

12.1.6/3

14 April 1998

**UNICE OZONE SHADOW GROUP COMMENTS ON  
IIASA 4<sup>th</sup> INTERIM REPORT AND ADDENDUM  
“COST-EFFECTIVE CONTROL OF ACIDIFICATION  
AND GROUND-LEVEL OZONE”  
(February 1998)**

UNICE notes that the report reviews different alternative principles for determining interim targets on the way towards the full achievement of environmental long-term goals based on the WHO-Europe Guidelines and assesses the implications of these alternative concepts for the distribution of national emission reduction requirements and environmental benefits. It also identifies a range of possible interim targets and explores the robustness of the resulting emission reductions implied by these illustrative targets.

UNICE values in the fundamental problem with the modelling approach used in that it uses the WHO-Europe Guidelines values as the basis for deriving the various emission reduction scenarios. Our concerns about the justification for these guidelines and their direct adoption as targets have been explained in detail in previous meetings and correspondence with the Commission.

We have stated from the outset that UNICE is also extremely concerned about the lack of transparency in the development of the ozone strategy. This is particularly because the IIASA ozone model remains unavailable to participants. We recognise that the problem arises (at least in part) because of the unreasonable pressure being placed upon the modellers by the unrealistic timetable for developing a robust Commission proposal. We are grateful for the efforts of the staff at IIASA and DGXI in trying to provide as much information as possible, despite these inordinate pressures. Even so, the fact remains that the level of transparency is still unsatisfactory and we believe that this must be resolved for all participants.

This means that, despite all the efforts and hard work, UNICE cannot express its support for the modelling work so far. Like many of the participants at the recent AQFD Steering Group meeting (2-3 April 1998), UNICE reserves its position. However, in the spirit of

co-operation we have provided some general comments which we hope will be of some use, despite our fundamental reservations.

In the meantime, UNICE strongly requests access to the current UNIX version of the model. UNICE is very keen to resolve any barriers there may be to this being arranged and would be happy to talk to the Commission or IIASA on a bilateral basis in this regard. UNICE's request is made in the spirit of transparency and co-operation.

### **General Approach to Target Setting**

UNICE note that two alternative approaches to target setting are explored :

1. improvement of the situation in areas with the largest ozone problems (hot-spots), e.g. by establishing uniform target exposure values to be achieved everywhere (3 different ceiling targets are analysed); and
2. general progress towards the long-term targets, e.g. by postulating uniform relative improvements in relation to the situation in a base year (3 different gap closure targets are analysed).

UNICE believes that, in choosing whether either one of these approaches or a combined approach should be adopted, it is important to examine the overall effect on those air quality parameters that are relevant to the environmental impacts. This is particularly the case for health impacts where the WHO-Europe Eastbourne Workshop clearly stated that it is both the degree and period of exposure that is important in determining the health impacts.

Attainment of predicted  $160 \mu\text{g}/\text{m}^3$  (80ppb.) 8-hr concentrations should be explored as the basis for an EU strategy. As this seems impossible in the time available, sufficient time should be given to explore AOT80. In all cases, sufficient time should be allowed to translate AOT improvements into data that is directly relevant to health impact evaluation. The Addendum to the 4th Interim Report helps to a certain extent in this regard – see comments below.

### **Further Work**

The following work items would improve transparency and/or robustness :

- joint optimisation taking into account ozone, acidification and eutrophication abatement strategy - **this needs to be done before the Commission develops proposals for ozone**;
- exploration of alternative agricultural scenarios (including likely changes to livestock numbers);
- incorporation of improved energy scenarios;

- exploration of the role of non-EU countries;
- exploration of alternative definitions of environmental targets (especially an alternative to the population exposure index);
- update emissions using CORINAIR'94;
- “extended uncertainty and robustness analyses to derive solid conclusions from the model taking into account the gaps and imperfections of the available databases and models”;
- comprehensive documentation of the revised databases, following the numerous changes made recently;
- examination of gap closure targets for AOT80 (relevant to the US 8-hr standard) and AOT90 (relevant to the A/O1-hr target);
- exploration of an integrated gap closure approach (reducing both the magnitude and duration of exceedances of AOT values) across all 5 years;
- presentation of the full results for D1/1, D1/3, D2/1 and D2/3;
- analysis of the implications of purely health-based strategies on ecosystem protection;
- completion of Tables 6.10, 7.7, and 8.1.

### **Compensation Mechanism**

UNICE notes the introduction of a ‘compensation mechanism’ allowing the optimisation to exceed environmental targets at single (150x150 km) grid cells provided some other constraint is justified. UNICE can understand the introduction of such a mechanism to avoid modelling artifacts due to the chance placement of the EMEP grid, for instance. However, UNICE is concerned that the compensation method employed, so far, appears likely to be inequitable in its treatment of small countries versus large countries and of people living in different parts of the same country. See also comment on population exposure below.

The Commission might wish to consider giving the different EU-15 countries the option to choose which environmental issue (or indeed ozone target – health based versus ecosystem based) is of greatest priority to that country and hence allowing compensation between one environmental issue/target and another on a country by country basis.

### **Transport Module**

UNICE notes the extension of RAINS to include a new transport module addressing the combined effects of control technologies on NO<sub>x</sub> and VOC. It is important that the IIASA model fully and accurately represents all source categories.

UNICE notes that, for the first time, the analysis presented by IIASA includes the potential for further emission reductions from mobile sources beyond measures agreed upon in Auto/Oil 1. The 4th Interim report states that as the in-depth analysis of Auto/Oil 2 has not yet presented definite findings, the emission control potential and the costs assumed by IIASA for these measures “have to be considered as purely illustrative and should in no way prejudge the outcome of the ongoing Auto/Oil 2 activities”. UNICE wish to express its support for this view.

### **Common Market Constraints**

One important consideration for many sectors is the influence of the common market on the ability to introduce certain controls in one EU country rather than across all EU countries. For many of the control measures, the common market would not allow fragmentation of the market; hence, introduction of a measure in one country would automatically require its implementation in other EU countries.

This is likely significantly to reduce the relative cost-effectiveness of measures that would only be required in very few countries. This will also lead to an underestimation of the costs of implementing any resulting strategy to combat ozone.

### **Cost Data**

UNICE has considerable reservations concerning the VOC cost data which will be the subject of a separate comment by UNICE.

### **Ozone Model**

The description of the ozone model on page 26 could be clearer as it is possible to interpret the current text to mean that 3 of the EU15 countries are completely excluded from the model. It needs to be spelt out that it is the 12 most important countries that are covered by 150x150-km grid squares that are included in the model.

Figure 2.4 (page 28) shows the % difference between RAINS model and EMEP estimates of AOT40 for forests. The scale stops at >5%. Are there any areas where the difference is >8%, >12% etc?

### **New VOC module**

UNICE notes that the EMEP model internally calculates natural and agricultural emissions of VOC as a function of temperature, land use etc. On the other hand, the agricultural emissions are also fully included in the CORINAIR estimates. In order to avoid double counting of these emissions, the RAINS data presented in the report exclude these agricultural emissions from the anthropogenic sources (and the cost curves). UNICE would

like some reassurance that this is not an important omission as it is unreasonable to overlook any significant and controllable anthropogenic source. If the same applies to the NOx module, UNICE seeks similar reassurance for agricultural emissions of NOx. Energy Scenario The 4th Interim report uses a modified 'business as usual' scenario – i.e. an overall increase of EU-15 total energy consumption of 20% between 1990 and 2010. It is widely recognised that a significant change to this scenario would significantly affect the modelling results, e.g. a post Kyoto energy scenario. UNICE requests access to the underlying data and assumptions used to develop any alternative energy scenario derived from the decisions made at Kyoto.

## **Ships/Bunkers and offshore installations**

UNICE urges the relevant parties to harmonise the treatment of ship emissions, including the differentiation of ships in port in coastal areas and at sea; and also the treatment of other offshore installations within the EMEP and RAINS models.

## **Current Legislation (CLE) and Current Reduction Plan (CRP) Scenarios**

There is some rather confused text concerning whether Stage II vapour recovery is included in the CLE (pages 38 and 39). It should only be assumed for certain countries.

There is a third scenario that could be considered in addition to CLE and CRP: the level of abatement that is imposed by limits on air quality, e.g. the proposed AQFD Daughter Directive on SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>10</sub> and Pb and National air quality Standards. Are there any plans to interpret these standards as constraints on emissions?

IIASA estimate that implementation of current legislation/reduction plans will result in a 45 % cut in NO<sub>x</sub> and 46% cut in VOC emissions by 2010 costing ECU 33 Billion/yr. UNICE urges the Commission to consider very carefully whether further expense can be justified given the limited and uncertain benefits. The preliminary results from the cost-benefit study reinforce UNICE's concern in this regard. UNICE is to provide separate comments on the cost-benefit study. However, it is worth stating at this point that there are considerable inconsistencies and even bias to the benefits evaluation. Of particular concern are the :

- implied credence placed upon the hypothesis that there is a causal relationship between ozone and premature mortality; and
- extrapolation of experimental data to calculate estimated reductions in crop yields. The experts at the WHO-Europe Eastbourne meeting specifically rejected this as invalid.

## **AOT60**

UNICE agree with the caveats contained within the report where IIASA stress that AOT60 is a surrogate indicator for health protection which has been introduced purely for modelling reasons. It states that it is not possible to link any AOT60 value larger than 0 with a certain health risk. The only possible interpretation is that, if the AOT60 is above zero, the WHO-Europe criterion is exceeded at least once during the 6-month period. Health effects are dependent on both the magnitude and duration of an exceedance. See earlier comment also.

## **Population Exposure**

UNICE is concerned about the use of population exposure indices within the report and believes that this index compounds the recognised error already found within EMEP.

Population exposure indices are only potential exposure indices as exposure of individuals is likely to be less than these indices suggest, for two reasons. Firstly, EMEP states that its model over-predicts ozone concentrations in cities (highly populated) and under-predicts ozone in rural areas affected by urban plumes (less populated). Secondly, individuals are not outdoors all the time and unless individuals are exposed to an indoor ozone source their exposure is likely to be much lower indoors. This also calls into question the validity of the population weighted ‘compensation mechanism’.

UNICE suggests the addition of the word ‘potential’ to any reference to population exposure indices and asks that the cost-effectiveness curves also be displayed as air quality indices without the population weighting.

### **Vegetation exposure**

Recent information suggests there is a significant gradient in the concentrations of ozone at typical measurement heights and crop levels. The measurement data are what is used to validate the EMEP model. The height gradient is such that crop exposure may be much less than that suggested by the EMEP modelling results. There is a need to investigate this source of error more thoroughly.

IIASA present two vegetation-related exposure indices. Both treat all vegetation the same way. Would it be possible to examine crops, forests and natural vegetation separately? This is especially important as the WHO-Europe Guidelines vary considerable between these different vegetation types.

### **Influence of Meteorology**

The so-called “4 out of 5 years Principle” is used in the 4th Interim Report. Other gap closure methods have been discussed under the auspices of the UN-ECE Task Force on Integrated Assessment Modelling but not attempted in this report. In particular, **Accumulated Excess Acidification Targets**. In this approach the target would be to reduce the total area under the various AOT curves over the whole of the 5-year period. This approach has the advantage that it does not lose any information and is likely to lead to more robust results. Does the Commission (through IIASA) intend to explore this alternative method for gap closure?

### **Review of input data**

Although the VOC data are available on the Internet, NO<sub>x</sub>, NH<sub>3</sub> and SO<sub>2</sub> control option data and country specific data have not been presented to industry for review.

## **ADDENDUM**

This addendum provides a vital link between the complex gap closure scenarios and the attainment of 'real' air quality targets. UNICE urges that such results are made available for other scenarios as a matter of course.

The addendum would have been helped if the base year 1990 data were also included to demonstrate how much things will improve as a consequence of the REFERENCE case measures.

UNICE notes that the map showing the REFERENCE scenario impact on 80 ppb. exceedances (second highest ozone year) is not included. UNICE requests that this map is made available to all interested parties.

UNICE requests that the EMEP data used to generate these (and future) maps are also made available to interested parties on request. Particularly as these results are much more relevant to the air quality target setting process than the gap closure data.