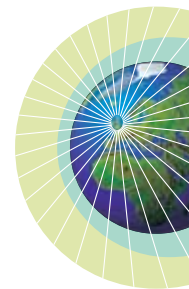


# Executive Summary



We face two key energy policy challenges: to tackle climate change and ensure security of energy supply. To meet these challenges, we are already acting to develop a diverse low-carbon energy mix including renewables, nuclear power and carbon capture and storage, and to promote energy efficiency and demand reduction.

Renewable sources of energy are a vital part of this strategy. They provide low-carbon energy, increase the diversity of our energy mix, and bring key business and employment opportunities. We therefore agreed with our EU partners last year to a binding target that 20% of the EU's energy consumption must come from renewable sources by 2020. The European Commission has proposed that the UK's contribution to this should be to increase the share of renewables in our energy mix from around 1.5% in 2006 to 15% by 2020. This would be a very challenging target. It will be important to meet it in the most cost-effective way possible.

In this document we are consulting on a range of possible measures to deliver our share of the EU target. Together they could lead to almost a ten-fold increase in our use of renewable energy – across electricity, heat and transport – by 2020. This will affect consumers, businesses and the wider environment. Indeed, everyone in the UK will have a role to play in this endeavour.

We already have a wide range of policies in place to deliver increased renewable deployment in the UK. We want to hear your views about the additional measures that we will need to employ. These could include:

- extending and raising the level of the Renewables Obligation to encourage up to 30-35% of our electricity to come from renewable sources by 2020;
- introducing a new financial incentive mechanism to encourage a very large increase in renewable heat;
- delivering more effective financial support for small-scale heat and electricity technologies in homes and buildings;
- helping the planning system to deliver, by agreeing a clear deployment strategy at regional level similar to the approach established for housing;
- ensuring appropriate incentives for new electricity grid infrastructure and removing grid access as a barrier to renewable deployment;
- exploiting the full potential of energy from waste, by discouraging the landfilling of biomass as far as is practical;

- 
- requiring all biofuels to meet strict sustainability criteria, to limit adverse impacts on food prices, or other social and environmental concerns;
  - promoting the development of new renewable technologies, through effective support particularly where the UK has the potential to be a market leader;
  - maximising the benefits for UK business and jobs, by providing a clear long-term policy framework, working with Regional Development Agencies to tackle key blockages, considering support for specific technologies and addressing skills shortages.

## Introduction

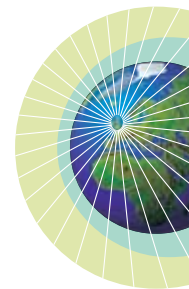
### Renewable energy in the UK


1. Energy policy in the UK faces two very serious challenges: tackling climate change by reducing emissions both here and abroad, and ensuring that our energy supply remains secure. The Energy White Paper 2007 set out the Government's response to these challenges.
2. As well as strongly supporting international action to address climate change at EU, G8 and UN level, we have set ourselves the ambitious target of reducing the UK's carbon emissions by at least 60% by 2050. Under the Climate Change Bill our emission reduction goals for 2020 and 2050 will become statutory, with the introduction of five-year 'carbon budgets' (total emission limits). The Government will be required to produce plans to meet its carbon budgets, and to report to Parliament on how it is doing so.
3. Our main policy for achieving carbon reductions involves putting a price on carbon, notably via the EU Emissions Trading Scheme, which caps emissions in the power and other heavy industry sectors in the EU. However, in line with the principles of the Stern Review into the economics of climate change, we also encourage behavioural change to reduce energy use, and we provide support for specific low-carbon technologies.
4. Ensuring security of energy supply is essential to climate and energy policy. Fundamental to securing our energy supplies is to ensure that we are not dependent on any one supplier, country or technology. By increasing the level of energy we generate domestically, we will be less dependent on imports of fuel from abroad. Investment in more renewable energy in the UK, alongside other low carbon sources such as nuclear power and carbon capture and storage, can contribute to a more diverse mix of technologies and lower levels of fossil fuel imports. Our Renewable Energy Strategy (RES) can make an important contribution to this – we estimate that increased investment in renewables in the UK to meet a 15% renewable energy target in 2020 will reduce UK gas imports by 11-14% in 2020.
5. It will be very important that this diverse, low-carbon energy mix is achieved at competitive prices. We believe that the best way to ensure this is through

independently regulated markets, with the right interventions to correct specific market failures.

6. This document focuses on renewable energy. Since 2002, the chief policy mechanism to encourage the deployment of renewables has been the Renewables Obligation (RO), which requires electricity suppliers to obtain a specified and increasing proportion of their electricity from renewable sources or pay a buy-out price. Since its introduction, the RO has increased the level of RO-eligible renewable generation in the UK from less than 2% in 2001 to around 4.4% in 2006. This year we will overtake Denmark as the country with the highest operating offshore wind capacity in the world at over 400 MW. We have also recently introduced the Renewable Transport Fuel Obligation (RTFO) to bring forward biofuels in the transport sector.
7. The 2007 Energy White Paper set out proposals to reform the Renewables Obligation to make it more effective and efficient. It also suggested policies to address key stumbling blocks for renewable deployment, arising from planning controls and difficulties with grid connection. Many of these reforms are now being enacted through the Energy and Planning Bills currently before Parliament.
8. At the end of 2007, we launched a Strategic Environmental Assessment on a draft plan for up to 25 GW – nearly a third of our current total electricity generating capacity – of new offshore wind development rights in UK waters. In June 2008 The Crown Estate launched Round 3 of the offshore wind leasing programme, with bids expected in early 2009. In January this year we also announced the terms of reference for a cross-Government feasibility study into a barrage or other tidal power scheme in the Severn Estuary.
9. However, we will need to go much further. As part of our long-term support for renewables, in spring 2007 we helped secure agreement in the EU to an ambitious target to source 20% of the EU's total energy use – a combination of electricity, heat and transport – from renewable sources by 2020. This compares to around 8.5% across the EU in 2005. Member State contributions to this overall target have yet to be agreed, but the European Commission has proposed that the UK should provide renewable sources for 15% of its total energy use by 2020.
10. This is a very challenging target. In 2006 only around 1.5% of our final energy consumption<sup>1</sup> came from renewable sources, and under current policies<sup>2</sup> we expect this to rise to 5% by 2020. To meet the proposed EU target by 2020 we will have to increase the proportion of our energy coming from renewables ten-fold from 2006 levels, three times more than current policies are designed to achieve.
11. Delivering this level of change in renewable energy in such a short time will need action at all levels. Government – central, devolved, and local – will need to set the overall policy framework, as well as increasing its own use of renewable energy. This document is drafted from the perspective of UK policy, but the Welsh Assembly and the Scottish and Northern Ireland Ministers all recognise the importance of renewable energy, and they will

1 This is equivalent to 25 Terawatt hours (TWh), out of a total 1,800 TWh consumed in the UK.  
2 Policies set out in the Energy White Paper 2007.



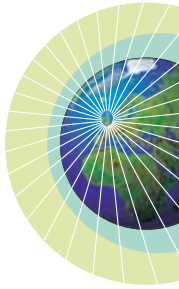


be essential in meeting the target. The market will also need to provide the necessary investment, and businesses and individuals will have to play an important role, for example by using less energy and supporting increased renewable deployment. This document sets out initial ideas of how each group could contribute. We want to hear your views on the proposals it contains, as well as any other ideas for achieving our ambitious goal in the most cost-effective way.

## A new strategy

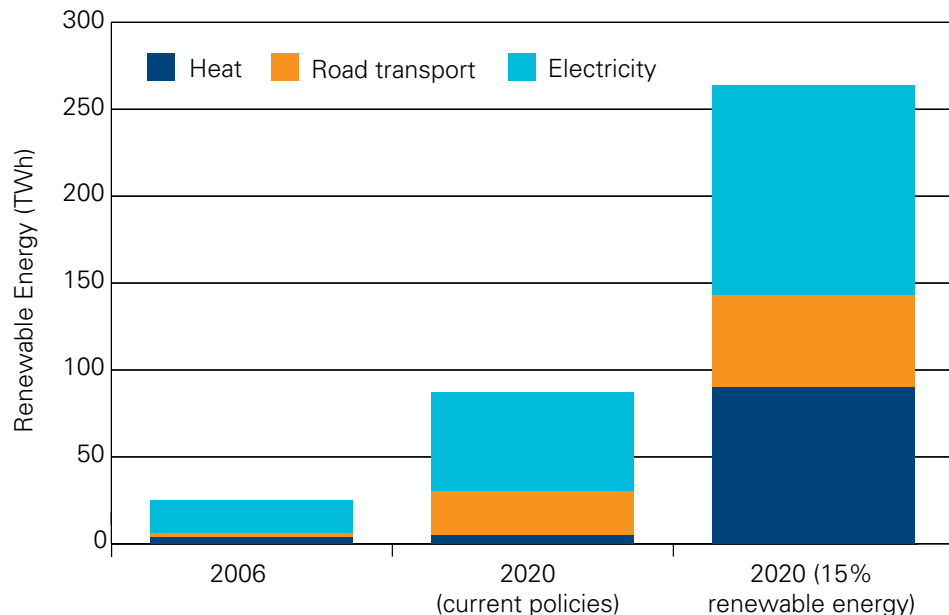
12. To meet the EU Renewable Energy target, we will need a far-reaching new strategy to increase the contribution of renewable sources in the three main energy-consuming sectors – electricity, heat and transport.
13. This document contains a range of possible additional measures to encourage deployment of renewable energy in the UK. These measures are designed to achieve a 15% renewable energy target for the UK by 2020. However, in a market economy policy alone cannot guarantee outcomes. How much these measures will deliver will depend on how energy companies, developers and investors in the market, and the supply chains which serve them, respond to the signals we provide. It will also depend on how successful we are in overcoming the constraints on development. Indeed, because renewable deployment depends on decisions by governments, businesses, communities and individuals in all parts of the UK, it will depend to some extent on how committed we are as a country to achieving our goals.
14. If all the options set out in this document were successfully implemented (and if no cost constraints were applied in deciding the measures we should take), our scenarios suggest that it will be possible to reach 15% renewable energy in the UK by 2020. This is at the top end of the range of possible outcomes and would require a very rapid response from suppliers, with a step change in the rate of building renewable technologies. We would need to develop a completely new approach to renewable heat: providing a substantial incentive to jump-start this new market, developing supply chains and encouraging large numbers of households to find renewable ways of heating their homes. We would also need to develop a new sustainable biomass market. The country's current wind generation capacity, on and offshore, would have to increase by a factor of ten.
15. Achievement of the target will also depend on the extent to which we can reduce overall energy demand. The renewable target is a percentage of total energy consumed: the lower that figure, the easier it will be to achieve the required share. Reducing energy demand is of course also important for other reasons: it is cost-saving to households and businesses, it reduces greenhouse gas emissions, and it contributes to security of supply. That is why the starting point for our Renewable Energy Strategy is energy saving. All of us have a role in this. We seek views on how this can be achieved.
16. This document does not set out a definitive division of the renewables target between electricity, heat and transport. That will depend on how markets react to the incentives and opportunities provided. There are particular uncertainties over the contribution which can be made by renewable transport. In line with the draft EU Renewable Energy Directive, this document assumes a 10% renewable share of transport fuel. In the light

of the increasing concerns raised in recent months about the indirect effects of biofuels, we commissioned Professor Ed Gallagher of the Renewable Fuels Agency to carry out a review of evidence on this issue. Gallagher’s findings will be important to the development of the Government’s biofuel policies and targets. We are committed to meeting both our and the EU’s renewable energy goals in a sustainable way. We also need to explore how far other renewable transport strategies, such as the development and use of electric-powered cars, can contribute to the renewable transport fuel target by 2020.



17. To understand how the 15% target might be shared between electricity, heat and transport, we have modelled different scenarios, using estimates of cost, practical feasibility (such as ‘build rates’ for onshore and offshore wind) and technology development. This analysis suggests that – if 10% renewable transport is feasible and sustainable – then one possible scenario to deliver 15% renewable energy in the UK in 2020 might be: 10% renewable energy in transport (compared with less than 1% today), 14% in heat (less than 1% today) and 32% in electricity (less than 5% today). If sustainability concerns meant that the transport sector could not contribute 10%, and the same overall renewables target were retained, then the contribution from the other sectors would have to be higher. In this circumstance it is unclear how we could meet the target domestically without making use of other options such as trading with other countries.

Figure 1: The size of the challenge – a potential scenario to reach 15% renewable energy by 2020

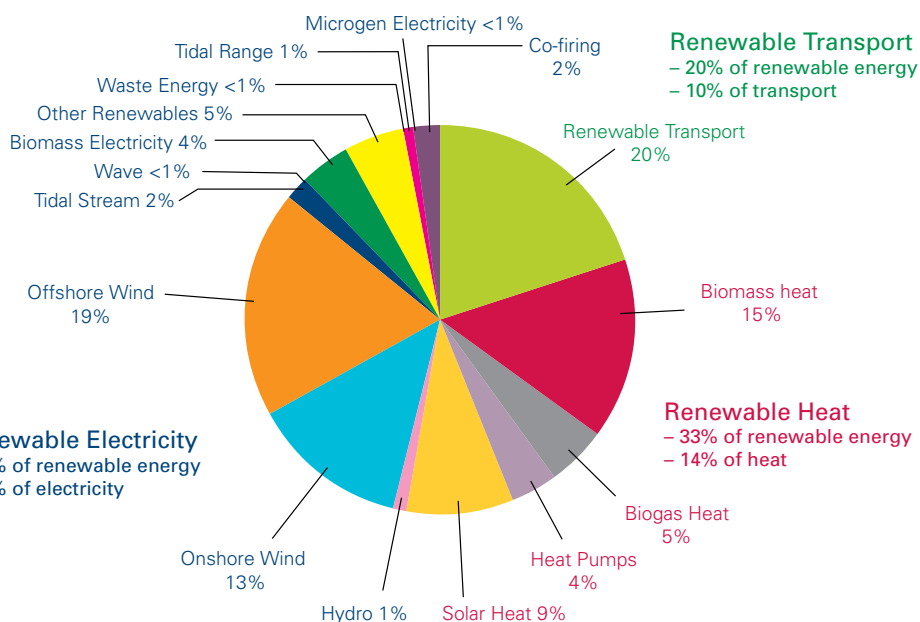


Source: BERR analysis

18. Within the overall framework the Government puts in place, the market will need to determine which technologies should be used, and then to deploy them. Initial analysis based on our current understanding of relative costs and constraints suggests that the key growth areas will be the currently commercial technologies of wind (on and offshore) and biomass. Figure 2 provides one possible scenario of what the final shares of different types of renewables

in 2020 might look like. Other, less-established technologies such as marine power generation may have more of a part to play over the longer term.

Figure 2: Illustrative renewable technology breakdown to reach 2020 target



Source: Redpoint et al (2008), NERA (2008), Department for Transport estimates.<sup>3</sup>

19. We do not underestimate the challenge of delivering this scale of renewable deployment in a little over a decade, although we note that the rate of building needed for offshore wind could be similar to the rapid rates of building that took place for coal in the 1970s and gas and onshore wind in the 1990s. However, to meet our target, we have no choice but to face this challenge head-on. This document seeks views on the measures we need to take to achieve it.

### How much will it cost?

20. Meeting the UK's share of the renewable energy target will involve difficult trade-offs and costs. Providing companies with incentives to make the necessary investments will require an increase in the amount of consumer subsidy. So there will be an effect on fuel prices for all energy users over the longer term, although further energy efficiency measures, and changes in our use of energy could reduce the impact on bills, as discussed below.
21. How far it will involve additional cost for the economy and consumers will depend on the relative costs of renewables and alternative sources of energy. Our initial research, which is set out in the impact assessment attached to this document,<sup>4</sup> suggests that a central estimate of the cost to the UK of meeting a 15% target could be around £5 to £6 billion a year in 2020 (at

<sup>3</sup> The chart shows the split of total renewable energy in 2020 between the three sectors: 20% coming from renewable transport sources; 33% from heat; and the remaining 47% from electricity.

<sup>4</sup> [www.berr.gov.uk/renewableconsultation](http://www.berr.gov.uk/renewableconsultation)

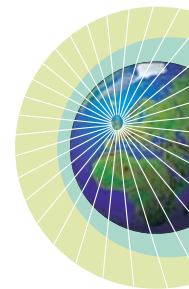
today's prices).<sup>5</sup> This is based on a range of projected prices for oil and other commodities by 2020 which are inherently uncertain: it assumes oil, for example, at \$70 a barrel in 2020. If oil and other energy prices were higher than this, at \$150 a barrel, the cost of the renewable strategy could fall by 35 to 40%. Similarly, these figures assume that demand for energy is at the level projected in the 2007 Energy White Paper; if demand could be reduced below this, the costs would fall.


22. The costs will also depend on the final design of the EU Renewable Energy Directive. A particular issue under discussion is whether trading with other EU member states or investment in renewable projects outside the EU should be allowed to count towards the target. The measures set out in this document relate to increasing renewable deployment in the UK. But because the cost of renewables projects in some other countries (both within and outside of the EU) are lower than the cost in the UK, allowing a specified and limited proportion of our target to be delivered abroad would make the task significantly less expensive – we estimate that trading one percentage point of the target could save 15 to 20% of the costs of meeting the target domestically, with a correspondingly lower impact on energy prices. Supporting the deployment of renewables outside the EU could also provide investment in clean energy technology in poorer countries. We want to hear your views about the extent to which we should seek to use such opportunities.
23. If we are to drive up renewables deployment in the UK to this degree and within this timescale, these costs will have to be incurred. But it is important to recognise what these costs are paying for: a reduction in the risk of catastrophic climate change and dangerous energy insecurity. These risks carry real and much higher costs. The Stern Review showed that the damage caused by global climate change could cost five times more than the cost of actions to stabilise global emissions by 2050. So the Government believes strongly that the cost of meeting our renewables target should be seen as an investment to avoid much higher costs to the economy in the longer term.
24. We want to hear your views about how we can make the step change transition to using renewable energy in the most cost-effective way.

## Saving energy

25. The starting point for our energy policy is to save energy. If we can reduce the amount of energy we use, this will reduce carbon emissions, reduce the need for additional energy supplies and reduce costs. Saving energy can also reduce the amount of renewable energy needed to meet our target by reducing our overall energy consumption; and it is cheaper than investing in new generation plant.

5 These estimates are based on economic modelling by Redpoint et al (2008), Nera (2008) and Department for Transport estimates. Resource costs are net of the value of ETS allowances saved from carbon abated by additional renewable generation in the ETS sectors. Valued at forecast carbon price. Estimates are based on central fuel price estimates.

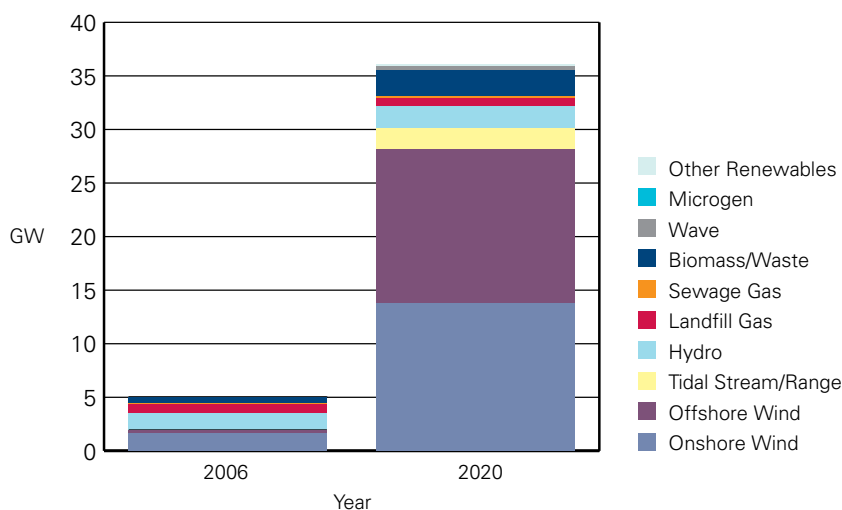


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26. We have already introduced a range of measures to reduce energy use. In the business sector the EU Emissions Trading Scheme, the Climate Change Levy and Climate Change Agreements all provide incentives for greater energy efficiency. In 2010 we will introduce the Carbon Reduction Commitment, a mandatory trading scheme for large non-energy intensive businesses and public sector organisations. In the domestic sector the new Carbon Emission Reduction Target sets obligations on energy suppliers to deliver energy efficiency improvement measures to households. After 2011, as set out in the 2007 Energy White Paper, the Government's aim is to introduce a Suppliers Obligation which aligns the incentives of energy companies with a reduction in demand through the development of 'energy services' markets. Building on already tougher building regulations, we intend that all new homes in England will be zero-carbon from 2016, and all new buildings by 2019. In the transport sector we are negotiating new compulsory emissions targets for new cars.
27. These policies will deliver considerable reductions in projected energy demand over the coming years. However, the EU 2020 renewable energy target changes the context, making more radical measures to reduce energy use more economically attractive than previously considered. Because energy efficiency measures are generally lower cost than building additional renewable supply, our analysis suggests that it will be economically worthwhile to introduce such measures by comparison with marginal electricity options, up to a cost of around £45/tCO<sub>2</sub>.
28. This suggests that in this context there is still scope for significant further increases in energy efficiency across the household, business and public sectors. We are not consulting specifically on these issues in this document. However, later this year, we will consult separately on a range of new and enhanced energy efficiency policies that will help promote cost-effective savings across the economy.
29. Using every unit of energy as efficiently as possible has to be our ultimate ambition. This may lead to an absolute reduction in energy demand in the longer term. To achieve this, our intention is to introduce policies so that every sector of the economy benefits from energy efficiency, that where possible all economic opportunities to save energy are realised, and that our energy efficiency policies are integrated so that links can be exploited. Improving the energy performance of people's homes will play a particularly important role in this, reducing emissions and helping us all to manage our energy bills. We will consult on a new strategy to achieve a step change in household energy efficiency, including a Suppliers Obligation, later this year. All this will be closely linked with our work to develop a low-carbon heat strategy.

## Centralised electricity

30. As outlined above, if we are to meet our 2020 goal, up to 30-35% of our electricity may need to come from renewable sources. Today that figure is less than 5%, made up mostly of biomass, hydro and wind.

Figure 3: Renewable electricity generation capacity – comparison between 2006 and projected 2020



Source: DUKES 2007

31. As shown in Figure 3, we expect the key growth area to be wind power, both on and offshore. Analysis on electricity constraints suggests that up to 33 GW of offshore wind might be achievable by 2030.<sup>6</sup> However, our initial modelling suggests that by 2020 deployment may be closer to 14 GW, compared to less than 1 GW today. This would equate to around 3,000 extra offshore turbines of 5 MW. Others have suggested that higher levels might be achievable – for example, RAB estimated that around 18 GW of offshore wind could be deployed by 2020.<sup>7</sup> BERR is undertaking a Strategic Environment Assessment (SEA) to assess the feasibility (economic, technical and environmental) of proposals for up to a further 25 GW of offshore wind on top of the 8 GW already planned. We want to make full use of the potential for offshore development.
32. Our initial modelling suggests that we might need approximately 14 GW of onshore wind too, compared to 2GW today – equating to around 4,000 new 3 MW onshore turbines in addition to the approximately 2,000 turbines already installed. Others have estimated a slightly lower level of onshore deployment, for example, RAB estimated that around 13 GW of onshore wind could be deployed by 2020. Subject to planning permission, we would expect that a large proportion of onshore wind development will take place in Scotland. Tidal barrages and lagoons, such as the options being discussed in Severn Estuary, could also make a key contribution if they are able to meet environmental assessment, economic and other criteria.
33. The level of renewables deployment in the UK has historically been low, largely due to the availability of cheap alternative energy sources, particularly North Sea oil and gas. While the Renewables Obligation has provided a strong financial incentive mechanism since 2002, several non-financial constraints have inhibited and slowed renewables deployment. These include, in

6 SKM (2008a)

7 RAB (2008)

particular, planning issues (including conflict with other Government policies); access to the electricity grid; and supply chain constraints. In this consultation we would like to hear your views on our proposals to address each of these issues, as set out below.

## Financial incentives

- 34.** The current financial incentive to produce renewable electricity comes from the Renewables Obligation,<sup>8</sup> by which electricity suppliers must obtain a specified and increasing proportion of their electricity from renewable sources. Since it was introduced in 2002, the RO has increased the level of RO-eligible renewable generation in the UK from less than 2% in 2001 to around 4.4% in 2006. Under measures set out in the Energy Bill, it is estimated that the RO will lead to around 14% of our electricity being generated from renewable sources by 2015-20.
- 35.** To meet the EU 2020 renewable energy target, however, we will need to at least double this figure. This consultation examines various alternative ways to provide the financial incentive for this, including strengthening the RO or introducing a new scheme such as feed-in tariffs (which guarantee renewable generators a fixed sum per unit of electricity generated). Our analysis indicates that, while feed-in tariffs could in some circumstances have theoretical financial advantages, these benefits could be within the margin of modelling error and would be small for the scale of deployment required. More significantly, it is less likely that a new system of feed-in tariffs could achieve the target by 2020, due to the delay and uncertainty that a change of support scheme (which could take several years to introduce) would necessarily entail. There could also potentially be difficulties in the operation of feed-in tariffs in the UK's market-based system. This document therefore concludes strongly in favour of maintaining the RO for large-scale electricity while recognising that we need to continue to improve its efficiency. The RO will nevertheless need modifying, including significantly increasing the level of the Obligation (e.g. 30–35%), and extending its end date. On the assumption that the RO is maintained, we would like your views on any further changes required.
- 36.** This document also considers the most appropriate financial incentive for microgeneration of electricity (see below).

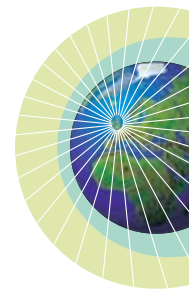
## Planning issues

- 37.** A robust planning regime is vital to ensure that the national, regional and local economic benefits; environmental and social objectives; and the interests of individuals, communities and society as a whole are all taken properly into account in reaching decisions about new developments. We are firmly committed to maintaining the democratic, participatory values of our planning system.
- 38.** We know there are potential tensions between local concerns and wider national policy and needs. Renewable developers often complain that the balance between them is not always struck correctly; that the planning system takes too long, costs too much and, in some cases, does not consistently reflect national policy. This can block new generation and the

<sup>8</sup> The Renewables Obligation covers England and Wales. Scotland and Northern Ireland have their own renewables obligations.

extensions to the electricity grid which are necessary for it to become operational, adding delay and cost to investment.

39. We are already seeking powers to address some of these concerns through the Planning Bill and the Marine Bill, notably by ensuring that all onshore wind developments above 50 MW and offshore wind developments above 100 MW in England and Wales are considered by a new Infrastructure Planning Commission (IPC) on tight timeframes and on the basis of a new National Policy Statement for renewables.
40. To achieve the 15% target all parts of the UK, in particular the Devolved Administrations, English Regions, Local Authorities and local communities, will have to play their part in contributing to the achievement of the target. We would like to hear your views on a range of potential additional measures to support onshore renewable developments within the context of the reformed planning regime. These could include:
- development of a suite of stronger National Policy Statements for renewables and electricity networks that would set a clear, comprehensive, national policy framework for local planning authorities;
  - helping the planning system to deliver, by agreeing a clear deployment strategy at regional level similar to the approach established for housing;
  - the creation of an expert body to provide specialist advice on renewable energy to local planners and developers;
  - further extension of Permitted Development Rights for domestic microgeneration to include wind turbines and air source heat pumps, extension to smaller-scale non domestic renewables and using Local Development Orders to speed up the re-powering of existing wind turbines.
41. We also need to create the conditions in which communities are able to see local benefits in renewables developments. Sometimes it is only the disadvantages they see. We would also like to hear your views on how this could be achieved. Measures could include:
- establishing a single benchmark for the local community benefits that renewable developers are expected to provide and producing best practice guidance;
  - considering the particular needs and circumstances of the renewables sector in developing the detailed design of the Community Infrastructure Levy (CIL), which secures contributions from developers towards funding for local infrastructure;
  - providing mechanisms that will enable communities to benefit financially from the development of community energy assets.
42. A significant number of planning applications for new renewable developments, notably wind farms, are blocked as a result of conflict with other Government policies. This reflects legitimate policy concerns – notably to avoid degradation of radar that could have adverse effects on national security; to protect the local environment; and to secure adequate space for





sea transport. We would like to hear your views on how to resolve such policy conflicts, potentially through:

- implementation of the new Memorandum of Understanding between the Government and the wind industry, and the development of an aviation action plan to identify workable solutions to mitigate the impact of wind turbines on radar systems;
- extending the Vessel Traffic Service (VTS) – a system for assisting shipping movements at sea – to allow offshore wind farms to be built closer to shipping lanes;
- providing clarity on the scope and application of UK and EU environmental regulation – relating in particular to the Birds and Habitats Directives – to help renewable development proposals to comply with environmental legislation.

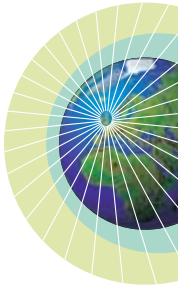
43. The Marine Policy Statement, proposed under the draft Marine Bill, will also help to address planning issues in relation to offshore renewable developments by integrating the Government's existing and new policies on marine issues, and identifying and resolving conflicts of this type.
44. The Devolved Administrations are also working on these issues in the light of their responsibilities for planning outside England and Wales. The Government seeks to work collaboratively with the Scottish, Welsh and Northern Ireland administrations in achieving our UK renewables target.

### Grid issues

45. New renewable electricity needs secure connection to the national grid to gain access to the electricity market in order to sell its output. Some new grid infrastructure will be needed to meet our target. For example, new offshore wind projects will need sub-sea cables to take the electricity generated onshore, and further upgrades to the onshore network may be needed to transport that power to the end users (businesses and homes).
46. We have already taken the major decisions on the shape of a new Offshore Transmission Regime which will ensure swift and cost-effective grid connections for offshore generation. Measures will include the licensing of offshore transmission through competitive tenders run by the Gas and Electricity Markets Authority (Ofgem).
47. In the Transmission Access Review (TAR), published at the same time as this document, we have announced a number of measures that should, over time, remove the constraints on grid access for onshore generation. We aim to ensure that all generators, not just of renewables, who want to connect to the electricity grid can do so when they need to. We are announcing short-term measures in the TAR to speed up the grid connection of projects that already have planning permission through a form of 'connect and manage', for an interim period. We have also concluded that fundamental changes are needed to the rules that govern access to the grid. Ofgem and the industry have been tasked with delivering that change. However, the Government will review progress at the end of the year and if it is insufficient we will consider further options, including legislation, to bring about the changes we believe are

needed. Ofgem also intends to review the incentives on network operators to build the necessary infrastructure in a timely fashion, and to review with National Grid the system planning standards to allow the connection of more generation to a given network.

48. We are also consulting separately on revised statutory social and environmental guidance for Ofgem, the energy regulator. Ofgem must have regard to such guidance, which sets out the Government's expectations of how it can make a contribution to the achievement of social or environmental policy goals appropriate to its remit and functions. We are seeking views on whether the proposed revised guidance is sufficient and appropriate.



### Supply chain issues

49. Delivering the proposed increase in renewable electricity generation will put considerable strain on supply chains in the energy sector. The drive to increase renewable deployment elsewhere in the EU and around the world will increase these pressures. Our core approach to reducing supply chain constraints is to provide a clear, long-term policy framework which will give investors and suppliers confidence in future demand. We will also be working with Devolved Administrations, Regional Development Agencies and business to tackle specific blockages, identify key gaps in the supply chain, and encourage those best able to fill them to the benefit of UK jobs and the economy.

### Impacts on the electricity generation market

50. We would like to hear your views on the potential impacts that a large increase in renewable deployment might have on the electricity generating market. One important area is the relationship between renewable and fossil fuel plants. The intermittency and variability of wind and some other renewable generation will have implications for the rest of the electricity generating fleet, as well as presenting challenges to the system operator in the vital task of ensuring instantaneous balance on the national grid. Our initial analysis suggests that these challenges can be met through back-up generation from fossil fuel plants. Even though meeting the European target would mean a large share for renewable generation in the UK electricity mix, the need for back-up plants, along with the large numbers of conventional plants due to close in the next two decades, means that the next decade will also require considerable new build of fossil fuel generation. On these assumptions, including the impact of new measures to meet the renewables target, we would expect to need over 45 GW new generating capacity by 2020 – of which around 30 GW will be renewable.
51. New techniques of 'dynamic demand management', utilising new technologies such as commercial-scale electricity storage and smart meters, may also be able to play a role in addressing the intermittent nature of some renewable technologies. The future widespread use of electric vehicles could provide distributed energy storage capacity via batteries and could potentially improve the efficiency of the electricity grid by smoothing power demand between day and night. Smart metering is likely to have a particularly important role in dynamic demand management. It could also help with optimising network operation, for instance through the provision of far more data on energy usage than is available at present. The Government recently announced that it will proceed with a rollout of advanced metering for larger business sites from early 2009, and a call for evidence on smart or advanced

metering for other business customers will follow this summer. Decisions will be made after the second report from the Energy Demand Research Project, which is due in November 2008.



## Heat

52. Heating accounts for the largest single proportion of the UK's final energy demand at approximately 49%, and also the largest proportion of our carbon emissions at 47%. Increasing renewable heat is therefore crucial for delivering the UK target. However, deployment is presently at a very early stage, and only about 0.6% of heat is generated from renewable sources. Unlike electricity, heat cannot travel for long distances without significant losses and expense so most deployment is decentralised and local. Because heat is typically generated on site, the existing market consists of fuel, equipment and services. There is thus no heat unit price or traded sector as there is for electricity. The fragmented nature of the heat market, compared to electricity, means it is more difficult to develop renewable heat policies that encourage efficient and cost-effective deployment of these technologies and fuels.
53. The main technologies to increase renewable heat in the UK are likely to be biomass-based technologies (such as heat from biomass waste) and microgeneration technologies (such as solar water heating and ground and air source heat pumps). Other possibilities include biogas and biomass-fuelled Combined Heat and Power (CHP) plants, which would generate both heat and renewable electricity.
54. Building on responses to the Heat Call for Evidence which the Government published in January 2008, we would like to hear your views on how to increase renewable heat generation in the UK. Measures proposed in this document include:
- introducing a new heat incentive mechanism, such as a Renewable Heat Obligation or a Renewable Heat Incentive, akin to a feed-in tariff, to provide the financial stimulus for new renewable heat deployment;
  - improving the regulation of biomass heating systems to ensure that their rollout minimises the impact on air quality standards;
  - providing regulatory incentives to install renewable heat technologies in new buildings through the implementation of the zero-carbon homes and non-domestic buildings initiatives;
  - providing better information to consumers, businesses and Local Authorities on the potential of renewable heat, including for the planning process.

## Distributed energy

55. Households, businesses and communities can play an important role in reducing carbon emissions by generating their own electricity or heat from renewable or fossil fuel energy sources. Such distributed energy can be

an important tool in tackling the carbon impact of the built environment, particularly when combined with energy efficiency measures. The Government is putting in place ambitious policies to harness this potential, including our zero-carbon new building policies. Furthermore, most of the renewable heat to be brought forward by a new heat incentive mechanism is likely to be produced at local level.

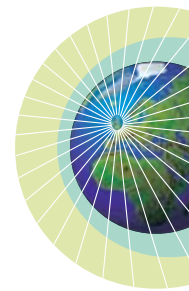
56. Many of the non-financial barriers to increased take-up of distributed energy are being addressed by policies in place or under development. However, the complexity and novelty of some of the technologies, together with their need to be integrated into the built environment, often by players new to the energy business, means there is a significant gap between potential and delivery. Moreover, many of the technologies are not yet cost-competitive at their current state of development and with current fuel and carbon prices. This document proposes a range of possible measures to overcome these cost and information barriers, on which we would like to hear your views. These include:


- delivering more effective financial support for small-scale heat and electricity technologies in homes and buildings (including considering whether a move to a feed-in tariff system may have advantages);
- establishing a decentralised energy ‘information hub’ under the Government’s Act on CO<sub>2</sub> advice service, to bring together and signpost information for households, businesses, communities, developers and others wanting to generate their own energy;
- supporting outreach activity to identify the potential for retrofit of distributed energy in the community.

## Transport

57. The EU’s draft Renewable Energy Directive includes a binding target for all Member States to source 10% of their transport energy consumption (excluding aviation and shipping) from renewable sources by 2020.<sup>9</sup> At present the main source of renewable energy available for transport is biofuels. However, vehicles powered through the electricity grid using renewable energy may have a growing part to play.
58. In 2006, biofuels accounted for less than 1% of the UK’s road transport fuel. However, the Renewable Transport Fuel Obligation, which was introduced in April this year, now requires fuel suppliers to ensure that their road transport fuel contains 2.5% by volume of biofuels, rising to 5% in 2010.
59. It is essential that our biofuel use is sustainable – environmentally, socially and economically. We therefore commissioned Professor Ed Gallagher to carry out a review of evidence on this issue. Gallagher’s findings will be important to the development of the Government’s biofuel policies and targets.

9 The proposed target requires renewable energy to make up 10% of the energy consumption in transport excluding petroleum products other than petrol and diesel. This effectively excludes aviation and shipping, except that any renewable energy in these sectors would count towards the target.

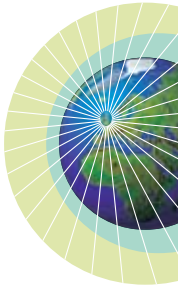


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60. Over the next few years, motor manufacturers have committed to developing electric and, potentially, hydrogen-powered vehicles. In widespread use, such vehicles would have the potential to contribute to the EU renewable transport target. Since electric vehicles may be charged at night (when not in use), and would entail a system of battery replacement, they could have other benefits too. They could improve the returns to renewable energy generation, and through vehicle-to-grid technologies could help smooth electricity demand. They would have the ancillary benefits of reducing air and noise pollution. The Government is keen to promote all options for future technological development (including electric and hydrogen) and is interested in examining now how the development of electric vehicles and an appropriate charging infrastructure could be accelerated in the UK.
61. We would therefore like to hear your views on potential measures for increasing renewable transport in the UK, including:
- agreeing robust sustainability criteria for all biofuel use;
  - adapting the Renewable Transport Fuel Obligation (RTFO) to provide incentives for greater levels of renewable energy in transport with safeguards to ensure these levels are sustainable, and ensuring our support provides the greatest greenhouse gas savings;
  - facilitating the development of second and third-generation biofuels, which are made from non-food sources and therefore avoid many of the sustainability concerns around current biofuels;
  - extending the use of biofuels in rail transport and shipping so far as is sustainable;
  - exploring the potential contribution of alternative vehicle technologies such as electric or hydrogen cars to meeting our renewable energy targets, taking into account the possible impact on electricity demand, and the potential for vehicle-to-grid technologies to help smooth electricity demand.

## Bioenergy

62. Bioenergy is produced either directly, by burning biomass material such as forestry products, or indirectly, such as through the conversion of food wastes to biogas, generating heat and electricity. Currently, biomass accounts for about 2.3% of our electricity generation and for less than 1% of our heat needs. To meet our share of the EU 2020 renewable energy target our analysis suggests that biomass-fuelled technologies, including biogas, may need to provide around 30% of the UK's renewable electricity and heat generation. An increase on this scale means we will have to make the best possible use of UK-produced biomass resource, including waste, as well as meeting some of the increased demand through sustainable imports.


63. This document seeks views on a range of measures for maximising our biomass resources, including:
- ensuring the sustainability and fuel quality standards for biomass, both domestic and imported;
  - supporting research into new energy crops and the development of local supply chains via the existing Bio-Energy Infrastructure Schemes and the Bio-Energy Capital Grants Scheme;
  - discouraging the landfilling of biomass as far as is practical, thereby maximising its availability as a renewable fuel;
  - considering the scope for Local Authorities to collect and separate organic food waste, so that it can be broken down to biogas through anaerobic digestion;
  - encouraging Waste Incineration Directive compliant infrastructure and support for anaerobic digestions as a means of generating energy from waste;
  - a biomass communications programme to raise awareness about the benefits of bioenergy including energy from biomass waste.



## Innovation

64. The development of new and emerging renewable energy technologies will be important for meeting our 2020 target and vital for our longer term climate change goals. Innovation can make improvements to existing renewable technologies and reduce costs, as well as create new technologies. The Government has many ways of supporting innovation – including regulatory and market-based measures, as well as direct funding for research, development and demonstration of new technologies.
65. We would like to hear your views about how we can most effectively encourage innovation in renewable technologies, including technologies such as electricity storage and smart metering which can help support increased renewable deployment. In particular:
- Should we adapt the Renewables Obligation to ensure that it better supports emerging as well as existing technologies? Are there more effective mechanisms to achieve this?
  - Is there evidence that specific emerging renewable and associated enabling technologies are not receiving appropriate support?
  - Are there other barriers to the development of renewable and associated enabling technologies that are not addressed by current or proposed support mechanisms, particularly in areas where the UK has the potential to be a market leader?

## Business benefits

- 
66. Dealing with climate change by reducing carbon dioxide emissions will require a major change in the way the world's economies are powered, as all countries move from high-carbon fossil fuels to renewable or low-carbon fuels and resource-efficient products and services. This rapid expansion in clean technology offers considerable business opportunities. For example, the Carbon Trust estimates that UK annual revenues from offshore wind alone could reach £2 billion per year by 2020, around half of which would come from exports, while revenues from marine renewables could range from £300-900 million by 2020.<sup>10</sup> Our own analysis suggests that the expansion in renewable energy in the UK has the potential to generate 160,000 new jobs in the sector by 2020. There is no guarantee that all these jobs will be sited in the UK, but we want to ensure that we secure as many of them as possible for the UK by putting in place an appropriate policy framework.
67. To maximise the benefits for UK business, the core need is to provide a clear, long-term policy framework within which British companies can invest in renewables. This is what the policy proposals in this document are designed to do. But we also want to take further steps specifically to maximise the UK business and employment benefits of these policies. So we will work closely with our key delivery partners, UK Trade and Investment and the Regional Development Agencies, to encourage investment in the UK from overseas renewables companies, and to encourage UK businesses to turn to renewable technologies. Subject to State Aids clearance, BERR expects to launch a new offshore wind capital grant scheme in 2009. We also intend to ensure that the right economic conditions exist for entrepreneurial growth and spin-out companies for supporting technologies, and to encourage markets that can help to introduce dynamic products to meet renewable targets at competitive prices. We would like your views on how best we can support UK businesses in these ways.

## Wider impacts

68. Delivering such an ambitious shift to renewable energy in just over a decade will involve trade-offs and create some additional challenges and costs in the short to medium term to our economic, social and environmental goals. Our renewables strategy will be underpinned by the principles of sustainable development, integrating social, environmental and economic objectives. We will seek to ensure that we strike the right balance between the contribution of renewable energy to tackling climate change and its potential impacts on other sustainable development priorities. This document sets out our initial analysis of the key impacts.

## Carbon savings

69. Emissions from large-scale electricity and a small part of the heat sector are covered by the EU Emissions Trading Scheme (ETS), which sets a Europe-wide cap on emissions in those sectors and provides incentives for firms

to seek least-cost emissions reductions by creating a carbon price. Our Renewable Energy Strategy will therefore not reduce overall emissions in Europe in the large-scale electricity sector.

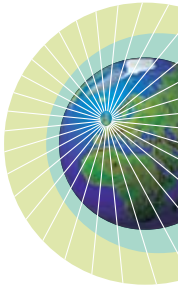
70. This strategy will, however, also considerably increase renewable energy use in the heat and transport sectors, most of which are not covered by the ETS. We estimate that the measures in this document will provide additional savings of around 20 MtCO<sub>2</sub> from heat and transport outside the ETS in 2020 (around 4-5% of our projected 2020 emissions).
71. By requiring an increased use of renewable technologies within the EU ETS cap, one effect of the EU renewables target will be to reduce the EU-wide carbon price. The Commission has estimated that the carbon price will be around €39/tCO<sub>2</sub> across 2013-20, compared with €49 if there were no renewables target.
72. However, as the Stern Review demonstrated, carbon pricing alone is not enough. We will also need policies to support the development of more costly technologies to deliver effective carbon reduction in the longer term. By 2050, we expect renewables, along with other technologies such as nuclear and carbon capture and storage, to be playing a very significant part in delivering a largely decarbonised electricity mix.

### Security of supply

73. A diversity of energy sources – ensuring that we are not dependent on any one supplier, country or technology – is fundamental to managing the risks to the UK's security of supply. Energy from diverse renewable sources across the electricity, transport and heat sectors will play an important role in this regard. Meeting our targets could reduce gas imports by between 12-16% in 2020, with increasing benefits as these become more scarce and expensive. The challenges presented in the electricity sector by an increase in largely intermittent renewable generation are discussed above.

### Energy prices

74. In recent years, as in other countries, we have seen increases in prices for electricity, gas and oil as the cost of fossil fuels on the world markets has increased. Our existing policies to reduce carbon emissions have contributed a small amount to such price increases: about 7% of current domestic energy bills arises from climate change policies. Our measures to incentivise renewable energy deployment will also have an effect on energy prices. Because of the time it will take to accelerate investment, in the short term, up to 2010, the impact on bills will be close to zero. Small increases will then occur in the period 2010-15. By 2020, we estimate that the measures set out in this consultation document, taken together, could result in increases in electricity bills of 10% to 13% for domestic and 11% to 15% for industrial customers; increases in gas bills of 18% to 37% for domestic and 24% to 49% for industrial customers; and increases in petrol and diesel prices of 2% to 4% and 1% to 3% respectively. The distribution of these costs will partly depend on the policy instruments used and how the market responds to them. We are interested in your views on how these costs will and should be distributed across the economy.





75. All things being equal, greater use of renewables should reduce upward pressure on fossil fuel prices. These estimates are based on our central projections of fossil fuel prices in the future (consistent with a projected oil price of \$70/barrel in 2020). If fossil fuel prices were higher (in line with an oil price of \$150/barrel in 2020) the percentage increase in electricity bills could fall by three-quarters. The percentage increase in gas bills could fall by around a half.
76. Further energy efficiency measures could also reduce the impact of these price increases on bills, and will be a focus of further consultation later this year. As far as domestic consumers are concerned, we remain committed to supporting, through our Fuel Poverty Strategy, those households disproportionately affected by energy prices. We will consider these issues further within the context of the Fuel Poverty Strategy in England and Wales. The Welsh Assembly Government will also be reviewing its Fuel Poverty Commitment as part of its work on developing a National Energy Efficiency and Saving Plan. The impact of high energy prices on business and competitiveness will depend partly on actions taken by other EU Member States to meet their targets.

## Next steps

77. We are inviting views on this consultation by **26 September 2008**. We will provide a summary of responses towards the end of the year. In the autumn we will also be consulting on the potential for further energy efficiency measures and considering other low-carbon heat solutions. We will publish our full Renewable Energy Strategy in spring 2009, once the EU Directive has been agreed, along with the UK's share of the target, and the framework in which we can deliver it. The Strategy will set out a clear framework to provide certainty and detail on the policies we will introduce and actions we will undertake to reach our 2020 target and to promote renewable energy in the UK for the long term.
78. We will develop any measures and further work set out in this consultation document in accordance with the principles of better regulation to ensure that the regulatory burden on business is kept to a minimum.
79. Some of the potential measures discussed in this document, for instance the introduction of new financial incentives, would require primary legislation. Following publication of the Strategy, we will introduce any such legislation in England and Wales as soon as Parliamentary time allows.

## How to respond

This consultation seeks views on how to drive up the use of renewable energy in the UK, as part of our overall strategy for tackling climate change, and to meet our share of the EU target to source 20% of the EU's energy from renewable sources by 2020.

Responses to this consultation will help shape the UK Renewable Energy Strategy, which will be published in spring 2009, once the UK's share of the target has been agreed.

We want to hear from members of the public, industry, non-Governmental organisations (NGOs) or any other organisation or public body.

The consultation began on 26 June 2008 and will close 26 September 2008.

There are a number of ways to let us know your views.

### Online

Visit our website at [www.berr.gov.uk/renewableconsultation](http://www.berr.gov.uk/renewableconsultation). 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 e-mail

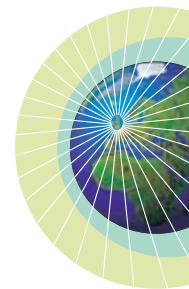
A response can also be submitted by letter, fax or e-mail to:

Renewable Energy Strategy Consultation  
Ropemaker Court  
11 Lower Park Row  
Bristol  
BS1 5BN  
E-mail: [renewableconsultation@opinionsuite.com](mailto:renewableconsultation@opinionsuite.com)  
Fax: 0117 3169 512

### Additional points about this consultation

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 and, where applicable, how the views of members were assembled. The website registration form provides space to do so.

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 & Data Protection

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).

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.

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.

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

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:

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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.berr.gov.uk/renewableconsultation](http://www.berr.gov.uk/renewableconsultation)

## Help with queries

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

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Information about the relevant Devolved Administration policies is available from:

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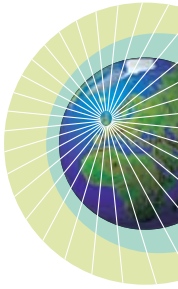
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If you have comments or complaints about the way this consultation has been conducted, these should be sent to:

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A copy of the Code of Practice on Consultation is attached at Annex 5.

Related documents, including the Impact Assessment, can be found at:  
[www.berr.gov.uk/renewableconsultation](http://www.berr.gov.uk/renewableconsultation).