CO2 emissions from transport in the EU27

An analysis of 2008 data submitted to the UNFCCC

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Summary

This note is written as a complement to the annual submissions to the UNFCCC on the EU's greenhouse gas emissions. These submissions are compiled by the EEA on the basis of the date from the 27 EU Member States.

We wrote this complement because of the continuing confusion over the contribution of the transport sector to the EU's CO_2 emissions. This confusion arises because the EEA's figures usually leave out emissions from international shipping and aviation (so-called 'bunkers'). The Kyoto Protocol is to blame for this; it does not allocate the emissions from these two sectors to individual countries, and therefore EU-total figures also typically leave them out. This report includes bunker emissions, determined on the basis of fuel sales.

All figures in this note apply to CO_2 emissions in the EU27 and include emissions from international aviation and shipping, unless otherwise stated.

- Between 1990 and 2008, transport emissions increased by 34% while emissions from other sectors decreased by 14%. Compared with 2007 transport emissions decreased by 1.6% and those of other sectors by 2.2%.
- Consequently, the share of transport in total emissions rose further from 28 to 29%; in 1990 the share of transport was 21%;
- Emissions from international aviation and shipping (both outside Kyoto) have risen by 110% and 56% respectively. Emissions from aviation were unchanged in 2008, those of shipping dropped by 2.1% compared with 2007;
- In 2008 aviation and shipping accounted for 7.0% of total CO_2 emissions, and 24% of transport emissions. In 1990, these figures were 3.8% and 18% respectively.

Background

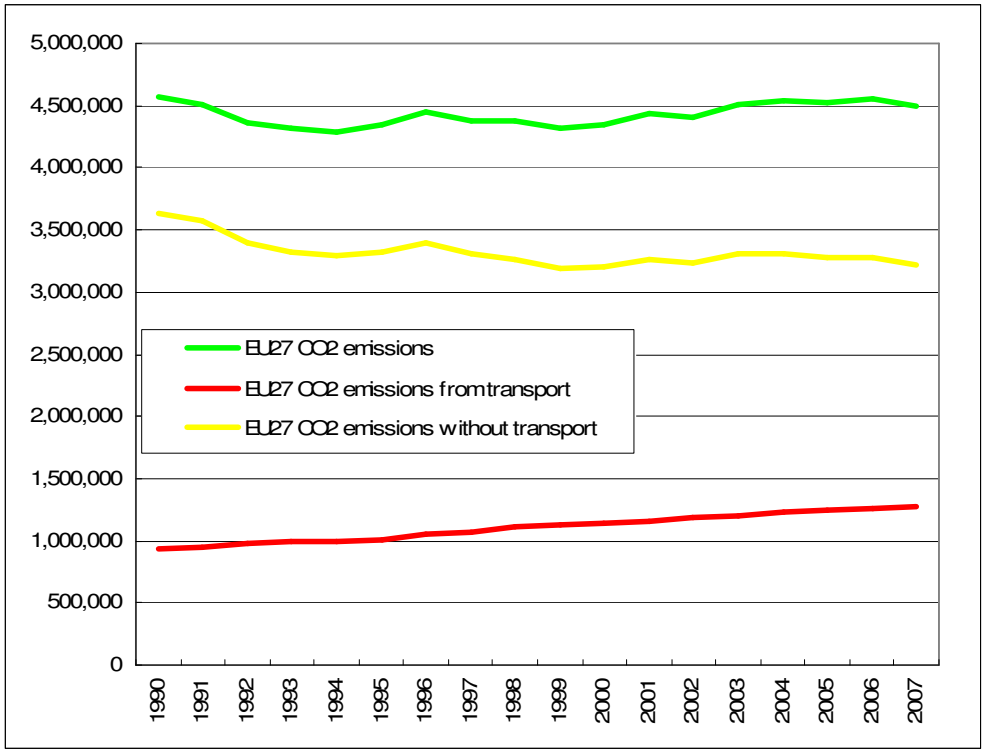
The European Community (EC), as a party to the United Nations Framework Convention on Climate Change (UNFCCC), reports annually on greenhouse gas (GHG) inventories within the area covered by its Member States. The 2008 inventory was published in May 2010 (EEA, 2010).

T&E has published this short paper to clarify the climate performance of the transport sector, also including the developments of international 'bunkers' (international aviation and shipping) which are not covered by the Kyoto Protocol and hence not officially reported to the UNFCCC. The exclusion of international bunkers often leads to an underestimation of the contribution of the transport sector to climate change.

Developments 2007-2008

CO_2 emissions in the EU under the Kyoto Protocol have decreased by 2.1% between 2007 and 2008, both including and excluding bunkers. Emissions from non-transport sectors decreased by 2.2%, while transport emissions declined by 1.6%. Consequently, the share of transport in overall EU CO_2 emissions grew from 28 to 29%.

Developments 1990-2008



Without taking bunker emissions into account, the EU's total CO_2 emission compared to 1990 have decreased by 7.1%.
However, if bunker fuel emissions are taken into account the reduction is only about half that figure (3.9%).
These figures are the result of a decrease in non-transport emissions of 13.6%, and an increase of transport CO_2 emissions by 33.7%.

Share of transport in total

The share of the transport sector's emissions has been continuously growing, from 21% in 1990 to 29% in 2008.
Excluding international bunkers, the contribution of transport grew from 17% in 1990 to 23% in 2007.

Growth and share of international aviation and shipping

International bunkers play an important role in the increased share of the transport sector in overall emissions. Emissions from international aviation and shipping have been growing at higher rates than those of transport as a whole.

The following figures present the evolution of international aviation and shipping CO_2 emissions since 1990.

Emissions from international aviation more than doubled between 1990 and 2008 (growth of 110%), with a stabilisation in 2008. The average annual emission growth since 1990 has been 4.2%.

Emissions from international maritime transport have increased by 56% since 1990, with a decrease of 2.1% in 2008 compared with 2007. Average annual emission growth since 1990 has been 2.5%.

The share of emissions from bunkers in the total continues to increase. In 2008 they grew from 6.9 to 7.0% of the total, and from 24.3 to 24.4% of EU transport CO_2 emissions. In 1990, these figures were 3.8% and 18% respectively.

Note: non-CO_2 emissions

This report only considers CO_2 emissions, although both transport and other sectors also emit other gases and have other impacts on the climate than just those of CO_2.

Under the Kyoto Protocol, Parties should include 5 other greenhouse gases in their reporting: CH4, N2O, HFCs, PFCs, and SF6. These emissions are also included in the EEA report on which this briefing is based.
But in the case of transport, the 'six gases' do not include most of the non-CO_2 impacts. Besides CO_2, the main contributions of transport to climate change are ozone (both at ground level and in the troposphere), sulphur dioxide, particle emissions, and, in the case of aviation, contrails and cirrus clouds.

In particular the climate impact of aviation is relatively well studied. On a worldwide basis the contribution of aviation to man-made radiative forcing in 2005 was 4.9%, with a bandwidth of 2 to 14%. The 4.9% is 2.8 times the contribution of CO_2 alone[1].

However, the EU does not officially report these non-CO_2 impacts. In order to avoid confusion, therefore, this report has exclusively focused on CO_2.

[1] Lee, D.S., et al., Transport impacts on atmosphere and climate: Aviation, Atmospheric Environment (2009), doi:10.1016/j.atmosenv.2009.06.005

Overview table of CO2 emissions in the EU27 as of 1990

	Total CO_2 emissions (including bunkers)	Transport Emissions (incl. Bunkers)	Transport Contribution	Total emissions without transport	International Bunkers share in total	Emissions from international air and sea transport ('bunkers')	
						Aviation	Shipping
1990	4,573,674	941,631	21%	3,632,043	3.81%	65,584	108,553
1991	4,513,971	943,524	21%	3,570,447	3.80%	64,992	106,365
1992	4,368,737	973,353	22%	3,395,384	4.08%	70,319	107,734
1993	4,311,221	987,793	23%	3,323,428	4.29%	74,628	110,202
1994	4,288,887	994,062	23%	3,294,825	4.33%	78,735	107,068
1995	4,341,746	1,013,840	23%	3,327,906	4.41%	83,178	108,379
1996	4,453,935	1,049,861	24%	3,404,074	4.56%	87,618	115,302
1997	4,379,770	1,074,133	25%	3,305,637	4.96%	91,631	125,570
1998	4,382,053	1,114,381	25%	3,267,672	5.25%	98,711	131,437
1999	4,315,801	1,132,325	26%	3,183,476	5.36%	106,298	125,219
2000	4,349,931	1,145,009	26%	3,204,922	5.61%	112,867	131,284
2001	4,432,551	1,162,320	26%	3,270,231	5.60%	111,479	136,671
2002	4,410,774	1,179,606	27%	3,231,168	5.73%	109,420	143,293
2003	4,511,252	1,195,927	27%	3,315,326	5.74%	113,341	145,566
2004	4,540,591	1,232,080	27%	3,308,511	6.08%	121,991	154,196
2005	4,521,140	1,244,934	28%	3,276,207	6.41%	128,073	161,518
2006	4,548,667	1,266,704	28%	3,281,963	6.72%	133,670	171,896
2007	4,497,517	1,276,892	28%	3,220,625	6.91%	137,360	173,499
2008	4,396,040	1,257,936	29%	3,138,104	6.99%	137,625	169,583

(Unit: Gg or kt of CO_2)