



Road transport has biggest long-term impact on global warming

Emissions from transport affect the climate both in the short and long term. New research explored the size and mix of emissions with short and long-lived effects and found that road transport has the largest effect on global mean temperature.

The study conducted under the EU-funded QUANTIFY¹ project compared the effects of current emissions from road, air, rail and shipping. The study explored the effects of emissions from a single year over different time periods and found that emissions from road transport have the most impact in the long term (20-100 years).

CO₂ is the only GHG that remains in the atmosphere for centuries. It has an influence on warming over relatively long time scales compared to other greenhouse gases (GHGs), such as ozone. The researchers calculated that high levels of CO₂ emitted as a result of fuel consumption means that road transport has the largest contribution to global temperature increases when 20 to 100 year timescales are considered.

In contrast, aviation has a large impact over a 10 year timescale because most of its effects result from short-lived gases, such as ozone, and induced cirrus clouds. Shipping illustrates this variation in the effects of emissions; SO₂ and NO_x emissions from shipping cause a cooling effect during the first 40 years, but on longer timescales CO₂ emissions from shipping cause a net warming effect. It should be noted that SO₂ and NO_x have other negative environmental impacts, such as causing acid rain.

The findings have important implications for policy as they demonstrate that the effectiveness of a GHG reduction strategy depends on its timescale. As an example, the authors give the EU's target of limiting global warming to within 2°C above preindustrial levels. If this limit is to be reached within the next four decades, then a 40-year timescale is relevant. Over this timescale, the researchers calculate that the warming effect of aviation is 15 per cent of that caused by road transport. For shipping this figure is 4 per cent and for rail, just 2 per cent.

The research suggests that policies seeking to reduce the impact of current emissions in the longer term should focus on reducing emissions from road transport. However, if emissions need to be reduced in the short term, then policies should target aviation.

The study is based on estimates of global mean temperature and offers a simple tool that could help policymakers to assess the effects of future emissions scenarios on global temperatures. Previous studies have used an approach called 'radiative forcing' (the difference between incoming and outgoing radiation), which the researchers suggest may be less easily applied in the context of making policy.

¹ QUANTIFY was supported by the European Commission under the Sixth Framework Programme. See: <http://www.pa.op.dlr.de/quantify/>

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