

Case Study: Integrated Air Pollution Policy

An integrated policy or strategy analyses the environmental and health problems, sets interim and long term objectives and identifies cost-effective measures to reach several environmental objectives. As a consequence packages of measures may be identified that would achieve several of the objectives. The implementing policy instruments depend on the sector targeted, combining regulatory, economic and voluntary instruments. Important strategies have been developed to fight acidification and ground-level ozone. These issues are also addressed in the comprehensive Auto-Oil programs related to fuels and vehicles.

The energy and industry sector (stationary sources) and transport sector (mobile sources) are the two main contributors to air pollution. Fair market conditions can be ensured by establishing the same conditions of operation within the market which can be guaranteed through common environmental standards for large combustion plants fuels and the vehicle standards. Furthermore legislation for fuel quality is closely linked to marketing of products and environmental performance.

Stationary source emissions

The stationary emission sources directives cover large combustion plants (Directive 2001/80/EC), waste incineration plants (Directive 2000/76/EC) and emissions of volatile organic compounds from storage of petrol (Directive 94/63/EC) and from solvents (Directive 1999/13/EC). In the source oriented directives direct reference is given to the air quality standards in force that have to be met.

Directive 2001/80/EC⁶ on the limitation of emissions of certain pollutants into the air from large combustion plants plays a decisive role in the Community's efforts to combat acidification, eutrophication and ground-level ozone as part of the overall strategy to reduce air pollution. The directive aims at tightening the Community's curbs on air pollution from new combustion plants in line with the substantial technical progress made in this sector. The directive also covers "old" power plants. The new Directive encourages the combined generation of heat and power and sets specific emission limit values for the use of biomass as fuel. It sets standards for emissions of sulphur and nitrogen oxides and for dust. Limit values depend on type of fuel used, production (power) of the plant and separates existing and new plants. The directive also sets reduction targets for the sector in the Member States and allows for flexible ways of achieving these targets through alternative national plans and programs that achieve the same overall target as emission limit values applied for each installation. Member States have in several cases extended their national legislation to include also power plants below the threshold size level (50 MW_{th}) laid down in the directive and also applying stricter emission standards.

The Directive on waste incineration plants (Directive 2000/76/EC⁷) requires the Member States to permit incineration within limit values for dust, total organic carbon, hydrogen chloride and fluoride, sulphur dioxide and oxides of nitrogen, metals and dioxins and furans, and carbon monoxide. Also other substances may be controlled through this directive such as PCBs.

⁶ Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from Large Combustion Plants. Building on and amending Directive 88/609/EEC on the limitation of emissions of certain pollutants into the air from Large Combustion Plants and Council Directive 94/66/EC amending Directive 88/609/EEC on the limitation of emissions of certain pollutants into the air from large combustion plants.

⁷ Directive 2000/76/EC of the European Parliament and of the Council of 4th December 2000 on the incineration of waste. Building on and amending Directive 89/369/EEC of 8 June 1989 on the prevention of air pollution from new municipal waste incineration plants, Directive 89/429/EEC of 21 June 1989 on the reduction of air pollution from existing municipal waste-incineration plants, Directive 94/67/EC on incineration of hazardous waste, latest amendment proposal COM (97) 604,

Directive 1999/32/EC⁸ on the reduction of sulphur content of certain liquid fuels aims to reduce the emissions of sulphur dioxide resulting from the combustion of heavy fuel oils and gas oils and marine gas oils in the EU. Heavy fuel oils are generally used in combustion plants, while gas oils are used in heating boilers and marine gas oils are used in smaller engines on ships. Reducing emissions from these sources will reduce the harmful effects of such emissions on man and the environment. These reductions shall be achieved by imposing limits on the sulphur content of certain fuels as a condition for their use within the territory of the Member States. The sulphur limits are 1% for heavy fuel oil and 0.2% for gas oil and marine gas oil (dropping to 0.1% in 2008).

Volatile Organic Compounds (VOCs) have a direct effect on human health and the environment and through their role in producing ground level ozone. For VOCs two major directives are in force: the VOC Stage I directive (94/63/EC)⁹ and VOC solvents directive (1999/13/EC)¹⁰. The VOC Stage I directive aims to prevent emissions to the atmosphere of VOCs (mainly hydrocarbons) during the storage of petrol at terminals and its subsequent distribution to service stations. It contains measures that terminals should employ such as floating roofs and reflective coatings so as to reduce evaporative losses from storage tanks. In addition, when petrol is loaded onto tankers and transported to service stations, the directive ensures that any vapours are recovered and returned to the tanker or terminal.

The VOC solvent directive sets emission limit values (expressed in terms of the maximum solvent concentration in waste gases) and fugitive emission values (expressed as a percentage of solvent input). Industrial operators can be exempted from the above-mentioned limitations, provided that they achieve by other means the same reduction as would be made by applying them. In other words, they can choose the most cost-effective way to achieve the required reductions: either by the use of abatement technology, or by substituting high-solvent products by low-solvent or solvent-free products. Member States are required either to implement the set of emission limit values foreseen by the Directive, or to design and implement a National Plan to achieve the same reduction.

The VOC solvent directive was recently amended to include also the limitation of emissions of VOCs due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products (the so-called VOC Paints Directive¹¹). The directive establishes limit values for maximum VOC contents of decorative paints and other products covered by the Directive. For paints, the Directive sets up two sets of limit values for the maximum contents of VOCs in grammes per litre of the product ready for use. The first set of limit values shall apply from 1 January 2007. The second, and stricter, set of limit values apply from 1 January 2010. See Annex II A.

⁸ Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC

⁹ European Parliament and Council Directive 94/63/EC of 20 December 1994 on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations

¹⁰ Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations

¹¹ Directive 2004/42/EC of the European Parliament and of the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC.

Road transport emissions

The *Auto Oil programs* from 1992 to 2000 carefully analyzed the relationship between vehicle fuel quality and technical standards for vehicles. One objective of the programs was to meet air quality objectives and to reduce the effects of urban air pollution on human health. The Auto Oil programs formed the basis of and underpinning for a number of directives on fuel quality and performance standards for vehicles.

Vehicles standards

Directive 70/220/EEC¹² is the base directive for emission standards for **light duty vehicles** (classes M1 and N1), and Directive 88/77/EEC¹³ is the base directive for emission standards for heavy vehicles. For motorcycles and mopeds Directive 1997/24/EC¹⁴ lowers the emissions.

For **light commercial vehicles and passenger cars** the present so called EURO IV (in force from 2005) sets emission standards for diesel and petrol cars and includes pollutants such as particulate matter, nitrogen oxides, carbon monoxide and hydrocarbons. Further tightening of the emission standards for cars is being prepared. Also two and three wheelers are covered in a separate directive¹⁵ setting the standards for carbon monoxide, hydrocarbons and nitrogen oxides.

For **heavy duty vehicles**, buses and trucks the present standard EURO IV has been in force as of 2005. EURO IV sets standards for emissions of nitrogen oxides, hydrocarbons and particulate matter. As a further step, the EURO V standards will enter into force as of 2008 that will further reduce the emissions of nitrogen oxides.

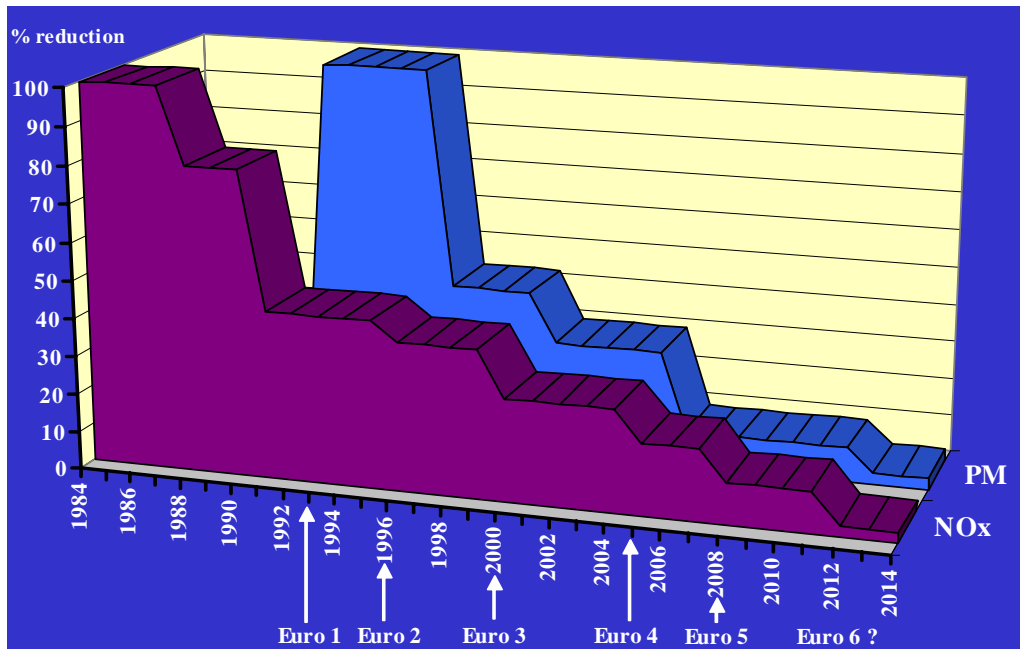
¹² Directive 70/220/EEC on the approximation of the laws of the Member States relating to measures to be taken against air pollution by gases from positive-ignition engines of motor vehicles. Amendments to Directive 70/220/EEC: Council Directive 74/290/EEC, Commission Directive 77/102/EEC, Commission Directive 78/665/EEC, Council Directive 83/351/EEC, Council Directive 88/76/EEC, Council Directive 88/436/EEC, Council Directive 89/458/EEC, Council Directive 91/441/EEC, Council Directive 93/59/EEC, European Parliament and Council Directive 94/12/EC, Commission Directive 96/44/EEC, European Parliament and Council Directive 96/69/EC, European Parliament and Council Directive 98/69/EC, Commission Directive 99/102/EC, European Parliament and Council Directive 2001/1/EC, European Parliament and Council Directive 2001/100/EC.

¹³ Directive 88/77/EEC on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous pollutants from diesel engines for use in vehicles. Amendments to Directive 88/77/EEC: Council Directive 91/542/EEC (this provides the Euro 1 and Euro 2 emission standards), Commission Directive 96/1/EC, European Parliament and Council Directive 1999/96/EC (this provides the Euro 3 (from October 2000), Euro 4 (from October 2005) and Euro 5 (from October 2008) emission standards), Commission Directive 2001/27/EC.

¹⁴ Directive 97/24/EC amended through Commission Directive 2003/77/EC and Commission Directive 2005/30/EC.

¹⁵ Commission directive 2003/77/EC of 11 August 2003 amending Directives 97/24/EC and 2002/24/EC of the European Parliament and of the Council relating to the type-approval of two- or three-wheel motor vehicles

Figure Development of Emission standards for heavy duty vehicles



Non-road mobile machinery

The engines and fuels used for the non-road machinery are similar to those used in heavy duty vehicles. The Community standards are laid down in Directive 97/68/EC on the approximation of the laws of the Member States relating to roadworthiness tests for motor vehicles and their trailers. The present legislation covers agriculture and forestry tractors¹⁶ and other non-road machinery (excavators, bulldozers, front loaders, back loaders, compressors locomotives, railcars and inland waterway vessels etc)¹⁷ and hand held and non-hand held engines¹⁸. The directives set emission standards for nitrogen oxides and hydrocarbons, carbon monoxide and particulate matter. For seagoing ship emissions, please see later section.

Automotive Fuel Quality

Directive 98/70/EC as amended by Directive 2003/17/EC¹⁹ contains the environmental fuel quality specifications for petrol and diesel fuels in the Community with the main focus for diesel on sulphur and for

¹⁶ Directive 2000/25/EC of the European Parliament and of the Council of 22 May 2000 on action to be taken against the emission of gaseous and particulate pollutants by engines intended to power agricultural or forestry tractors and amending Council Directive 74/150/EEC.

¹⁷ Directive 2004/26/EC of the European Parliament and of the Council of 21 April 2004 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery.

¹⁸ Directive 2002/88/EC of the European Parliament and of the Council of 9 December 2002 amending Directive 97/68/EC on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery.

¹⁹ Directive 2003/17/EC of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and Commission Recommendation 2005/27/EC on what, for the purposes of Directive 98/70/EC of the European Parliament and of the Council concerning petrol and diesel fuels, constitutes availability of unleaded petrol and diesel fuel with a maximum sulphur content on an appropriately balanced geographical basis.

petrol on lead and aromatics. There are three distinct specifications. The first entered into effect on 1st January 2000, the second on 1st January 2005 (it sets limits for the sulphur content of petrol and diesel (50 ppm) and the aromatics content of petrol (35% by volume)) and the third is the phase in, as of 1st January 2005, of diesel and petrol with a sulphur content of 10 ppm to be fully implemented by 2009. In addition, since 1 January 2002 all petrol sold in the Member States is unleaded.