

HEALTH IMPACT ASSESSMENT OF MEASURES THAT REDUCE PM10 AND PM2.5 CONCENTRATIONS IN GERMANY

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Background and Aims: The most important environmental health risks in Europe are caused by exposure to fine particles. Current PM10 and PM2.5 concentrations result in an average reduction of life expectation of the European population of a few (ca 3 to 5) months. Furthermore the PM10 thresholds are frequently exceeded. Thus a further reduction of the fine particle concentration is necessary. However this should be done with efficient measures, i.e. measures with the lowest costs per unit of health risk reduced (e.g. expressed in DALYs – disability adjusted life years). The aim of this paper is to identify and assess measures applied in Germany to reduce health risks.

Methods: The 'impact pathway approach' is used to estimate health effects of the measures. First the change in emissions of primary PM10/PM2.5 and of PM precursors (NO_x, SO₂, NH₃, VOC) caused by the measures is determined. Then using an atmospheric model the concentration of PM10 and PM2.5 is calculated for Europe. The increase in concentration in cities is taken into account by estimating an urban increment. The resulting concentration is then used to estimate different health impacts (e.g. years of life lost, cases of chronic bronchitis, respiratory hospital admissions and many others). These health endpoints are then aggregated to DALYs. For each measure the costs per DALY saved are calculated.

Results: Around 40 measures are ranked according to their efficiency and effectiveness. Important measures are identified in the agricultural sector, e.g. improved application and amount of fertilizer and manure, filter in hog houses or less animal protein (meat) consumption; and in the industrial sector, e.g. improved dust filters and DENOX plants.

Conclusions: Results show the usefulness of health impact assessments for supporting environmental policy decisions. However the results depend on assumptions about the relative toxicity of the different species contained in PM, thus further research is needed.