

 **Environment**

## CO<sub>2</sub> emissions – Causes with regard to production, consumption and use

Destatis, 04 December 2007

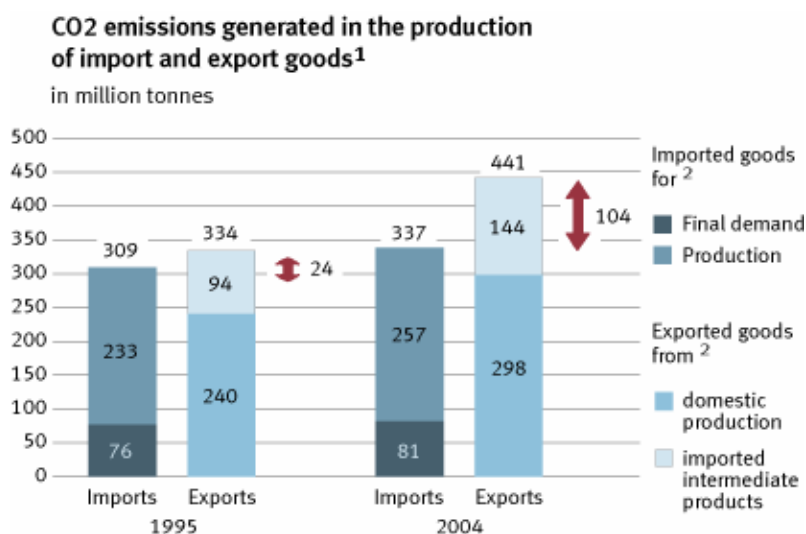
Who causes greenhouse gases and what influence has globalisation on the utilisation of environmental resources? These are questions dealt with by environmental-economic accounting through close interlinkage with results of national accounting, with physical data on energy consumption and on the emission of greenhouse gases.

There are manifold aspects to the problem of the greenhouse gas CO<sub>2</sub>. Generally, however, it must be stated that Germany emitted 700 million tonnes of CO<sub>2</sub> in the industry in 2004. A good half of that was created in the production of export goods.

The continuously increasing exports as a result of globalisation on the one hand support economic growth and employment in Germany but, on the other hand, they have a growing impact on the environment.

What was examined in the past in the context of calculating CO<sub>2</sub> emissions or greenhouse gases at the national and international levels was only the production aspect with a sole focus on domestic emissions. The consumption and use aspects, however, lead to different results. What is done here is adding the emissions of import goods production to the domestic economy and adding the emissions of export goods production to the rest of the world. For countries with a high positive foreign trade – such as for Germany – the emissions from the consumption aspect are much smaller than from the production aspect. For countries with a high foreign trade deficit – such as the USA – the emissions would be much larger from the consumption aspect than from the production aspect. When global questions must be answered, a balance of carbon dioxide emissions from the consumption aspect may be added to the production aspect applied so far.

### The development of CO<sub>2</sub> emissions in the production of goods



<sup>1</sup> National accounts definition.

<sup>2</sup> Excl. re-exports.

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The production of export goods in 2004 involved the generation of 441 million tonnes of CO<sub>2</sub>, which is about 104 million tonnes more than the amount generated in the production of all imports (2004: 337 million tonnes for final consumption and intermediate consumption goods). In 1995, however, the “emission balance” of exports and imports was just 24 million tonnes.

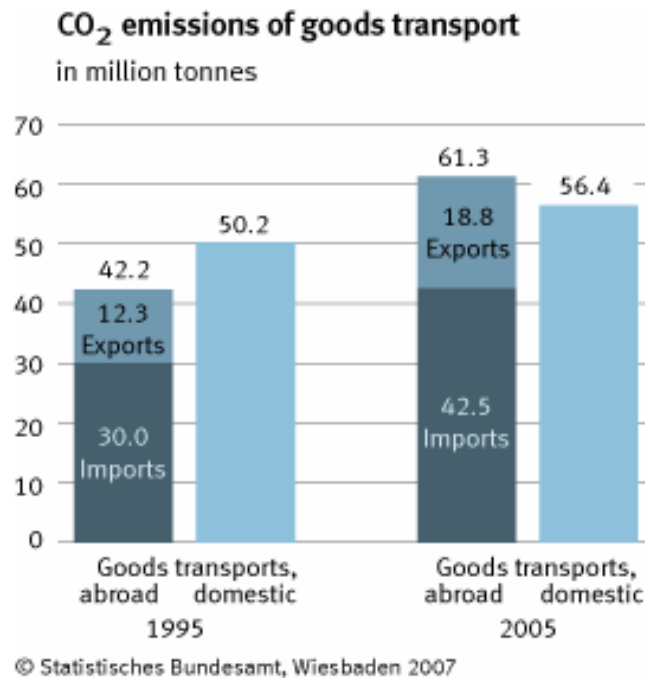
Total CO<sub>2</sub> emissions of export goods rose by about 32% from 334 million tonnes in 1995 to 441 million tonnes in 2004. The CO<sub>2</sub> emissions generated during the production of those goods within Germany increased by about 24% from 240 million tonnes to 298 million tonnes. As much as just under 43% of the emissions of the domestic production branches is due to the production of export goods. In 1995 it was just a good 33%. What is even much higher than the increase in domestic CO<sub>2</sub> emissions caused by export goods production is the increase in emissions of the intermediate imports required here. The latter rose by over 50% (from 94 million tonnes to 144 million tonnes).

The CO<sub>2</sub> emissions caused by the production of the imported goods increased, too, though less strongly than those of exports. The emissions of imports rose by 28 million tonnes from 309 million tonnes in 1995 to 337 million tonnes in 2004, i.e. by 9.0%. That increase is due especially to the increase in the volume (growth effect) of import goods.

From the production aspect (emissions generated by the total domestic production of goods, excluding emissions of households), both in 1995 and in 2004, more emissions were generated than when examined from the consumption aspect. The surplus of the production aspect increased considerably – from 24 million tonnes to 104 million tonnes. Altogether, CO<sub>2</sub> emissions caused by the production of consumption, investment and export goods (in Germany and abroad) were slightly up from 1,028 million tonnes (1995) to 1,037 million tonnes (2004). While the CO<sub>2</sub> emissions of exports rose by some 100 million tonnes, the emissions of domestic consumption (consumption and investment goods) were down by about 100 million tonnes.

### **Goods transport**

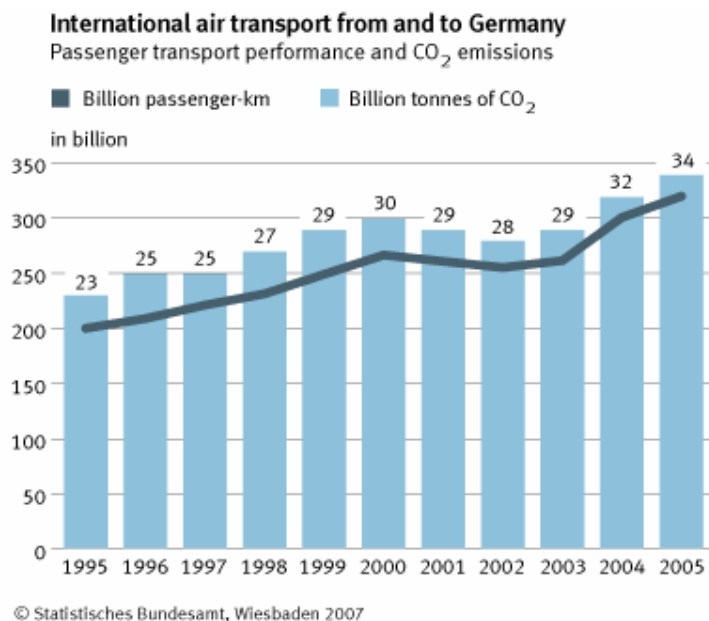
CO<sub>2</sub> emissions are caused not only by the production of imported and exported goods but also by their transport to Germany or to the countries of destination. According to calculations of environmental-economic accounting, approximately 61 million tonnes of direct CO<sub>2</sub> emissions were generated outside the territory by the transport of import and export goods in 2005. That was 5 million tonnes more than the domestic emissions from goods transport. CO<sub>2</sub> emissions of maritime transport and air transport in international goods transport have so far been included only in part in the national CO<sub>2</sub> balances according to the Kyoto Protocol.



About 70% of the CO<sub>2</sub> emissions that are generated by transporting foreign trade goods are caused by German imports, 30% by German exports (2005). Compared with that, the value of German exports in 2005 (EUR 897 billion) was markedly higher than that of imports (EUR 753 billion). What is relevant here is that goods at a low processing stage (e.g. raw materials) are usually imported in large quantities and over long distances, whereas exports refer to smaller amounts of high-quality goods usually transported over smaller distances.

### Air passenger transport

International air passenger transport from and to Germany, too, contributes considerably to the emission of greenhouse gases. Those emissions have so far been covered only rudimentarily in the national list of emissions.



International air passenger transport from and to Germany comprises all passenger flights from and to the 25 largest German airports. The transport volume rose from 199 billion passenger kilometres (pkm) in 1995 to 319 billion pkm in 2005. Compared with that, the number of national passenger flights is small and does not show a similarly strong increase. In 2005 the national passenger transport volume was 9.5 billion pkm, which was just about 3% of the international volume. The CO<sub>2</sub> emissions in international air transport from and to Germany rose strongly by 48% from 23.3 million tonnes (1995) to 34.5 million tonnes (2005). Following a marked slowdown in the increase in air passenger transport volume in 2002, caused by the terror attacks of 11 September 2001, the increase in flights and CO<sub>2</sub> emissions since 2003 has been comparable to that before 2001. When put in relation to CO<sub>2</sub> emissions, the national passenger flights are somewhat more important because of the higher average kerosene consumption at small distances: In 2005 the CO<sub>2</sub> emissions caused by national air transport amounted to 1.3 million tonnes, which is 3.8% of the emissions of international flights.