

# Emissions of air pollutants by air traffic

## Dimension - Environment

Associated Key Factor:

### Attitudes and implementation of principles relating to sustainable development

#### Data Source:

Co-operative Program on Long Range Transboundary Air Pollution

<http://webdab.emep.int/>

<http://www.emep.int>

#### General Availability:

Reporting unit: Gigagrams  
Reporting level: national or 50km x 50km grid  
Reporting period: annually  
Data available from 1980 to 2001

#### Availability by country:

1980 - 2001: EU-25

#### Data Source:

US Department of State

[www.state.gov/](http://www.state.gov/)

#### General Availability:

Reporting unit:  
Reporting level:  
Reporting period:  
Data available from to

#### The indicator:

Low-altitude aircraft emissions include nitrogen oxides, carbon monoxide, and hydrocarbons. They are converted into ozone and other compounds that comprise smog. While aircraft emissions are minor relative to road traffic, and even relative to other means of transporting goods, they are rising faster than other emission sources, with the growth of air travel and air freight. (Vedantham and Oppenheimer 1994, p 1). Global Air Pollution Aircraft emissions during high-altitude flight are a significant source of greenhouse gases, although both their quantity and their exact impact are still matters of considerable scientific debate (Vedantham and Oppenheimer 1994, pp. 4-13; Crayston, personal communication).

#### Description

Air transportation can threaten the environment in three important ways. Aircraft emissions at take-off and landing contribute to both conventional air pollution and global warming. Emissions during flight contribute to global warming.

Low-level pollution is emitted during the aircraft's landing and take-off cycle (LTO). An LTO comprises the descent or approach of the plane from 915 meters (3000 feet), its touchdown, landing run, taxi in, idle and shutdown, start-up and idle, checkout, taxi out, takeoff, and climb out to 915 meters.

#### How is it measured?

Emissions are based on accurate estimates (limited types of engines and engine powers and strict statistics on age of aircraft and trips are available for the estimates). All published statistics of air pollutants are based on complex estimation and modelling procedures and are subject to several sources of error. The calculations are typically based on activity or fuel consumption data multiplied by an emission factor. (for details see Europe's Environment Statistical compendium; Eurostat 1995)

#### What are the disadvantages of the Indicator?

Little is known about the quantity of aircraft emissions at these altitudes. Vedantham and Oppenheimer 1994 (pp. 35-40) have made some rough estimates based on anticipated fuel usage and the CO<sub>2</sub> and NO<sub>x</sub> content of jet fuel. Using their emission factors and an International Civil Aviation Organisation (ICAO) estimate that civil aviation consumes an average of 510 grams of fuel per tonne kilometre<sup>2</sup>, we can arrive at the following emission factors per ton-kilometre.

#### What is the policy relevance of the indicator?

Following the Air Quality Framework Directive (96/62/EC (1)), a number of limit values have been set for the atmospheric concentrations of main pollutants, including sulphur dioxide, nitrogen oxides, particulates (PM<sub>10</sub>), lead, carbon monoxide, benzene and ozone. Limits have been set at levels that should prevent or reduce harmful effects on health and ecosystems. Data is also officially submitted by the Parties to the CLRTAP Convention on Long Range Transboundary Air Pollutants to the EMEP project via the UNECE secretariat

#### The Indicator is relevant for the following pathways of the FORESIGHT FOR TRANSPORT exercise:

	Transport Impact	External Determining Variable	Intermediate Variable	Contextual Information
A reorientation of European transport policy	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increase of trade and infrastructure needs	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>