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Steep increase in global CO₂ emissions despite reductions by industrialised countries with binding Kyoto targets

Global emissions of carbon dioxide (CO₂) – the main cause of global warming – increased by 45 % between 1990 and 2010, and reached an all-time high of 33 billion tonnes in 2010. Increased energy efficiency, nuclear energy and the growing contribution of renewable energy are not compensating for the globally increasing demand for power and transport, which is strongest in developing countries.

This increase took place despite emission reductions in industrialised countries during the same period. Even though different countries show widely variable emission trends, industrialised countries are likely to meet the collective Kyoto target of a 5.2 % reduction of greenhouse gas emissions by 2012 as a group, partly thanks to large emission reductions from economies in transition in the early nineties and more recent reductions due to the 2008-2009 recession. These figures were published today in the report "Long-term trend in global CO₂ emissions", prepared by the European Commission's Joint Research Centre and PBL Netherlands Environmental Assessment Agency.

The report, which is based on recent results from the Emissions Database for Global Atmospheric Research (EDGAR) and latest statistics for energy use and other activities, shows large national differences between industrialised countries. Over the period 1990-2010, in the EU-27 and Russia CO₂ emissions decreased by 7% and 28% respectively, while the USA's emissions increased by 5 % and the Japanese emissions remained more or less constant. The industrialised countries that have ratified the Kyoto Protocol (so called 'ratifying Annex 1 countries') and the USA, in 1990 caused about two-thirds of global CO₂ emissions. Their share of global emissions has now fallen to less than half the global total.

Continued growth in the developing countries and emerging economies and economic recovery by the industrialised countries are the main reasons for a record breaking 5.8% increase in global CO₂ emissions between 2009 and 2010. Most major economies contributed to this increase, led by China, USA, India and EU-27 with increases of 10%, 4%, 9% and 3% respectively. The increase is significant even when compared to 2008, when global CO₂ emissions were at their highest before the global financial crisis. It can be noted that in EU-27, CO₂ emissions remain lower in absolute terms than they were before the crisis (4.0 billion tonnes in 2010 as compared to 4.2 billion tonnes in 2007).

At present, the USA emits 16.9 tonnes CO₂ per capita per year, over twice as much as the EU-27 with 8.1 tonnes. By comparison, Chinese per capita CO₂ emissions of 6.8 tonnes are still below the EU-27 average, but now equal those of Italy. It should be noted that the average figures for China and EU-27 hide significant regional differences.



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Long term global growth in CO₂ emissions continues to be driven by power generation and road transport, both in industrial and developing countries. Globally, they account for about 40% and 15% respectively of the current total and both have consistent long-term annual growth rates of between 2.5% and 5%.

Throughout the Kyoto Protocol period, industrialised countries have made efforts to change their energy sources mix. Between 1990 and 2010 they reduced their dependence of coal (from 25% to 20% of total energy production) and oil (from 38% to 36.5%), and shifted towards natural gas (which increased from 23% to 27 %), nuclear energy (from 8% to 9%) and renewable energy (from 6.5% to 8%). In addition they made progress in energy savings, for example by insulation of buildings, more energy-efficient end-use devices and higher fuel efficiencies.

The report shows that the current efforts to change the mix of energy sources cannot yet compensate for the ever increasing global demand for power and transport. This needs to be considered in future years in all efforts to mitigate the growth of global greenhouse gas emissions, as desired by the UN Framework Convention on Climate Change, the Bali Action Plan and the Cancún agreements.

The full report can be downloaded from:

edgar.jrc.ec.europa.eu or www.pbl.nl/en

About the Joint Research Centre (JRC)

The Joint Research Centre (JRC) is the European Commission's in-house science service. Its mission is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of European Union policies.

The Emissions Database for Global Atmospheric Research (EDGAR) project uses the latest scientific information and data from international statistics on energy production and consumption, industrial manufacturing, agricultural production, waste treatment/disposal and the burning of biomass in order to model emissions for all countries of the world in a comparable and consistent manner. EDGAR is also unique in its provision of historical emission data for 20 years prior to 1990, the reference year for the Kyoto protocol.

PBL Netherlands Environmental Assessment Agency

PBL is the national institute for strategic policy analysis in the field of environment, nature and spatial planning in The Netherlands and contributes to improving the quality of political and administrative decision-making by conducting outlook studies, analyses and evaluations in which an integrated approach is considered paramount. Policy relevance is the prime concern in PBL studies, for which independent and sound research is conducted.

The Kyoto Protocol: Annex I Parties

The industrialised countries listed in this annex to the Convention committed to return their greenhouse-gas emissions to 1990 levels by the year 2000. They have also accepted



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emissions targets for the period 2008-12. They include the 24 original OECD members, the European Union, and 14 countries with economies in transition.

Non-Annex I Parties

Refers to countries that have ratified or acceded to the United Nations Framework Convention on Climate Change that are not included in Annex I of the Convention.

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