

# The Government's Strategy for Combined Heat and Power to 2010



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<http://www.defra.gov.uk/environment/energy/chp/index.htm>

Printed copies are available from:

David How  
Sustainable Energy Policy  
DEFRA  
6/H10 Ashdown House  
123 Victoria Street  
LONDON SW1E 6DE

Email: [david.how@defra.gsi.gov.uk](mailto:david.how@defra.gsi.gov.uk)

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## Foreword by Rt Hon Margaret Beckett, Secretary of State for Environment, Food and Rural Affairs

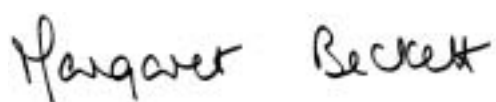


Our new energy policy reflects, and will reinforce, our wider commitment to sustainable development. That was the message we set out in the Energy White Paper, published in February 2003. The White Paper laid out the range of policies needed in order to move us towards a thriving, competitive, low-carbon economy.

We must address the growing threat of climate change, maintain the reliability of energy supplies, promote competitive energy markets and work towards eradicating fuel poverty. Our vision is a bold one – to set the UK on the path to achieving a 60% reduction in carbon dioxide emissions by 2050.

This Strategy confirms our belief that combined heat and power (CHP) has an important role to play in achieving these White Paper aims, and that we must continue to aim at our target of 10GW<sub>e</sub> of “good quality” CHP capacity in the UK by 2010. We recognise that in recent years the CHP industry has experienced serious economic difficulties and progress towards the target has been uncertain. We also acknowledge that in the years ahead there are still very serious challenges to overcome.

We are confident that by working in close partnership with industry we can meet these challenges so this important energy technology realises its full potential in the low-carbon economy of the future.

A handwritten signature in black ink that reads "Margaret Beckett".

Margaret Beckett

## Executive Summary

- i. This Strategy document sets out a framework to support the growth of CHP capacity in the UK and to enable the CHP industry to meet the challenges ahead. The Government announced, in 2000, a target of achieving at least 10,000 MW<sub>e</sub> of Good Quality CHP capacity by 2010 and the development of a Strategy to achieve it. A draft Strategy was published for consultation in May 2002 and in February 2003 the Energy White Paper – *Our energy future – creating a low carbon economy* – reaffirmed the Government's commitment to the target.
- ii. Combined Heat and Power (CHP), the simultaneous generation of heat and power, is a highly efficient way to use both fossil and renewable fuels. CHP can therefore make a significant contribution to the UK's sustainable energy goals, bringing environmental, economic, social and energy security benefits.
- iii. CHP is already making a valuable contribution towards these goals, particularly the reduction of UK carbon emissions. However, in recent years the CHP industry has faced serious economic difficulties. CHP has the potential to make further significant contributions to the security, diversity and competitiveness of energy supply and to help support a competitive manufacturing industry for sustainable energy technologies in the UK.
- iv. The Government recognises that, in the light of the adverse economic circumstances faced by much of the UK CHP industry, a range of interventions in the market is needed to help support this sustainable energy technology. This support falls into a number of broad categories, has been introduced over a number of years, and is set out in full in this Strategy.

### Fiscal Incentives:

- Climate Change Levy exemption on fuel inputs to Good Quality CHP and on all Good Quality CHP electricity outputs;
- eligibility for Enhanced Capital Allowances to stimulate investment;
- Business Rates exemption for CHP power generation plant and machinery;
- a reduction in VAT on certain grant-funded domestic micro-CHP installations;
- a Government announcement to possibly reduce VAT more widely on micro-CHP; and
- Climate Change Agreements to provide an incentive for emissions reductions.

### Grant Support:

- the £50m Community Energy programme to encourage CHP in community heating schemes, now extended to 31 March 2005

### Regulatory Framework:

- the EU Emissions Trading Scheme, from which CHP should benefit as a form of low-carbon generation. A portion of the free new entrant reserve will be ring-fenced for CHP. The impact of the Scheme on CHP capacity is difficult to quantify and will partly depend on decisions yet to be taken on the implementation of the Scheme, but could be in the range of 100–400 MW<sub>e</sub> by 2010;
- introduction of the EU Directive *on the promotion of cogeneration (CHP) based on useful heat demand in the internal energy market*;
- changes to the licensing regime, benefiting smaller generators;
- continued work with Ofgem to ensure a level playing field under NETA for smaller generators, including CHP;
- continued emphasis of the benefits of CHP and community heating whenever Planning Policy Guidance, Regional Planning Guidance or Sustainable Development Guidance is introduced or reviewed;
- review of the existing guidance on information required to accompany power station consent applications to ensure full consideration of all options for CHP and community heating;
- explore the opportunities to incentivise CHP technologies in an expanded household Energy Efficiency Commitment from 2005, and any wider Commitment;
- encouraging the take-up of CHP through the Building Regulations; and
- addressing the administrative burdens placed on smaller generators and incentivising the utilisation of distributed generation.

### Promotion of Innovation:

- instigation of field trials to evaluate the benefits of micro-CHP;
- promotion and support by the Carbon Trust, in non-domestic markets, and the Energy Savings Trust, in domestic markets, for the development of energy efficiency and low-carbon technologies including CHP;
- reviews by the Energy Saving Trust and the Carbon Trust of their current and future programmes to ensure they reinforce delivery of the Government's CHP target; and
- improvements to existing CHP schemes through development of a Quality Improvement programme.

### Government Leadership and Partnership:

- adoption of a 15% target for Government Departments to use CHP generated electricity and the encouragement of other parts of the public sector to consider doing the same.

- v. In the second half of 2003, Cambridge Econometrics were asked to update and re-run their CHP model and incorporate additional data that had become available. The re-run indicates a central projection of 8,100 MW<sub>e</sub> of Good Quality CHP capacity by 2010, within a range of 7,700–9,400 MW<sub>e</sub> (the range of the projection allows for uncertainties over gas and electricity price movements). This does not take account of the introduction of the EU Emissions Trading Scheme, which could add up to 400 MW<sub>e</sub>, or the CHP measures in the Energy White Paper, as these are at too early a stage of development to quantify fully. The current central projection is therefore around 8,500 MW<sub>e</sub> by 2010.
  
- vi. The Government will continue to monitor progress towards the CHP and wider Climate Change Programme targets and will work in an active partnership with industry to ensure that the delivery of this Strategy continues to be cost-effective. The Government's aim is to provide a framework in which business can plan long-term investment decisions with greater certainty. This strategy document sets out that framework, helping the industry to meet the challenge ahead.

## What is CHP?

- 1.1 Combined Heat and Power (CHP) is a highly fuel-efficient energy technology, which puts to use waste heat produced as a by-product of the electricity generation process. CHP can increase the overall efficiency of fuel utilisation to more than 75% Gross Calorific Value – compared with around 40% achieved by fossil fuel electricity generation plants in operation today, and up to 50% from modern Combined Cycle Gas Turbines – and has the potential to save substantially on energy bills.
- 1.2 CHP is the simultaneous generation of usable heat and power (usually electricity) in a single process. Most new CHP schemes use natural gas, but a significant proportion burn alternative, renewable fuels and some, such as those bio-fuels that are suitable for use, qualify for additional support (e.g. under the Renewables Obligation).
- 1.3 CHP is not only more efficient through utilisation of heat, but it also avoids transmission and distribution losses and can provide important network services such as “black start”, improvements to power quality, and the ability to operate in “island mode” if the distribution network goes down.
- 1.4 The possibility of linking heat users together, including community heating to link up residential users, can provide additional opportunities for the commercial exploitation of CHP. Community heating involves the use of appropriate centralised heat sources for heating of a number of separate premises. Community heating has already proved effective in dense city developments and residential developments, shopping centres and business parks.
- 1.5 Table 1 contains a classification of CHP schemes by size. CHP has traditionally been deployed in larger applications involving CHP schemes of several hundred kW<sub>e</sub> and above. The replacement of domestic boilers with micro-CHP units, which can generate electricity (around 1–5 kW<sub>e</sub>) as well as heat for space heating, may offer further potential for energy savings. However, significant market penetration is not expected over the short term. Larger micro-CHP and mini-CHP have potential in the small business sector, such as retail, catering, guesthouses and nursing homes. In aggregate, they may therefore make a significant contribution to future installed CHP capacity. A number of issues are yet to be resolved and, at this stage, it is uncertain how much micro-CHP will contribute to the 2010 target.

## CHP: The Contribution to Sustainable Development

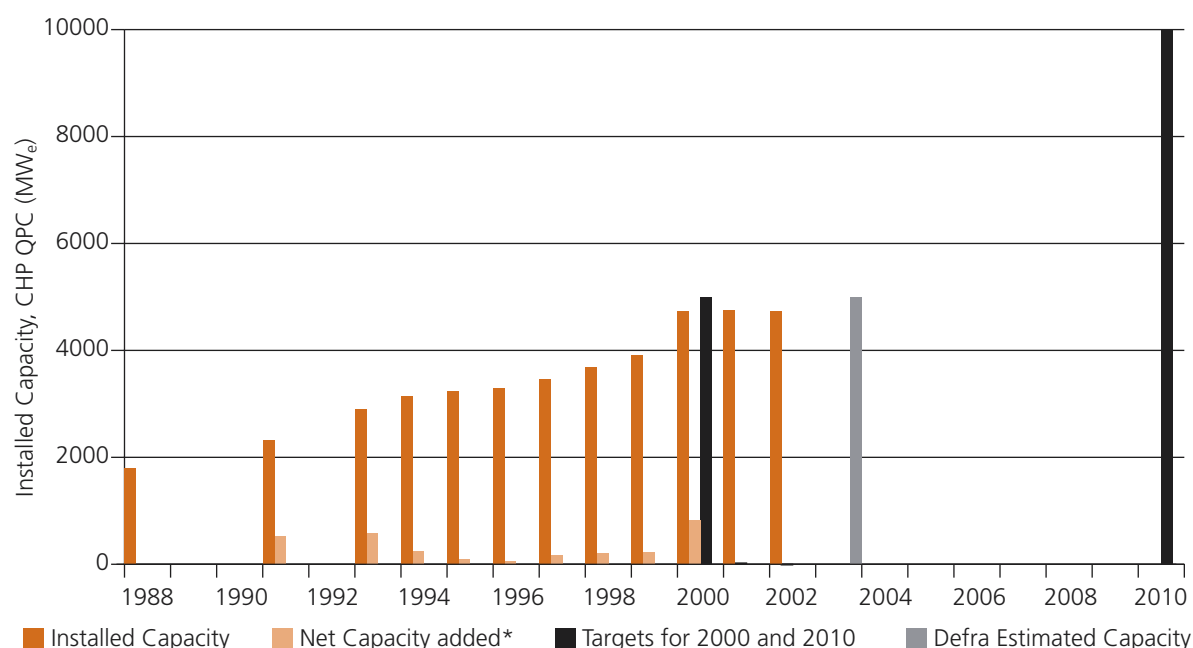
- 1.6 The Government recognises the positive contribution CHP can make to a range of sustainability objectives, including the considerable environmental, economic and social benefits CHP can bring. Using the latest data available, installed CHP in 2002 provided savings of 3.3–4.6 MtC compared to conventional heat-only and electricity-only generation. This is equivalent to 0.7–0.96MtC per 1,000 MW<sub>e</sub> of installed capacity. Annex 1 provides further information.
- 1.7 CHP can also make a significant contribution to security, diversity and competitiveness of energy supply and help to support a competitive manufacturing industry for sustainable energy technologies in the UK. The combination of CHP and community heating provides:
- an integrated approach to the supply of energy services;
  - a source of affordable warmth and power, so helping to alleviate fuel poverty and contributing to the rejuvenation of run-down urban communities as part of a range of measures in an integrated social policy; and
  - a contribution to the objectives of an increase in distributed generation.
- 1.8 Carbon savings from new CHP plant installed to meet the Government's 10,000 MW<sub>e</sub> target depend on the generating plant displaced. In the short term, this will be fossil fuel generation and carbon savings would be around 0.7MtC for each additional 1,000 MW<sub>e</sub> of CHP capacity. Towards 2010 and beyond, CHP is more likely to displace new gas generating technologies, compared with which CHP savings would be around 0.1MtC per 1,000 MW<sub>e</sub> installed<sup>1</sup>.

## Current CHP Capacity and Recent Trends

- 1.9 During the 1990s, installed CHP capacity in the UK more than doubled. However, this buoyant trend has been interrupted by recent market conditions. Figure 1 shows the trend in installed CHP capacity and how this relates to the 10,000 MW<sub>e</sub> target.

1 *Savings in carbon emissions resulting from the use of Combined Heat and Power*, Energy Trends June 2003 at [www.dti.gov.uk/energy/inform/energy\\_trends/2003/jun\\_03.pdf](http://www.dti.gov.uk/energy/inform/energy_trends/2003/jun_03.pdf).

Figure 1. Good Quality CHP Installed Capacity and Targets



Source: Digest of UK Energy Statistics Chart 6.1 2003

\*Net capacity added between reported years i.e. between 1988 and 1991, 1993 and 1991 and annually thereafter

1.10 At the end of 2002 there were 1,539 CHP schemes with an aggregate Good Quality capacity of 4,742 MW<sub>e</sub>, producing 6% of the UK's electricity requirements. Table 1 gives a breakdown of CHP schemes in the UK. These figures are taken from the DTI's Digest of United Kingdom Energy Statistics 2003.

Table 1. Breakdown of CHP schemes by size (end 2002)

	Total Schemes	% of No.	QPC (MW <sub>e</sub> )	% QPC	QPO (GWh)	% QPO	TPC (MW <sub>e</sub> )	TPO (GWh)
Micro CHP (<5 Kw <sub>e</sub> )	0	0%	0	0%	0	0%	0	0
Mini CHP (5–500KW <sub>e</sub> )	1237	80%	154	3%	728	3%	154	729
Small Scale (500KW <sub>e</sub> –5MW <sub>e</sub> )	175	11%	372	8%	1771	7%	379	1871
Medium Scale (5–50MW <sub>e</sub> )	98	6%	1237	26%	6468	27%	1358	6714
Large Scale (50+ MW <sub>e</sub> )	29	2%	2980	63%	15269	63%	8679	36072
<b>Total</b>	<b>1539</b>	<b>100%</b>	<b>4742</b>	<b>100%</b>	<b>24236</b>	<b>100%</b>	<b>10570</b>	<b>45385</b>

**QPC – Qualifying Power Capacity (CHP<sub>QPC</sub>)** – registered power generation capacity (MW<sub>e</sub>) qualifying as Good Quality CHP capacity.

**QPO – Qualifying Power Output (CHP<sub>QPO</sub>)** – registered annual power generation (MWh) qualifying as Good Quality CHP electricity.

**TPC – Total Power Capacity (CHP<sub>TPC</sub>)** – registered maximum power generation capacity (MW<sub>e</sub>) of a CHP scheme.

**TPO – Total Power Output (CHP<sub>TPO</sub>)** – registered annual power output capacity (MW<sub>e</sub>) of a CHP scheme.

- 1.11 Respondents to the 2002 consultation exercise noted the slowdown in CHP capacity in 2001 (which continued in 2002 and 2003) with particular concern in terms of the loss of skills through reduced staff numbers and that a later improvement in the market might result in insufficient time for the required new CHP construction to take place to achieve the Government's 2010 CHP target.

### UK Regional Breakdown

- 1.12 Whilst the 2010 target for CHP and this Strategy are concerned with the UK as a whole, the Government will continue to monitor the installed capacity and growth of schemes in the four countries that make up the UK. At the end of 2002, installed capacity in England, Scotland, Wales and N. Ireland was as shown in Table 2.

**Table 2. CHP installation and capacity figures around the UK**

	Number of Schemes	% Schemes	TPC (MW <sub>e</sub> )	% TPC	QPC (MW <sub>e</sub> )	% QPC	QPO (GWh)	% QPO
England	1,327	86%	9,459	89%	3,832	81%	19,048	79%
Wales	95	6%	325	3%	143	3%	852	4%
Scotland	85	6%	762	7%	742	16%	4,214	17%
Northern Ireland	32	2%	24	0%	25	0.5%	122	1%
<b>Total UK</b>	<b>1,539</b>	<b>100%</b>	<b>10,570</b>	<b>100%</b>	<b>4,742</b>	<b>100%</b>	<b>24,236</b>	<b>100%</b>

**TPC – Total Power Capacity (CHP<sub>TPC</sub>)** – registered maximum power generation capacity (MW<sub>e</sub>) of a CHP scheme

**QPC – Qualifying Power Capacity (CHP<sub>QPC</sub>)** – registered power generation capacity (MW<sub>e</sub>) qualifying as Good Quality CHP capacity

- 1.13 CHP opportunities and conditions vary throughout the UK, not only because business profiles are different in each country, but also because of other parameters e.g. parts of Scotland and Wales do not have access to the gas network and so schemes are restricted in the choice of fuel and technology, while Northern Ireland has little access to mains gas.
- 1.14 In addition, policy frameworks are different from country to country. For example, Business Rating is a devolved matter. The Scottish Executive and the National Assembly for Wales introduced the 'tools of the trade' exception for CHP power generating plant and machinery in April 2001, the Northern Ireland Department of Enterprise, Trade and Investment are still considering the issue. Scotland has its own Environmental Protection Agency. Northern Ireland has its own Energy Regulator. Regional Planning Guidance is determined regionally and not centrally. It is essential therefore, when considering CHP developments, that each of these bodies be involved as CHP stakeholders in their own right and that each has been consulted in the development of CHP in their countries.

## CHP Targets

- 1.15 Recognising the benefits of CHP, the 1990 White Paper 'This Common Inheritance' set a target for CHP of 4,000 MW<sub>e</sub> of installed capacity in the year 2000 – doubling the then existing capacity. Early progress was encouraging and consequently, in 1993, the Government announced an increase in the target to 5,000 MW<sub>e</sub> as part of the UK Climate Change Programme.
- 1.16 The first Government CHP Strategy was published in June 1996. It identified barriers to further progress and opportunities for the future. The primary objective then was to establish an undistorted market for CHP in the context of market liberalisation, particularly following relaxation of the licensing and exemptions regime. The main themes of the previous Strategy were to:
- continue the promotion of CHP through the Energy Efficiency Best Practice programme and any other appropriate information channels;
  - exploit CHP opportunities in the Government's own estate;
  - encourage and promote community heating; and
  - encourage the financing of CHP schemes through Public Private Partnerships and the Private Finance Initiative.
- 1.17 This approach supported a growth in installed capacity from some 2,600 MW<sub>e</sub> in 1993 to over 4,700 MW<sub>e</sub> in 2000. In the same year, the Government set a new target of 10,000 MW<sub>e</sub> capacity by 2010.

## UK Energy Market Conditions, Frameworks and Rules Affecting CHP

- 1.18 A major factor affecting the economics of CHP is the relative cost of fuel (principally natural gas) and the value that can be realised for electricity (both on site and for export off site). Over the last decade, electricity prices have steadily declined in real terms and for most of the last decade gas prices too have fallen. However, in 2000 and 2001 gas prices rose in real terms because of structural changes in the gas market, but fell back somewhat in 2002. This disparity in prices was cited by almost every respondent to the 2002 consultation exercise as the key barrier to further development of CHP in the UK.
- 1.19 There is uncertainty about fuel prices over the next 8–10 years. Therefore, a variety of scenarios were considered when modelling possible outcomes for CHP capacity in 2010. This is described further in Section 3. Again, this uncertainty surrounding future gas and electricity prices was seen by most respondents to the 2002 consultation exercise to be a major disincentive to investing in new CHP schemes.

- 1.20 Typical economic calculations for recent major CHP schemes were based on gas prices of around 0.5p/kWh, whereas industrial prices for the third quarter of 2003 were 0.7p/kWh. Measures introduced over the past two years have to some extent provided greater economic security. However, much of the roughly 3,000 MW<sub>e</sub> (CHP<sub>TPC</sub>) of new capacity which has received consent over the past few years has been put on hold and many of these schemes are unlikely to go ahead until industry confidence returns.
- 1.21 Looking forward, the economics of CHP may prove to be rather healthier. Forward wholesale electricity prices suggest a rising trend in the coming years, mainly as a result of the EU Emissions Trading Scheme.
- 1.22 Access to gas and electricity networks is key for most CHP developers. To ensure fair and equal access to electricity networks, the recommendations of the Embedded Generation Working Group (EGWG) are being taken forward by the Office of Gas and Electricity Markets (Ofgem).
- 1.23 Ofgem's work will result in new price controls for the electricity distribution network operators (DNOs) from April 2005. A key aspect of this work is to create appropriate incentives for DNOs to connect distributed generation to their networks. Ofgem is also consulting on a possible initiative to facilitate the financing of innovation in the construction and management of networks to which significant amounts of distributed generation are connected.
- 1.24 In parallel with the price control review, Ofgem is consulting on the future structure of distribution charges and, in particular, on the scope for more closely aligning connection and use of system charges paid by generators with those paid by demand customers. Full details of the price control review and of Ofgem's work on distribution charge structures are available on the Ofgem website<sup>2</sup>.
- 1.25 Ofgem, DTI and Defra participate in the Distributed Generation Co-ordinating Group (DGCG) to advise on the removal of barriers to the connection of distributed generation, including CHP. The DGCG has created a Technical Steering Group to manage a range of projects addressing technical and commercial issues associated with distributed generation. Further details of their work are available on the DGCG website<sup>3</sup>.
- 1.26 Successive Licence Exemption Orders during the 1990s have ensured that the majority of existing CHP schemes are exempt from the requirement to hold either a generation or supply licence. Licence exempt status can affect the treatment of CHP electricity sales under the New Electricity Trading Arrangements (NETA) and

2 [www.ofgem.gov.uk](http://www.ofgem.gov.uk)

3 [www.distributed-generation.gov.uk](http://www.distributed-generation.gov.uk)

the current Climate Change Levy (CCL) regime and will therefore be an important issue during the period to 2010 as more CHP electricity becomes available for export. The exemption from the CCL of Good Quality CHP electricity sold via licensed suppliers came into effect on 1 April 2003. This enables licensed electricity suppliers to offer CHP generated electricity to their customers exempt from CCL. Further details of this change are contained in the newly updated version of HM Customs and Excise's Technical Brief No.18<sup>4</sup>.

- 1.27 In addition, concerns have been raised that NETA is having an adverse impact on the development of CHP and this was a major concern of the respondents to the 2002 consultation exercise. Ofgem's report on the initial impact of NETA on smaller generators (published in August 2001) found export prices achieved by small generators had reduced by 17%, somewhat less than for generation prices overall. Output had also fallen substantially for small generators, with export volume down by 44% in total and 61% for CHP. Lower prices were a factor but there was evidence that higher fuel costs, mainly for gas, had also contributed as had the trading mechanisms themselves. With regard to the latter concern, respondents to the 2002 consultation exercise noted that NETA rewarded predictable generation, and was having a downward effect on prices paid to CHP operators.
- 1.28 The Government's Response to Ofgem's review of the first three months of NETA operation and to a consultation on the impact of NETA on small generators including CHP was published<sup>5</sup> on 4 April 2002. Respondents to the 2002 consultation exercise generally felt that measures implemented to redress the negative impact of NETA did not go far enough.
- 1.29 Whilst there has been some increase in CHP output, including exports, since 2001, CHP electricity generation in 2002 was still well below 2000 levels. Defra is therefore continuing to work with DTI, Ofgem and the industry on delivering further enhancements to the market mechanism that can allow smaller operators to work on an even footing.
- 1.30 A report on NETA and smaller generators was published by the DTI on 1 August 2003. The report, commissioned from ILEX Energy Consulting, followed work by the Embedded Generation Working Group. Many of the recommendations in the report have now been taken up or have been overtaken by market events. The report is available on the DTI website<sup>6</sup>.

4 This document can be viewed at <http://www.hmce.gov.uk/business/othertaxes/ccl/tec18.pdf>

5 available from the DTI website at [www.dti.gov.uk/industries\\_energy.html#markets](http://www.dti.gov.uk/industries_energy.html#markets), under 'Energy Markets'

6 [www.dti.gov.uk/energy/domestic\\_markets/electricity\\_trading/genissues.pdf](http://www.dti.gov.uk/energy/domestic_markets/electricity_trading/genissues.pdf)

## International Context

- 1.31 As commitments under the UN Framework Convention on Climate Change are likely to become more demanding in the future, CHP will have an increasingly important role to play in reducing carbon emissions. The development and deployment of more efficient energy technologies is likely to be important if the objectives of energy security, environmental protection and economic growth and social progress are to be attained.
- 1.32 The EU Directive *on the promotion of cogeneration (CHP) based on useful heat demand in the internal energy market* came into force on 21 February 2004. Its purpose is to increase energy efficiency and improve security of supply by creating a framework for promotion and development of high efficiency cogeneration. Member States have two years from this date to comply with the Directive.
- 1.33 The Integrated Pollution Prevention Control (IPPC) Directive provides for the consideration of energy efficiency for regulated installations to pursue CHP. CHP can be promoted as Best Available Technique (BAT) under energy efficiency obligations. Sites or sectors that sign up to Climate Change Agreements and meet their biannual milestone targets are deemed to have fulfilled the energy efficiency requirement of IPPC subject to baseline requirements for energy efficiency being met.
- 1.34 The revised Large Combustion Plant Directive (LCPD) encourages Member States to move towards more efficient means of generating energy, particularly CHP. The LCPD requires that CHP shall be considered for all major new combustion plant and developed wherever it is technically or economically feasible, bearing in mind the market and distribution situation. In implementing Directives on IPPC and the LCPD, the Government will continue to ensure that CHP opportunities are considered.
- 1.35 As a sustainable energy technology, promotion of CHP exports will be a priority. This will provide valuable new market opportunities for the UK CHP industry. UK Trade and Investment is responsible for the promotion of UK technology and expertise overseas. The UK will also ensure that the potential of CHP to contribute to sustainable energy worldwide is promoted through the Renewable Energy and Energy Efficiency Partnership (REEEP).

## Technology Development

- 1.36 CHP applications based on steam turbines, gas turbines and reciprocating engines have been developed in a number of sectors, resulting in improved efficiency and performance levels. One of the first Combined Cycle Gas Turbine applications in the UK was in a CHP scheme, and such applications can now achieve high-power generating efficiencies in excess of 45% Gross Calorific Value.
- 1.37 New and novel technologies suitable for CHP applications are currently being developed. Typical examples are fuel cells down to 5 kW<sub>e</sub>, micro-turbines down to 30 kW<sub>e</sub> and Stirling engines down to 0.7 kW<sub>e</sub>. These developments could result in the more widespread use of CHP, particularly in areas where traditional CHP technologies are not suitable. Developments within the fuel cell area will provide valuable opportunities for use of CHP in domestic and commercial applications, but are unlikely to provide significant contributions by 2010.
- 1.38 Micro-CHP technologies are likely to become commercially available in the UK. The infrastructure for selling micro-CHP, possibly as part of an energy services package, and for installing and maintaining micro-CHP systems, is still to be developed.
- 1.39 In the recent Energy White Paper, the Government announced that they would support field trials designed to evaluate the benefits of micro-CHP. The Carbon Trust is leading on this, through its Low Carbon Innovation Programme (LCIP), which was set up in 2002. The technology-impartial field trial will provide independently monitored data on up to 200 micro-CHP units running in a range of applications over a full year. It aims to obtain robust, independent performance data from a range of impartially procured equipment in real operating environments. This project will help determine what future trials or measures, if any, are necessary to tap the micro-CHP potential of a wider domestic environment. How the machines perform and where they perform best will be of particular interest to help inform future policy. Interim results will now be available at the end of 2004 at the earliest.
- 1.40 Throughout the previous year the LCIP has also invested in and supported a number of other innovative CHP technologies and companies, including a company developing a high-efficiency micro-turbine power generation system, and a company commercialising a small-scale wood fuelled CHP unit.
- 1.41 A number of other mini-CHP technologies are currently under development. These include small-scale gas turbine/burner units (sub 300 kW<sub>e</sub>) to be fitted to new and existing boilers, small-scale gas turbines in conjunction with wood gasification units and new units in combined cycle arrangement e.g. fuel cells with micro-gas turbines.

- 1.42 There are uncertainties surrounding the cost of mini-CHP and micro-CHP and when they will enter the market. These uncertainties mean technologies below 100 kW<sub>e</sub> are not expected to make a major contribution to the 2010 target. However, the potential contribution from these units in domestic applications over the next ten to twenty years could be relatively large.
- 1.43 In addition, Small and Medium-sized Enterprises (SMEs) could benefit from micro or mini-CHP. Various studies (by EA Technology, Frost and Sullivan and the Society of British Gas Industries) have provided a range of estimates of the likely growth of micro-CHP. A range of 300–500 MW<sub>e</sub> of installed capacity for micro-CHP by 2010 might be achieved. Given the uncertainties, the potential in the short and medium term will be kept under review.

## Overall Approach

- 2.1 The Government has introduced a wide range of measures since 2000 to support the growth of CHP capacity. Whilst the detailed modelling work (outlined in Section 3) indicates that we are likely to fall short of the target, it also indicates that the measures introduced by the Government will contribute well over half the new capacity added between now and 2010. These measures fall into a number of categories: fiscal incentives, grant support, regulatory framework, promotion of innovation and Government leadership and partnership. The Government will continue to monitor progress towards the target through data derived from the CHP Quality Assurance programme (CHPQA). The way in which each of these measures could affect the development of CHP capacity to 2010 is illustrated in Table 3 overleaf.
- 2.2 The main support measures favoured by the CHP industry in their responses to the Strategy consultation were a CHP Obligation and exempting CHP from the Renewables Obligation base. A CHP Obligation would be the surest way to ensure the 2010 target is met. However, it would be relatively expensive in terms of carbon saved, and would not be consistent with the policy to promote a competitive energy market, of both the Government and the European Union. In terms of the Renewables Obligation, the Government has given a commitment to consider how CHP is handled in the review of the Renewables Obligation 2005/6. The key consideration in the review will be to ensure delivery of the renewables targets at a reasonable cost to end consumers.

## *Fiscal Incentives*

### Climate Change Levy Exemption

- 2.3 The Climate Change Levy (CCL) came into force on 1 April 2001 and included an exemption for Good Quality CHP fuel inputs and electricity outputs, provided that the electricity was used on site, or sold direct to other users. For electricity sold via a licensed supplier, that licensed supplier had to collect the levy, subject to any reliefs that applied, when it was sold on to a consumer. In cases where CHP operators are themselves licensed suppliers, direct sales of Good Quality CHP electricity are levy exempt.
- 2.4 In the 2002 Budget the Government announced that Good Quality CHP electricity sold via licensed suppliers will also be exempt from the CCL. Following a successful State Aid application to the European Commission, this exemption came into effect on 1 April 2003.

**Table 3. Likely Effectiveness of Policy Measures to Stimulate CHP Capacity Growth**

Broad CHP Categories	CCL Exemption on direct sales, CCAs	Facilitating Exports (CCL Exemption on Exports, NETA & Network Issues)	Supply/Gen Licence and Exemptions	Enhanced Capital Allowances	Business Rating	Community Energy/HEES/PPP/SRB	Carbon Trust EEBPP/CHP Club	EST/EE SOPs/EEC/HEES	Bldg Regs/SAP	Quality Improve Prog (CHQA DTI Stats)	Distributed Generation	Others e.g. Carbon Trading
1. Micro CHP (< 5 kW <sub>e</sub> )	*	*	***	**	-	*	*	**	*	-	***	**
2. Mini CHP (5-500 kW <sub>e</sub> )	**	*	***	**	*	*	**	**	*	*	***	**
3. Small Scale (500 kW <sub>e</sub> - 5 MW <sub>e</sub> )	***	**	***	**	*	**	**	*	*	**	**	***
4. Medium Scale (5-50 MW <sub>e</sub> )	***	***	**	**	**	**	**	-	**	**	**	***
5. Large Scale (50+ MW <sub>e</sub> )	***	***	*	**	**	*	*	-	***	***	*	***

\*\*\* major potential    \*\* important    \* minor    - not significant

## Enhanced Capital Allowances, Energy Services and leasing

- 2.5 Enhanced Capital Allowances (ECAs) were introduced as part of the CCL package in April 2001. They are 100% first-year capital allowances on investments in certain energy-saving equipment. Businesses are able to write-off the whole cost of their investment against their taxable profits during the period in which they make the investment. Good Quality CHP is one of the technologies eligible for support under the ECA scheme, as it qualifies as “energy-saving plant and machinery”. The CHP plant and machinery covered by the ECA scheme is detailed on the Energy Technology Criteria List.<sup>7</sup>
- 2.6 Pipelines or connections to the electrical network often represent a significant portion of a scheme’s total costs, but these are sometimes not eligible for ECAs. Their eligibility depends on
- the boundary of the CHP scheme;
  - whether they are fixtures; and
  - the developer’s interest in the land.
- 2.7 The Energy Technology Criteria List covers equipment to connect CHP schemes to existing electrical networks or heat distribution systems, but this list is by no means exhaustive. However, a whole new gas pipeline would currently not fall within the boundary of the scheme, as it may also serve purposes other than the CHP scheme throughout its potential lifetime. In addition, the developer would often not have the necessary interest in the land (i.e. through which the pipeline is developed) that is required in order to claim the allowances.
- 2.8 Spending on long-life plant and machinery (with an economic life of 25 years or more), including certified long-life Good Quality CHP assets, can qualify for 100% first-year capital allowances under the ECA scheme for energy-saving equipment. This enables businesses, including energy services providers, to claim a larger proportion of the cost of CHP equipment against taxable profits.
- 2.9 Energy services agreements may include activities wholly or mainly related to:
- the design of the equipment;
  - obtaining and installing the equipment;
  - the operation of the equipment;
  - the maintenance of the equipment; and
  - payments in respect of the operation of the equipment to be linked to energy savings resulting from the provision or operation of it.

7 see [www.eca.gov.uk](http://www.eca.gov.uk)

- 2.10 In recent years, a large proportion of new CHP capacity has been installed under an energy services agreement and it is recognised that many developments are heavily reliant on the services provided by energy services companies. To meet the Government's objective of reducing carbon emissions, legislation for the ECA scheme allowing Energy Services Companies (ESCOs) to claim ECAs took effect in 2001. This applies to equipment provided as part of an energy services agreement, so long as the equipment is fixed to a client's property in which the ESCO has no interest.
- 2.11 Studies undertaken during 2000 suggested that whilst the majority of CHP schemes were developed either via ESCOs or through leasing arrangements eligible for ECAs, such as hire purchase, a significant proportion are still owned by a bank and leased to the ESCO.
- 2.12 Expenditure incurred from 17 April 2002 on energy-saving equipment for leasing can also qualify for ECAs, provided capital allowances would be available under the normal rules for plant and machinery leasing. This provides a further boost for all CHP investments regardless of the method of financing.

### **Exemption from Business Rates of Power Generating Plant and Machinery**

- 2.13 For Business Rates purposes, most properties that include CHP are valued conventionally, but some fall within prescribed valuation. This occurs where the sole or primary function of the property is the generation of electricity and the plant capacity is at least 500kW<sub>e</sub>. Around 50 schemes accounting for approximately 2,000 MW<sub>e</sub> of CHP Qualifying Power Capacity (CHP<sub>QPC</sub>) are in prescribed assessment.
- 2.14 Where a CHP scheme forms part of a wider property (for example, embedded within the property it serves, where the main function of the property is not electricity generation), a conventional rating assessment applies, and a valuation officer assesses the rateable value on an individual market rental basis. The remaining 1,450 or so schemes are in conventional assessment, accounting for around 2,600 MW<sub>e</sub> of CHP<sub>QPC</sub>.
- 2.15 In March 1999, the Second Wood Committee on the Rating of Plant and Machinery in Industries subject to Prescribed Assessment recommended that the plant and machinery used to generate electricity be exempted from rating. The Secretary of State for Transport, Local Government and the Regions took account of this recommendation in setting rateable values for the Revaluation on 1 April

2000<sup>8</sup>. For CHP schemes in conventional assessment, the plant and machinery regulations were amended with effect from 1 April 2001<sup>9</sup>. This ensures equal treatment for schemes in prescribed and conventional assessment.

### VAT Reduction for Domestic CHP

- 2.16 In the 2002 Budget the Government announced a reduction in VAT for certain grant-funded domestic installations of micro-CHP. Micro-CHP may offer the potential for significant reductions in household energy bills, with claims by the developers in the range of £150 to £200 a year. Because of its potential contribution to alleviating fuel poverty, the VAT reduction on domestic micro-CHP will apply only to type-tested units installed under the Home Energy Efficiency Scheme, now called the Warm Front Team. Respondents to the 2002 consultation exercise welcomed the reduction in VAT but wanted this extended to all micro-CHP installed in homes.
- 2.17 In the 2003 Budget, the Chancellor announced that he would consult further on specific fiscal measures to promote domestic energy efficiency. This consultation, jointly undertaken with Treasury, closed on 24 October 2003. Treasury published a summary of consultation responses on their website alongside the Pre-Budget Report (PBR) in December 2003. The consultation responses were broadly supportive of the principal measures proposed by the Government, including extending the existing reduced rate of VAT to 5% for the supply and installation of micro-CHP to non-grant schemes when householders employ contractors.
- 2.18 In Budget 2004, within the measures to improve household efficiency, the Chancellor announced that the Government is ready to extend its support to micro-CHP, by possibly introducing a reduced rate of VAT, taking account of the emerging findings of the field trials and will consider introducing this in 2005.

### Climate Change Agreements

- 2.19 The Climate Change Agreements (CCAs) established with 44 industry sectors provide a strong incentive to businesses to meet the energy savings targets they have agreed with the Government, and so retain the 80% discount on the rate of the CCL up to 2013.
- 2.20 For sectors with well-established experience of using CHP, such as the paper and chemicals industries, Defra was able to agree sector level targets that took due account of the opportunities for deployment of CHP.

8 SI 2000/947 *The Electricity Supply Industry (Rateable Values) (England) Order 2000*. Similar legislation exists or is under preparation through the Devolved Administrations.

9 SI 2001/846 *The Valuation for Rating (Plant and Machinery) (England) (Amendment) Regulations 2001*.

- 2.21 For a further 16 sectors with much less experience of CHP, but with a recognised potential, Defra agreed that targets would initially be set on the basis of taking no account of CHP opportunities. However, during the first year each facility would be appraised for CHP using a standard assessment procedure. Due to the unfavourable economic climate for CHP in recent years, the appraisal was put on hold after the first stage. The potential for CHP in those sectors will now be addressed as part of the review of all sectors' targets for 2006 to 2010, which will take place in 2004. This review will ensure that the targets continue to represent the potential for cost-effective energy savings whilst taking account of any changes in technical or market circumstances.
- 2.22 The Chancellor also announced in Budget 2004 that the eligibility criteria for CCAs are to be extended to cover other energy-intensive sectors, subject to state aid approval. The potential for CHP will be taken into account when drawing up the targets for these new entrants.

### **Grant Support**

#### **Community Energy programme**

- 2.23 Community heating provides reduced heating and electricity costs for households and businesses alike. It helps alleviate fuel poverty and provides environmental benefits. A study commissioned by the Energy Saving Trust on behalf of Defra found that the cost-effective potential for CHP in community heating is estimated to be around 2,300 MW<sub>e</sub> by 2010<sup>10</sup>.
- 2.24 In April 2001, the Deputy Prime Minister announced the £50m UK-wide Community Energy programme, funded through the Capital Modernisation Fund, as a two-year programme. This was extended to a third year in 2003 to help ensure a stream of quality bids by allowing them time to be fully developed. Community Energy is managed on behalf of the Government by the Energy Saving Trust and the Carbon Trust. The programme works closely with industry through the Combined Heat and Power Association (CHPA) and others. Its purpose is to promote the installation, upgrading and extension of community heating schemes through grants, utilising CHP or renewable sources where appropriate.
- 2.25 The programme provides up to £2 million of development grant support, and £48 million of capital support, whilst aiming to lever in up to £200m from other sources. In addition it provides site visits from experts, training courses, and

10 [www.est.org.uk/communityenergy/downloads/communityenergy\\_sept.doc](http://www.est.org.uk/communityenergy/downloads/communityenergy_sept.doc). This figure uses a private/public partnership discount rate of 9%, deriving from a public sector investment level of 6% and a full private sector financed scheme at 12%. However, since the study the Government has reduced the discount rate for the public sector to 3.5% which could increase the cost-effective potential for public-private partnerships to almost 10,000 MW.

generic guidance, such as a guide to financing schemes and heat density maps to show where the cost-effective potential is located according to postcode<sup>11</sup>.

- 2.26 The programme is making a significant contribution to several key policy objectives and involves a wide variety of stakeholders. To date it has supported a strong mix of schemes, including homes, schools, hospitals, universities and other public buildings. Community Energy aims to contribute up to 130 MW<sub>e</sub> of new CHP capacity, whilst helping 100,000 people on low incomes heat their homes and reducing carbon emissions by 0.15MtC/yr (0.5MtCO<sub>2</sub>/yr expressed as carbon dioxide). Recently arrangements were finalised for apportioning carbon savings from schemes that are funded under both the Energy Efficiency Commitment and the Community Energy programme, a concern of several respondents to the 2002 consultation exercise.
- 2.27 Bidding rounds are held quarterly. In the six rounds completed to March 2004, over 100 development grants have been awarded, totalling in excess of £1 million. 38 schemes have been awarded capital support of £25 million, which has levered in investment from other sources of £80 million. These schemes will contribute 45 MW<sub>e</sub> of new CHP capacity, saving 33,000 tC/yr and helping 35,000 people on low incomes. At least 10 of these schemes will utilise a range of fuels including heat from a geothermal well, landfill gas, biomass, and energy from waste. Schemes supported include £5 million towards a £21 million project in Leicester. This is the first phase of a city-wide network providing both heat and power using both CHP and woodchip boilers and the first to bring biomass heat to a city-wide project. It is a bold example to other UK cities of what is possible.
- 2.28 The programme has four remaining quarterly bidding rounds planned (the last in January 2005). Defra is now exploring the possibilities of extending the programme beyond its current end date of 31 March 2005, subject to the outcome of the next spending review.
- 2.29 Given current market conditions, community heating projects can deliver cost-effective carbon savings in public buildings and city-wide schemes. Community heating is also a cost-effective solution for the alleviation of fuel poverty in tower blocks. Equally, renewables-fired community heating in off-gas areas can cost-effectively address fuel poverty in rural areas and also contribute to climate change targets, renewable energy targets, and fuel diversity. These types of projects can be expected to feature in any extension to the programme, though their cost-effectiveness and that of other types of projects would be affected by a change in market conditions.

<sup>11</sup> see [www.est.co.uk/communityenergy](http://www.est.co.uk/communityenergy).

## **Biomass Grants**

- 2.30 The Government recognises that biomass could provide a material contribution to UK heat and electricity generation but may be resource constrained. To address this, a recent joint DTI/Carbon Trust Renewables Innovation Review on biomass was undertaken. This has concluded that the main challenges in taking biomass forward are not technology issues but related to the fuel chain. Government's preliminary view is to focus on smaller projects where risks are more manageable and take an incremental approach to addressing the various barriers currently facing developments in this area. DTI and Defra are working closely on taking this forward.
- 2.31 The Bio-energy Capital Grant scheme, which closed to applicants in 2002, is promoting the efficient use of biomass for energy and, in particular, the use of energy crops by stimulating the early deployment of biomass-fuelled heat and electricity generation projects, including CHP. It does this by awarding capital grants towards the cost of equipment in complete working installations. The scheme is aimed at project developers and organisations that are considering investing in heat and/or electricity generating projects fuelled by energy crops and other biomass feedstocks.

## **Regulatory Framework**

### **Emissions Trading Scheme**

- 2.32 Emissions trading will be a central plank of our future emissions reduction policies. The UK Emissions Trading Scheme (UK ETS) was launched on 1st April 2002 and is expected to save up to 2 MtC by 2010. It is the first economy-wide greenhouse gas trading system in the world, giving UK business and Government the opportunity to gain first mover advantage in the emerging greenhouse gas market. Participants may use CHP to increase their energy efficiency and so help meet scheme targets. In May 2003, Defra published the results of the first year of trading which showed that the 31 Direct Participants who entered the Scheme in April 2002 have reduced their emissions by more than 4.6 MtC equivalent from their baselines.
- 2.33 The Energy White Paper included a support measure for CHP via a pilot project entry route into the UK ETS. This was overtaken by the Commission's proposal to link projects into the EU Emissions Trading Scheme, which will now take precedence over UK ETS.

- 2.34 The EU ETS is due to begin in 2005 and will cover carbon dioxide emissions from a number of industrial sectors, including heavy industries, larger generators (with an aggregated on-site capacity of over 20MW<sub>e</sub> thermal input) and refineries. As a form of low-carbon generation, CHP plant should benefit above other less efficient forms of energy generation. The impact of the Scheme on CHP capacity is difficult to quantify but modelling work has suggested that it could be in the range of 100–400MW<sub>e</sub> by 2010. Considerable uncertainty exists over the likely price of carbon and the final impacts on CHP will also depend on decisions yet to be taken on the implementation of the scheme. These will be covered in the UK's National Allocation Plan, which the Government is due to submit to the European Commission before the end of April 2004. The draft phase 1 allocation plan (2005–2007), published in January 2004, states that a portion of the free new entrant reserve will be ring-fenced for new CHP plants.
- 2.35 Phase 2 of the EU ETS, which runs from 2008 to 2012, requires provision of at least 90% of installations, including CHP, with free emission allocations.

### EU Cogeneration Directive

- 2.36 The EU Cogeneration Directive places an obligation on Member States to ensure that support for CHP is based on useful heat demand and primary energy savings. It sets out a methodology for assessing the energy efficiency of CHP schemes based on harmonised efficiency reference values for the separate production of heat and power. These reference values will be developed over the next two years. Article 12 sets out alternative methods for calculating primary energy savings from CHP. Paragraph 2 of this Article is key to the UK, and ensures that the majority of UK based CHP schemes providing primary energy savings are likely to continue to be eligible for public support. Such support includes, for example, exemption from the Climate Change Levy on fuel inputs and power outputs.
- 2.37 The Commission's original proposal for the Directive would have limited public support to schemes with a power capacity of less than 50 MW<sub>e</sub>. This element was strongly opposed by the majority of Member States and as a result does not feature in the final text of the Directive.
- 2.38 The Directive places an obligation on Member States to issue certificates of origin for the electricity from high-efficiency CHP where such a certificate is requested by the producer, i.e. the CHP operator. It also requires Member States to undertake an analysis of the national potential for high-efficiency CHP. This analysis includes identification of any barriers to the achievement of the national potential. Furthermore, the Directive lays down provision for ensuring the transmission and

distribution of electricity from CHP and requires Member States to evaluate the existing legislative and regulatory framework with a view to reducing barriers to the growth of CHP capacity.

2.39 The Directive includes an important amendment to the EU Hot-Water Boilers Directive (92/42/EEC). This amendment overcomes the problem that many micro-CHP units, producing both heat and electricity, would not be able to comply with the minimum heat efficiency thresholds set down in the latter Directive.

### Licence Exemption Regime

2.40 On 1st October 2001, the Government brought into force legislation relaxing licence exemption criteria for electricity generation and supply, and introducing exemption arrangements for electricity distribution. A number of current and future schemes, especially Community Energy schemes, are likely to be able to benefit from easier exports, particularly when exporting to tenants. The new criteria increase the power output limits to include:

- distribution of 2.5 MW<sub>e</sub> to domestic consumers, with up to a further 1 MW<sub>e</sub> from a generating station embedded in the distribution system;
- supplies of no more than 5 MW<sub>e</sub>, of which no more than 2.5 MW<sub>e</sub> could be supplied to domestic consumers (generated on-site or received from a licensed supplier); and
- supplies to a single consumer or group of consumers (provided these consumers are located on the site where the power is generated or take the power directly over private wires).

2.41 This benefits CHP by encouraging small-scale distribution, particularly from embedded generation, to domestic consumers and increasing the threshold above which a supply licence is required. This enables operators of more schemes to supply electricity directly, without the need for the additional administrative burden associated with becoming a licensed supplier.

### Addressing the Impact of the New Electricity Trading Arrangements (NETA)

2.42 The Government's response to the consultation on the impact of NETA (see Section 1.28) describes recent improvements, and identifies further action.

2.43 In July 2002 Ofgem published a review of the first year of NETA<sup>12</sup>. This reported that NETA was generally "working well", and that wholesale prices had fallen by 20–25% when compared to the previous year. Ofgem also carried out an initial

12 [www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/1984\\_48neta\\_year\\_review.pdf](http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/1984_48neta_year_review.pdf)

review of the affect of NETA upon smaller generators in particular. This showed that export prices achieved by respondents to Ofgem's survey were 17% below those achieved in the Pool over the previous year (these reductions were smaller than for generation prices overall), and that output from smaller generators had fallen substantially.

- 2.44 The Government has been working with industry to help further ensure a level playing field under the NETA for small generators, including CHP. Positive developments so far include DTI and Ofgem continuing to look at the practicability of unbundling embedded benefits. This work is to be taken forward in the Distributed Generation Coordinating Group.
- 2.45 A number of modifications to the Balancing and Settlement Code (BSC) have also been approved by the Authority. Following substantial work by key industry players, these were brought forward and considered by the BSC Panel:
- gate closure was reduced from 3.5 hours to 1 hour. This has helped the smaller, more intermittent generators predict their output more accurately and has therefore reduced the risks of imbalance; and
  - Modification P78 (alternative) to revise the definition of the System Buy Price and the System Sell Price was implemented in March 2003. It has significantly reduced the spread of imbalance prices and thus the risk to which smaller generators are exposed.
- 2.46 Modification P100 came into force on 5 November 2003. It ensures that licence exempt distributed generators who are signatories to the BSC and have registered meters in the Central Meter Registration Service have the opportunity to receive directly from the National Grid Company the benefit of a reduced Balancing Services Use of System (BSUoS) charge, as well as receiving other benefits relating to Balancing and Settlement Code Company (BSSCo) costs and transmission losses from the appropriate BSC Agent. The Energy White Paper made clear that the Government would continue to keep developments in this area under review to ensure that the needs of CHP operators are properly taken account of.

### Regional Planning and Power Station Consents

- 2.47 The Government will continue to emphasise the benefits of Renewables, CHP and community heating in planning and sustainable development guidance. This was highlighted in the Energy White Paper commitment for CHP, whereby the Government will continue, as and when appropriate, to emphasise the benefits of CHP and community heating whenever planning and sustainable development guidance is introduced or reviewed. This measure addressed those suggestions from respondents to the 2002 consultation exercise to use the planning frameworks to promote the development of CHP.

- 2.48 This can be seen in the Government's Planning Policy Statement 1 Creating Sustainable Communities, which was issued for public consultation in February 2004 and is due to be published later in the year. It will set out the Government's vision for planning and the key policies and principles which underpin the planning system. It places sustainable development at the heart of the planning system and ensures that consideration will need to be given to the need for developments, over their lifetime, to make efficient use or reuse of existing resources rather than making new demands on the environment. Local Planning Authorities should therefore seek to promote and encourage renewable energy sources as well as encouraging energy efficient buildings and the use of combined heat and power and community heating systems in developments.
- 2.49 Development consent for small CHP Schemes (below 50 MW<sub>e</sub> capacity) is subject to planning permission from Local Planning Authorities, whilst for medium and large schemes (above 50 MW<sub>e</sub>) a power station consent must be sought from the Department of Trade and Industry under Section 36 of the Electricity Act of 1989. In addition to this, any proposal of 10 MW<sub>e</sub> or more, if fuelled by oil or natural gas, must be cleared by the Department of Trade and Industry under section 14 of the Energy Act 1976.
- 2.50 For those schemes seeking DTI clearance, the lifting of the temporary Stricter Consents Policy in November 2000 means the developers are required to show that they have seriously explored opportunities to use CHP when bringing forward power station proposals. The Department of Trade and Industry has published guidance on this, aimed at ensuring the developer can obtain market information on heat sales opportunities and consider CHP early in the decision-making process. As promised in the Energy White Paper, the Government will be consulting shortly on an update to this guidance. This will include more up to date references to the Government's policy goals, better clarification of the evidence needed by developers to show that they have properly considered CHP and the provision of more information to inform their deliberations on whether CHP is feasible.
- 2.51 It is recognised that a lack of available information can be a constraint. To help overcome this barrier a Heat Mapping exercise was carried out by the Energy Saving Trust in September 2002 as part of the Government's investigation into the potential for CHP and community heating schemes to supply a greater proportion of the nation's heat markets. The results<sup>13</sup> of this have added to market information and contributed to Regional Development plans by quantifying the potential and identifying key opportunities for development.
- 2.52 A clear message from the responses to Ofgem's consultation on distributed generation was that planning constitutes a problem for some smaller generators. The Government will assess the scope for providing assistance from regional

13 The results of this exercise can be found at <http://www.est.org.uk/communityenergy/information/heatmaps.cfm>

government offices to guide developers through planning applications, indicating locations of any favoured regional development areas. This support could extend to advising on how to access the various support measures available to developers of CHP schemes.

- 2.53 The Government issued revised social and environmental guidance to Ofgem in February 2004. The guidance confirms the importance that the Government attaches to the four goals of energy policy set out in the Energy White Paper and sets out some of the Government's key targets, including the 10,000 MW<sub>e</sub> CHP target, and asks Ofgem to help achieve these. To help secure the targets, Ofgem are asked to ensure that, within their area of influence, barriers that inhibit progress are, wherever possible, removed.

### Energy Efficiency Commitment

- 2.54 Since 1994, under the Energy Efficiency Standards of Performance (EESOP) schemes, suppliers have been able to use community heating with CHP as a way of contributing towards meeting their energy targets, provided that the dwellings were previously electrically heated or had their own individual gas supplies. Under the Energy Efficiency Standards of Performance Scheme (EESOP) 2000–2002 (SOP3), the Government ensured that for any residential premises which are heated using gas, including dwellings on community heating networks without individual gas supplies, the energy savings arising from CHP were eligible to count towards the savings targets of suppliers. The target gas energy savings for SOP3 assumed that 4% of the equivalent gas savings would occur through CHP, accounting for some 10,000 homes.
- 2.55 The Energy Efficiency Commitment (EEC) replaced the EESOP from April 2002. Under the EEC for 2002–2005, obligations are placed on all gas and electricity suppliers to achieve targets for the promotion of improvements in energy efficiency. CHP is one of a number of measures which gas and electricity suppliers may use in order to meet their obligations under the EEC. Programmes that encourage or assist with new or additional uses of CHP are eligible. This could include the deployment of micro-CHP in domestic applications, community heating schemes, or other applications where the fuel is purchased by a landlord who is not himself a domestic consumer, since the fuel is in effect being bought on behalf of, and for the benefit of, domestic consumers.
- 2.56 A further incentive is provided for the delivery of energy efficiency through energy services under the present EEC by crediting suppliers with additional savings of up to 50%, up to a limit of 10% of their targets. In line with the commitment made in the Energy White Paper, the Government is considering how to incentivise CHP technologies under the next phase of the EEC. The EEC for the period beyond 2005 will be the subject of a public consultation exercise in the very near future.

## Building Regulations

2.57 Guidance on CHP was included in the 2002 edition of the Building Regulations Approved Document L2 (conservation of fuel and power in buildings other than dwellings) as a way of contributing towards compliance with the overall building carbon emissions standards. Further ways of encouraging the take up of CHP and other low and zero carbon technologies are being explored in the Building Regulations revision announced in the Energy White Paper. The Government aims to bring this revision into effect in 2005. The Government envisages announcing formal consultations on the proposed changes this summer. In advance of this, officials in the Office of the Deputy Prime Minister (ODPM) have been informally consulting industry on what practical improvements could be made, and how they might best be introduced. The final report from the Industry Advisory Group on low and zero-carbon technologies is to be placed on the ODPM web site.

## Network Issues and Distributed Generation

2.58 The findings of the Embedded Generation Working Group (EGWG) suggested that regulatory change is necessary to ensure embedded CHP schemes are granted fair and equitable access to local distribution networks. A move away from asset-based regulation, which currently provides incentives for Distribution Network Operators to invest in network assets, towards performance-based regulation may be important to the long-term viability of distributed generation.

2.59 As part of providing equitable arrangements for generators the EGWG identified the need for:

- effective information flows;
- clear market entry conditions;
- equitable and transparent terms for connection and use of the system;
- review of design codes and operation standards and guidance; and
- a market for services such as power quality, voltage and ancillary services.

2.60 The Distributed Generation Co-ordinating Group (DGCG) is a joint Government/industry group that has been set up to consider how best to take forward the recommendations of the EGWG, to address the technical, commercial and regulatory barriers to the deployment of generation within the local distribution network. The Group has over 30 projects in hand aimed at addressing network-related barriers to, or facilitating the connection of, distributed generation. These are funded by the DTI's New and Renewable Energy Programme and a number are specifically aimed at improving the environment for micro-CHP. The Government is working with Ofgem to address the administrative burdens

placed on smaller generators and, through the DGCG, is following up a range of wider changes designed to facilitate the development of distributed generation.

- 2.61 As part of its work on the Distribution Price Control Review, Ofgem has been developing an incentive framework to encourage distribution network operators to connect and utilise distributed generation. An outline of the incentive framework was published in a consultation paper in July 2003<sup>14</sup>, and an indicative range of values for the incentives was set out for consultation in December 2003.

### ***Promotion of Innovation***

#### **Micro-CHP and other New Technology Developments**

- 2.62 In addition to work to stimulate CHP development, DTI's New and Renewable Energy R&D programme, with an annual budget of £19 million, helps support a variety of technologies which can include renewable CHP, fuel cell-CHP, micro-CHP and advanced gasification technology, depending on priorities in any given year.
- 2.63 As part of its low-carbon technology innovation remit, The Carbon Trust will consider proposals for R&D into systems featuring CHP and novel technologies. The International Energy Agency's Information Centres provide an essential vehicle for communicating R&D results and achievements covering a broad spectrum of topics. Of particular relevance to CHP are the Energy Technology Data Exchange, the International Centre for Gas Technology Information, the Centres for the Analysis and Dissemination of Demonstrated Technologies (CADET-EE and CADET-RE) and the Greenhouse Gas Technologies Information Exchange (GREENTIE).
- 2.64 In the Energy White Paper, Government made a commitment to support field trials to evaluate the benefits of micro-CHP. These trials are going ahead, with the Carbon Trust, in consultation with the Energy Saving Trust, building on development work through the Carbon Trust Innovation Programme. The trials will provide independently monitored data from a range of impartially procured micro-CHP units, in real operating environments. This project will help determine what carbon benefit the units may provide and the need for any future trials or appropriateness of any support measures, if any, that might be necessary to support the progress of micro-CHP.
- 2.65 Respondents to the 2002 consultation exercise suggested that a suitable type-approval system be implemented for micro-CHP units, as well as other regulatory issues to facilitate market entry. While no such type approval system is currently in

14 The Consultation document can be found here:  
[http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/3939\\_DPCR\\_Main%20doc\\_july03.pdf](http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/3939_DPCR_Main%20doc_july03.pdf)

place, a Draft Laboratory Testing Procedure to determine the thermal and electrical efficiency of micro-CHP units has been developed by the Energy Saving Trust. Manufacturers are being invited to undertake physical testing of the units to verify the practicality of the Procedure. Once the system is in place initial work on developing a treatment for micro-CHP in the Standard Assessment Procedure (SAP) can be finalised and work taken forward to list the performance of micro-CHP boilers on the Seasonal Efficiency of Domestic Boilers in the UK (SEDBUK) database.

### Wider Promotion of the Role of CHP

- 2.66 Delivering the target for CHP will require efforts from the industry, close collaboration among Government departments, and co-operation between Government and other stakeholders in the private and public sectors, including the regulators and the technology developers and manufacturers. The Government maintains regular contact with the Combined Heat and Power Association, which represents the interests of a broad range of organisations involved in CHP, at both Ministerial and official level. It has also set up the Sustainable Energy Policy Network to ensure that Government departments take forward the Energy White Paper's low-carbon aims.
- 2.67 The continuing promotion of CHP to the wider market and the provision of reliable advice, assistance and networking opportunities to both existing and potential users of CHP underpins all the Strategy measures.
- 2.68 Keeping CHP on the agenda through the effective promotion of the technology and its wider environmental benefits is important in view of the long-term nature of CHP investments and the fact that most CHP projects take several years from the decision to proceed to initial operation. Information is especially important because, even with adequate incentives in place, building and operating CHP requires a detailed understanding of a number of complex technical, market and regulatory issues.
- 2.69 The Carbon Trust, which was established in April 2001, took over the Energy Efficiency Best Practice Programme in July 2002 and re-launched it as Action Energy. Action Energy helps organisations in business and the public sector to reduce carbon emissions primarily through energy efficiency measures. Action Energy supports the implementation of CHP projects in both the private and public sector in a number of ways including the CHP Club (an information resource and website for organisations interested in CHP), specialised site surveys to assess CHP feasibility in more detail for sites with potential for CHP and targeted publications e.g. "Guide to CHP use in hospitals." Where there are opportunities to consider CHP, Action Energy general site surveys draw these to the attention of the

company as part of the visit report. Action Energy includes an interest-free loan scheme targeted at SMEs – loans of £5,000 to £50,000 are available for energy efficiency projects, including CHP.

- 2.70 The Energy Saving Trust has supported CHP through its Government sponsored programmes since 1997, through a variety of programmes and policy work. It will continue to support CHP with its audiences, including households, housing managers such as registered social landlords (RSLs) and Local Authorities, and housing developers. It will also continue policy and regulatory development work to support the market development of CHP in the domestic and other sectors.
- 2.71 The two Trusts work closely together on CHP-related matters and on issues related to energy services. These include the Community Energy programme, which is managed jointly by the two Trusts, and micro- and/or mini-CHP, where the Carbon Trust is running field trials. The Carbon Trust is taking lead responsibility on innovation and market development in the non-domestic sector (where there are a number of opportunities for adoption of mini-CHP). The Energy Saving Trust takes lead responsibility on market development in the domestic sector, and on policy issues for micro-generation.
- 2.72 The Energy White Paper included a support measure for CHP inviting the Energy Saving Trust and the Carbon Trust to review their current and future programmes to ensure that they reinforce the delivery of the Government's CHP target. Ministers subsequently wrote to both Trusts, reminding them of the importance of reviewing their ongoing programmes. Defra continues to work with the Trusts on developing their annual Business Plans so that their programmes can promote and support CHP is ongoing.

### Improvements to Existing CHP Schemes

- 2.73 A Quality Improvement programme will be developed to make use of the performance assessments of CHP schemes carried out under CHPQA. On the basis of this information the CHPQA Administrator could contact operators of those schemes identified with having a major scope for improvement via replacement, expansion, enhancement or operating changes. This could include the provision of site-specific advice or perhaps financial assistance towards more detailed feasibility studies. In either case, the Carbon Trust will be involved, through the Energy Efficiency Best Practice Programme's Action Energy initiative and possibly through the Community Energy programme. The Draft CHP Strategy suggested that a CHP Quality Improvement Programme may lead to 750MW<sub>e</sub> of new Good Quality CHP capacity. A re-evaluation of the options for such a programme using current energy prices indicates that the new capacity that such a programme could stimulate would be up to 250MW<sub>e</sub>.

## ***Government Leadership and Partnership***

### **The Government Estate**

2.74 The Energy White Paper included a support measure to proceed with considering setting targets for Government departments to use CHP-generated electricity. This was in line with the Government's commitment to long-term use of CHP. In December 2003, as required by the Sustainable Energy Act 2003, the Government set a target for the Government Estate to source at least 15% of electricity from Good Quality CHP by 2010. Achievement of this target is subject to any additional costs incurred by the exchequer being considered acceptable. The target is enshrined in the Energy section of the *Framework for Sustainable Development on the Government Estate* document, which was published in February 2004. Sourcing electricity from CHP is similar to purchasing renewable electricity i.e. it is not dependent on Departments building combined heat and power plants. Departments are none the less encouraged to consider the feasibility of developing on-site CHP plants and to connect to local heat networks if it is economic to do so. Defra has also undertaken to offer help and advice to Departments in developing their plans in delivering the CHP target<sup>15</sup>.

15 <http://www.sustainable-development.gov.uk/sdig/improving/guidanceee.htm>.

## The Potential for Growth in CHP Capacity

- 3.1 The past decade has seen steady progress in the development of CHP capacity in the UK, resulting in a total of 4,742 MW<sub>e</sub> now in place. However, this progress has largely stagnated over the past few years.
- 3.2 The Government's view of the future potential of CHP is based on continual monitoring and analysis of the growth of installed CHP capacity. In 1997, ETSU published a study "Assessment of CHP Potential – Final Report", which gave a range for the potential in 2010 of 10–17,000 MW<sub>e</sub>. In addition, work under the Energy Efficiency Best Practice Programme at that time suggested that there was a further potential of 2,000 MW<sub>e</sub> in community heating.
- 3.3 A potential of 14,000 MW<sub>e</sub> at 2010 was also reported in the context of a European study, "The Environmental Impact of Cogeneration – A Study for the EU and selected European Nations", carried out by COGEN Europe in 1995 and reported in 1998. Then, in October 2000, Forum for the Future and Cambridge Econometrics published a study "Combined Heat and Power to 2020 – Economic and Environmental Implications of Exploiting the Potential of CHP". The potential at 2010 was given as 6,600 MW<sub>e</sub> rising to 8,600 MW<sub>e</sub> by 2020, although this modelling did not include the larger CHP opportunities.
- 3.4 In 2001/2, the Government commissioned modelling work from Cambridge Econometrics to provide an independent evaluation of the effect of a number of support measures and some further options on growth of CHP installed capacity to 2010. This work was updated in the second half of 2003 in light of new data and improved information on industrial business planning.
- 3.5 The projections in the new modelling<sup>16</sup> are particularly sensitive to gas and electricity price assumptions between now and 2010. By modelling a range of +/-20% for both of these, results suggest an installed capacity of 7,700–9,400 MW<sub>e</sub> in 2010 with a central projection value of 8,100 MW<sub>e</sub>.
- 3.6 The central projection includes a number of Government support measures and initiatives. In particular, micro-CHP is expected to contribute around 400 MW<sub>e</sub> by 2010, although it could be much higher in the future. A figure of 130 MW<sub>e</sub> is included for Community Energy, which is the contribution aimed for from the current programme to 2005, though if continued it could contribute a total of between 500–1,000 MW<sub>e</sub> by 2010. The Quality Improvement Programme is expected to contribute 250 MW<sub>e</sub>. Taken together, all the Government support measures for CHP are expected to contribute around 1,900 MW<sub>e</sub> to the achievement of the 2010 CHP target.

16 The full report is available at [http://www.dti.gov.uk/energy/environment/energy\\_efficiency/chpreport.pdf](http://www.dti.gov.uk/energy/environment/energy_efficiency/chpreport.pdf).

3.7 The Cambridge Econometrics modelling does not take into account the potentially beneficial effects of the EU Emissions Trading Scheme (EU ETS) or the new support measures in the Energy White Paper. The impact of the EU ETS on the price of carbon in the EU market can be expected to produce an increase in electricity prices favouring carbon-efficient generation, including CHP. The effect on CHP capacity is difficult to quantify but calculations based on sensitivities derived from the Cambridge Econometrics results suggest that this could be of the order of an additional 100–400MW<sub>e</sub> of capacity. The White Paper measures are at too early a stage of development at present to fully quantify their total effect. The current central projection is therefore around 8,500MW<sub>e</sub> by 2010.

### CHP Quality Assurance Programme

3.8 The CHP Quality Assurance programme (CHPQA) forms the basis on which progress towards the target is monitored. CHPQA is a Government initiative to encourage the wider practical application of combined heat and power, community heating and alternative fuel technologies.

3.9 The aims of CHPQA are to:

- define, assess and monitor the quality of CHP schemes on the basis of energy efficiency and environmental performance;
- ensure fiscal and other benefits are in line with environmental performance;
- provide clear signals to users and potential users to minimise the cost of energy demands through CHP; and
- achieve the above at minimum cost to CHP users and to the Government.

3.10 CHPQA provides the following:

- a methodology for assessing the quality of CHP schemes, and their qualification as CHP for all or part of their inputs, outputs and capacity; and
- a programme whereby designated "Responsible Persons" can apply for Registration and Certification of their schemes in accordance with the criteria for Good Quality CHP and hence qualify for benefits. Application to CHPQA is voluntary.

3.11 Certification issued under CHPQA may be used for determining the eligibility of schemes for fiscal or other benefits and for determining compliance of schemes with regulatory requirements where quality is relevant to entitlement.

3.12 The CHPQA database provides the most comprehensive set of data on CHP schemes available. Over 1,430 CHP schemes have already registered with CHPQA.

## Monitoring and Reporting

- 3.13 The Government will continue to monitor and report annually on progress towards the CHP target. Monitoring will be based on the data collected under CHPQA, which registers the Power Capacity of the majority of CHP schemes in the UK. This is supplemented by additional data from the Office for National Statistics.
- 3.14 Growth in CHP capacity, which this Strategy is designed to underpin, is expected to provide a key contribution to the Government's Climate Change Programme. Longer-term progress will be monitored to assess whether the measures set out in this Strategy remain a sound basis for achievement of the CHP target. Progress will also be reported as part of the wider Energy White Paper annual reporting process.

A1.1 A new build CHP scheme typically displaces:

- heat that would have come from on-site boilers; and
- electricity from on-site generation that is decommissioned, with the balance made up of electricity imported from the network.

A1.2 For a single given scheme, the heat source displaced will be known and emissions can be calculated. Similarly, displacement of any existing on-site generation will be known and emissions can be calculated. For electricity displaced from the network, assumptions have to be made about the mix of technologies and fuel displaced.

A1.3 The electricity generation assumed to be displaced by a single new CHP scheme depends on the actual power stations that are, or would otherwise have been, operating at the time the CHP plant is operating. This is discussed in more detail in an article in Energy Trends June 2003. Table A1.1 taken from that article shows the proportions and average efficiency of fossil-fuel generation plant in 2001, assuming 6% transmission and distribution losses. The average supply efficiency in 2001 was 39.6%, giving an average emission of 196 gC/kWh of delivered electricity.

**Table A1.1. Fossil Fuel Generating Efficiencies, 2001**

Type	Efficiency range %	Average primary efficiency %	Delivered electricity efficiency %	Carbon gC/kWh of delivered electricity	% of fuel mix
Coal	32–37	34.0%	32%	278	46%
Oil	25–37	28.0%	26%	276	2%
Gas	32–52	45.0%	42%	119	52%
<b>Total all fossil fuels</b>			<b>39.6%</b>	<b>196</b>	

A1.4 Where a single scheme replaces an existing scheme on a particular site, the existing on-site boiler (and sometimes existing on-site electricity generation) is known. The only assumption that needs to be made to calculate the emissions impact of the CHP scheme is the mix of power generation imported from the network. Where savings from a portfolio of schemes are to be estimated e.g. at the UK level for installed CHP, a proxy has to be found for the range of heat sources displaced. The best proxy is the average of the current installed boiler capacity. As discussed in the Energy Trends article, the current average mix gives a central emissions factor of 81 gC/kWh of delivered energy from boilers.

A1.5 The emissions from the fuel burnt in CHP in 2001 were 4.72 MtC (Table A1.2).

**Table A1.2. CHP Fuel Emissions Factors, 2001**

	Fuel used (GWh)	Emissions factor (gC/kWh)	Emissions (MtC)
Coal	7,256	89	0.7
Fuel oil	8,066	73	0.6
Gas oil	419	68	0.02
Natural gas	68,804	50	3.4
Blast furnace gas	1,537		
Coke oven gas	526		
Refinery gas	6,737		
Renewable fuels	2,224		
Other fuels*	17,485		
<b>Total</b>	<b>113,054</b>		<b>4.72</b>

\*Other fuels include: carbon monoxide, methane, propane, process liquid waste and process waste.

**A1.6** CHP generated 22,568 GWh of electricity and 61,025 GWh of heat in 2001. Compared to the average of fossil-fuel fired electricity-only plant and the current average mix of boilers, installed CHP in 2001 gave savings of 4.1 MtC. Compared with the average of all electricity-only plant the savings were 2.9MtC. In 2002 CHP saved 3.3–4.6MtC, compared to equivalent electricity-only and heat-only generation. This is equivalent to 0.7–0.96MtC per 1,000MW<sub>e</sub><sup>17</sup>. The methodology and assumptions are outlined in the June 2003 edition of Energy Trends<sup>18</sup>.

**A1.7** The emissions savings for future years are harder to project and depend on not only the improvements in efficiency of electricity-only and heat-only plant, but also improvements in CHP technology. For new CHP schemes built to meet the Government's 10,000 MW<sub>e</sub> target, the savings will depend on the generating plant displaced. In the short term this will be fossil-fuel generation, and carbon savings would be around 0.7MtC for each additional 1,000 MW<sub>e</sub> of CHP capacity. Towards 2010 and beyond, CHP is likely to begin to replace new gas-generating technologies compared with which projected savings are 0.1MtC per 1,000 MW<sub>e</sub> installed. More information on carbon savings from future investments in CHP can be found in the June 2003 edition of Energy Trends<sup>19</sup>.

17 Digest of UK Energy Statistics 2003

18 Document available at [www.dti.gov.uk/energy/inform/energy\\_trends/index.shtml](http://www.dti.gov.uk/energy/inform/energy_trends/index.shtml)

19 [www.dti.gov.uk/energy/inform/energy\\_trends/index.shtml](http://www.dti.gov.uk/energy/inform/energy_trends/index.shtml)

### Action Energy

Action Energy is the UK's main energy efficiency information, advice and research programme for organisations in the business and public sectors. Action Energy is managed by the Carbon Trust.

### Balancing Mechanism and Balancing and Settlement Code

The Balancing Mechanism allows the National Grid Company, amongst other things, as the System Operator, to keep the transmission system in electricity balance close to, and in, real time by adjusting levels of generation and demand in the light of the Bids and Offers submitted. The Balancing and Settlement Code (BSC) contains the rules and governance for trading in the Balancing Mechanism and the Settlement Process. The BSC covers arrangements for Parties to make, and for the System Operator to accept, Offers and Bids to increase or decrease the quantities of electricity to be delivered to or taken off the transmission system and for the settlement of financial obligations arising from the acceptance of such Bids and Offers.

### Bio-Energy Capital Grant scheme

The scheme is jointly funded by the Department of Trade and Industry (DTI) and the National Lottery New Opportunity Fund (The Fund) with input from the Department for Environment Food and Rural Affairs (Defra). The scheme provides a common focus and entry point into the capital grant funding available from DTI and The Fund. The scheme closed for applications in 2002.

### Bio-fuels

Fuels derived from plant or animal matter, such as energy crops or wood chip, or from the digestion of animal or vegetable matter, such as farm slurry or municipal sewage.

Although potentially a useful alternative fuel for CHP, municipal solid waste is not considered a bio-fuel.

### Black Start

The ability of a local back-up generator to start automatically upon loss of supply from the grid, with no disruption in the power supply.

### Capital Modernisation Fund

The CMF was set up in 1998 to help unlock innovative ways of delivering high-quality public services. £5 billion was allocated until Budget 2003, when the Government decided to make no further allocations from the fund.

### Carbon emissions

Emissions to atmosphere of the main Climate Change gas carbon dioxide. Expressed in terms of carbon: 12g of C = 44g of CO<sub>2</sub>.

### Carbon Trust

The Carbon Trust, an independent company funded by Government, was launched in April 2001 as part of the UK Climate Change Programme. Its role is to "take the lead on energy efficiency for business and the public sector, and to support the development of a low carbon economy in the UK".

### Combined Heat and Power (CHP)

The simultaneous generation of heat and power in a single process, putting to use heat that would normally be wasted to the atmosphere, rivers or seas.

### CHP capacity: Total Power Capacity and Qualifying Power Capacity

CHP Total Power Capacity (CHP<sub>TPC</sub>) – the registered maximum power generation capacity of a CHP scheme (MW<sub>e</sub>).

CHP Qualifying Power Capacity (or Good Quality CHP capacity, CHP<sub>QPC</sub>) – the registered power generation capacity (MW<sub>e</sub>) qualifying as Good Quality CHP. For most Schemes this will be the same as CHP<sub>TPC</sub>.

### CHP Club

An initiative under the Energy Efficiency Best Practice Programme for users and potential users of CHP providing both general and detailed technical information and the opportunity to network with other users.

### CHPQA

The Combined Heat and Power Quality Assurance programme, which defines, assesses and monitors the quality of UK CHP schemes.

### Climate Change Levy

The Climate Change Levy is a tax on gas, coal, electricity and LPG used by the non-domestic sector to encourage these sectors to become more energy-efficient and so reduce carbon emissions. The levy and its associated measures have a key role in the UK Climate Change Programme, making significant contributions to the targets set under both the Kyoto Protocol and the targets set for the UK by the Government.

### Climate Change Programme

The Climate Change Programme was published in November 2000. It consists of a package of policies and measures which will help to achieve the UK's targets to cut emissions of 6 greenhouse gases by 12.5% (5% below 1990 levels) by 2008–2012 (agreed as part of Kyoto and also our EU target) and to reduce CO<sub>2</sub> emissions by 20% of 1990 levels by 2010 (domestic target).

### Co-generation

See definition of CHP.

### Combined Heat and Power Association (CHPA)

The UK trade body representing CHP developers and users.

### Community Energy programme

The UK-wide Community Energy programme offers both capital and development support to foster the refurbishment and installation of community heating schemes.

### Community heating

A community heating scheme is based around a heat network that supplies more than one building or dwelling and provides significant benefits for customers, especially households. Some schemes may, through energy linking, provide services to more than one site, and sometimes a range of sites spread across a city. A scheme may supply heat to the network from conventional boilers, from renewables-fired boilers, or utilise waste heat from power generation (CHP). In addition a scheme may provide other services e.g. electricity (either over the public network or via private wires) or chilled water for air conditioning.

### Embedded Generation Working Group

A working group set up during the year 2000 by DTI, Ofgem and former DETR to consider a range of issues relating to distributed generation and to make initial recommendations about its equitable treatment. DTI published the EGWG report on 12 January 2001.

Note: the term embedded generation has now largely been replaced by distributed generation.

### Emissions Trading (Scheme)

The UK Emissions Trading Scheme was launched in 2002 and forms part of the UK Climate Change Programme. It is a voluntary scheme designed to achieve cost-effective emissions reductions and provide UK business with early experience of emissions trading.

### Energy Efficiency Best Practice Programme

UK national programme run by Carbon Trust to promote the wider uptake of energy efficient technologies and practices.

### Energy Efficiency Commitment

Energy Efficiency Commitment 2002–2005. An obligation on electricity and gas suppliers in GB to make energy efficiency improvements, through measures provided to domestic consumers. The overall obligation was set by the Government for the first time and at least 50% of energy savings must be focused on lower income consumers.

### Energy Saving Trust (EST)

Set up after the 1992 Rio Earth Summit to help reduce CO<sub>2</sub> emissions in the UK, the EST is a non-profit organisation funded by the Government and the private sector.

The EST works with a range of partners to deliver the sustainable and efficient use of energy. Current priorities are:

- to stimulate energy efficiency in UK households and achieve social and environmental and economic benefits; and
- to create a market for clean-fuel vehicles to deliver local and global environmental benefits.

### Energy Services Companies (ESCOs)

Organisations that provide integrated energy services to customers. In the context of CHP, this could include design, development, installation, operation and maintenance of a CHP scheme in order to provide the customer with heat and electricity and could extend to on-site energy management services.

### Enhanced Capital Allowances

Good Quality CHP certified under CHPQA is eligible for Enhanced Capital Allowances, allowing business to write-off the cost of investments in CHP plant against their taxable profits of the period in which they make the investment.

### Fuel Poverty Strategy

A Strategy published by the Government in November 2001, setting out measures to ensure that no low-income or disabled household will be in fuel poverty by 2010. A fuel-poor household is defined as one needing to spend in excess of 10% of household income to achieve a satisfactory heating regime.

### Good Quality CHP

CHP that ensures significant energy efficiency and environmental benefits relative to comparable, separate, conventional methods of heat and power generation.

### Good Quality CHP electricity

See Qualifying Power Output.

### Gross Calorific Value (GCV)

The GCV of a fuel is the total energy available from that fuel (solid, liquid or gas) when it is completely burnt. It is expressed as heat per unit weight or volume of fuel. Gross signifies that the water formed or liberated during combustion is condensed to the liquid phase. The GCV of a solid or liquid fuel is determined at constant volume and of a gaseous fuel at constant pressure.

### Home Energy Efficiency Scheme (HEES)

See Warm Front Team.

### IEA Information Centres

- *Energy Technology Data Exchange*
- *Int. Centre for Gas Technology Information*
- *CADDET Energy Efficiency and Renewable Energy*
- *GREENTIE*

The International Energy Agency, based in Paris, is an autonomous agency linked with the Organisation for Economic Co-operation and Development (OECD). The 26 IEA Member governments are committed to taking joint measures to meet oil supply emergencies and have agreed to share energy information.

### Imbalance Charges

If a Party's actual volume taken from or put onto the transmission system differs from its notified contract volume, the Party is in a position of energy imbalance. Parties with a position of energy imbalance will be exposed to the relevant Energy Imbalance Prices depending upon how their actual volume compares to their contracted volume. Imbalance charges are determined by applying an imbalance position to the relevant Energy Imbalance Prices: the System Sell Price (SSP) if a party is "long" and the System Buy Price (SBP) if a party is "short".

### Intelligent Energy for Europe

An EC multi-annual framework programme for actions in the field of energy that commenced in 2003. The programme covers four work streams: SAVE (energy efficiency), ALTERNER (Alternative sources of energy), STEER (energy for transport) and COOPENER (support for International projects).

### Island Mode

Ability of the power connection system to isolate a localised generator upon failure of the grid supply, allowing it to operate normally.

### ktC

Kilotonnes of carbon.

### kW<sub>e</sub>, MW<sub>e</sub>, GW<sub>e</sub>

Units of electrical capacity: kilo (10<sup>3</sup>), mega (10<sup>6</sup>), giga (10<sup>9</sup>) watts.

### Large Combustion Plant Directive (LCPD)

The revised LCPD (2001/80/EC) which replaces the early LCPD adopted in 1988, requires EU Member States to regulate emissions of SO<sub>2</sub>, NO<sub>x</sub> and particulates. It applies to combustion of all fuels in gas turbines and boiler plant of over 50 MW<sub>e</sub> thermal input.

### Licence Exemption Orders

The Secretary of State may make an order under Section 5(1) of the Electricity Act granting exemption from the requirements for a licence to generate electricity. Interested parties will be consulted before an order is issued.

### Load factor

Total Power Output/(8760 x Total Power Capacity).

### Micro-CHP

CHP units with Total Power Capacity of less than 5kW<sub>e</sub>.

### Mini-CHP

CHP units with Total Power Capacity in the range 5 to <500kW<sub>e</sub>.

### NETA

The New Electricity Trading Arrangements (NETA), which came into effect on 27 March 2001, are based on bilateral trading between generators, suppliers, traders and customers. Market participants contract bilaterally to meet their needs and contractual commitments. Participants face commercial incentives to contract accurately so that the costs of balancing the system, and ultimately the costs to participants, are minimised.

### Ofgem

Office of Gas and Electricity Markets. Ofgem is the regulator for Britain's gas and electricity industries. Its role is to promote choice and value for all customers.

### PIU Energy Review

Published in February 2002, this PIU report examines the long-term challenges for energy policy in the UK, and sets out how energy policy can ensure competitiveness, security and affordability in the future. The report looks to 2020 and beyond to 2050.

### Power Efficiency

Total Power Output/Total Fuel Input. Power Efficiency is one of two key CHPQA parameters.

### Private Finance Initiative

The Private Finance Initiative (PFI) is one of the main mechanisms through which the public sector can improve value for money in partnership with the private sector. It was launched in 1992 with the aim of delivering higher quality and more cost-effective public services. It does this by encouraging partnerships and by involving the private sector more directly in asset provision and operation.

### Public Private Partnerships

Public/private partnerships (PPPs) involve establishing arrangements, often a legally-binding contract, that will bring benefits to both sectors. The private sector needs to earn a return on its ability to invest and perform. The public sector wants to deliver services to the standard specified and to make the best use of public resources.

### Qualifying Power Output (CHPQPO)

The registered annual power generation ( $MWh_e$ ) qualifying as Good Quality output from CHP. For most Schemes this will be the same as Total Power Output ( $CHP_{TPO}$ ). Can include mechanical output but  $CHP_{QPO}$  is always expressed in terms of electrical output.

### Quality Index (QI)

One of 2 key CHPQA parameters. QI is a measure of energy efficiency and environmental performance.

### Renewable Energy and Energy Efficiency Partnership (REEEP)

A coalition of progressive governments, businesses and organisations committed to accelerating the development of renewable and energy efficiency systems. REEEP provides an open and flexible framework within which governments work together to meet their own sustainable energy objectives according to their own timetables.

### Renewables Obligation

A requirement on licensed electricity suppliers in Great Britain to source a rising percentage of their annual sales from eligible renewable sources, rising to 10.4% in 2010.

### Single Regeneration Budget

The Single Regeneration Budget provides resources to support regeneration initiatives in England carried out by local regeneration partnerships. Its priority is to enhance the quality of life of local people in areas of need by reducing the gap between deprived and other areas, and between different groups. It supports initiatives that build on best practice and represent good value for money.

### Total Fuel Input

The total registered annual fuel input (MWh) to a CHP scheme.

### UK Trade and Investment

UK Trade and Investment is the Government body responsible for promoting UK trade overseas and inward investment into the UK.

### Warm Front Team

The Home Energy Efficiency Scheme (HEES) is now marketed as the Warm Front Team. It provides grants for insulation and heating improvements, such as central heating, for those most vulnerable to cold-related ill health – older householders, families with children, the disabled or those with long-term illnesses.

*Business Rates*

[www.voa.gov.uk](http://www.voa.gov.uk)

*Carbon Trust*

0207 170 7000; [www.thecarbontrust.co.uk](http://www.thecarbontrust.co.uk)

*CHP Association*

0207 828 4477; [www.chpa.co.uk](http://www.chpa.co.uk)

*CHP Club*

0800 585 794; [www.chpclub.com](http://www.chpclub.com)

*CHP Quality Assurance programme*

0870 190 6196; [www.chpqa.com](http://www.chpqa.com)

*Climate Change Agreements*

[www.defra.gov.uk/environment/ccl/index.htm](http://www.defra.gov.uk/environment/ccl/index.htm)

*Climate Change Levy*

0161 827 0332; [www.hmce.gov.uk/business/othertaxes/ccl.htm](http://www.hmce.gov.uk/business/othertaxes/ccl.htm)

*Climate Change Programme*

[www.defra.gov.uk/environment/climatechange/index.htm](http://www.defra.gov.uk/environment/climatechange/index.htm)

*EU Cogeneration Directive*

[www.defra.gov.uk/environment/energy/internat/ec-cogen.htm](http://www.defra.gov.uk/environment/energy/internat/ec-cogen.htm)

*Community Energy programme*

<http://www.est.org.uk/communityenergy>

*DEFRA*

[www.defra.gov.uk](http://www.defra.gov.uk)

*DG-TREN*

[http://europa.eu.int/comm/dgs/energy\\_transport/index\\_en.html](http://europa.eu.int/comm/dgs/energy_transport/index_en.html)

*Digest of UK Energy Statistics*

[www.dti.gov.uk/energy/inform/dukes/index.shtml](http://www.dti.gov.uk/energy/inform/dukes/index.shtml)

*DTI*

[www.dti.gov.uk/energy](http://www.dti.gov.uk/energy)

*Emissions Trading Scheme*

<http://www.defra.gov.uk/environment/climatechange/trading/index.htm>

*Energy Efficiency Best Practice Programme*

0800 585794; [www.energy-efficiency.gov.uk](http://www.energy-efficiency.gov.uk)

*Energy Efficiency Commitment*

[www.defra.gov.uk/environment/energy/eec/index.htm](http://www.defra.gov.uk/environment/energy/eec/index.htm)

*Energy Saving Trust*

<http://www.est.org.uk/>

*Enhanced Capital Allowances*

[www.eca.gov.uk](http://www.eca.gov.uk)

## The Government's Strategy for Combined Heat and Power to 2010

### *European Climate Change Programme*

<http://europa.eu.int/comm/environment/climat/eccp.htm>

### *Framework Programme 6*

[www.europa.eu.int/comm/research/fp6/index.html](http://www.europa.eu.int/comm/research/fp6/index.html)  
[energie@enviros.com](mailto:energie@enviros.com)

### *Integrated Pollution Prevention Control Directive (IPPC)*

<http://europa.eu.int/comm/environment/ippc/>

### *Intelligent Energy for Europe*

[www.europa.eu.int/comm/energy/intelligent/index\\_en.html](http://www.europa.eu.int/comm/energy/intelligent/index_en.html)

### *Large Combustion Plant Directive (LCPD)*

[http://europa.eu.int/eur-lex/en/consleg/main/2001/en\\_2001L0080\\_index.html](http://europa.eu.int/eur-lex/en/consleg/main/2001/en_2001L0080_index.html)

### *National Assembly for Wales*

[www.wales.gov.uk](http://www.wales.gov.uk)

### *New Electricity Trading Arrangements*

[www.ofgem.gov.uk/elarch/reta\\_contents.htm](http://www.ofgem.gov.uk/elarch/reta_contents.htm)

### *NI Assembly*

[www.ni-assembly.gov.uk](http://www.ni-assembly.gov.uk)

### *Ofgem*

[www.ofgem.gov.uk](http://www.ofgem.gov.uk)

### *Performance and Innovation Unit (Now known as the 'Strategy Unit')*

[www.strategy.gov.uk/output/page77.asp](http://www.strategy.gov.uk/output/page77.asp)

### *Power Station Consents Guidance*

[www.dti.gov.uk/energy/leg\\_and\\_reg/consents/powerstation\\_eng.pdf](http://www.dti.gov.uk/energy/leg_and_reg/consents/powerstation_eng.pdf)

### *Scottish Executive*

[www.scotland.gov.uk](http://www.scotland.gov.uk)

### *New and Renewable Energy R&D programme*

[www.dti.gov.uk/energy/renewables/support/index.shtml](http://www.dti.gov.uk/energy/renewables/support/index.shtml)

### *UK Trade & Investment*

[www.uktradeinvest.gov.uk](http://www.uktradeinvest.gov.uk)

### *UN Framework Convention on Climate Change*

[www.unfccc.de](http://www.unfccc.de)

