

1. ENVIRONMENTAL TRENDS

Particulate emissions and population exposure

Degraded air quality can have substantial economic and social consequences, from health costs and building restoration needs to reduced agricultural output, forest damage and a generally lower quality of life.

The concentration of pollutants in air raises major concerns as to its effects on human health. Human exposure is particularly high in urban areas where economic activities are concentrated. Causes of growing concern are concentrations of fine particulates, nitrogen dioxide (NO₂), toxic air pollutants, and ground-level ozone pollution episodes.

Definition

The indicators presented here refer to:

- Total emissions of small particulates from human activities, given as quantities of PM₁₀. They show changes in emissions over time, as well as emission intensities per capita.
- Small particulates (PM₁₀) refer to suspended particulates less than 10 microns in diameter (PM₁₀) that are capable of penetrating deep into the respiratory tract and causing significant health damage. Fine particulates smaller than 2.5 microns in diameter (PM_{2.5}) cause even more severe health effects because they penetrate deeper into the respiratory tract and because they are potentially more toxic and may include heavy metals and toxic organic substances.
- Population exposure to air pollution by small particulates is represented by urban-population weighted PM₁₀ levels in residential areas of cities with more than 100 000 residents. The estimates represent the average annual exposure level of the average urban resident to outdoor particulate matter.

When interpreting these indicators, it should be kept in mind that they provide only a partial view of air pollution problems. They should be complemented with information on ground-level ozone and on other air pollutants, and be read in connection with information on air emissions in urban areas, socio-demographic patterns, climatic conditions, and emission and fuel standards.

Overview

Over the past two decades, urban air quality has continued to improve slowly with respect to sulphur dioxide (SO₂) concentrations, and the estimated average annual exposure level of an average urban resident to particulate matter (PM₁₀) has been decreasing.

But acute ground-level ozone pollution episodes in both urban and rural areas, NO₂ concentrations, fine particulates (i.e. those smaller than 2.5 microns in diameter) and toxic air pollutants are of growing concern. This is largely due to the concentration of pollution sources in urban areas and to the increasing use of private vehicles for urban trips.

Some groups of the population are especially vulnerable to air pollution. The very young and the very old are more at risk than the remainder of the population.

The *OECD Environmental Outlook* projects that, if no new policies are implemented, urban air quality will continue to deteriorate globally, and that with increasing urbanisation and population ageing, outdoor air pollution will become the top cause of environment-related deaths by 2050.

Comparability

International data on particulate emissions are available for many but not all OECD countries. The details of estimation methods for emissions, the extent of sources and particles included in estimation, etc., may differ from one country to another. Though incomplete, data availability is best for PM₁₀. More needs to be done to estimate emissions of PM_{2.5}.

International data on exposure to air pollution exist but are scattered (EEA, World Bank, WHO, OECD). Efforts are needed to monitor or estimate overall population exposure and that of sensitive groups of the population.

Sources

OECD Environment Statistics (database), <http://dx.doi.org/10.1787/data-00598-en>.

European Monitoring and Evaluation Programme (EMEP) (2012), www.emep.int/.

World Bank, *World Development Indicators* (2012), <http://data.worldbank.org/data-catalog/world-development-indicators>.

Further information

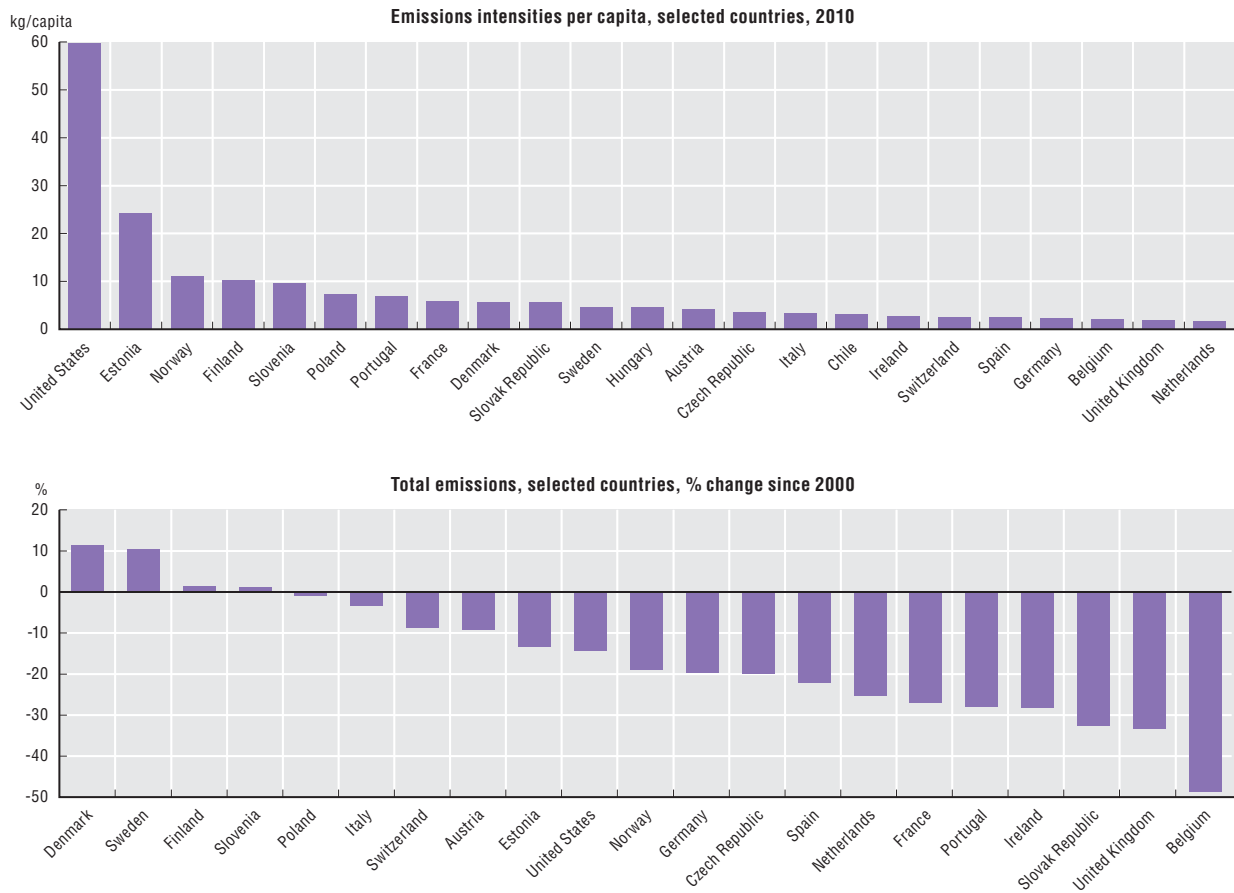
OECD (2012), *OECD Environmental Outlook to 2050: The Consequences of Inaction*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264122246-en>.

OECD (2011), *OECD Regions at a Glance 2011*, OECD Publishing, Paris, http://dx.doi.org/10.1787/reg_glance-2011-en.

UNECE (2012), "Convention on Long-Range Transboundary Air Pollution", www.unece.org/env/lrtap/multi_h1.html.

Information on data for Israel: <http://dx.doi.org/10.1787/888932315602>.

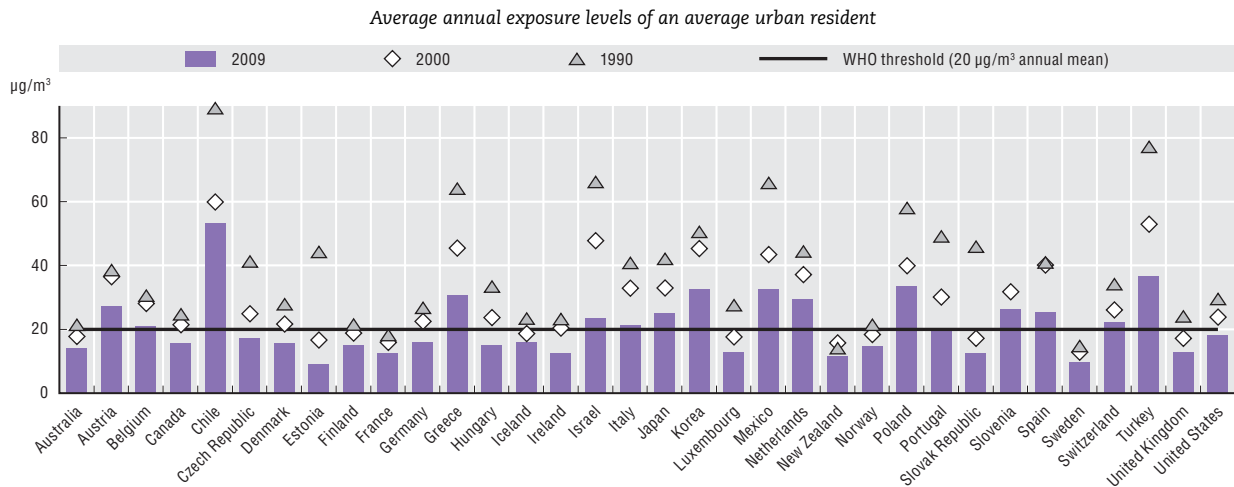
Figure 1.13. **Emissions of small particulates (PM₁₀)**



Source: European Monitoring and Evaluation Programme (EMEP) (2012); OECD Environment Statistics (database).

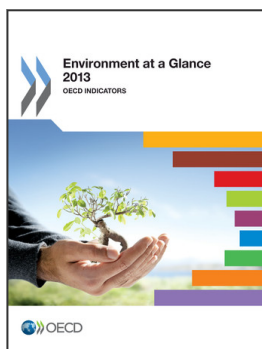
StatLink <http://dx.doi.org/10.1787/888932976878>

Figure 1.14. **Population exposure to small particulates (PM₁₀)**



Source: World Bank, World Development Indicators (2012) (database).

StatLink <http://dx.doi.org/10.1787/888932976897>



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