Informal document 2
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POSSIBILITIES FOR SETTING ASPIRATIONAL TARGETS FOR 2050

Prepared by the Chair of the Task Force on Integrated Assessment Modelling

During its forty-third session in March 2009 the Working Group on Strategies and Review discussed technical possibilities of setting non-binding national emission targets for 2050. This informal document describes what can be done and what can not be done.

1. We know the distance (gap) between current exposure/deposition levels and the no-effect levels and critical loads.

2. Assuming that critical loads and levels are not significantly different over Europe, and with (bold) assumptions on the future background levels, we can make rough estimates of the average emission reductions that are required over Europe, e.g. 40–60% reduction of sulphur and 70–90% reduction of nitrogen.

3. As we do not know emission control cost curves for 2050, we cannot calculate a least cost solution.

4. If the effectiveness of control measures would be the criterion, this would lead to removing emissions close to the places where impacts occur. For local problems higher emission reductions are needed near the places where these problems occur, e.g., more emission reduction of Particulate matter (PM) would be needed in urban than in rural areas.

5. For more widely dispersed problems, e.g. acidification, such reasoning would suggest a relatively larger reduction in Scandinavia, although emission densities are already low there.

6. Using a source-receptor matrix, in principle we might calculate how the distribution of emission reductions over countries looks like that would meet critical loads and levels with minimum total emission reduction over Europe. Without information on (increasing) costs for further emission controls, such a least-reduction optimization would reduce emissions close to the problem areas (which have the largest impact per ton of emissions) to zero. While this is solution formally correct, this is an unhelpful result from the optimization exercise. In addition, uncertainties about the accuracy of source-receptor relationships increase at extremely low pollution levels.

7. It might be more useful to derive from step 2 the spatial emission densities that correspond to critical loads and levels and estimate country-specific emission reduction requirements that would meet the target emission densities in each country. In such a case more measures would be needed in urbanized and industrialized areas and areas with high cattle densities.

Caveats

A focus on meeting no-effect levels for air pollution does not exclude that ecosystems can experience damage due to climate change. Would it make sense to put ‘all’ money on the protection of ecosystems against acidification, eutrophication or ozone exposure, without looking at the possible effects of climate change? A balanced approach could help to get a better possible outcome. There might be trade-offs in the timing of emission reductions. For instance a rapid decrease in sulphur emissions might lead to a fast recovery of ecosystems, but also to a higher risk of damage due to a fast increase in temperatures. A slower decrease in sulphur emissions could lead to a better adaptation of ecosystems to temperature rise. An integrated approach of ecosystem effects due to air pollution and climate change would be required to find the right balance in the long run.
