

# United Kingdom

## Sources of information

- The UK's Third National Communication under the United Nations Framework Convention on Climate Change, 2001
- Climate Change — UK Programme, 2000
- Projections of non-CO<sub>2</sub> Greenhouse Gases for the United Kingdom, Working Paper Oct 2000
- Energy Projections for the UK, Energy Paper 68, 2000
- The Costs and Benefits of the Climate Change Programme Methodology for Appraisal of Measures (paper provided for clarification), May 2000
- The derivation of the carbon savings figures included in the UK's Draft Climate Change Programme (paper provided for clarification), May 2000

## Quality and transparency of reporting

The Third National Communication draws on the UK Climate Change Programme. It provides a clear list of policies and measures to reduce greenhouse gas emissions in a range of sectors. The impact of the measures has been quantified in relation to the *with measures* projection. The *with measures* projection includes measures introduced since Kyoto, these are described and estimates of the savings given.

Costs and benefits of policies and measures were assessed in developing the programme; they are discussed in general terms in the published material and sources of more detailed information are sign-posted.

The table on policies and measures follows the UNFCCC guidelines, additional information is provided in footnotes.

**Table 1: Information provided on policies and measures**

Information provided	Level provided	Comments
Policy names	+++	
Objectives of policies	+++	
Which GHGs?	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFC, PFC and SF <sub>6</sub>	Most detail in CO <sub>2</sub> but quantification of effect also included for other gases
Status of implementation	+++	Clear indication of which measures are additional
Implementation body specified	+++	Generally central government but some local action
Quantitative assessment of implementation	+++	Details for most P&Ms — ranges given for some
Interaction with other P&Ms discussed	+++	The interactions between policies has been included and cumulative effect of additional measures in 2010 given

+, ++, +++ level of information available increases as the number of + signs increases

The latest projections contain a *with measures* scenario covering all six greenhouse gases with a base year of 1990 for carbon dioxide, methane and nitrous oxide and 1995 for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. This projection includes measures introduced since Kyoto, these are identified and quantified separately. Projections are for five year intervals to 2010 and are disaggregated to 9 sectors: energy supply; business; industrial processes; transport; domestic; agriculture, forestry and land use; and public. Emissions from domestic aviation and shipping are included in the projections in accordance with UN-FCCC reporting requirements, trends in international emissions are described and and policy initiatives for the future in this area are referred to. The description of the methodology is good when all the documents are used together. The additional measures are designed to reduce CO<sub>2</sub> and the sectors where they will have an impact are identified.

**Table 2: Information provided on projections**

Category of information	Level of information provided	Comments
Scenarios considered	With measures With additional measures	Both given for different sectors. <i>With measures</i> projections are also disaggregated by gas
Expressed relative to inventory for previous years	Yes	
Starting year	2000	
Split of projections	++	Projections split by gas and sector. Industry and service sectors aggregated as 'business'.
Presentation of results	+++	Results presented in both tabular and graphical form
Description of model (level of detail, approach and assumptions)	+++	Details of the models in the working papers
Discussion of uncertainty	+++	Overall uncertainty and sources discussed
Details of parameters and assumptions	++	Summary table for key parameters in 3 <sup>rd</sup> NC — more details in supporting papers

+, ++, +++ level of information available increases as the number of + signs increases

## Assessment of policies and measures

Table 3 gives an overview of the estimated effects of national policies on total greenhouse gas emissions. The figures given for the *with measures* projection are for the policies and measures introduced since Kyoto, other existing policies and measures have not been quantified separately.

**Table 3: Summary of the effect of policies and measures included in the projections (MtCO<sub>2</sub>)**

	With measures <sup>a</sup>	With additional measures <sup>b</sup>
Energy supply	14.7	
Business	7.3	23.5
Industrial processes		
Transport	6.4	20.9
Residential		17.1
Public		2.2
Agriculture		2.2 <sup>c</sup>
Land use change		
Waste management	1.1	
Total	29.5	65.8

<sup>a</sup>This represents those measures introduced post-Kyoto and does not include all measures included in the *with measures* projections.

<sup>b</sup>Since projections was made (November 2000) all of the policies and measures in the *with additional measures* projection have been either implemented or adopted, but are not yet within the *with measures* projection.

<sup>c</sup>Afforestation

Table 4 gives details of the estimated effects of individual policies and measures. The *with measures* projections include the impact of new measures introduced since Kyoto, which are quantified separately in the Climate Change programme and they are included in Table 4. The additional measures are aimed at CO<sub>2</sub> reduction, there are a number of existing policies, e.g. voluntary agreements on HFCs, aimed at reducing non-CO<sub>2</sub> greenhouse gases but these are not detailed in the table below.

Table 4: Detailed information on policies and measures

Sector	Name	Objective	GHG affected	Type of instrument	Status	Implementing entity	Estimate of savings (MtCO <sub>2</sub> )		CCPM
							2010	2020	
<b>Policies and measure in the with measures projection</b>									
Energy supply	NFFO	Electricity generation and supply	CO <sub>2</sub>	Regulatory	No longer in place	Electricity regulator	5.5	5.5	n
Energy supply	Renewables obligation	Electricity generation and supply	CO <sub>2</sub>	Regulatory	Adopted	Industry regulator (Ofgem)	9.2	9.2	n
Business and public	Climate change levy	Energy use by business and public sectors	CO <sub>2</sub>	Fiscal	Implemented	Government	7.3	7.3	n
Transport	Fuel duty escalator to 1999	Transport demand and fuel efficiency	CO <sub>2</sub>	Fiscal	No longer in place	Government	3.7–9.2	6.6	n
Waste management	Waste strategy and EU landfill directive	Waste	Methane	Regulatory and fiscal	Implemented	Government	0.4–1.8	n/q	y

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Policies and measures in the with additional measures projection									
Business	Climate change agreements and IPPC	Energy use by energy intensive sectors	CO <sub>2</sub>	Negotiated agreements and regulatory	Implemented	Government	9.2	>15.4	In part
Business and public	Energy efficiency measures under the climate change levy package	Energy use by business and public sectors	CO <sub>2</sub>	Fiscal	Implemented	Carbon Trust	1.8	>1.8	n
Business	Emissions trading scheme	All UK companies	All	Economic	Implemented	Government	7.3	>7.3	n
Business, residential and public	Amendment of building regulations	Energy use in buildings	CO <sub>2</sub>	Regulatory	Adopted	Government	5.1	>3.7	n
Residential	Residential energy efficiency, including energy efficiency commitment	Energy use in homes	CO <sub>2</sub>	Regulatory and fiscal	Implemented	Government, industry regulator (Ofgem) and energy supply companies	9.5–13.6	16.5	n

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Residential	Community heating	Energy use in homes	CO <sub>2</sub>	Fiscal (grant assistance)	Implemented	Government, various public and private sector bodies	3.3	3.3	n
Residential	New HEES	Energy use in homes	CO <sub>2</sub>	Fiscal (grant assistance)	Implemented	Government	0.7		n
Residential	Appliance standards and labels	Energy use in homes	CO <sub>2</sub>	Regulatory	Implemented	Government	0.7–1.5		y?
Residential	Central heating for pensioners and families	Energy use in buildings	CO <sub>2</sub>	Fiscal (grant assistance)	Implemented	Scottish Executive	0.4	0.4	n
Public	Public sector targets	Energy use in public buildings	CO <sub>2</sub>	Voluntary agreements	Adopted	Public sector	1.8	1.8	n
Public, business and residential	Reform of building regulations and public sector tables	Energy use in buildings	CO <sub>2</sub>	Regulatory and voluntary agreements	Adopted	Scottish Executive	0.4	0.4	n

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Transport	EU voluntary agreement, backed up by changes to company car taxation and vehicle excise duty	Vehicle fuel efficiency	CO <sub>2</sub>	Voluntary agreements and fiscal (taxation)	Implemented	Government, car manufacturers, European Commission	14.7	27.5	y (in part)
Transport	Ten year plan	System improvements	CO <sub>2</sub>	Fiscal (investment)	Adopted	Government	5.9	5.9	n
Transport	Sustainable development	System improvements in Scotland	CO <sub>2</sub>	Fiscal (investment)	Adopted	Scottish Executive	0.4	0.4	n
Forestry	Afforestation	Extended forest area since 1990	CO <sub>2</sub>	Fiscal (grant assistance)	Implemented	Government and devolved administrations	2.2	4.4	

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## Evaluation of projections

The data in Tables 5–7 are based on information from the Third National Communication.

Table 5 shows the projections by greenhouse gas for 2010 and Table 6 summarises the projections by sector. All sectors except transport and residential are projected to decrease in the *with measures* projections.

**Table 5: Summary of projections by gas in 2010 (MtCO<sub>2</sub>)**

	Base year	With measures	With additional measures
CO <sub>2</sub>	602.8	553.3	487.5
CH <sub>4</sub>	77.0	42.5	42.5
N <sub>2</sub> O	67.1	43.3	43.3
HFC	15.0	10.6	10.6
PFC	1.1	0.4	0.4
SF <sub>6</sub>	1.1	1.1	1.1
<b>Total</b>	<b>764.1</b>	<b>651.2</b>	<b>585.4</b>
% change relative to base year		-14.8 %	-23.4 %

**Table 6: Summary of projections by sector in 2010 (MtCO<sub>2</sub>)**

	Base year	With measures	% change relative to 1990	With additional measures	% change relative 1990 (additional measures)
Energy supply	247.1	171.2	-30.7 %	171.2	-30.7 %
Business	132.7	131.6	-0.8 %	108.2	-18.5 %
Industrial processes	56.8	20.2	-64.5 %	20.2	-64.5 %
Transport	130.5	160.6	23.0 %	139.7	7.0 %
Residential	80.7	84.7	5.0 %	67.7	-16.1 %
Public	16.1	16.1	0.0 %	13.9	-13.6 %
Agriculture	55.7	47.7	-14.5 %	45.5	-18.4 %
Land use change	19.4	10.3	-47.2 %	10.3	-47.2 %
Waste management	24.9	9.2	-63.2 %	9.2	-63.2 %
<b>Total</b>	<b>764.1</b>	<b>651.2</b>	<b>-14.8 %</b>	<b>585.4</b>	<b>-23.4 %</b>

The *with measures* projections shows that the UK is expected to slightly exceed its commitment of a 12.5 % reduction in greenhouse gas emissions under the EU burden sharing agreement.

In addition to its international commitments, the UK has a domestic goal to reduce carbon dioxide emissions in 2010 by 20 % compared to 1990. Additional quantified measures are identified which reduce the six gas basket to 23 % below 1990 levels, this corresponds to a 19 % reduction in CO<sub>2</sub> emissions

**Table 7: Assessment of the target**

	MtCO <sub>2</sub> equiv.	% of 1990 level (six gas basket)
Base year (from projections)	764.1	
Commitment	668.6	-12.5
With existing P&Ms <sup>1</sup>	651.2	-14.8
Gap (-ve means no gap)	-17.4	-2.2
Effect of additional P&Ms	65.8	-23.4

<sup>1</sup> The existing measures include ones introduced since Kyoto

The UK's 3NC also contains a discussion of uncertainty in the projections which is estimated to be  $\pm 10$  MtC ( $\pm 37$  MtCO<sub>2</sub>) in 2010. This corresponds to an uncertainty of about 5 % of base year emissions in the *with measures* scenario. This means that the range of emissions in 2010 under the *with measures* scenario would be 619 to 684 MtCO<sub>2</sub>. At the upper end of the range the UK would fail to meet its Kyoto commitment by about 15 MtCO<sub>2</sub>. However, as the additional measures are worth a further 66 MtCO<sub>2</sub> it seems likely that the UK would meet its commitment even if the *with measures* projection is optimistic and the *additional measures* deliver less than expected.

## Description of modelling approach

Emissions projections are based on existing sectoral activity projections and are described in the two working papers. These papers describe the models in some detail — a summary is presented here.

Demand side energy-related emissions are calculated from projections of energy demand carried out by the Department of Trade and Industry (DTI). The energy scenarios are based on a set of interconnected economic models of consumption in the electricity supply industry and 12 other sectors. The demand model is based on econometric equations including fuel share equations, stock equations e.g. number of cars and energy demand equations.

For electricity production, emissions can be estimated on a plant-by-plant basis.

Six core scenarios are used based on three GDP assumptions (low, central and high growth) and 2 energy price assumptions (high and low energy prices). The key variables for these scenarios are given in the paper on energy projections (EP68). The model also includes parameters for structure of demand and the fuel mix for particular sectors.

Details of the calculation of the costs and benefits of policies and measures and of the derivation of the carbon savings figures are given in the two additional papers.

Sources and types of information for projections for non-CO<sub>2</sub> greenhouse gases are given in the working paper and summarised in the Table below.

Gas	Sector	Sources and types of information
Methane	<i>Agriculture</i>	Ministry of Agriculture, Fisheries and Food — livestock numbers
	<i>Fuel combustion</i>	
	Electricity generation	Department of Trade and Industry (DTI) — projections of electricity generation
	Gas Distribution	Gas Distribution and Storage Companies — leakage reductions
	Mining	DTI and largest mining company — coal demand projections and methane mitigation plans
	Oil & Gas	United Kingdom Offshore Operators Association (UKOOA) and DTI — forecast of oil and gas production and number of installations
	Transport	AEA Technology and DETR — Road Traffic Forecast
	<i>Landfill</i>	AEA Technology report for DETR — effects of policies, UK population and site design and recovery schemes
	<i>Sewage Sludge</i>	Population and estimated likely changes in disposal routes
Nitrous Oxide	<i>Agriculture</i>	MAFF — fertiliser use, crop areas and national populations
	<i>Industrial Processes</i>	Chemical company — projections of production and estimates of mitigation
	<i>Transport</i>	AEA Technology and DETR — vehicle fleet composition and projected energy use
	<i>Electricity generation</i>	DTI — projections of electricity generation
Halogenated gases		March Consulting — projections of use and leakage rates

A simplified energy demand model is used to assess uncertainty in the CO<sub>2</sub> projections. The simple model contains only energy demand, price, GDP and temperature as independent variables. Uncertainty in the current non-CO<sub>2</sub> projections is summarised in the Third National Communication and reported in detail in the background documentation.

#### Modelling parameters

Parameter	2000	2010	Unit
GDP	2.25–3.25	1.75–2.75*	% growth / year
International oil price <sup>a</sup>	10–20	10–20	\$US/bbl 1999 prices
Gas (National price — Business)	13.8–17.7	10.9–21.5	p/therm 1999 Prices
Coal (National price — Business)	11–12.2	11.7–15.3	p/therm 1999 Prices

Source: Questionnaire

\*For the period of 2006–2020.

<sup>a</sup> Different scenarios — 2010 at 2000 prices.

## Country conclusions

The main document used for this summary was the Third National Communication. The level of detail and clarity of the documents from the UK is very good. The details of the methodology for the projections are available and contain a reasonable level of detail on the models and parameters. It would be helpful if the projections for the business sector could be disaggregated to show industry separately from the service sector. The additional policies and measures are summarised in a table, which makes clear the potential greenhouse gas savings.

The projected fall from the 1990 baseline with existing measures, including the impact of some introduced since Kyoto, is -14.9 % in the basket of six greenhouse gases by 2010 which slightly exceeds the UK's burden sharing target of -12.5 %. Additional new policies and measures are described which could reduce GHG emissions to 23 % below base year levels by 2010.

About half of the current reduction and about one third of the projected reduction by 2010 in greenhouse gas emissions arises from changes in the electricity supply industry, such as the switch from coal to gas and increased efficiency in the nuclear industry. However, there is an active programme of policies and measures and a domestic goal to reduce carbon dioxide emissions by 20 % of 1990 levels by 2010.

The *with measures* projection includes three specific measures that are discussed in the programme:

- The effect of the energy price rises from the Climate Change Levy,
- the fuel duty escalator to 1999; and
- a reduction arising from the UK target of 10 % of electricity supplied by renewables by 2010

The first two measures have been implemented, the last represents a challenging target but policies are in place to encourage the introduction of renewables.

All the extra measures included in the *with additional measures* projection have either been implemented or adopted since the projection was made. There is the intention of implementing all the outstanding additional measures as soon as possible.