PRESS KIT

Air Pollution Valuation Method

The valuation considers the impacts of six air pollutants: ammonia (NH_3), particulates (PM_{10}), sulphur dioxide (SO_2), nitrogen oxides (NOx), volatile organic compounds (VOCs)[1] and carbon monoxide (CO). These pollutants are associated with various, sometimes overlapping, external costs. Five types of external cost were included in the valuation: negative health effects, reduced crop yields, corrosion of materials, effects on timber, and acidification of waterways. Some of the effects are caused directly by the pollutant emitted (e.g. health impacts of PM_{10}) and some effects are caused by secondary pollutants formed as a result of chemical reactions in the atmosphere (e.g. SO_2 forming sulphate compounds which contribute to smog).

Literature reviews were carried out to derive the average level of each type of effect associated with a tonne of that pollutant (e.g. the reduction in crop yield from a tonne of NOx emission). Local market values were applied to impacts on market goods such as crops, materials and timber. For largely non-market costs such as health impacts, values were based on averages derived from 'willingness to pay' studies. Where necessary, these averages were then adjusted based on relevant local factors (e.g. purchasing power parity for willingness to pay analyses, population density for health impacts).

PM_{10} has local impacts on human health and the location and height of the emissions has a significant impact. The number of effects associated with each tonne of PM_{10} emissions was adjusted based on which type of sector was emitting the pollutant. For example emissions of PM_{10} from electricity generation generally cause less harm to human health than emissions from the transport sector because of the average height at which the emissions occur (high stacks of a power station,

[1] VOCs valuation only considers their outdoor environmental impacts at this stage.

compared to ground level emissions from transport) and the average local population density. For the other pollutants, where local factors are less important, average impacts from the literature were adjusted based on regional population densities.

Carbon monoxide effects were found to be small, accounting for less than 0.5% of the total cost of air pollution and an average global external cost was derived from the literature (approximately €3).

The valuation of acidification effects on waterways uses observed clean up costs as a proxy for the value placed on non-acidified water; transferring these from site to site where necessary. It is common practice to use such cost based approaches in the absence of welfare derived alternatives, but worth noting that the approach does not therefore explicitly value reduced fish catches, lost recreational value or other impacts of acid rain.

Air pollution is known to have other moderate impacts on the services provided by natural ecosystems and these were also not explicitly valued in this study. The literature suggests, however, that the value of these indirect impacts on humans is dwarfed by the value of the more direct impacts captured in this analysis. The dispersion of air pollutants is unpredictable and non-uniform and modelling this dispersion was beyond the scope of this study, making estimation of costs associated with geographical location difficult. Taking averages from existing regional studies, each of which modelled air dispersion, should help to counteract this element of uncertainty. There are also significant non-linearities associated with some of the chemical reactions that the pollutants undergo in the atmosphere, which could have unpredictable effects on costs and may not be fully captured in an analysis based on average values.

The table below shows the weighted average values (per tonne) for each pollutant according to the geographical breakdown of each product value chain. The table also shows the range of values across the locations (values vary according to location and sector as described above).

Air Pollutant	**Weighted Average Value per tonne (€)**	**Range (€)**
Particulates	21,417	1,390 – 207,455
Ammonia	1,407	1,226 – 6,135
Sulphur dioxide	2,789	847 – 6,948
Nitrogen oxides	1,454	718 – 3,439
Volatile Organic Compounds	1,065	460 – 2,162