The Thematic Strategy on Air Pollution—under the microscope

Analysing the implications of the Commission's ambitious air pollution targets

The European Commission adopted its 'Thematic Strategy on Air Pollution' (TSAP) in September 2005. This was the culmination of more than three years' work undertaken in the Clean Air For Europe (CAFE) Programme. Since that time the other European Institutions have been scrutinising the strategy. In particular the EU Parliament (EP) recently indicated that, while they welcome the TSAP, they consider the targets are not ambitious enough. Table 1 shows the resulting 2020 emission levels in EU-25 for the five pollutants targeted by the CAFE programme/TSAP for '2020 CLE', the TSAP and those proposed by the EP. The small emission reduction increments between the TSAP and the EP 'more ambitious' targets should be seen in the light of the substantial increase in attendant costs to EU-25 from the € 7.1 billion/year of the TSAP to the € 11 billion/year estimated by the EP.

A key follow-up to the strategy is the review and revision of the National Emission Ceiling Directive (a process already well under way within DG Environment). Given that Member State emission ceilings proposed in the revision of this directive will be designed to deliver the TSAP, it is vital to address this question of the appropriateness of the ambition levels set out in the strategy and their vulnerability to uncertainties. In this brief article we seek to do just that as we, as it were, examine it under the microscope.

Table 1 Emission of pollutants in EU-25 in 2020 vs. 2000 for various scenarios

Scenario	SO_2	NO_x	NH_3	PM	VOC
2020 CLE	32%	51%	96%	55%	55%
TSAP	18%	40%	73%	41%	48%
EU Parliament	18%	35%	73%	39%	45%

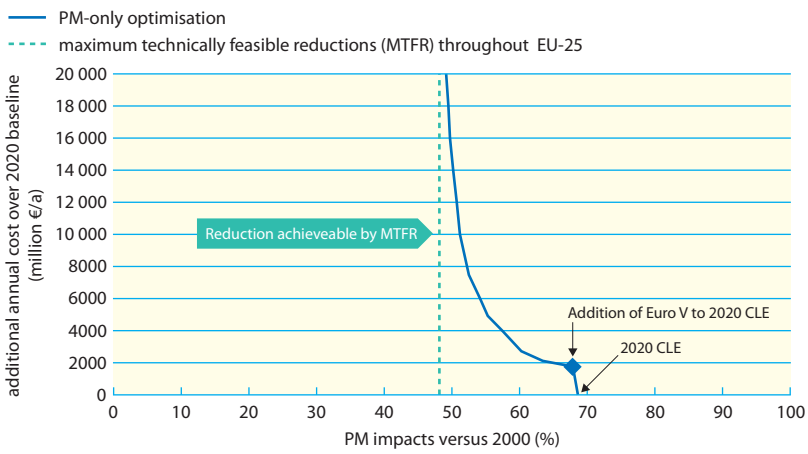
Of course, if we are to do this we need a suitable microscope and here we have used CONCAWE's in-house Integrated Assessment Model (IAM) which incorporates the functional relationships (relating emissions to impacts) and cost databases from IIASA's RAINS model used throughout the CAFE programme.

Getting things in focus

CONCAWE's IAM was run with various reduction targets for fine particulate health impacts (reduction in statistical life expectancy only). Reducing these impacts was the highest priority goal for the CAFE programme and the TSAP.

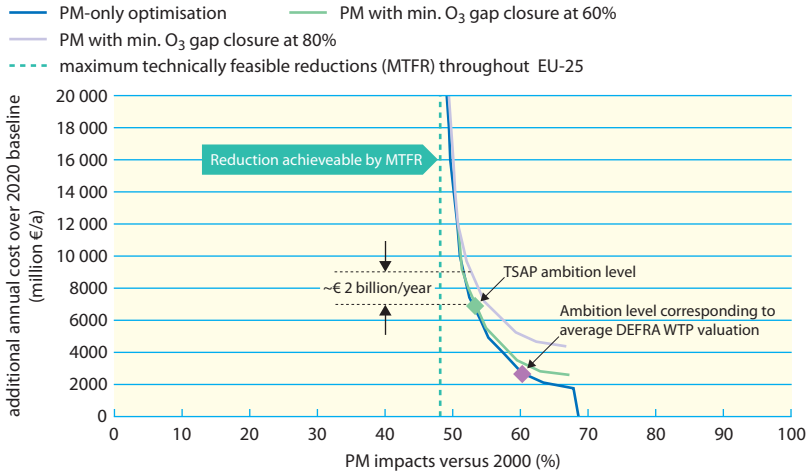
Figure 1 shows the resulting relationship between additional costs to the EU (compared to the 2020 Baseline of

Figure 1 Additional cost to EU-25 versus reduction in PM impacts: optimised for PM impacts only



The first point on the curve results from the addition of Euro V vehicle measures to the 2020 Baseline. Each subsequent point on the curve represents the optimum cost (i.e. least cost to the EU) of delivering a given further reduction in impacts.

Figure 2 Additional cost to EU-25 versus reduction in PM impacts with additional ozone targets



Increasing the ozone gap closure from 60% (as in the TSAP) to 80% would increase the cost by € 2 billion per year.

Current Legislation) and the reduction of impacts. The impacts are related to the situation in 2000 to provide a suitable perspective. The first point on the curve results from the addition of Euro V vehicle measures to the 2020 Baseline. Each subsequent point represents the least cost to EU-25 of delivering a given further reduction in impacts. The vertical dotted line shows the maximum reduction in impacts achievable by implementing Maximum Technically Feasible Reductions (MTFR) throughout EU-25.

This figure demonstrates the importance of already-agreed measures in reducing the impacts of fine particulates on human health since the reduction in impacts between 2000 and '2020 CLE' represents some two-thirds of the maximum feasible improvement over this period. We shall return to this important matter later in the article.

Figure 2 shows the implications on costs of adding a fixed ozone health target to the PM target viz. 60% gap closure[1] and 80% gap closure for ozone impacts.

To provide a perspective on the implications of adding an ozone target, Figure 2 indicates the position on the curve of the TSAP ambition (and associated cost). While the finally adopted TSAP proposes a 60% gap closure for ozone impacts, this curve serves to indicate the significant cost implications of moving from this to an 80% gap closure target—an additional cost to the EU of some € 2 billion a year.

Ambition levels under the microscope

Such a significant increase in cost prompts the obvious question of justification for a given ambition. To support their proposed ambition level for both PM and ozone health impacts in the TSAP, DG Environment drew on Cost Benefit Analysis (CBA). Benefits were essentially derived from a 'willingness to pay' analysis based on the work of NewExt[2]. In the previous article in this *Review* as well as in an earlier *Review* article[3] CONCAWE has highlighted the large uncertainties associated with this work and the relevance of other published 'willingness to pay' studies which give much lower benefit valuations, e.g. a study commissioned by UK Defra[4].

To illustrate the importance of these uncertainties and variation in valuations between studies, the point that would correspond to the Defra study 'average' valuation is also shown in Figure 2. This cost-benefit study would result in the selection of a much lower ambition level, with significant implications for costs to the EU.

Attainability under the microscope

During the closing stages of the CAFE programme and into the technical discussions around the TSAP, CONCAWE highlighted the potential problem of attainability, should overly ambitious targets be proposed by the Commission. The reasons for this are already clear in Figure 2, which shows that the TSAP ambition is on the steep part of the curve and rather close to the MTFR 'stonewall'. Should any important sector 'under-deliver',

[1] *As in CAFE the 'gap' here is defined as the change in impacts between 2020 CLE and 2020 MTFR. The 'gap closure' (expressed in percent) is therefore defined as the extent to which this gap is reduced by introducing additional measures beyond 2020 CLE.*

[2] *'New Elements for the Assessment of External Costs from Energy Technologies', EU Research Project 2004.*

[3] *CONCAWE* Review *Vol. 13 No. 2, Autumn 2004.*

[4] *Chilton, S., Covey, J., Jones-Lee, M., Loomes, G. and Metcalf, H., 2004.* Valuation of health benefits associated with reductions in air pollution', *Defra publication PB 9413, May 2004.*

making up for this shortfall by further measures would result in large cost increases to achieve the ambition, a significant shift in individual Member State costs (as some key contributing countries run out of further available measures) and possibly render the ambition unattainable if emission reductions beyond those achievable by MTFR were required.

The agricultural sector, from which the TSAP foresees a significant and necessary contribution from ammonia (NH_3) reductions, provides a suitable example. What would be the consequences of agriculture not delivering this contribution? Figure 3 shows the results of CONCAWE's IAM when NH_3 control measures are excluded from the optimisation. Although perhaps an extreme case, it serves to highlight the potential problem of attainability. A further IAM run indicates that, if agriculture delivers only two-thirds of the reductions foreseen in the TSAP, the TSAP ambitions would drive other sectors to MTFR with an attendant cost of more than € 25 billion/year compared to the TSAP cost of € 7.1 billion/year.

Figure 3 Additional cost to EU-25 versus reduction in PM impacts: importance of NH_3 reduction measures

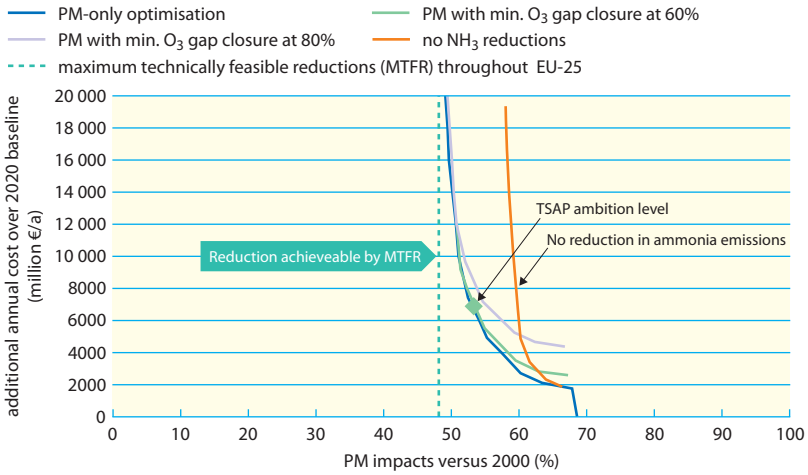


Figure 3: Excluding NH_3 control measures from the optimisation serves to highlight the potential problem of attainability: even if agriculture delivered two-thirds of its expected contribution, the TSAP ambitions would drive other sectors to MTFR or be unattainable.

2020 CLE under the microscope

As noted above, the delivery of the TSAP at the level of burden indicated by the CAFE programme is highly dependent on already-agreed/legislated measures delivering the expected CAFE '2020 CLE'.

It is already clear from the NECD Review process that the new national baseline scenario results in lower than expected reductions in SO_2, NO_x and primary $PM_{2.5}$ emissions compared to the CAFE 2020 baseline. Figure 4, showing the change in EU emissions between the CAFE 2020 Baseline and the new national baseline, is abstracted from IIASA's first report on the NECD Review[5].

This will potentially have significant implications for the cost of delivering the ambitions of the TSAP and/or the attainability of these ambitions.

It is clear that the NECD review process will need to face up to these important issues. The notion that the ambition levels of the TSAP are fixed (or in the Parliament's view need to be more ambitious) will have to contend with the likelihood of significant increases in attendant costs, a significant change in distribution of costs across individual Member States and sectors of the economy, the potential for non-attainability and finally the difficulty of justification. As further data emerges from the process, these challenges will inevitably become more and more apparent. It will therefore be essential for the analyses to include appropriate sensitivities around the core scenarios as the basis for the development of robust policy.

Figure 4 2020 baseline emissions: difference between National and CAFE data

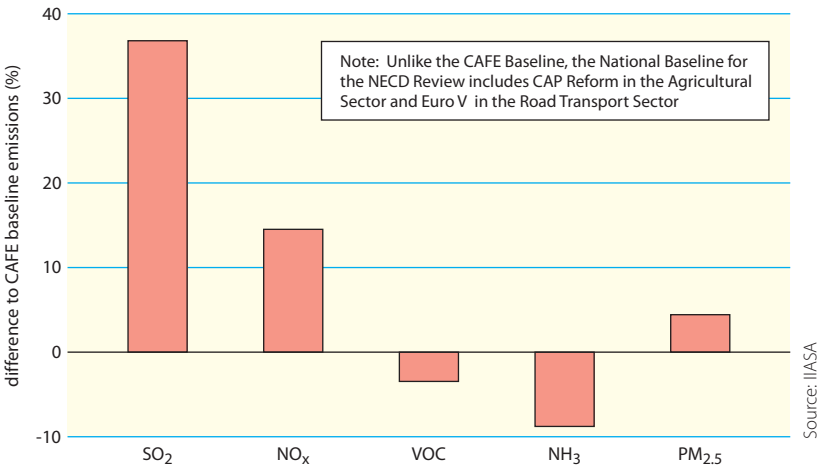


Figure 4: The change in EU emissions between the CAFE 2020 baseline and that based on the national energy scenarios will have potentially significant implications for the cost of delivering the ambitions of the TSAP and/or the attainability of these ambitions.

[5] *IIASA NEC Scenario Analysis Report No. 1, September 2006*