CHAPTER 3

Distributed Energy

Generating energy near where we use it – "distributed energy" – can potentially lower emissions, increase the diversity of our energy supply and, in some cases, lower costs. We will look at the potential of distributed energy as a long-term alternative or supplement to our current highly centralised system. At the same time, we will take steps to encourage the use of low carbon and distributed technologies by individuals and communities, to increase awareness of their potential and to remove barriers to their adoption.

What is distributed energy?

3.1 The UK energy system is highly centralised. Most of our electricity is generated in large power stations connected to a high-voltage 'transmission' network and transported to regional low-voltage 'distribution' networks for distribution to points of use. More than two thirds of our heat comes from gas that is fed through a nationwide gas grid. Both our electricity distribution and gas networks are optimised for a one-way flow, from a small number of entry points out to industry and buildings.

3.2 But there are a number of ways of producing heat and/or electricity for a home, housing development, industrial site or local community, and of connecting these sites through small-scale electricity or heat networks. 'Distributed energy' is a broad term used to denote this diverse range of technologies. Its essence lies in generating energy near where it is used (see box 3.1).

BOX 3.1: DISTRIBUTED ENERGY

There were differences in the way the term 'distributed energy' was understood in submissions to the Review. For some it related solely to energy used near where it was generated. In this report we take a broader view, using the term to refer to the wide range of technologies that do not rely on the high-voltage electricity transmission network or the gas grid. This includes:

- Distributed electricity generation, including:
  - All plant connected to a distribution network rather than the transmission network;
  - Small-scale plant that supplies electricity to a building, industrial site or community, potentially selling surplus electricity back into a distribution network; and
  - 'Microgeneration', ie small installations of solar panels, wind turbines or biomass/waste burners that supply one building or small community, again potentially selling any surplus; and
- Combined Heat and Power (CHP) plants, including:
  - Large CHP plants (where the electricity output feeds into the transmission network but the heat is used locally);
  - Building or community level CHP plants;
  - 'Micro-CHP' plants that effectively replace domestic boilers, generating both electricity and heat for the home; and
- Non-gas heat sources such as biomass, wood, solar thermal panels, geothermal energy or heat pumps, where the heat is used in just one household or is piped to a number of users in a building or community.

3.3 A 'distributed' system could fundamentally change the way we meet our energy needs, contributing to emissions reduction, the reliability of our energy supplies and potentially to more competitive energy markets. The main advantage of the traditional system has been its ability to reduce costs through economies of scale. Gas in large quantities or electricity made in large power stations has been cheaper than other alternatives, despite the cost of transmission over long distances. But a combination of new and existing technologies are opening up the possibility of accessing benefits at a regional or local level.

3.4 New information and communication technologies can help us to monitor and control the electricity system in more sophisticated ways. Emerging energy storage equipment will help us to manage electricity flows on a local scale – most balancing of supply and demand for electricity is currently done centrally. And mass adoption of small-scale generating technologies (for both heat and electricity) would bring down their prices. The result could be economic benefits achieved at a local level rather than through a centralised system.

3.5 There are many advantages to generating energy locally. Chief among them is the potential for more efficient use of our fuels. When using oil, coal, gas or biomass/waste to make electricity, we can use existing Combined Heat and Power (CHP) technology to capture the heat generated and to use it locall.[20] The closer our power stations are to the users of heat, the more we can deploy CHP, reducing the need for an additional heat supply. Given our increasing need to rely on gas for heat, this is potentially a significant benefit in terms of both carbon reduction and reliability of supply. Further efficiencies lie in reducing the amount of energy we lose in transmission and distribution across large distances.

3.6 Another benefit of distributed generation is that small-scale renewable technologies can be deployed at a local level. There is also evidence that a more community-based energy system might lead to a greater awareness of energy issues, engaging people in the supply of energy and, in turn, prompting them to consider how to use it more efficiently. Energy Review submissions outlined a number of other proven and potential benefits of distributed energy applications, for example in providing back-up energy supply, reducing energy costs in some circumstances, and reducing the need to invest in transmission networks.

3.7 Perhaps the most innovative demonstration of the potential of distributed energy has been by Woking Borough Council, which achieved cuts of 77% in carbon dioxide emissions from energy efficiency savings in its own buildings over the period 1991-2004 and invested the profits in renewable energy projects, installing 10% of the UK's solar PV capacity and the UK's only fuel cell CHP by 2004. Among other achievements, Woking Council has developed a network of over 60 local generators, including Combined Heat and Power plant, to power, heat and cool municipal buildings and social housing. Many town centre businesses are also connected to this local energy supply.

Why do we not have more distributed energy?

3.8 Despite the progress made in Woking and in other local areas such as Kirklees in West Yorkshire (see Box 3.2), distributed energy accounts for only a small proportion of our total energy supply. Renewable electricity and Combined Heat and Power plants connected to the distribution grid make up well under 10% of our electricity generation. Off-grid heat generation represents less than 10% of our heat market.[21] Of these, technologies that bring energy generation down to a community or household level – such as the small-scale heat and electricity installations and community heat and electricity networks used in Woking – represent around 1 – 2%.

20 It is not possible to capture the heat from renewables such as micro-wind turbines or solar photovoltaics.
21 'Off grid' here used to refer to heat generation that does not depend on either the gas grid or on electricity.

BOX 3.2: KIRKLEES COUNCIL

Kirklees Council in West Yorkshire has long been a leader on environmental and sustainability issues. It has developed a district-wide renewable energy strategy, established a solar thermal promotion scheme and a corporate capital grant fund for renewable energy. 79 energy efficient homes have been created where owners have invested in solar electricity panels or micro wind turbines. Kirklees now accounts for nearly 5% of the UK's installed capacity of solar photovoltaics across schools, homes and civic buildings. They have also fitted over 160 houses with solar thermal heating and supported a 15kW wind turbine on a local sports college.

3.9 The reasons for current low levels of distributed generation vary by technology and are examined separately below. Three barriers are, to differing degrees, common across them. One is lack of information and awareness. The positive examples of Woking, Kirklees and elsewhere suggest that other developers and planning authorities may be missing cost-effective opportunities to invest in and promote community level electricity networks, CHP, microgeneration and alternative heat technologies. The Government's recent Microgeneration Strategy[21] identified lack of awareness as a key obstacle to the take-up of microgeneration by households, as did our response to the the report of the Biomass Task Force in the context of using biomass for both electricity and heat.[23]

3.10 There are also a number of potential practical barriers. For example, planning permission is often required for installation of microgeneration in a home. The processes required for small electricity generators to receive payment for electricity sold back to the grid, or to access the potential financial benefits of the Renewables Obligation,[24] are complex and time-consuming; and there are currently a number of factors that might be making it more difficult than is necessary to develop local private wire electricity networks.[25]

3.11 Finally, most types of low-carbon distributed generation, especially microgeneration of electricity, are currently expensive compared to more conventional technologies in most circumstances, with high upfront investment costs. But the cost of the best new technologies should decline over time if there is a receptive market and a fair chance to compete. We need to be doing all we can to ensure that we are not missing cost-effective current opportunities, and that we are providing the context in which new technologies can take hold, build scale and become competitive over time.

22 http://www.dti.gov.uk/energy/sources/sustainable/microgeneration/strategy/page27594.html
23 http://www.dti.gov.uk/energy/sources/renewables/renewables-explained/biomass/government-response/page28196.html
24 The Renewables Obligation is described in the Renewables section.
25 Private wire networks are stand-alone networks, some of which are capable of operating without connection to the grid. The main private wire networks are in specific applications such as at the UK's largest airports and on the London Underground system. Electricity is created specifically to provide electricity for users connected to the private wire network. Surplus electricity not used on the private network can in the case of some private wire networks, be sold back into the local grid.

Incentivising Action at the Regional, Local, and Community Levels

3.12 It is inherent in the nature of distributed energy that community leadership will have a significant role to play. In his submission to the Energy Review, the Mayor of London outlined a range of actions that will be taken forward as part of London's Climate Change and Energy strategy. Other regional bodies, and some local authorities, including Aberdeen, Leicester, Sheffield and Southampton, have plans to move forward on distributed generation. Merton Borough Council was among the first of a growing number of Local Authorities to set a target for 10% of the energy on new developments in its area to come from on-site renewables.

3.13 Not all communities will have the same potential, because of differences in geography, population density and wealth. It is imperative, however, that we make the most of opportunities to act cost-effectively where they exist. We will introduce therefore a series of measures aimed to promote the growth of distributed generation at community level.

3.14 First, the Mayor of London has already launched a series of initiatives in the area of distributed generation. But as noted in Chapter 2, we will shortly announce a new statutory duty on the GLA on climate change. Among other things, the Mayor will be required to produce a Climate Change and Energy Strategy which will put forward plans to minimise carbon emissions from the use of energy in London. This should give a further boost to the growth of distributed generation in the capital.

3.15 Second, the Housing and Planning Minister made it clear in a strong statement to Parliament in June 2006 that all planning authorities should include policies in their development plans that require a percentage of energy in new developments to come from on-site renewables, wherever viable.

3.16 Third, we will set out proposals that provide a framework to encourage all local authorities to take action on climate change in the Local Government White Paper later this year. It is important that all local authorities take action to combat climate change in a cost-effective way, taking account of local circumstances and priorities.

3.17 Finally, we explained in Chapter 2 that we will be consulting on a range of options to improve energy efficiency in the large commercial sector including the option of a mandatory emissions trading scheme. This consultation will also consider whether larger Local Authorities and public bodies should be included in these measures[26]. If so, this will provide a direct incentive on those bodies to invest in low carbon measures.

3.18 In addition to action at the level of local government, we are also taking forward a series of measures that will promote demand for distributed generation technologies from households and developers. A process to remove the obstacles to installing microgeneration on existing buildings is already in place (see section 3.36). But the majority of the growth of

26 Any new burden on local authorities will be funded as agreed under the existing new burdens agreement.

renewable generation and community electricity and heating schemes will come from new build where renewables such as photovoltaics and microwind, as well as associated infrastructure such as heating pipes and electricity wires, can be built into the building fabric. But a process to remove the obstacles to installing microgeneration is already in place. See section 3.36 below.

3.19 Our series of proposals aimed at energy efficiency in the housing stock were outlined earlier in chapter 2. They are equally important to the promotion of low-carbon generating technologies as they are to energy efficiency. They are that:

- Government confirms its ambition to support the move towards carbon-neutral developments, through implementation of the Code for Sustainable Homes and making clear that this will set the direction for further tightening of Building Regulations. Carbon neutrality will not be possible in most developments without some form of distributed energy;
- We will undertake a feasibility study into the Thames Gateway becoming cost-effectively a low carbon development area within a decade, and whether and how fast we can move towards zero carbon thereafter. We will look in that context at the major role distributed generation can play in achieving low carbon development; and
- We will consult on the form of the third phase of the Energy Efficiency Commitment (EEC) in the second half of this year. We will consider whether to make changes to EEC that could allow all forms of microgeneration to be eligible under the Scheme.

Large-Scale Combined Heat and Power

3.20 While many of the most exciting growth opportunities in Combined Heat and Power lie with community and building level schemes, and while the Government is bringing forward a range of measures to encourage these[27], the great majority of our CHP capacity will continue to come for the near future from large-scale plant. Because it cannot be transported long distances, opportunities to use the heat from large electricity plants are limited mainly to places where a large industrial heat user is located nearby. But where a long-term buyer for the heat can be found, we must ensure that the full potential of large-scale CHP is captured.

3.21 Between 1997 and 2000 favourable market conditions, in conjunction with the Government's stricter consents policy for new generating plant led to a strong rise in CHP capacity. Total capacity stood at 5.6 GW in 2004, 90% of which was in large-scale plant. Modelling by Cambridge Econometrics, assuming a medium allowance price under the EU Emissions Trading Scheme (EU ETS), estimates that by 2010 total CHP capacity will be in a range 9.3 – 9.6 GW. This modelling is subject to uncertainty and depends significantly on carbon price assumptions.

3.22 Concerns have been raised about the impact of Phase I of the EU ETS on CHP. In developing the Phase II National Allocation Plan the treatment of

27 Set out elsewhere in this chapter.

CHP has been carefully considered. Government has consulted on proposals to create a separate sector for incumbent (existing) Good Quality CHP plant and a ring-fenced New Entrant Reserve for new plant generating Good Quality CHP electricity. Government has also consulted on favourable allocation arrangements to new entrant CHP relative to non-CHP through the New Entrant Reserve. We have decided to introduce changes that will result in more favourable treatment for CHP in Phase II than in Phase I. Announcements will be made in due course.

3.23 Various other policy measures were introduced to support CHP as part of the Climate Change Programme. These include:

- Climate change levy exemptions on fuel inputs to Good Quality CHP and on all Good Quality CHP electricity outputs;
- Enhanced Capital Allowances eligibility to stimulate investment;
- Reducing the rate of VAT rate to all domestic micro-CHP appliances.

Distributed Electricity Generation

3.24 Many of the economic incentives and the potential barriers to investment in medium-scale electricity stations, whether connected to the distribution or the transmission network, are shared with large-scale generation and are discussed in chapters 5 and 7. The specific circumstances and barriers facing CHP and microgeneration are also addressed separately. A description of the types of generation connected to the distribution network is set out in box 3.3.

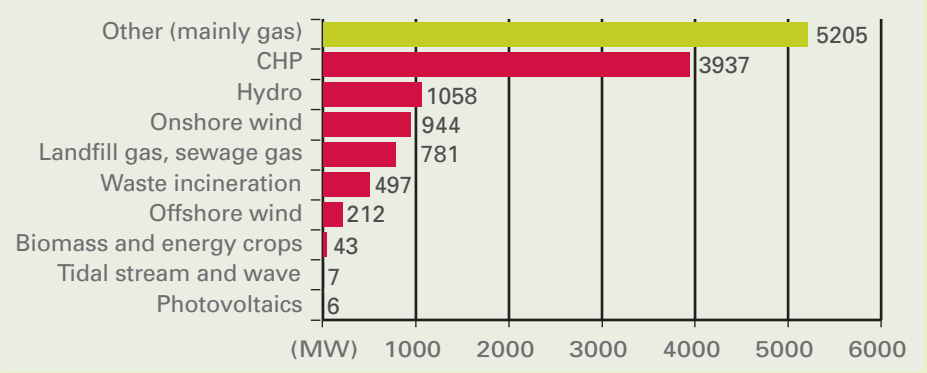
BOX 3.3. BREAKDOWN OF ELECTRICITY GENERATION CONNECTED TO DISTRIBUTION NETWORKS

The majority of our current distributed electricity generation takes the form of medium-scale dedicated electricity plant (see chart 8). Its heat is not captured. This plant operates in essentially the same way as large plant but connects directly into a distribution network rather than the transmission grid. In this report, we make a number of proposals for bringing forward more renewable electricity generation.

The vast majority of the UK's Combined Heat and Power plant (CHP) is located on industrial sites; very little of it provides electricity for residential buildings. Most of our CHP is fuelled by gas, though a small proportion is CHP plant fuelled by biomass/waste. CHP represents around 7% of UK electricity. Two thirds of this connects into distribution networks, the rest to the transmission network.

The final form of distributed electricity generation is microgeneration in the home or in a larger building, for example micro-CHP, mini wind turbines or solar photovoltaic panels. See Microgeneration heading, below. There are only around 3,000 installations currently in place in the UK. These can also be used to supply surplus electricity back to the distribution grid. A negligible amount of our electricity is generated in this way.

CHART 8. GENERATION PLANT CURRENTLY CONNECTED TO UK DISTRIBUTION NETWORKS



Source: DTI, 2006.

3.25 However, investors in these diverse technologies share a common interest in being able to access the distribution grid without undue hassle and in being rewarded appropriately for selling electricity and other services such as balancing of the distribution system. It is also in the interests of these investors for Distribution Network Operators (DNOs) to invest in distribution networks and to explore innovative ways of more efficiently meeting the demands and realising the benefits of increases in distributed generation.

3.26 There is an argument that greater long-term certainty around future industry direction would facilitate more investment and innovation in the networks than Ofgem's current 5-year pricing reviews allow. This needs to be reconciled with Ofgem's need to ensure that investments in networks are cost-effective and do not create unnecessary costs for consumers. In this regard we welcome Ofgem's recent announcement that it will draw together and publish scenarios for the potential long-term development of the networks.[28]

3.27 Ofgem and the Government have done much over the last five years to improve arrangements for medium-scale generators. In 2004 Ofgem announced new incentives for distribution companies to connect all forms of distributed generation, and to invest more in innovation. These incentives only apply to new connection applications since April 2005, so there is as yet limited experience of their operation. Work is also ongoing between Ofgem and the industry in regard to small-scale installations.[29]

3.28 The Government remains concerned, however, to ensure that the overall impact of the regulatory regime is not to discriminate against distributed generation in any unjustifiable way or to disincentivise desirable investment in distribution networks. It is possible, for example, that current price controls create an unnecessary disincentive for Distributed Network Operators (DNOs) to invest in upgrades or to facilitate connection of small generators.

28 Ofgem has committed to take into account the joint Ofgem-Government review announced below in the development of these scenarios.

29 In particular, projects under the Distribution Working Group are looking at a wide range of issues including connection terms, metering/trading and access to the incentives for renewable generation. However, other groups (e.g. the BSC and CUSC Panels, the Grid & Distribution Code Review Panels, the DTI and Ofgem's recently formed Microgeneration Forum) are also dealing with issues that impact unlicensed generators. (This work is focussed on electricity rather than heat).

3.29 A number of submissions to the Review highlighted more specific regulatory barriers, for example in relation to licensing. Among other things, the licensing regime offers protection to consumers and, through competition, ensures that consumers can choose their suppliers. However it was argued to us that the current class exemption regulations for electricity licencing place an unnecessary limit on the economic potential of private wire networks, by limiting supply to residential customers to 1 MW (about 1,000 homes) for each private wire site and placing a 5 MW aggregate limit on trading between sites.

3.30 In this context, the Government and Ofgem will lead a comprehensive review of the incentives and barriers that impact on distributed electricity generation including CHP. This Review will report in the first half of 2007. Its scope will include, but not be limited to:

- The economic and other incentives on suppliers to buy electricity from distributed generators;
- The economic costs and benefits, and other incentives on DNOs to connect new generators and to invest in upgrading distribution networks in order to accommodate increasing amounts of distributed generation;
- The incentives on DNOs to engage in innovation aimed at minimising the costs and capturing the benefits of distributed generation;
- Options for resolving potential barriers to the sale of electricity from small generators, for example:
  - licensing procedures; and
  - technical standards for connection and for network operation.

This review will take place in combination with the study announced in the 2006 Climate Change Programme into the licensing and exemption arrangements govering small-scale CHP and renewables.

3.31 In addition, the Climate Change and Sustainable Energy Act 2006, which received Royal assent in June, empowers Government to require all energy suppliers, through licence modifications, to offer to acquire exported electricity. The Secretary of State has to make a decision whether to use these powers twelve months after commencement, that is, in the second half of 2007. If energy suppliers do not develop a system to acquire electricity from microgenerators, the Government will intervene.

Microgeneration

3.32 Microgeneration refers to small-scale installations that generate heat, electricity or, in the case of micro-CHP, both. Potentially installed in an individual home, better opportunities for microgeneration are often found in larger buildings or developments where scale benefits can be accessed, for example in a school, building development or hospital (see box 3.4).

3.33 Microgeneration has been the focus of particular Government attention over the last 6 – 12 months, with the Microgeneration Strategy (April 2006) enhanced by the Climate Change and Sustainable Energy Act 2006 and Budget 2006. The Microgeneration Strategy will be implemented aggressively by Government, and the powers acquired by Government under the Climate Change and Sustainable Energy Act 2006 will be exercised where appropriate.

Key policies include:

- Easier access to the monetary benefits of Renewable Obligation Certificates;
- Producing reports on energy measures for local authorities – including promoting microgeneration – that authorities will have to have regard to in the exercise of their functions, under the Act;
- Promoting community energy projects;
- A review of communications activity to assess how to improve information provision; and
- A new power for Parish Councils to promote microgeneration in their own parishes.

BOX 3.4: MICROGENERATION

Microgeneration is defined in section 82 of the Energy Act as the small-scale production of heat and/or electricity from a low carbon source. The technologies covered by this definition are:

- Heat producing technologies:
  - Solar water heating installations account for 79,000 out of the total of 82,000 installations
  - Heat pumps (ground source, air source, water source). Ground source heat pumps are starting to gain prominence as on 'off gas-grid' heating solution, but the requirement for ground works makes them more attractive in new build or as part of a substantial refurbishment
  - Biomass stoves and boilers provide space and/or water heating from a variety of fuels such as wood pellets, woodchips, logs and non-wood fuels.
- Electricity producing technologies:
  - Solar photovoltaics can take the form of a bolt-on panel or roof-tiles and are perhaps the most architecturally attractive technology, yet remain one of the most expensive solutions in most cases
  - Micro-wind. Small-scale building-mounted turbines are a relatively new innovation and are one of the cheapest technologies
  - Micro-hydro installations are limited by the availability of suitable locations
- Combined heat and power technologies at the small-scale mainly use natural gas as a fuel but provide electricity as well as heat. The two systems closest to market use reciprocating engines or Stirling engines, with fuel cells being an alternative source of power.

3.34 Budget 2006 allocated an additional £50m of capital grants for microgeneration. Using this fund, *Government is working to set up a framework agreement whereby a number of suppliers agree to provide microgeneration installations at reduced prices*, secure in the knowledge that they will have access to the market created by the £50m grant funding. This is designed to provide a level of certainty for suppliers in return for reduced retail prices for their products. It is hoped that participation in the framework will encourage suppliers to invest in larger-scale production, bringing down prices on a permanent basis and stimulating demand yet further. Expressions of interest were published mid-June, and we aim to have the programme up and running by the end of the year.

3.35 The Government is giving particular attention to schools. We have already pledged significant funds (around £5.5 billion in 2005 – 06) to spend on maintaining and improving school buildings, with the aim of rebuilding or renewing every secondary school and refurbishing half the primary schools in England over the next 10-15 years. We need to ensure that these new and refurbished schools demonstrate substantial energy efficiency savings and carbon reductions.

3.36 As announced in the Microgeneration Strategy, Government is also working on changes to the planning system which will make it much easier for homeowners to install microgeneration equipment on existing houses. The aim of this work is to ensure that, as far as possible, homeowners will be able to install solar panels, photovoltaic cells, domestic wind turbines, etc without having to apply for planning permission.

3.37 Government recognises that uncertainty over the planning status of new equipment, and the cost and time it takes to obtain planning permission, are real barriers to the more rapid adoption of such technologies. We are therefore proposing to ensure that, as far as possible, all such technologies are exempted from the need for a specific planning application through the General Permitted Development Order (GPDO).

3.38 The most recent version of the GPDO came into force in 1995, when few people were aware of microgeneration's potential and so was not drafted to accommodate it. Government will therefore up-date it, with the objective of making these new technologies "permitted development", wherever this can be done without removing essential safeguards that protect the interests of neighbours and local amenity.

3.39 This work will involve amending a Statutory Instrument (SI) and it is necessary to undertake appropriate public consultation before changes come into force. The key target dates for this work are as follows:

W/c 5 June 2006	Consultant contract commences
September	Consultants complete assignment
End October	Interim report to Parliament Public consultation commences (3 months)
End Jan 2007	Consultation ends
Spring 2007	SI and User Guidance drafting completed – 6 week consultation
Summer 2007	Secretary of State reports to, and SI laid before, Parliament
Autumn 2007	Commencement

Developing alternative fuels for heat

3.40 It is difficult to break down precisely the sources of heat used in the UK, as use of fuels outside the gas grid is not measured comprehensively. It is estimated that around three quarters of our heat comes from gas delivered through the national gas grid. Another 8% comes from electricity, for example in the form of electric heaters in the home. The remainder is 'distributed' heat generation, most of it from fossil fuels (eg domestic coal fires or heat from

coal or oil used in industrial processes), and a small portion from renewables (e.g. from biomass/waste plant, solar heating panels, geothermal and/or heat pumps).

3.41 Some investors in low carbon renewable heat technologies are put off by uncertainty in the long-term demand for their product, inhibiting investment and cost reduction. While some of these technologies are mature, others have the potential for significant cost reduction. Even the mature technologies, such as biomass, could enjoy cost reductions with scale and the development of supply chains.

3.42 Costs will come down only with a much more vibrant market. The best way to strengthen market development is to combine grant funding with appropriate incentives on the users of heat to invest in low-carbon solutions. We make a number of proposals, outlined earlier in this Chapter, to underpin the long-term demand from buyers of heat (such as households, developers, local authorities and central government) to invest in low carbon technologies.

3.43 As well as taking measures to underpin demand, it is essential to remove barriers to the development of emerging low-carbon heat technologies. Aggressive implementation of the Microgeneration Strategy, outlined in paragraph 3.33, will benefit low carbon micro-heat installations. In the specific case of biomass, Government recently committed in its response to the Biomass Task Force report (April 2006) to taking forward a wide range of initiatives aimed at removing barriers to market development.

3.44 The Climate Change and Sustainable Energy Act 2006 placed a duty on the Secretary of State to promote renewable heat. The UK provides a direct incentive for renewable electricity generation (the Renewables Obligation) and will be bringing into force a Renewable Transport Fuels Obligation in 2008, but no equivalent instrument for renewable heat. While renewable heat technologies have received grant funding through Clear Skies, Bioenergy Capital Grants Scheme, Community Energy and the Low Carbon Buildings Programme, and while we have committed further funding to renewable heat in England through a new 5-year Biomass Heat/CHP programme,[30] they do not receive additional revenue support.

3.45 There have been a number of calls for a Renewable Heat Obligation or other market-based mechanisms to support renewable heat. In particular we note that in the absence of an equivalent to the Renewables Obligation there is potential for a distortion of the market for biomass in some regions, as demand from local biomass or co-fired electricity plant pushes up its price. The Biomass Task Force found that the most efficient use of biomass is in dedicated heat or preferably CHP plants, rather than dedicated electricity plant, and that there are circumstances where biomass heat was already economic.

3.46 The Government noted in its response to the Biomass Task Force (April 2006) its recommendation that a Renewable Heat Obligation should not be pursued at this time, but indicated that we would further consider the evidence on such a measure. However a number of practical difficulties need to be addressed in relation to the implementation of a direct market-based

30 Announced in the Climate Change Programme Review (2006)

incentive for heat. Unlike the transport fuels market, and the electricity market, where there are easily identifiable suppliers, both the supply and demand for heat are very diverse. There are difficulties in defining on whom a Renewable Heat Obligation, for example, would be placed, and how the amount of low-carbon fuels provided by a supplier could reliably be measured. There is also a risk that measurement and management required to run such a scheme would create significant administrative burdens.

3.47 We will however continue to be open to solutions to these practical issues and will report on this in April 2007. The proposed EU Renewable Heating and Cooling Directive, expected later this year, and further developments of the market for renewable heat technologies over time may hasten this process. We will also consider outputs from the recently launched Carbon Trust's £5m Biomass Heat Acceleration Projects, which aims to help make the biomass heat market self-sustaining by reducing costs and addressing supply-chain risks.

Is Distributed Energy an Alternative to a Centralised System?

3.48 Our current energy system serves us well in many ways. It captures scale benefits in electricity and in the distribution of heating fuel. Recently announced price control proposals will see up to £5 billion invested by 2012 with a minimal impact on bills, and efficiency gains have halved costs in the electricity transmission network since privatisation. Our networks are 99.98% reliable[31] and meet high safety standards. We are beginning to see a marked growth in uptake of renewables, and the prospects for offshore wind are promising. We must protect the best of these outcomes, while grasping the potential of distributed energy to reduce emissions, increase reliability of supply and reduce costs.

3.49 Moving towards a distributed energy system will bring challenges. For example, potential savings due to a reduced need for investment in large power stations cannot be captured until we have reliable capacity in small-scale plant. Given the current low levels of small-scale generation, this may take many years. And the technologies necessary for a truly distributed energy system, notably electricity storage, are still emerging. Investment in networks will need to continue over the next ten to fifteen years to ensure that renewables, particularly in the north of Scotland and offshore, are brought online. See annex E.

3.50 Cost is currently a key limiting barrier for many of the technologies, especially in small scale electricity generation. The stiffening up of long-term demand and the removal of barriers, along with the measures announced in this report, in Budget 2006 and in the Microgeneration Strategy, are major steps in bringing these costs down. In particular, our comprehensive review with Ofgem will aim to ensure that we have the right regulatory framework for Distributed Network Operations and the National Grid to invest appropriately, as part of their re-investment cycles, in technologies that will allow the long-term transition towards a more distributed energy system.

31 Source: Ofgem

3.51 Because the most economical and most convenient opportunities for uptake of community and local energy are in new build, the shift will not happen overnight. And the kinds of communication and information measures laid out in the Microgeneration Strategy and the Government Response to the Biomass Task Force are crucial if there is to be quicker take-up of microgeneration than we have seen with energy efficiency technologies.

3.52 In the meantime, innovators are finding ways to make the economics work, in particular by making efficient use of fuels through CHP schemes. They must be encouraged. One benefit currently available to the customers of some private wire networks is that they do not pay the costs of the Climate Change Levy, the Renewables Obligation, transmission extension or distribution upgrades. Yet some of these networks feed into the grid and rely on it for back-up. As this kind of distributed electricity grows, the impact on prices for grid-users (who do pay these costs) will grow. In the early stages of growth for distributed generation, the impact of this cross-subsidy will be minimal.

3.53 In the light of the many competing considerations in this area, and of the real potential of distributed energy systems, we will undertake a wide-ranging review of the long-term potential and challenges of distributed generation, including Combined Heat and Power, as an alternative or large-scale supplement to centralised generation. Incorporating a range of scientific, technical, economic and behavioural issues, it will be taken forward as part of a Foresight Project looking at sustainable energy management in the built environment, by the Office of Science and Innovation.

3.54 We must recognise however that we will be heavily dependent on much of our centralised infrastructure for decades to come. We need to foster the growth and development of distributed energy in a way that maintains and strengthens the safety and reliability of supply. And energy must remain affordable. In order to achieve our carbon and energy security goals, we must make the most of our renewable resources – such as wind and, in the longer term, marine. These are located predominantly in such remote locations that much of the electricity they generate will have to be transported to energy users in distant locations through our transmission networks.

DISTRIBUTED ENERGY: SUMMARY OF PROPOSALS

Incentivising Community and Building Level Distributed Energy

1. **Government confirms its ambition to support the move towards carbon neutral developments, through implementation of the Code for Sustainable Homes and making clear that this will set the direction for further tightening of Building Regulations. Carbon-neutrality will not be possible in most developments without some form of distributed energy.**

2. **We will undertake a feasibility study into the Thames Gateway becoming a low carbon development area within a decade, and whether and how fast we can move towards zero carbon thereafter.**

3. **We will consult on the form of the third phase of the Energy Efficiency Commitment (EEC3) in the second half of this year. We will consider whether to make changes to EEC that could allow all forms of microgeneration to be eligible under the Scheme.**

4. **In the longer term, Government will work with a wide range of industry and consumer groups to consider whether EEC3 could be replaced with an obligation on suppliers to cap growth of emissions from the household sector. Distributed energy and energy efficiency options investments will be the most common way of achieving this goal.**

5. **We will shortly announce a new statutory duty on the GLA on climate change. This should give a further boost to the growth of distributed generation in the capital.**

6. **We will expect all planning authorities to include policies in their development plans that require a percentage of energy in new developments to come from on-site renewables, where viable.**

7. **We will set out proposals that provide a framework to encourage all planning authorities to take action on climate change, in the Local Government White Paper later this year.**

8. **We will consult on a range of options to improve energy efficiency in the large commercial sector including the option of a mandatory emissions trading scheme. This consultation will also consider whether larger Local Authorities and public bodies should be included in these measures. If included, this would provide a direct financial incentive on these bodies to invest in low carbon heat and electricity technologies in their own buildings.**

9. **We will aim to achieve carbon neutrality in the central government estate by 2012 (as described in Chapter 2).**

Large-Scale Community Heat and Power

10. **We have decided to introduce changes to allowance allocations that will result in more favourable treatment for CHP in Phase II of the European Emissions Trading Scheme than in Phase I. Announcements will be made in due course.**

Distributed Electricity Generation

These proposals are in addition to the proposals made in the Renewables section to bring forward renewable generating capacity.

11. **The Government and Ofgem will lead a comprehensive review of the incentives and barriers that impact on distributed electricity generation including CHP. This Review will report in the first half of 2007. Its scope will include, but not be limited to:**
    - **The economic and other incentives on suppliers to buy electricity from distributed generators;[32]**

32 eg The impact of the Balancing and Settlement Code on rewarding exported electricity.

- **The economic and other incentives on DNOs to connect new generators and to invest in upgrading distribution networks in order to accommodate increasing amounts of distributed generation;**
- **The incentives on DNOs to engage in innovation aimed at minimising the costs and capturing the benefits of distributed generation;**
- **Options for resolving potential barriers to the sale of electricity by small generators, for example:**
  - **licensing procedures (including exemptions);**
  - **technical standards for connection and for network operation.**

12. **The Climate Change and Sustainable Energy Act 2006 empowers government to require all energy suppliers, through licence modifications, to offer to acquire exported electricity. The Secretary of State has to make a decision whether to use these powers twelve months after commencement, that is, in the second half of 2007. If energy suppliers do not develop a system to acquire electricity from microgenerators, Government will intervene.**

13. **Government will undertake a wide-ranging review of the long-term potential and challenges of distributed generation, including Combined Heat and Power, as an alternative or large-scale supplement to centralized generation. Incorporating a range of scientific, technical, economic and behavioural issues, it will be taken forward as part of a Foresight Project looking at sustainable energy management in the built environment, by the Office of Science and Innovation.**

Microgeneration

14. **The Microgeneration Strategy will be implemented aggressively by Government, and the powers acquired by Government under the Climate Change and Sustainable Energy Act 2006 will be exercised where appropriate. Key policies included:**
    - **Easier access to the monetary benefits of Renewable Obligation Certificates;**
    - **Producing reports on energy measures for local authorities – including promoting microgeneration – that authorities will have to have regard to in the exercise of their functions;**
    - **Promoting community energy projects;**
    - **A review of communications activity to assess how to improve information provision; and**
    - **A new power for Parish Councils to promote microgeneration in their own parishes.**

15. **Government will consult on changes to the Planning system with a view to making it easier for householders to install microgeneration equipment on existing houses by removing the need to submit a planning application.**

Alternative fuels for heat

16. **Proposals 1-9 and 13-14 will all impact on alternative heat technologies.**