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WWF Climate Scorecards

Comparison of the climate performance of the G8 countries



Emissions, projections and climate policies for Canada, France, Germany, Italy, Japan, Russia, United Kingdom and United States of America
Includes background information for China, Brazil, India, Mexico, and South Africa

Prepared by Ecofys Germany/Netherlands for WWF

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Introduction

Climate change is a serious and urgent threat to global society. It adds stress to unique and already threatened ecosystems, increases the frequency and intensity of extreme weather events, such as storms and droughts, and adds stress to agriculture and food production. In addition, glaciers are melting around the world as is the Arctic, contributing to sea level rise. Climate change also increases the risk of large-scale singular events such as the melting of the West Antarctic Ice Sheet and the shutdown of the thermohaline circulation.

The level at which climate change becomes “dangerous” depends on the values attached to the threatened systems. Several countries, most prominently the EU, but also e.g. the Philippines and Micronesia, have agreed that global average temperature increase in comparison to pre-industrial levels should be kept below 2°C. As a consequence, global greenhouse gas emissions will have to peak in the next decade or two and then decline to a fraction of current levels. Leaving some room for growth for developing countries, industrialized countries need to decrease their emission by the order of 80% by the year 2050. This is a major challenge, as current trends are going in the opposite direction with high emissions in developed countries and growing emissions in most developing countries.

Individual countries have reacted differently to this challenge. Each country is unique in its starting position, including the economic activities that result in greenhouse gas emissions, its level of development, industrial structure, availability of natural resources and public perceptions. Since the problem was recognized internationally (1992 with the adoption of the United Nations Framework Convention on Climate Change), governments and the public have reacted differently, also depending on national circumstances.

These climate scorecards provide a comparable snapshot of the current situation across the G8 countries (Canada, France, Germany, Italy, Japan, Russia, United Kingdom and United States of America). They provide recent and expected emission developments of each country and various other indicators. The scorecards also provide an overview of the most important activities by the governments to respond to the threat of climate change. They finally provide an overall summary evaluation of the climate performance of the country based on all of the criteria covered in the scorecard. This is based on the core benchmark that countries implement enough measures to reduce emissions by the order of 80% by 2050 as to keep the global-average temperature increase below 2°C in comparison with pre-industrial levels.

The scoring, based on the ten indicators, demonstrates that none of the G8 countries are implementing enough measures in order to be considered for the upper range of the score (see summary table at the end of this document). Three countries are furthest along this track including France, Germany and the UK, but each is likely to see increases in emissions if further measures are not implemented soon. Italy, Japan, Russia and Canada rank much lower due to their low scoring on the range of indicators, thus quite far away from making a contribution to staying below 2°C. The United States scores the worst of all G8 countries, not having ratified the Kyoto Protocol, nor having put any substantive measures in place to curb emissions in the short term.

Information is also provided for major developing countries (Brazil, China, India, Mexico and South Africa), where a number of initiatives are already underway. These five countries are expecting large growth of emissions in the future and the question remains whether G8 countries will assist them in developing in a less carbon intensive manner. These countries have not been scored in the same manner as G8 due to their different national circumstances and level of development.

Emission trends
Includes the historical trend and future projections of emissions of those greenhouse gases and sectors that are relevant under the Kyoto Protocol in comparison to the Kyoto target.

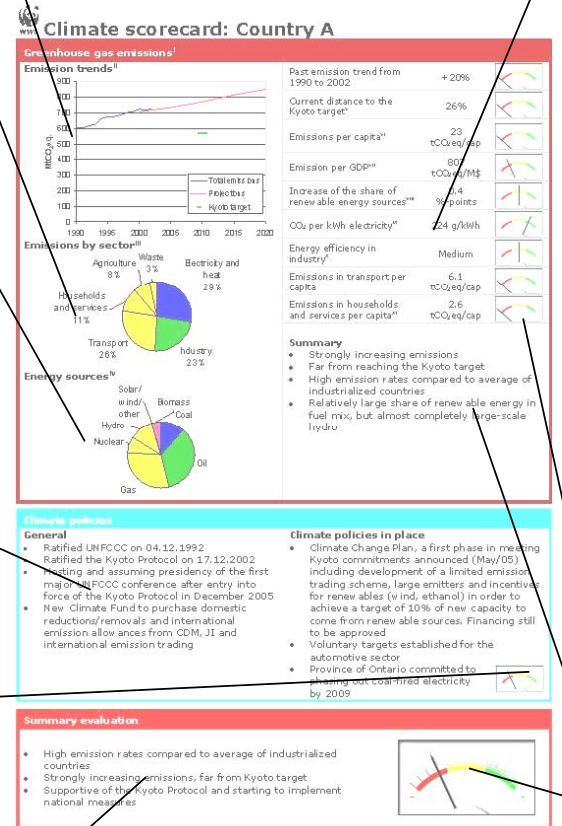
Emissions by sectors
Includes the split of emissions into the different sectors. It shows which activities are responsible for the emissions.

Energy sources
As most greenhouse gas emissions originate from energy use, it is instructive to examine the energy mix of a country. The chart shows the primary energy consumption, which includes also energy that is consumed but not used such as waste heat

Climate policies
A brief description of the climate policies put in place by the national government.

Climate meter
A visualisation of the approximate status of the climate policies in place. It is a relative comparison of the ambition level and comprehensiveness of policies by the countries.

Summary evaluation
A general evaluation of the countries' climate performance based on the information provided above.



Indicators

- Past emission trends** over the whole economy
- Current distance to the Kyoto target** as magnitude of emission reductions still necessary to reach the Kyoto target
- Emissions per capita**
- Emission per Gross Domestic Product**
- Change in share of renewable energy sources** showing efforts made to use more renewable energy since 1990
- CO₂ per kWh electricity** of public electricity production (national aggregate)
- Energy efficiency in industry** as a qualitative aggregate for major industries
- Greenhouse gas emissions in transport per capita**
- Greenhouse gas emissions in households and services per capita** excluding emissions from use of electricity

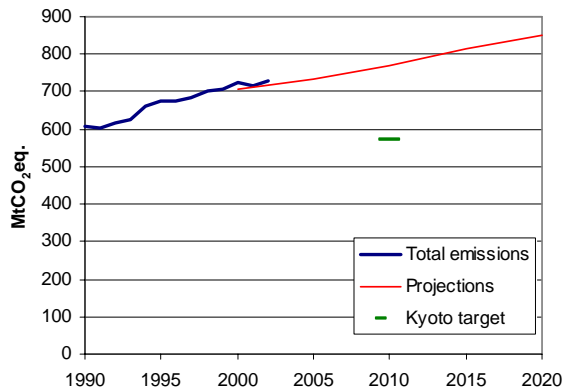
Climate meters
An approximate indication how these indicators relate to the average over the industrialized countries.

Summary
Qualitative synthesis of the emission indicators.

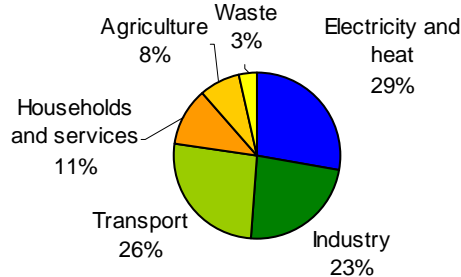
Climate meter
A visualisation of the approximate overall climate performance taking into account the emission indicators and the climate policies. The benchmark is, whether a country is on a path to keep the global-average temperature increase below 2° C in comparison with pre-industrial levels.

Greenhouse gas emissions¹

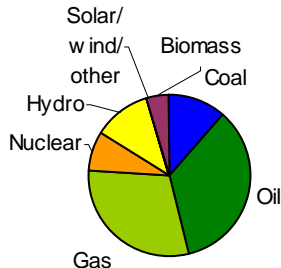
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2002	+20%	
Current distance to the Kyoto target ⁵	26%	
Emissions per capita ⁶	23 tCO ₂ eq/cap	
Emission per GDP ⁷	807 tCO ₂ eq/M\$	
Increase of the share of renewable energy sources ⁸	0.4 %-points	
CO ₂ per kWh electricity ⁹	224 g/kWh	
Energy efficiency in industry ¹⁰	Medium	
Emissions in transport per capita	6.1 tCO ₂ eq/cap	
Emissions in households and services per capita ¹¹	2.6 tCO ₂ eq/cap	

Summary

- Strongly increasing emissions
- Far from reaching the Kyoto target
- High emission rates compared to average of industrialized countries
- Relatively large share of renewable energy in fuel mix, but almost completely large-scale hydro

Climate policies

General

- Ratified UNFCCC on 04.12.1992
- Ratified the Kyoto Protocol on 17.12.2002
- Hosting and assuming presidency of the first major UNFCCC conference after entry into force of the Kyoto Protocol in December 2005
- New Climate Fund to purchase domestic reductions/removals and international emission allowances from CDM, JI and international emission trading

Climate policies in place

- Climate Change Plan, a first phase in meeting Kyoto commitments announced (May/05) including development of a limited emission trading scheme, large emitters and incentives for renewables (wind, ethanol) in order to achieve a target of 10% of new capacity to come from renewable sources. Financing still to be approved
- Voluntary targets established for the automotive sector
- Province of Ontario committed to phasing out coal-fired electricity by 2009



Summary evaluation

- High emission rates compared to average of industrialized countries
- Strongly increasing emissions, far from Kyoto target
- Supportive of the Kyoto Protocol and starting to implement national measures



¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from UNFCCC (2005). www.unfccc.int. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The climate meters are related to how each country compares to the average of industrialized countries.

² Additional allowances can be generated optionally from "Forest Management" up to the amount of 44 MtCO₂/y (Annex to decision 11/CP.7 in UNFCCC document FCCC/CP/2001/13/Add.1). This would represent 7% of the base year emissions. The projections are taken from the National Communication to UNFCCC "Canada's third national report on climate change 2001". Revised GHG projection, including current policies. <http://unfccc.int/resource/docs/natc/cannce3.pdf>

³ For the year 2002. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation. "Agriculture" includes only non-CO₂ emissions. Emissions exclude "Land-Use Change & Forestry", which amount to -15 Mt CO₂ (i.e. removals) in 2002, equivalent to 2% of total emissions.

⁴ For the year 2002. Total primary energy supply as provided by IEA (2004) Energy Balances, Paris, France.

⁵ Difference between emissions in 2002 and the Kyoto target as percentage of emissions in 1990. Additional allowances can be generated optionally from "Forest Management", which would lower the distance by 7 percentage points.

⁶ For the year 2002. Population in 2002 is based on World Bank (2005).

<http://www.worldbank.org/data/wdi2005/index.html>

⁷ For the year 2001. Gross Domestic Product is based on Purchase Power Parity from World Resources Institute (2005). <http://cait.wri.org/>

⁸ Change in share of renewable energy sources in primary energy consumption from 1990 to 2002 based on IEA (2004) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

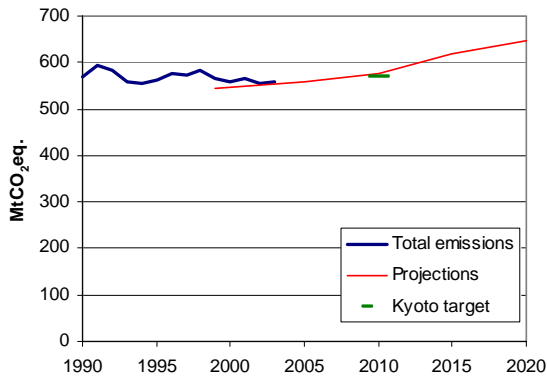
⁹ For public electricity plants in 2002. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2004) Energy Balances, Paris, France.

¹⁰ Based on CIEEDAC (2002). Energy intensity indicators for Canadian industry 1990 to 2000. Canadian Industrial Energy End-use Database and Analysis Centre. Quebec, Canada.

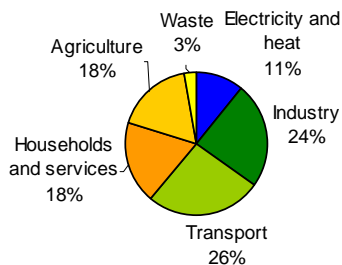
¹¹ For the year 2002. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

Greenhouse gas emissions¹

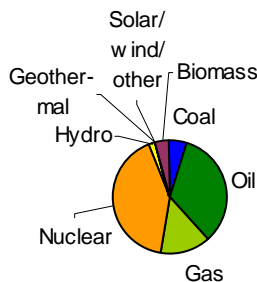
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2003	-1.9%	
Current distance to the Kyoto target ⁵	-1.9%	
Emissions per capita ⁶	9.3 tCO ₂ eq/cap	
Emission per GDP ⁷	360 tCO ₂ eq/M\$	
Increase of the share of renewable energy sources ⁸	-0.8 %-points	
CO ₂ per kWh electricity ⁹	57 g/kWh	
Energy efficiency in industry ¹⁰	High/medium	
Emissions in transport per capita	2.5 tCO ₂ eq/cap	
Emissions in households and services per capita ¹¹	1.7 tCO ₂ eq/cap	

Summary

- Emission below Kyoto target, also due to elimination of industrial HFC by-production, but increasing emissions in transports (+20% from 1990 to 2002) and households/services
- Generally low emission rates compared to average of industrialized countries because of a high share of nuclear energy in the energy mix, which WWF does not consider as viable policy
- Projections show an increase in emissions

Climate policies

General

- Ratified UNFCCC on 25.03.1994
- Ratified the Kyoto Protocol on 31.05.2002
- Supports that global temperature increase should be kept below 2°C¹²
- Long-term national emissions target: -75% by 2050 compared to 1990 level for all GHG

Climate policies in place

- New national energy law agreed with emphasis on reducing emissions by 3% p.a.
- Renewable energy sources, cogeneration and efficient home equipments promotion through fiscal incentives and guaranteed tariffs for delivered electricity¹³
- Participant in the EU Emission Trading Scheme
- Several voluntary agreements for emissions reduction in industrial sectors
- Financial incentives to increase energy efficiency in existing buildings
- Support for bio fuels



Summary evaluation

- Emission rates are low for industrialized countries due to high share of nuclear energy, which WWF does not consider as viable policy
- Emissions currently below Kyoto target, although emissions in transports and households/services increased, and total emissions projected to increase
- Most ambitious long-term target



¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from UNFCCC (2005). www.unfccc.int. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The climate meters are related to how each country compares to the average of industrialized countries.

² Emissions trend from 1990 to 2003 is taken from European Environment Agency (2005). Annual European Community greenhouse gas inventory 1990 to 2003 and inventory report 2005, Copenhagen, Denmark. Additional allowances can be generated optionally from "Forest Management" up to the amount of 3.2 Mt CO₂/y (Annex to decision 11/CP.7 in UNFCCC document FCCC/CP/2001/13/Add.1). This would represent 0.6% of the base year emissions. The projections are taken from the National Communication to UNFCCC; Third National Communication under the UN Framework Convention, 2001. <http://unfccc.int/resource/docs/natc/france3.pdf> Page 117 and 118, including existing policies.

³ For the year 2002. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation. "Agriculture" includes only non-CO₂ emissions. Emissions for "Land-Use Change & Forestry" are not included in the graph. Net emissions from this sector are -55 Mt CO₂ in 2002 (i.e. removals), equivalent to 10% of total emissions in 2002.

⁴ For the year 2002. Total primary energy supply as provided by IEA (2004) Energy Balances, Paris, France.

⁵ Difference between emissions in 2003 and the Kyoto target as a percentage of emissions in 1990. Additional allowances can be generated optionally from "Forest Management", which would lower the distance by 0.6 percentage points.

⁶ For the year 2002. Population in 2002 is based on World Bank (2005).

<http://www.worldbank.org/data/wdi2005/index.html>

⁷ For the year 2001. Gross Domestic Product is based on Purchase Power Parity from World Resources Institute (2005). <http://cait.wri.org/>

⁸ Change in share of renewable energy sources in primary energy consumption from 1990 to 2002 based on IEA (2004) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

⁹ For public electricity plants in 2002. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2004) Energy Balances, Paris, France. According to the value, the climate meter should be in the green area, but the rating was reduced due to high use of nuclear power, which WWF does not accept as a viable policy option.

¹⁰ Based on energy efficiency of iron and steel and cement production in Philipsen, G.J.M., W. Graus, K. Blok, Y. Hofman and M. Voogt (2003). International Comparisons Of Energy Efficiency – Results For Iron & Steel, Cement And Electricity Generation. Ecofys, Utrecht, The Netherlands.

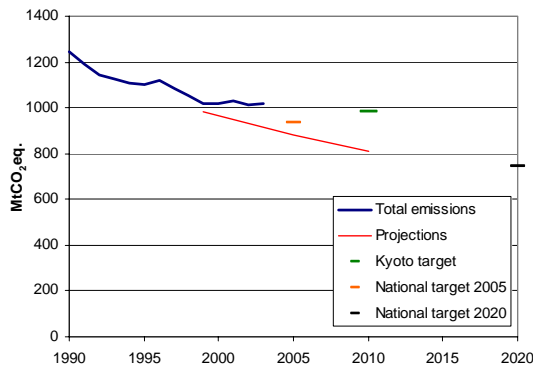
¹¹ For the year 2002. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

¹² Ministère de l' Ecologie et du Développement Durable; Climate Plan 2004; 2004.

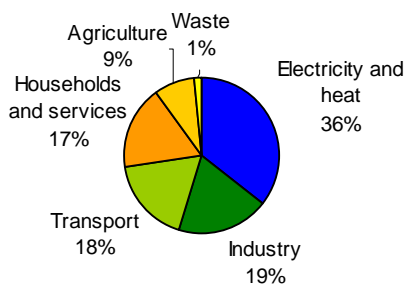
¹³ Monetary value of the support for renewable energy is much larger than expenditure that is usual for industrialized countries for research and development for renewable energy.

Greenhouse gas emissions¹

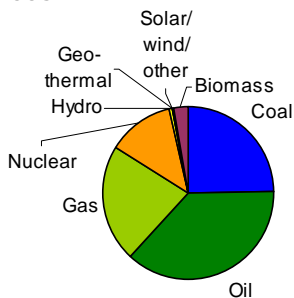
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2003	-18.2%	
Current distance to the Kyoto target ⁵	2.8%	
Emissions per capita ⁶	12 tCO ₂ eq/cap	
Emission per GDP ⁷	464 tCO ₂ eq/M\$	
Increase of the share of renewable energy sources ⁸	1.9 %-points	
CO ₂ per kWh electricity ⁹	567 g/kWh	
Energy efficiency in industry ¹⁰	High	
Emissions in transport per capita	2.2 tCO ₂ /cap	
Emissions in households and services per capita ¹¹	2.2 tCO ₂ /cap	

Summary

- Strong dependence on coal and oil
- Decreasing emissions, partly due to economic downturn in Eastern Germany
- Currently small distance to Kyoto target, but new measures likely needed to meet target
- Medium emission rates compared to average of industrialised countries, but high emission rates from electricity generation and households
- Large share of *new* renewable energy sources
- Emissions could increase unless new measures introduced

Climate policies

General

- Ratified UNFCCC on 09.12.1993
- Ratified the Kyoto Protocol on 31.05.2002
- Supports that global temperature increase should be kept below 2°C¹²
- Long-term target of 40% emission reduction by 2020 compared to 1990 levels¹³ if EU commits to 30%
- No plans to use CDM/JI for achieving Kyoto target
- Initiated the "KfW Carbon Fund" to pool industry demand for credits from CDM projects

Climate policies in place

- Eco-Tax: taxation of energy-use, revenues are used to lower labour costs
- Guaranteed tariffs for delivered electricity from renewable sources through feed-in law, which led to considerable increase of renewable capacity¹⁴
- Favourable loans for measures to reduce CO₂ emissions in the household sector
- Participant in the EU Emission Trading Scheme, allocated so that there is low incentive for further reductions from electricity generation



Summary evaluation

- Average emission rates for industrialized countries, but high emission rates from electricity generation due to use of coal
- Emissions already close to Kyoto target, partly due to economic downturn in Eastern Germany but also due to national measures, but still likely gap to meet Kyoto target
- Proactive in taking national measures, e.g. successful promotion of new renewable energy sources, but less ambitious for electricity production from fossil fuels



¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from UNFCCC (2005). www.unfccc.int. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The climate meters are related to how each country compares to the average of industrialized countries.

² Emissions trend from 1990 to 2003 is taken from European Environment Agency (2005), Annual European Community greenhouse gas inventory 1990 to 2003 and inventory report 2005, Copenhagen, Denmark. Additional allowances can be generated optionally from "Forest Management" up to the amount of 4.5 Mt CO₂/y (Annex to decision 11/CP.7 in UNFCCC document FCCC/CP/2001/13/Add.1). This would represent 0.4% of the base year emissions. The projections are taken from the National Communication to UNFCCC "Third Report by the Government of the Federal Republic of Germany in accordance with the Framework Convention of the United Nations". <http://unfccc.int/resource/docs/natc/gernc3.pdf> page 118-125, excluding sinks. Germany has a long-term target of 40% emission reduction by 2020 compared to 1990 levels. This goal was made conditional to the prerequisite that the European Union as a whole commits itself to a minus 30% target during the same time period. Source: Germany (2002): Koalitionsvertrag vom 16. Oktober 2002. Berlin. An older voluntary national target aimed at reducing CO₂ emissions from 1990 to 2005 by 25%.

³ For the year 2002. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation. "Agriculture" includes only non-CO₂ emissions. Emissions exclude "Land-Use Change & Forestry" which account for 14 Mt CO₂ in 2002, equivalent to 1% of total emissions.

⁴ For the year 2002. Total primary energy supply as provided by IEA (2004) Energy Balances, Paris, France.

⁵ Difference between emissions in 2003 and the Kyoto target as percentage of emissions in 1990. Additional allowances can be generated optionally from "forest management", which would lower the distance by 0.4 percentage points.

⁶ For the year 2002. Population in 2002 is based on World Bank (2005).

<http://www.worldbank.org/data/wdi2005/index.html>

⁷ For the year 2001. Gross Domestic Product is based on Purchase Power Parity from World Resources Institute (2005). <http://cait.wri.org/>

⁸ Change in share of renewable energy sources in primary energy consumption from 1990 to 2002 based on IEA (2004) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

⁹ For public electricity plants in 2002. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2004) Energy Balances, Paris, France.

¹⁰ Based on energy efficiency of iron and steel and cement production in Phylipsen, G.J.M., W. Graus, K. Blok, Y. Hofman and M. Voogt (2003). International Comparisons Of Energy Efficiency – Results For Iron & Steel, Cement And Electricity Generation. Ecofys, Utrecht, The Netherlands.

¹¹ For the year 2002. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

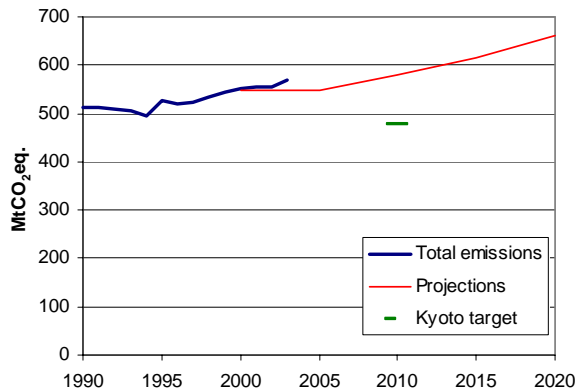
¹² International Institute for Sustainable Development (IISD); Earth Negotiations Bulletin; Vol 12 No 231; 15.12.2003

¹³ This goal was made conditional to the prerequisite that the European Union as a whole commits itself to a minus 30% target during the same time period. Source: Germany (2002): Koalitionsvertrag vom 16. Oktober 2002. Berlin.

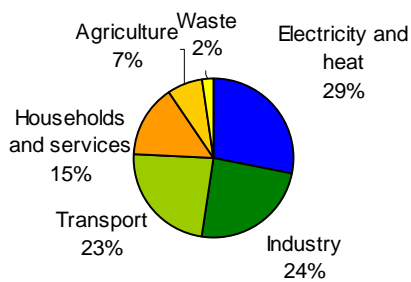
¹⁴ Monetary value of the support for renewable energy is much larger than expenditure that is usual for industrialized countries for research and development for renewable energy.

Greenhouse Gas Emissions¹

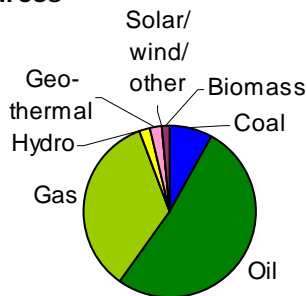
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2003	+11.5%	
Current distance to the Kyoto target ⁵	18%	
Emissions per capita ⁶	10 tCO ₂ eq/cap	
Emission per GDP ⁷	370 tCO ₂ eq/M\$	
Increase of the share of renewable energy sources ⁸	1.3 %-points	
CO ₂ per kWh electricity ⁹	509 g/kWh	
Energy efficiency in industry ¹⁰	Medium	
Emissions in transport per capita	2.2 tCO ₂ eq/cap	
Emissions in households and services per capita ¹¹	1.4 tCO ₂ eq/cap	

Summary

- Increasing emissions
- Far from reaching the Kyoto target
- Medium/low emission rates compared to industrialised countries
- Strong dependence on oil, fast increasing share of natural gas
- No use of nuclear power since 1987

Climate policies

General

- Ratified UNFCCC on 15.04.1994
- Ratified the Kyoto Protocol on 31.05.2002
- Mixed public/private "Italian Carbon Fund" set up to provide certificates from CDM/JI projects

Climate policies in place

- Participant in the EU Emission Trading Scheme
- Voluntary agreements with industry sectors to increase energy efficiency in production
- Promotion of energy efficiency through innovative tradable energy efficiency certificates (white certificates)
- Promotion of electricity from renewable sources through renewable certificates
- Additional policies needed to meet Kyoto target



Summary evaluation

- Emission rates are average for industrialized countries with relatively high but decreasing share of oil
- Emissions considerably above Kyoto target and projected to further increase substantially
- Only a few national measures in place that have reduced emissions



¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from UNFCCC (2005). www.unfccc.int. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The climate meters are related to how each country compares to the average of industrialized countries.

² Emissions trend from 1990 to 2003 is taken from European Environment Agency (2005), Annual European Community greenhouse gas inventory 1990 to 2003 and inventory report 2005, Copenhagen, Denmark. Additional allowances can be generated optionally from "forest management" up to the amount of 0.7 Mt CO₂/y (Annex to decision 11/CP.7 in UNFCCC document FCCC/CP/2001/13/Add.1). This would represent 0.1% of the base year emissions. The projections are taken from the National Communication to UNFCCC "Third National Communication under the Framework Convention on Climate Change" page 123.

http://www.minambiente.it/Sito/settori_azione/pia/docs/III_ccc/5.pdf

³ For the year 2002. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation.

"Agriculture" includes only non-CO₂ emissions. Emissions exclude "Land-Use Change & Forestry", where net emissions from this sector account for a -20 Mt CO₂ (i.e. removal) in 2002, equivalent to 4% of total emissions in 2002.

⁴ For the year 2002. Total primary energy supply as provided by IEA (2004) Energy Balances, Paris, France.

⁵ Difference between emissions in 2003 and the Kyoto target as percentage of emissions in 1990. Additional allowances can be generated optionally from "forest management", which would lower the distance by 0.1 percentage points.

⁶ For the year 2002. Population in 2002 is based on World Bank (2005).

<http://www.worldbank.org/data/wdi2005/index.html>

⁷ For the year 2001. Gross Domestic Product is based on Purchase Power Parity from World Resources Institute (2005). <http://cait.wri.org/>

⁸ Change in share of renewable energy sources in primary energy consumption from 1990 to 2002 based on IEA (2004) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

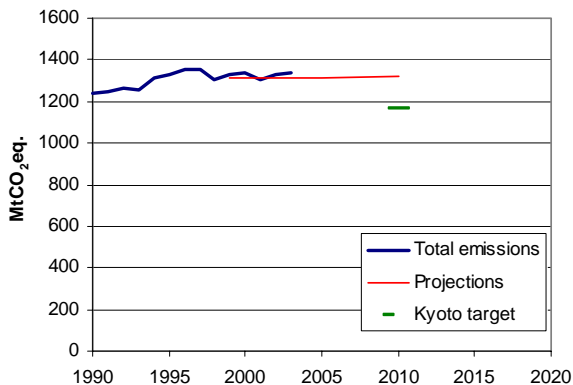
⁹ For public electricity plants in 2002. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2004) Energy Balances, Paris, France.

¹⁰ Based on energy efficiency of iron and steel and cement production in Phylipsen, G.J.M., W. Graus, K. Blok, Y. Hofman and M. Voogt (2003). International Comparisons Of Energy Efficiency – Results For Iron & Steel, Cement And Electricity Generation. Ecofys, Utrecht, The Netherlands.

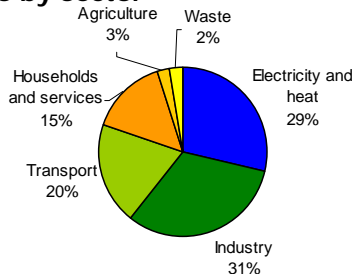
¹¹ For the year 2002. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

Greenhouse gas emissions¹

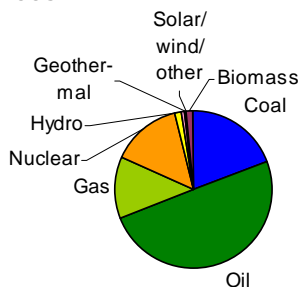
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2003	+8.3%	
Current distance to the Kyoto target ⁵	14.3%	
Emissions per capita ⁶	10 tCO ₂ eq/cap	
Emission per GDP ⁷	386 tCO ₂ eq/M\$	
Increase of the share of renewable energy sources ⁸	-0.2 %-points	
CO ₂ per kWh electricity ⁹	389 g/kWh	
Energy efficiency in industry ¹⁰	High	
Emissions in transport per capita	2.1 tCO ₂ eq/cap	
Emissions in households and services per capita ¹¹	1.5 tCO ₂ eq/cap	

Summary

- Increasing emissions from 1990 to 2002
- Large distance to Kyoto target
- Relatively low emission rates compared to average of industrialised countries due to high efficiency and use of nuclear power, which WWF does not consider as viable policy
- Projections show an emission increase

Climate policies

General

- Ratified UNFCCC on 28.05.1993
- Ratified the Kyoto Protocol on 04.06.2002
- Early involvement in joint implementation and clean development projects. Government plans to achieve at least 1.6% of the 6% target from JI and CDM and 3.9% from land-use change and forestry

Climate policies in place

- Voluntary action plans with industries for energy conservation, reporting and disclosure of CO₂ emissions will become mandatory from 2006 for large emitters
- Enhancing efficiency of household appliances and vehicles through "top runner" standards
- Voluntary emission trading scheme with subsidies for participants
- Obligatory energy management systems for large factories, commercial buildings and emitters in the transport sector
- Considering carbon tax

Summary evaluation

- Relatively low emission rates compared to average of industrialized countries due to high efficiency and use of nuclear power, which WWF does not consider as viable policy
- Increasing emissions and large distance to Kyoto target
- No mandatory emission reduction scheme based on market mechanisms



¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from UNFCCC (2005). www.unfccc.int. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The climate meters are related to how each country compares to the average of industrialized countries.

² For the years 1990 to 1994 no data is available for the emissions of HFCs, PFCs and SF₆. In 1995, the emissions for these gases amounted to 49.7 Mt CO₂ eq. This amount is added to the emissions for the years 1990 to 1994. For the year 2003, emissions are taken from the Greenhouse Gas Inventory Office of Japan (2005). http://www-gio.nies.go.jp/download/6gas_2005E-gioweb.xls. Additional allowances can be generated optionally from "Forest Management" up to the amount of 48 Mt CO₂/y (Annex to decision 11/CP.7 in UNFCCC document FCCC/CP/2001/13/Add.1). This would represent 3.9% of the base year emissions. The projections are taken from the National Communication to UNFCCC "Japan's Third National Communication Under the United Nations Framework Convention on Climate Change". <http://unfccc.int/resource/docs/natc/japnc3.pdf> page 133, including current policies, excluding additional policies.

³ For the year 2002. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation. "Agriculture" includes only non-CO₂ emissions. Emissions are exclude "Land-Use Change & Forestry", which amounted to -97 Mt CO₂ in 1995 (i.e. removals), equivalent to 7% of total emissions in 1995.

⁴ For the year 2002. Total primary energy supply as provided by IEA (2004) Energy Balances, Paris, France.

⁵ Difference between emissions in 2003 and the Kyoto target as percentage of emissions in 1990. Additional allowances can be generated optionally from "forest management", which would lower the distance by 3.9 percentage points.

⁶ For the year 2002. Population in 2002 is based on World Bank (2005).

<http://www.worldbank.org/data/wdi2005/index.html>

⁷ For the year 2001. Gross Domestic Product is based on Purchase Power Parity from World Resources Institute (2005). <http://cait.wri.org/>

⁸ Change in share of renewable energy sources in primary energy consumption from 1990 to 2002 based on IEA (2004) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

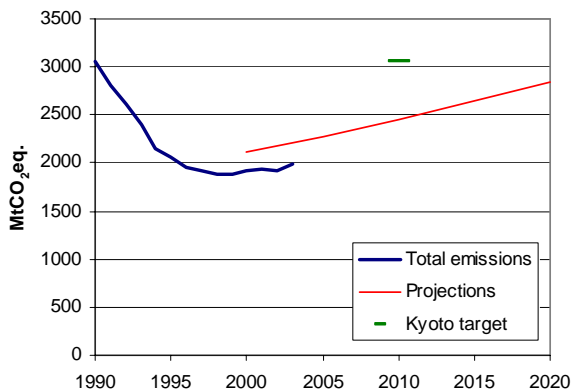
⁹ For public electricity plants in 2002. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2004) Energy Balances, Paris, France. According to the value, the climate meter should be in the green area, but the rating was reduced due to high use of nuclear power, which WWF does not consider as viable policy.

¹⁰ Based on energy efficiency of iron and steel and cement production in Phylipsen, G.J.M., W. Graus, K. Blok, Y. Hofman and M. Voogt (2003). International Comparisons Of Energy Efficiency – Results For Iron & Steel, Cement And Electricity Generation. Ecofys, Utrecht, The Netherlands.

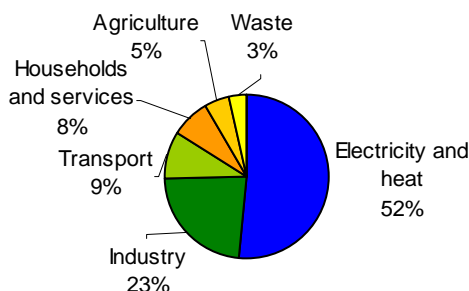
¹¹ For the year 2002. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

Greenhouse gas emissions¹

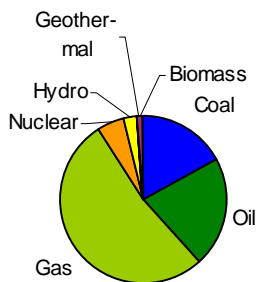
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2003	-35%	
Current distance to the Kyoto target ⁵	-35%	
Emissions per capita ⁶	13 tCO ₂ eq/cap	
Emission per GDP ⁷	1858 tCO ₂ eq/M\$	
Increase of the share of renewable energy sources ⁸	0.0 %-points	
CO ₂ per kWh electricity ⁹	522 g/kWh	
Energy efficiency in industry ¹⁰	Low	
Emissions in transport per capita	1.2 tCO ₂ eq/cap	
Emissions in households and services per capita ¹¹	1.0 tCO ₂ eq/cap	

Summary

- Decreasing emissions from 1990 to 1999 due to economic downturn, but now increasing
- Projections showing large emission increase
- Current emissions far below the Kyoto target
- Average emission rates in electricity production compared to industrialised countries
- Low efficiency in industry and very high emissions per GDP

Climate policies

General

- Ratified UNFCCC on 25.03.1994
- Ratified the Kyoto Protocol on 18.11.2004

Climate policies in place

- Climate change policy mainly builds on the energy efficiency part of the national energy strategy¹²
- Increase in gas-fired cogeneration plants
- Very few climate policies in place

Summary evaluation

- Emission rates are average for industrialized countries with high use of natural gas but low efficiency
- Emissions well below Kyoto target due to economic downturn, but currently increasing
- Only limited national measures in place



¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from UNFCCC (2005). www.unfccc.int. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The climate meters are related to how each country compares to the average of industrialized countries.

² Russia reported emissions only up to 1999 to the UNFCCC. For the years 2000 to 2002, emissions are extrapolated based on the annual growth rates of CO₂ emissions from IEA (2004) CO₂ emissions from fuel combustion; total CO₂ emissions, sectoral approach. The share of CO₂ emissions from fuel combustion is assumed to remain equal to the share in 1999 (79%). For the year 2003, the annual growth rate of the Russian Institute of Energy Studies was used (Report of Director A. Makarov in the Kyoto-into-Force Conference, 16 Feb 2005, Moscow, House of Scientists, Russia). Additional allowances can be generated optionally from "Forest Management" up to the amount of 121 Mt CO₂/y (Annex to decision 11/CP.7 in UNFCCC document FCCC/CP/2001/13/Add.1). This would represent 4% of the base year emissions. The projections are taken from the National Communication to UNFCCC "Third National Communication of the Russian Federation (2002)". <http://unfccc.int/resource/docs/natc/rusnce3.pdf> page 73. Scenario I: favorable economic development.

³ For the year 2002. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation. "Agriculture" includes only non-CO₂ emissions. Emissions for "Land-Use Change & Forestry" are not included in the graph. These emissions are 54 Mt CO₂ in 2000, equivalent to 3% of total emissions. The breakdown is based on World Resources Institute (2005), available at: <http://cait.wri.org/cait.php?page=yearly&sort=val-desc&url=form&pHints=shut&year=2000§or=erg&co2=1&update=Update>

⁴ For the year 2001. Total primary energy supply as provided by IEA (2003) Energy Balances, Paris, France.

⁵ Difference between emissions in 2003 and the Kyoto target as a percentage of emissions in 1990. Additional allowances can be generated optionally from "forest management", which would lower the distance by 4 percentage points.

⁶ For the year 2000. Population in 2000 is based on World Resources Institute (2005). <http://cait.wri.org/>

⁷ For the year 2000. Gross Domestic Product is based on Purchase Power Parity from World Resources Institute (2005). <http://cait.wri.org/>

⁸ Change in share of renewable energy sources in primary energy consumption from 1990 to 2002 based on IEA (2004) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

⁹ For public electricity plants in 2001. Corrected for heat supply by adding the exergetic value of the heat supply (0.175 of heat supply) to the power output. Without this correction the emission intensity is 408 g/kWh. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2003) Energy Balances, Paris, France.

¹⁰ Based on IEA (2004), Energy Balances, and United Nations Industrial Statistics Yearbook.

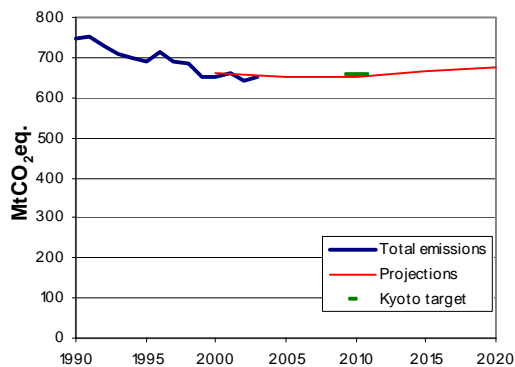
¹¹ For the year 2002. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use. Emissions are based on IEA (2004) CO₂ emissions from fuel combustion for "Commercial and public services" and "Residential sector".

¹² "Main Directions of the Energy Strategy of Russia by 2020"; 2003. "Federal Target Programme Energy - Efficient Economy for 2002 to 2005 with an outlook to 2010", 2001. "Federal Target Programme Energy Saving in Russia for 1998 to 2005"; 1997. "Federal Target Programme for the Prevention of Dangerous Climate Change and its Negative Impacts"; 1996.

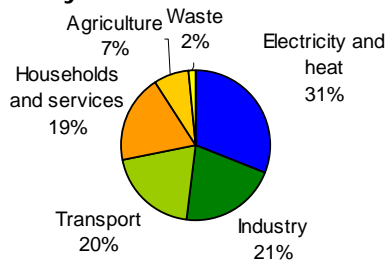
Climate scorecard: United Kingdom

Greenhouse gas emissions¹

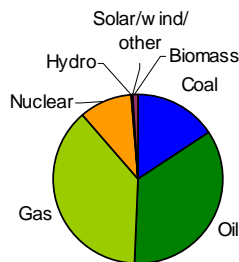
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2003	-13%	
Current distance to the Kyoto target ⁵	-0.5%	
Emissions per capita ⁶	11 tCO ₂ eq/cap	
Emission per GDP ⁷	435 tCO ₂ eq/M\$	
Increase of the share of renewable energy sources ⁸	0.7 %-points	
CO ₂ per kWh electricity ⁹	455 g/kWh	
Energy efficiency in industry ¹⁰	Medium	
Emissions in transport per capita	2.2 tCO ₂ eq/cap	
Emissions in households and services per capita ¹¹	2.0 tCO ₂ eq/cap	

Summary

- Decreasing GHG emissions (but increased in 2003 and 2004) due to major switch from coal to gas in the 1990s, elimination of industrial HFC by-production and decrease in methane emissions
- Below Kyoto target in 2002
- Medium/low emission rates compared to industrialized countries
- Very small share of renewable energy
- Projections show an increase in emissions

Climate policies

General

- Ratified UNFCCC on 08.12.1993
- Ratified the Kyoto Protocol on 31.05.2002
- Supports that global temperature increase should be kept below two degrees Celsius¹²
- Voluntary medium-term target of 20% reductions by 2010 for CO₂ emissions (from 1990 levels)
- Voluntary long-term target of reduction of 60% by 2050 compared to 2000 levels for all greenhouse gases
- No intent to use CDM/JI for achieving Kyoto target
- Initiated debate on climate change within the G8

Climate policies in place

- Increasing energy efficiency in industry through a climate change levy, which can be reduced if a reduction agreement is negotiated
- Introduced national emissions trading scheme already in 2002, landfill allowances trading scheme in 2005
- Participant to the EU Emission Trading Scheme, allocated in line with Kyoto target, but seeking legal steps against the EU to increase the amount of allowances
- Electricity suppliers are required to ensure that a certain percentage of sold electricity stems from renewable energy sources

Summary evaluation

- Emission rates are average for industrialized countries with a relatively small share of renewable energy
- Emissions already below Kyoto target, also due to recent transition from coal to gas, but have increased 2003 and 2004 and are expected to rise further, so that the voluntary national 2010 reductions target for CO₂ will be missed by 6-8%-points
- Proactive in taking national measures and driving the international debate



¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from UNFCCC (2005). www.unfccc.int. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The climate meters are related to how each country compares to the average of industrialized countries.

² Emissions trend from 1990 to 2003 is taken from European Environment Agency (2005), Annual European Community greenhouse gas inventory 1990 to 2003 and inventory report 2005, Copenhagen, Denmark. Additional allowances can be generated optionally from "Forest Management" up to the amount of 1.4 Mt CO₂/y (Annex to decision 11/CP.7 in UNFCCC document FCCC/CP/2001/13/Add.1). This would represent 0.2% of the base year emissions. The projections are taken from the National Communication to UNFCCC "The UK's Third National Communication under the United Nations Framework Convention on Climate Change". http://www.defra.gov.uk/environment/climatechange/3nc/pdf/climate_3nc.pdf, page 44. The UK has a national target for reducing CO₂ emissions (not total greenhouse gas emissions) of 20% by 2010 in comparison to 1990 levels (source: DTI (2005). Energy white paper. Our energy future – creating a low carbon economy. UK. <http://www.dti.gov.uk/energy/whitepaper/ourenergyfuture.pdf>)

³ For the year 2002. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation. "Agriculture" includes only non-CO₂ emissions. Emissions exclude "Land-Use Change & Forestry", which account for 2Mt in 2002, equivalent to 0.3% of total emissions.

⁴ For the year 2002. Total primary energy supply as provided by IEA (2004) Energy Balances, Paris, France.

⁵ Difference between emissions in 2003 and the Kyoto target as a percentage of emissions in 1990. Additional allowances can be generated optionally from "forest management", which would lower the distance by 0.2 percentage points.

⁶ For the year 2002. Population in 2002 is based on World Bank (2005).

<http://www.worldbank.org/data/wdi2005/index.html>

⁷ For the year 2001. Gross Domestic Product is based on Purchase Power Parity from World Resources Institute (2005). <http://cait.wri.org/>

⁸ Change in share of renewable energy sources in primary energy consumption from 1990 to 2002 based on IEA (2004) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

⁹ For public electricity plants in 2002. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2004) Energy Balances, Paris, France.

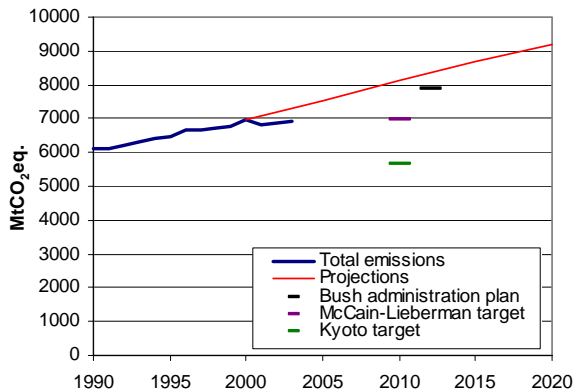
¹⁰ Based on energy efficiency of iron and steel and cement production in Phylipsen, G.J.M., W. Graus, K. Blok, Y. Hofman and M. Voogt (2003). International Comparisons Of Energy Efficiency – Results For Iron & Steel, Cement And Electricity Generation. Ecofys, Utrecht, The Netherlands.

¹¹ For the year 2002. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

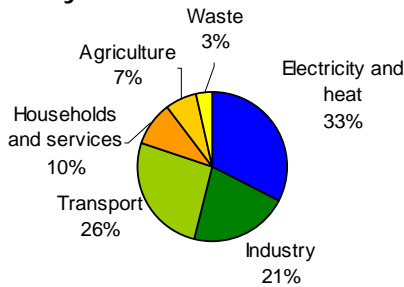
¹² International Institute for Sustainable Development (IISD); Earth Negotiations Bulletin; Vol 12 No 231; 15.12.2003.

Greenhouse gas emissions¹

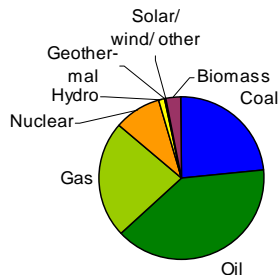
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2003	+13%	
Current distance to the Kyoto target ⁵	20%	
Emissions per capita ⁶	24 tCO ₂ eq/cap	
Emission per GDP ⁷	694 tCO ₂ eq/M\$	
Increase of the share of renewable energy sources ⁸	-0.8 %-points	
CO ₂ per kWh electricity ⁹	594 g/kWh	
Energy efficiency in industry ¹⁰	Low	
Emissions in transport per capita	6.3 tCO ₂ eq/cap	
Emissions in households and services per capita ¹¹	2.3 tCO ₂ eq/cap	

Summary

- High emission rates compared to average of industrialized countries
- Strong dependence on coal and oil
- Strongly increasing emissions
- Far from reaching the Kyoto target, which the USA did not ratify
- Bush administration policy will continue the rise in emissions, the most credible alternative proposal (McCain-Lieberman proposal) would stabilize emissions at 2000 levels

Climate policies

General

- Ratified UNFCCC on 15.10.1992
- Rejected the Kyoto Protocol
- Bush administration proposed an alternative national approach which would result in substantially higher emissions
- Bush administration states climate change is "a serious problem", but policies do not result in short-term emission reductions

Climate policies in place

- R&D programmes and international cooperation on climate science, carbon capture and storage, hydrogen and emission reductions from methane¹²
- Voluntary partnerships to reduce emissions, government-industry as well as NGO-industry
- Several activities on state level (climate action plans, emission trading systems, renewable portfolio standards, greenhouse gas standards for vehicles), independent of Bush Administration¹³

Summary evaluation

- Country with the highest absolute emissions. Emission rates are among the highest in the world, strong dependence on coal and oil
- Kyoto target is out of reach, national targets are significantly less ambitious
- National strategy (climate technology R&D funds) aimed only at long-term emissions
- Strong pressure by local and state governments and some businesses to strengthen policies



¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from UNFCCC (2005). www.unfccc.int. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The climate meters are related to how each country compares to the average of industrialized countries.

² Based on UNFCCC (2005) except for the years 1990 and 1997 to 2003, which are based on EPA (2005). US Emissions Inventory 2005. United States.

[http://yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/RAMR69V4ZZ/\\$File/05trends.pdf](http://yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/RAMR69V4ZZ/$File/05trends.pdf)

The projections are taken from the National Communication to UNFCCC "U.S. Climate Action Report (2002)".

<http://unfccc.int/resource/docs/natc/usnc3.pdf> page 79. The Bush Administration Plan requires a 18% improvement in greenhouse gas intensity (the ratio of greenhouse gas emissions to economic output)

amounting to a 350 Mt reduction in CO₂ by 2012 (source:

[http://64.70.252.93/newfiles/Final_Report/II_Climate%20Change/II.3.a%20-](http://64.70.252.93/newfiles/Final_Report/II_Climate%20Change/II.3.a%20-%20Greenhouse%20Gas%20Emissions%20Targets.pdf)

[%20Greenhouse%20Gas%20Emissions%20Targets.pdf](http://64.70.252.93/newfiles/Final_Report/II_Climate%20Change/II.3.a%20-%20Greenhouse%20Gas%20Emissions%20Targets.pdf) page 10). In terms of absolute emissions, total U.S. greenhouse gas emissions would grow 12% from 2002 to 2012, resulting in greenhouse gas emissions of 7,900 MtCO₂eq (source: http://www.pewclimate.org/policy_center/analyses/response_bushpolicy.cfm).

The McCain-Lieberman Climate Stewardship Act of 2003 was discussed in the Senate but not yet accepted. It calls for U.S. emissions to be capped at 2000 levels in 2010. McCain-Lieberman excludes residential and agricultural sources of greenhouse gases, as well as any entity responsible for less than 10,000 metric tons of carbon dioxide per year or its equivalent. The proposed programme covers more than 70% of all U.S. carbon dioxide and industrial greenhouse gas emissions (source: http://64.70.252.93/newfiles/Final_Report/II_Climate%20Change/II.3.a%20-%20Greenhouse%20Gas%20Emissions%20Targets.pdf page 13).

³ For the year 2002. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation.

"Agriculture" includes only non-CO₂ emissions. Emissions exclude "Land-Use Change & Forestry", which account for -691 Mt CO₂ in 2002 (i.e. net removals), equivalent to 10% of total emissions.

⁴ For the year 2002. Total primary energy supply as provided by IEA (2004) Energy Balances, Paris, France.

⁵ Difference between emissions in 2003 and the Kyoto target as a percentage of emissions in 1990.

⁶ For the year 2002. Population in 2002 is based on World Bank (2005).

<http://www.worldbank.org/data/wdi2005/index.html>

⁷ For the year 2001. Gross Domestic Product is based on Purchase Power Parity from World Resources Institute (2005). <http://cait.wri.org/>

⁸ Change in share of renewable energy sources in primary energy consumption from 1990 to 2002 based on IEA (2004) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

⁹ For public electricity plants in 2001. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2003) Energy Balances, Paris, France.

¹⁰ Based on energy efficiency of iron and steel and cement production in Phylipsen, G.J.M., W. Graus, K. Blok, Y. Hofman and M. Voogt (2003). International Comparisons Of Energy Efficiency – Results For Iron & Steel, Cement And Electricity Generation. Ecofys, Utrecht, The Netherlands.

¹¹ For the year 2002. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

¹² Research budgets are in the range of those of other industrialized countries in comparison to their GDP. Other countries' support for renewable energy through feed in tariffs in comparison to their GDP is substantially higher.

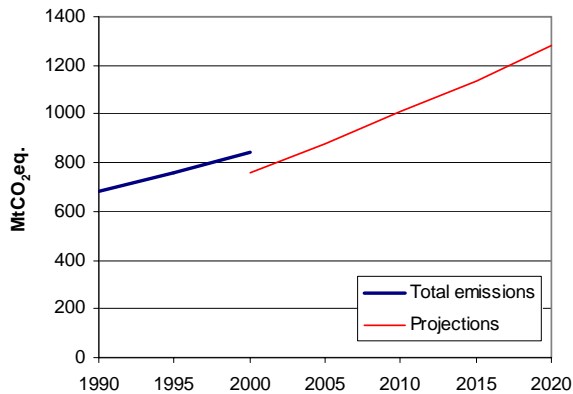
¹³ "The good, the bad, and the ugly: A guide to U.S. climate policy", U.S. Climate Action Network Report, COP10, December 2004, available at: <http://www.climateactionnetwork.org/uscanweb/gbu.htm>; PEW Center for global climate change 2005: "Learning From State Action On Climate Change", in brief No. 8, available at: http://www.pewclimate.org/policy_center/policy_reports_and_analysis/state/index.cfm



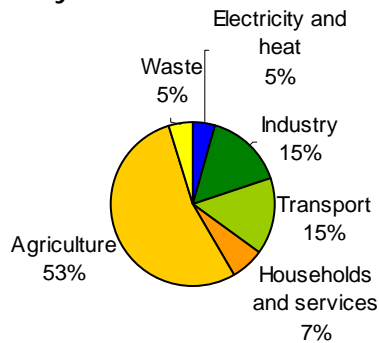
Climate scorecard: Brazil

Greenhouse gas emissions¹

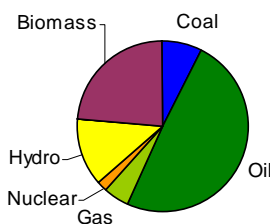
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2000	+23%
Emissions per capita ⁵	4.9 tCO ₂ eq/cap
Emission per GDP ⁶	672 tCO ₂ eq/M\$
Increase of the share of renewable energy sources ⁷	-8.6 %-points
CO ₂ per kWh electricity ⁸	68 g/kWh
Energy efficiency in industry ⁹	Low/medium
Emissions in transport per capita ¹⁰	0.7 tCO ₂ eq/cap
Emissions in households and services per capita ¹¹	0.3 tCO ₂ eq/cap

Summary

- Increasing emissions trend
- High emission rates per GDP
- Low emission rates per capita
- Low emission intensity for electricity generation
- Large share of renewable energy sources (hydro) in fuel mix, WWF supports World Commission on Dams guidelines
- High (but decreasing) share of residential use of biomass in energy mix
- Emissions from deforestation and agriculture are a large share of total greenhouse gas emissions

Climate policies

General

- Ratified the UNFCCC on 28.02. 1994
- Ratified the Kyoto Protocol on 23.08.2002
- 48 CDM project submitted for validation to the UNFCCC

Climate policies in place

- Use of ethanol as substitute for petrol, success of programme depends strongly on the price of sugar and has therefore considerably decreased in the last years
- Use of bagasse for firing co-generation plants
- Tax incentive for highly efficient car engines
- Promotion of natural gas import for use in gas-fired cogeneration plants
- Energy conservation through co-funding or funding scheme for energy efficiency projects¹²

Summary evaluation

- Very low emission intensity for electricity generation due to extensive use of hydropower
- Increasing national emissions
- Emissions from deforestation and agriculture account for a large share of total greenhouse gas emissions

¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from Climate Analysis Indicators Tool (CAIT) by the World Resources Institute, available at: <http://cait.wri.org>. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The emissions are available for the years 1990, 1995 and 2000 from this source.

² The projections are taken from IEA CO₂ emissions from fuel combustion from CAIT.

<http://cait.wri.org/cait.php?page=project&menu=5&start=2010&end=2020&update=Update> for CO₂ and U.S. EPA 2002: "Emissions and Projections of Non-CO₂ Greenhouse Gases from Developing Countries: 1990 to 2020" DRAFT June 2002, Elizabeth Scheehle, available at

<http://www.epa.gov/methane/pdfs/draftdevelopingcountries.pdf> for CH₄ and N₂O

³ For the year 2000. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation.

"Agriculture" includes only non-CO₂ emissions. Emissions exclude "Land-Use Change & Forestry". These emissions account for 1372 Mt in 2000, equivalent to 160% of total emissions (excluding Land-Use Change & Forestry).

⁴ For the year 2001. Total primary energy supply as provided by IEA (2003) Energy Balances, Paris, France.

⁵ For the year 2000. Population is based on World Resources Institute (2005). <http://cait.wri.org/>

⁶ For the year 2000. Gross Domestic Product is based on Purchase Power Parity from World Bank, World Development Indicators (Online), 2005, available at: <http://devdata.worldbank.org/dataonline/>.

⁷ Change in share of renewable energy sources in primary energy consumption from 1990 to 2001 based on IEA (2003) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

⁸ For public electricity plants in 2001. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2003) Energy Balances, Paris, France.

⁹ L. Price, E. Worrell and D. Phylipsen (1999). Energy Use and Carbon Dioxide Emissions in Energy-Intensive Industries in Key Developing Countries. Lawrence Berkeley National Laboratory. LBNL-45292. United States.

¹⁰ For the year 2000. Includes only CO₂ emissions. Based on World Resources Institute (2005).

<http://cait.wri.org/cait.php?page=yearly&filter=1>

¹¹ For the year 2001. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

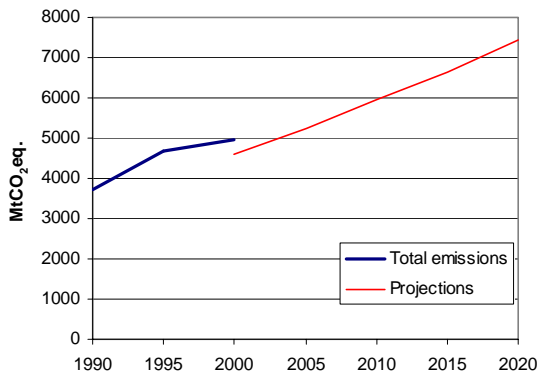
¹² PEW Center on Climate Change: Climate Change Mitigation in Developing countries, 2002.



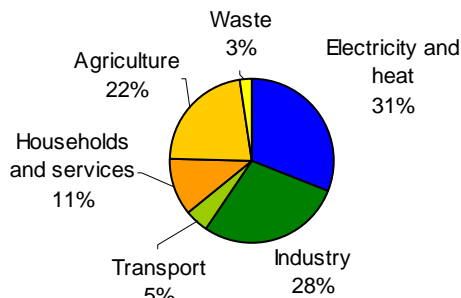
Climate scorecard: China

Greenhouse gas emissions¹

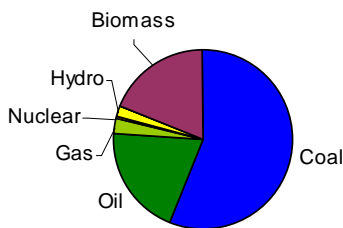
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2000	+33%
Emissions per capita ⁵	3.9 tCO ₂ eq/cap
Emission per GDP ⁶	1024 tCO ₂ eq/M\$
Increase of the share of renewable energy sources ⁷	-3.2 %-points
CO ₂ per kWh electricity ⁸	795 g/kWh
Energy efficiency in industry ⁹	Low
Emissions in transport per capita ¹⁰	0.2 tCO ₂ eq/cap
Emissions in households and services per capita ¹¹	0.4 tCO ₂ eq/cap

Summary

- Strongly increasing emissions
- Decreasing but still high emission rates per GDP (halved in the last 10 years)
- Low emission rates per capita
- High emission intensity for electricity generation due to extensive use of coal
- High (but decreasing) share of residential use of biomass in energy mix

Climate policies

General

- Ratified the UNFCCC on 05.01.1993
- Ratified the Kyoto Protocol on 30.08.2002
- 5 CDM project submitted for validation to the UNFCCC

Climate policies in place

- Commitment to use 12% electricity and 17% of total energy from renewable sources by 2020
- Adopted renewable energy law to take effect in 2006 with feed in tariff, a national fund, discounted lending and tax preferences for renewable energy projects
- Measures in economic restructuring, i.e. energy price reform, promotion of technological progress beyond the status quo
- Incentive to substitute coal by natural gas through provision of improved infrastructure for natural gas

Summary evaluation

- Low emissions per capita but strongly increasing total emissions
- Strong dependence on coal
- The fast development of the energy system includes efforts to increase renewable sources and implement energy efficiency measures

¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from Climate Analysis Indicators Tool (CAIT) by the World Resources Institute, available at: <http://cait.wri.org>. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The emissions are available for the years 1990, 1995 and 2000 from this source.

² The projections are taken from IEA CO₂ emissions from fuel combustion from CAIT

<http://cait.wri.org/cait.php?page=project&menu=5&start=2010&end=2020&update=Update> for CO₂ and U.S. EPA 2002: "Emissions and Projections of Non- CO₂ Greenhouse Gases from Developing Countries: 1990 to 2020" DRAFT June 2002, Elizabeth Scheehle, available at:

<http://www.epa.gov/methane/pdfs/draftdevelopingcountries.pdf> for CH₄ and N₂O

³ For the year 2000. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation.

"Agriculture" includes only non-CO₂ emissions.

Emissions are exclude "Land-Use Change & Forestry". Net emissions from this sector account for -47 Mt in 2000 (i.e. removals), equivalent to 1% of total emissions.

⁴ For the year 2001. Total primary energy supply as provided by IEA (2003) Energy Balances, Paris, France.

⁵ For the year 2000. Population is based on World Resources Institute (2005). <http://cait.wri.org/>

⁶ For the year 2000. Gross Domestic Product is based on Purchase Power Parity from World Bank, World Development Indicators (Online), 2005, available at: <http://devdata.worldbank.org/dataonline/>.

⁷ Change in share of renewable energy sources in primary energy consumption from 1990 to 2001 based on IEA (2003) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

⁸ For public electricity plants in 2001. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2003) Energy Balances, Paris, France.

⁹ L. Price, E. Worrell and D. Phylipsen (1999). Energy Use and Carbon Dioxide Emissions in Energy-Intensive Industries in Key Developing Countries. Lawrence Berkeley National Laboratory. LBNL-45292. United States.

¹⁰ For the year 2000. Includes only CO₂ emissions.

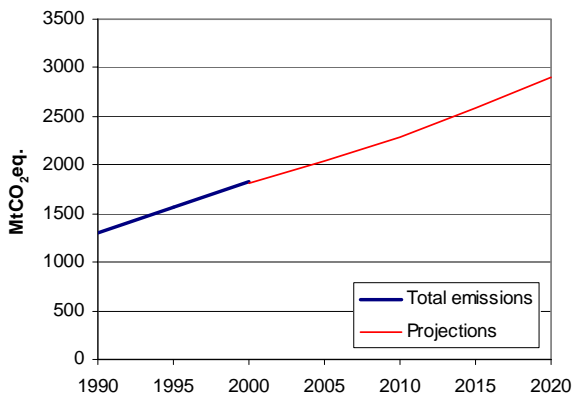
¹¹ For the year 2001. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.



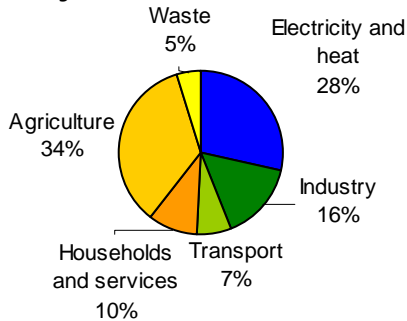
Climate scorecard: India

Greenhouse gas emissions¹

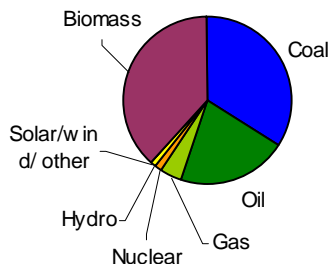
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2000	+41%
Emissions per capita ⁵	1.8 tCO ₂ eq/cap
Emission per GDP ⁶	745 tCO ₂ eq/M\$
Increase of the share of renewable energy sources ⁷	-10 %-points
CO ₂ per kWh electricity ⁸	932 g/kWh
Energy efficiency in industry ⁹	Low
Emissions in transport per capita ¹⁰	0.1 tCO ₂ eq/cap
Emissions in households and services per capita ¹¹	0.2 tCO ₂ eq/cap

Summary

- Strongly increasing emissions
- High emission rates per GDP
- Very low emission rates per capita
- Very high emission intensity for electricity generation due to large share of coal
- Very high (but decreasing) share of residential use of biomass in energy mix

Climate policies

General

- Ratified the UNFCCC on 01.11.1993
- Ratified the Kyoto Protocol on 26.08.2002
- 27 CDM project submitted for validation to the UNFCCC

Climate policies in place

- Reduction of vehicle emissions through measures like required performance standards or obligatory use of compressed natural gas as fuel
- Reduced coal subsidies
- Public investment for development of natural gas infrastructure
- Mandatory annual reporting of energy conservation measures for private companies
- Renewable energy programme, e.g. biomass gasification systems for rural homes, subsidisation of renewable technologies

Summary evaluation

- Very low emissions per capita but strongly increasing emissions
- Strong dependence on coal, some efforts underway to increase renewables
- Efforts made to slow emission growth

¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from Climate Analysis Indicators Tool (CAIT) by the World Resources Institute, available at: <http://cait.wri.org>. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The emissions are available for the years 1990, 1995 and 2000 from that source.

² The projections are taken from IEA CO₂ emissions from fuel combustion from CAIT.

<http://cait.wri.org/cait.php?page=project&menu=5&start=2010&end=2020&update=Update> for CO₂ and U.S. EPA 2002: "Emissions and Projections of Non-CO₂ Greenhouse Gases from Developing Countries: 1990 to 2020" DRAFT June 2002, Elizabeth Scheehle, available at:

<http://www.epa.gov/methane/pdfs/draftdevelopingcountries.pdf> for CH₄ and N₂O

³ For the year 2000. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation.

"Agriculture" includes only non-CO₂ emissions.

Emissions exclude "Land-Use Change & Forestry". Net emissions of this sector account for -40 Mt in 2000 (i.e. removals), equivalent to 2% of total emissions.

⁴ For the year 2001. Total primary energy supply as provided by IEA (2003) Energy Balances, Paris, France.

⁵ For the year 2000. Population is based on World Resources Institute (2005). <http://cait.wri.org/>

⁶ For the year 2000. Gross Domestic Product is based on Purchase Power Parity from Nation Master, H Gross Domestic Product is based on Purchase Power Parity from World Bank, World Development Indicators (Online), 2005, available at: <http://devdata.worldbank.org/dataonline/.H>

⁷ Change in share of renewable energy sources in primary energy consumption from 1990 to 2001 based on IEA (2003) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

⁸ For public electricity plants in 2001. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2003) Energy Balances, Paris, France.

⁹ L. Price, E. Worrell and D. Phylipsen (1999). Energy Use and Carbon Dioxide Emissions in Energy-Intensive Industries in Key Developing Countries. Lawrence Berkeley National Laboratory. LBNL-45292. United States.

¹⁰ For the year 2000. Includes only CO₂ emissions.

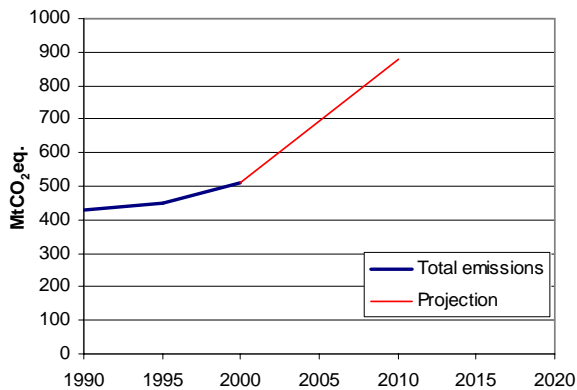
¹¹ For the year 2001. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.



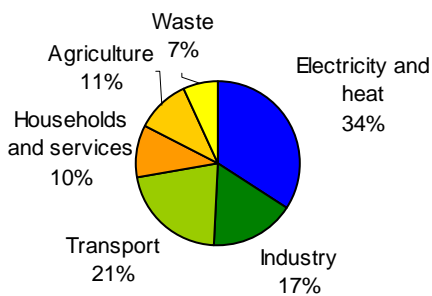
Climate scorecard: Mexico

Greenhouse gas emissions¹

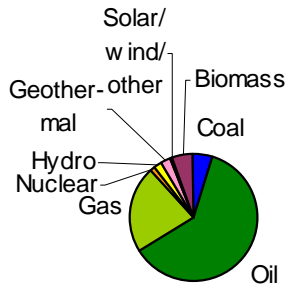
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2000	+18
Emissions per capita ⁵	5.1 tCO ₂ eq/cap
Emission per GDP ⁶	585 tCO ₂ eq/M\$
Increase of the share of renewable energy sources ⁷	-0.9 %-points
CO ₂ per kWh electricity ⁸	571 g/kWh
Energy efficiency in industry ⁹	Low
Emissions in transport per capita ¹⁰	1.0 tCO ₂ eq/cap
Emissions in households and services per capita ¹¹	0.5 tCO ₂ eq/cap

Summary

- Low emissions per capita
- Increasing emissions
- High emission growth projected for 2010
- Strong dependence on oil

Climate policies

General

- Ratified the UNFCCC on 11.03.1993
- Ratified the Kyoto Protocol on 07.09.2000
- 5 CDM project submitted for validation to the UNFCCC

Climate policies in place

- Creation of the National Commission for Energy Saving (CoNAE) to promote energy savings at national level and the use of renewable energy. Implemented energy efficiency standards
- Enhancing natural gas use by opening gas transport and distribution to private sector

Summary evaluation

- Low emissions per capita, but increasing and projected to increase faster in the future
- Strong dependence on oil
- First efforts to slow emission growth

¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions are taken from Climate Analysis Indicators Tool (CAIT) by the World Resources Institute, available at: <http://cait.wri.org>. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The emissions are available for the years 1990, 1995 and 2000 from this source.

² The projections are taken from Mexico's second National Communication to UNFCCC. The projection for the year 2010 refers only to CO₂ emissions from fuel combustion. <http://unfccc.int/resource/docs/natc/mexnc2.pdf> page 145. Medium scenario; 4.5% annual growth GDP.

³ For the year 2000. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation.

"Agriculture" includes only non-CO₂ emissions. Emissions exclude "Land-Use Change & Forestry", which amount to 97 Mt in 2000, equivalent to 19% of total emissions (excluding Land-Use Change & Forestry).

⁴ For the year 2001. Total primary energy supply as provided by IEA (2003) Energy Balances, Paris, France.

⁵ For the year 2000. Population is based on World Resources Institute (2005). <http://cait.wri.org/>

⁶ For the year 2000. HGross Domestic Product is based on Purchase Power Parity from World Bank, World Development Indicators (Online), 2005, available at: <http://devdata.worldbank.org/dataonline/.H>

⁷ Change in share of renewable energy sources in primary energy consumption from 1990 to 2001 based on IEA (2003) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.

⁸ For public electricity plants in 2001. Based on IEA (2004) CO₂ emissions from fuel combustion and IEA (2003) Energy Balances, Paris, France.

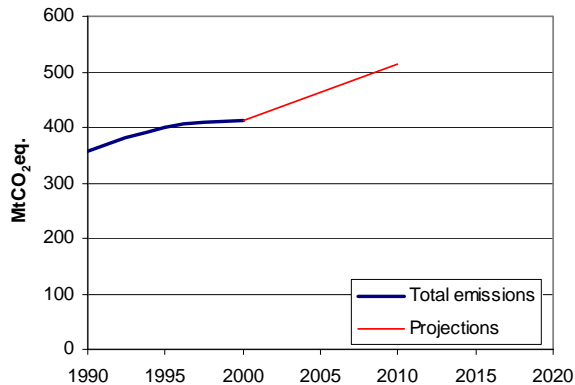
⁹ L. Price, E. Worrell and D. Phylipsen (1999). Energy Use and Carbon Dioxide Emissions in Energy-Intensive Industries in Key Developing Countries. Lawrence Berkeley National Laboratory. LBNL-45292. United States.

¹⁰ For the year 2000. Includes only CO₂ emissions.

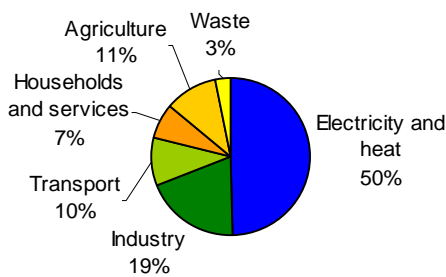
¹¹ For the year 2001. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

Greenhouse gas emissions¹

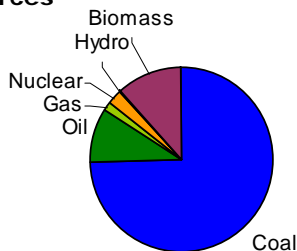
Emission trends²



Emissions by sector³



Energy sources⁴



Past emission trend from 1990 to 2000	+16%
Emissions per capita ⁵	9.2 tCO ₂ eq/cap
Emission per GDP ⁶	994 tCO ₂ eq/M\$
Increase of the share of renewable energy sources ⁷	0.3 %-points
CO ₂ per kWh electricity ⁸	890 g/kWh
Energy efficiency in industry ⁹	Low
Emissions in transport per capita ¹⁰	0.8 tCO ₂ eq/cap
Emissions in households and services per capita ¹¹	0.6 tCO ₂ eq/cap

Summary

- Very large share of coal in energy mix
- High emission intensity for electricity generation due to large share of coal
- Very high emission rate per GDP
- Low emissions per capita compared to industrialized countries, but high for developing countries
- Increasing emissions

Climate policies

General

- Ratified the UNFCCC on 28.08.1997
- Ratified the Kyoto Protocol on 31.07.2002
- 2 CDM projects submitted

Climate policies in place

- Programmes addressing energy efficiency in energy production and the main energy-consuming sectors
- Renewable energy target of 10 000 GWh by 2013, about 4% of then projected electricity generation¹²
- Government took legal and economical steps taken for future substitution of coal-based liquid fuel by natural gas

Summary evaluation

- Emissions per capita slightly below average of industrialized countries, increasing trend
- Very strong dependence on coal
- First intentions to lower emissions in the future

-
- ¹ Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in M CO₂ equivalent. The emissions are taken from Climate Analysis Indicators Tool (CAIT) by the World Resources Institute, available at: <http://cait.wri.org>. The emissions exclude "Land-Use Change & Forestry" and "International Bunker Fuels". The emissions are available for the years 1990, 1995 and 2000 from this source.
- ² The projections are taken from IEA CO₂ emissions from fuel combustion from CAIT. <http://cait.wri.org/cait.php?page=project&menu=5&start=2010&end=2020&update=Update> for CO₂ and U.S. EPA 2002: "Emissions and Projections of Non-CO₂ Greenhouse Gases from Developing Countries: 1990 to 2020" DRAFT June 2002, Elizabeth Scheehle, available at: <http://www.epa.gov/methane/pdfs/draftdevelopingcountries.pdf> for CH₄ and N₂O
- ³ For the year 2000. "Industry" includes energy, process and fugitive emissions but excludes emissions from electricity generation. "Households and services" also excludes emissions from electricity generation. "Agriculture" includes only non-CO₂ emissions. Emissions are excluding "Land-Use Change & Forestry". These emissions are 1.7 Mt in 2000, equivalent to 0.4% of total emissions.
- ⁴ For the year 2001. Total primary energy supply as provided by IEA (2003) Energy Balances, Paris, France.
- ⁵ For the year 2000. Population is based on World Resources Institute (2005). <http://cait.wri.org/>
- ⁶ For the year 2000. Gross Domestic Product is based on Purchase Power Parity from Nation Master, http://www.nationmaster.com/graph-T/eco_gdp_ppp
- ⁷ Change in share of renewable energy sources in primary energy consumption from 1990 to 2001 based on IEA (2003) Energy Balances, Paris, France. Includes also large hydro, due to lack of disaggregated data. WWF only supports hydropower that is consistent with World Commission on Dams guidelines.
- ⁸ Eskom (2003). Annual report: Corporate delivery in a decade of democracy. Sandton, Eskom Holdings. www.eskom.co.za
- ⁹ L. Price, E. Worrell and D. Phylipsen (1999). Energy Use and Carbon Dioxide Emissions in Energy-Intensive Industries in Key Developing Countries. Lawrence Berkeley National Laboratory. LBNL-45292. United States.
- ¹⁰ For the year 2000. Includes only CO₂ emissions.
- ¹¹ For the year 2001. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.
- ¹² DME (Department of Minerals and Energy) 2003. White paper on renewable energy, Pretoria, South Africa. www.dme.gov.za

Summary

	Middle position ¹	France	Germany	UK	Italy	Japan	Russia	Canada	USA
Greenhouse gas emissions²									
Past emission trend from 1990 to 2002 ³	0%								
Current distance to the Kyoto target ⁴	0%								
Emissions per capita	14 tCO ₂ eq/cap ⁵								
Emission per GDP ⁶	662 tCO ₂ eq/M\$ ⁷								
Increase of the share of renewable energy sources ⁸	0.0% ⁹								
CO ₂ per kWh electricity ¹⁰	477 g/kWh ¹¹								
Energy efficiency in industry ¹²	Medium								
Emissions in transport per capita	2.7 tCO ₂ eq/cap ¹³								
Emissions in households and services per capita ¹⁴	1.4 tCO ₂ eq/cap ¹⁵								
Climate policies									
	-								
Summary evaluation									
	-								
		France	Germany	UK	Italy	Japan	Russia	Canada	USA

¹ Value that defines the middle of the climate meter. It is derived as the average over the industrialized countries.

² Unless otherwise specified, emissions refer to greenhouse gas emissions from CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆ in Mt CO₂ equivalent. The emissions exclude “Land-Use Change & Forestry” and “International Bunker Fuels”. The climate meters refer to deviation from average of industrialized countries.

³ Past emission trend in the period 1990 to 2000 for developing countries, 1990 to 2003 for the United Kingdom, France, Italy, Germany, Japan, Russia and the United States and 1990-2002 for Canada.

⁴ Difference between emissions in most recent year available and the Kyoto target as percentage of emissions in 1990.

⁵ For the year 2000. Based on CAIT:

<http://cait.wri.org/cait.php?page=comp coun&url=form&pHints=shut&pOne=shut&pTwo=shut&pThree=&pFour=&lmenu=520&rmenu=534&year=2000§or=natl&co2=1&ch4=1&n2o=1&pfc=1&hfc=1&sf6=1&update=Update&start2=1950&limit2=1&emit2=1&luc2=1>

⁶ The Gross Domestic Product (GDP) is based on Purchase Power Parity (PPP).

⁷ For the year 2000. Gross Domestic Product is based on Purchase Power Parity from World Bank, World Development Indicators (Online), 2005, available at:

<http://devdata.worldbank.org/dataonline/>.

⁸ Change in share of renewable energy sources in primary energy consumption from 1990 to 2002 (or most recent year available). Includes also large-scale hydro.

⁹ For OECD countries. As percentage of total primary energy supply in 2002 as provided by IEA (2004) Energy Balances, Paris, France.

¹⁰ For public electricity plants. Reflects CO₂ emissions from fuel combustion. For France and Japan, the climate meter has been adapted from green to medium to reflect the relatively large share of nuclear power in their fuel mix.

¹¹ For the year 2000. Based on CAIT:

<http://cait.wri.org/cait.php?page=comp coun&url=form&pHints=shut&pOne=shut&pTwo=shut&pThree=&pFour=&lmenu=520&rmenu=534&year=2000§or=natl&co2=1&ch4=1&n2o=1&pfc=1&hfc=1&sf6=1&update=Update&start2=1950&limit2=1&emit2=1&luc2=1>

¹² Based on energy efficiency of iron and steel and cement production. Countries are divided into three categories: high, medium and low energy efficiency.

¹³ For the year 2000. Includes only CO₂ emissions. Based on World Resources Institute (2005). <http://cait.wri.org/cait.php?page=yearly&filter=1>

¹⁴ Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use.

¹⁵ For the year 2001. Includes only direct emissions (e.g. from space heating) and excludes indirect emissions from electricity use. Emissions are based on IEA (2004) CO₂ emissions from fuel combustion for “Commercial and public services” and “Residential sector”.

Further reading

- **Official national emission estimates reported to the UNFCCC:** Greenhouse gas inventory data of the UNFCCC secretariat, available at <http://ghg.unfccc.int/index.html>
- **Compilation of national greenhouse gas emissions and other climate relevant data:** Climate Analysis Indicators Tool (CAIT) by the World Resources Institute, available at <http://cait.wri.org>
- **Annex I emission fact sheets:** Malte Meinshausen, 2004: "Emissions, Targets and Projections for Annex I Parties", revised version of data appendix in F. Yamin and J. Depledge, "The International Climate Change Regime: A Guide to Rules, Institutions, and Procedures", Cambridge University Press, 2004, available at <http://www.simcap.org>
- **Emission trends in EU countries:** European Environment Agency's European Topic Centre for Air and Climate Change, 2004: "Greenhouse gas emission trends and projections in Europe 2004", EEA Report No 5/2004, available at http://reports.eea.eu.int/eea_report_2004_5/en
- **Analysis of national allocation plans and Kyoto targets:** Ecofys, 2004: "Interim Report on National Allocation Plans", YUES4003, available at www.ecofys.com
- **Comparison of energy efficiency:** Phylipsen, G.J.M., W. Graus, K. Blok, Y. Hofman and M. Voogt (2003). International Comparisons Of Energy Efficiency - Results For Iron & Steel, Cement And Electricity Generation. Ecofys, Utrecht, The Netherlands.

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