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Air quality in Europe: pollution levels have dropped, but health concerns remain

Some progress has been made towards improving air quality in Europe with levels of sulphur dioxide, carbon monoxide and benzene all falling substantially in recent years, a new report from the European Environment Agency (EEA) concludes. However, threats to human health and ecosystems remain, and urban citizens' exposure to high levels of particulate matter (PM) and ozone are a particular concern.

Air pollution in Europe causes ill health, damage to the environment and has a significant impact on the economy. In this report, the EEA brings together data regarding trends in key air pollutants in the EU between 2002 and 2011.

PM — very small airborne particles, mainly the result of fuel combustion — causes the greatest concern with regards to human health, and exposure to this has been linked to lung, heart and nervous system disease, as well as cancer. Emissions of PM decreased by 14-16% during 2002-2011 and emissions of precursor gases, which can react in the atmosphere to form PM, also fell. This did result in a slight reduction of background levels of PM pollution, however, the report concludes that 22-44% of Europe's urban population remain exposed to concentrations of PM above legally-binding EU limits.

Ground-level ozone is a toxic gas linked to lung diseases and is formed by reactions of precursor gases, such as carbon monoxide. While emissions of precursors fell by between 15 and 32%, during 2002-2011, ozone concentrations decreased only slightly, and between 14 and 65% (this range partly reflects variations caused by atmospheric conditions which differ between years) of Europe's urban population were exposed to levels above EU targets. The researchers also note that ozone is causing widespread damage to natural ecosystems and reductions in crop yields.

Nitrogen oxides (NO_x) and sulphur dioxide are noted by the report to cause significant damage to ecosystems and loss of biodiversity, with NO_x causing eutrophication and sulphur dioxide leading to acidification. They can also damage human health and both have been linked to respiratory problems.

The area of natural habitat affected by NO_x dropped by 23% between 1990 and 2010. However, research shows that monitoring stations near traffic show reductions of only 8% between 2002 and 2011. This may reflect the increase in diesel cars during this time, as they emit more NO_x than their petrol counterparts. Atmospheric concentrations of sulphur dioxide showed substantial improvement during 2002-2011, with reductions of 33% due to Member States' emissions falling by a half.

Carbon monoxide levels also fell, with emissions reductions of 32% leading to a 35% reduction in atmospheric levels over the study period. Reviewing heavy metals, the report finds that levels of arsenic, cadmium, nickel and lead were generally low across Europe. However, 54% of sensitive ecosystems, in terms of area, suffered from mercury levels which exceeded critical loads in 2010.

Finally, by 2011, levels of benzene, a carcinogenic chemical found in exhaust, were below European limits at almost all monitoring stations. However, emissions of a similar carcinogenic chemical benzo(a)pyrene, which is emitted by traffic (diesel cars in particular) and wood and coal burning, have increased by 11%, and the authors of the report warn that increasing domestic combustion across Europe is likely to cause further increases.