

# Science for Environment Policy

## The cost of air pollution impacts on health

**Researchers** have developed a new model to assess the health-related external costs arising from air pollution from ten major emission sectors. Applying the model at national and Europe-wide levels, they suggested that the major contributors to costs were industrial power production, agriculture, road traffic and domestic combustion.

**In recent years**, policy action to reduce emissions has targeted sources near towns and cities, encouraging measures such as installing filters on power plants and vehicles. However, [air pollution](#) can be transported in the atmosphere over thousands of kilometres and harmful compounds can be produced by chemical reactions 'along the way' rather than at source.

This study examined the contribution from ten major sectors that emit pollutants, such as agriculture and road traffic. It investigated their impact at a national level (in Denmark) and at a European level (including EU-27 and parts of Russia and Ukraine). It then quantified their impact on human [health](#) and the resulting external costs. External costs are those that occur when a certain activity imposes a cost (in this case through pollution damage) on a third party (the society).

Unlike previous approaches, the model applied a tagging method that considers the transport of emissions and the possible production of other harmful compounds *en route*. Over 58 chemical compounds were considered and eight classes of particulate matter. Exposure levels were estimated using population data and impacts on human health were measured in 'years of life lost', among other measurements, which were then converted into economic costs.

The study estimated that Danish emissions in 2000 caused approximately 49,000 years of life lost, Europe-wide. Total European emissions resulted in 7.2 million years of life lost yearly. This results in yearly health-related external costs caused by the air pollution from European emissions of €766 billion within Europe, and €3.7 billion in Denmark alone. The total health-related external costs caused by air pollution from Danish emissions were €4.9 billion in Europe and €0.82 billion in Denmark.

Considering European emissions in 2000, the sectors contributing most to the Europe-wide health cost were industrial power production (24% of costs), agriculture (24% of costs) and road transport (18% of costs). The emission sectors within Denmark that contributed the most to costs in Denmark alone were agriculture (39% of costs – caused by the chemical transformation of manure into harmful particles) and road transport (19% of costs), but domestic combustion was also a major contributor (16% of costs).

The results demonstrate that air pollution presents a serious problem to human health and has substantial related economic costs. Emission sources (such as power plants and road traffic) contribute significant health-related problems. The authors note that in Denmark, coal-fired plants are heavily regulated and contribute only around 6% to total national emissions. However, for the whole of Europe (where regulation is not always as restrictive as in Denmark) power plants contribute 24%. This indicates more can be done to reduce emissions from power plants in Europe.

Another important finding is that other less heavily-regulated sources of air pollution, such as agriculture and domestic combustion, also have significant impacts, at both a national and European level.

The authors suggest that future research should expand cost estimates of air pollution to include those related to the environment and climate. In addition, the interactions between emissions from different sources should be assessed.



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