insulation measures by offering them council tax discounts of up to £125, with £75 paid for by the supplier through CERT plus an optional £50 from the council. The Government is supportive of innovative approaches to delivery such as this, and would encourage development of similar arrangements. Kirklees Council has made use of the funding available from suppliers under the CERT obligations. The Council, which has about a quarter of its population living in fuel poverty, established Warm Zone Plus in 2007. The three-year programme will offer free loft and cavity wall insulation to all homes. Personal visits will offer energy efficiency advice, low-cost insulation and grant aided measures. Over the three years, the Council expects 40,000 homes to take up the free insulation offered. The programme, which will cost £21 million, is funded through capital borrowing with the interest paid from revenue, supplemented with funds through Warm Front and CERT.

4.23 A partnership approach could allow councils to be involved in steering delivery towards priority areas, and households in most need of energy saving improvements. This would ensure a targeted approach which makes best use of the information available to councils. It could also connect delivery proposals to local strategic plans, and would increase the opportunity for strategic level delivery covering whole streets or neighbourhoods. Local authorities are well-placed to identify opportunities for infrastructure projects at the community level, such as district heating or CHP, and may provide the right level of decision making power. Paragraph 6.25 explains how the Planning Policy Statement on Climate Change encourages the development of district heating. It may also be easier for local authorities to coordinate with community groups and charities, for example, and to build on existing relationships with householders within their area through schools and social services. However, local authorities are independent of central government and the ability to roll-out this approach in a comprehensive way across the country would depend on voluntary involvement. We hope that CESP will further develop experience of partnership, working with communities and local authorities. This experience can inform development of the role for local authorities in any delivery framework post-CERT.

International examples

4.24 In exploring the different approaches available to us, we can also learn from international examples of frameworks for delivering energy efficiency. In boxes 4.1 and 4.2, we set out two examples: Canada's ecoENERGY Retrofit programme, and Germany's energy efficiency programme in the housing sector.

Box 4.1: ecoENERGY Retrofit in Canada

In 2007, the Canadian government launched ecoENERGY Retrofit Homes programme. Through this programme the Canadian government provides financial support for energy saving projects that reduce greenhouse gas emissions and air pollution in existing residential buildings. The budget commitment is 220 million Canadian dollars (about £122 million) over four years.

Property owners can qualify for federal grants by improving the energy efficiency of their homes. The maximum grant per dwelling is approximately £2700. The grants can be supplemented by provincial government grants and interest-free loans.

To qualify for grants, property owners must undergo an energy efficiency assessment by an energy advisor licensed by Natural Resources Canada. As part of the assessment, property owners receive a report which shows the grant amounts for each eligible upgrade. Owners must then implement the recommendations included in the assessment report, and the grant amount is based on the extent of energy efficiency improvements made. The upgrades must be carried out within 18 months of the initial assessment. A second evaluation of the dwelling follows after the improvements are implemented, in order to determine the energy savings, and owners are provided with a new energy efficiency rating label.

Natural Resources Canada also offers an ecoENERGY Retrofit Incentive for commercial, institutional and industrial buildings owned by small and medium-sized organisations. Organisations can receive up to £5 per gigajoule of estimated energy savings, 25% of eligible project costs or approximately £27,500 per project.

Box 4.2: Germany's CO_2 Building Rehabilitation Programme

This German programme supports household energy savings through low interest loans for large-scale packages of multiple-measures. A separate grant scheme, Housing Modernisation, supports individual measures.

The national development bank, KfW Fordebank, offers loans of up to 30 years with fixed interest rates for up to 10 years. The amount of the loan payable depends on what level of efficiency is achieved compared to building standards. Buildings must reach new build standards or better. The federal government subsidises each loan up to a maximum of €50,000 (about £45,000). In 2007, loans averaged €14,800 per dwelling.

People apply to their personal bank for a loan, and the application must be accompanied by confirmation by an expert that the work will reach the required efficiency standard. The bank then decides whether to approve the application, and if so, forwards it to the KfW bank. The KfW bank re-finances the loans at favourable rates and disburses the funds. The loans are raised from the capital markets and secured on the property's equity. Following implementation of the energy efficiency measures, an expert has to confirm that the work was completed as planned.

As well as individuals, housing companies, co-operatives, local authorities, districts and municipal associations, public corporations, foundations and other associations can apply for the low interest loans.

The future of supplier-led delivery

4.25 The obligation on energy suppliers has been very successful to date. The current model could be adapted to deliver under these new circumstances. Delivery through suppliers has a number of advantages:

- they have been successful in delivering current targets and some are already thinking about adapting to new circumstances;
- they are likely to be very good at cost-effective management of the supply chain and keeping administration costs, and subsidy costs, of any scheme low;
- they already have a customer interface and marketing capability established and in place; and
- competition is likely to push them to deliver targets efficiently.

4.26 However, to address the new challenges set out above, the supplier-led model would have to evolve.

4.27 Given the above challenges faced by a future supplier obligation, Defra led a programme of work to develop and appraise the potential options for the post-2011 obligation, which included a Call for Evidence in 2007. This explored various options focused on two main approaches: a cap-and-trade model, and a revised measures-based approach. Following the Call for Evidence, the Government made a commitment in the Renewable Energy Strategy Consultation to examine the potential to move to an outcome-based scheme, such as cap-and-trade. The conclusions of this analysis are set out in Box 4.3.

Box 4.3: Analysis of a supplier-led cap-and-trade approach

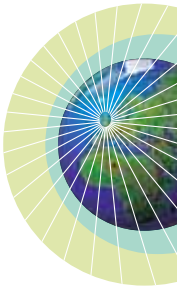
During the 2007 Energy Review, some stakeholders suggested changing the current supplier obligation into a cap-and-trade scheme similar to the European Union Emissions Trading Scheme (EU ETS). Cap-and-trade schemes can deliver environmental outcomes with certainty, while allowing flexibility to participants, thus minimising costs. In its purest form a cap-and-trade scheme would set an overall cap on the emissions associated with the sale of energy. Allowances would be allocated to energy suppliers. Over time the Government could reduce the level of the cap.

Whilst cap-and-trade schemes are an effective means of ensuring carbon budgets are met, in addition to factoring the price of greenhouse gases into the purchase of products and services, our analysis suggests that such a scheme placed on energy suppliers would not work in the same way as other emissions trading schemes, but would instead operate more along the lines of energy rationing. As such it may not be appropriate. This is because:

- Energy supply companies could not be accredited under a supplier cap-and-trade scheme for decarbonisation of the energy supply because (a) other policies such as the EU ETS already work to achieve this for electricity, (b) the objective of the supplier obligation is to overcome barriers to the implementation of energy saving measures in people's homes – recognising the argument from the Stern report that market failures other than pricing also need to be addressed – accrediting decarbonisation of the energy supply would weaken incentives to implement measures in peoples' homes.

- Without upstream decarbonisation a cap placed on suppliers differs from other emissions trading schemes, because it would require suppliers to reduce their sales, whilst other emissions trading schemes allow participants to increase sales as long as the carbon content of each sale is reduced.

- A cap on the energy supply company is not a cap on the person responsible for emissions (the consumer), and as such a supply company would have to encourage consumers to reduce demand. It may not be appropriate to assign responsibility to suppliers over a phenomenon they do not fully control.



- Household carbon emissions can vary because of factors other than supplier-led energy efficiency measures including weather, changes in appliance standards, changes in the carbon intensity of electricity and broader societal trends such as the tendency to heat homes more than in the past, making it difficult to set a target fairly. A study carried out by Oxford University's Environmental Change Institute[58] suggested that if the supplier obligation had been set on a cap-and-trade basis over the period 2004-2007 using the emissions projections available at the time, suppliers could have met their target without carrying out any activity at all.

Our analysis suggests that placing a cap on energy suppliers runs the risk that suppliers would primarily use fuel prices as a means of reducing demand, only installing measures where they could do so profitably. This price effect could be significant. Our assessment of a policy involving placing a cap on energy supply companies suggests that the price impact could lead to an increase in consumer bills of between £128 – £2095 by 2020 (depending on the responsiveness of consumers to energy price rises; with a central assumption of £299) and provide benefits to the UK of around £5.16 billion due to reduced fuel use. In comparison, the measures-based model, as currently applied, would increase consumers' bills by £66-£104 by 2020 (depending on the extent to which supply companies have to subsidise measures) and deliver benefits to the UK of around £18.9 billion. Those households that receive measures could save around £85 on average in addition to increased comfort levels.

As such the Government believes that a cap-based supplier obligation is not desirable from 2012.

Q16: Do you agree with our analysis of the potential impacts of a cap-and-trade approach to delivering energy efficiency in homes? Please support your answer with evidence.

How a developed supplier-led approach could meet our objectives

4.28 Noting the success of supplier-led models, other measures-based options are available. There could be opportunities to amend the design to improve the effectiveness of the policy in meeting our objectives. An obligation on suppliers to install measures to meet a carbon reduction target could be maintained. As currently, suppliers would be required to meet these targets, with substantial penalties for non-compliance. Competition between suppliers would ensure that measures are installed at the lowest cost.

60 **Eyre, Nick; Oxford University Environmental Change Institute:** Regulation of energy suppliers to save energy – lessons from the UK debate, in Proceedings of the British Institute of Energy Economics Conference, September 2008

4.29 The target could be made more ambitious and the scoring mechanisms revised, to encourage higher-cost measures, such as solid wall insulation, to strengthen the incentive to undertake whole-house schemes where these are cost effective in delivering efficiency savings, and to address concerns over the coordination and streamlining of information and advice services.

4.30 A supplier-led scheme could be designed to open up the delivery system to more competition and the entry of new players. This could help to bring down costs and encourage the development of an energy services market (see Box 4.4), whereby the energy service company installs energy efficiency and low carbon energy equipment and the householder is subsequently charged to use the service over a defined contract period. This is described in more detail in Box 4.4 and paragraphs 3.28 to 3.31.

Box 4.4: Energy service markets

The Government has several times set out its aspiration that the household energy supply market will be transformed from selling units of energy to the marketing of broader energy-related services.

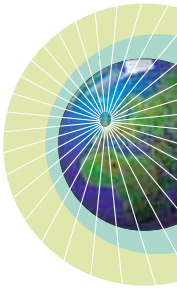
- Energy services broadly refer to the supply of energy as an outcome (heat and power) rather than outputs (fuel and electricity).
- The term Energy Services Company (ESCo) is commonly used to denote organisations which provide energy services (heat and light, as opposed to gas and electricity), but is also used to describe some organisations operating district heating schemes.
- An energy services business model would create a shared incentive for suppliers and consumers to reduce energy use and carbon emissions from homes.

Looking at the future delivery framework, the potential fit with the energy services business model will be an important consideration. The current obligation on suppliers, CERT, may inhibit ESCos entering the market to some extent, because energy suppliers cross subsidise the efficiency measures they install, by increasing the price charged for energy. New entrants wanting to offer energy efficiency measures cannot access this subsidy. However, there are reasons to expect energy supply companies to play a crucial part in the establishment of the energy services market. Suppliers have a direct relationship with customers, they handle the energy metering and billing, which will include the introduction of smart meters in coming years, and are well placed to target and advise customers about their energy use.

ESCos have had more success in the non-domestic building sector in the UK. Energy services have been able to fit into the more complex pattern of building ownership, management and tenancy.

4.31 Currently, suppliers sub-contract installers to fit insulation at a rate subsidised through CERT. Third parties cannot access these subsidies unless they have a contract with suppliers. There could be a way to allow installers to sell the emission savings associated with the measures they install without being

directly sub-contracted, through tradable certificates, for example. This could open up the market and make it possible for individual tradesmen to carry out small-scale work. This could encourage builders to promote low-cost, routine energy saving measures, insulating piping for example, as a matter of course whenever they carry out other work on a house.



Supplier-led model with an outcome target

4.32 If the Government concludes that the cap-based approach is not viable, as outlined above, some form of measures-based supplier obligation with an outcome target may have benefits.

4.33 The attraction of some form of cap on emissions from households is that it gives a greater degree of certainty of outcome. In a world where carbon budgets constrain emissions, this greater certainty is desirable. There are a number of ways in which this could be done:

- if emissions exceed a cap, suppliers are required to install more energy efficiency measures in the following period;
- if they reduce actual emissions by more than target amount, their measures-based target will reduce; or
- suppliers are required to demonstrate reductions in demand from a certain proportion of their customers.

4.34 As with the current model, energy supply companies would subsidise the upfront cost of measures, which would be recouped from bills.

4.35 This model would assure outcomes in terms of carbon savings, but it would not deal with the other potential shortcomings of a supplier-led model. It could also add another layer of administrative complexity in assessing whether the actual emissions had reduced. Furthermore, there are concerns regarding how suppliers might opt to encourage reduced demand for energy, for example by increasing prices, as well as possible interactions with existing upstream cap-and-trade schemes such as the EU Emissions Trading Scheme.

The suppliers' social and environmental obligations

4.36 In response to 'The Household Energy Supplier Obligation from 2011: A Call for Evidence', some stakeholders raised a question about how best to manage the social obligations under a future supplier obligation alongside the environmental obligations, to ensure effective delivery of both. Currently, 40% of energy saving activity under CERT has to go to low income and vulnerable households. The Government is committed to maintaining at least this degree of support to the vulnerable.

4.37 The new Community Energy Savings Programme (CESP), announced by the Prime Minister on 11 September 2008, is intended to impose a new obligation on energy suppliers and electricity generators to install energy saving measures such as insulation and heating systems in around 100 low-income communities around the country. This new obligation changes the landscape

into which the social element fits, as, by focusing on low-income communities, it helps to ensure that more energy saving measures are installed in houses that are likely to be in the priority group.

4.38 The Government will consider how best to take forward its social objectives in the context of CESP and the extension to CERT set out earlier in this document.

Delivering through a central coordinating body

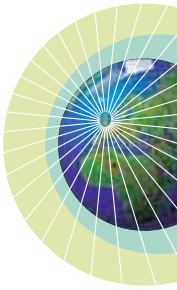
4.39 Another option would be to consider a more coordinated approach to meeting energy saving targets. This could be through the formation of a central coordinating body. Energy saving activity could be coordinated through a separate body, in order to meet the Government's energy saving targets. The Government could continue to set specific targets for priority groups. Suppliers already contract out different aspects of delivery under CERT, and one company has outsourced delivery of its entire obligation to a separate company.

4.40 A central coordinating body could help adapt the supplier obligation to better address some of our future concerns. For example, such a body would enable delivery to be better coordinated, compared to individual suppliers working in isolation. It might also facilitate more streamlined engagement with local authorities, which could promote targeting and strategic delivery. This may offer a number of advantages, for example it holds particular potential for implementing projects on a street-by-street basis, which may present more of a challenge for individual suppliers. The body could also work with local authorities to facilitate implementation of community-scale energy efficiency projects and encourage more private sector providers into the market. The proposed CESP initiative could provide valuable experience of how to coordinate community-scale activity and involvement of local authorities.

4.41 Bringing the work currently undertaken by the six supply companies together under one body could also provide economies of scale which may work to improve efficiency. This will become increasingly important as we move towards installation of less straightforward measures such as solid wall and under-floor insulation. Furthermore, this approach could also offer a more coherent customer interface, facilitating clear and coherent delivery: with a single body it could be easier for customers to understand and access the support available. This could engender a more positive customer experience. However, there may be additional administrative costs associated with a more coordinated approach.

4.42 With one entity coordinating delivery, careful design of the framework would be needed to ensure that it did not inhibit the market for technology and insulation businesses, and the development of energy services and an ESCo market, which the government wishes to see. We would not wish to inhibit the transformation of the suppliers' business model towards energy services, or obstruct new entrants. Suppliers have already proven to be innovative within the existing CERT structure, and this level of innovation is something we would wish to see continue under any delivery framework. Safeguards would be required to ensure that the approach was consistent with

competition law, including that commercially sensitive data was not shared across competitors, and that it was the central coordinating body which had access to the information required to target delivery.



4.43 We are interested in exploring how this level of coordination might be achieved and whether or not the Government should mandate that a single coordinating body be formed. We are particularly interested to examine how we can enable greater coordination while maintaining the benefits of competition.

Next steps

4.44 The current delivery model for installing energy efficiency measures in households is a supplier-led obligation, CERT. Post-CERT we face a number of different, and sizeable, challenges to delivering energy efficiency and heat in an increasingly carbon constrained world. We have taken the opportunity presented by the creation of the new Department of Energy and Climate Change to take a strategic view of energy and climate change and to re-examine our longer-term delivery frameworks to meet both our increased ambition and the need for fairness. In this chapter we have attempted to set out a range of approaches for delivery of energy efficiency in households for the post-CERT period. An impact assessment will be prepared and a full consultation will be undertaken before any revised scheme is introduced, learning from domestic and international experience and the responses we received. As we continue to develop our thinking it is important to us to hear your thoughts on the ideas set out here.

Q17: Do you have views on the merits of moving to a different approach for delivering energy efficiency to households? Do you have other suggestions of alternative delivery models which might be effective in achieving our objective?

Chapter 5
Stronger incentives to move to a low carbon future

Chapter summary

Our intention is to put in place a package of support and incentives that will be sufficient to deliver our ambition. New regulatory levers should only be considered where aims cannot be better met in other ways.

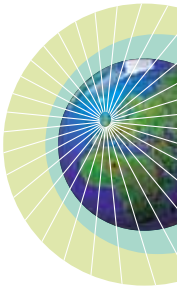
We do however want to ensure that existing regulation is as effective as possible and achieves the desired outcomes. So the Government will examine how existing tools, such as Energy Performance Certificates and Building Regulations, can encourage the take-up of opportunities to improve the energy efficiency of buildings before considering any further regulation. One option may be to widen Building Regulations that require energy saving measures to accompany certain types of building work, providing it is cost effective to do so. We are also considering working with representatives of the building trade to design a voluntary code of practice on energy efficiency and low carbon energy. These ideas are set out in this chapter, which seeks views on their potential, and evidence to inform the development of any proposals.

We will conduct a review to assess whether sufficient progress has been made in reducing emissions from existing buildings by the end of the first carbon budget period (which runs from 2008 to 2012), before we look again at whether other options should be considered.

Introduction

5.1 So far we have set out how the Government plans to support individuals, communities and businesses to save energy and money, and reduce their carbon emissions. This is a broad package, aimed at overcoming the barriers to a low energy lifestyle, by making it easier for households and businesses to save energy and access low carbon heating technologies. We have shown how we can engage people more and help people identify ways to make their lifestyle more energy efficient, and ease access to low carbon technologies.

5.2 However, many stakeholders have expressed the view that there is also a need for greater regulation of the existing building stock to match the regulation planned and already in place to reduce emissions of CO_2 from new buildings. It is harder to regulate existing buildings, as this would effectively mean additional costs for homeowners and businesses to renovate their properties. It could also be difficult to enforce such regulation. Nevertheless, the Government recognises that, in the long term, we may not achieve our goals to reduce radically the UK's emissions without reconsidering whether some regulatory standards for housing and business premises would better achieve our desired outcomes. The Government will keep the situation under review to assess progress against our objectives.



Approach to regulation

5.3 The Government already sets standards for the energy efficiency of new buildings, and for building work to existing buildings through Part L of the Building Regulations. The Energy Performance Certificate ensures that information on the energy performance of buildings is available at the point of sale and rental. We have already set standards for the energy efficiency of appliances, for example the Government has announced the phasing out of inefficient light bulbs, so they will not be sold after 2011.

5.4 In the short to medium terms, the Government wishes to examine how we can use existing tools, such as EPCs and Building Regulations, most effectively to ensure that we take up obvious opportunities to improve the energy efficiency of buildings. Ideas for how we might do this are described below. However, we recognise that the success of these measures will also depend on achieving the kind of behaviour change that we described in Chapter 2, so that people are motivated to take action and have the information and tools they need to do so.

5.5 The Government's aim is to achieve our ambitions on saving energy and reducing emissions from existing buildings by using existing regulation more effectively and to encourage people to change the way they use energy, and providing more help to install new energy saving and low carbon energy measures. We do not want to introduce additional regulation now, as we believe that these other policies and tools should be able to deliver the necessary action at considerably less cost to individuals. Following better regulation principles, we would not introduce regulation where our aims can be better met in other ways.

5.6 However, given the importance of reducing the UK's emissions and reducing our energy use, the Government will assess whether sufficient progress has been made in reducing these emissions and energy use from existing buildings by 2012 in the context of our overall position in meeting our carbon budgets. We believe that 2012 is an appropriate time for such an assessment because it is the end of the first carbon budget and the proposed new date for the end of CERT. Such a post-implementation review will need to consider whether the strategy we have is achieving its objectives, and in a cost effective and fair way.

Short-term regulatory options

Making existing regulation more effective

5.7 Building Regulations already require energy efficiency improvements during some building work. The Housing Health and Safety Rating System (HHSRS) also requires homes in all sectors, including the private rented sector, to meet minimum safety standards, including standards for thermal comfort. There is evidence that there may be opportunities to save energy and reduce bills by ensuring better compliance, for example:

- Discussions with local councils suggest that the volume of work involved makes it challenging for building control to effectively enforce Part L of the Building Regulations. In particular, building work that requires only building notices is heavily reliant on the Building Control Officer making the householder and builder aware of the requirements.

- Local authorities decide the priority given to enforcing the Housing Health and Safety Rating System (HHSRS), the risk assessment procedure for residential properties. HHSRS requires the owner of a property to ensure that their property does not present risks to occupants' health and safety. The thermal comfort component of HHSRS would require all rented homes to meet standards roughly equivalent to an EPC rating of E[61], as part of wider action to tackle disrepair and make other improvements. The case for further action will be considered during 2009/10 in light of the review of the private rental sector by Julie Rugg and David Rhodes[62].

5.8 We recognised the need to improve compliance with Part L of the Building Regulations in the 2003 Energy White Paper[63]. Alongside the changes to Part L in 2006 we instigated a substantial training programme, improved guidance, mandatory air-tightness testing and additional schemes for competent installers. We have introduced extended time limits for prosecution and consulted on proposed changes to the building control system. Indications are that compliance may be improving as a result of this, but better evidence is being gathered. This will inform a further package of proposals for improving compliance and reform of the building control system, which will be set out alongside proposed changes for 2010.

Reducing regulatory barriers

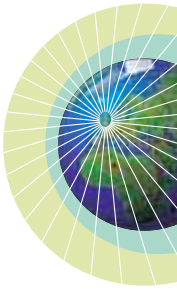
5.9 The Government is also looking at reducing regulatory barriers to low carbon energy. For example the Government developed its Microgeneration strategy to tackle barriers to take-up of microgeneration, including: a certification scheme to provide consumers with independent certification of microgeneration products and installers; easier access to Renewable

61 **Environmental Change Institute:** A Low Carbon Strategy to Reduce UK Carbon Emissions by 80%, *(2007) November* http://www.eci.ox.ac.uk/research/energy/hometruths.php

62 **Rugg and Rhodes:** Review of Private Rented Sector Housing *(2008), October* http://www.york.ac.uk/inst/chp/Projects/PRSreview.htm

63 **Department of Trade and Industry:** Our Energy Future – Creating a Low Carbon Economy, *(2003) February* http://www.berr.gov.uk/files/file10719.pdf

Obligation Certificates (ROCs); and removal of the need for specific planning permission for household microgeneration installations that have little or no impact beyond the host property.



Product standards

5.10 The Government is committed to improving the sustainability and efficiency of products. Existing and future initiatives are expected to improve product sustainability. These initiatives include using public procurement to create demand for energy efficiency products, setting mandatory minimum standards and labelling requirements.

5.11 The Government is also helping people by ensuring that products that are lagging behind others and have become inefficient and therefore costly to run, are no longer allowed to be placed on the EU single market. For example, the product standards agreed in the last 6 months in Europe on simple set top boxes, external power supplies, domestic lighting and stand-by are expected to generate a net benefit of over £400 million per annum to the UK as a whole, mostly in the form of reduced energy bills to householders, helping to reduce around 3 $MtCO_2$ emitted per annum. We will continue to argue hard in Europe for new and dynamic products standards that can generate further saving to UK consumers and businesses.

5.12 Domestically, the Government set out its aims in the Energy White Paper 2007 to save 1 to 3 million tonnes of carbon by 2020 through product policy and committed to publish annually its analysis of how performance of energy using products will need to improve in order to achieve this. These indicative standards will be used to guide and support policy relating to mandatory EU minimum standards and energy labelling as well as to encourage UK retailers, manufacturers and service providers to supply consumers more energy efficient products.

Voluntary codes of practice

5.13 Stakeholders have suggested that the Government could work with representatives of the building trade to design a voluntary code of practice on energy efficiency and low carbon energy. Under such a code, builders would offer householders associated energy efficiency work when undertaking renovation work. This would provide an incentive for builders to invest in training to improve skills in energy efficiency work.

5.14 Similarly, a voluntary code of practice could be introduced under which private landlords pledge not to rent out properties below a specified minimum standard for energy efficiency. This could help to tackle the problem of landlords having little incentive to improve the energy efficiency of their properties when the tenants pay the energy bills.

5.15 Codes of practice would promote the benefit of action without imposing a heavy regulatory burden or large enforcement costs. However, it is important to note that both the building industry and the private rental sector are very fragmented which may make it difficult to achieve a critical mass of people within the industries who would sign up to new codes of practice.

5.16 The Government, with the Energy Saving Trust, has begun an initial exploration of these issues and has commissioned a scoping study to assess what information and advice is needed by different stakeholders in the residential market. This will range from the individual householder and how well informed they are when employing contractors, to large firms of builders carrying out refurbishment work. The study will consider the needs of all sectors in the residential market and explore the potential role of a Code for Sustainable Refurbishment and whether this is needed.

Q18: Would you support a voluntary code of practice on energy performance for landlords and/or builders? How high do you think uptake would be, and would it achieve much additional action? Please support your response with evidence.

Building on Energy Performance Certificates

5.17 The Energy Performance Certificate (EPC) is a unique resource and the only widespread measure of energy efficiency in domestic and non-domestic buildings. It can be used to inform and to encourage people to take action, and to deliver information and assistance more effectively.

5.18 While there is significant scope to use the EPC to support further intervention, like any new system it needs time to bed down. We may also need to update the methodology to reflect feedback from audits and from assessors.

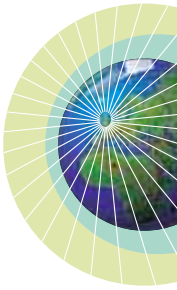
5.19 The Government is commissioning research to assess the performance and impact of the EPC arrangements. The findings of the first phase of the research will be available in July 2009. This study will be advised by a research steering group comprising public and private stakeholders.

Wider use of Energy Performance Certificates

5.20 There may be more that the Government can do to promote the EPC and to raise awareness of energy efficiency when people are comparing properties, by making the information as prominent as possible. Options include:

- Strengthening requirements for promotion and display of the EPC in estate agents. To make more of the informational value of the EPC, the Government could consider requiring estate agents to feature the EPC rating more prominently, as with other product labelling such as appliances. This is proposed in the revised European Performance of Buildings Directive[64], which remains subject to cross EU negotiation. Examples of what this might entail are:
  - putting the EPC rating on the first page of the marketing material;

64 **Europa:** Energy Efficient Buildings Save Money: Recast of the Energy Performance of Buildings Directive, *(2008) November*



  - including the EPC rating in all material that is displayed in the window of the estate agents; or
  - showing the EPC alongside all material that is marketed on the internet.
- Doing more to make EPC data available to assist with directing advice and services to the right people. The Energy Saving Trust is being given access and other groups may be able to use the data to drive delivery. This would have to be carefully administered and would need to follow data protection laws. There would also need to be rules governing how the delivery body could approach householders, to avoid misconduct.

5.21 Taken together, these changes could increase awareness and effectiveness of EPCs, which could in turn encourage more people to act on the energy saving recommendations in EPCs. It would also be useful for people to receive advice on energy efficiency when they are already undertaking building work, as installing measures at this time can reduce the cost and disruption of making energy efficiency improvements. We will need to consider how this is best delivered.

Q19: Should we require marketing material for property sales and rental to feature the EPC rating more prominently? If so how?

What delivery bodies or industry groups could be given access to the EPC database, and how could they make best use of it whilst ensuring that it is not misused?

Please support your answers with evidence.

5.22 Occupiers of large public sector buildings are also required to obtain and show Display Energy Certificates (DECs) with details of their actual energy use over the year. Some businesses voluntarily obtain DECs. This could be an opportunity to encourage businesses to become exemplars of good performance. By doing so they will also be able to identify potential cost savings resulting in lower fuel bills and fewer carbon emissions.

Widening Building Regulations requirements

5.23 The Building Regulations in England and Wales currently require consequential improvements during some types of building work[65] to buildings above 1000 m^2. This means that certain improvements to the energy efficiency of the building have to be made alongside the other work, helping to offset the carbon footprint of an extension, and helping to seize opportunities to make practical and cost effective energy improvements. Installing measures at this time is efficient as it minimises disruption and reduces the cost of the energy efficiency installation, compared to having it installed separately.

5.24 In April 2008, the Communities and Local Government Committee of the House of Commons recommended that consequential improvements be made a condition of planning permission, as demonstrated by Uttlesford

65 During extension work, initial provision or increasing the capacity of fixed building services

District Council. In response, the Department for Communities and Local Government has committed to look again at consequential improvements in the context of potential changes to Part L of the Building Regulations in 2010. This review provides an opportunity to extend the regulation to all buildings including homes, and specific detail will be set out within a Government consultation scheduled for 2009. The introduction of stronger performance standards is then planned for 2010. The recent draft vision of the European Performance of Buildings Directive (EPBD2) has also proposed expanding this provision to cover all buildings.

5.25 Regulating to increase the scope of work that falls under the Building Regulations would also provide certainty to the building industry that there will be future demand for these services. This would provide a strong incentive to invest in training to develop these skills. This is an important opportunity for the industry – the industry has estimated the potential market for energy efficiency refurbishment to be worth £3.5 to £6.5 billion per annum[66].

5.26 At the request of Welsh Ministers the UK Government is currently considering the transfer of responsibility for Building Regulations to Wales. Discussions are in the final stages. Should a transfer of responsibility take place prior to the implementation of changes proposed as a result of this or related consultations in respect of Building Regulations, the Welsh Assembly Government will have regard for the responses received (and in particular those received from Welsh respondents) and the conclusions reached in bringing forward any proposals for change in Wales.

Q20: Besides removing the threshold for consequential improvements, which will be considered in the consultation on changes to the Buildings Regulation in 2009, are there any other options for wider building regulation that you would like to see considered in the longer term? Please support your answer with evidence for the effectiveness of your suggestions.

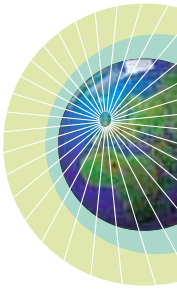
Long-term regulatory options

5.27 This consultation outlines a broad package of measures to achieve our goals. These will need time to bed down and become established before we can properly assess their impact. If these measures alone do not achieve the reductions in energy use we require by 2012, the Government may need to consider stronger regulatory measures as part of its strategy for saving energy and reducing emissions. Ongoing evaluation will inform whether this is necessary.

5.28 Stakeholders have suggested that standards may be particularly useful in the private rented sector where landlords currently have less incentive to act, and in the non-residential sector where most buildings are leased. This sector is a

66 **Federation of Master Builders:** Building a Greener Britain, (2008) http://www.fmb.org.uk/news/campaigns/building-a-greener-britain/

small proportion of the total housing stock (12% of homes), but has a lower take-up of existing Government initiatives. Research by the Energy Saving Trust found that, for the more vulnerable groups, not owning the property was cited as the major barrier to installing cavity wall or loft insulation. As a result, CERT has undertaken less work in the private rental sector than in owner-occupied properties.



5.29 The independent Review of the Private Rented Sector undertaken by Julie Rugg and David Rhodes, Centre for Housing Policy at the University of York, set out a challenging agenda to improve both professionalism and the condition of the stock within the private rented sector[67]. The proposals build upon existing powers for local authorities to enforce the Housing Health and Safety Rating Regime introduced in the Housing Act 2004. If implemented this could contribute to improvements in energy performance within the sector. The Government is considering the proposals in the review and will work with stakeholders in 2009 in developing the options that it takes forward.

5.30 The Government is seeking to make progress before standards become necessary. The Government introduced the Landlords Energy Saving Allowance in 2004, which provides an allowance of up to £1500 for landlords who invest in improvements such as cavity wall and loft insulation. The allowance was recently extended to corporate landlords following receipt of State aid approval from the European Commission. The Government is continuing work to raise awareness of this allowance.

5.31 Any policies developed at a later stage will be based on a full impact assessment setting out the evidence and analysing the impacts of the policy options, which will be presented for full consultation.

Q21: Do you agree with the approach of conducting a review in 2012 to assess the effectiveness of other policies before considering further policy interventions for the energy performance of existing buildings?

Are there other options you think should be part of our strategy? Please support your answer with evidence.

67 **University of York:** Review of Private Rented Sector Housing, (2008) *October*

Chapter 6
District heating

Chapter summary

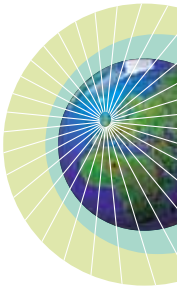
The first step in saving money on energy bills and reducing CO_2 emissions will be to reduce the amount of energy we use. However this alone will not allow us to meet our four objectives for this strategy. We have already explained in Chapter 3 how we are supporting renewable heat at all scales through the Renewable Heat Incentive (RHI). But we need also to consider community and larger-scale solutions for generating heat cleanly and efficiently, whether this is using fossil or renewable fuels.

Advice, and support with costs, will help individual households take action to save energy and to lower their emissions. District heating, in particular, has already been shown in the UK and on the Continent to offer the potential for some communities to receive low carbon heat, at comparable or lower costs than conventional heating. The Government is committed to supporting action which allows communities to realise the benefits of low carbon energy, and is keen to identify whether more should be done to support the development of district heating. We are setting out a number of possible measures aimed at tackling key barriers to district heating. These include considering changing regulation, enhancing the role of local authorities and improving the supply chain. We will be convening a Summit on Community Energy and Heating with local government leaders to start the process of facilitating the development and expansion of district heating. We are also proposing to set up a Heat Markets Forum, with representatives from the Government, the energy industry and consumers, to assess the various types of arrangements for heat supply and to identify those areas where we may need to do more to protect consumers or to build market confidence, for example through developing industry codes. The supply of district heating to residential consumers is a particular area that the forum will consider.

What is district heating?

6.1 District heating is a system where the heat for an area is produced centrally, and hot water or steam is transported to the buildings through a network of pipes. Heat is transferred into individual properties through a heat exchanger, and then used in conventional heating systems (in flats, for example, there may just be one heat exchanger for the whole block). District heating

networks vary widely in scale from individual developments or apartment blocks to whole cities. In Denmark, where district heating accounts for about 60% of the heat supplied, cities such as Copenhagen receive heat from large-scale power stations and energy from waste plants situated up to 40km away.



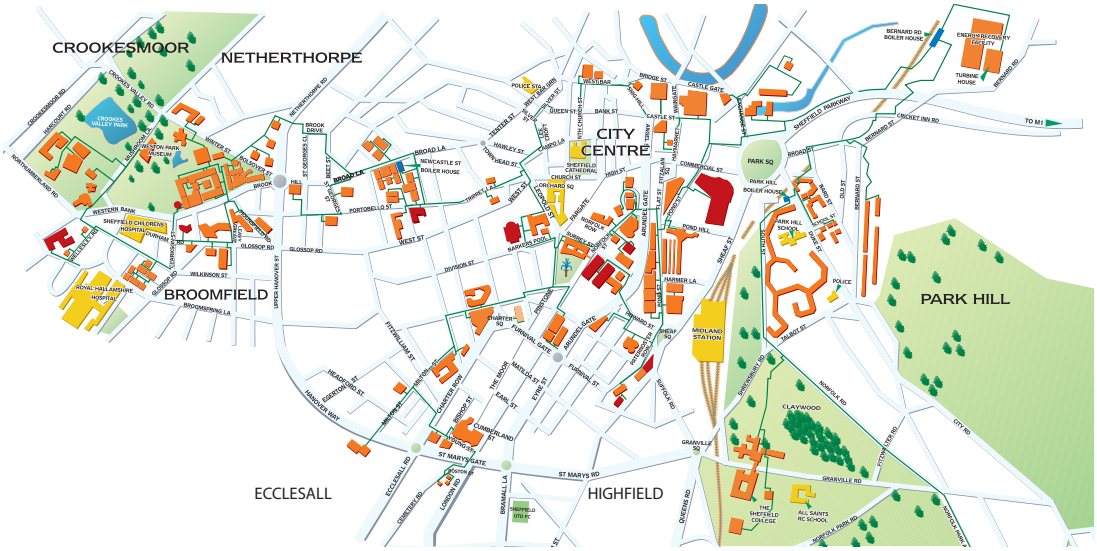
6.2 Modern district heating can be cost effective and reduce CO_2 emissions compared to conventional heating systems. This is because generating heat centrally at large scale can reduce costs compared to generating heat in boilers in individual properties, particularly when combined heat and power (CHP) plants are used. Heat transported through the network can also be converted into cooling using absorption chillers, again improving the efficiency of the system and also providing an option to use heat produced in the summer.

6.3 Whilst district heating is more environmentally friendly than conventional heating, the potential to reduce emissions will depend greatly on the fuel used and the type of central plant that is generating the heat. Modern district heating offers the potential to use a variety of low carbon and renewable heat generation technologies, such as CHP using fossil fuels, biomass or waste, biomass boilers or surplus heat from industrial processes. As an experienced and tested technology, employed effectively in many countries, district heating has evolved significantly from the days when it was first installed. Networks are now highly efficient, with sophisticated heating controls that allow suppliers to maintain the network and consumers to easily manage their heat use. Underground sensors are able to quickly locate any leaks, and back-up generating plant is used to limit the effect of possible problems with the central generating plant.

6.4 We have conducted research into the potential for district heating in the UK. This work is ongoing; however, some preliminary results are referred to in this chapter. It is clear from this and Heat Call for Evidence responses that there are important benefits which justify further action. However, district heating represents a significant departure from the conventional approach to heating our homes and businesses. It will not be right for every community, but if we want to realise the benefits we need to act to remove the barriers which currently restrict its deployment. The results of this consultation, taken alongside a clearer understanding of the delivery models and approaches necessary to bring about change at this kind of scale, will allow us to refine our views in time for the final strategy.

Box 6.1: Veolia Environmental Services' Energy Recovery Facility

An Energy Recovery Facility in Sheffield's city centre uses 225,000 tonnes of waste to produce up to 60 MW of thermal energy or 19 MW of electrical energy. There are 45km of pipeline delivering heat through two networks to 140 different buildings including: universities, health facilities, shops, offices and leisure facilities. Over 2800 dwellings have benefited, where in a typical year around 120,000 MWh of heat is delivered, saving over 21,000 tonnes of CO_2 a year. All the buildings highlighted in colour below are connected to the district heating network.

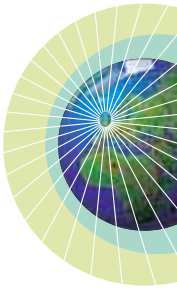


Where might district heating be viable?

6.5 Although evidence suggests heat can be generated at lower costs than conventional systems, the networks are very expensive. They require special highly insulated pipes, and the costs of laying the pipes will also be high, for example, where existing roads have to be dug up. This means that district heating is most likely to be cost effective in areas where there are high heat densities (or where building new properties can create a high enough density): in other words, where there is or will be a high demand for heat in a small area.

6.6 Examples of areas with high heat densities include city centres or dense urban areas with concentrated terraced housing or blocks of flats. These areas might also include commercial properties and public sector buildings (such as swimming pools, hospitals or university campuses), which are particularly good for district heating networks as they offer a relatively high and consistent demand for heat. A key benefit of areas with diverse property types is also that they can offer complementary heat demand, as some require more heat in, for example, the day or night, summer or winter.

How much could be deployed, and what are the benefits?



6.7 Previous research[68] looking at the potential of district heating recognised the high costs, but suggested that there was the potential for positive economic returns in certain types of area or community. One of the factors highlighted as important was the heat density. Preliminary research we have conducted into the potential for district heating in the UK has found that areas with a heat density above 3000 kW/km^2 could provide returns on investment of 6% or above. Connecting the areas in the UK with a density of 3000 kW/km^2 or above would account for about 5.5 million properties – about 20% of overall UK heat demand – and could for example include 90% of all flats and 20% of all terraced properties. This compares to less than 2% of the UK receiving their heat via district heating today. The economic potential or return (which network developers will use to work out whether they should invest) is, however, sensitive to the economic assumptions[69].

6.8 The initial research we have done indicates that if all these properties were connected to district heating networks using heat generated from large natural gas CHP stations, for example, this could save around 9.8 $MtCO_2$ per year. If the heat source were a biomass CHP plant, the emissions savings would be even greater, potentially 19.3 $MtCO_2$. In comparison, individual ground source heat pumps providing heat to the same properties would save between 2 and 3 $MtCO_2$ per year.[70] Figure 6.2 shows potential CO_2 savings by technology per year for an average UK house in an area of medium heat density, compared to a baseline of conventional heating systems (individual gas condensing boilers and electric heating). Technologies considered are individual heating solutions and various scales of district heating network.

6.9 Our analysis suggests that district heating is generally more expensive across its lifetime than individual gas condensing boilers and electric heating. However, this is predominantly on account of the high costs of the network. Evidence from existing schemes (including in the UK) indicates that district heating offers the potential to generate heat at lower, or at worst comparable, costs once the infrastructure is in place. The level of savings will also depend on the existing heat source, for example, savings will be greater for consumers who have electric heating, use pre-payment meters or have old or inefficient boilers. This could offer potential savings on energy bills.

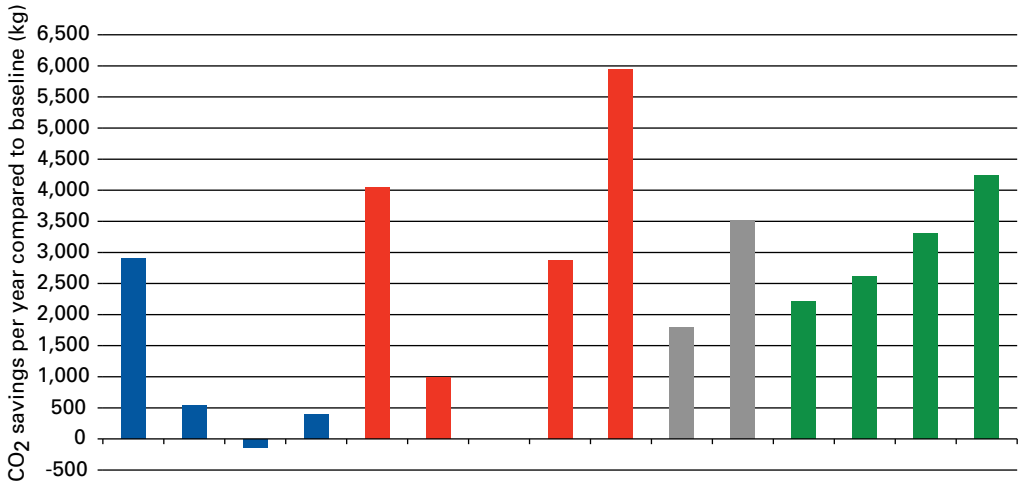
6.10 In some cases, particularly on the Continent, district heating customers are guaranteed that the cost of their heating will be capped to remain lower than, say, the cost of generating the heat in an individual gas boiler. However, these guarantees are often based on the fact that there is an existing network of pipes and a regulatory framework offering fixed tariffs and pricing structures. Figure 6.3 shows the cost of heat by technology, again, over a year in an average UK house in an area of medium heat density.

68 **Defra:** Analysis of the UK potential for combined heat and power (2007), October www.defra.gov.uk/environment/climatechange/uk/energy/chp/pdf/potential-report.pdf

69 This means that there is the possibility that even communities with a heat density of 3000 kW/km^2 or above, may not guarantee developers a 6% return on their investment.

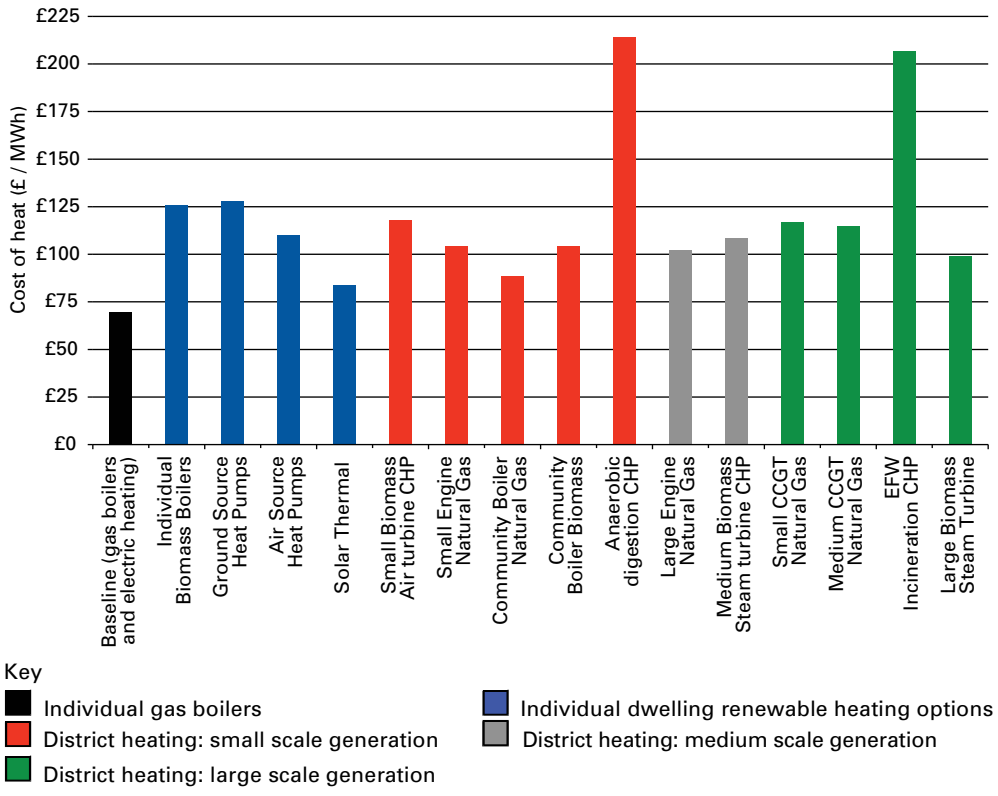
70 Based on the current carbon intensity of the electricity grid

Figure 6.2: CO_2 savings per year by technology



Source: Pöyry Energy Consulting and Faber Maunsell

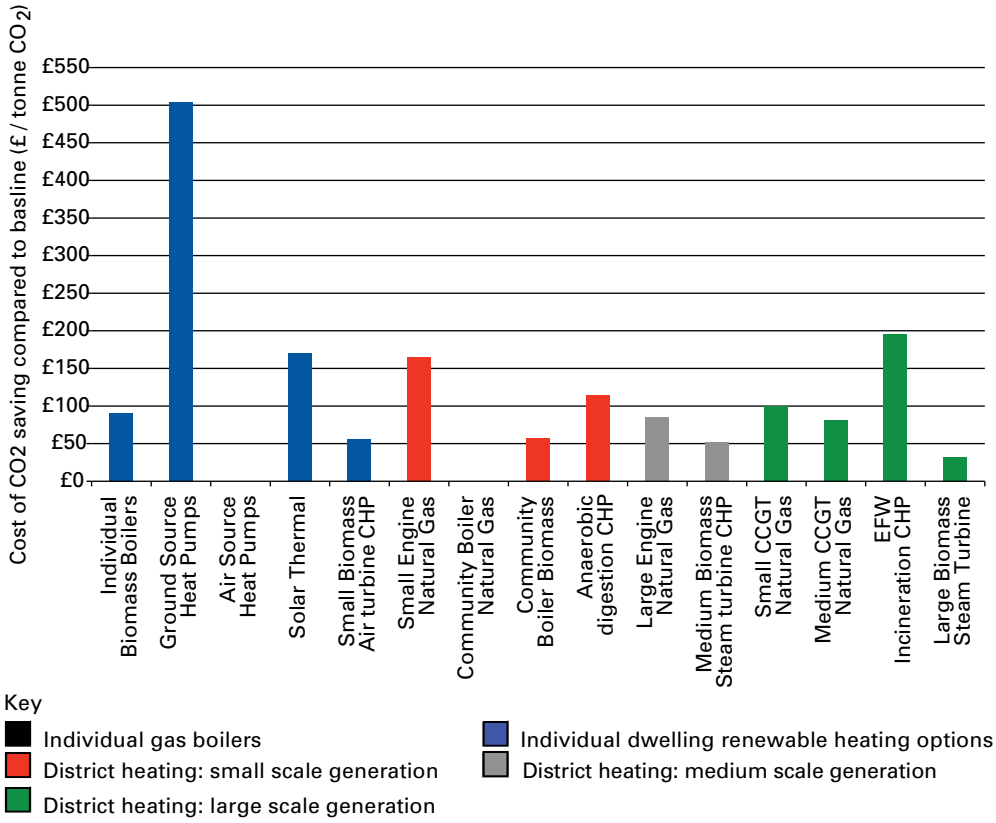
Figure 6.3: Cost of heat per year by technology for an average UK house



Source: Pöyry Energy Consulting and Faber Maunsell

6.11 In policy terms, an important consideration in understanding the benefits of district heating against other heating technologies is the cost of carbon abatement (i.e. how much it would cost to produce heat per tonne of CO_2). This information then indicates how costly it would be to reduce emissions.

Figure 6.4: Cost of CO_2 abatement by technology for an average UK house



Source: Pöyry Energy Consulting and Faber Maunsell

6.12 As shown in Figure 6.3, district heating is currently expensive in the current commercial and policy environment; however, there is clear potential to save CO_2 as compared to conventional heating systems. This means, as demonstrated by Figure 6.4, that district heating is a potentially cost effective way of reducing CO_2 from the UK's heat supply and warrants action to allow communities to consider and develop district heating networks where it makes sense. It should be noted that these figures do not include support from the Renewable Heat Incentive (RHI), as levels of support under the RHI are to be determined.

6.13 High network costs have been highlighted as just one of the reasons why district heating is either not economically viable for developers or is simply too expensive. This and other barriers to district heating are addressed below.

Barriers to district heating

6.14 Heat Call for Evidence responses highlighted that the key barriers to district heating are regulatory, financial and commercial. Regulatory barriers will restrict the installation or evolution of a network. Financial barriers would be those associated with raising the volume of capital required (or being able to borrow at acceptable rates) to fund the cost of installing the network. Failure to deal with either regulatory or financial barriers would make it impossible to build the network. Commercial barriers would prevent or limit, the ability of the developer to recover a sufficient return on their investment, or at least make this return uncertain. The sections below address each of these in turn. As part of making decisions for the final strategy, it will be important to assess the costs, benefits and impacts of any proposals we put in place.

6.15 District heating networks are, by their nature, complicated and will take a long time to install. This means that they are more appropriate to long-term energy solutions which offer the opportunity for lower energy, can decarbonise our heat supply, and reduce our demand for imported fossil fuels. However, the scale of the challenge we face in achieving these goals means urgent individual, community and national action is necessary, particularly if we are to help the most vulnerable in society.

Regulatory barriers to district heating deployment

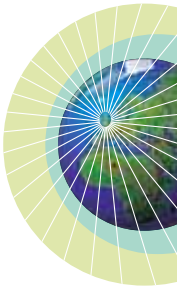
6.16 There is currently no separately regulated market for heat in the UK, unlike electricity or gas. Direct sales of heat, for example by district heating or CHP operators, take place within the economy's general regulatory framework in regard to competition and consumer protection. We estimate that the total amount of heat sold in 2007 was about 13 TWh, around 2% of the UK's total heat demand, of which about 60% was industrial. Space and water heating in commercial and residential sites accounted for the rest.

6.17 This means that domestic consumers of district heating do not have the protection provided to gas and electricity consumers by the licensing framework administered by Ofgem; and potential commercial heat customers do not operate in a market like gas markets with many alternative sellers in competition, published reference prices etc. A district heating provider needs to establish contractual arrangements that, in the case of gas or electricity supply, would normally be subject to regulatory control, in particular:

- quality and continuity of service (including protections for consumers during supply outages);
- the basis for setting prices in the long term;
- metering and billing; and
- dispute resolution.

6.18 Currently, such contracts establishing these arrangements are negotiated on a case by case basis. Some standardisation of contractual arrangements would help to improve consumer confidence in district heating and could lead to significant savings in legal and other fees by not having to negotiate every

contract from first principles. Several bodies are currently progressing work to standardise these contracts, including the Homes and Communities Agency and the Combined Heat and Power Association.



6.19 Once connected to a district heating network, customers are unlikely to be able to switch between heating suppliers in the way that gas consumers can. Although options such as electric heating may still be available, this would involve a level of cost or disruption that would discourage many people from switching, even if they were unhappy with the service they received from the district heating network. It is therefore important to protect district heating customers. This will in turn ensure consumer confidence, good quality of service and reasonable prices.

6.20 Responses to the Heat Call for Evidence[71] expressed a range of views on the regulatory framework for heat supply. Some said that lack of a reliable framework is holding back development of the market and for small consumers, in the residential district heating sector, for example, there was wide support for a regulatory framework to protect the interests of consumers. However many took the view that any regulation could stifle innovation in an undeveloped market. Overall, respondents did not support the establishment of a new regulatory framework for heat transactions between large companies. There was also very strong support for the position that, given the size and stage of the industry's development, any regulatory framework should not be intrusive or heavy-handed.

6.21 On the basis of the responses and further consultation with industry, we do not at this stage propose to establish a new licensing framework for heat, but we recognise the need to develop market confidence and to ensure that buying and selling heat is as straightforward as possible. It is also important to protect vulnerable consumers. A more structured approach may be required in the future as the industry develops. It is important that the Government closely monitors the development of the market and assesses the degree to which more might be needed to protect consumers as it evolves.

6.22 The Government therefore proposes to convene a forum to monitor heat markets and to identify any necessary action. This forum will include representation from industry, consumer interests, including Consumer Focus, and regulators, including Ofgem. The forum will look at all aspects of heat supply. Specifically, as its first task, the forum will be asked to provide advice on the consumer and other issues regarding district heating and to facilitate an industry code for district heating. Several responses to the Heat Call for Evidence proposed that we should extend the remit of Ofgem to include heat, particularly district heating. It already has a duty under section 47 of the Electricity Act 1989 to monitor the market for heat produced by CHP, and, where it considers it necessary, to report to the Secretary of State. It will therefore be important for Ofgem to be included in the proposed Heat Markets Forum. However, given the emerging nature of the heat market, we do not at this stage plan to make legislative changes to give Ofgem a broader remit over heat supply.

71 **Department for Business Enterprise and Regulatory Reform**: Heat Call for Evidence, *(2008) January*

Q22: Do you agree that the Heat Markets Forum should consider regulatory arrangements for district heating to ensure consumer protection? Are there specific issues you think it should cover?

Commercial barriers to district heating deployment

The importance of a heat load

6.23 District heating networks are only commercially viable if they can be assured of large and consistent heat loads. If there is not enough heat load (i.e. sufficient customers to buy the heat), the developer will not be able to recover his investment. If the heat load is not consistent (i.e. has too many high peaks in demand but a low annual consumption), the amount of heat required in the network to ensure there was always enough supply would be higher, meaning that a great deal of heat would be wasted. There are three ways in which central and local government can help to address this.

6.24 First, the planning system can encourage development of district heat networks where new developments are proposed. Planning Policy Statement on Planning and Climate Change which supplements Planning Policy Statement 1 (the Climate Change PPS) allows local planning authorities to require new developments to connect to existing district heating networks. It also encourages co-location of heat supply with demand, meaning planning authorities could specify that sources of heat (e.g. central generation plant or industrial plant offering potential waste heat) should only be built, for example, close to high heat loads. This would facilitate future network development by reducing the distance heat had to be transported and ensuring that generating plant had customers to buy the heat.

6.25 Much of the focus in planning is on new developments, but the Climate Change PPS underlines the importance of considering the relationship between new development and existing buildings. Local authority planning strategies are expected to secure the highest viable resource, energy efficiency and reduction in emissions, both for new developments and for existing localities. In particular, the Climate Change PPS expects local planners, in considering targets for using local energy for new development areas or sites, to look for opportunities to use "existing decentralised and renewable or low carbon energy supply systems and to foster the development of new opportunities to supply proposed and existing development"[72]. District heating provides a good option for a decentralised low carbon or renewable energy supply system, in line with the approach set out in the Climate Change PPS.

72 See the glossary to the Climate Change PPS for explanations of the terms used: **Communities and Local Government:** Planning Policy Statement: Planning and Climate Change – Supplement to Planning Policy Statement 1, (2007) *December* http://www.communities.gov.uk/planningandbuilding/planning/planningpolicyguidance/planningpolicystatements/planningpolicystatements/ppsclimatechange/

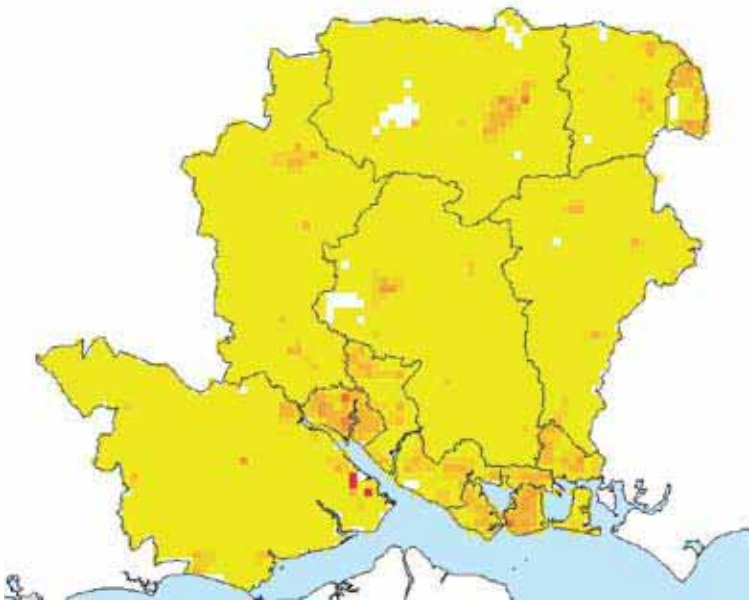
6.26 For properties with high thermal efficiencies, especially new build, local authorities and developers should increasingly be considering the potential for cooling from district heating networks. Further research will provide a better understanding of the potential for district heating and cooling in new developments in comparison with older, less energy efficient buildings.

6.27 In Wales Planning Policy Wales and Technical Advice Note 8 on Renewable Energy provides the policy framework for planning and low carbon energy. The Welsh Assembly Government have consulted on changes to Planning Policy Wales to ensure that climate change is a fundamental part of the planning system in Wales, and deliver more sustainable buildings through the use of low and zero carbon energy sources. This considers similar policy mechanisms to bring through district heating in Wales.

6.28 The importance of high and consistent heat loads is such that district heating will not be right for every community. However, in terms of broader energy planning, district heating offers a valuable option to local authorities as part of local community strategies to tackle climate change.

Box 6.5: A heat map for Hampshire

In 2008, Hampshire County Council (HCC) commissioned a heat map of the county based on Geographic Information System (GIS) data. The resulting heat map shows the current and likely future situations regarding the demand for and supply of heat in Hampshire, so that the expected best locations for viable district heating networks can be easily identified. The heat map also informs HCC of the optimal locations of new Energy from Waste (EfW) CHP plant, helping to meet the aims of their Materials Resource Strategy. This heat map is now being used as a valuable tool during planning decisions, facilitating greater efficiencies in Hampshire's generation and use of heat, and supporting a reduction in the county's greenhouse gas emissions.



6.29 A second way in which central and local government can help, is for regional development agencies and local authorities to take a more active role in understanding and shaping the supply and demand of heat in their area, brokering commercial arrangements and facilitating infrastructure development. At the very least, local authorities should use heat mapping to ensure each community has an evidence based understanding of its energy needs and potential. This heat mapping will be a valuable resource for prospective developers and investors and will be an essential input into the local energy planning now expected by the Climate Change PPS. Advice on local energy planning is provided in the supporting practice guidance.

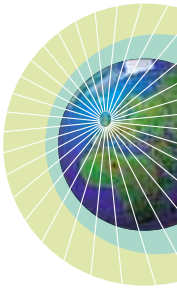
6.30 As set out above, planning policies in England and Wales expect local authorities, as part of their role in infrastructure planning, to identify the local potential for renewable and low carbon energy to supply new development in their area. This infrastructure planning, taken alongside an evidence-based understanding of the type and location of anticipated development, will assist with understanding the long-term energy needs of an area, and could be helpful with the process of setting a Community Infrastructure Levy (CIL).

6.31 The CIL will be a new charge which local authorities in England and Wales will be able, but not required, to charge on most types of new development in their area. The proceeds of the levy can be spent on local and sub-regional infrastructure to support the development of the area. In August 2008, the Government published a document setting out in more detail how the CIL would work in practice[73]. In doing so, the Government made it clear that district heating can be a central part of the infrastructure which the CIL will help fund.

6.32 A third way of helping with the heat load could be to encourage or require properties with large heat loads to connect to district heating networks, either when the network is installed or within a specified time period. These could be large commercial buildings, but in many cases will be buildings serving or having some status in the whole community, for example hospitals or council buildings such as swimming pools or schools. These "anchor load" properties have been shown to act as catalysts from which a network can grow and develop. The existence of anchor loads will assure developers that there is sufficient heat load to recover their investment. That some of these buildings are wholly or partly owned by the local authority is an additional benefit, as developers will have confidence the heat supply will be long term and consumers and potential commercial customers will attach higher credibility to the network, helping to encourage future expansion and development. At some stage, it may become necessary to address the need for incentives to encourage connection to a district heating network, since some buildings that might otherwise represent good anchor loads may find individual heating options more attractive. A key consideration for network developers and local planning authorities will therefore be that the commercial viability of potential district heating networks is not affected by possible anchor load properties not connecting.

73 **Communities and Local Government**: The Community Infrastructure Levy, *(2008) August* http://www.communities.gov.uk/documents/planningandbuilding/pdf/communityinfrastructurelevy.pdf

6.33 It is important that leadership is shown in the way the public estate is managed and developed. We are keen to hear views on whether there should be an expectation that any major additions to the public estate should be located where they can act as anchors for district heating networks, and are interested in views (particularly of network developers and local authorities) as to the benefits of this and whether there are specific types of property which would support the development of a network.



Supply chain/experience in the market

6.34 A key concern highlighted by responses to the Call for Evidence is the lack of experience in the UK of planning, installing and operating district heating networks. This causes problems for those wishing to develop district heating networks in the UK, both in finding a skilled workforce and in raising finance. Moreover, the evidence we have so far suggests that the public sector (including local authorities) lacks the necessary skills to commission and operate these systems or to properly evaluate them for planning and building control purposes. Nor are there adequate learning pathways into these jobs. In such circumstances, lenders will often attribute high risk to the projects, meaning capital is either unavailable or very expensive. We envisage that the Office for Renewable Energy Deployment would work with the Sector Skills Councils and key employers to review the situation and develop appropriate training solutions.

Engaging property developers

6.35 As part of ensuring the availability of a heat load, it is also important to encourage property developers to include the potential for district heating in their planning for new projects, and to consider connecting properties to existing or proposed networks. The planning measures mentioned above will help with this, especially for new build properties. We are encouraging local authorities to take the lead in co-locating heat supply with demand and realising the potential in their areas, including through their planning responsibilities and the opportunities offered by new development.

6.36 Energy Performance Certificates will be one key tool to help householders and developers understand the potential for improving the energy performance of their properties, including the role connecting to district heating can play and, in future, could include information and recommendations about how connecting to district heating could help increase energy efficiency of properties.

6.37 New build properties will also benefit from proposals put forward in a consultation on Zero Carbon Homes launched on 17 December 2008. Acting on a commitment that all new homes will be zero carbon from 2016, we are consulting on the details of the definition of zero carbon to support that policy[74]. Zero carbon homes will be highly energy efficient homes with low carbon emissions and low fuel bills for occupants.

6.38 But it will not always be practical for the home's energy requirements to be met on the same site as the home or housing development. So as part of meeting requirements for a home to be zero carbon, the Government will put in place a

74 **Communities and Local Government:** Building a Greener Future, Policy Statement, *(2007) July* http://www.communities.gov.uk/documents/planningandbuilding/pdf/building-greener.pdf

range of solutions that will allow carbon emissions to be tackled away from the housing development. These "allowable solutions" will not only support the development of renewable technologies, but also help to tackle emissions from the wider housing stock, in particular by encouraging community scale low and zero carbon energy, such as district heating networks.

6.39 More specifically, the Zero Carbon Homes consultation sets out that one of the proposed allowable solutions will be exports of heating (or cooling) to surrounding developments. In this context, the Government is interested in the potential for heat infrastructure developed as part of Zero Carbon Homes to support multiple developments, including existing residential and commercial properties.

Q23: There are a number of ways to tackle commercial barriers to district heating. These include using the planning system and heat mapping, encouraging or requiring certain buildings to connect to networks and engaging property developers. Which of these options should be taken forward and why?

Financial barriers to district heating deployment

6.40 The upfront costs of district heating are high. For residential properties, full infrastructure costs can vary from about £1000 per dwelling in apartment blocks, to around £5500 per dwelling for detached or semi-detached properties.

6.41 The lack of experience of district heating in the UK, coupled with lengthy payback periods, mean that there are few investors willing to consider district heating networks, and (in the absence of a regulatory regime or contractual regime that provides sufficient certainty) lending rates for such investments are unattractive. However, other large or community scale energy projects are able to raise funding for investment and deliver reasonable returns to investors. In the case of district heating therefore, it is not necessarily the scale of investment which prevents greater deployment, but the potential risks in construction and operation of the network, which affect the willingness of the private sector to invest.

6.42 Heat Call for Evidence responses pointed to an important role for the public sector in reducing the risk associated with investing in district heating networks. Methods of reducing risk to investors in other countries have included obliging or requiring consumers to connect to a network, influencing the price of the heat sold by taxing the alternatives or providing significant public sector funding to support investment. However, the current UK market framework prevents mandating network connections, or fixing prices. It also remains unclear whether direct Government funding is necessary if the risks can be reduced in other ways. In particular, we need to understand better what the new financial incentives for renewable heat and electricity look like, before we can start to make assessments of how and whether they might affect the economics of district heating. Some of the risks affecting district heating networks are considered below, alongside possible options the public sector could pursue to mitigate them.

Box 6.6: Risks affecting investment in district heating

Technology

Technology risk occurs when a technology is relatively new or untried. It stems from a lack of confidence that the technology is sufficiently developed and tested to operate on a large scale and over a long period. It should be acknowledged that while district heating is not "untried" in the UK, investment in networks is uncommon, particularly when compared to alternative energy technologies. Solutions include:

- education and international knowledge transfer: this should allay concerns regarding the technology and provide substantial empirical evidence of costs and benefits, consequently reducing the cost of borrowing.
- project subsidies for the first "X" megawatts of new schemes: this should kick-start the local market and engender confidence in the scheme. This market development would further reduce technology risk in the medium and long term.

Construction

Construction risk arises from uncertainty that the project will be delivered to agreed specifications and on an agreed timetable. For district heating networks, this risk stems from the high initial capital costs involved. Solutions include:

- cost or delay insurance: this should relieve investors' concerns that cost or project over-runs affect the return on investment. Insurance is available from the market, but an option could be to centrally underwrite the insurance.
- simplified planning arrangements: these would be important to minimise planning risk, particularly during the construction phase.
- project subsidies for the first "X" megawatts: as above, to incentivise confidence and competitive markets, but also to assist with high capital costs.
- capital grants: these could stimulate national markets and develop experience.

Off-take

The off-take risk is associated with understanding how much demand there is for the heat – the heat load. Investors will want to be assured that there are customers willing to buy the heat before lending or offering finance packages. For district heating networks, a particular concern will also be how long those customers are connected to the network. Solutions include:

- guaranteeing demand from central and local government estate: this would give certainty to developers that demand existed for the heat, it should also give confidence to the local area, engendering wider support.

- promoting district heating through planning policies: co-locating supply with demand and building district heating into local authority development plans.
- connection subsidies for customers: this could help to overcome customer inertia.
- availability payments for approved projects: where the risk associated of not being able to sell the heat is taken by the public sector would effectively remove a major concern for investors and developers.

Maintenance and management

With long pay back periods, a concern for investors will be that the network remains operational. Quality of construction and the availability of contractors to maintain the network is therefore a long-term concern. Solutions include:

- local and national supply chain development: creating competitive markets with access to good and affordable services will reduce the risk and impact of problems with supply and maintenance.

Pricing

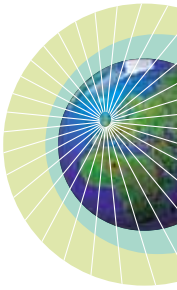
Another concern with long pay back periods is that income from the network does not decrease over time. This is a risk for district heating networks since income will depend, in part, on the difference between the input fuel price and the heat sale price, which is difficult to predict in the long term. Solutions include:

- consumer subsidies and discounts: these could be helpful to encourage consumers to connect to district heating networks in the short term.
- formal price control regulation: unlikely to be an option, but this has been used effectively on the continent to provide certainty to investors and consumers.

6.43 In the first instance, the Government will seek to tackle the other, non-financial barriers to district heating, to make district heating networks as attractive as possible to investors. There are also many things the market can and should do for itself, for example, in the context of long-term supply contracts, market insurance and knowledge sharing, particularly across Europe. However, given the scale of the financial barriers, we recognise there may still be a need to do more.

Q24: What are your views on the options for reducing the risks of poor returns on investment in district heating networks? Which do you think would be most effective and are there other more appropriate solutions?

Specific support for community energy and district heating



6.44 The involvement of local government in district heating is critical, in terms of planning, financing and supporting the development of networks in those communities where it makes sense. This is highlighted by the fact that all of the successful district heating schemes in the UK have required the involvement, or at the very least support and encouragement, of the local authority.

6.45 The Government attaches significant weight to ensuring that local authorities have the tools they need, and that they understand the potential of district heating and other community-scale energy projects in the UK. As part of this, Ministers from the Department for Energy and Climate Change and the Department for Communities and Local Government will host a Local Authority Summit on Community Energy and Heating. The summit will be an important opportunity for key players across the fields of community energy generation and local authority control and planning to engage with central Government policy makers on innovative and emerging thinking to realise the benefits of generating and saving energy at the community level. It will be important to discuss, including with the Local Government Association, the detail of the event and what issues should be addressed. However, the summit will focus in particular on the potential for meeting carbon reduction targets, tackling fuel poverty and making effective use of waste heat from low carbon and renewable district heating.

6.46 A wealth of best practice and experience already exists as a result of efforts by pioneering local authorities and proponents of distributed energy in the industry and beyond. In particular, the summit will focus the benefits of low carbon and renewable district heating for meeting carbon reduction targets, tackling fuel poverty and making effective use of waste heat.

6.47 As part of the summit, we want to consider options aimed at facilitating the cost-effective development and expansion of community energy in the future. The radical change we need is, at some stage, likely to require radical new policies and ways of thinking, so we will also evaluate current policies and support to see what more can or needs to be done. The summit will be held during the consultation period of the Heat and Energy Saving Strategy and the results will be published in the final strategy.

6.48 The Homes and Communities Agency (HCA) can play an important role, working with local authorities, on exemplar schemes and then sharing that experience. To this end, CLG has set aside £12 million from its £605 million Growth Point funding programme in order for the HCA to work with some of the authorities in the Growth Areas and Growth Points, in order to develop exemplar schemes covering a range of sustainability issues, including low carbon energy schemes such as district heating.

Chapter 7
Combined heat and power and surplus heat

Chapter summary

Utilising the waste heat that is produced during the generating of electricity, in a process known as combined heat and power (CHP), will also have a vital role to play in helping the UK meet its targets to reduce emissions and increase the use of renewable energy. CHP can improve efficiency by over 30% compared to generating heat and electricity separately and is already delivering significant carbon emissions reductions within the UK – 10.2 $MtCO_2$ in 2008. The high fuel efficiency of CHP means that less fuel is burned, resulting in savings on fuel bills, increasing the competitiveness of businesses using CHP and increasing security of energy supply. There are also opportunities to put the surplus heat produced in some industrial processes to productive use, rather than simply discharging it into the environment.

CHP is supported by a number of policies, such as the EU ETS, exemption from the Climate Change Levy and the Renewables Obligation. It will also by incentivised by the forthcoming financial support for renewable heat. We wish to ensure that this range of carbon pricing mechanisms provides sufficient support to CHP, and we are open to any further proposals to improve this framework.

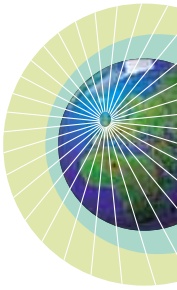
CHP can also be used to provide low carbon cooling. Using CHP to provide cooling can make CHP more economically attractive as it provides a use for heat year-round and improves the efficiency of operation of the plant.

The potential for CHP and surplus heat

7.1 Good Quality CHP[75] is a highly fuel efficient process that puts to use the heat that is a waste product from the generation of electricity. CHP can therefore save energy, reduce carbon emissions and lower fuel costs compared with the separate generation heat and electricity. CHP is highly flexible, as it uses a range of different technologies such as Sterling engines, fuel cells and gas

75 Good Quality CHP is CHP which meets the energy efficiency criteria of the UK's CHP Quality Assurance programme, in line with the definition for high efficiency cogeneration set out in EU legislation. More details are available at www.chpqa.com

turbines, and can operate at any scale, from a household boiler to the largest industrial plants. CHP can also be powered by a range of fuels, including fossil fuels, biomass, biogas or waste.



7.2 CHP displaces the need for inefficient electricity generation in conventional power stations. A gas-fired CHP plant can be up to 85% efficient, whilst conventional power stations utilising modern combined-cycle gas turbine technologies are around 50% efficient. Biomass power-only schemes are only up to 25% efficient, meaning 75% of the energy potential of the fuel is wasted.

7.3 There are also other opportunities where waste, or surplus, heat can be utilised. Surplus heat is any residual heat from high-temperature industrial processes such as, in industrial chemical plants, that is deemed surplus to requirements and emitted as waste into the environment. This heat could also be captured and exported for utilisation in lower temperature industrial processes or for district heating and cooling[76].

7.4 The use of CHP and surplus heat will have an important role to play in meeting the four objectives set out in this strategy:

- Greater fuel efficiency results in lower costs for electricity and heating across all sectors. In the domestic sector, suitable homes such as those heated by oil or electricity, can achieve lower energy bills through connection to a district heating network using CHP or surplus heat.

- In the commercial and industrial sectors, the savings on energy bills mean that businesses are more competitive. Furthermore, at the large industrial scale, CHP or the presence of surplus heat can act as a catalyst for the economic development of the nearby area by attracting businesses with a heavy demand for heat or steam, or allow for the diversification of the plant itself (see case study in Box 7.1).

- Using CHP or surplus heat also increases security of energy supply. The reduced level of gas required to generate the same level of electricity and heat means the UK is less dependent on gas imports. Furthermore, use of CHP can also help to ensure that the energy potential of limited fuel supplies, such as biomass, are fully realised.

- At all sizes, CHP is already delivering significant carbon emissions reductions within the UK (see paragraph 7.5), and will play an important role in meeting our carbon budgets and our targets to reduce emissions. Renewable CHP will play a major role in meeting all the UK targets for reducing greenhouse gas and carbon emissions and the 2020 target for renewable energy.

76 Rotterdam and Gothenburg are examples of heat networks that make use of industrial waste heat.

Box 7.1: Use of CHP at British Sugar

In 1998, British Sugar commissioned a new CHP plant at its Wissington factory. This marked the beginning of a diversification plan around the core sugar process as constant availability of steam and power presented new opportunities. The gas turbine has an electrical generating capacity of 70MWe, with approximately 50MWe of this low carbon electricity exported to the local network. The plant is fully qualified as a Good Quality CHP scheme under the UK's CHPQA programme.

The CHP plant has provided a low net cost of energy to the facility and has enabled the expansion of the sugar factory into a modern biorefinery. Additional multimillion pound facilities have been added so that the biorefinery now produces a specialist fine chemical which is extracted from sugar beet, and integrates the UK's first bioethanol manufacturing facility. The site also hosts one of Europe's largest glasshouses, covering an area of 11 hectares. The glasshouse utilises significant volumes of waste heat and CO_2 from the CHP plant for the production of tomatoes.

The CHP plant itself was recently augmented by the addition of a multi-million pound water injection system which boosts output from the gas turbine, especially during periods of warm weather.

7.5 In 2008, CHP provided over 7% of our electricity and saved 10.2 $MtCO_2$ in the UK. We estimate that, if we can realise the cost-effective potential of CHP, this capacity could triple, saving 21.4 $MtCO_2$ a year by 2010 and 27.67 $MtCO_2$ by 2015. However, recent analysis suggests this level of potential will not be met[77], mainly because of unfavourable and volatile fuel prices in recent years.

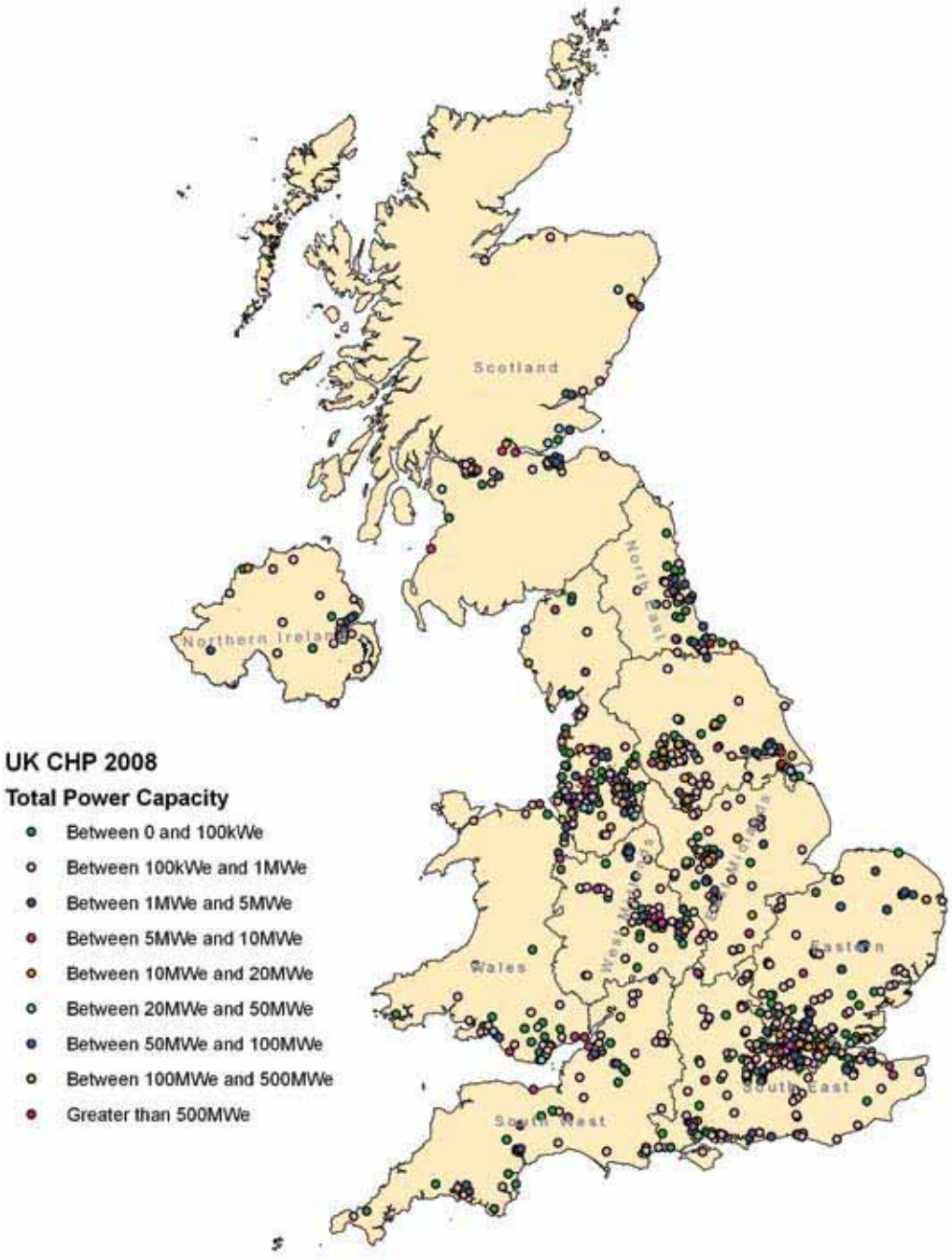
7.6 We recognise that CHP can be seen as financially risky and outside most industries' core business, so the Government is working to provide robust information to business to make the decision to invest in CHP more straightforward. The volatility of the 'spark spread' in previous years (the difference between the price of the input fuel and the price of electricity, which determines the profitability of CHP) has also made investment decisions difficult. The Government is therefore focused on ensuring that there are long-term, stable price signals for investors, for example through carbon pricing. Chapter 6 explains how we are seeking to provide certainty about the demand for the heat produced from CHP plant, through the development of heat networks and other contractual arrangements.

7.7 Recently there has been renewed activity in setting up smaller-scale CHP schemes, encouraged by changes to the planning regime and the banding of the Renewables Obligation. From April 2009, CHP plants fuelled by biomass will receive two Renewable Obligation Certificates (ROCs) for each megawatt hour of electricity, compared to 1.5 ROCs for biomass power-only plants.

77 **Department for Environment Food and Rural Affairs:** Analysis of the UK potential for Combined Heat and Power, *(2007) October* & **Committee on Climate Change:** Building a Low Carbon Economy – The UK's Contribution to Tackling Climate Change, *(2008) Dec*

The Government has also confirmed that the Renewables Obligation will continue up to 2037, providing long-term certainty about this source of revenue for renewable generators.

Figure 7.1: Map showing concentrations of current Good Quality CHP schemes



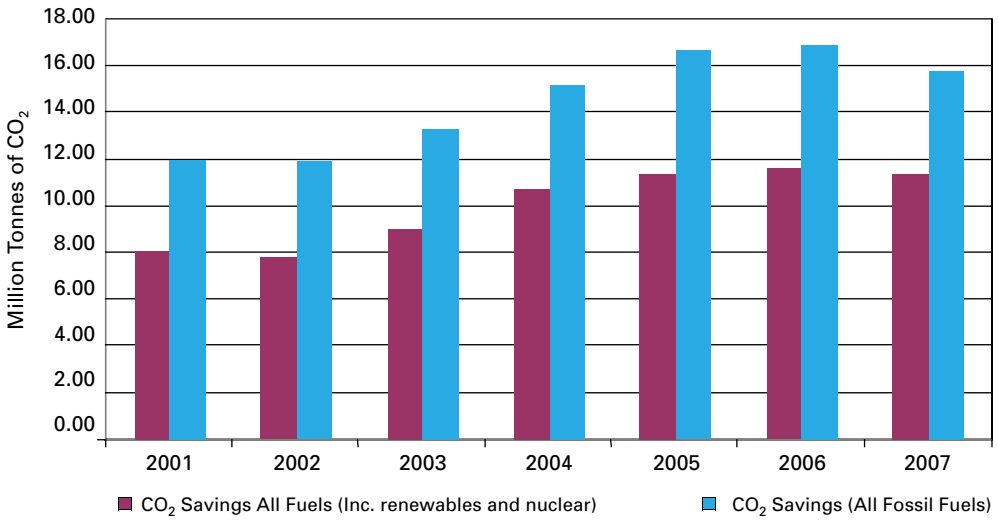
Source: AEA Energy and Environment

Strategic approach to CHP and surplus heat

7.8 The UK Government has recognised the potential value of CHP in meeting greenhouse gas reduction targets for several years now and set out its strategic approach to CHP in 2004[78]. At a European level, the European Commission is assessing the progress of Member States in implementing the Cogeneration Directive, and is considering proposals for additional support for CHP as part of developing work under the European Energy Efficiency Action Plan. At an international level, the International Energy Agency has reviewed CHP and district heating policy globally and provided profiles of CHP policy in a number of countries[79].

7.9 The Government's analysis shows that CHP, particularly at large scales, should be a very cost-effective way to reduce carbon emissions. Work for the 2007 Energy White Paper suggested industrial CHP can be built at a cost of about £16/tCO_2 saved and the advice to Government from the Committee on Climate Change suggested that there is the potential for reductions of at least 4 MtCO_2 available, at a cost below £40/tCO_2. In addition, micro–CHP, which is a household-scale CHP unit, could save just over 1 MtCO_2 by 2020 at a cost of over £250/tCO_2 in larger, older homes with high heat demands.

Figure 7.2: CO_2 emissions from Good Quality CHP, compared to emissions from fossil fuel power stations and emissions from mixed-fuel electricity generation[80]



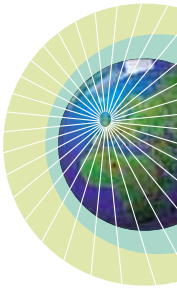
7.10 The Government has implemented, or is planning, a number of measures to support CHP In the UK. Current and future key measures are set out in Box 7.2.

78 **Department for Environment Food and Rural Affairs:** Government's Strategy for Combined Heat and Power to 2010, *(2004)*
http://www.defra.gov.uk/environment/climatechange/uk/energy/chp/pdf/chp-strategy.pdf

79 **International Energy Agency:** Advancing Near Term Low Carbon Technologies, *(2008)*
http://www.iea.org/G8/CHP/docs/UK.pdf

80 **Department for Business Enterprise and Regulatory Reform:** Digest of UK Energy Statistics, *(2007) July*
http://www.berr.gov.uk/whatwedo/energy/statistics/source/electricity/page18527.html

7.11 These measures provide significant support for CHP, particularly renewable CHP. However the key issue remains how to reduce the risk to investors, when the capital investment required is high and the returns are uncertain.



7.12 Large-scale CHP and its alternatives – large power stations and large industrial boilers – all fall within the EU ETS (see Chapter 8). The carbon price set by the ETS therefore provides investors with the opportunity to benefit from CHP, in that carbon savings from its installation removes the need for the purchase of allowances. The EU ETS will be complemented by the Carbon Reduction Commitment (CRC) for large, non-energy intensive businesses and the public sector.

Box 7.2: Support for CHP

Favourable treatment in Phases II and III of the EU Emissions Trading Scheme

CHP, as a low carbon technology, has benefited from the EU ETS as it does not have to buy as many allowances to emit CO_2 as conventional power stations.

Carbon Reduction Commitment

CHP will also benefit from the operation of the Carbon Reduction Commitment, which will introduce carbon trading for large non-energy intensive industries. In particular, heat exported from Combined Heat and Power plants will be treated as if it were zero carbon, even if it comes from fossil fuels.

Exemptions from the Climate Change Levy

The Climate Change Levy is a tax on certain forms of energy supplied to the non-domestic sector. Fuel inputs and electricity outputs from Good Quality CHP are exempt from this tax. The CCL exemption for electricity exported to unknown end users constitutes a state aid, which the European Commission has approved until 2013. The Government is aware that representations have been made by industry to extend the state aid exemption. As with all tax policy and associated exemptions, these will be considered by HM Treasury as part of the Budget and Pre-Budget Report process.

Enhanced Capital Allowances

Enhanced Capital Allowances enable a business to claim 100% first-year capital allowances on their spending on qualifying plant and machinery, including Combined Heat and Power plant. This means businesses can write off the whole of the capital cost of their investment in these technologies against their taxable profits of the period during which they make the investment, helping cash flow and providing a shorter pay back period.

Support for renewable CHP

At present electricity generated from renewable CHP receives financial support via the Renewables Obligation. From April 2009, the introduction of banding will mean CHP receives a higher level of support in recognition of the fuel efficiency and higher capital cost of the plant. In addition, the Energy Act 2008 provides powers to establish feed-in tariffs giving the option of providing support to small-scale low carbon electricity generation, including from renewable CHP up to 5MWe. The forthcoming RHI should also reward the heat generated in renewable CHP. As the Government develops the detail of these new incentives, we will need to ensure the implications of these different incentives are understood for CHP, and that interactions between them are properly managed to ensure CHP is rewarded fairly.

Micro-CHP

Micro-CHP is an emerging, innovative technology. As such, energy suppliers may choose to deploy micro-CHP to meet their obligations under CERT. The enabling powers for feed-in tariffs mentioned above also include the opportunity to support fossil fuelled micro-CHP up to 50kWe. Furthermore, since Budget 2005, a reduced rate of VAT applies to the professional installation of micro-CHP equipment.

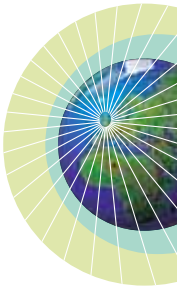
CHP using energy from waste

Generating energy from waste has the potential to be a major contributor to our energy policy goals, as well as, in the right circumstances, delivering better use of waste. An increasingly important part of the energy-from-waste picture is the use of solid recovered fuels (SRF). This involves the treatment of waste that can be easily transported for heat and electricity generation away from the original treatment. The Government has developed standards for this kind of material and the minimum SRF composition standard is now incorporated within the Renewables Obligation.

There are opportunities for local authorities to use their waste treatment infrastructure to provide fuels derived from waste, and link these sources of fuel to potential heat generators and users. The waste private finance initiative (PFI) programme offers a platform for funding new energy from waste infrastructure and seeks to support CHP over power-only plant.

Planning framework

As mentioned above, the guidance set out in Planning Policy Statement 1 on Climate Change, the changes to Building Regulations and the Code for Sustainable Homes (and the later application of its principles to buildings) have driven renewed interest in CHP. In addition, the consents process for new power stations requires applicants to demonstrate that they have fully considered the opportunities for CHP when developing their proposals.



7.13 In the Heat Call for Evidence, we also sought views on the barriers to greater use of surplus heat and asked to what extent carbon pricing signals – through the EU ETS, the CRC and other policy measures – would be enough to encourage greater use of surplus heat. The lack of a clear and long-term carbon price was identified by many respondents as the most significant barrier.

7.14 If carbon prices are to encourage long-term investment in low carbon technologies such as CHP, and encourage the productive use of surplus heat, they must send a clear and consistent signal about the long-term value of carbon. In Phase I of the EU ETS, volatile prices and lack of long-term certainty reduced the impact of this signal. These issues have been addressed in Phase II, which runs from 2008 to 2012. Steps are being taken to provide greater certainty for Phase III and beyond, with longer-term horizons and centrally set caps that reduce year-on-year helping to establish more robust carbon prices.

7.15 The Directive for Phase III envisages a system for determining a declining allocation of allowances through a process of benchmarking, where energy efficiency measures such as CHP and district heating are recognised. This should ensure that CHP is not disadvantaged compared to other heat technologies as the free allocation of allowances is phased out. There is also scope for the same level of free allocation on the heat produced from CHP by large electricity producers. We will continue to work with other Member States to ensure that this process recognises the carbon savings that CHP provides.

Q25: Will the ETS and other policies, such as the Carbon Reduction Commitment and support for renewable combined heat and power, send a strong enough signal to encourage the development of CHP schemes and more efficient use of surplus heat? If not what measures do you believe would provide sufficient stimulus to accelerate new CHP capacity build? Can you provide evidence to support your view?

7.16 It has been suggested that, in addition to supporting CHP through the long-term carbon price, the Government could send a strong market signal by setting new targets for the growth of the CHP sector. CHP will have a critical role to play in meeting the UK's carbon budgets and our emissions and renewables targets. We believe that we should consider progress on CHP in the context of these commitments, rather than setting a revised stand-alone target for CHP beyond 2010. This will mean projecting and monitoring the growth of installed CHP, to ensure it is making sufficient contribution to carbon budgets and renewable energy targets.

7.17 The UK Government has already commissioned a study to project the capacity of Good Quality CHP to 2025, which will look at the decision about whether to invest in CHP from the investor's perspective and compare this against existing Government projections. Further modelling has also been carried out

to examine the impact of the EU ETS under various scenarios. The results of this work will be published during the period of consultation to sit alongside this document.

Future of fossil fuel CHP

7.18 As long as we continue to use fossil fuels for our heating and electricity, CHP can help to ensure that those fuels are used as efficiently as possible. 68% of the UK's heating requirements across all sectors are met through the use of natural gas[81]; and around 43% of the UK's current electricity[82] is also generated from gas. This is set to continue, with analysis for the Renewable Energy Strategy projecting gas generating around 40% of our electricity, and the majority of our heating, in the UK by 2020.

7.19 However, as the percentage of electricity generated from renewable and low carbon sources such as nuclear power and carbon capture and storage increases, the role for CHP in reducing emissions from fossil fuels declines. It should be possible to calculate at what point the electricity supply is so clean that other technologies such as fossil-fuel CHP no longer provide additional carbon saving benefits. For example, the Committee on Climate Change has suggested that once the carbon intensity of electricity falls below 200gCO_2/kWh it will be more carbon efficient to use electricity to produce hot water and space heating, rather than by through a condensing boiler, even when using established technologies such as electric bar or storage heaters. However, DECC projections made before consideration of the impact of the renewable energy targets were that the carbon intensity of the electricity grid in 2020 would be 413 gCO_2/kWh, with the long-run marginal plant being 430 gCO_2/kWh.

Q26: As electricity generation overall becomes much less carbon intensive than today, the advantages of CHP powered by fossil fuel in reducing carbon emissions will diminish, although it will continue to be a cost-effective energy efficiency measure. When do you think CHP powered by fossil fuels will no longer help to reduce emissions because the alternatives are less carbon intensive?

Remaining issues for CHP and better use of surplus heat and possible options for addressing them

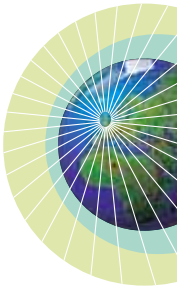
7.20 There are three main non-financial constraints are slowing the growth of CHP in the UK, namely planning, informational barriers and the absence of an established market for heat.

81 **Office of Climate Change:** Annual Report to Parliament, (2007) *July* http://www.defra.gov.uk/ENVIRONMENT/climatechange/uk/ukccp/pdf/ukcc-annrpt-07.pdf

82 **Department for Business Enterprise and Regulatory Reform:** Digest of UK Energy Statistics, *(2007) July* http://www.berr.gov.uk/whatwedo/energy/statistics/source/electricity/page18527.html

Planning and permitting

7.21 CHP schemes need to be relatively close to where there is a demand for the heat they produce. It is not always easy to arrange this. Energy planning strategies by regional development agencies and heat mapping by local authority planners can help, as described in Chapter 6.



7.22 In future the Infrastructure Planning Commission, established by the Planning Act 2008, will take decisions on planning applications for nationally significant energy infrastructure. The requirement for developers to demonstrate that they have fully considered CHP will continue.

7.23 As part of existing pollution control regulation, European energy efficiency guidance encourages the uptake of CHP and better use of surplus heat. The Government will continue to work with the regulators who provide the permits under Integrated Pollution Prevention and Control[83] to encourage energy efficiency in an industrial and large commercial context. The Environment Agency will bring out new guidance shortly.

7.24 Some respondents to the Heat Call for Evidence proposed that carbon pricing signals should be supplemented by regulatory requirements through the planning process. We consider that a regulated approach would be difficult to apply and could place a considerable regulatory burden on necessary energy investment. It would be difficult to determine the extent to which any surplus heat in a particular location could be used by others as this may depend on local economic conditions, the willingness of local business to buy surplus heat and the existence of a local heat network.

Informational barriers

7.25 There is a clear need to improve awareness and understanding of CHP technologies and the potential for better use of surplus heat, and create an environment where potential heat customers and generators can receive advice and information quickly and efficiently. Key audiences will be varied – it might be individual householders for micro-CHP, small businesses for packaged CHP solutions, housing developers or local planners who might need to understand the potential in their local area for CHP. Initiatives on information and advice to consumers, described in Chapter 2, will be one route.

7.26 In October 2008, DECC launched CHP Focus, a website[84] and free helpline service for assisting the development of new and existing CHP schemes. As part of this initiative, a series of workshops was held jointly with the RDAs in order to give practical advice on CHP to local authority planners. Further a number of workshops aimed at the industrial and commercial sectors will also be organised. The CHP focus website includes downloadable guides to CHP, giving detailed advice on the issues developers need to consider. The helpline service is available for developers with specific questions for technical experts.

83 The Environment Agency (in England and Wales), the Scottish Environment Protection Agency and [NI].

84 http://chp.defra.gov.uk/cms **Department for Environment Food and Rural Affairs:** CHP Focus Website http://chp.defra.gov.uk/cms

7.27 The Government will continue to work with the main bodies which provide advice in this area, such as the Carbon Trust, the National Non-Food Crops Centre and Energy Saving Trust, in order to promote renewable and low carbon CHP solutions.

Q27: Should the Government do more to publicise the opportunities and benefits of CHP and surplus heat? If so, how should it do this, and which are the key audiences we need to reach?

Market issues

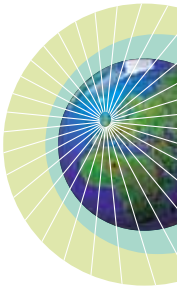
7.28 As discussed above, potential buyers of heat can be put off because there is no established market for buying and selling heat, such as those that exist for gas and electricity. Large users of heat, who may be used to operating in gas markets that have published reference prices and standard contract terms, face the same uncertainties. We propose that a Heat Market Forum will consider these issues (see Chapter 6).

7.29 Another way to address the financial risk relating to the large capital investment is to transfer it to an energy services company (ESCo) which could install, operate and maintain the CHP plant while guaranteeing prices for heat and electricity to the host. There are a number of these companies in the UK already, and we would expect further development of this market. The development of companies with expertise in installing CHP and heat networks will reduce some of the risk to the host company, since they would not need to be an expert in areas which were not their core business.

Low carbon cooling

7.30 Heat from CHP plant commonly provides space and water heating, or heat for other industrial processes. However, the heat can also provide cooling, a process also known as combined cooling, heating and power (CCHP), or trigeneration. Heat is used to drive an absorption chiller in order to provide chilled water for air conditioning and industrial process cooling, which acts as an alternative to more conventional electrically-driven systems.

7.31 Using CHP to provide cooling can make CHP more economically attractive as it provides a use for heat year-round, improves the efficiency of operation of the plant and potentially improves return on investment. Furthermore, the carbon savings are greater as CCHP has a smaller carbon footprint than CHP with an independent electric air conditioning system. The economics will depend on how the cooling is derived, whether using absorption chillers in individual buildings to convert heat delivered through a district heating network into cooling, or using chilled water delivered through a dedicated distribution network. It may be economic to operate CCHP to provide cooling as its principal function, where there is a large, year-round cooling demand, as can be found in businesses with extensive IT requirements.



Box 7.3: The use of trigeneration in London's museums

In 2000, the Natural History Museum together with the Victoria and Albert Museum, contracted the provision of its heating, cooling and power requirements to an ESCo. Both museums require constant temperature and humidity control to maintain their collections. Their new energy system includes a CHP unit generating 1.8MW of electricity and 1.7MW of thermal energy at full load, a waste heat recovery boiler to recover the thermal energy in the flue gases and engine jacket and two heat-fired absorption chillers each providing 705kW of cooling. The two heat-fired absorption chillers use Lithium Bromide and water as refrigerant and deliver chilled water at 6C through a 1000 m district cooling network, the latter replacing localised air conditioning systems.

Over the 15 year span of the contract it is estimated the museums will save 2840 tonnes CO_2 per annum and £750,000 per annum in energy and maintenance costs at 2008 prices.

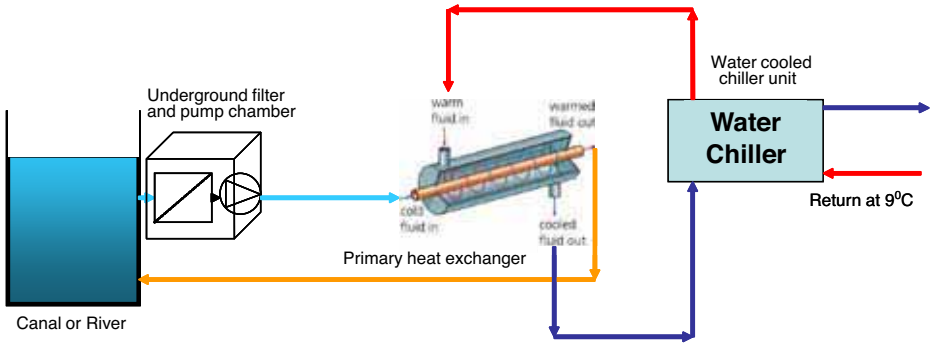
7.32 Low carbon cooling can also be provided through the use of technologies such as reversible ground-source heat pumps and natural cooling. Heat pumps offer opportunities for a wide range of industrial and commercial applications, as well as being suitable for use in community projects. The IEA Heat Pump Centre estimates that in the UK over 99% of heat pumps sold to the commercial and public sector are used to provide air conditioning, with an estimated 650,000 units installed[85].

7.33 Natural cooling water systems, using water such as the deep sea, close shore, lakes, rivers, aquifers and canals are already exploited by the large industrial sector but have the potential to be used at smaller scale, such as commercial buildings (see Figure 7.3).

85 **Bouma, J:** Achieving domestic Kyoto targets with building heat pumps in the UK, IEA Heat Pump Conference, (2002) *July* http://www.heatpumpnet.org.uk/files/webversionmeetingnote1.RTF

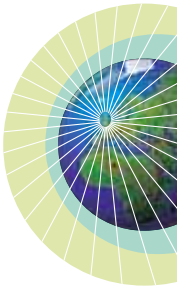
Figure 7.3: Cooling buildings using canal water

GlaxoSmithKline has replaced its traditional air conditioning system with recyclable water from the Grand Union Canal to cool its computer data centre at its headquarters in West London. By doing so GSK estimates it will reduce its carbon emissions by 920 tonnes per year and its energy bill by more than £100,000 per year.



Q28: Do you consider such cooling technologies can play a role in delivering a renewable and low carbon energy mix? What opportunities exist for their exploitation in the UK? What further factors do we need to consider?

Chapter 8
Wider impacts



Chapter summary

The proposals in this document explore the best ways to deliver the carbon savings that we have identified in previous strategies, as well as looking at options for going further than these existing policies. This chapter sets out some of the wider impacts of these proposals on UK emissions, energy prices, security of supply, sustainable development and the economy.

Introduction

8.1 The proposals set out in this document sit within our broader strategy for delivering the Government's goals on energy and climate change, which we set out in our 2007 Energy White Paper. This chapter considers how delivery of our ambitions to save energy and to deploy options for low carbon heating and cooling will affect greenhouse gas emissions, security of supply, energy prices, fuel poverty, the environment and UK economic growth. The energy savings analysis in this section takes a delivery framework based on the Supplier Obligation. Should we decide to pursue an alternative delivery framework and new finance options, further detailed analysis of the impacts would be required, which may alter the figures set out below.

Climate change

8.2 The proposals in this document explore the best ways to deliver the carbon savings that we have identified in previous strategies. We also look at options for going further than these existing policies. In the 2007 Energy White Paper, we committed to the level of ambition for the Supplier Obligation from 2011 being at least equal to that under CERT in the 2007 Energy White Paper, delivering annual savings of 12.6 $MtCO_2$ a year in 2020. In our consultation on the UK Renewable Energy Strategy, we projected carbon savings from renewable heat deployment of 23.7 $MtCO_2$. To place this in context, total UK emissions were 592 $MtCO_2$ annually in 1990 and are projected to be 440 $MtCO_2$ in 2020.[86]

86 **Department of Energy and Climate Change:** Updated Energy and Carbon Emissions Projections, *(2008) November* http://www.berr.gov.uk/files/file48514.pdf

8.3 However, this Heat and Energy Saving Strategy suggests going further with, for example, new financing and delivery options, which could contribute additional carbon savings of 8 $MtCO_2$ per year which may be achieved through options such as accelerated rollout of solid wall installations. Consequently, this strategy could lead to aggregate carbon savings of around 44 $MtCO_2$ per year by 2020. If achieved, this would be equivalent to 30% of 2006 household emissions and 7.4% of our total UK 1990 emissions.

Impact on emissions from the traded sector

8.4 The EU Emissions Trading System (EU ETS) is central to our long-term strategy for reducing carbon emissions. The EU ETS cap on carbon emissions covers electricity generation and around half of the UK's carbon emissions arising from heat generation, including emissions from heat generated for large-scale industrial processes and from space and water heating for large institutions.

8.5 Within the EU ETS cap, we expect a measures-based Supplier Obligation to contribute 5 $MtCO_2$ savings in 2020 and the Renewable Heat Incentive (RHI), in a scenario that delivered 14% renewable heat, would contribute 6.7 $MtCO_2$ in 2020. These savings are already accounted for by the EU ETS cap and would not make any additional contributions to meeting our carbon targets.

Impact on emissions in the non-traded sector

8.6 We expect a measures-based Supplier Obligation to contribute carbon savings in the non-traded sector of around 7.6 $MtCO_2$ in 2020. We expect the RHI, in a scenario that delivered 14% renewable heat, would contribute around 17 $MtCO_2$ in 2020. Together, these could contribute a reduction of around 3% on our 1990 greenhouse gas emissions. Should we decide to move to a different delivery framework, we would expect this commitment to be achieved or surpassed.

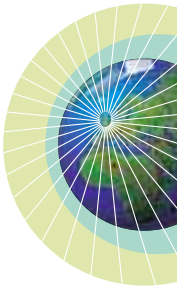
From 2020 to 2050

8.7 If we are to meet the UK's goals on climate change for 2050, we will need to have all but eliminated carbon emissions from electricity generation and to make significant progress towards decarbonising heat generation.

8.8 Beyond 2020, we will need to continue to focus on increasing the energy efficiency of the existing housing stock. Some 70% of the homes and buildings that will be in use in 2050 have already been built. There will still be considerable scope remaining after 2020 to improve their energy efficiency. By then, revised Building Regulations and our commitment to zero carbon homes will be in force. As set out earlier in this document, our aim is for all homes by 2030 to have had a package of measures including all cost-effective energy saving measures.

8.9 Decarbonisation of heat generation over the period 2020 to 2050 is most likely to come about through deployment of renewable heat and subsequently electric heating (drawing on electricity generated from low carbon sources such as renewable energy, nuclear power and carbon capture and storage). While it is difficult to predict when we will reach a sufficiently low carbon

intensity of the grid (i.e. 200g/kW) as we move towards 2050, electric heating could become more widespread in new, highly energy efficient buildings and then see wider take-up.



Energy prices

8.10 Our current policies on climate change and energy saving – including the Renewables Obligation, EU Emissions Trading Scheme, and the Carbon Emission Reduction Target – account for around 14% of average domestic electricity bills and 3% of average domestic gas bills. On the industrial side, for an average medium-sized consumer, the Renewables Obligation, EU ETS, and Climate Change Levy together contribute around 21% to industrial electricity bills and about 4% to gas bills. Incoming climate change policies such as smart metering, will add further to retail prices. However, some of these policies will also reduce energy consumption, so the net effect on actual energy bills will be lower.

Impact on gas bills

8.11 A measures-based Supplier Obligation would be expected to increase domestic gas prices, while at the same time introducing measures that will reduce gas demand, thus reducing bills (see Table 8.1).

Figure 8.1: Impact of the Supplier Obligation on average annual domestic gas bills

	2015	2020
Impact of increase in price	3% (£25)	5% (£37)
Impact of drop in demand	-3% (-£24)	-9% (-£64)
Overall impact on bills	0% (£0)	-4% (-£27)

8.12 Projections for the possible impact on gas bills, in a potential scenario where we obtain 14% of our heat from renewable sources, were published in the Impact Assessment for the Renewable Energy Strategy consultation in June[87]. However, we are continuing to work on development of the RHI and will be coming forward with a more detailed consultation later this year.

8.13 The impact of a measures-based Supplier Obligation on electricity bills would be expected to mirror the impact on gas bills, with an increase in price offset by a reduction in demand (see Table 8.2). The RHI will not affect electricity bills.

87 **Department for Business Enterprise and Regulatory Reform:** UK Renewable Energy Strategy Consultation Document, *(2008) June* http://renewableconsultation.berr.gov.uk/

Figure 8.2: Impact of the Supplier Obligation on average annual domestic electricity bills

	2015	2020
Impact of increase in price	7% (£25)	10% (£37)
Impact of drop in demand	-8% (-£27)	-19% (-£70)
Overall impact on bills	-1% (-£3)	-9% (-£32)

Fuel poverty

8.14 Every household in the UK should be able to heat and light their homes affordably. However, for some people, meeting this basic energy need accounts for a disproportionate amount of their income. The generally accepted definition of fuel poverty is when a household needs to spend 10% or more of its income on energy to maintain an adequate standard of warmth. The main factors that influence whether a household is fuel poor are the cost of fuel, the income of the household and the energy efficiency of the home.

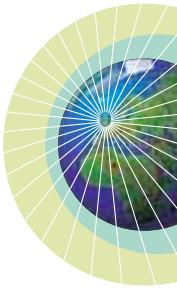
8.15 Tackling fuel poverty is a priority for the Government. Since 2000, we have spent around £20 billion on fuel poverty programmes and benefits across the UK. Although the number of people in fuel poverty fell significantly, recent rises in energy prices mean that fuel poverty now affects rising numbers of people. In response, the Government has recently stepped up its focus on energy efficiency as a long-term response to rising energy bills. In addition to existing commitments, in September 2008, the Government announced the new Home Energy Saving programme, which includes the CERT 20% uplift and the CESP programme.

8.16 Whilst, taken together, the measures proposed in this consultation document will tend to have an upwards effect on energy prices in the long term, there are also synergies between our proposals and our objectives on fuel poverty. For example, the new Community Energy Savings Programme (CESP) will be piloting a new community-based delivery partnership focussed on improving the energy efficiency of the homes of those in the most disadvantaged areas and cutting bills for those who need it most.

Security of supply

8.17 The 2007 Energy White Paper set out our strategy for delivering energy security while also accelerating the transition to a low carbon economy. Our starting point is to save energy, because cutting energy demand reduces the challenge of delivering reliable supplies. Delivering secure heat supplies depends on multiple factors. For those consumers that generate their own supplies of heat, which currently accounts for nearly all heat consumption, heat security of supply requires sufficient supplies of fuel, the associated infrastructure to deliver fuel supplies to consumers, and a reliable way to generate heat. For those consumers who purchase heat directly, for example through a district heating network, the reliable operation of the local heat infrastructure is also fundamental.

8.18 Today, we generate 71% of the heat we use in the UK from gas, a further 14% comes from other fossil fuels, with electricity providing the remaining 15%[88]. By 2020 we expect biomass and other forms of renewable heating to be making a real contribution, and to begin to reduce our reliance on fossil fuels. By 2050, as we make our transition to a low carbon economy, we may see a shift towards electric heating powered by low carbon electricity sources. The key challenges are therefore to continue to ensure reliable supplies of gas and electricity, to establish a reliable supply chain for sustainable biomass (considered in our Renewable Energy Strategy consultation), and to establish a market framework that offers appropriate levels of security and protection to consumers on heat networks (considered in Chapter 6).



Gas supply and demand

8.19 DECC's strategy for managing risks to gas security include a focus on the more efficient use of energy and reduction in gas demand, to help avoid over-dependency on gas, including gas imports. Taking account of our proposed energy saving and heat measures, we expect there to be a 12% fall in gas demand in 2020 compared to 2010 levels.

8.20 Our strategy also aims to facilitate flexibility on the demand side to help balance supply, particularly from large gas users. For smaller industrial, commercial or domestic gas consumers, the historic security of gas supply for use as a heating fuel may be an important factor when they are considering whether they would want to adopt other heat options.

Electricity supply and demand

8.21 Taking account of our proposed energy saving and heat measures we expect an overall reduction in electricity use of around 5% compared to 2010 levels. The 2007 Energy White Paper and the 2008 Renewable Energy Consultation have already taken this reduction in electricity demand into account.

Sustainable development

8.22 Our proposals are underpinned by the Government's five principles of sustainable development, integrating our social, environmental and economic objectives[89]:

- living within environmental limits;
- ensuring a strong, healthy and just society;
- achieving a sustainable economy;
- promoting good governance; and
- using sound science responsibly.

88 **Department for Business Enterprise and Regulatory Reform:** Energy Trends, *(2008) September* http://www.berr.gov.uk/files/file47740.pdf

89 **HM Government:** Securing the Future – Delivering UK Sustainable Development Strategy, *(2005) March* http://www.defra.gov.uk/sustainable/government/publications/pdf/strategy/SecFut_complete.pdf

8.23 When developing our approach to decarbonising the UK's heat supplies there are important considerations regarding the potential impacts on air, water and land quality, and on biodiversity.

8.24 The Government is strongly of the view that all biofuels and biomass used in the UK should come from sustainable sources. Biomass fuelled boilers, heaters and CHP plants will emit some fine particulate pollution, which could affect our ability to meet the required air quality standards. This issue was addressed in the 2008 Renewable Energy Strategy Consultation where we considered possible measures to allow the deployment of biomass-fired plant, in rural and urban areas, at the maximal sustainable rate that does not compromise our objectives on air quality or public health.

8.25 Rivers and seawater provide cooling water at industrial scale. However, excessive release of heat into rivers and streams can cause environmental problems as can over-abstraction of water. Increased use of cooling using renewable energy could therefore put pressure on water resources and water quality. So any activity must take place within the requirements of water legislation and following guidance by the Environment Agency. Capturing some of this heat for local use in homes and businesses would reduce the impact of waste heat discharged into the environment.

8.26 Where there is no environmental or economic case for recycling waste, such as household garbage, recovering energy from that waste can contribute to a well-balanced energy policy. The UK can increase the amount of heat we generate from waste with a high biomass content, such as municipal 'black bag' waste, about two thirds of which is biogenic. Emissions into the air from incinerators that burn waste fuels must meet the standards set out in the EU's Waste Incineration Directive (WID). More broadly, the Waste Framework Directive requires that waste is recovered and disposed of without endangering human health or using processes or methods that could harm the environment, including soil, water, air, plants and animals. Emerging technologies such as pyrolysis, gasification and anaerobic digestion may offer a low-emission alternative to incineration.

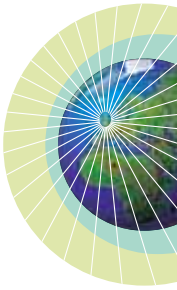
8.27 A national and EU legislative framework protects the UK's wildlife and important habitats. We are looking at opportunities to improve the process and developing guidance both nationally and with our EU partners regarding how developers and planners can meet the requirements of our environmental legislation most cost effectively and efficiently.

The economy

8.28 Our transition to a low carbon economy will create opportunities for jobs and growth as business and industry respond to demand for low carbon and energy efficient products and processes. As part of our vision to place the UK's businesses at the forefront of the new low carbon revolution, we will consult separately on an integrated low carbon industrial strategy.

8.29 In the period to 2020, our energy saving measures will bring an overall benefit to the economy. However, the costs of our policies on heat mean that these measures will, overall, have an economic cost, at least in the short

term. We should look at these impacts in the context of the global efforts to tackle climate change. The Stern Review concluded that the benefits of strong, early coordinated action against climate change far outweigh the economic costs of inaction. Stern estimates that the cost of not taking action could be equivalent to losing between 5% and 20% of annual global GDP, whereas the costs of taking action can be limited to around 1% of annual global GDP, if the world pursues optimum policies.



Q29: Do you agree with our analysis of the likely impacts of the proposals in this document and in the associated impact assessments on:

- **carbon dioxide emissions?**
- **energy prices?**
- **fuel poverty?**
- **security of supply?**
- **sustainable development?**
- **the economy?**

Are there any other wider issues that we should consider? Do you have any other comments on the Impact Assessments?

Chapter 9
Territorial extent and how to respond

This chapter sets out the territorial extent of the document, and explains how to respond to this consultation.

Territorial extent

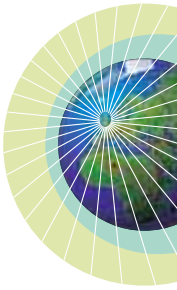
9.1 The Devolved Administrations have particular roles to play in developing and delivering policies on energy saving and heat. Many of the policies and arrangements and most of the proposals in this document apply to England and Wales. Although many of the policy areas in this document are devolved to Scotland, the Scottish Executive will consider responses to this consultation in developing its own policies, particularly those from Scottish stakeholders. The Welsh Assembly Government will also use responses in the development of its energy policies. The proposals do not apply to Northern Ireland, although the UK Government and Northern Ireland Assembly will work closely together on these issues.

9.2 The role and policies of the different Devolved Administrations are set out below.

Scotland

9.3 While certain aspects of energy policy relating to generation and supply are reserved to the UK Government, a number of issues are devolved to the Scottish Parliament. These include planning and Building Regulations, some elements of energy efficiency as well as aspects of renewable energy policy.

9.4 Scottish Ministers have, through their Renewable Energy Framework consultation which closed on 1 December 2008, set out plans for the development of renewables in Scotland, with the stated aim of delivering on and possibly exceeding the renewable energy targets set by the EU. Building on responses to this consultation, it will publish an Action Plan around spring/summer 2009, including a route map for the development of renewable heat in Scotland.



9.5 Scottish Ministers have been laying the foundations for future energy use and emission reductions by a range of means including:

- seeking to maximise investment in Scotland under the CERT scheme;
- making it easier for people to take action by providing a new Home Help service and improving other advice services;
- working with stakeholders through the Fuel Poverty Forum to review fuel poverty programmes and to introduce a new Energy Assistance Package;
- bringing in Energy Performance Certificates to encourage owners and landlords to improve the energy performance of their homes;
- requiring social landlords to meet the energy efficiency requirements of the Scottish Housing Quality Standard; and
- supporting whole communities to take action to reduce emissions, including street-by-street insulation schemes, and through the Climate Challenge Fund.

9.6 However, there is more to do to ensure that energy efficiency improvements continue into the future. Scottish Ministers will therefore produce a consultation paper on reducing energy use and emissions from housing in Scotland with the intention to consult this year. In taking forward policy in this area in Scotland, the Scottish Executive will consider responses to this DECC paper, particularly those from Scottish stakeholders, alongside those made to its own consultation.

9.7 In addition, through devolved responsibilities for Building Regulations, Scottish Ministers are taking forward action in relation to improving the energy performance of new buildings and existing non-domestic buildings. In 2008, Scottish Ministers consulted on proposals to improve the energy performance of existing non-domestic buildings[90]. Later this year they will consult on energy standards for new buildings.

Wales

9.8 Although the Welsh Assembly Government has responsibilities for energy efficiency, microgeneration and fuel poverty, many of these policy areas are reserved to the UK Government. For example, the suppliers obligation, fiscal policy and regulation are reserved matters. As such, most of the proposals in this document will apply to England and Wales.

9.9 Important areas in which powers and policies devolved to the Welsh Assembly Government need to be considered are planning, local government, health and education. Where relevant, this consultation document highlights devolved policy in these areas.

90 **Scottish Executive:** Proposals for Improving the Energy Performance of Non-Domestic Buildings, *(2008) September* http://www.scotland.gov.uk/Publications/2008/08/15155233/0

9.10 The Welsh Assembly Government will hold its own consultation on a National Energy Efficiency and Savings Plan early in 2009. The plan will seek to build upon and reinforce the policy of the UK Government in Wales. It will also explore how to address characteristics that are specific to Wales, such as low coverage by the gas network, an older housing stock and a higher proportion of small businesses.

9.11 The results of this Heat and Energy Saving Strategy consultation will be considered in the development of the Assembly Government's Climate Change Strategy and the overarching Energy Strategy for Wales.

Northern Ireland

9.12 Energy policy is primarily devolved to the Northern Ireland Assembly. Many other issues covered in this strategy are also devolved matters, including climate change, fuel poverty, planning and Building Regulations. In addition, energy regulation in Northern Ireland is not carried out by Ofgem but by the Northern Ireland Authority for Utility Regulation which regulates the province's electricity, gas and water industries.

9.13 Many organisations in Northern Ireland already undertake energy efficiency activities. Both the Energy Saving Trust and the Carbon Trust also provide UK-wide coverage of national initiatives, including Northern Ireland. In addition, Northern Ireland participates at a UK level in the implementation of the Energy End Use and Energy Services Directive. CERT and the proposed CESP cover only Great Britain and have no effect in Northern Ireland. The closest equivalent in Northern Ireland is the Energy Efficiency Levy (EEL). While this has similarities to CERT, the EEL is not a legal obligation on suppliers in Northern Ireland. Funding from the levy is available to all suppliers wishing to promote projects.

9.14 Northern Ireland notes the proposals on delivery models and notes that a recent review of the delivery market there has resulted in the Province continuing with a mixed-market model, inherently market-led, much in line with the conclusions in Great Britain.

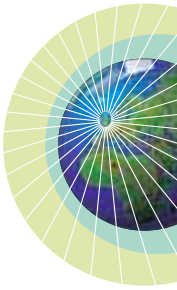
9.15 Northern Ireland faces many of the same challenges outlined in this strategy. It looks forward to working with DECC to understand the outcome of this important consultation. This understanding will help to inform Northern Ireland's work in this area, particularly in relation to heat. A new Strategic Energy Framework for Northern Ireland will be published in mid 2009.

How to respond

9.16 The consultation on this strategy began on 12 February 2009 and will close on 8 May 2009. There are a number of ways to let us know your views.

Online

9.17 Visit our website at www.decc.gov.uk/consultations. The online consultation has been designed to make it easy to submit responses to the questions. If you decide to submit your response through the website you will be provided with a user name and a password to enable you to edit or update your submission as many times as you wish whilst the consultation is open.



By letter, fax or email

9.18 A response can also be submitted by letter, fax or email to:

HES Consultation
Ropemaker Court
11 Lower Park Row
Bristol BS1 5BN
Email: hes.consultation@opinionsuite.com
Fax: 0117 3169512

Responses should be received by 8 May 2009.

Additional points about this consultation

9.19 When responding please state whether you are responding as an individual or representing the views of an organisation. If responding on behalf of an organisation, please make it clear who the organisation represents.

9.20 After the consultation has closed, all responses (including respondents' names) will be published unless respondents specifically request that their responses be kept confidential. This will apply to all responses whether submitted online, posted, faxed or emailed. Please indicate on your response if you want us to treat it as confidential. You should also read the section on confidentiality and data protection below.

Confidentiality and data protection

9.21 Information provided in response to this consultation, including personal information, may be subject to publication or disclosure in accordance with the access to information regimes (these are primarily the Freedom of Information Act 2000 (FOIA), the Data Protection Act 1998 (DPA) and the Environmental Information Regulations 2004).

9.22 If you want other information that you provide to be treated as confidential, please be aware that, under the FOIA, there is a statutory Code of Practice with which public authorities must comply and which deals, amongst other things, with obligations of confidence.

9.23 In view of this it would be helpful if you could explain to us why you regard the information you have provided as confidential. If we receive a request for disclosure of the information we will take full account of your explanation, but we cannot give an assurance that confidentiality can be maintained in all circumstances. An automatic confidentiality disclaimer generated by your IT system will not, of itself, be regarded as binding on the Department.

9.24 The Department will process your personal data in accordance with the DPA and in the majority of circumstances this will mean that your personal data will not be disclosed to third parties.

Additional copies

9.25 You may make copies of this consultation document without seeking permission. Further printed copies of the consultation document or copies of the response form can be obtained from:

BERR Publication Orderline
ADMAIL 528
London SW1W 8YT
Tel: 0845 015 0010
Fax: 0845 015 0020
Minicom: 0845 015 0030
http://www.berr.gov.uk/publications

9.26 Copies of the document in Welsh, Braille, large print and audio are also available on request from the orderline. An electronic version can be found at www.decc.gov.uk/consultations

Help with queries

9.27 Questions about the policy issues raised in the document can be addressed to:

HES Consultation
Ropemaker Court
11 Lower Park Row
Bristol BS1 5BN
Email: hes.consultation@opinionsuite.com
Tel: 020 72156788
Fax: 0117 3169512

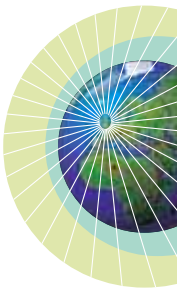
9.28 If you have comments or complaints about the way this consultation has been conducted, these should be sent to:

Marjorie Addo, Consultation Co-ordinator
DEFRA
Area 7C Nobel House
17 Smith Square
London SW1P 3JR
E-mail consultation.coordinator@defra.gsi.gov.uk.
Tel: 020 72385947

9.29 A copy of the Code of Practice on Consultation is attached at Annex 2

9.30 Related documents included the Impact Assessment can be found at: www.decc.gov.uk/consultations

Annex 1
Consultation questions



Q1: **Do you agree with the level of ambition and the indicative pathway set out in this chapter? If not, why, and what alternative would you suggest?**

Q2: **Do you agree with the Government's policy approach set out in paragraphs 1.31 onwards to achieving our ambitions on heat and energy saving?**

Q3: **How can the Government encourage people and communities to change behaviour to save energy? What is the appropriate balance between changing attitudes, and providing advice and information?**

Q4: **How can home energy audits be made most useful, and do you agree that the Government should use Domestic Energy Assessors, who have been suitably trained, to deliver them as widely as possible?**

Q5: **Should the Government work with industry to develop accreditation standards for advice about, and installation of, energy efficiency technologies? What would be the best model for such a scheme, and why?**

Q6: **Are the information, advice and support services provided by the Government to businesses effective in encouraging them to reduce their energy use and their CO_2 emissions?**

What other types of support services are useful and how can these be provided cost effectively?

Is there scope to do more on behaviour change through businesses and their employees? Please support your suggestions with evidence.

Q7: **Are the existing commitments for public sector buildings sufficient for the public sector to fulfil its role in driving improvements and leading by example?**

Q8: **What will be the most effective way for Government to develop RHI and FIT policy so that combined financing packages of insulation, renewable heat and small-scale low carbon electricity technologies might be offered?**

Q9: **What action, if any, should the Government take to enable finance to be arranged for the higher cost energy efficiency and low carbon measures? Are there other options the Government should consider? Please provide evidence to support your response.**

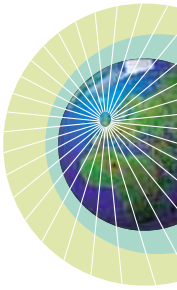
Q10: **What should the Government do beyond these initiatives to promote investment in energy saving and low carbon energy technologies in business and the public sectors?**

Q11: **Should levels of support through the Renewable Heat Incentive vary by technology and/or customer group? Are there any other ways of differentiating levels of support under the RHI?**

Q12: **How can we introduce the levy to fund the Renewable Heat Incentive so as to minimise suppliers' administrative costs and reduce uncertainty among suppliers of fossil fuels for heat?**

Q13: **Do you think that financial institutions, such as banks or other loan companies, would be an effective way of assisting potential small-scale heat generators (such as householders) with financing of the initial capital cost of renewable installations?**

What other considerations, if any, should be taken into account when determining eligibility for an up-front payment (for example, only generators with equipment below a certain size can apply, such as domestic customers)?



Q14: How can we maintain demand for renewable heat technologies before we introduce the Renewable Heat Incentive?

Q15: Do you agree with the proposal to continue with a CERT-type obligation until December 2012?

Do you also agree that the proposed CESP framework should run concurrently to the same end date?

Q16: Do you agree with our analysis of the potential impacts of a cap-and-trade approach to delivering energy efficiency in homes? Please support your answer with evidence.

Q17: Do you have views on the merits of moving to a different approach for delivering energy efficiency to households? Do you have other suggestions of alternative delivery models which might be effective in achieving our objective?

Q18: Would you support a voluntary code of practice on energy performance for landlords and/or builders? How high do you think uptake would be, and would it achieve much additional action? Please support your response with evidence.

Q19: Should we require marketing material for property sales and rental to feature the EPC rating more prominently? If so how?

What delivery bodies or industry groups could be given access to the EPC database, and how could they make best use of it whilst ensuring that it is not misused?

Please support your answers with evidence.

Q20: Besides removing the threshold for consequential improvements, which will be considered in the consultation on changes to the Buildings Regulation in 2009, are there any other options for wider building regulation that you would like to see considered in the longer term? Please support your answer with evidence for the effectiveness of your suggestions.

Q21: Do you agree with the approach of conducting a review in 2012 to assess the effectiveness of other policies before considering further policy interventions for the energy performance of existing buildings?

Are there other options you think should be part of our strategy? Please support your answer with evidence.

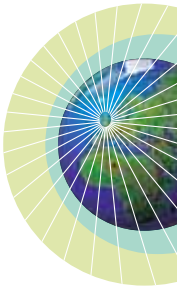
Q22: Do you agree that the Heat Markets Forum should consider regulatory arrangements for district heating to ensure consumer protection? Are there specific issues you think it should cover?

Q23: There are a number of ways to tackle commercial barriers to district heating. These include using the planning system and heat mapping, encouraging or requiring certain buildings to connect to networks and engaging property developers. Which of these options should be taken forward and why?

Q24: What are your views on the options for reducing the risks of poor returns on investment in district heating networks? Which do you think would be most effective and are there other more appropriate solutions?

Q25: Will the ETS and other policies, such as the Carbon Reduction Commitment and support for renewable combined heat and power, send a strong enough signal to encourage the development of CHP schemes and more efficient use of surplus heat? If not what measures do you believe would provide sufficient stimulus to accelerate new CHP capacity build? Can you provide evidence to support your view?

Q26: As electricity generation overall becomes much less carbon intensive than today, the advantages of CHP powered by fossil fuel in reducing carbon emissions will diminish, although it will continue to be a cost-effective energy efficiency measure. When do you think CHP powered by fossil fuels will no longer help to reduce emissions because the alternatives are less carbon intensive?



Q27: **Should the Government do more to publicise the opportunities and benefits of CHP and surplus heat? If so, how should it do this, and which are the key audiences we need to reach?**

Q28: **Do you consider such cooling technologies can play a role in delivering a renewable and low carbon energy mix? What opportunities exist for their exploitation in the UK? What further factors do we need to consider?**

Q29: **Do you agree with our analysis of the likely impacts of the proposals in this document and in the associated impact assessments on:**

- **carbon dioxide emissions?**
- **energy prices?**
- **fuel poverty?**
- **security of supply?**
- **sustainable development?**
- **the economy?**

Are there any other wider issues that we should consider? Do you have any other comments on the Impact Assessments?

Annex 2
Code of Practice on Consultation

1. Formal consultation should take place at a stage when there is scope to influence policy outcome.

2. Consultation should normally last for at least 12 weeks with consideration given to longer timescales where feasible and sensible.

3. Consultation documents should be clear about the consultation process, what is being proposed, the scope to influence and the expected costs and benefits of the proposals.

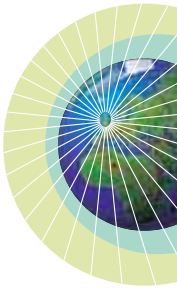
4. Consultation exercise should be designed to be accessible to, and clearly targeted at, those people the exercise is intended to reach.

5. Keeping the burden of consultation to a minimum is essential if consultations are to be effective and if consultees' buy-in to the process is to be obtained.

6. Consultation responses should be analysed carefully and clear feedback should be provided to participants following the consultation.

7. Officials running consultations should seek guidance in how to run an effective consultation exercise and share what they have learned from the experience.

Annex 3
References



Australian Government: Energy Efficiency Rating and House Price in the ACT, *(2008)*
http://www.nathers.gov.au/about/publications/eer-house-price-act.html

Bouma, J: Achieving domestic Kyoto targets with building heat pumps in the UK, IEA Heat Pump Conference, *(2002) July*
http://www.heatpumpnet.org.uk/files/webversionmeetingnote1.RTF

British Chambers of Commerce: Business and the Environment: Challenges Ahead *(2008)*
http://www.britishchambers.org.uk/6798219247040024540/BCC_Environment%20Survey_2008.pdf

British Gas: Green Streets Website
http://www.britishgas.co.uk/greenstreets

Cabinet Office: **Excellence and Fairness**: Achieving World Class Public Services, *(2008)*
http://www.cabinetoffice.gov.uk/media/cabinetoffice/strategy/assets/publications/new_excellence_report.pdf

Carbon Trust: Carbon Trust Delivers Credit Boost for Small Companies, *(2008) September*
http://www.carbontrust.co.uk/News/presscentre/290908_Changes+to+the+EEL+Scheme.htm

Carbon Trust: Annual Report 2007/08, *(2008)* September https://author.carbontrust.co.uk/publications/publicationdetail.htm?productid=CTC735

Centre for Research in the Built Environment: Incorporating Environmental Best Practice into Commercial Tenant Lease Agreements: Good Practice Guide – Part 1, *(2007) January*
http://www.greenleases-uk.co.uk/publications.php

Committee on Climate Change: Building a Low Carbon Economy – The UK's Contribution to Tackling Climate Change, *(2008) December*
http://www.theccc.org.uk/reports/

Committee on Climate Change: MARKAL modelling based on CCC assumptions, *(2008)*

Communities and Local Government: Building a Greener Future, Policy Statement, *(2007) July*
http://www.communities.gov.uk/documents/planningandbuilding/pdf/building-greener.pdf

Communities and Local Government: EPC Regulatory Impact Assessment, *(2007) June*
http://www.communities.gov.uk/documents/planningandbuilding/pdf/323825.pdf

Communities and Local Government: Planning Policy Statement: Planning and Climate Change – Supplement to Planning Policy Statement 1, *(2007) December*
http://www.communities.gov.uk/planningandbuilding/planning/planningpolicyguidance/planningpolicystatements/planningpolicystatements/ppsclimatechange/

Communities and Local Government: The Community Infrastructure Levy, *(2008) August*
http://www.communities.gov.uk/documents/planningandbuilding/pdf/communityinfrastructurelevy.pdf

Communities and Local Government: Housing in England 2006/07, *(2008) September*
http://www.communities.gov.uk/housing/housingresearch/housingsurveys/surveysofenglishhousing/

Darby, S: Environmental Change Institute, The Effectiveness of Feedback on Energy Consumption, *(2006) April*
http://www.defra.gov.uk/environment/climatechange/uk/energy/research/pdf/energyconsump-feedback.pdf

Department for Business Enterprise and Regulatory Reform: Consultation on Energy Billing and Metering, *(2007) August*
http://www.berr.gov.uk/files/file40456.pdf

Department for Business Enterprise and Regulatory Reform: Digest of UK Energy Statistics, *(2007) July*
http://www.berr.gov.uk/whatwedo/energy/statistics/source/electricity/page18527.html

Department for Business Enterprise and Regulatory Reform: Energy Trends, *(2008) September*
http://www.berr.gov.uk/files/file47740.pdf

Department for Business Enterprise and Regulatory Reform: Heat Call for Evidence, *(2008) January*
http://www.berr.gov.uk/files/file43609.pdf

Department for Business Enterprise and Regulatory Reform: NERA Renewable Heat Phase II Report, *(2008) September*
http://renewableconsultation.berr.gov.uk/download?filename=NERA-Renewable-Heat-Phase-II-Report.pdf

Department for Business Enterprise and Regulatory Reform: UK Renewable Energy Strategy Consultation Document, *(2008) June*
http://renewableconsultation.berr.gov.uk/

Department of Energy and Climate Change: Updated Energy and Carbon Emissions Projections, *(2008) November*
http://www.berr.gov.uk/files/file48514.pdf

Department of Energy and Climate Change: Non-domestic Energy Efficiency Data Framework, *(2009) January*
http://www.defra.gov.uk/environment/climatechange/uk/energy/energyservices/documents/need-report090129.pdf

Department for Environment Food and Rural Affairs: Analysis of the UK potential for Combined Heat and Power, *(2007) October*
http://www.defra.gov.uk/environment/climatechange/uk/energy/chp/pdf/potential-report.pdf

Department for Environment Food and Rural Affairs: Assessment of the Potential Effectiveness and Strategic Fit of Personal Carbon Trading, *(2008) November*
http://www.defra.gov.uk/environment/climatechange/uk/individual/carbontrading/pdf/pct-economic-analysis.pdf

Department for Environment Food and Rural Affairs: Carbon Reduction Commitment, *(2008) December*
http://www.defra.gov.uk/environment/climatechange/uk/business/crc/index.htm

Department for Environment Food and Rural Affairs: CHP Focus Website
http://chp.defra.gov.uk/cms

Department for Environment Food and Rural Affairs: DECC/BERR Estimated emissions based on energy consumption for heat and other end uses by fuel 2006 and DECC/DEFRA Sector level summary of 2007 EU ETS results, *(2006)*
http://www.defra.gov.uk/environment/climatechange/trading/eu/pdf/sectorlevel-ukresults-2007.pdf

Department for Environment Food and Rural Affairs: Government's Strategy for Combined Heat and Power to 2010, *(2004)*
http://www.defra.gov.uk/environment/climatechange/uk/energy/chp/pdf/chp-strategy.pdf

Department for Environment Food and Rural Affairs: Market Transformation Programme, *(2008) March*
http://www.mtprog.com/spm/files/download/byname/file/10_07_08%20PA&P%2008%20v1.pdf

Department for Environment Food and Rural Affairs: Policy Brief: Improving the Energy Performance of Air-Conditioning Products, *(2008) July*
http://www.mtprog.com/spm/files/download/byname/file/2006-07-10%20Policy_Brief_Air_Con_doc%20fin.pdf

Department for Environment Food and Rural Affairs: Public Attitudes to Climate Change, *(2008) March*
http://www.defra.gov.uk/environment/climatechange/uk/individual/attitudes/pdf/ccresearch-toplines7-0803.pdf

Department for Environment Food and Rural Affairs: Sector Level Summary of 2007 EU ETS Results in the UK, *(2008) May*
http://www.defra.gov.uk/environment/climatechange/trading/eu/pdf/sectorlevel-ukresults-2007.pdf

Department for Environment Food and Rural Affairs: UK Climate Change Program Annual Report to Parliament, *(2007) July*
http://www.defra.gov.uk/environment/climatechange/uk/ukccp/pdf/ukcc-annrpt-07.pdf

Department for Environment Food and Rural Affairs: UK Energy Efficiency Action Plan, *(2007)*
http://www.defra.gov.uk/environment/climatechange/uk/energy/pdf/action-plan-2007.pdf

Department for Environment Food and Rural Affairs: UK Government Sustainable Procurement Action Plan, *(2007) March*
http://www.defra.gov.uk/sustainable/government/publications/pdf/SustainableProcurementActionPlan.pdf

Department for Transport: Delivering a Sustainable Transport System – Consultation on Planning for 2014 and Beyond, *(2008) November*
http://www.dft.gov.uk/consultations/open/planning/

Department for Transport: Public Attitudes to Climate Change and the Impact of Transport, *(2008) January*
http://www.dft.gov.uk/pgr/statistics/datatablespublications/trsnstatsatt/attitudestoclimatechange2

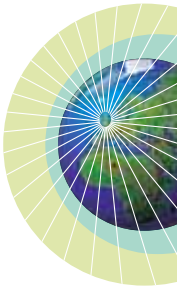
Department of Trade and Industry: Our Energy Future – Creating a Low Carbon Economy, *(2003) February*
http://www.berr.gov.uk/files/file10719.pdf

Direct Gov: Act on CO_2 Calculator Website
http://actonco2.direct.gov.uk/index.html

Direct Gov: Guide to Greener Living Website
http://www.direct.gov.uk/en/Environmentandgreenerliving/Greenerlivingaquickguide/DG_064391

Eddington, R: The Eddington Transport Study, *(2006) December*
http://www.dft.gov.uk/about/strategy/transportstrategy/eddingtonstudy/

Energy Saving Trust: Energy Saving Trust Website
http://www.energysavingtrust.org.uk



Enviros: The Potential for Behavioural and Demand-Side Management Measures to Save Electricity, Gas and Carbon in the Domestic Sector, and Resulting Supply Side Implications, *(2008) November*
http://www.defra.gov.uk/environment/climatechange/uk/energy/energyservices/documents/decc-save-energy-implications.pdf

Eoin Lees Energy: 'Evaluation of the Energy Efficiency Commitment 2005-08', report to DECC, *December 2008*

Europa: Energy Efficient Buildings Save Money: Recast of the Energy Performance of Buildings Directive, *(2008) November*
http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/693&format=HTML&aged=0&language=EN&guiLanguage=en

Eyre, Nick: Regulation of energy suppliers to save energy – lessons from the UK debate', in Proceedings of the British Institute of Energy Economics Conference, *September 2008*

Federation of Master Builders: Building a Greener Britain, *(2008)*
http://www.fmb.org.uk/news/campaigns/building-a-greener-britain/

Green Homes Concierge: Green Homes Concierge Website
http://www.greenhomesconcierge.co.uk/

HM Government: Securing the Future – Delivering UK Sustainable Development Strategy, *(2005) March*
http://www.defra.gov.uk/sustainable/government/publications/pdf/strategy/SecFut_complete.pdf

HM Treasury: Budget 2008, *(2008) March*
http://www.hmrc.gov.uk/budget2008/

HM Treasury: Pre Budget Report, *(2008) November*
http://www.hm-treasury.gov.uk/prebud_pbr08_repindex.htm

Innovas: Position on Low Carbon and Other Green Jobs on the Market (Forthcoming)

International Energy Agency: Advancing Near Term Low Carbon Technologies, *(2008)*
http://www.iea.org/G8/CHP/docs/UK.pdf

London Green Homes Service: London Green Homes Services Website
http://www.greenhomesconcierge.co.uk/services_benefits/summary_of_benefits.aspx

National Audit Office: Accelerating the move to a low carbon economy, *(2007) November*
http://www.nao.org.uk/publications/0708/the_carbon_trust_accelerating.aspx

Number 10: Number 10 Website
http://www.number10.gov.uk/Page16807

Office of Climate Change: Annual Report to Parliament, *(2007) July*
http://www.defra.gov.uk/ENVIRONMENT/climatechange/uk/ukccp/pdf/ukcc-annrpt-07.pdf

Ofgem: A Review of the Energy Efficiency Commitment 2005-2008, *(2008) September*
http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=25&refer=SUSTAINABILITY/ENVIRONMNT/ENERGYEFF/PREVSCHEMES

Parity Eco Solutions: Parity Eco Solutions Website
http://www.parityecosolutions.com/demonstration_project.htm

Residential Energy Conservation Ordinance (RECO): RECO Website
http://www.sfbaywindow.com/articles/1/4/146.html

Rugg and Rhodes: Review of Private Rented Sector Housing, *(2008) October*
http://www.york.ac.uk/inst/chp/Projects/PRSreview.htm

Salix Finance: Salix Finance Website
http://www.salixfinance.co.uk

Scottish Executive: Proposals for Improving the Energy Performance of Non-Domestic Buildings, *(2008) September*
http://www.scotland.gov.uk/Publications/2008/08/15155233/0

Stern, N: The Stern Review, *(2006) October*
http://www.occ.gov.uk/activities/stern.htm

TCPA & CHPA: Community Energy: Urban Planning for a Low Carbon Future, *(2008)*
http://www.chpa.co.uk/news/reports_pubs/Community%20Energy-%20Urban%20Planning%20For%20A%20Low%20Carbon%20Future.pdf

UK Energy Research Centre: Energy Performance Certificates: Are they Really Working? *(2008) August*
http://www.ukerc.ac.uk/MediaCentre/UKERCPressReleases/Releases2008/010808EPCs.aspx

University of York: Review of Private Rented Sector Housing, *(2008) October*
http://www.york.ac.uk/inst/chp/Projects/PRSreview.htm

World Wildlife Fund: How Low? – Achieving Optimal Carbon Savings from Existing Housing Stock, *(2008) March*
http://www.wwf.org.uk/what_we_do/campaigning/one_planet_homes/how_low__key_findings.cfm

Printed in the UK by The Stationery Office Limited
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ID6034546 02/09

Printed on paper containing 100% recycled fibre content minimum.


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