

CONTROLLING AIR QUALITY

INTRODUCTION

Controlling air pollution has been an EC policy for the best part of two decades. The twin problems of acid rain threatening forests, and high levels of pollutants in urban areas threatening human health, provoked the start of significant actions against SO₂ and NO_x emissions in the 1980s. These were largely divided between individual measures designed to control emissions from stationary sources (such as power stations) and from mobile sources (such as cars).

In the 1990s, with the Single European Act in place, and the Fifth Environmental Programme under way, the Commission began to look at a more comprehensive approach, with a view to the longer term. This led to the development of a new framework in which air quality could be assessed and managed, according to individual pollutants and varying geographical circumstances, as well as the development of structures to support the framework, such as the European Environmental Agency and a network through which Member States could exchange information on air quality.

The comprehensive approach also had an impact on the way policy developed in more specific areas. It led, for example, to the Auto-Oil Programme, under which vehicle engine technology was examined in conjunction with fuel quality to determine how the two elements should be regulated for the most cost-effective results. In addition, it led to the development of an overall acidification strategy, including international elements, rather than a narrow-based control on plant emissions.

This chapter deals with the elements of environmental policy aimed at controlling those pollutants considered most dangerous for human health and the local environment - essentially lead, SO₂ and NO_x - which are most linked to energy use. However, many of the policies now being developed to deal with the climate change problem - especially some of the transport-related issues - will of course have an important impact on SO₂ and NO_x emissions, but these are discussed in Chapter Four B.

REGULATING AIR QUALITY - ASSESSMENT AND CONTROLS

Regulations on air quality have been in place at the European Community level for nearly 20 years in some cases. Three Directives exist, for example, dating from the 1980s, which set ambient air quality levels for SO₂/suspended particulates, NO₂ and lead respectively. Moreover, a 1982 Council Decision created a reciprocal exchange of information on air quality between Member States. By the early 1990s, the Commission was aware that this rather ad hoc approach to air quality standards was outdated.

In a report reviewing the state of implementation of the Directives at that time, the Commission said there was no consistency in the reporting of standards, and that there was no requirement for States to transmit information on air quality except when thresholds were exceeded. It identified a need for harmonisation in a variety of areas ranging from implementation of the legislation to the siting of monitoring stations: *"A harmonised approach will allow the identification of areas in Member States where there are particular problems and where specific actions are required."*

A harmonised approach necessary

In 1994, therefore, the Commission proposed a new framework Directive for the management and assessment of ambient air quality, and a new draft Decision providing for an improved reciprocal exchange of information and data from networks and individual stations measuring air quality. Under the cooperation procedure, the EP suggested the concepts of maximum allowable emissions levels and critical loads. These ideas, however, were considered too ambitious by the Council.

Details from air quality framework Directive

A Common Position was agreed in June 1995 and the Directive was finally adopted in September 1996. The general aim is to:

- *Define and establish objectives for ambient air quality in the Community designed to avoid, prevent or reduce harmful effects on human health and the environment as a whole;*
- *assess the ambient air quality in Member States on the basis of common methods and criteria;*
- *obtain adequate information on ambient air quality and ensure that it is made available to the public, inter alia by means of alert thresholds;*
- *maintain ambient air quality where it is good and improve it in other cases."*

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*Public warnings
when alert
thresholds
breached*

The Directive, which was to have been transposed by March 1998, requires Member States to designate competent authorities at the appropriate level for a whole range of tasks, such as making the air quality assessments themselves, approval of measuring devices, and analysis of assessments. Measurements of air quality are mandatory in agglomerations of more than 250,000 inhabitants (the EP had wanted this to be 100,000) or, if less than that, where the population density “justifies the need” for ambient air quality to be assessed and managed. Apart from warning the public when alert thresholds are breached, Member States must also develop short-term action plans in order to reduce the risk of the thresholds being breached and to limit the duration of any occurrence. Such plans can include restrictions on the use of motor vehicles. Other detailed provisions cover requirements for those zones where levels are higher than the limit values, for the transmission of information and reports, and for a committee to oversee the Directive’s implementation.

The Directive also required the Commission to come forward with a first wave of proposed limit value and alert threshold specifications for SO₂ and other pollutants (see below). In fact, this first draft so-called daughter Directive was put forward some nine months late, in October 1997. A draft daughter Directive for benzene limits and thresholds should have been put forward in 1996 (a schedule in the framework Directive pressed for and won by the Parliament against the wishes of the Commission) but, by spring 1998, there was still no sign of it from the Commission. In a third stage, the Commission is due to present, by the end of 1999 at the latest, proposed limit values for polyaromatic hydrocarbons, cadmium, arsenic, nickel and mercury.

The first daughter Directive with limit values for SO₂, NO_x

The first daughter Directive, put forward by the Commission in October 1997, proposed limit values and alert thresholds for ambient concentrations of SO₂, NO_x, particulate matter and lead in ambient air in the Community, in order “to avoid, prevent or reduce harmful effects on human health and the environment as a whole”. The main elements of the proposal were based on the revised Air Quality Guidelines for Europe adopted by the World Health Organisation in 1996. They were:

*Main elements of
the proposal based
on WHO AQGs*

- health-based limit values for SO₂, lead and particulate matter to be met by 2005;
- health-based limit values for NO₂ and a tighter set of limit values for particulate matter to be met by 2010;
- limit values to protect the rural environment against the effects of SO₂ and NO_x;
- details of pollutants levels to be assessed throughout the EU;
- a requirement that up-to-date information on all pollutants should be easily available to the public.

To meet these targets, emissions of SO₂ and NO₂ must be reduced by nearly 10% throughout the Union in addition to the reductions already expected by 2010, the Commission said. For particulate matter (including pm₁₀s), it estimated that emissions in cities would need to be reduced by some 50% below present levels.

Following adoption of the proposal by the Commission, Bjerregaard said it would bring enormous benefits in terms of improved public health - “thousands of deaths associated with air pollution will be avoided”. However, she added that to achieve the objectives will require a partnership between the EU institutions, national governments, local and regional authorities, industry and the citizens. “Since we all, in one way or another, contribute to problems of air pollution we must all be part of finding a solution”, she concluded.

By April 1998, none of the institutions had yet adopted their Opinions. In March, environment ministers did acknowledge their broad support for the proposal. They were, though, expected to weaken the proposed limit values and introduce some measure of flexibility. The UK Presidency said the exceptions should be limited and accompanied by appropriate monitoring procedures and safeguards. The ministers also emphasised the importance of “timely and exhaustive information to the public, paying attention, however, not to overburden local administrations with excessive requirements, while ensuring that data, especially those relating to human health, are readily available to the public”.

*Reciprocal
exchange of
information*

As a complement to the air quality framework and daughter Directives, the EU also put in place, on the basis of a Council Decision in January 1997, a new mechanism for the “reciprocal exchange of information and data from networks and individual stations measuring ambient air pollution within the Member States”. The Decision requires the Member States to designate one or more organisations to implement the reciprocal exchange, to provide the Commission with all the relevant details of its measuring stations and equipment, and to update the Commission regularly with information on a long list of pollutants (all those in the air quality framework Directive and many others besides). It also defines the statistical parameters, units of measurement, and the

averaging time for each of the pollutants. It establishes that the public is to be kept informed through the setting up of an information system by the European Environment Agency (which is involved with the reciprocal exchange) and through regular reports from the Commission.

REDUCING THE IMPACT OF VEHICLE ENGINE EMISSIONS

Vehicle emission limits have been in place at the EC level since 1970, but it was only with the passing of the Single European Act in the mid-1980s that Community policy in this area was given any teeth. A milestone was passed in 1989 with a Directive that required all small passenger cars to be manufactured with a catalytic converter. Since then, the emission limits for cars, light commercial vehicles and heavy goods vehicles (HGVs) have been further regulated on several occasions.

A Directive, approved in March 1994, set the emission limits for new types of passenger vehicles from January 1996 and for all new vehicles from January 1997. Emission levels from light commercial vehicles are currently controlled by a Directive adopted in October 1996. Three types of vehicles are classified: Class I vehicles, with a reference mass of less than 1,250kg (which are subject to the same emission limits as passenger vehicles); Class II for vehicles of 1,250-1,700kg; and Class III for vehicles over 1,700kg. For diesel engines using direct injection technology, slightly less stringent particulate and HC+NOx levels were accepted until 1999.

Current engine emission standards (g/km)			
	Cars/Class I	Class II	Class III
<u>Gasoline</u>			
CO	2.2	4.0	5.0
HC+NOx	0.5	0.6	0.7
<u>Diesel</u>			
CO	1.0	1.25	1.5
HC+NOx	0.7	1.0	1.2
Particulates	0.08	0.12	0.17

NB: Passenger car limits in force from January 1997; Class I limits from October 1997, Class II and III limits from October 1998.

Source: Directive 96/69/EC

During the legislative process, the Parliament, with codecision powers, called for the Class III levels to be aligned with Class II, and for a specific limit value for NOx. The EP also said all vehicles, not just new vans but old ones as well, should meet the new limits by the year 2000. However, when it came to the second reading, the EP dropped all these demands and insisted only on some minor amendments which were taken on board by the Council.

A 1991 Directive limits emissions from diesel engines used in HGVs. Two stages were set but the first expired in 1996 and since October that year, all engines have been subject to the following limits: 4.0g/kWh of CO; 1.1g/kWh of HC; 7g/kWh of NOx; and 0.15g/kWh of particulates.

1991 Directive on emission limits for HGV engines

The Auto-Oil Programme results

The March 1994 Directive which set new emission standards for passenger cars required the Commission to put forward new proposals on controlling air pollution from motor vehicles for the year 2000 and beyond. However, the Commission was also told it would have to take an approach aimed directly at air quality objectives by using a broader range of policy instruments. The Directive stated: "An assessment of the cost-effectiveness of taking each measure shall be undertaken; in this global assessment full account shall be taken, inter alia, of the contributions that:

- traffic management, for example by spreading the environmental costs appropriately,
 - enhanced urban public transport,
 - new propulsion technologies (e.g. electric transmission),
 - the use of alternative fuels (e.g. biofuels),
- could make to improving air quality."

In particular, the Commission was asked to bring forward not only improvements to the existing Directive, but also Directives on fuel quality and inspection and maintenance. To fulfil some of these requirements, the Commission initiated the European Auto-Oil Programme. A major part of this was a two year joint test programme (EPEFE), conducted and funded jointly by the European motor vehicle manufacturers (ACEA) and the European oil industry (Europia). Such collaboration between the two industries, although common enough in the US, was a breakthrough for European policy-making.

The EPEFE joint test programme

The EPEFE programme, begun in 1993, was designed to expand the information available on the relationships between fuel properties and engine technologies and to quantify the reduction in road

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traffic emissions that could be achieved by combining advanced fuels with the vehicle/engine technologies under development for the year 2000. There were four projects: an evaluation of existing data; the identification of the necessary amendments to the present test procedures; specific testing of engine/fuels to determine the relationship between the fuel - gasoline in one case and diesel in the other - and engine technology on emissions, life cycle CO2 and fuel economy.

NOx emissions considered the driving force for policy

With the results of the EPEFE programme, the Commission demonstrated that European air quality would improve dramatically during the late 1990s and into the new century as a result of Directives in force or due to come into force. The key finding, however, was that beyond 2000, the driving force for policy would have to be the control of NOx emissions. There are two main reasons for this. Firstly, NOx is considered a significant health hazard in urban areas where pollution is at its greatest. Secondly, emissions of CO, benzene and VOC, among others, will not be a major problem, and, in any case, will be reduced effectively by NOx reduction measures.

New vehicle emission limits for the 21st century

As a result of the Auto-Oil Programme, the Commission proposed new emission standards for all three groups of vehicles. The first to be unveiled, in June 1996, were those for passenger cars (along with new fuel standards - see below). Apart from suggesting more restrictive emission limits for 2000, and for 2005, the Commission also introduced new elements. One of these was separate limits for NOx and hydrocarbons. Another was a requirement for on-board diagnostics (OBD) in gasoline cars (the technology was not ready for diesel cars) to ensure that a car's emissions are within legal limits during its useful life.

On-board diagnostics

In addition, the Commission proposed arrangements for in-use testing and an eventual recall of vehicle models after they have been placed on the market. The Commission said in its proposal: *“Together with the strengthening of the periodic technical inspections, OBD and recall provisions should ensure that the emission performance should not deteriorate significantly during the life of the vehicle.”*

The emission limits for 2000, when taken in conjunction with the proposed tighter test procedure, will correspond to a reduction of 20-40% for the different pollutants concerned, the Commission said. Indicative levels for 2005 levels were put forward at the same time in order to give advance

A 50-70% reduction by 2005

notice to the vehicle industry and to provide uniform targets for those Member States that wish to stimulate the improvement of environmental technologies by granting fiscal incentives. The 2005 values, based on the most promising environmental technologies under development, would require a 50-70% reduction compared to current standards, the Commission said.

Proposed engine limits (g/km)			
	Cars/Class I	Class II	Class III
Gasoline			
<u>Standards for 2000</u>			
CO	2.3	4.17	5.22
HC	0.2	0.25	0.29
NOx	0.15	0.18	0.21
<u>Indicative limits for 2005</u>			
CO	1.0	1.81	2.27
HC	0.1	0.13	0.15
NOx	0.08	0.1	0.11
Diesel			
<u>Standards for 2000</u>			
CO	0.64	0.8	0.95
HC + NOx	0.56	0.72	0.86
NOx	0.5	0.65	0.78
Particulates	0.05	0.08	0.11
<u>Indicative limits for 2005</u>			
CO	0.5	0.63	0.74
HC + NOx	0.3	0.39	0.46
NOx	0.25	0.33	0.39
Particulates	0.025	0.04	0.06
<i>Source: COM/96/248</i>			

Towards a conciliation procedure on vehicle standards

The Council, in its June 1997 agreement, accepted the bulk of the Commission's proposal, including the proposed figures (as above). There was a considerable debate between Member States over provisions to allow fiscal incentives for meeting the standards in advance of the requirements. A compromise agreed would allow tax incentives so long as they comply with the provisions of the Treaty and satisfy the following conditions:

Compromise on the use of fiscal incentives

- they apply to all new series production vehicles offered for sale on the market of a Member State which comply in advance with the mandatory limit values and, thereafter, as from 1 January 2000, with the indicative limit values set out by the Directive;
- they cease when the above-mentioned limit values come into effect (i.e. in 2000 or 2005);
- for each type of motor vehicle, they do not exceed the additional cost of the technical solutions introduced to ensure compliance with the mandatory or indicative limit values.

The Parliament, however, adopted over eighty amendments in its first reading under the codecision procedure during April 1997, and confirmed most of them on its second reading in early 1998. It called for stricter hydrocarbon emissions in 2000 (0.12g/km for petrol engines and 0.07g/km for diesel engines), as well as more stringent limits on particulates and nitrogen oxides. More importantly, it called for the 2005 indicative levels to be legislated for at the same time as the 2000 levels. The EP's Opinion also asked the Commission to submit a proposal during 1998 for making the average fuel consumption level of 5 litre/100km mandatory for all new petrol cars by 2005, and 4.5 litre/100km for all new diesel cars (Chapter Four B); and for substantial revisions to proposed compulsory testing procedures. The differences between the Council and the EP will be resolved through the conciliation procedure in 1998.

Parliament's call for 2005 limits to be fixed

New standards for light commercial vehicles

In February 1997, the Commission put forward proposals, under the framework of the Auto-Oil Programme, to tighten the standards for light commercial vehicles. Its intention is to maintain as parallel an approach as possible between the rules for passenger cars and those for light commercial vehicles, and to merge the two Directives. As with the previous stage, the emission limits proposed for 2000, and the indicative limits for 2005, for Class I vans were identical to those for passenger cars.

As with the passenger cars, the Commission proposal included a requirement for OBD for gasoline-engined vans, and included mechanisms for fiscal incentives. The Commission said the new limit values would correspond to reductions against the 1997 standards of 40% NO_x, 40% total hydrocarbons, and 30% CO for gasoline light commercial vehicles. And for diesel vehicles, the new standards would mean a 20% reduction in NO_x, 65% in hydrocarbons, 40% in CO and 35% in particulate matter.

The Parliament passed its first Opinion on the proposal in February 1998, very much along the same lines as its Opinion on the passenger cars. The Council agreed its Common Position in March 1998, also in line with its Common Position on passenger cars. After a quick second reading by the Parliament, the dossier was expected to be dealt with alongside the first two Auto-Oil Directives - passenger cars and fuel qualities - in the conciliation procedure between the Council and the Parliament during 1998.

Limits on vans dealt with alongside proposal on car emissions

Diesel engines in lorries and off-road vehicles

New emission levels for HGVs were proposed by the Commission in December 1997 along with a new dual test cycle, one for conventional diesel engines (using the so-called ESC and ELR test cycles) and one for diesel engines fitted with advanced emission control systems (using the same two cycles plus the so-called ETC cycle). For the first time, the Commission proposed emission standards for engines fuelled by natural gas or liquefied petroleum gas, to be tested exclusively by the ETC cycle. The emission levels proposed for diesel engines under the conventional test procedure and for diesel and gas engines under the ETC procedure respectively were:

- 2.1g/kWh and 5.45g/kWh for CO;
- 0.66g/kWh and 0.78g/kWh for HC;
- 5.0g/kWh and 5.0g/kWh for NO_x;
- 0.1/0.13g/kWh and 0.16/0.21g/kWh for particulates (depending on diesel engine size).

In addition, methane emissions from natural gas-fuelled engines are to be restricted to 1.6g/kWh.

The proposed limits represent reductions of 30% for CO, NO_x and particulates (compared with the 1996 emission standards) and a 34% reduction for HC, the Commission said in its proposal. Unlike the schemes for cars and vans, the Commission did not put forward indicative limits for 2005 but said it would submit further proposals after a second Auto-Oil Programme.

In September 1995, the Commission put forward a bulky and technical proposal for the approximation of laws on emission standards of diesel engines in all kinds of non-road mobile machinery of over 18 kW - industrial drilling rigs, bulldozers, cranes, loaders excavators, rotary tillers, fork lift trucks, road maintenance equipment, snow plough equipment, and airport maintenance vehicles etc. - with the notable exception of agricultural and forestry tractors which are now due to be the subject of a parallel proposal. The Commission calculated that these engines produce 7% of all man-made NO_x emissions in the Community as well as 1% of HC and 0.5% of CO. The Directive, which was finally adopted in December 1997 by the Council and Parliament, is expected to reduce NO_x emissions from non-road mobile machinery by 23% in a first stage (from 1997-2000) and by 42% in a second stage (2002-05) as compared with the uncontrolled case. Similarly, HC emissions are expected to be reduced by 11% and 29% and particulates by 27% and 67% in stage one and stage two respectively.

First Directive limiting emissions from offroad vehicles

Chapter Four A FUEL QUALITIES - A MORE CONSISTENT REGULATORY APPROACH

To date, the EU’s overall policy on fuels has been rather ad hoc and confined to setting lead and benzene limits in gasoline and sulphur limits in gasoil. However, with the setting up of the Auto-Oil Programme and the proposals that emerged following its conclusion, a more concrete fuels policy has emerged, one which complements the ongoing policy of controlling vehicle emission standards.

EC rules limiting the lead content in petrol to 0.15-0.4g/l date from 1978. A 1985 Directive required Member States to ensure the introduction and distribution of lead-free petrol and a further Directive in 1987 allowed Member States to ban the marketing of leaded petrol of regular grade. Although, under these Directives, no State is allowed to ban leaded petrol altogether, both Austria and Sweden have been able to do so on the basis of their accession arrangements.

The 1985 Directive also set a limit of 5% for the benzene content in gasoline, but this level has been under pressure from Germany, which was refused leave by the Commission in 1990 to set a national level of 1%, and from Austria which had a lower level on accession and was given a transition period to align itself with Community norms (but it was acknowledged that this would involve the Community reducing its own levels).

Community legislation agreed by the Council in March 1993 reduced the maximum sulphur content of diesel fuel to 0.2% from October 1994 and to 0.05% from October 1996. The Council rejected the Commission’s proposal of a 0.1% level for gasoils other than automotive diesel and the legal limit remained at 0.2%. The Council did, however, ask the Commission to put forward a proposal for a second phase of restrictions (and new limit values for aviation kerosene) “in the more general framework of the policy to improve air quality”. Greece was given a derogation to 1999 authorising the use of gasoil with a sulphur content higher than 0.2% for marine use. Austria was given a similar derogation to that for benzene with regard to the sulphur content of gasoil for heating.

Current rules on sulphur content of diesel

Draft Directive on fuel limits for pollutants

In parallel with the proposed new emission limits for passenger cars, the Commission put forward, in June 1996, a draft Directive setting new maximum levels for a range of pollutants in gasoline and diesel. The Auto-Oil Programme had confirmed, the Commission said, that legislation on fuel quality would be an integral part of a cost-effective package to reduce overall vehicle emissions.

For specific local areas with extreme air quality situations (where human health and/or the environment may face serious threat), the Commission proposed that States could insist on the marketing of special fuels. They would need, however, to justify the measures to the Commission on air quality grounds and to provide information on the anticipated impact of the measures proposed.

Marketing of special fuels to be allowed in problem areas

The Commission said leaded petrol should be phased out by 2000, although a three year derogation could be given to States able to demonstrate severe socio-economic problems

related to the age and composition of their vehicle fleets and supply infrastructure. The Directive would also involve a monitoring system to verify that the fuel quality standards were being met. Unlike the vehicles proposal, the Commission did not include new indicative standards for 2005, but said it would review the possibility of such measures.

Proposed fuel qualities		
	Limits	Expected average
<u>Spark ignition fuels (petrol)</u>		
Olefins (% v/v)	Max 18	11
Aromatics (% v/v)	Max 45	37
Benzene (% v/v)	Max 2	1.6
Oxygen (% m/m)	Max 2.3	~1
Sulphur (mg/kg)	Max 200	150
Lead (g/l)	Max 0.005	0.005
RVP Summer (kPa)	Max 60	58
E.100 (% v/v)	Min 46	53
E.150(% v/v)	Min 75	84
<u>Compression ignition fuels (diesel)</u>		
Cetane number	Min 51	53
Density (kg/m ³)	Max 845	835
Polyaromatics (% m/m)	Max 11	6
Distillation 95% point (°C)	Max 360	350
Sulphur (mg/kg)	Max 350	300

Source: COM/96/248

Towards a difficult conciliation on fuel quality

In June 1997, after long and difficult discussions, the Council reached unanimous political agreement on the fuels proposal. It accepted most of the technical specifications proposed by the Commission, but made several of the more important ones tougher. For gasoline engines, it

reduced the maximum aromatics limit value to 42%, the sulphur content to 150mg/kg, and the benzene content to 1%. It also agreed to allow the Commission to grant a three year derogation (from 2000) from the sulphur specifications for Member States with severe socio-economic problems. On the banning of leaded petrol, the Council agreed to lengthen the possible derogation period to January 2005. Leaded petrol (max 0.15g/l) will be available after then for specialist/vintage vehicles (up to 0.5% of the market).

Moreover, the Council's Common Position went further than the Commission with regard to 2005. It agreed to set indicative limit values for a number of parameters: for petrol engines, a sulphur content of 50mg/kg and a limit for aromatics of 35%; and for diesel engines, a sulphur content of 50mg/kg with a gradual phase-in and balanced distribution of the new type of fuel from 2005.

Council addition of indicative limits for 2005

As with the draft car emissions Directive, the Parliament, in its first reading in April 1997, called for major amendments to the fuel quality proposal, and most of these were confirmed at the second reading in February 1998. On sulphur, the Parliament did accept the Council's 150mg/kg figure for gasoline, but it called for the 350mg/kg limit for diesel, proposed by the Commission and accepted by the Council, to be reduced to 200mg/kg. Also for gasoline, the EP demanded a maximum of 14% for olefins; 35% for aromatics; and 2.7% for oxygen content.

Moreover, the Parliament insisted on fixed levels for 2005 - for gasoline: a research octane minimum of 95, a motor octane minimum of 85, maximum aromatic content of 30% and a maximum 30mg/kg sulphur content; for diesel, the proposed limits included a maximum of 50mg/kg for sulphur and a minimum cetane number of 58. It also called for some adjustments to the derogation regimes contained in the Common Position. As with the Directives on vehicle emissions, a tough conciliation procedure was expected in 1998 to resolve the differences between the Council and the Parliament.

The Parliament's insistence on fuel standards for 2005

TRANSBOUNDARY POLLUTION AND THE PROBLEM OF ACIDIFICATION

Control of atmospheric pollution which has a significant transboundary component, such as acidification, has been a key policy objective of the European Community since the 1980s and provided much of the impetus behind the first effective moves against pollution from large combustion plant. The Commission, in its review of the Fifth Environmental Action Programme, concluded that significant progress had been made on SO₂, but that the situation with regard to NO_x was more worrying.

In response to the concerns of Sweden after its accession, the Commission brought forward a detailed working document on the problems of acidification. The results of an analysis showed that even under a "rigorous scenario" using BAT, the maximum reduction by 2010 for SO₂ would be 90% and for NO_x it would be 70%. At these levels, the 'critical loads' would still be surpassed in a large part of Europe, especially the northern and central regions. (Critical loads, which are science-based and quantifiable, indicate the sensitivity of a particular environment by defining how much exposure to pollution it can tolerate before long-lasting or other significant damage occurs.) The working document also noted that the sources of the emissions were largely within the Community (although cooperation with other non-EU countries would probably be necessary to reduce acid deposits below the critical levels).

The critical load concept

In response to this analysis, environment ministers, meeting in December 1995, agreed that measures beyond those of the rigorous scenario would be necessary to meet the objective of reducing pollution so as not to exceed the critical loads. Consequently, they invited the Commission to define measures for a coherent strategy against acidification, and to fix targets intermediate to those of reaching the final objective based on critical loads.

Commission strategy paper on acidification

The Commission adopted a major strategy document aimed at combating the problems of acidification in March 1997. In presenting the new strategy, Environment Commissioner Ritt Bjerregaard said: "[The strategy] is based on an extensive scientific assessment of the most cost-effective measures to reduce emissions of SO₂, NO_x and ammonia which are the pollutants responsible for causing acidification. The strategy is based on the principle of shared responsibility and foresees a series of interlocking and complementary measures at the level of the European Union, in Member States and at the regional/local level."

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Despite considerable progress in reducing emissions of acidifying air pollutants, the Commission explained in the document, acidification still constitutes a major environmental problem for large areas of forest and freshwater ecosystems in the Union. In 1990, the critical loads for acidification were exceeded in over 33m hectares of sensitive ecosystems in the EU, an area similar to that of the UK, Denmark, and the Netherlands together. As a result of existing or already planned measures, the Commission said, emissions of acidifying pollutants would be likely to fall so that the surface area of ecosystems where critical loads are exceeded would eventually be reduced to 8.7m hectares.

50% gap closure target

The Commission accepted the difficulty of resolving the problems directly and therefore set its aim at a "50% gap closure" target - meaning that for every area in the EU where, in 1990, the critical loads for acidification were exceeded, the objective would be to close the gap between the 1990 situation and the critical load by 50%. The new strategy, the Commission said, aimed at reducing this to a surface area of 4.5m hectare. Several new initiatives were proposed.

The need for national emission ceilings

One necessary element, the Commission said, was the establishment of national emission ceilings for each pollutant and each Member State, which if achieved would bring about the interim environmental quality target. Such a policy, it explained, would be consistent with the Convention on Long-Range Transboundary Air Pollution, and would allow Member States a significant degree of flexibility in how the ceilings would be achieved. The Commission said it would put forward a proposal in 1998 to establish binding national emission ceilings for SO₂, NO_x, ammonia and volatile organic compounds (or VOCs).

New proposals due on large combustion plant

Secondly, the Commission said, emissions from combustion plant need to be further controlled. The 1988 Large Combustion Plant Directive (LCPD), which set emission reduction targets for SO₂ and NO_x, remains an important piece of Community legislation. There has been one addition to the LCPD since its adoption. In December 1994, ministers agreed a Directive which brought 50-100 MW power plant installations into the LCPD regulatory framework with respect to emissions of SO₂.

A revision of the Directive, although due in 1994-95, was still under preparation in early 1998. It is unlikely to require a retrospective tightening of emission limits from plant already in operation prior to implementation of the 1988 Directive, but the Commission may well call for tougher limits on new plant and it will ensure that the measures dovetail into the framework of the IPPC (Chapter Four). It will almost certainly include new provisions for gas turbines.

Proposal to reduce the sulphur content of heavy fuel oil

A third measure, for which the Commission presented a draft Directive in parallel with the acidification strategy Communication, concerned the reduction of sulphur in heavy fuel oil and gasoil. The Commission proposed a reduction of the maximum sulphur content of HFO (used principally in power stations and industry) to 1% by January 2000 while maintaining the current 0.2% ceiling for gasoils (used in domestic heating, for example). A sulphur content no higher than 2.5% would be allowed in some cases where air quality standards are respected and the contribution to transboundary pollution is negligible.

Exemptions were also written into the draft for new plants covered by the LCPD or which respect an SO₂ emission standard equivalent to using HFO with a 1% sulphur concentration. In order to avoid problems caused by a sudden change in the supply of oil, the Directive would also allow the Commission to authorise a higher sulphur content for different fuels for a period not exceeding six months. As a result of the proposal, emissions of SO₂ will be reduced by up to 1mt/yr, the Commission estimated.

Measures to foster international cooperation

The Commission's acidification strategy Communication also proposed several initiatives in the international arena. For example, it said the promotion of cost-effective measures to reduce emissions in Eastern Europe was a necessary part of the acidification strategy and that the adoption of EC environmental legislation should constitute one of the priorities in ongoing contacts with the ten CEEC (Chapter Nine).

The Communication also looked in detail at the Community's responsibilities and opportunities within the Convention on Long-Range Transboundary Air Pollution (LRTAP). This was signed in 1979 and, since then, there have been two protocols on sulphur (1985 and 1994) and one on NO_x. The Community acceded to the 1988 NO_x Protocol in 1993. Moreover, it signed, along with most

Member States, the 1994 SO₂ Protocol (which exploits the critical load concept). The Commission believes the LRTAP to be an extremely effective vehicle for addressing transboundary problems on a pan-European level, and therefore included, in its 1997 Communication, a draft Decision for the Community to ratify the 1994 SO₂ Protocol. In March 1998, the Council concurred to the proposal.

More specifically, the Commission's acidification strategy also called for the designation of the Baltic Sea and the North Sea as "SO₂ control areas". This would require ships in those areas to use fuels with a sulphur content of a maximum 1.5%. The Commission urged Member States to push for this policy within the International Maritime Organisation's Convention on Marine Pollution (commonly known as Marpol). Negotiations, in autumn 1997, succeeded in getting such a designation for the Baltic Sea but not for the North Sea.

Designation of certain seas as SO₂ control areas

Council restrictions on acidification strategy

The Member States' environment ministers reacted somewhat hesitantly to the Commission's strategy and proposals. Meeting in December 1997, they agreed Conclusions which called on the Commission "to take increasing account of the fact that acidification is a phenomenon which affects some countries and regions more severely than others" because of a number of factors, such as sensitivity of the ecosystems, prevailing wind directions, and the pattern of acidifying emissions across the Community. They reiterated their commitment to the long-term objective of ensuring critical loads are not exceeded and supported the idea of interim environmental targets "given the technical difficulties and the costs of achieving the long-term environmental objective".

Nevertheless, the Council was not prepared to accept a 50% gap closure as an interim target: "[It] considers that the interim environmental objective chosen by the Commission is very ambitious if applied uniformly across the Community. It believes that a comparable level of environmental protection could be achieved in a different manner and considers that alternative options for achieving the environmental objectives should be explored taking into account, inter alia, the polluter pays principle."

Council rejection of 50% gap closure target

Furthermore, the Council said it recognised that national emission ceilings could constitute an "effective as well as a flexible approach towards the reduction of emissions" but noted that "the cost estimates associated with the provisional emission ceilings included in the Commission's Communication imply an unacceptable economic burden for some Member States". The Council, therefore, called for more analysis "in order to avoid excessive costs for individual Member States".

The Council supported the use of methods for technical assessment as applied in the context of the LRTAP Convention but suggested the analysis could be improved through the use of alternative options (listed in an annex to the Conclusions) not considered by the Commission. The Council called for the timetable and results of the technical work to be coordinated with LRTAP work on the development of a new NO_x Protocol and it acknowledged that the Commission would propose a negotiating mandate for EU membership of such a Protocol.

The need to avoid excessive costs for some Member States

ASSESSMENT

There are two major ongoing problems of energy use which affect our lives in the short term. The one affects our health in cities and towns where dense traffic, and sometimes industrial activity, serve to pollute the air we breathe. The other, resulting from acid rain, affects the environment in which we live, especially the forests. SO₂ and NO_x emissions from energy use are major contributors to both problems, but the build-ups of lead and benzene in urban areas are also harmful.

In the 1980s, the answer to these problems was to place basic and rather crude controls on emissions from vehicles and combustion plants. They worked, in as much as the very worst polluting sources were put under strict EU-wide regulation. But in the 1990s, as public demand for cleaner air increased and Member States became more willing to allow Brussels to deal with the problem, so more sophisticated responses became necessary. The Commission needed to take a more deeply-considered approach; and it needed to justify action, not only against other environmental concerns competing for resources, but also in terms of the costs of any legislation.

These pressures resulted in the need, first, for much better information on the state of the environment and the level of pollutants; second, for the more comprehensive problem-based approach of the Fifth Environment Action Programme; and, thirdly, for a more rigorous cost-benefit analysis of each proposed action.

Thus, in order to make effective any policy towards controlling air pollution, the Commission needed to set up a framework for providing information about air quality across the Union, and a

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mechanism for responding to critical pollution levels. Now that such a framework is ready the EU should agree on detailed parameters for each pollutant; a first set of such parameters - for SO₂, NO_x, particulates and lead - were under negotiation in 1998. Of particular importance, for this proposal and others, is the trend towards making information available to the public. Within a few years, it is likely that pollution reports will be as common as weather forecasts, especially in those cities and industrial areas where there is a risk that critical levels may be exceeded.

The problems of urban pollution are not going to disappear overnight. Traffic is on the increase everywhere, and even the Commission's ambitious environment strategy scenarios always include a growth in emissions from the transport sector (Chapter Four B). It is of great importance, therefore, that the EU continues with its push to make engines and fuels cleaner. The Auto-Oil Programme, and the cooperation between the oil and car industries, was a very welcome addition to the instruments backing up the policy process, even if Europe had previously lagged behind the US.

It was probably inevitable that the two industries would never see eye-to-eye on the way the results were used by the Commission. The oil industry, as represented by Europa, appeared to be most satisfied with the outcome of the Commission's internal negotiations. In a press release, it said the Commission's proposals were "a fully validated series of measures that will solve Europe's air quality needs". The automobile industry was less enthusiastic about the draft Directive on vehicle emissions. It complained that the manufacturing costs would increase by 3-5%, and that it was being asked to do far more than the oil industry.

The Commission itself included cost estimates in its Auto-Oil proposal documents. It noted that the proposed standards for 2000 would cost the car industry an extra Ecu2.44bn, the van producers Ecu316m, and HGV producers Ecu675m each year. Moreover, additional costs of Ecu706m/yr would be incurred for improved emissions control durability, and Ecu555m/yr for improved inspection tests. The fuel quality proposals would cost the Union's refining industry Ecu765m/yr and this would translate into an additional cost of Ecu0.002/litre for petrol or diesel, the Commission said.

Europa's hyperbole

Europa, in fact, having been self-satisfied with the Commission's proposal, reacted aggressively to the European Parliament's second reading amendments to the fuels Directives. It made the astonishing claim that the EP's amendments would only improve air quality by about 1% (compared to the original proposals) but that they would cost the oil industry, and therefore the consumer, five times more. Europa's hyperbole seemed all the more unreal since it had made exactly the same claim about the draft Opinion prepared by the EP's environment committee, and yet, the final Opinion failed to adopt one of the most significant amendments - on the sulphur content of gasoil - proposed by the committee.

During 1998, the Council and the European Parliament will have to resolve their rather wide differences on the Auto-Oil proposals. It is difficult to understand the Parliament's insistence on fixing emission levels and fuel qualities for 2005 now, when there is time to take a more considered approach to the future levels (the Commission's second Auto-Oil Programme is already under way), and when the Council has already agreed to a sensible approach which includes setting targets for 2005 and allowing Member States to make use of incentives to encourage a more rapid evolution towards those targets. Perhaps, during the conciliation procedure, the EP will drop the insistence on mandatory levels for 2005 in exchange for the Council agreeing marginally stronger standards for 2000.

The ambitious targets and the high costs

Although the problem of acid rain is not as important as that of damage to human health caused by the same pollutants in urban areas, it is one of great concern, especially to some of the North European Member States. With the LCPD, the Community made huge strides in reducing large-scale sulphur emissions, but further action has proved necessary. The Commission's recent acidification strategy has defined a framework for making further progress, but it contains some worrying elements. The interim targets look very ambitious, a point the Council has not failed to notice, nor have many industry lobby groups. Moreover, it is not clear why the promised revision to the LCPD has still not appeared - it was due in the mid-1990s.

Moreover, the costs appear far from negligible. The Commission itself has calculated that, overall, the additional emission control costs of meeting the interim target would be around Ecu7bn/yr. More specifically, the Commission has estimated that the incremental costs of introducing a 1% sulphur limit for HFO would be Ecu760m, with the costs spread extremely unevenly across the Community, from Ecu0 in Sweden and Finland to Ecu178m and Ecu217m in Spain and the UK respectively. Of these the largest costs would be borne by the power station sector (Ecu291m), other industry (Ecu196m) and refineries (Ecu149m), according to the Commission's analysis.