

# Executive Summary

## The Carbon Challenge

The world's economies need to get on a path to being significantly less carbon-intensive. This means using less energy in our products and services and changing the way we produce energy so that more of it comes from low-carbon sources.

A key step to achieving this in Europe has been the introduction of the EU Emissions Trading Scheme (ETS). By putting a price on carbon it creates a strong economic incentive for more energy efficiency and investments that help reduce carbon emissions. The Government is determined to ensure that the EU ETS develops into a credible long-term international framework for pricing carbon.

To achieve this we are working with the European Commission on proposals for the third phase of this Scheme – which should be more ambitious in reducing carbon across the EU than previous phases – to begin in 2013. We need a strengthened ETS; key to this is signalling the direction of EU emissions reductions over a longer period into the future than the five years in phase II. This will give more certainty to companies planning long-term investments in power stations and other energy intensive assets. We will keep open the option of further measures to reinforce the operation of the EU ETS in the UK, should this be necessary to provide greater certainty to investors.

On present policies, the UK is on course to exceed its target under the first commitment period of the Kyoto Protocol, which is to cut greenhouse gas emissions by 12.5% on 1990 levels throughout the period 2008-2012. The welcome strong performance of the UK economy over the past nine years has, however, led to growing energy consumption. This growth combined with higher levels of electricity generation from coal has led to higher carbon emissions in the UK. So we now need to take further action to help us move towards the goal of cutting carbon emissions by 60% by 2050.

## Saving energy

**The starting point for reducing carbon emissions is to save energy. The challenge is to secure the heat, light and energy we need in our homes and businesses in a way that cuts the amount of oil, gas and electricity we use and the carbon we emit.**

Progress on energy efficiency requires all of us – companies, individuals and Government – to recognise that we have a role to play. The main obstacles to the take up of energy efficiency are lack of information about costs and benefits, absence of appropriate incentives, and lack of motivation among consumers. We propose measures that will provide individuals and companies with more information and clearer incentives to make better use of energy.



In total by 2020, we estimate the measures we propose on energy efficiency<sup>1</sup> could be a saving of 6 – 9 MtC (million tonnes of carbon), around 4 – 6% of our total emissions in 2005, on top of the 12 MtC saving that will come from the policies announced in the 2006 Climate Change Programme by 2010.

In our homes people need more information about the amount of energy we use and its environmental impact. We should require energy suppliers to provide their customers with more information about their energy use over time and advice on saving energy. There are other tools coming that will also help householders. Trials are starting this year to test the impact of a range of modern technologies in providing real-time information to households about their energy use. And the new Home Information Packs, provided to all new buyers and tenants, will include comprehensive data on the energy efficiency of the house.

We will lead a drive to raise basic standards of energy efficiency. Working with other governments, manufacturers and retailers, we will seek to phase out the least efficient light bulbs, remove the most inefficient white goods from the market and limit the amount of stand-by energy wasted on televisions, stereos and other consumer electronics.

We are already building new homes that are much more energy efficient than previously. For example, new homes use around a quarter of the energy to heat and light compared with the average existing home. We will put in place measures to take us towards our long-term ambition of making all new developments carbon neutral. These measures will provide strong support for the use of on-site electricity generation, such as solar panels or mini wind turbines.

And we are proposing to look at how we can radically transform the role of energy supply companies so that they have strong incentives to work with their customers to get more out of the energy we use in our homes, rather than simply selling more energy.

The EU Emissions Trading Scheme and the Climate Change Levy are the key instruments to encourage business to save energy and cut emissions. But there is wide potential to make cost-effective energy savings – around 1.2 MtC by 2020 – in many businesses and public services not covered by the EU ETS and we will bring forward proposals to incentivise making those savings. We shall consult on a proposal for a mandatory emissions trading scheme – an Energy Performance Commitment – alongside other options, for achieving our carbon reduction aims in this sector.

Government too has to change its behaviour and take energy efficiency even more seriously in the buildings and operations it is responsible for. We will change the way Government procures buildings, goods and services in order to reduce energy use across the central Government estate. We aim to make the central government estate of buildings carbon neutral by 2012, with any shortfall to government targets 'offset' by payment into a central fund and ploughed back into sustainable energy projects.

<sup>1</sup> Including carbon savings from recent announcements on carbon neutral developments and carbon neutral Government.

Energy saving measures will also help us meet our security of supply objectives. For example, the proposals outlined in this paper will reduce gas consumption by between 11 and 15 billion cubic metres in 2020 (roughly 10 – 13% of expected gas consumption by 2020).

### More energy efficient transport

Transport accounts for around 30% of total UK energy use (mostly from oil) and around 25% of UK carbon emissions. Emissions from road transport in the UK are projected to peak around 2015 and thereafter fall as growth in demand for transport moderates, fuel efficiency in transport continues to improve and we start to use more lower-carbon fuels, especially biofuels. However, there may be more cost effective opportunities to save carbon in the longer term as new technologies are developed and applied.

Government has established the principle that fiscal measures can play a part in achieving our environmental goals and will continue to examine how fiscal and other policy instruments can achieve these aims. Company Car Tax and Vehicle Excise Duty have already been reformed to reflect this, and combined with savings expected from the Voluntary Agreement on new vehicle fuel efficiency, these measures are expected to deliver reductions of 2.3 MtC in 2010.

We will continue to press the European Commission to seriously consider the inclusion of road transport in the EU Emissions Trading Scheme, potentially saving between 4 and 7 MtC in 2020. And we are working to get aviation included in the EU ETS as well.

We are also pressing for new EU targets on new car fuel efficiency to be finalised as soon as possible. We believe the Commission should consider all options for ensuring these targets are met, including mandatory targets with trading. We will also seek to raise awareness amongst consumers so that they can make informed choices about the type of cars they buy and how they use them.

## Cleaner energy

**Cost-effective ways of using less energy will help move us towards our carbon reduction goal. But on their own they will not provide the solution to the challenges we face. We also need to make the energy we use cleaner.**

### Distributed energy generation, including low-carbon heat

Most of our electricity is generated in large power stations, and around three quarters of our heat comes from gas fed through a nationwide network. This centralised model delivers economies of scale, safety and reliability. But a combination of new and existing technologies are making it possible to generate energy efficiently near where we use it, potentially delivering lower emissions, increased diversity of supply and in some cases lower cost.

A 'distributed energy' system using these technologies could radically change the way we meet our energy needs in the long-term. Heat and electricity can be created locally from renewable sources. Where we use fossil fuels, local generation allows us to capture the heat generated in that process and use it



nearby. Smaller-scale systems have the potential to be more flexible and to reduce the energy we lose in networks. And a more community-based energy system could lead to a greater awareness of energy issues, driving a change in social attitudes and, in turn, more efficient use of our energy resources.

It is not yet a question of leaving our centralised system behind. Less than 1/2% of our electricity comes from microgeneration, and Combined Heat and Power plants (capturing the heat from electricity generation) provides about 7%. Most small-scale renewables, for now at least, are expensive compared to large power stations. And there will be tough transitional issues. To capitalise on our best renewable resources, for example, we need to continue extending our networks to the remote locations where they are found.

To understand its true long-term potential, and the challenges we face in getting there, we will commission a high-powered investigation of the potential of distributed energy as a long-term alternative or supplement to centralised generation, looking at the full range of scientific, technical, economic and behavioural issues.

But we must grasp the opportunities offered by distributed energy today. Government is therefore taking forward a series of measures to encourage the use of low carbon and distributed technologies, with action at community level and to encourage individuals. We will be removing barriers, where viable, in planning, in selling electricity and in accessing the benefits of the Renewables Obligation. We are encouraging Local Authorities to take action appropriate to their communities, and will be announcing new powers and duties for the Mayor of London. There will also be the potential to use the recently announced Environmental Transformation Fund (ETF)<sup>2</sup> to encourage distributed generation.

And with Ofgem we will undertake a comprehensive review of the economic and other incentives that currently impact on distributed generation, including those that affect energy supply companies and the operators of distribution networks.

### **Large scale electricity generation**

Over the next two decades, it is likely that we will need around 25 GW (Giga Watt) of new electricity generation capacity, as power stations – principally, coal and nuclear plants – reach the end of their lives and close. This will require substantial new investment and is equivalent to around one third of today's generation capacity.

Power station investments are long term and we need to have in place the right framework to incentivise those investment decisions to be made at the right time and to limit carbon emissions, helping us lock in substantial carbon savings for years to come.

Over the next few years, new investment is likely to be in renewables, especially wind, and gas-fired power stations. Longer term, there are other low carbon forms of generation that can contribute to meeting our goals.

<sup>2</sup> The Environmental Transformation Fund was announced in June 2006. The fund will provide a boost to investment in renewables and other low carbon technologies.

We propose a number of measures to improve the market framework for investment:

- a strong commitment to carbon pricing in the UK, through improving the operation of the EU Emissions Trading Scheme
- a strengthened commitment to the Renewables Obligation
- proposals for reform of the planning regime for electricity projects
- a clear statement of our position on new nuclear build
- new arrangements for providing improved information about future trends in energy supply.

### Renewable electricity

Renewable energy is an integral part of the Government's strategy for tackling climate change. We propose a range of measures to promote its growth – taken together we believe we can achieve 20% of our electricity coming from renewable sources by 2020.

The Renewables Obligation (RO) is the key support mechanism for the expansion of renewable electricity. It has succeeded in bringing forward major developments of the most economic forms of renewable energy, in particular onshore wind, landfill gas, and co-firing of biomass in coal power stations. The cost of the RO is met by electricity consumers. It allows renewable energy, which is currently more expensive to produce than coal, gas or nuclear, to be competitive with them. Its rationale is that, as these are new technologies, they are yet to achieve the full economies of mature technologies. We propose to strengthen the RO in two ways.

First, we will increase the level of the RO. At present, it is due to rise to about 15% in 2015-16 and remain at that level till the Obligation ceases at the end of 2026-27. We now plan to ensure that the level of the Obligation always stays above the level of renewables actually installed, up to a 20% obligation. This will boost investors' confidence in the returns they can make from their projects.

Second, we propose to consult on adapting the Renewables Obligation to reflect the fact that some technologies are better-established and no longer need the full support of the Obligation, and so that it begins to provide more support to emerging technologies – such as offshore wind. We propose to consult on whether and how we might "band" the Obligation to provide differentiated levels of support to different renewable technologies. Any change would not be introduced until 2009 or 2010. The new arrangements would not apply to projects in operation before the changes were introduced.

In this report, we set out the strategic role of renewables in the energy system. We also announce that we will consult on changes to the planning inquiry rules. Taken together, these should help reduce planning delays to renewable projects while recognising the rights of people to object to applications.

Much of our renewable resource, potential and planned projects are to be found in Scotland, where the promotion of renewable energy is the responsibility of Scottish Executive Ministers. We will work with them to deliver on our UK-wide targets.



Renewables should also benefit from the Environmental Transformation Fund.

This boost for renewables will add carbon savings of around 0.7 – 1.5 MtC per year by 2020 to the savings the RO is already helping to deliver. Our proposals will not increase the impact of the RO on bills. Additional renewables will also contribute to our security of supply goals, for example by displacing gas power stations that might otherwise be built (around 1 – 2% of gas consumption in 2020).

### **Replacing nuclear power stations**

Nuclear power is currently an important source of low carbon electricity in the UK. The existing fleet of nuclear power stations will close in the years ahead. Our assessment is that higher projected fossil fuel prices and the introduction of a carbon price to place a value on CO<sub>2</sub> have improved the economics of nuclear as a source of low carbon generation.

We have concluded that new nuclear power stations would make a significant contribution to meeting our energy policy goals. For illustrative purposes, if existing capacity were replaced, then by 2030 our carbon emissions would be around 8 MtC lower – equivalent to total emissions from twenty two 500MW (Mega Watt) gas-fired power stations – than otherwise, and our gas consumption some 13% lower.

It will be for the private sector to initiate, fund, construct and operate new nuclear plants and to cover the full cost of decommissioning and their full share of long-term waste management costs. But in view of the potential benefits for our public policy goals, the Government proposes to address potential barriers to new nuclear build.

By early next year, the Health and Safety Executive will develop guidance for potential promoters of new nuclear power stations. This will explain how they can obtain assessment of possible reactor designs before committing significant sums to planning and construction.

On nuclear waste, the report of the Committee on Radioactive Waste Management, due later this month, following its interim report published in April, will provide the basis for a decision on the long-term management of waste by the Government and the Devolved Administrations.

We are also setting out a proposed framework for considering the relevant issues and context in which planning inquiries should be held. This would be set out in the Energy White Paper to be published around the turn of the year. To support preparation of this White Paper, we are consulting on the proposals outlined in annex A of this document.

For nuclear new build, considerations of safety and security will be paramount, as they are with the regulation of our existing nuclear plant.

### **Cleaning up fossil fuels**

The Government believes that coal has a role to play in our generating mix. During this winter over 50% of our electricity generation came from coal-fired stations, underlining the benefits coal brings in delivering secure electricity supplies. To have a long-term future coal needs to tackle its heavy carbon

emissions. Carbon Capture and Storage (CCS) is an emerging technology which could reduce the carbon emissions of coal or gas power stations by 80 to 90%. If CCS were economic and technically feasible on a large scale, it could deliver substantial reductions in carbon emissions, not just in the UK, but also in rapidly developing countries such as China and India.

The UK has some natural and commercial advantages – such as a strong oil industry and old oil fields where carbon dioxide could be stored – that mean we could be well placed to benefit from this technology. We will therefore continue to work with international partners on CCS and to remove regulatory barriers. The Government believes that the next step in the development of CCS would be a commercial demonstration, if it proved to be cost effective. Following HM Treasury's recent consultation on CCS, more work will be undertaken on the costs of such demonstration projects, and a further statement will be made at the Pre-Budget Report. Successful demonstration could lead to CCS saving several million tonnes of carbon on an annual basis in the 2020s.

### Developing alternative fuels for transport

Alternatives to petrol and other fossil fuels are already being used in a variety of forms of transport. But it will take decades before we see a real shift away from oil as the predominant fuel source. We propose a Transport Innovation Strategy that will help to bring forward cleaner technologies and fuels. We also intend that the level of the Renewable Transport Fuel Obligation should rise above 5% after 2010/11. Provided certain conditions are met, and for example we were able to raise the level of the obligation to 10% by 2015, we would save a further million tonnes of carbon a year, equivalent to removing another 1 million cars from our roads.

## The Energy Security Challenge

### Security of supply

**The challenges of reducing carbon emissions and ensuring security of supply are closely linked. Security of supply requires that we have good access to available fuel supplies, the infrastructure in place to transport them to centres of demand and effective markets so that supply meets demand in the most efficient way. Many of the measures already described for tackling carbon emissions also contribute to the healthy diversity of energy sources that is necessary for meeting the energy security challenge.**

There are two main security of supply challenges for the UK:

- Managing increased dependence on oil and gas imports; and
- Ensuring that the market delivers substantial and timely investment in electricity generating capacity and networks so that households and businesses have the electricity they need at affordable prices.

With production from our own reserves of oil and gas in decline we will increasingly rely on international markets to give us access to the supplies we need. For example, we could be importing as much as 90% of our gas needs by 2020 compared with 10% or so now. This brings risks:



- The largest global reserves of oil and gas are concentrated in Russia, Central Asia, the Middle East, and African countries. We shall become increasingly reliant on supplies from these regions.
- Global energy demand is forecast to grow strongly. This will mean greater competition for supplies.
- There is a risk that supplier countries may not make sufficient or timely investments to increase output.
- The global oil market has tightened, with a decline in spare production and refining capacity. The OPEC share of the crude oil market is projected to increase from 40% now to around 50% by 2030.
- Unlike oil, gas is not currently traded in a global market. While increasing shipments of Liquefied Natural Gas may make the market more flexible, gas is now largely supplied into regional markets and constrained by access to pipelines which may cross many countries.
- Overall, these trends could put upward pressure on prices and encourage increased political intervention in international energy transactions.

### **Our response**

We need to respond to these challenges with:

- A strong international agenda to promote more open and competitive markets.
- A market framework in the UK that is positive for investment and diversity of supplies and for the growth of our own home-grown energy.

Our international agenda is active on three fronts.

First, bilaterally, we are building stronger political relationships with energy producers to ensure UK energy suppliers have fair access to energy supplies.

Second, within the EU, we are backing the Commission in securing effective implementation of a competitive, liberal energy market. This will address anti-competitive behaviour and ensure more reliable UK access to gas coming into European networks.

Third, multilaterally, we are working to strengthen the dialogue between consumers and producers so there is a better common understanding of the mutual benefits of investment in exploration and production, rapid deployment of cleaner and more efficient technologies, and open trade in supplies.

For the UK, the Government believes that the best way to maintain energy reliability is through energy diversity – in our sources of energy, our suppliers, and our supply routes. Competitive markets can help us achieve diversity, as companies themselves seek diversity in order to manage risks.

### **Market information and projections**

We need to improve the quality of information and analysis about the outlook for gas and electricity supplies. This should make the market work more effectively, and it will help government judge how far our regulatory framework looks likely to deliver reliable supplies. Currently, the Joint Energy and Security of Supply working group is designed to bring together market information, helping investors make informed choices. We shall bring forward proposals in the autumn to build on and improve these arrangements.



## Securing electricity supplies

The large investment needed in new electricity generation will be a big test for our market-based system. The incentives for companies to build new power stations need to be consistent with the economy's need for capacity to be added in a timely way. We shall continue to monitor the investment outlook very closely, including through the new arrangements described above. It will be particularly important for the market to respond to the prospect of significant coal power station closures in the period up to 2015, brought about by EU environmental legislation. Adequate investment in transmission networks will also be essential. Ofgem are consulting on proposals to allow a big increase in investment over the period 2007-2012.

By setting out in this report the Government's position on renewables, nuclear power, and carbon pricing, we believe we will provide energy companies and investors with greater clarity about the future. The proposals set out in this report to streamline and simplify the planning process for large-scale energy projects should reduce delays in delivering the significant new investment the country will need to meet its energy demands over the coming years.

## Coal

Coal-fired generation continues to meet around one third of electricity demand on average and during the winter of 2005/6, in response to high gas prices, it met about half of demand. This illustrates the important contribution made by coal-fired generation to the UK's energy security and the flexibility of the UK's energy system.

The future for coal must be to become cleaner. "Clean coal", in particular CCS, can make this a reality.

Generators have already recognised the importance of coal and have committed significant investment to enable 20GW, or about two thirds, of existing coal-fired capacity to comply with new EU legislation. Coal-fired generation will therefore continue to play an important role in the UK's energy system, provided that its environmental impact can be managed effectively.

The Government will convene a coal forum to bring together coal-fired generators, coal producers and suppliers, power plant suppliers, trade unions, small businesses and other parties in order to help them to find solutions to secure the long term future of coal-fired power generation and UK coal production.

## Securing gas supplies

There are three elements in our strategy for securing our gas supplies:

- maximising economic recovery from the North Sea;
- limiting our dependence on gas; and
- managing the risks in higher gas import dependence.

## Maximising exploitation of UK oil and gas reserves

Estimates of the oil and gas remaining to be produced from the UK Continental Shelf (UKCS) range from 21 to 27 billion barrels of oil equivalent. Analysis suggests that if the higher estimates are right and if investment in exploration and development can be maintained near current levels, then



production in 2020 could be equivalent to a million barrels day higher than if investment falls away (split roughly equally between oil and gas production).

The underlying geology and future oil and gas prices are the dominant drivers of investment and hence ultimate recovery levels. But we have identified actions that could be taken now to boost the attractiveness of investment in the UK compared to other regions of the world. This will help recovery from fields that are already producing and establish infrastructure to the west of Shetland for our undeveloped heavy oil resources. The Treasury's review of the fiscal framework will also be important.

### **Limiting UK gas dependence**

It will be for energy producers and consumers to decide how much gas we should use within the market framework we have established. But the action we are taking in support of our carbon goals should have the effect of reducing the amount of gas we need in our economy and hence our demand for imports.

But gas will continue to be needed for heat because at present there are no cost effective alternatives that could be implemented at scale. And the economics of gas-fired power stations are likely to mean they remain attractive for new investment.

### **Managing gas import risks**

Many countries, including most of our competitors, are already energy import dependent and have been for many years. Whilst we should avoid excessive dependence on gas as a single source of our energy, it will continue to play a very important role. So we will need to prepare for higher levels of imports and manage the attendant risks.

Promoting more open and competitive international markets, is central to our strategy for managing a much higher level of gas imports.

Facilitating the timely construction of sufficient storage and import infrastructure to meet our energy needs is also critical. The private sector has already responded to our increasing import requirement by committing £10bn of investment in new gas pipeline and storage projects. As with electricity, Ofgem is consulting on proposals that would allow a big increase in gas network investment over the next five years. We will need to find the right balance between the national need for timely delivery of this infrastructure and local concerns as these projects come through the planning system. We propose to consult in the autumn on measures to improve the consenting regime for gas infrastructure.

We also need to review whether there are clear enough incentives for the UK market to develop sufficient flexibility – including, for example, gas storage – to meet these challenges. We shall seek the views of energy suppliers and users on the effectiveness of current gas security of supply arrangements, and whether they need strengthening as we become more dependent on gas imports.

## Delivering competitive prices through effective markets

Over the past decade, the UK has benefited from the most competitive gas and electricity markets in the EU and G7 with prices in the UK decreasing substantially since energy market liberalisation. However as the UK increasingly becomes a net importer of energy, we may be affected by the interaction of the UK's liberalised energy market with the less liberalised energy markets in the rest of the EU.

The UK suffered some very high prices this past winter. Despite this, flows through the UK-Belgium gas interconnector averaged 60% of total capacity which indicated that the EU market was not responding to price signals as would be expected in a competitive market. We asked the Commission to investigate, specifically to establish whether this may have been due to abusive behaviour or distortions in the wider EU gas market. We are awaiting the results of the Commission's inquiry.

Two recent reports from the European Commission on the functioning of EU electricity and gas markets identified serious problems: the high degree of market concentration; vertical integration being used as a barrier to new entrants; the lack of market integration; the lack of transparency; and the lack of well functioning and transparent market mechanisms for setting prices. These problems have led to significant extra costs for UK consumers

We will continue our drive for EU energy markets liberalisation and integration, by working with the European Commission to enforce and strengthen internal market legislation and to make full use of European competition rules to tackle anti-competitive practices, and to influence the future direction of European energy policy as set out in the European Commission's Green Paper<sup>3</sup>.

We also remain committed to improving the functioning of the UK's energy markets as the best way to deliver competitive prices. Our proposals improve the effective functioning of UK energy markets through:

- greater information transparency leading to more informed investments and decision making;
- improved planning helping to facilitate investments coming onstream in a timely way and
- a consultation on whether our gas security of supply framework is fit for purpose as we become increasingly import dependent.

These measures should reduce pressure on fossil fuel prices and the likelihood of price volatility. Our proposals to improve energy efficiency should also help reduce the energy bills of business and household consumers.

## Protecting vulnerable consumers

Everyone should be able to afford an adequate energy supply and live in a warm home. Between 1996 and 2003, considerable progress was made in tackling fuel poverty, with the number of UK households in fuel poverty falling from 5 million to around 1.5 million.



This was thanks to a range of factors – not least economic growth, progress in tackling poverty in vulnerable elderly households and households with children, and specific fuel poverty policies. Those policies include the Winter Fuel Payment, and the Warm Front programme and its equivalents in the Devolved Administrations, under which 1.5 million homes across the UK have received assistance. Rising fuel prices mean that fuel poverty remains a major long-term challenge. We will therefore take steps to better target existing support. And in dialogue with energy companies and other interested parties, we will keep our policy framework under review.

## What do our proposals deliver?

By implementing these proposals, the UK will be much better able to respond to the increased risks associated with the move to increased UK gas import dependence and the need for substantial new investment in electricity generation.

And on climate change, full implementation of these ambitious proposals will be a significant step in the right direction, getting us on course to achieve real progress in emissions reductions in 2020 and on the right path to achieving our goal of cutting the UK's CO<sub>2</sub> emissions by 60% by 2050.

Carbon emissions would be between 19 and 25 million tonnes lower in 2020 than our current projections. That's a cut of 13 – 17% on what we anticipate our 2020 emissions would be otherwise.

We are proposing to establish a new Office of Climate Change, which will monitor progress towards our carbon goals and ensure coherence of action across Government departments to achieve them. And we shall continue to study the merits of carbon budgeting as a means of helping deliver our goals.

In taking forward the proposals and further work set out in this report, we will continue to consider the regulatory impact our proposals will have on different groups and sectors within our society. These include companies and organisations that will play a direct role in helping us deliver our objectives – such as energy suppliers, regulators, and local and regional authorities – as well as businesses and individuals who will be affected by new requirements arising from our proposals – product manufacturers, retailers, and homeowners for example.

The Government is clear in its determination to achieve its energy policy objectives through an approach that is consistent with the principles of good regulation. Over the coming months, we will work to refine our estimates of the benefits the measures in this report are expected to deliver and the policy and administrative costs that will arise. Only measures that are well-targeted, reasonable and proportionate will be implemented. We will assess this on a case-by-case basis, while having regard to the collective regulatory impact on business and other parties.

## Introducing Chapters 1-9

The following chapters set out the detail of the Government's proposals. Many of these proposals help us make progress against more than one of our energy challenges.

- Chapter 1 sets out our overarching approach to saving carbon and giving incentives to reduce carbon dioxide emissions.
- Chapter 2 sets out the Government's proposals to increase the efficiency of the products and services we use at work and at home and to improve the standards and heat efficiency of buildings.
- Chapter 3 sets out the Government's proposals on distributed energy. This includes proposals on combined heat and power (CHP), microgeneration and proposals to encourage the development of renewable forms of heat.
- Chapter 4 sets out the Government's proposals on oil, gas and coal. This includes steps to make international markets for oil and gas work better; to encourage companies to maximise investment and production from the UK's fossil fuel resources; and to help reduce the risks associated with the UK's increasing reliance on gas imports.
- Chapter 5 examines the electricity market and the need for substantial new investment in power stations over the next two decades. This includes proposals on renewables, cleaner coal and carbon capture and storage and on civil nuclear power.
- Chapter 6 discusses the steps Government will take to reduce carbon dioxide emissions from transport.
- In chapter 7, we set out the steps the Government will take to improve the planning process for all energy infrastructure. The proposals include planning improvements for gas infrastructure (e.g. pipelines, LNG terminals and gas storage) and electricity generation, including renewables, CHP, fossil fuel and nuclear power stations.
- Chapter 8 highlights the progress the overall package of proposals could help us make by around 2020 towards addressing our energy challenges. In this chapter, we also describe the potential for future technologies to help us make more rapid and cost-effective progress in the coming decades.
- Finally, in chapter 9, we summarise the next steps, including the actions and timing of the proposals and consultations we plan to launch after the summer.

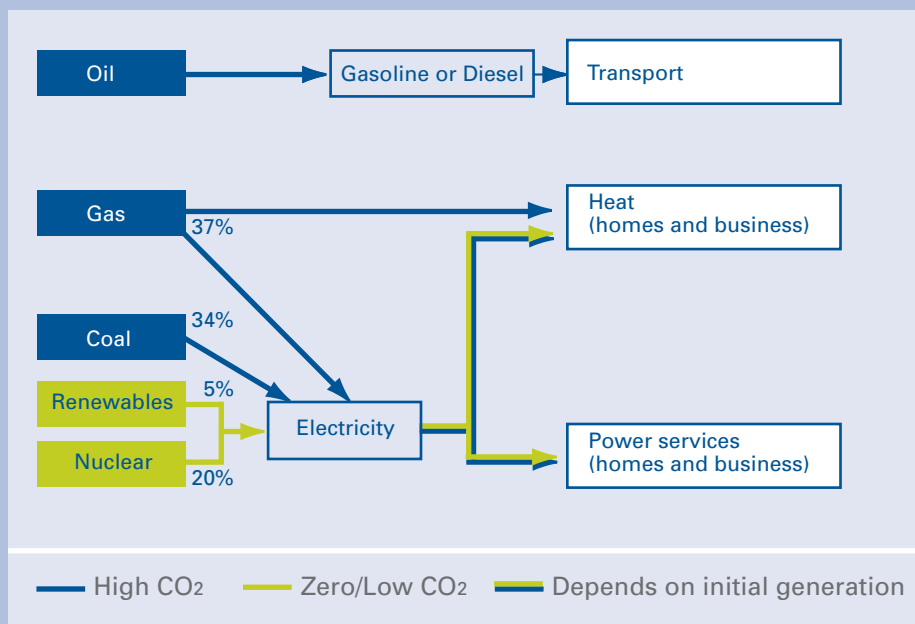


## BOX 1: THE UK ENERGY SYSTEM

Energy is essential to nearly everything we do. We use it in transport, to generate the heat that we use in homes and businesses and to power our lights and other appliances. Increasingly we are learning how to use natural and renewable sources of energy such as sunlight, water, wind and crops to meet these needs. We remain however, heavily reliant on fossil fuels which, when burnt, release greenhouse gases.

For transport we currently rely almost entirely on oil – 99% of our road transport relies on it, in the form of petrol or diesel.<sup>4</sup> Indeed oil and transport are intimately linked, with around 74% of our oil going to transport. Heat is generated mainly from gas, but we also use electric heaters and burn small amounts of oil, coal and other natural substances. For lighting and the powering of appliances, we use electricity. Capturing only the major flows from raw fuel through to end use, we might think of our energy system in simple diagram form:

CHART 1: THE UK ENERGY SYSTEM



Source: DTI, 2006

Electricity plays a key role in this system. It is not a fuel, but rather a conduit of energy generated from a mixture of coal (34%), gas (37%), nuclear (20%) and renewables (5%)<sup>5</sup>. When the use of fossil fuels to generate electricity is added to their uses in transport and providing heat, we get a full picture of our reliance on fossil fuels.

4 DTI Energy Flow Chart. 2004, [www.dti.gov.uk/files/file11248.ppt](http://www.dti.gov.uk/files/file11248.ppt)

5 The remaining 4% consists mainly of electricity imports and oil.