EU AMBIENT AIR QUALITY LEGISLATION – PRESENT AND FUTURE

A. Kobe
DG Environment, European Commission

ABSTRACT

The Clean Air for Europe (CAFE) programme compiled the latest knowledge on the impacts of air pollution and developed policy responses to complement implementation of existing legislation and other activities related to air pollution abatement. The resulting 2005 Thematic Strategy on Air Pollution (the Strategy) sets interim objectives for improvement of human health and environment through improvement of air quality up to year 2020. Need for specific measures at the community and the international level is outlined such as vehicle emission standards, shipping and the revision of the national emission ceilings directive. In parallel activities to support more effective implementation are being prepared.

The Commission has jointly with the Strategy proposed a new Directive for ambient air quality and cleaner air for Europe, which is currently in the co-decision process. It includes proposal for new $PM_{2.5}$ environmental standards. Experience with the implementation of the first daughter directive 1999/30/EC is reflected in proposed flexibility to address compliance with existing limit values.

The ambient air assessment provisions in the new directive principally follow the existing practice. It is expected that new modelling capacity, widespread problems of exceedance of certain pollutants such as NO2 and PM_{10} which requires extensive preparation of abatement measures, modification of provisions on demonstration of modelling uncertainty, and not at least development of new reporting system with further appreciation of spatial nature of air quality will significantly extend the use of modelling for the assessment of air quality under EU legislation. The Commission plans to facilitate harmonized and streamlined approach through the AIRMODE action of the JRC and by developing air quality assessment services under GMES.

1. INTRODUCTION

Air pollution has been subject to action taken at the national and the EU/international level for several decades. In the last 15 years a number of different legal community instruments have been developed to address emissions at source, fuel quality as well as to set the ambient air quality standards[1]. These are only the most direct actions in a vast arsenal of measures which enable air pollution abatement that includes information exchange, research, development of emission inventories, air quality models and measurement standards, assessment of air quality and human exposure, and the development of non-technical measures such as urban transport planning.

Despite significant improvements, serious air pollution impacts persist. The Community's Sixth Environmental Action Programme (6th EAP) called for the development of a thematic strategy on air pollution with the objective to attain *'levels of air quality that do not give rise to significant negative impacts on, and risks to human health and the environment'*. Impacts on public health are particularly significant in the urban areas due to stronger pressures on the environment and larger public exposure. For those, 6th EAP had called for a strategy '*contributing to a better quality of life through an integrated approach concentrating on*

[1] See References

urban areas' and to contribute *'to a high level of quality of life and social well-being for citizens by providing an environment where the level of pollution does not give rise to harmful effects on human health and the environment and by encouraging sustainable urban development'*.

As it is impossible to present even in brief all related activities, the paper is limited to the presentation of the Thematic Strategy on Air Pollution, the Thematic Strategy on Urban Environment, and the new Air Quality Directive. It is important to note at least two additional relevant activities, which are the fight against climate change (recent environment and energy package) and the environment and health action plan that is aiming to coherently address the impacts of a number of physical and chemical stressors including air pollution on human health.

2. THEMATIC STRATEGIES

Following its communication on the Clean Air for Europe programme (CAFE), the Commission has examined whether current legislation is sufficient to achieve the 6th EAP objectives by 2020. This analysis looked at future emissions and impacts on health and the environment and has used the best available scientific and health information. It showed that significant negative impacts will persist even with effective implementation of current legislation. Fine particles $PM_{2.5}$ and to a lesser extent ozone have been identified as principal pollutants which need to be addressed.

According to the CAFE impact assessment modelling using the energy scenarios available at the time, in 2020 even the use of all available technological solutions would not deliver in full the 6th EAP objectives. Based on the thorough assessment of the scope and costs of currently known technological solutions for air pollution abatement, the Commission's Communication on a ***Thematic Strategy on Air Pollution*** (COM(2005) 446) therefore recommended interim objectives for the protection of health and the environment from air pollution to be attained by 2020 relative to the position in the year 2000, among others:

- 47% improvement in premature mortality (expressed as life years lost over the whole population) due to exposure to fine particulate matter (PM2.5) in air [3.62 million life years lost in 2000 roughly equivalent to 350,000 deaths];
- 10% improvement in acute deaths from exposure to ozone from [20,000 cases in 2000];

These objectives by themselves have no legal force, but they serve as a benchmark when developing and adopting measures which have legal force.

Accompanied by a comprehensive impact assessment, the Strategy proposed a range of measures, among others:

- The air quality Proposal to combine the existing air quality legislation (see chapter below).
- Revision of the national emissions ceilings directive 2001/81/EC. It currently establishes annual mass limits to be attained by 2010 for each Member State's emissions of nitrogen oxides, sulphur dioxide, volatile organic compounds and ammonia and does not specify the means of attaining these emissions reductions. The revision that will be available by mid-2007 would potentially establish national emission caps on for the year 2020 and include primary/direct emissions of fine particles $PM_{2.5}$.
- New measures to reduce exhaust emissions from cars and vans in two stages (EURO 5 & 6, addressing particle and NO_x emissions respectively) have been already adopted

by legislator. Preparatory work is underway to develop new tailpipe limits for heavy duty engines (EURO VI). Proposal is expected in 2007. Heavy duty vehicles account for a third of all road transport emissions of NO_x in 2020 where transport will comprise up to half of all NO_x emissions from land based sources.

- Review of the directive on IPPC (integrated pollution prevention and control) to potentially include (i) intensive cattle farming activities; wider range of pig and poultry installations; (ii) industrial combustion plant in the power range of 20-50 Mega Watts which are currently outside the scope. The review is expected to finish in late 2007.
- Ship emissions will represent more than half of total emissions of sulphur dioxide and nitrogen oxides in the EU in 2020. In its conclusions on the ship emissions strategy, the Council invited the Commission to pursue action at the International Maritime Organisation to tackle emissions of NOx from international shipping by imposing stricter standards on ships' engines. If progress is unsuccessful, the Council invited the Commission to look at the feasibility of establishing Community measures.
- Other measures to reduce exhaust emission from domestic boilers and in particular ammonia emissions from agriculture.
- Last but not least, measures in research to improve our understanding of air pollution, its impacts on health and environment, and to develop new technological solutions which will reduce anthropogenic emissions in air.

Main impacts due to air pollution are found in agglomerations. The main conclusion of the ***Thematic Strategy on Urban Environment*** (COM(2005) 718) was the recognized importance of national and EU support to the local authorities to adopt the integrated approach to the urban environmental management. Voluntary technical guidance on the integrated management, drawing on experiences and good examples as well as appropriate references to the legislation was chosen as the most appropriate and instrument at EU level, as the potential EU legislation could probably not appreciate appropriately the diversity of local implementation.

3. AIR QUALITY DIRECTIVES

The ambient air quality is regulated at the EU level by the Council Directive 96/62/EC on ambient air quality assessment and management, referred to as the Air Quality Framework Directive and its 4 daughter directives 1999/30/EC, 2000/69/EC, 2002/3/EC, and 2004/107/EC.

Their implementation has revealed 2 main issues that needed to be addressed by the Commission when launching the Strategy:

- The fine particles $PM_{2.5}$ are not yet covered by the environmental objectives. The Directive 1999/30/EC includes general references to monitoring of $PM_{2.5}$,, but this provision has not been well implemented
- There are widespread exceedances of limit values for particulate matter PM_{10} (in 2005 40% of all air quality zones for daily PM10 limit value, 17% for annual, in all countries except Ireland). Reasons for exceedance are complex, from strong increase in urban traffic in recent years, late planning and weak implementation of local/regional measures, to late introduction of community measures (such as vehicle emission standards EURO 5/6, EURO VI). Some measures such as reductions of emissions under national emission ceilings directive have also not delivered enough, contributing to high regional background concentrations and transboundary pollution.

The Strategy was accompanied by a **directive Proposal on ambient air quality and cleaner air for Europe** (COM(2005) 447). The proposal merges existing air quality directives except 4th daughter directive and the Exchange of Information Decision. It has three key elements, the last two of which specifically address non-compliance problems:

- Introduce two new air quality objectives for fine particulate matter in ambient air ($PM_{2.5}$): a limit value and an exposure reduction target requiring improvement of $PM_{2.5}$ concentration in urban areas by 20% between 2010 and 2020. It also provides explicit requirements for monitoring $PM_{2.5}$ and to the limited degree its chemical speciation
- the possibility of discounting natural sources such as sea spray for the purpose of assessing compliance
- under certain conditions, granting of time extensions to meet air quality standards in specific areas (PM_{10} up to 2010, NO_2 up to 2015).

Granting time extensions is linked to strict conditions which include demonstration of implementation of all related community legislation, and the assessment on an updated air quality plan by the Commission. The Commission will assess the rationale for any such request and whether all possible measures have been considered, and that the levels of ambition and implementation are adequate to ensure compliance with the limit values by the new date. Possibility to discount natural sources is an extension of the already existing provision to discount for natural events such as Sahara dust, acknowledging for example that these contributions, which are beyond control of the Member States, can be quite significant particularly in arid and coastal areas.

The most important innovation is the national exposure reduction target for $PM_{2.5}$. Its assessment is based on urban background monitoring which should be set in a way to proxy the population exposure in urban areas. It is expected to drive more cost-efficient measures with larger benefits in terms of reducing the population exposure as compared to the setting of an ambitious $PM_{2.5}$ limit value, which could focus the efforts in improving the situation to hot-spots. The accompanying $PM_{2.5}$ limit value is however still proposed to prevent unduly high exposure in some areas and to a larger extent ensure social equity.

The Council and the European Parliament have deliberated on the proposal in the first reading. The Council common position expressing the political agreement between the Member States is expected in June 2007. It follows closely the original Commission proposal. Due to several differences between the Council and the Parliament on some of the future solutions the directive will go into the second reading in autumn 2007. If an agreement is reached, the directive will enter into force early 2008.

MODELLING IN AIR QUALITY LEGISLATION AND RELATED ACTIVITIES

Modelling is recognized as one of the basic assessment methods in the air quality directives. Even more than for standard assessment under the directives, modelling is used in the development of air quality plans and short term action in areas in exceedance of the limit and target values. In the new proposed directive the existing concept of assessment is preserved. New elements such as determination of natural contributions, higher standards for the development of air quality plans, and exposure reduction will prompt new and specific use of modelling. An already observed increase in model use is considered to be further accelerated through the improved uncertainty provisions of the new directive and the new reporting

scheme currently under development by the Commission assisted by the expert Group on Data Exchange. The scheme is expected to facilitate reporting and exchange of modelling results and is building also on the experience of the recent development in GIS and related research projects such as Air4EU. To ensure comparability between modelling results and support implementation of the directive, the Commission launched AIRMODE. This JRC action will manage, among other activities related to modelling of air quality, specific expert modelling network.

There is high expectation that GMES Atmosphere service will provide better spatial assessment of air quality at the Community level and facilitate local air quality modelling through delivery of boundary conditions and other products. The service is still under development, but it will, if successful, enable to qualitatively reconsider the air quality legislation assessment requirements in the upcoming revision in 2011-2013.

CONCLUSIONS

It is the Member States, their regional and local governments as well as the industry that implement the EU policy presented above. The Commission facilitates the implementation by providing guidance, organises networks to promote exchange of best practices, supports production of common standards and services, and monitors compliance with the obligations under the EU legislation.

The Commission is also constantly re-evaluating the situation and trying to ensure that all related EU policies pursue the objectives of the 6th EAP and the more specific targets of the Thematic Strategy on Air Pollution.

Modelling is an important assessment tool of increasing importance that provides the necessary link of understanding and quantification between the state of environment, pressures and response. EU air policy is finding new ways to make its use as effective as possible while achieving maximum comparability and joint pull of resources at the Community level.

ACKNOWLEDGMENT

The CAFE programme as well as the preparation of the Thematic Strategy on Urban Environment has been extensive collaborative exercises. CAFE alone included a public consultation with more than 10000 responses, over 100 meeting with stakeholder representatives from the Member States, NGOs and industry federations, consultants, and a number of organisations, most notably UN-ECE CLRTAP, World Health Organisation (WHO) and the European Environment Agency (EEA).

The Commission gratefully acknowledges all contributions.

REFERENCES

For general information and an exhaustive list of the existing related EU legislation see http://ec.europa.eu/environment/air/index_en.htm