

SULPHUR AND NITROGEN EMISSIONS

Atmospheric pollutants from energy transformation and energy consumption, but also from industrial processes, are the main contributors to regional and local air pollution and raise concerns as to their effects on human health and ecosystems.

In the atmosphere, emissions of sulphur and nitrogen compounds are transformed into acidifying substances. When these substances reach the ground, acidification of soil, water and buildings arises. Soil acidification is one important factor causing forest damage; acidification of the aquatic environment may severely impair the life of plant and animal species.

Nitrogen oxides (NO_x) also contribute to ground-level ozone formation and are responsible for eutrophication, reduction in water quality and species richness. High concentrations of NO_x cause respiratory illnesses.

Definition

The indicators presented here refer to total emissions from human activities of sulphur oxides (SO_x) and nitrogen oxides (NO_x), given as quantities of SO₂ and NO₂ as well as emission intensities per capita.

It should be kept in mind that SO_x and NO_x emissions provide only a partial view of air pollution problems. They should be supplemented with information on the acidity of rain and snow, and the exceedance of critical loads in soil and water, which reflect the actual acidification of the environment, and with information on population exposure to air pollutants.

Comparability

International data on SO_x and NO_x emissions are available for almost all OECD countries. The details of estimation methods for emissions such as emission factors and reliability, extent of sources and pollutants included in estimation, etc., may differ from one country to another.

Overview

Compared to 1990, SO_x emissions have decreased significantly for the OECD as a whole as a combined result of structural changes in the economy, changes in energy demand through energy savings and fuel substitution, pollution control policies and technical progress.

NO_x emissions have decreased in the OECD overall since 1990, but less than SO_x emissions. Major progress in the early 1990s, particularly in OECD Europe, reflects changes in energy demand, pollution control policies and technical progress. However, these results have not compensated in all countries for steady growth in road traffic, fossil fuel use and other activities generating NO_x.

The high emission levels of SO_x for Iceland are due to SO_x emissions from geothermal energy which represented 79% of total emissions in 2011.

OECD totals do not include Chile and Mexico.

Sources

- European Monitoring and Evaluation Programme (EMEP) (2013), www.emep.int.
- OECD (2013), "Emissions of air pollutants", OECD Environment Statistics (database).
- United Nations Framework Convention on Climate Change (UNFCCC), "National Inventory Submissions", National Reports.

Further information

Analytical publications

- OECD (2012), *OECD Environmental Outlook*, OECD Publishing.
- OECD (2012), "Review of the OECD Environmental Strategy for the First Decade of the 21st Century", OECD, Paris.
- United Nations Economic Commission for Europe (UNECE) (1972), "Convention on Long-Range Transboundary Air Pollution", United Nations.

Statistical publications

- IEA (2013), *CO2 Emissions from Fuel Combustion*, OECD Publishing.

Methodological publications

- Intergovernmental Panel on Climate Change (IPCC) (1996), *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, Intergovernmental Panel on Climate Change (IPCC), London, UK.

Online databases

- OECD Environment Statistics.

Websites

- OECD Environmental Strategy, www.oecd.org/env/indicators-modelling-outlooks/oecdenvironmentalstrategy.htm



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Sulphur and nitrogen oxides emissions

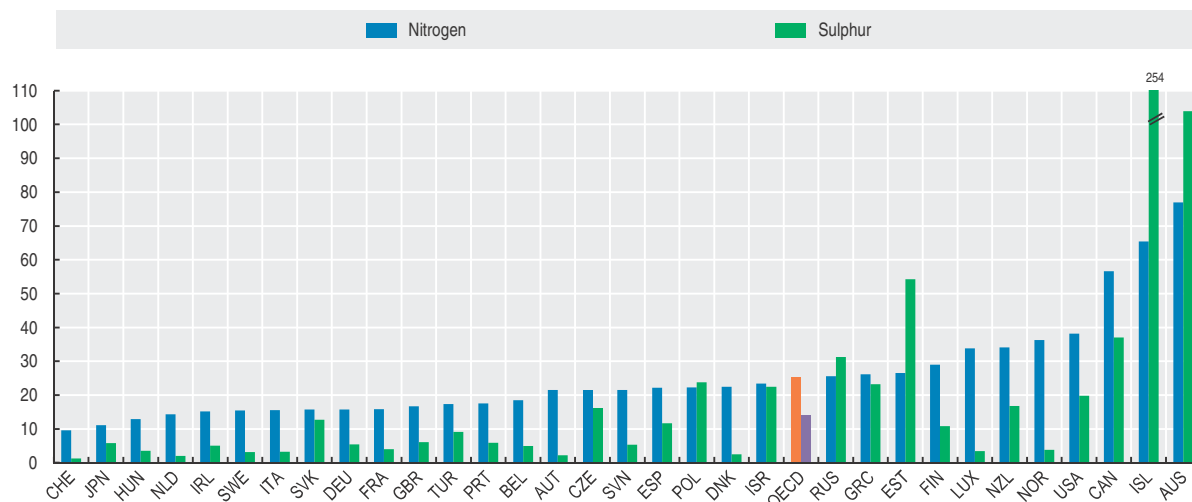
Thousand tonnes

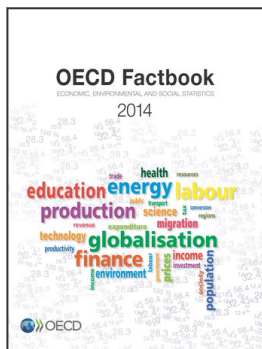
| | Sulphur oxides | | | | | | Nitrogen oxides | | | | | |
|--------------------|----------------|----------|----------|----------|----------|----------|-----------------|----------|----------|----------|----------|----------|
| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| Australia | 2 473.6 | 2 436.4 | 2 615.3 | 2 591.3 | 2 373.2 | 2 350.3 | 1 632.1 | 1 677.4 | 1 700.8 | 1 700.9 | 1 804.5 | 1 741.9 |
| Austria | 27.7 | 24.3 | 21.9 | 17.6 | 18.8 | 18.4 | 221.7 | 215.4 | 203.0 | 187.5 | 191.7 | 181.1 |
| Belgium | 133.7 | 124.1 | 96.9 | 75.4 | 62.7 | 54.5 | 268.9 | 258.0 | 232.6 | 201.9 | 214.1 | 203.3 |
| Canada | 1 970.1 | 1 904.2 | 1 733.8 | 1 480.5 | 1 370.6 | 1 276.3 | 2 306.1 | 2 270.8 | 2 140.9 | 2 029.3 | 2 066.1 | 1 951.3 |
| Chile | 893.0 | .. | .. | .. | .. | .. | 302.3 | .. | .. | .. | .. | .. |
| Czech Republic | 211.2 | 216.5 | 174.3 | 173.5 | 170.3 | 169.0 | 282.2 | 283.2 | 261.1 | 251.4 | 239.1 | 225.9 |
| Denmark | 28.3 | 25.6 | 20.1 | 15.0 | 14.8 | 13.9 | 187.0 | 173.2 | 155.2 | 136.3 | 133.0 | 124.9 |
| Estonia | 69.9 | 88.0 | 69.4 | 54.8 | 83.2 | 72.7 | 35.3 | 38.6 | 35.7 | 30.2 | 36.7 | 35.6 |
| Finland | 84.6 | 82.5 | 68.5 | 58.9 | 66.9 | 58.2 | 192.1 | 183.1 | 167.9 | 153.7 | 165.7 | 156.0 |
| France | 436.8 | 425.2 | 360.2 | 311.2 | 287.7 | 254.8 | 1 336.7 | 1 269.2 | 1 177.5 | 1 096.9 | 1 073.4 | 1 003.6 |
| Germany | 486.7 | 469.2 | 469.1 | 419.0 | 444.0 | 444.6 | 1 558.9 | 1 481.1 | 1 403.7 | 1 305.2 | 1 328.7 | 1 288.3 |
| Greece | 533.2 | 537.9 | 445.1 | 425.5 | 265.4 | 262.1 | 412.7 | 414.0 | 391.8 | 379.1 | 318.9 | 295.5 |
| Hungary | 118.2 | 84.4 | 87.6 | 79.7 | 32.3 | 34.9 | 207.8 | 189.9 | 183.4 | 166.9 | 162.5 | 129.2 |
| Iceland | 44.2 | 58.0 | 74.2 | 68.7 | 74.4 | 81.2 | 25.4 | 26.3 | 24.4 | 24.8 | 22.4 | 20.9 |
| Ireland | 61.1 | 55.4 | 45.4 | 32.4 | 26.1 | 23.3 | 121.9 | 119.4 | 108.1 | 85.9 | 78.1 | 69.6 |
| Israel | 212.6 | 198.9 | 183.8 | 167.8 | 164.0 | 174.2 | 201.4 | 201.4 | 196.3 | 183.9 | 186.1 | 182.0 |
| Italy | 383.0 | 339.8 | 284.6 | 233.0 | 215.2 | 195.5 | 1 163.8 | 1 123.1 | 1 056.9 | 987.0 | 955.3 | 935.6 |
| Japan | 826.1 | 810.0 | 784.7 | 766.7 | 755.5 | 747.5 | 1 706.1 | 1 661.7 | 1 596.0 | 1 525.3 | 1 477.1 | 1 422.1 |
| Korea | 446.5 | 402.5 | 418.0 | 387.7 | 401.7 | .. | 1 275.0 | 1 187.8 | 1 044.9 | 1 014.1 | 1 061.1 | .. |
| Luxembourg | 2.9 | 2.4 | 2.2 | 2.2 | 2.2 | 1.7 | 18.4 | 17.9 | 16.6 | 16.5 | 17.2 | 17.3 |
| Mexico | .. | .. | 2 241.2 | .. | .. | .. | .. | .. | 3 206.9 | .. | .. | .. |
| Netherlands | 62.8 | 59.3 | 50.0 | 36.8 | 33.5 | 33.4 | 304.6 | 289.2 | 280.8 | 259.7 | 255.6 | 239.6 |
| New Zealand | 89.7 | 82.2 | 86.3 | 74.3 | 74.3 | 73.9 | 161.3 | 158.7 | 159.7 | 149.4 | 147.7 | 150.3 |
| Norway | 21.1 | 20.1 | 20.0 | 15.4 | 19.5 | 18.8 | 202.7 | 205.6 | 193.5 | 182.9 | 185.6 | 179.7 |
| Poland | 1 310.8 | 1 223.1 | 1 001.1 | 866.5 | 950.4 | 910.0 | 891.1 | 868.0 | 830.0 | 790.7 | 863.4 | 850.7 |
| Portugal | 166.8 | 159.5 | 115.5 | 79.5 | 70.4 | 62.3 | 254.3 | 247.6 | 221.3 | 209.5 | 196.1 | 185.6 |
| Slovak Republic | 87.8 | 70.6 | 69.4 | 64.1 | 69.4 | 68.5 | 96.4 | 95.6 | 93.6 | 84.2 | 88.6 | 85.0 |
| Slovenia | 16.4 | 14.5 | 12.7 | 10.4 | 9.8 | 10.9 | 46.9 | 47.5 | 52.4 | 45.1 | 44.4 | 44.3 |
| Spain | 1 215.4 | 1 209.2 | 565.4 | 519.6 | 488.2 | 539.5 | 1 359.8 | 1 359.2 | 1 177.4 | 1 062.5 | 984.2 | 1 021.0 |
| Sweden | 35.7 | 32.4 | 30.2 | 28.6 | 31.7 | 29.7 | 176.3 | 170.4 | 162.5 | 151.7 | 154.1 | 146.2 |
| Switzerland | 15.1 | 13.1 | 13.6 | 11.7 | 12.0 | 10.2 | 91.2 | 88.3 | 86.6 | 82.2 | 81.1 | 76.1 |
| Turkey | 974.3 | 1 004.3 | 1 071.6 | 806.5 | 462.8 | 673.4 | 1 113.4 | 1 194.5 | 1 288.7 | 1 425.9 | 1 280.6 | 1 286.7 |
| United Kingdom | 649.7 | 567.4 | 488.3 | 394.7 | 406.6 | 378.4 | 1 513.6 | 1 447.8 | 1 309.8 | 1 139.9 | 1 101.9 | 1 027.9 |
| United States | 12 042.6 | 10 685.4 | 9 328.2 | 7 455.8 | 6 811.5 | 6 167.7 | 16 634.0 | 16 074.2 | 15 514.4 | 14 140.1 | 13 264.1 | 11 899.0 |
| EU 28 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| OECD | 25 238.6 | 23 426.3 | 20 807.7 | 17 724.8 | 16 269.1 | 15 586.7 | 35 999.2 | 35 038.1 | 33 467.4 | 31 200.4 | 30 179.0 | 28 259.1 |
| Brazil | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| China | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| India | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Indonesia | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Russian Federation | 4 904.0 | 4 709.0 | 4 675.0 | 4 512.0 | 4 512.0 | 4 462.0 | 3 678.0 | 3 764.0 | 3 809.0 | 3 669.0 | 3 735.0 | 3 562.0 |
| South Africa | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

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Kilograms per capita, 2011 or latest available year


 StatLink <http://dx.doi.org/10.1787/888933026126>



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