Air Quality Control 2010

National Programme of the
Federal Republic of Germany pursuant to Article 6
of Directive 2001/81/EC of 23 October 2001 on national
emission ceilings
for certain atmospheric pollutants
(NEC Directive)

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Germany presents national programme to limit emissions of major air pollutants to meet emission ceilings by 2010

The Federal Government has presented a programme setting out specific measures to further reduce emissions of major air pollutants. This programme aims to meet the national emission ceilings (NECs) laid down in Directive 2001/81/EC of the European Parliament and the of Council on national emission ceilings for certain atmospheric pollutants, which entered into force on 27 November 2001. The NEC Directive limits Germany's total national emission loads to 520 kt for sulphur dioxide (SO_2), 1051 kt for nitrogen oxide (NOx), 550 kt for ammonia (NH_3) and 995 kt for non-methane volatile organic compounds (NMVOCs). This means emission reductions of about three quarters of the levels in 1990 and, compared to current levels, a reduction of about 30% for nitrogen dioxides and NMVOCs, about 20% for sulphur dioxide and about 10% for ammonia.

This programme is an important step towards the goal of meeting the critical loads for acidification, eutrophication and ground-level ozone in Europe. It is expected that compliance with the national emission ceilings will halve the ecosystem areas that are affected by acidification and reduce health-related ozone exposure by about two-thirds and vegetation-related ozone exposure by one-third. Due to its sensitive ecosystems and its central location in Europe, Germany will profit very much from these ecological improvements.

The "National Programme" in German, including documentation of the emission inventory, emission projections and relevant legislation, is available on the Internet at http://www.umweltbundesamt.de and as Texte 37/02 Luftreinhaltung 2010, Umweltbundesamt.

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1 Summary

Directive 2001/81/EC of 23 October 2001 (NEC Directive) lays down national emission ceilings for the air pollutants sulphur dioxide (SO_2), nitrogen oxides (NO_x), ammonia (NH_3) and volatile organic compounds (not including methane, NMVOCs) which may not be exceeded after 2010. Under Articles 6 and 8 of the Directive, every Member State is required to draw up a national programme for the reduction of emissions of the above-mentioned pollutants and to inform the public and, by the end of 2002, the European Commission about this programme. The programme aims to comply at least with the national emission ceilings. In accordance with Article 6, the status of the base data for the national programme is generally October 2002.

The programme provides information on existing and planned measures in Germany and the EU to reduce emissions of the above-mentioned pollutants. In addition, it includes quantified estimates of the effect of these measures on emissions of the pollutants in 2010.

Chapter 2 describes the so-called reference projection. This projection shows the development of emissions in Germany up to the year 2010. The framework conditions for this projection are the current regulations and the emission control measures they require, as well as the expected economic development. Chapter 3 describes the additional measures which need to be taken over and beyond the measures of the reference scenario in order to comply with the national emission ceilings in due time. The annexes 1 and 2 provide documentation of the emission calculations and annex an overview of the present German legislation and programmes for reduction of emissions.

Table 1 compares the NEC Directive's emission ceilings for Germany with the emissions in 2010 projected in the reference projection.

Table 1 Emission Ceilings and reference projections for Germany

	SO_2(kt)	**NO_x(kt)**	**NH_3(kt)**	**NMVOC(kt)**
Emission ceilings of the NEC Directive 2010	520	1051	550	995
Emissions in 2010 according to the reference projection, not including measures listed in Chapter 3	513	1126	585	1192
Difference between reference projection and ceiling	-7	+75	+35	+197

According to the reference projection, the emission ceiling for SO_2 will be complied with in 2010. Projected emissions of the other substances show the need for further reductions of 75 kt NO_x, 35 kt NH_3 and 197 kt NMVOCs. The additional measures listed in Chapter 3 serve to achieve compliance with the emission ceilings for these three substances. These measures include:

- A further reduction of NO_x from heavy goods vehicles, passenger cars with a diesel engine and light goods vehicles through adaptation of the relevant EC Directives.

- A further reduction of emissions from non-road mobile machinery through adaptation of the relevant EC Directive.

- Limitation of the solvent content in products (e.g. paints and varnishes) and introduction of corresponding labelling through EC directives.

- A tightening of the emission standards for industrial and large combustion installations in response to the advancement of the state of the art.

- Implementation of an integrated programme for reduction of ammonia emissions through development of sustainable agriculture.

In order to realise these measures, decisions must also be taken at EC level. Corresponding directives are on the Commission's agenda. In Council deliberations Germany will press for the adoption of provisions which provide the instruments Germany needs to comply with its emission ceilings. This requires, in particular, directives for reducing the solvent content in products and for further limitation of NO_x emissions from motor vehicles and non-road mobile machinery as well as the integration of environmental aspects in regulations for animal production.

2 Emissions in 2010

2.1 Basis for the projection

The basis for the emissions projection was the legislation currently in force in Germany, including future measures based on it which will become effective by the year 2010. The calculations were carried out according to the relevant international emissions reporting guidelines[1].

Emissions were calculated by linking activity rates with emission factors. Reference parameters representative of the quantity emitted were chosen as activity rate. For example, the typical parameter for the energy sector is fuel input; for the products sector it is the production volume. An emission per unit of quantity which is representative of the emission cause was determined as emission factor. Ammonia emissions from agriculture were calculated on the basis of data on livestock numbers by category and production system, type of manure storage, manure spreading techniques and use of mineral fertilisers. All activity rates and emission factors reflect the scientific information available in 2000.

In Germany, energy consumption is the main factor for SO_2 and NO_x emissions. In 2000, energy use accounted for 90% of SO_2 and 98% of NO_x emissions. 62% of releases of NMVOCs come from solvent use. Agricultural activities are responsible for 95% of NH_3 emissions.

For the 2010 projection, all data were carried forward in line with the information available up to October 2002. The relevant factors for installations and products were the provisions of the Technical Instructions on Air Quality Control (German acronym: TA Luft) of 2002, the sharper reduction of NMVOC losses during fuel transport and motor vehicle refuelling as a result of amendments to the appropriate statutory ordinances as well as the implementation of the EC Solvents Directive with stricter national requirements. For calculation of motor vehicle emissions using the TREMOD model (version 2.1)[2], all relevant EC Directives including adopted improvements up to 2010 were taken into account. Data on traffic volumes was taken from the time series published by the Federal Ministry of Transport, Building and Housing in “Verkehr

[1] The IPCC Guidelines for National Greenhouse Gas Inventories, Reporting Instructions, IPCC Guidelines http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm and CORINAIR Atmospheric Inventory Guidebook, CORINAIR Handbook http://reports.eea.eu.int/EMEPCORINAIR3/en/

[2] ifeu Heidelberg: Aktualisierung des Daten- und Rechenmodells: Schadstoffemissionen aus dem motorisierten Verkehr in Deutschland 1980-2020“. Under contract to the Umweltbundesamt, UFOPLAN No. 201 45 112, Heidelberg 2000. A new version of the model (version 3.0) has been available since October 2002.

in Zahlen 2001/2002“. Their projection was based on the trend scenario of the “Verkehrsprognose 2015” (2015 forecast for the transport sector), prepared for Federal transport infrastructure planning, and estimates for 2020[3] by the German Economic Research Institute (DIW). The assumed development of fuel consumption draws upon the prognos99[4] energy forecast. The assumptions of this forecast already take into account the ecological tax reform of 1999 and the anticipated structural changes from the phase-out of nuclear energy. They were supplemented by relevant developments due to the Renewable Energy Sources Act and the Combined Heat and Power Act (referred to in the following as prognos99plus). In Germany, emissions of NH_3 from agriculture are caused mainly by natural processes in livestock farming which can only be influenced to some extent. The main source are livestock farms which are not subject to an authorisation procedure pursuant to the IPPC Directive. For projection of NH_3 emissions, use was made in particular of estimates of the development of livestock numbers and the use of low-emission technologies[5]. The development of livestock numbers was estimated on the basis of the official livestock census of 1999[6].

2.2 Results of the projection

Table 2 shows the results of the emissions calculation for 2000 and the projection for 2010 following the sectoral breakdown prescribed by IPPC and CORINAIR. Details of the emissions calculation are documented in Annexes 1 and 2.

The “reference projection” is the emissions projection which takes into account the legislation currently in force in Germany, including its effect on emissions up to the year 2010. This reference projection shows the following emissions for 2010 for the four pollutants: SO_2 513 kt; NO_x 1126 kt; NH_3 585 kt and NMVOCs 1192 kt. A comparison of the reference projection and the figures of the NEC Directives (Table 1) shows that an additional reduction of 75 kt for NO_x, 35 kt for NH_3 and 197 kt for NMVOCs is necessary to comply with the emission ceilings

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[3] DIW: Instrumente und Maßnahmen zur Realisierung einer nachhaltigen Energieversorgung im Bereich „Mobilität“. Under contract to Forschungszentrum Karlsruhe, Büro für Technikfolgenabschätzung, in preparation

[4] Energiewirtschaftliches Institut (EWI) at the University of Cologne and PROGNOS AG:
Die längerfristige Entwicklung der Energiemärkte im Zeichen von Wettbewerb und Umwelt.
Study under contract to the Federal Ministry of Economics and Technology (BMWiT), Berlin, 1999

[5] Döhler, H, Eurich-Menden, B., Dämmgen, U., Osterburg, B., Lüttich, M., Bergschmidt, A., Berg, W. and Brunsch, R. 2002: BMVEL/UBA-Ammoniak-Emissionsinventar der deutschen Landwirtschaft und Minderungsszenarien bis zum Jahre 2010. UBA-Texte 05/02.

[6] Statistisches Jahrbuch der Landwirtschaft 2001

by 2010. The emission ceiling for SO_2 will be complied with according to the reference projection. The additional measures set out in Chapter 3, which are not included in the reference projection, serve to achieve compliance with the emission ceilings.

During the period 2000 – 2010, emissions in Germany will fall significantly as a result of the measures which have already been launched by the Federal Government. In the case of stationary sources, the decrease of SO_2 and NO_x is mainly the result of climate protection measures, which will reduce energy consumption and the associated emissions, and the tightening of emission control requirements by the TA Luft of 2002. Emissions from transport will also decrease significantly, due to the tightening of exhaust emissions limit values for motor vehicles and improvements in vehicle fuel quality. In the case of NO_x, the calculated reductions will partly be offset by the increase in goods transport by road and the growing proportion of diesel engines in newly registered cars[7]. It is expected that the implementation of the EC Solvents Directive will result in considerable reductions in NMVOC emissions. Additional national requirements will generate a reduction of about 50 kt.

In the sector of agriculture, the reduction of ammonia emissions in the reference scenario results from the expected further decline in cattle populations and the increased use of technical abatement measures, e.g. covering of slurry stores or use of trailing hoses for land spreading of slurry. Based on the estimated development of livestock numbers for 2010, and assuming that the propagation of modern technologies in agriculture will be continued, NH_3 emission from livestock farming in 2010 will amount to c. 455 kt NH_3 emissions from mineral fertilisers are assumed to remain unchanged, at 103 kt.

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[7] A measurement programme carried out jointly by Germany, the Netherlands, Austria and Switzerland showed, in February 2003, that Euro II engines of heavy duty vehicles emit 30% more NO_x than previously assumed. This means, according to recent calculations, that the difference between the reference projection and the emission ceiling for NO_x in 2010 will be 150 kt instead of 75 kt. This result became known only recently, and after preparation of the national programme, and is therefore still subject to study and coordination. For this reason, a more detailed discussion of this matter will have to be deferred until the next report to the European Commission on the update to the Federal Republic of Germany's national programme.

Table 2

Emissions estimate 2000 und reference projection 2010 by emission source categories as prescribed by IPCC und CORINAIR

IPCC Code	CORINAIR SNAP Code	Emission Source Category	Emissions from Germany in kt							
			SO2		NOx		NMVOC		NH3	
			2000	2010	2000	2010	2000	2010	2000	2010
1		**Energy**	**510**	**401**	**1.441**	**1.037**	**466**	**257**	**16**	**12**
1A		**Fuel Combustion Activities**	**510**	**401**	**1.441**	**1.037**	**424**	**236**	**16**	**12**
1A1	**01**	**Energy Industries**	**310**	**254**	**261**	**233**	**23**	**16**	**3**	**3**
1A1a	0101+0102	Public Electricity and Heat Production	238	181	220	192	20	13	2	2
	0101	*Public Powrer*	*233*	*175*	*216*	*187*	*20*	*12*	*2*	*2*
	0102	*District Heating Plants*	*5*	*6*	*4*	*5*	*0*	*0*	*0*	*0*
1A1b	0103	Petroleum Refining	56	59	25	28	2	2	1	1
1A1c	0104+0105	Manufacturing of Solid Fuels and Other Energy Industries	16	14	16	14	2	2	0	0
1A2	**03**	**Manufacturing Industries and Other Mining**	**84**	**78**	**71**	**79**	**5**	**5**	**1**	**1**
1A3	07 + 08	**Transport**	**25**	**5**	**1.000**	**621**	**334**	**157**	**9**	**5**
1A3b	**07**	Road Transport	20	1	788	419	283	113	9	5
1A3a,c,d,e	**08**	other Transport	5	4	212	202	51	44	0	0
1A4	**02**	**Non-Industrial Combustion**	**90**	**64**	**109**	**104**	**63**	**58**	**3**	**3**
1A4a	0201	Commercial and Institutional	27	18	32	29	8	7	1	1
1A4b	0202	Residential	63	46	77	75	55	51	2	2
1B		**Fugitive Emissions from Fuels**					**41**	**21**		
1B2a5	0505	Petrol Distribution					41	21		
2	**04**	**Industrial Processes**	**127**	**112**	**114**	**89**	**139**	**135**	**15**	**15**
3	**06**	**Solvent Use**					**1.000**	**800**		
3A	0601	Paint Application					372	208		
3B-3D	0602-0604	Other Use of Solvents					628	592		
4	**10**	**Agriculture**							**568**	**558**
4B	1005	Manure Management							464	455
4D	1001	Cultures with Fertilisers							103	103
		Sum	**636**	**513**	**1.555**	**1.126**	**1.605**	**1.192**	**599**	**585**

Note: In this table, traction current is included under “Public Power”

3 Additional measures to meet the emission ceilings

3.1 Overview

As shown in Table 1, additional measures, going beyond the activities taken into account in the reference scenario (cf. Chapter 2), are necessary to comply with the emission ceilings for NO_x, NH_3 and NMVOCs in 2010. To realise these measures, efforts must be made at national and EU levels. The Federal Government is considering using, in particular, the additional measures listed in Table 3 for complying with the requirements of the NEC Directive in due time. The measures in Table 3, whose pollutant reduction effect can already be quantified, by themselves are sufficient to achieve the necessary additional reductions.

For motor vehicles, non-road mobile machinery, solvents in products and integrated measures in agriculture, actions need to be taken jointly in the EU. Without new or revised directives it will not be possible for Germany to comply with the emissions ceilings for NO_x and NMVOCs. At national level, measures required by the revised TA Luft, particularly further limitation of emissions as a result of advances in the state of the art, will contribute to the reduction of emissions from industrial installations. Further reductions are also expected to result from the revision of the Ordinance on Large Firing Installations. The same applies to the Use of Fertilisers Ordinance. Germany considers the reduction of ammonia emissions to be an integral part of its agricultural policy. However, as there is little scope for national actions in this area, Germany advocates measures for reduction of ammonia emissions to be taken at EU level, within the scope of the Council Decision on environment integration in agriculture policy[8]. Measures which could help to achieve significant reductions in ammonia emissions from cattle farming comprise, in particular, the decoupling of head age payments from production in combination with intensified promotion of grassland.

After the elections to the Bundestag in September 2002, the two governing parties agreed, in the Coalition Agreement of 16 October 2002, on a number of measures[9] which will likely

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[8] European Council – Presidency Conclusions (Cardiff 1998) and decision adopted at the 2218th Agriculture Council of 15 November 1999 on the strategy for environment integration and sustainable development in common agriculture policy

[9] See: http://www.bundesregierung.de (>Regierung > Koalitionsvertrag)

play a supplementary role for compliance with the emission ceilings. No information can be given as yet about the emission reduction contributions of the various measures.

With the aim of best-possible transport services, the Federal Government -will promote the harmonisation of the transport modes' competitive conditions and encourage fair competition between them to facilitate an economically reasonable division of tasks. This includes the future integration of transport by air, rail and inland waterways into the national emissions reduction programme.

Table 3

Additional measures to achieve compliance with the national emission ceilings

Measure	Estimated reduction of pollutants, in kilotonnes			
Mobile sources and small motors	**SO_2**	**NO_x**	**NH_3**	**NMVOC**
Adaptation of the EURO V limit value stage for engines for use in commercial vehicles and incentives for their market penetration, and of the distance-based motorway toll	Minor effect (ME)	36	ME	ME
Exhaust emission limit values and roadworthiness test for motorcycles	ME	1	ME	2.5
Reduction of NO_x from passenger cars with a diesel engine and light-duty vehicles (EURO 5, catalytic converter or equivalent technology)	No effect (NE)	9	NE	NE
Reduction of emissions from internal combustion engines in non-road mobile machinery, labelling initiative	NE	34	NE	15
Stationary sources				
Specification of emissions requirements under the TA Luft in line with the development of the state of the art	ME	25	ME	ME
Amendment to 13th BImSchV (draft of 05.12.02) Tightening of the emission limits for large combustion plants and gas turbines	Not quantifiable at present	6	ME	ME
Amendment to the 17th BImSchV (draft of 13.09.02) Increased co-incineration of waste in combustion plants subject to stricter emission limits	Not quantifiable at present			
Products				
Limitation and labelling of solvents in products on the basis of new EC directives	NE	NE	NE	Potential of c. 200

Agriculture	**Estimated reduction of pollutant, in kilotonnes**
	NH_3
Measures to reduce ammonia emissions from agriculture, covering the following areas: • Common Agricultural Policy (CAP) - Reduction of the stocking density for the special premium for male bovines and the suckler cow premium - Decoupling the headage payment from production - Promotion of organic farming • Recommendations for good agricultural practice • Development of BAT for small holdings • Support measures for reduction of livestock densities and ammonia emissions - Agri-environmental measures - Support measures which provide for a maximum stocking limit per holding - Support measures for the introduction of low-emission techniques • Adaptation of building law to restrict landless livestock production • Adaptation of the Use of Fertilisers Ordinance • Adaptation of immission control legislation - Extension of the licensing requirement - Inclusion of nitrogen inputs when assessing the existing pollution load within the scope of the TA Luft - Adaptation of the state of the art within the scope of the TA Luft	Estimate for sum of all measures 40-60

3.2 Explanatory comments on the additional measures

3.2.1 Adaptation of the EURO V for engines for use in commercial vehicles and incentives for their faster market penetration

In Germany there are 1.3 million heavy-duty vehicles (trucks and busses with a permissible total weight of more than 3.5 tonnes). Projections indicate that total distance travelled in goods transport by road will continue to grow. Emissions will however decrease as a result of fleet renewal with vehicles which meet increasingly stringent limit values (EURO stages III, IV and V in 2000, 2005 and 2008). Directive 1999/96/EC relating to measures to be taken against emissions from engines for use in vehicles already provides for a EURO V limit value stage, including *inter alia* a limit value for NO_x of 2.0 g/kWh for both the stationary and the dynamic European test cycles which will apply from 2008 to type-approval of new engine types and from 2009 to the placing on the market of all new engines for use in commercial vehicles.

Article 7 of the Directive mandates the Commission to consider the available technology for compliance with the NO_x standard for 2008 and to present new proposals, if necessary, in a report to the European Commission and to the Council by 31 December 2002. This report is to include considerations on a further lowering of the NO_x limit value with effect from 2008/2009 or a later date. Assuming that an NO_x limit value of 1.0 g/kWh from 2008/2009 is technically feasible and will be introduced as part of an adaptation of the EURO V stage, and that corresponding commercial-vehicle engines will be launched on the market as early as to account for 100% of new registrations in 2008, it was calculated that this would result in an NO_x reduction of 36 kt for 2010. In order to accelerate the market launch and penetration of corresponding vehicles, the Federal Government is considering incentives in the form of a variation of the motorway toll and the further development, in cooperation with the *Länder*, of the emissions-based motor vehicle tax for commercial vehicles.

3.2.2 Exhaust emission limit values, emissions-based motor vehicle tax and roadworthiness test for motor vehicles

There are 5.1 million motorcycles in Germany, which are operated mainly in summer on Sundays and holidays. At present, the pollutant emissions of new motorcycles are at the level of those of 10 year old passenger cars. Due to the successes achieved with passenger cars and

commercial vehicles, the exhaust emissions of motorcycles now account for a significant proportion of the pollutant emissions from road traffic (NMVOCs: 2002 15 %, 2010 17.6 %; NO_x: 2002 0.5 %, 2010 1.2 %). Under the Exhaust Emissions Directive of 19 July 2002 for two- and three-wheel motor vehicles (2002/51/EC), the exhaust emission limit values for motorcycles will be lowered, in two stages (1.4.03 and 1.1.06), to the level of those of a modern EURO III car, i.e. by 50-90% compared to the current situation. In order to accelerate their market launch and penetration, the Federal Government, together with the *Länder*, is considering the introduction of an emissions-based motor vehicle tax for motorcycles which are subject to registration. Furthermore, periodic road worthiness tests are to be carried out to ensure regular servicing and counteract the deterioration of the exhaust emission behaviour that is connected with increasing duration of use. The introduction of EURO II from 2003 and EURO III from 2006 can bring about a reduction of about 2.5 kt in NMVOCs and 0.9 kt in NO_x compared to the previous TREMOD scenario (EURO II only).

3.2.3 EURO V for passenger cars with a diesel engine and light-duty vehicles

EURO IV diesel engines are not yet as low in NO_x as corresponding gasoline engines. Also, the share of diesel-engine passenger cars and light goods vehicles in new registrations is growing so that for 2002 their proportion of total NO_x emissions from road traffic is assumed to be 13%, and 21% for 2010. The initiative launched in the EU to update EU exhaust emission standards (EURO V) for diesel-engine passenger cars and light-duty vehicles for reduction of NO_x emissions, in line with the update already adopted for heavy goods vehicles, must be continued. Given early adoption of the NO_x limit value for a EURO V stage from 2008, promotion via the motor vehicle tax for accelerated introduction of such lower-emission vehicles can be considered together with the *Länder*. As this is still open, a reliable quantification is not possible. A EURO V stage and the tax incentive are expected to result in an additional reduction of 9 kt of NO_x for 2010.

3.2.4 Non-road mobile machinery

For the area of internal combustion engines in non-road mobile machinery, total emissions for 1995 were roughly estimated to be 180 kt for NO_x and 68 kt for NMVOCs. A more detailed analysis has been initiated. Results are not yet available. European legislation (EU Directive 97/68/EC) limits initially the emissions of large diesel engines with a power output in the range of 18 kW to 560 kW, in two stages (1999 and 2001-2004). A proposal for a third

and a fourth stage for engines in this power output range was presented by the European Commission in December 2002. In the area of small gasoline engines, emission limit values will be introduced in 2004-2005 depending on category. The reduction potential of the measures mentioned above is roughly estimated to be 34 kt for NO_x and 15 kt for NMVOCs. More detailed analyses have been initiated for this area as well.

3.2.5 Specification of emissions requirements under the TA Luft in line with the development of the state of the art

The minimum requirements of the TA Luft for stationary sources can, for specific pollutants and specific types of installation, be tightened to reflect advances in the state of the art. This means, for example, that the information on BAT published in the European Reference Documents on Best Available Techniques must be taken into account when determining the state of the art. In addition, for specific pollutants and types of installation, the TA Luft includes not only minimum requirements, but also prescribes target values to be achieved in the medium term. In cases where technological development is rapid, it stipulates that, over and beyond compliance with the emission standard, any options to further reduce emissions by applying best available techniques shall be used (dynamic clauses).

Requirements with a dynamic clause (including target values) for reduction of NO_x emissions are laid down in the TA Luft for internal combustion engines, cement kilns, facilities for burning of lime and dolomite, glass manufacture, manufacture of mineral fibres, metal surface treatment, mineral oil refineries, facilities for production of soot and facilities for roasting coffee.

Dynamic clauses for reduction of SO_2 emissions are laid down in the TA Luft for internal combustion engines, mineral oil refineries and test benches for or with combustion engines. Dynamic clauses for reduction of NMVOC emissions are laid down in the TA Luft for internal combustion engines, asphalt mixing plants, rolling mills, tar plants, facilities for processing polyester resins, facilities for production of paper, cardboard or paper board, facilities for production of particle boards, facilities for production of yeast, facilities for producing sugar, facilities for internal cleaning of railway tank wagons, barrels, etc., and facilities for textile finishing.

The continuing technological development by its very nature makes it impossible to precisely quantify the potential reduction by 2010 for NO_x, SO_2 or NMVOCs. However, for NO_x, the

dynamic clauses of the TA Luft offer, for all sectors combined, potential for an additional reduction of at least 25 kt of NO_x compared to the reference projection.

3.2.6 Amendment to the Ordinance on Large Combustion Plants

The amendment to the 13th Federal Immission Control Ordinance (13th BImSchV) will transpose Directive 2001/81/EC (Large Combustion Plants Directive) into national law. The requirements which the first ministry draft contains for limitation of SO_2 and NO_x emissions using state-of-the-art emissions control techniques are in part farther-reaching that those of the Directive. In future, gas turbines with a rated thermal input equal to or greater than 50 MW will be regulated by the 13th BImSchV (now: TA Luft). As a new provision, the draft requires measures for combined production of heat and power to be considered and implemented when upgrading or establishing combustion plants. Compliance by existing plants with the requirements for new plants would reduce annual NO_x emissions by at least 6 kt. The ministry draft includes further additional measures, but these will not take effect until after 2010. Emissions reductions are also expected for SO_2.

Following completion of discussions with relevant associations and the *Länder*, the draft amendment will be revised and then discussed finally between the ministries concerned. Subsequently, the Bundesrat must give its consent. At present, no estimate can be made of the emission reductions that will result from the amendment.

3.2.7 Amendment to the Ordinance on Incinerators for Waste

The 17th Federal Immission Control Ordinance (17th BImSchV) on Incinerators for Waste and Similar Combustible Material lays down emission limit values for SO_2, NMVOCs and NO_x for waste incinerations plants that are subject to licensing. Its scope also includes the co-incineration of waste (substitute fuels) in industrial processes and in combustion plants, whose emission limit values for SO_2 and NO_x are still higher than those of the 17th BImSchV for waste incinerators. The amendment will generate a further emissions reduction. The reduction potential cannot currently be determined, due to lacking information on the amount of waste going to co-incineration plants .

3.2.8 Limitation and labelling of solvents in products

Measures to limit and label the solvent content of products which are not covered by the scope of the current EU Solvents Directive can only be initiated by the EU, as they interfere with the free movement of goods in Europe. Therefore, Germany and other Member states have presented initiatives for relevant product-related measures to the European Commission a number of times. They concern the reduction of the solvent contents of products used in industry which are not covered by the EU Solvents Directive as well as the use of systems and products low in or free of solvents (e.g. water-based) in small and medium-sized enterprises and households. The reduction potential of these measures in Germany is estimated to amount to about 200 kt of NMVOCs.

The European Commission has now submitted a proposal for a directive on the limitation of VOC contents in the areas of decorative paints and varnishes and vehicle refinishing paints. In the report titled “The Costs and Benefits of the Reduction of Volatile Organic Compounds from Paints”, the Commission states that the envisaged measures would result in an overall emission reduction of 279 kt in Europe. Germany’s share was given as 62 kt. The Federal Government has welcomed this proposal in principle. However, in order to achieve the necessary emission reduction of 197 kt of NMVOCs in Germany, additional measures are necessary. Aside from various other proposals, the Federal Government has requested the Commission to consider whether products for other areas of use (such as coating materials for wood surfaces, wood preservation, surface cleaners, adhesives, household products) can be included in the provisions on solvent content limitation.

3.2.9 Measures to reduce ammonia emissions from agriculture

Emissions in agriculture are caused predominantly by natural processes in livestock farming which can only be influenced to some extent. Emission reductions can in part only be achieved by changing production processes or restrictions on production. Measures in the area of livestock farming should take animal welfare concerns into account. For these reasons, integrated policies are necessary.

Reform of the Common Agricultural Policy (CAP)

- In the framework of further reform of the common agricultural policy (CAP), greater consideration should be given to the effects of the type and intensity of farming activities and the resulting ammonia emissions.

- The intervention price cuts for beef and the premium scheme for male bovines for fattening and suckler cows have already helped to make production more extensive and consequently less emission-intensive. This will also have a positive effect on the necessary reduction of farm-related emissions of ammonia. The stocking density used to limit production under the special premium for male bovines and the suckler cow premium will be further reduced.

- A decoupling of the headage payment from production and increased grassland promotion would further reduce cattle stocks within the EU and effectively reduce emissions.

Promotion of organic farming

- Organic farming can make a contribution to the reduction of ammonia emissions as it uses no chemical fertilisers.

Recommendations on good agricultural practice

- Farm management offers effective and cost-efficient measures for reducing ammonia emissions. The aim of publishing recommendations on good emission abatement practice in agriculture is to provide advisory services, trainers and farmers with valuable guidance on emission reduction measures for the various operations.

Development of BAT for small farms

- Definition of best available techniques at EU level and publication of corresponding reference documents (BREFs) at national level are another measure to achieve improvements in emission reduction. The European Integrated Pollution Prevention and Control Bureau (EIPPCB) has already finalised a BREF for the sector. In future, it must also deal with low-emission production techniques for small farms and cattle farming. Animal welfare requirements must be taken into account and preference must be given to production systems that are more welfare-friendly.

Measures to promote reduction of livestock densities and NH_3 emissions

Agri-environmental measures

- Promotion of extensive use of grassland, including reversion of arable land to extensively used grassland, and multi-annual set-aside for provision of selected agri-ecological compensatory land areas and improvement of agricultural production structures.

- Increased aid for organic farming, promotion of land or strips of land with flowering plants on which – as in the case of multi-annual set-aside – no chemical fertiliser may be applied, among other requirements.

Support measures which provide for a maximum stocking limit per holding

- In the area of investment support for single farms, the stocking limit for support for investment in the area of livestock farming is 2 LU/ha of farmland or, if this limit is exceeded, it must be demonstrated that nutrient inputs and outputs are in balance.

- Support for extensive use of grassland subject to a maximum limit of 1.4 LU/ha of farmland with regard to manure generation.

- In the framework of support for organic farming, fertiliser use may not exceed 170 kg of nitrogen per year and hectare of farmland.

- Support for reduction of livestock density in regions with high livestock densities, with the aim of reducing stocking by at least 0.5 LU to a maximum of 2 LU/ha of farmland.

- Support for husbandry techniques that are compatible with environmental and animal welfare concerns, stocking between 0.3 und 2 LU/ha of farmland.

- With effect from 2004, granting of compensatory allowances in less favoured areas will be subject to a maximum limit of 2 LU/ha of farmland.

Support measures for introduction of low-emission techniques

- Investments in emission reduction are supported under the Agricultural Investment Support Programme, e.g. investment grants for covering of slurry stores and for the purchase of equipment for spreading of liquid manure close to the ground (trailing-hose spreaders or slurry injection equipment).

- From 2003, spreading of liquid manure on arable and grass land using techniques that are particularly environmentally friendly will be supported in the framework of agri-environmental measures.

Adaptation of the building law to restrict landless livestock farming

- Current law allows the permitting of livestock holdings which do not have sufficient land of their own for feed production. This is one of the factors which have led to very high livestock densities in some regions of Germany. An adaptation of the building law is to limit the resulting effects on the environment.

Adaptation of the Use of Fertilisers Ordinance

- Formulation of rules on good agricultural practice for application of volatile urea fertiliser to limit emissions from application of solid urea fertilisers.

- Requirements for best available slurry application techniques will be specified further.

- It is expected that use of low-emission techniques (e.g. trailing hoses) will be made a binding requirement for application of liquid manure to cultivated arable land.

- Equipment for spreading of fertiliser must comply with the generally acknowledged rules of technology.

- In addition to the current legal provisions - slurry applied to uncultivated arable land must be ploughed in directly after application – ploughing in of manure directly after application will also be mandatory in future.

- Compliance with these rules will be monitored by the Federal *Länder* in the framework of their powers in this area. The provisions are part of the good agricultural practice compliance with which can be a condition for payment of aid under the EAGGF Regulation.

Adaptation of immission control legislation

Extension of the licensing requirement

- With the aim of reducing ammonia emissions, provisions on area-linking of livestock farming and on cattle farming, which are not included in the IPPC Directive, have been incorporated and values markedly lower than those of the IPPC Directive have been set for poultry and pigs. Since 3 August 2001, the following installations are subject to licensing:

  Installations for rearing of poultry or fur animals or for rearing or separate rearing of cattle or pigs with

  - 15 000 places for hens,
  - 30 000 places for pullets,
  - 30 000 places for fattening poultry,
  - 15 000 places for fattening of turkeys,
  - 250 places for cattle,
  - 300 places for calves,
  - 1 500 places for fattening pigs (pigs of a live weight of 30 kilograms or more),
  - 560 places for sows including related places for rearing of piglets (piglets of a live weight of less than 30kilograms),
  - 500 places for separate rearing of piglets (piglets of a live weight of 10 to less than 30 kilograms),
  - 750 places for fur animals, or more;

  In the case of mixed stocks, the percentages up to which the above-mentioned place numbers are utilised are added up; if the sum of the percentages exceeds a value of 100, licensing is required.

  Installations for rearing of livestock with places for 50 livestock units or more and more than 2 livestock units per hectare of land farmed regularly by the owner of the installation or without farmed area. One livestock unit corresponds to a live weight of 500 kilograms per production period.

Taking nitrogen deposition into account when assessing the existing pollution load within the scope of the Technical Instructions on Air Quality Control (TA Luft)

- If there are indications that the protection against significant disadvantages due to nitrogen deposition causing harm or damage to sensitive plants and ecosystems (e.g. heathland, moorland, forests) is not ensured, a supplementary examination must be carried out as part of the licensing process under the Federal Immission Control Act. In this context it must be estimated, while taking into account the load structure, whether the installation contributes considerably to nitrogen deposition. A livestock density greater than 2 livestock units per hectare of district area is deemed to be an indication. During the examination, special attention must be paid to the type of soil, the type of vegetation prevailing and the degree of nitrogen supply.

Adaptation of the state of the art within the scope of the TA Luft

The following structural and operational measures for reduction of ammonia emissions must normally be applied, among others, and are monitored by the licensing authorities:

- Highest possible level of cleanliness and dryness in animal housing.

- Feeding adapted to the animals' nutritional requirements shall be ensured.

- When a solid manure system is used, sufficient bedding shall be spread to reduce odorous emissions. The bedding must be dry and clean.

- In order to reduce wind-induced emissions, dung yards for storage of solid manure shall be walled in on three sides and cover as small a surface as possible. The storage capacity shall be such that solid manure can be applied at a time that is appropriate from the viewpoint of plant cultivation.

- In order to reduce emissions from animal housing, when liquid manure systems are used, droppings and urine shall be transferred to the storage site for liquid manure continuously and at short intervals. A stench trap shall be installed between the housing and liquid manure channels and containers outside.

- Containers for storage of liquid manure must be provided with a cover that achieves a reduction of emissions of odour-intensive substances and ammonia of at least 80 per cent compared to the levels emitted from the open, uncovered container. Artificial floating covers must, when disturbed by stirring or removal operations, be restored to their functional state as soon as such operations have been completed.

- The storage capacity for liquid farmyard manure for use as fertiliser for own purposes shall be such that it is sufficient for at least six months.

- In cage rearing of poultry, belt drying or ventilation of the dropping belt is obligatory (drying rate at least 60 per cent). Dried poultry droppings must be stored so that rehumidification (e.g. through rainwater) in the vicinity of the installation is excluded.

4 Annexes

The following Annexes are available in German only,
annexed to the German National Programme at http://www.umweltbundesamt.de and in the brochure Texte 37/02 Luftreinhaltung 2010, Umweltbundesamt.

Annex 1
Emissions in 2000 und reference projection 2010 (not including agriculture)

Annex 2
Calculated estimate of the effect of possible policy measures on ammonia emissions from agriculture in Germany in 2010

Annex 3
German regulations and programmes, which have an effect on emission reduction