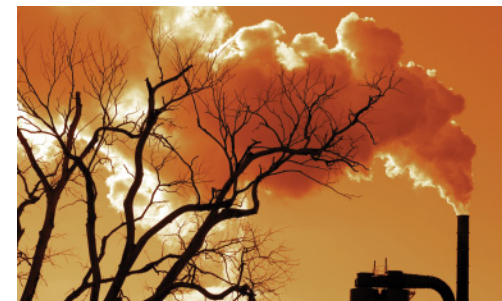


ATMOSPHERE & AIR POLLUTION

Developed countries' efforts to address air pollution beginning in the 1970s have resulted in the substantial reduction of serious pollutants. Due to knowledge of the impacts of air pollution and the availability of pollution control technologies, developing countries are "turning the corner" on air pollution sooner. Nonetheless, the quality of air in many cities in developing countries is far below WHO recommendations.



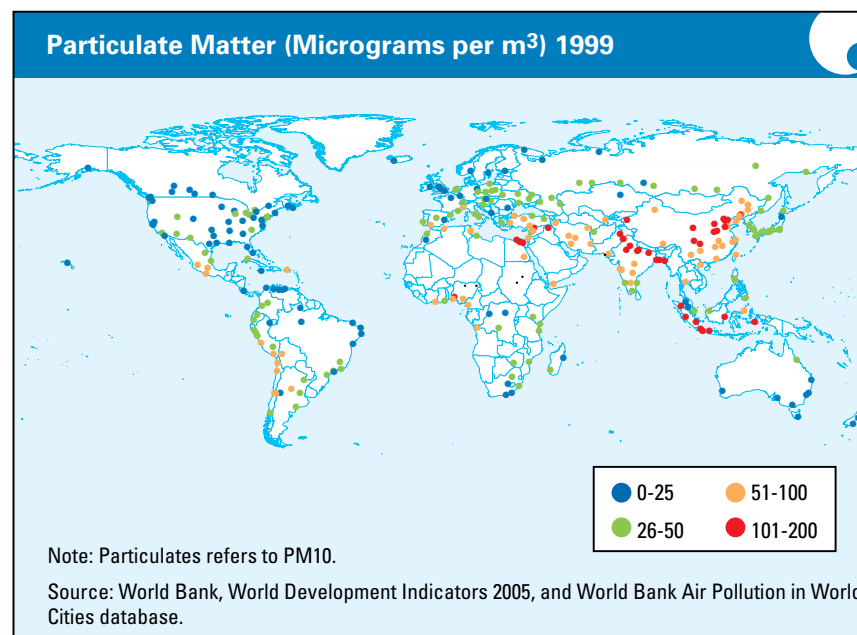
Particulate air pollution has been reduced worldwide but remains high in large cities in developing countries

The main human sources of particulate matter are power plants, industry, vehicles, household cooking and heating fuels, construction and waste incinerators. Particularly high concentrations of suspended particulates are found in countries relying on coal for energy, notably in Asia.

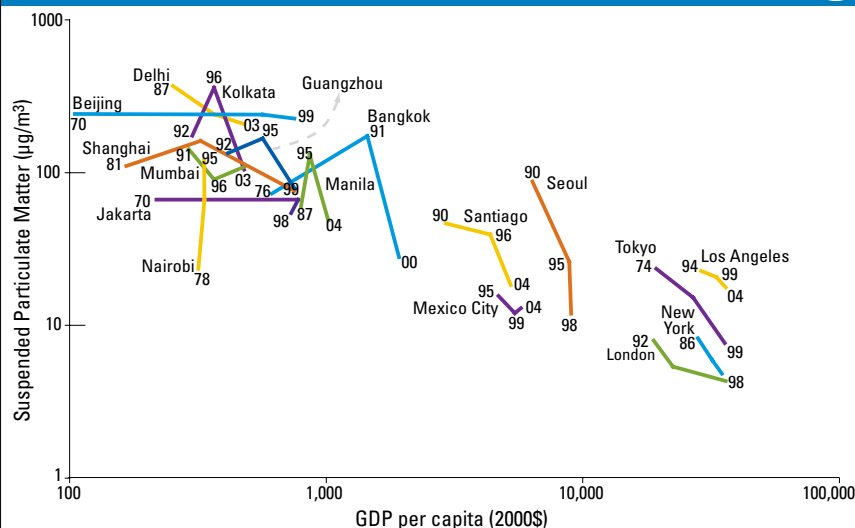
High levels of airborne particulates cause respiratory diseases, as well as inhibiting plant growth and requiring costly filtration equipment in certain high-tech manufacturing industries.¹⁹ The WHO does not set guideline values for particulates because there is no evident threshold below which there are no adverse health effects. Long-term exposure to particulates appears to be associated with a reduction of life expectancy of up to 2 years and higher prevalence of bronchitis and reduced lung function in children.²⁰

Since about 1970 in developed countries, and more recently in developing countries, particulate air pollution has been reduced by particulate control systems on power plants and industrial facilities, use of cleaner fuels such as natural gas, and requirements for catalytic converters on vehicles. Nonetheless, particulate concentrations are still very high in large cities in developing countries whose economies are growing yet are still in the process of introducing pollution control measures.²¹

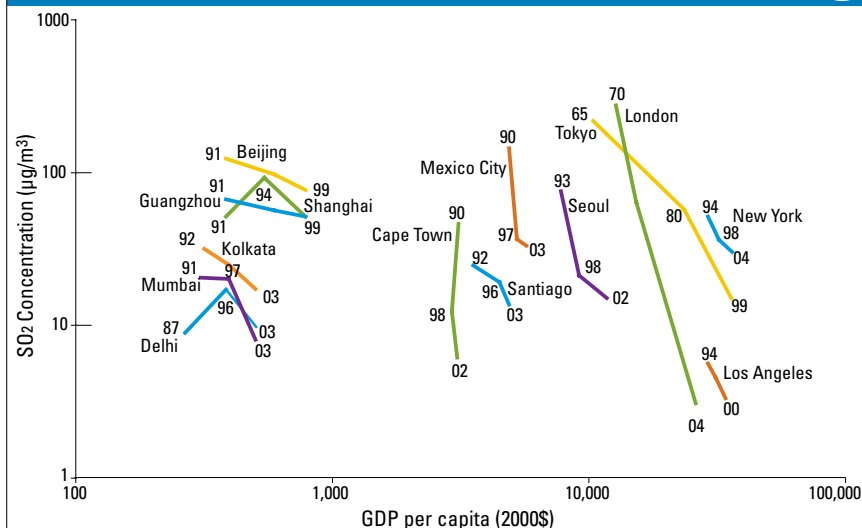
Despite some improvement, in many Asian cities air pollution levels are an order of magnitude higher than in major developed country cities.



Particulate Air Pollution



Sulphur Dioxide Pollution

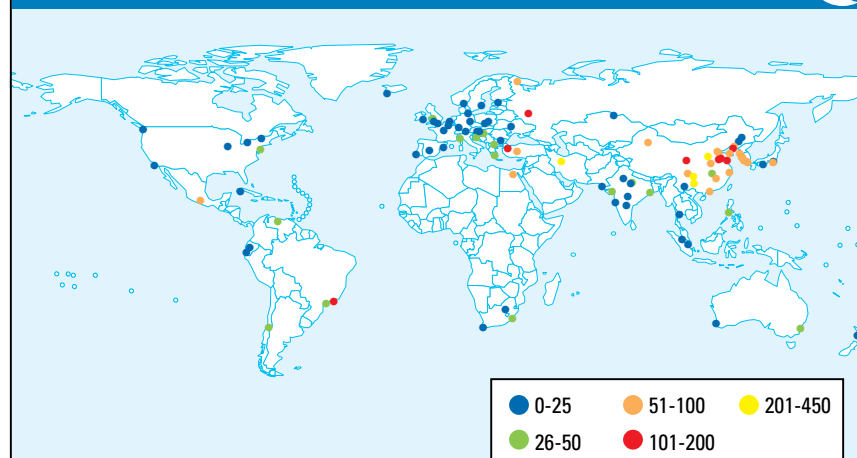


Global SO₂ emissions have decreased, but concentrations remain above the WHO threshold in many cities in developing countries

Sulfur dioxide (SO₂) emissions result from the combustion of sulphur-containing coal and oil for power generation, industry, motor vehicles and domestic cooking and heating. SO₂ causes respiratory illness as well as acid rain that affects natural ecosystems and buildings. Since the 1970s, developed countries have reduced emissions from power plants and industrial boilers, introduced catalytic converters to reduce SO₂ emissions from motor vehicles, and reduced sulphur in motor vehicle fuel. As a result, cities such as London and Los Angeles, once heavily polluted, now show concentrations well below the WHO recommended threshold.²²

In Eastern Europe, economic restructuring following the end of central planning resulted in the closing of many energy-inefficient and polluting facilities and the introduction of stricter environmental standards and cleaner technologies, particularly in new members of the EU.²³

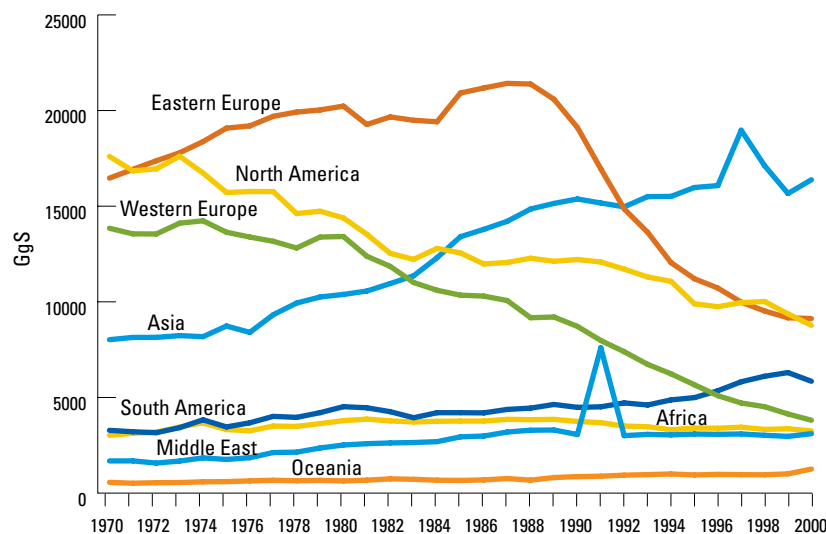
Sulphur Dioxide (Micrograms per m³) 1995-2001



In Asia SO₂ emissions have increased steadily since the mid 1970s due to the combustion of coal and high-sulphur oil that is fueling the rapid growth of emerging economies;²⁴ it is too early to know whether the apparent recent downturn in emissions will be sustained.

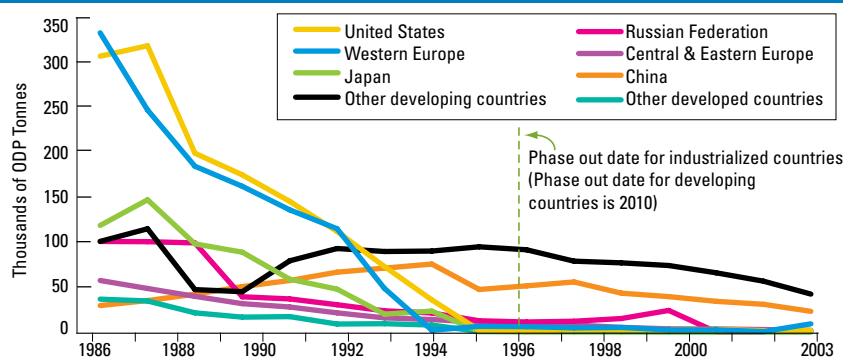


Regional Sulphur Emissions



Source: Stern, D. 2005.

Consumption of Ozone Depleting CFCs



Note: ODP is Ozone depleting potential.

Source: UNEP Ozone Secretariat.

Global action in phasing out CFCs and leaded gasoline is protecting the ozone layer and reducing airborne lead pollution.

Concerted global action guided by a multilateral agreement has been highly effective in phasing out CFCs

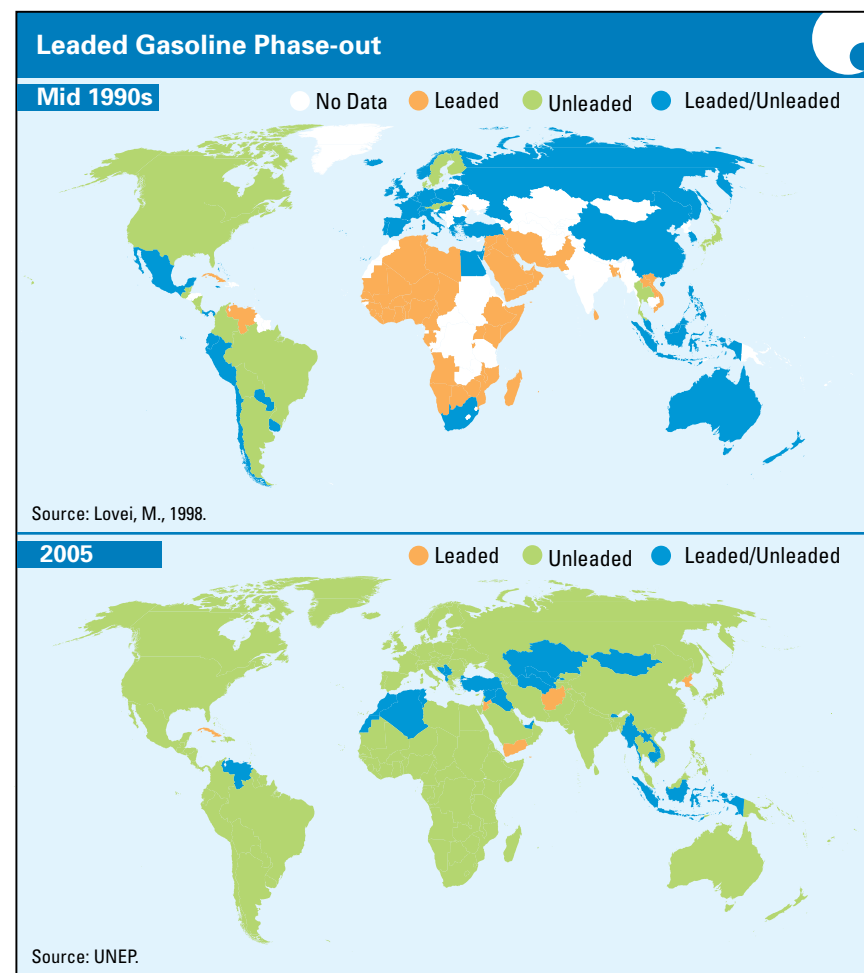
Since 1985, when depletion of the stratospheric ozone layer that protects the Earth from damaging ultraviolet radiation was recognized as an important problem, efforts have been made to reduce and eliminate the use of chlorofluorocarbons (CFCs) and other ozone depleting substances (ODS). The Montreal Protocol on Substances that Deplete the Ozone Layer, adopted in 1987 and strengthened in a number of subsequent amendments, called for the phase-out of the use of CFCs in developed countries by 1996 and in developing countries by 2010. A Multilateral Fund was established in 1990 to assist developing countries in phasing out ODS with the Global Environment Facility supporting phase-out in the economies in transition.

By 2003, developed countries had reduced consumption of CFCs by over 99% and developing countries by more than 50%. Taking into account the long delay between surface emission and diffusion of CFCs into the upper atmosphere and their long residence time in the stratosphere, the CFC concentration in the stratospheric ozone layer is expected to decline to pre-1980 levels in the middle of this century.²⁵

However, some challenges remain. Some of the chemicals replacing CFCs are also ozone depleting substances although less damaging than CFCs, and there are difficulties in replacing the ODS methyl bromide.

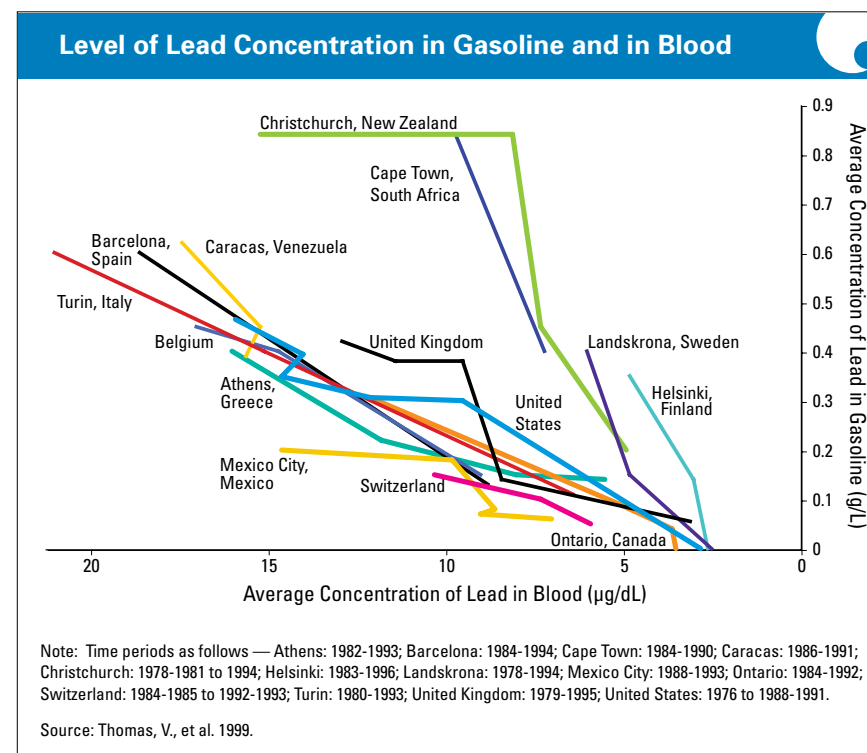
Airborne lead is declining in all regions as leaded gasoline is phased out

Airborne lead pollution increased over much of the 20th century with increasing motorization and the use of leaded fuel. Lead additives were used from the 1930s until the 1970s, when the recognition of serious health effects, especially in children, eventually led to a ban in many countries. The phase-out of lead in gasoline also allowed the introduction of catalytic converters, the most cost-effective method of reducing harmful exhaust emissions. As a result of the phase-out of leaded gasoline, there have been substantial drops in concentrations of lead in the air and in the human body.²⁶



The switch to unleaded gasoline has sharply reduced blood lead levels

The costs of leaded gasoline phase out are modest and the health benefits substantial. The political commitment of government is a key factor along with industry cooperation, and the recent action by sub-Saharan African governments to eliminate lead from gasoline as of 1 January 2006 is noteworthy. All high-income countries have now phased out leaded gasoline, as have most countries in Latin America. However, in Asia-Pacific, Eastern Europe and the Middle East, a number of countries still sell leaded gasoline as well as unleaded. In Eastern Europe, most countries have recently banned leaded gasoline or will do so in 2006.^{27, 28}



Note: In some instance, a country may be declared unleaded (as leaded gasoline is no longer produced) although the remaining stocks of leaded gasoline are still being sold. This is currently the case of some African countries. In addition, some countries with a very small percentage of leaded fuel in the market declare themselves unleaded and are labeled as such.