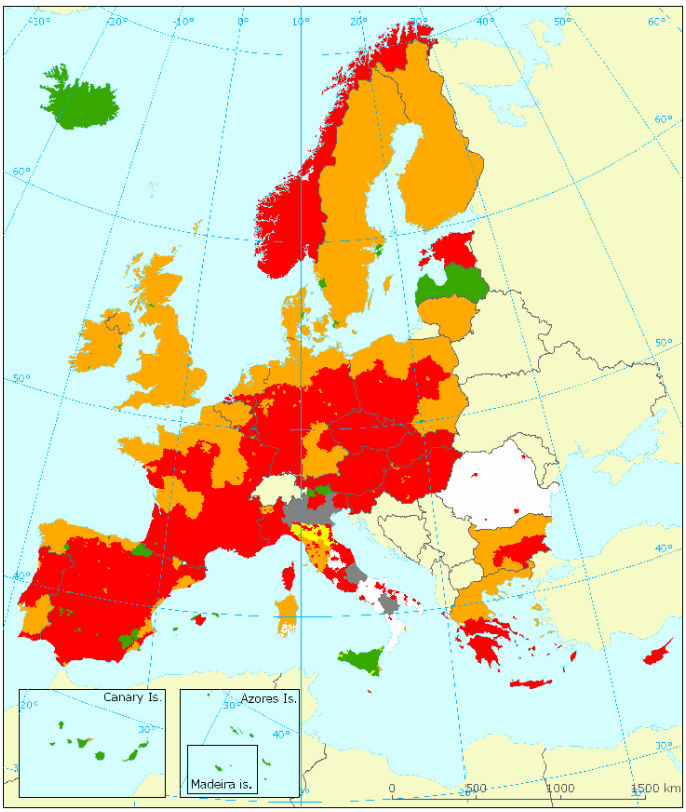
# Reporting on ambient air quality assessment 2007, Member States reporting ('The Questionnaire')

## Part one: the main report

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European Topic Centre on Air and Climate Change

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is a consortium of European institutes under contract of the European Environmental Agency
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***Cover page**: $O_3$ 8 hour mean target value for the protection of human health in 2007*

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# Acknowledgements

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EEA project manager was Anke Lükewille and EEA/ETC-ACC task manager was Edward Vixseboxse

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# Summary

In 2007 the number of zones in Member States where the limit (LV) or target value (TV) was exceeded was greatest for the daily limit value of $PM_{10}$ (42%) and the health-related target value of $O_3$ (46%).

When compared to the 2006 **zone exceedances** in Europe, most striking is the increase (+7%) of the $O_3$ health target value. Moreover, this increase is not supported by ozone forming favourable wheather conditions in 2007.

Both $PM_{10}$ daily limit value and $PM_{10}$ yearly zone exceedances decreased by 3 %, to respectively 42% ($PM_{10}$ day) and 17% ($PM_{10}$ year).
EU 27 zones exceeding the $NO_2$ (23%) and $NO_x$ (10%) year limit values increased by 5 and 7%.

# General

European Air Quality legislation is built on the principle that the Member States divide their territory into a number of air quality management zones and agglomerations. In these zones and agglomerations, the Member States should assess the air quality using measurements, modelling or other empirical techniques. Delimitations of zones may differ between different pollutants in order to optimize management of air quality due to differences in sources and abatement strategies. Where limit levels are exceeded, the Member States should prepare an air quality plan or programme to ensure compliance with the limit value before the date when the limit value formally enters into force. In addition, information on air quality should be disseminated to the public.

EU Member States have submitted annual reports on air quality in 2007 to the European Commission under the Air Quality Framework Directive (96/62/EC). The reports were provided in the form of a predefined questionnaire (http://ec.europa.eu/environment/air/quality/legislation/reporting.htm).The present report gives an overview and analysis of the submitted information for the year 2007. It is an update of the previous reporting cycles from 2001 to 2005; reports over these years are available from http://ec.europa.eu/environment/air/quality/legislation/reporting.htm. A preliminary analysis of the 2007-situation based on incomplete, not quality-controlled data has been published in December 2008 (see http://air-climate.eionet.europa.eu/reports/ETCACC_TP2008_4_AQQ2007_prelim_analysis).

In the last few years the reporting requirements from the Member States have evolved, following the successive entering into force of the first three daughter directives 1999/30/EC, 2000/69/EC and 2002/3/EC and following the accession of new Member States to the EU. The year 2005 was the first year over which 25 EU Member States had to report on assessment under the first three daughter directives. Since 2007 (reporting on the situation in 2006) Bulgaria and Romania have been included

in a EU27 report. In total 29 countries report as Iceland and Norway submitted voluntarily reports.

It should be mentioned that the assessment of air quality concentration levels within the zones may be further elaborated within the air quality plans for zones where such plans were developed. Such assessment information is not analysed in this report but may be of interest to the reader; one is encouraged to check CDR for uploaded information on AQ plans.

Reporting under the Fourth Daughter Directive (2004/107/EC) is mandatory for Member States from reporting year 2008 on. This 2007 report year offered Member States to voluntarily submit data relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

## Zone designation

The total number of reporting zones in 2007 was 909. This number was 1056 zones in 2006 and 1064 in 2005. Compared to the reporting on 2006 the number of air quality management zones has reduced significantly. This is especially due to Poland which reduced its number of zones from 362 to 186.

The Italian Questionnaire was, like in 2006, not complete in 2007 as parts of the Italian territory are not included.

Zones are classified as agglomerations or non-agglomerations. Compared to 2006 the ratio agglomeration and non-agglomeration increased in favour of the agglomeration type with 6% of the zones. Agglomerations account for 30% of the total number of zones, non agglomerations for 70%.

The Member States have the obligation to report over the total area of their country for the health protection target pollutants. The EU27 territory coverage for the health related pollutants is fairly good but never reaches 100% as is mandatory.

| All Zones EU27 | 909 | 100% |
|---|---|---|
| $NO_2$ Health | 819 | 90% |
| $PM_{10}$ | 809 | 89% |
| $SO_2$ Health | 807 | 89% |
| CO | 749 | 82% |
| Benzene | 721 | 79% |
| Lead | 685 | 75% |
| $O_3$ | 587 | 65% |
| $SO_2$ Eco-Systems | 469 | 52% |
| $NO_x$ Vegetation | 468 | 51% |
| As | 169 | 19% |
| Cd | 169 | 19% |
| Ni | 169 | 19% |
| BaP | 159 | 17% |

*** form 0/1/2**

**Table 1: EU27 number of zones and territory area coverage**

## Station characteristics

The total number of stations measuring air quality in the EU27 in the analysis of this report is 4064.

This is down from 4386 in 2006 and is in essence accounted for the Polish decrease of stations.

The pollutants that are measured most widely are $NO_2$ (70%); $PM_{10}$ (62%); $SO_2$ (49%) and $O_3$ (48%). In 2006 the percentages are grossly the same.

Stations can also be classified on the basis of their function. The three measuring functions of stations are: for the purpose of health targets, ecosystems ($SO_2$) or vegetation (NOx) targets. In 2006 88% of all stations measured for health targets and 6% for ecosystems and vegetation each. Compared to 2006, stations measuring for ecosystems and vegetation targets decreased 1%. The conclusion is that the dominant station function was and is measuring for health related pollution targets.

In parallel to the reporting under the Framework Directive, which mainly focuses on compliance checking with obligations under the air quality directives, such as limit values, Member States are sending detailed information from their monitoring networks each year under the Exchange of Information Decision (EoI)[1].

Reporting stations under the Questionnaire have to be included in the set of stations reporting under the EoI. In the 2007 Questionnaire 98% of the reporting stations could be traced down in the EoI AirBase database. Only 100 monitoring stations out of 4064 could not be matched.This on the basis of the EoI station code which is present in both databases. This is a substantial improvement compared to the 2006 reporting year when 83% of the stations had an Airbase match.

## Exceedances

The pollutants that exceed the limit value and target values the most in 2007 are $PM_{10}$ daily and $O_3$ health. $PM_{10}$ exceeds the limit value in 42% of all EU27 zones, for $O_3$ health this percentage is 46%.

If the EU27 zone exceedances of air quality pollutants are ‘translated’ to the number of people affected the conclusions are:

- 74% of EU27 population lives in zones exceeding $PM_{10}$ limit value (2006: 60%)
- 50% of EU27 population lives in zones exceeding $NO_2$ annual limit value (2006: 79%)
- 46% of EU27 population lives in zones exceeding $O_3$ health target value (2006: 38%)

Is the air quality getting any better? If the 2006 zone exceedances are compared with the 2007 results we can draw the following tentative conclusions

- $PM_{10}$ zone exceedances are slightly higher in 2006
- $O_3$ zone exceedances are 7% (health) and 19% (vegetation) higher and this sharp increase is not supported by specific weather conditions in 2007
- Number of zones exceeding the annual limit values of $NO_2$ and NOx increased with 5 and 7% between 2006 and 2007.

However, caution is needed interpreting these air quality trend conclusions as the number and designation of zone can differ from year to year.

On the basis of a Czech Republic resubmission of the Questionnaire in July 2009 the exceedance of the daily limit value for $PM_{10}$ in one zone (CZ031- Jihočeský kraj) needs to be adjusted to ‘exceeding the limit value’.

[1] Council Decision 97/101/EC establishing a reciprocal exchange of information and data from network and individual stations measuring ambient air pollution within the Member States (amended by Commission Decision 2001/752/EC).

| EU27 | 2006 | 2007 |
|---|---|---|
| O3-V | 27% | 46.4% |
| O3 H | 39% | 46.2% |
| PM10 day | 45% | 42% |
| NO2 Yr | 18% | 23% |
| PM10 Yr | 20% | 17% |
| NOx | 3% | 10% |
| NO2 Hr | 2% | 3% |
| SO2 Day | 3% | 2% |
| SO2 Hr | 2% | 2% |
| Lead Yr | 0.1% | 0.6% |
| CO Yr | 1% | 1% |
| SO2 Wntr | 2% | 0.3% |
| Benzene Yr | 0.2% | 0.3% |
| SO2 Yr | 1% | 0% |

*** form 8/9**

**Table 2: EU27 zone exceedances of limit or target value in 2006 and 2007**

The general reason for the exceedances of the air quality that Member States report are in line with the conclusions of previous years and are summarized as local traffic, industry and domestic heating. More detailed for the most important pollutants are the dominant reasons:

- $PM_{10}$ both daily and annual LV : local traffic, 31% (2006: 41%)
- $NO_2$ annual LV : local traffic, 69% (2006: 67%)
- $O_3$ alert threshold : other & not indicated, 81% (2006: 80%)
- $SO_2$ daily LV : other & not ind., 65%, industry, 18% (2006: 20%)

# 1 Introduction

Concerning **DATA QUALITY** of reporting year 2007, progress has been made when compared to reporting year 2006. Questionnaires have been received from all Member States and Norway and Iceland. 13 countries voluntary reported on the 4th DD. All countries used CDR for uploading the information.

Zones designated in Member States for the protection of human health should cover the whole territory and the total population of a Member State. A nearly complete coverage is in general found for sulphur dioxide (97%), nitrogen dioxide (98%), $PM_{10}$ (97%) and ozone (91%). Lower coverages are found in the case of lead (81%), benzene (81%) and carbon monoxide (88%). The general conclusion is that the designation of zones stil seems to be incomplete in a number of Member States.

Reporting stations under the Questionnaire have to be included in the set of stations reporting under the EoI. In the 2007 Questionnaire 98% of the reporting stations could be traced down in the EoI AirBase database. This is a big improvement compared to the 2006 reporting year (83%).

This document gives an overview of the annual reports by Member States to the European Commission on the results of the assessment of their air quality in 2007. These reports have been submitted under the Air Quality Framework Directive[2], following Commission Decision 2004/461/EC[3], which specifies the information to be sent in detail and provides a set of forms (27) to be filled in. In the 2007-reporting an extended version of the questionnaire including additional forms to cover the 4th DD has been used.In the remaining of this report this Decision will be called 'the AQ questionnaire' or, when the context is clear, simply 'the questionnaire'.
This report has been prepared by the European Topic Centre on Air and Climate Change (ETC/ACC) of the European Environment Agency upon a request of DG Environment.

| | |
|---|---|
| Form 0 | General information, update history |
| Form 1 | Contact body and address |
| Form 2 | Delimitation of zones and agglomerations |
| Form 3 | Stations and measuring methods used for assessment under first, second and fourth DD |
| Form 4 | Stations used for assessment of ozone, including nitrogen dioxide and nitrogen oxides in relation to ozone |
| Form 5 | Stations and measuring methods used for the assessment of recommended volatile organic compounds (3rd DD) and other relevant PAH and metals in ambient air and deposition (4th DD) |
| Form 6 | Stations and measurement methods used for the assessment of other ozone precursor substances |
| Form 7 | Methods used to sample and measure $PM_{10}$ and $PM_2$,5, ozone precursor substances, arsenic, cadmium, nickel, mercury, PAH: optional additional codes to be defined by the Member State |
| Form 8 | List of zones and agglomerations where levels exceed or do not exceed limit |

[2] Council Directive 96/62/EC on ambient air quality assessment and management.

[3] Commission Decision 2004/461/EC laying down a AQ questionnaire to be used for annual reporting on ambient air quality assessment under Council Directives 96/62/EC and 1999/30/EC and under Directives 2000/69/EC and 2002/3/EC of the European Parliament and of the Council.

| | |
|---|---|
| | values or limit values plus margin of tolerance for pollutants listed in first and second DD |
| Form 9 | List of zones and agglomerations where levels exceed or do not exceed target values or long term objectives for ozone and arsenic, cadmium, nickel, B(a)P |
| Form 10 | List of zones and agglomerations where levels exceed or do not exceed upper assessment thresholds or lower assessment thresholds, including information on the application of supplementary assessment methods |
| Form 11 | Individual exceedances of limit values and limit values plus the margin of tolerance of pollutants listed in first and second DD |
| Form 12 | Reasons for individual exceedances: optional additional codes to be defined by the Member State |
| Form 13 | Individual exceedances of ozone thresholds |
| Form 14 | Exceedance of target values of ozone, arsenic, cadmium, nickel, benzo(a)pyrene |
| Form 15 | Annual statistics of ozone, arsenic, cadmium, nickel, and benzo(a)pyrene |
| Form 16 | Annual average concentrations of ozone precursor substances of mercury and other relevant PAH and deposition rates of mercury and other relevant PAH |
| Form 17 | Monitoring data on 10 minutes mean $SO_2$ levels |
| Form 18 | Monitoring data on 24hr mean $PM_{2.5}$ levels |
| Form 19 | Tabular results of and methods used for supplementary assessment |
| Form 20 | List of references to supplementary assessment methods referred to in Form 19 |
| Form 21 | Exceedance of limit values for $SO_2$ due to natural sources |
| Form 22 | Natural $SO_2$ sources: optional additional codes to be defined by Member State |
| Form 23 | Exceedance of limit values of $PM_{10}$ due to natural events |
| Form 24 | Exceedance of limit values of $PM_{10}$ due to winter sanding |
| Form 25 | Consultations with other MS on transboundary pollution |
| Form 26 | Exceedances of limit values laid down in Directives 85/203/EEC |
| Form 27 | Reasons for exceedances of limit values laid down in Directives 85/203/EEC: optional additional codes to be defined by the Member State |

**Table 3: Listing of the 27 forms in the AQ Questionnaire**

# Member State reports addressed in this document

This document deals with the reports by the 27 EU Member States on the year 2007 submitted under the First Daughter Directive[4], the Second Daughter Directive[5] , the Third Daughter Directive[6] and the Fourth Daughter Directive[7].

The assessments in this report are based on the information received by ETC/ACC before 01 May 2009 (note that the official deadline was 30 September 2008).

Assessments of the air quality in zones in the EU Member States based on the questionnaire for the years 2001-2006 are available from the web site of DG Environment[8].

Modification of the questionnaire and related guidance has been prepared to enable reporting of 4th

[4] Council Directive 1999/30/EC relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air (amended by Commission Decision 2001/744/EC).

[5] Directive 2000/69/EC relating to limit values of benzene and carbon monoxide in ambient air.

[6] Directive 2002/3/EC relating to ozone in ambient air.

[7] Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

[8] http://ec.europa.eu/environment/air/quality/legislation/reporting.htm

Daughter Directive[9] on a voluntary basis already for the reporting year 2007. This reporting will become mandatory in 2009. The only changes introduced in the questionnaire are the inclusion of relevant forms covering the reporting un der the 4th DD; no changes or updates have been made in the parts covering the reporting under the first three DD. The updated questionnaire and guidance document have been made available at the website of DGEnvironment. Norway and Iceland submitted voluntary questionnaires.

## Reporting under the Exchange of Information Decision

In parallel to the reporting under the Framework Directive, which mainly focuses on compliance checking with obligations under the air quality directives, such as limit values, Member States are sending detailed information from their monitoring networks each year under the Exchange of Information Decision (EoI)[10]. These extensive reports contain to a large extent individual 'raw' data (e.g. all hourly concentrations) and include extensive complementary information about the monitoring stations (metadata). The European Topic Centre on Air and Climate Change publishes annually an assessment of these reports (see, for the assessment of the 2007-data: Mol et al., 2009). To avoid duplicate reporting by Member States, some of the data that are needed for evaluating the reports under the Framework Directive (particularly the metadata of stations) are only sent under EoI. Deadline for submitting the EoI information is 1 October. In the assessment of those parts of the questionnaire related to monitoring stations, the information extracted from the EoI has been included.

## Quality of the data received and implications for this overview

To facilitate the submission of the data, the Commission prepared a Guidance for reporting under 2004/461/EC [11] and has made the AQ questionnaire available to the Member States in Excel format. This format does not reject erroneous data, and during the processing numerous small errors, e.g. spurious spaces, had to be removed before all reports could be joined in a database. A second form of trivial errors is the use of other symbols than prescribed in the questionnaire, for example, ticking an "x" or "+" in stead of the prescribed "y"; using a comma as separator while the semi-colon is prescribed. Although in general the information is unambiguous, a time consuming correction of this type of errors is necessarily for an automatic processing of the data.
There were also errors that required more insight for correction, such as inconsistent use of zone and pollutant codes or use of codes that were not allowed. Another difficult type of error is that MS do not use the same codes for stations in the AQ questionnaire and EoI reports.

**Abbreviations used**

*Member States have been abbreviated following the ISO3166-1 country alpha-2 code[1]:*

Austria: AT; Belgium: BE; Cyprus: CY; Czech Republic: CZ; Denmark: DK; Estonia: EE; Finland: FI; France: FR; Germany: DE; Greece: GR; Hungary: HU; Ireland: IE; Italy: IT; Latvia: LV; Lithuania: LT; Luxembourg: LU; Malta: MT; Netherlands: NL; Poland: PL; Portugal: PT; Slovakia: SK; Slovenia: SI; Spain: ES; Sweden: SE; United Kingdom: GB[2], and Norway: NO.

[9] Council Directive 2004/107/EC relating to arsenic, cadmium, mercury nickel and polycyclic hydrocarbons in ambient air.

[10] Council Decision 97/101/EC establishing a reciprocal exchange of information and data from network and individual stations measuring ambient air pollution within the Member States (amended by Commission Decision 2001/752/EC).

[11] http://ec.europa.eu/environment/air/quality/legislation/pdf/guideline_questionnaire.pdf

| | |
|---|---|
| AQ questionnaire | Questionnaire on air quality set out by Commission Decision 2004/461/EC |
| questionnaire | |
| CO | Carbon monoxide |
| EoI | Exchange of Information Decision: Council Decision 97/101/EC, amended by Commission Decision 2001/752/EC |
| EU27 | The 27 EU Member States after accession of 12 new Member States in 2004 and 2007 |
| LV | Limit value |
| MOT | Margin of Tolerance (see the legend to Tables 3 and 4) |
| MS | Member State(s) |
| $NO_2$ | Nitrogen dioxide |
| $NO_x$ | Nitrogen oxides |
| Pb | Lead |
| $PM_{10}$ | Particulate matter composed of particles smaller than 10 micrometer in aerodynamic diameter |
| $PM_{2.5}$ | Particulate matter composed of particles smaller than 2.5 micrometer in aerodynamic diameter |
| $O_3$ | Ozone |
| $SO_2$ | Sulphur dioxide |
| TV | Target value ($O_3$) |
| LTO | Long Term Objective ($O_3$) |

Notes
1: see http://www.iso.ch/iso/en/prods-services/iso3166ma/02iso-3166-code-lists/index.html
2. including Gibraltar.

## Data handling and procedures

In comparison with the 2006 reporting cycle the same procedures have been introduced for the 2007 cycle.This to increase the quality of the reported data.

The official deadline for submitting the official report to the Commission[12] is 30 September. Before starting analysing the data ETC-ACC introduced two data quality checks and the introduction of a preliminary assessment report on the data quality of the 2007 data. These data checks were performed by ETC-ACC and had a voluntary nature.

The first data quality check was a check of the readability of the data and a summary assessment on the number of zones, objectives, stations, methods per form as reported by a Member State. This assessment was sent to the national contact persons listed in the Questionnaire with the basic question: are the ETC-ACC summary conclusions right? If not, send us your feed-back and/or revisions.

On the basis of the CDR upload and the first data quality check the preliminary 2006 results report[13] was written.

[12] Upon request by the Commission implemented through the uploading to the EEA CDR (Central Data Repository).
[13] Reporting on ambient air quality assessment, Preliminary results for 2007, ETC/ACC Technical Paper 2008/4, December 2007, Frank de Leeuw and Edward Vixseboxse.

| Procedure | Deadline | Purpose |
|---|---|---|
| CDR Upload Questionnaire | 1st October 2007 | Comply with AQ Directive |
| 1st quality check | October / November 2007 | Preliminary check on readability of data / forms |
| Preliminary report | December 2007 | Preliminary assessment of dataquality |
| 2nd quality check | March / April 2008 | Check on (in)consistency mistakes, missing data |

**Table 4: New data quality procedures in 2006**

The second data quality check was a check on mistakes, errors and inconsistencies of the reported data in the Questionnaire. Every Member State received a tailor-made excel spreadsheet on the mistakes and errors on the designation of zones and the missing data the ETC-ACC detected. We included the forms in which revision data could be reported.

All in all, the data quality in 2007 has been improved through the two quality checks procedures. Communication and response with and from Member States was good especially as the data checks were of a voluntary nature.

# Main findings

## Data quality

Overview 2008/2009 FWD AQ Reporting (Air Quality data of 2007)

| Country (#) | | Questionnaire arrived at ETC/ACC | GIS info | Date 1st feedback report to MS | Date MS reply to feedback 01 | Info on 4DD | Date 2nd feedback report to MS | Date MS reply to feedback 02 (deadline 06-04) | xls Update? | Remarks? |
|---|---|---|---|---|---|---|---|---|---|---|
| Alpha-2 | Short name | | | | | | | | | |
| AT | Austria * | 19-09-08 | 2006(d) | 08-10-08 | 08-10-08 | yes | - | - | - | |
| BE | Belgium * | 29-09-08 | update | 08-10-08 | 10-10-08 | no | 06-03-09 | 12-03-09 | yes | |
| BG | Bulgaria * | 24-09-08 | 2006(d) | 08-10-08 | 15-10-08 | yes | - | - | - | |
| CY | Cyprus * | 30-09-08 | 2006(d) | 08-10-08 | | yes | - | - | - | |
| CZ | Czech Republic * | 26-09-08 | 2006(f) | 08-10-08 | 27-10-08 | yes | - | - | - | |
| DE | Germany * | 19-09-08 | update | 08-10-08 | 08-10-08 | yes | 06-03-09 | 03-04-09 | yes | |
| DK | Denmark * | 29-09-08 | update | 08-10-08 | | no | 06-03-09 | 03-04-09 | yes | |
| EE | Estonia * | 30-09-08 | 2006(d) | 08-10-08 | 13-10-08 | yes | - | - | - | |
| ES | Spain * | 26-09-08 | update | 08-10-08 | | no | 06-03-09 | 03-04-09 | yes | |
| FI | Finland * | 03-10-08 | 2006(d) | 08-10-08 | 10-10-08 | no | - | - | - | |
| FR | France * | 26-09-08 | update | 08-10-08 | 09-10-08 | yes | 06-03-09 | | No reply | |
| GB | United Kingdom *(g) | 25-09-08 | 2006(d) | 08-10-08 | | yes | - | - | - | |
| GR | Greece * | 18-09-08 | 2006(d) | 08-10-08 | 09-10-08 | yes | 06-03-09 | 23-03-09 | | No update received Feedback02 |
| HU | Hungary * | 26-09-08 | 2006(d) | 08-10-08 | | no | 06-03-09 | 09-04-09 | | |
| IE | Ireland * | 11-09-08 | 2006 (d) | 08-10-08 | | yes | 06-03-09 | 13-03-09 | yes | |
| IS | Iceland ** | 19-01-09 | | - | - | no | 06-03-09 | 06-04-09 | yes | |
| IT | Italy * (b) | 01-10-08 | | 08-10-08 | | no | 06-03-09 | | No reply | |
| LT | Lithuania * | 25-09-08 | 2006 (d) | 08-10-08 | | yes | - | - | - | |
| LU | Luxembourg * | 31-03-09 | 2006 (d) | - | - | no | - | - | - | |
| LV | Latvia * | 24-09-08 | 2006 (d) | 08-10-08 | 22-10-08 | yes | 06-03-09 | 19-03-09 | yes | |
| MT | Malta * | 17-09-08 | 2006(d) | 08-10-08 | | no | 06-03-09 | 17-04-09 | yes | |
| NL | Netherlands * (a) | 19-11-08 | | - | - | no | 06-03-09 | 15-04-09 | yes | |
| NO | Norway ** | 05-12-08 | | - | - | no | 06-03-09 | 31-03-09 | yes | |
| PL | Poland * | 26-09-08 | update | 08-10-08 | | no | 06-03-09 | 06-04-09 | yes | |
| PT | Portugal * | 30-09-08 | 2006 (e) | 08-10-08 | | no | 06-03-09 | 06-04-09 | yes | |
| RO | Romania * | 29-09-08 | update | 08-10-08 | 08-10-08 | no | 06-03-09 | 03-04-09 | yes | |
| SE | Sweden * | 26-09-08 | 2006 (d) | 08-10-08 | | yes | 06-03-09 | 20-03-09 | yes | |
| SI | Slovenia * | 25-09-08 | 2006 (d) | 08-10-08 | 20-10-08 | no | 06-03-09 | 10-03-09 | yes | |
| SK | Slovak Republic * | 19-09-08 | 2006 (e) | 08-10-08 | 30-10-08 | no | 06-03-09 | 02-04-09 | yes | |

| | | | |
|---|---|---|---|
| * | EU-27 country | | |
| ** | Non EU-27 country | | |
| (a) | unofficial draft | (b) 13 regions only; 6-10-2008: in total 16 regions | |
| (c) | note that a reply is only needed when mistakes has been detected | | |
| (d) | designation of zones not changed; GIS data 2006 used | (e) one zone (combination of existing zone) added | |
| (f) | only change in coding of zone | (g) questionnaire for Gibraltar delivered 29-09-08 | |
| (#) | ISO3166-1 codes: Alpha-2 element and Short Name | | |

**Table 5**: **2007 Questionnaire quality checks result overview**

CDR Upload (1st October 2008)

24 Member States of a total of 27 had respected the Questionnaire upload deadline of 30 September 2008. Finland uploaded the Questionnaire in October 2008. On 1 October 2008 an incomplete set of the Italian questionnaire was available; information from the missing regions was received in January and March of 2009. Of the two voluntary reporting countries, Iceland and Norway, both did not comply with the deadline. Norway uploaded the Questionnaire in December 2008, Iceland in January 2009.

The Netherlands uploaded the Questionnaire in November 2008 and Luxembourg was last uploading at the end of March 2009.

1st Data quality check (19th October 2008)

The first data quality check was sent to the Member States on the 08th of October. Goal was to check readability of the data and forms of the Member States. The ETC-ACC summary conclusions on number of zones, objectives, stations and methods was send back to the MS. Basic question was: is our assessment right? 13 of 25 Member States (a response of more than 50%) responded with a confirmation that the data is correct or with a revision.

Not sending any revision could mean one of both: there are no mistakes or there are mistakes but there was no reply.

Thirteen member States reported voluntary on the Fourth Daughter Directive.

The 2007 preliminary report (December 2008)

On the basis of the CDR upload and the first data quality check the preliminary results were reported. The main conclusions related to the quality of the information were:

- Data from Luxembourg, The Netherlands and several regions from Italy were missing at that time.
- The number of Air quality management zones has reduced significantly.
- Voluntary reported information on area and population numbers in zones is present for 99% (area) and 99% (population). This was 89% (area) and 98% (population) in 2006.
- Mandatory zone designation data is missing for the health protection target pollutants. Coverage is better for $SO_2$ , $NO_2$ , $PM_{10}$ , and $O_3$ than for lead, benzene and CO
- Voluntary info on the 4th DD pollutants has been provided by 14 Member States. For the heavy metals (arsenic, cadmium, nickel) a limited number of non-complying zones has been reported. The largest problems have been observed for benzo(a)pyrene: non-compliance areas are found in 7 Member States

2nd Data quality check (20th February 2009)

The second data quality check was a content check on mistakes, errors and/or (in) consistencies in the reported data on zones and the air quality status in these zones[14]. Eighteen Member States and Norway and Iceland were sent a tailor-made excel spreadsheet with the mistakes and the corresponding forms for revision. Basic question was to update the data and send this back to ETC-

[14] The questionnaire in the form of an unprotected excel spreadsheet is sensitive for mistakes; by its complex structure with about 80 different sheets the risk of inconsistency in the information in the various sheets is high. As the designation of zones forms the basis of the assessments the ETC/ACC focussed this year on improve this information. Other potential inconsistencies (e.g in the reported monitoring stations and their link to the Exchange of Information decision ) will be targeted in later years.

ACC for renewed processing.

Response was good with 18 Countries responding except for France and Italy. Greece replied but did not send an update of the data. The all in all conclusion is that the data quality greatly improved as result of this feedback action.

The final dataset of data on which this report is based is the dataset that has been 'frozen' in the beginning April 2009. This is the data that was adjusted as a result of the Member States revisions on the basis of the two data quality check responses.

## Air quality health standards

Humans can be affected by exposure to air pollutants in ambient air. In response, the European Union has developed an extensive body of legislation which establishes health based standards and objectives for a number of pollutants in air. These standards and objectives are summarised in the table below. These apply over differing periods of time because the observed health impacts associated with the various pollutants occur over different exposure times. $PM_{2.5}$ has been introduced in the new 2008 directive of the European Parliament and of the Council on ambient air quality and cleaner air for Europe directive. An indicative limit value of 20 µg/$m^3$ by 2020 to be confirmed at review in 2013 is also set. In addition 2 new exposure related obligations are set[15].

Under EU law a limit value is legally binding from the date it enters into force subject to any exceedances permitted by the legislation. A target value is to be attained as far as possible by the attainment date and so is less strict than a limit value. Table 6 shows the EU air quality health standards.

| Pollutant | Concentration | Averaging period | Legal nature | Permitted exceedances each year |
|---|---|---|---|---|
| Fine particles (PM2.5) | 25 µg/m3***<br>25 µg/m3<br>20 µg/m3 | 1 year | Target value enters into force 1.1.2010<br>Limit value enters into force 1.1.2015<br>Indicative limit value enters into force 1.1.2020<br>(to be confirmed) | n/a |
| Sulphur dioxide (SO2) | 350 µg/m3 | 1 hour | In force | 24 |
| | 125 µg/m3 | 24 hours | In force | 3 |
| Nitrogen dioxide (NO2) | 200 µg/m3 | 1 hour | Limit value enters into force 1.1.2010 | 18 |
| | 40 µg/m3 | 1 year | Limit value enters into force 1.1.2010* | n/a |
| PM10 | 50 µg/m3 | 24 hours | In force** | 35 |
| | 40 µg/m3 | 1 year | In force** | n/a |

[15] For more details seehttp://ec.europa.eu/environment/air/quality/standards.htm

| | | | | |
|---|---|---|---|---|
| **Lead (Pb)** | **0.5 µg/m3** | **1 year** | **In force (or 1.1.2010 in the immediate vicinity of specific, notified industrial sources; there 1.0 µg/m3 limit value applies from 1.1.2005 to 31.12.2009)** | **n/a** |
| **Carbon monoxide (CO)** | **10 mg/m3** | **Maximum daily 8 hour mean** | **In force** | **n/a** |
| **Benzene** | **5 µg/m3** | **1 year** | **Limit value enters into force 1.1.2010**** | **n/a** |
| **Ozone** | **120 µg/m3** | **Maximum daily 8 hour mean** | **Target value enters into force 1.1.2010** | **25 days averaged over 3 years** |
| **Arsenic (As)** | **6 ng/m3** | **1 year** | **Target value enters into force 31.12.2012** | **n/a** |
| **Cadmium (Cd)** | **5 ng/m3** | **1 year** | **Target value enters into force 31.12.2012** | **n/a** |
| **Nickel (Ni)** | **20 ng/m3** | **1 year** | **Target value enters into force 31.12.2012** | **n/a** |
| **Polycyclic Aromatic Hydrocarbons** | **1 ng/m3 (expressed as concentration of Benzo(a)pyrene)** | **1 year** | **Target value enters into force 31.12.2012** | **n/a** |

**Table 6: EU air quality health standards**

**Under the new Directive the Member State can apply for an extension of up to five years (i.e. maximum up to 2015) in a specific zone. Request is subject to assessment by the Commission. . In such cases within the time extension period the limit value applies at the level of the limit value + maximum margin of tolerance (*48 µg/m3 for annual NO2 limit value).

***Under the new Directive the Member State can apply for an extension until three years after the date of entry into force of the new Directive (i.e. May 20011) in a specific zone. Request is subject to assessment by the Commission. In such cases within the time extension period the limit value applies at the level of the limit value + maximum margin of tolerance (35 days at 75*µg/m3 for daily PM10 limit value, 48 µg/m3 for annual Pm10 limit value).

****Standard introduced by the new Directive.*

# 2 Zoning in Member States

The number of zones in 2007 in the EU27 (909) was significantly lower than in 2006 (EU25: 1056).

The 2007 zoning adjustments compared to 2006 are:

- Poland reduced the number of zones from 362 to 186 zones
- Italy added 22 zones. Reason: in 2006 Italy did not report for the whole national territory.
- Romania added 17 zones. Reason: in 2006 Romania did not report for the whole national territory.

Voluntary information for 'Area size' (99%) and 'Population totals' (99%) per zone was submitted by the Member States and is almost complete. This is greatly improved compared to 2006.

The share of zones classified as agglomeration is 30% in the EU27. Population living in zones classified as agglomerations is on the other hand approx. 35%.

The total number of zones differs for each pollutant. The highest number of zones are designated for $NO_2$ (819) and $PM_{10}$ (809).

## *How have the Member States designated their zones?*

Designated zones in the Member States to assess and manage air quality vary widely dependant on the chosen variable: size, population, measured individual pollutant or types of protection targets.

The total number of zones that Member States design to assess and manage air quality is not strictly defined. Member States are free in defining their own zone structure and characteristics (population and area) to account for local specificity which makes mutual comparison of final results between countries more difficult.

The total number of zones in the Member States ranges from 186 in Poland to 1 zone in Cyprus.

Table 7 and Table 8 give an overview of the total number of zones defined in 2004 to 2006. The total number of 1056 zones in 2006 is, notwithstanding the enlargement with Bulgaria (6 zones) and Romania (4 zones), lower than in 2005 (1064 zones, Vixseboxse and de Leeuw, 2007). Luxembourg is designated in 3 zones and reported for the first time in four years. These 3 zones are included in the 2006 data and were absent in 2005.
Compared to 2005 three Member States (DE +2, GB +1, FR +1) had more zones designated and two Member States (ES -2, IT -23) had less zones designated. The difference between 2005 and 2006 zone designation is mainly caused by the missing information from Italy: only 16 from the 21 regions have submitted a questionnaire.

| Member State | All Zones | $SO_2$ | | $NO_2$ | $NO_x$ | $PM_{10}$ | Lead | Benzene | CO |
|---|---|---|---|---|---|---|---|---|---|
| | | Health | Eco-Systems | Health | Vegetation | | | | |
| AT | 19 | 11 | 8 | 11 | 8 | 11 | 11 | 11 | 11 |
| BE | 18 | 12 | 0 | 11 | 0 | 11 | 13 | 5 | 7 |
| BG | 6 | 6 | 1 | 6 | 1 | 6 | 6 | 5 | 6 |
| CY | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| CZ | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| DE | 120 | 79 | 15 | 85 | 15 | 82 | 72 | 84 | 84 |
| DK | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 1 | 3 |
| EE | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 |
| ES | 138 | 138 | 35 | 138 | 36 | 138 | 138 | 138 | 138 |
| FI | 18 | 14 | 1 | 14 | 1 | 14 | 14 | 3 | 14 |
| FR | 81 | 81 | 75 | 81 | 75 | 80 | 45 | 53 | 57 |
| GB | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 | 44 |
| GR | 4 | 4 | 4 | 4 | 4 | 4 | 0 | 1 | 4 |
| HU | 11 | 11 | 0 | 11 | 0 | 11 | 11 | 11 | 11 |
| IE | 4 | 4 | 1 | 4 | 1 | 4 | 4 | 4 | 4 |
| IT | 143 | 123 | 100 | 134 | 104 | 129 | 77 | 115 | 120 |
| LT | 3 | 3 | 1 | 3 | 0 | 3 | 3 | 3 | 3 |
| LU | 3 | 2 | 0 | 2 | 0 | 0 | 3 | 1 | 0 |
| LV | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| MT | 2 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 |
| NL | 9 | 9 | 1 | 9 | 1 | 9 | 9 | 9 | 9 |
| PL | 186 | 170 | 125 | 170 | 125 | 170 | 170 | 170 | 170 |
| PT | 27 | 24 | 7 | 25 | 8 | 25 | 1 | 1 | 1 |
| RO | 21 | 21 | 1 | 20 | 1 | 21 | 21 | 19 | 20 |
| SE | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| SI | 10 | 9 | 9 | 5 | 5 | 5 | 5 | 5 | 5 |
| SK | 11 | 10 | 10 | 10 | 10 | 10 | 7 | 10 | 10 |
| **EU27** | **909** | **807** | **469** | **819** | **468** | **809** | **685** | **721** | **749** |
| IS | 3 | 2 | 0 | 2 | 0 | 3 | 2 | 2 | 2 |
| NO | 7 | 3 | 3 | 7 | 0 | 7 | 0 | 7 | 5 |
| **ALL** | **919** | **812** | **472** | **828** | **468** | **819** | **687** | **730** | **756** |

*** form 0/1/2**

**Table 7: Number of zones per Member State and pollutants, 2007**

| MS | Total zones 2004 | Total zones 2005 | Total zones 2006 | Total zones 2007 |
|---|---|---|---|---|
| AT | 19 | 19 | 19 | 19 |
| BE | 17 | 17 | 17 | 18 |
| BG | | | 6 | 6 |
| CY | 1 | 1 | 1 | 1 |
| CZ | 15 | 15 | 15 | 15 |
| DE | 145 | 118 | 120 | 120 |
| DK | 10 | 10 | 10 | 3 |
| EE | 16 | 4 | 4 | 4 |
| GB | 43 | 43 | 44 | 44 |
| GR | 4 | 4 | 4 | 4 |
| ES | 140 | 140 | 138 | 138 |
| FI | 18 | 18 | 18 | 18 |
| FR | 85 | 87 | 88 | 81 |
| HU | 11 | 11 | 11 | 11 |
| IE | 4 | 4 | 4 | 4 |
| IT* | 137 | 144 | 121 | 143 |
| LT | 3 | 3 | 3 | 3 |
| LU | | | 3 | 3 |
| LV | 2 | 2 | 2 | 2 |
| MT | 3 | 2 | 2 | 2 |
| NL | 9 | 9 | 9 | 9 |
| PL | 362 | 362 | 362 | 186 |
| PT | 26 | 26 | 26 | 27 |
| RO* | | | 4 | 21 |
| SE | 6 | 6 | 6 | 6 |
| SI | 9 | 9 | 9 | 10 |
| SK | 10 | 10 | 10 | 11 |
| **EU25** | **1095** | **1064** | **1046** | **882** |
| **EU27** | | | **1056** | **909** |

* No country coverage in 2006

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**Table 8: Trend total number of zones per Member State, 2004-2007**

## Zone area size and population in zones

### *How complete is the reported voluntary information on population and area size in the zones?*

For the EU27 as a whole population data is missing in 1% of the zones and the same accounts for area information. National totals on area and population provided by Eurostat[16] and FAO[17] have been used here as a reference.

| | 2007 | | 2006 | |
|---|---|---|---|---|
| | # | % | # | % |
| **EU27 Zones total** | 909 | 100% | 1 065 | 100% |
| **Population info** | 901 | 99% | 1 041 | 98% |
| **Area info** | 903 | 99% | 957 | 89% |

*** form 0/1/2**

**Table 9: Voluntary zone info on area and population, percentage refers to the total EU27 population and area in 2007**

About 35% of the EU27 population lives in zones ($PM_{10}$) that are classified as agglomeration (Table 10). This percentage of population in agglomerations is roughly the same for all other health protection target pollutants ($SO_2$, $NO_2$, Pb, benzene, CO, $O_3$).

| MS | total population | PM10 |
|---|---|---|
| AT | 8 265 925 | 25% |
| BE | 10 511 382 | 23% |
| BG | 7 718 750 | 100% |
| CY | 766 414 | 0% |
| CZ | 10 251 079 | 28% |
| DE | 82 437 995 | 34% |
| DK | 5 427 459 | 23% |
| EE | 1 344 684 | 34% |
| ES | 43 758 250 | 51% |
| FI | 5 255 580 | 19% |
| FR | 62 998 773 | 40% |
| GB | 60 393 100 | 42% |
| GR | 11 125 179 | 39% |
| HU | 10 076 581 | 24% |
| IE | 4 209 019 | 25% |
| IT | 58 751 711 | 43% |
| LT | 3 403 284 | 27% |
| LU | 469 086 | 0% |
| LV | 2 294 590 | 31% |
| MT | 405 006 | 68% |
| NL | 16 334 210 | 31% |
| PL | 38 157 055 | 24% |
| PT | 10 569 592 | 41% |
| RO | 21 610 213 | 27% |
| SE | 9 047 752 | 31% |
| SI | 2 003 358 | 19% |
| SK | 5 389 180 | 12% |
| EU27 | 492 975 207 | 35% |
| IS | 299 891 | 64% |
| NO | 4 640 219 | 27% |

*** form 0/1/2**

**Table 10: Population in agglomerations[18], in 2007**

[16] http://epp.eurostat.ec.europa.eu/

[17] http://faostat.fao.org/

[18] 'agglomeration' shall mean a zone with a population concentration in excess of 250 000 inhabitants or, were

## Mandatory MS zone area and population coverage

### *How do Member States comply (total population and area) with the health protection target?*

The limit values for the protection of human health apply throughout the whole territories of the Member States, so areas that do not belong to any zone related to health protection should not exist. Similar, the population living is zones related to health protections should add up to the national total population numbers.

Table 28 and Table 29 in  compare the totals of area and population calculated for each of the objectives with the corresponding national area and population. For most, but not all Member States the total surface area of the health-related zones indeed added up to the total surface area of the country within a range of 5%. Small deviations from the 100% are to be expected in view of the different information sources and by difference in base year of the census.
It should be mentioned that reporting on the 4$^{th}$ DD pollutants was voluntary so the data presented here has an incomplete character as not all Member States reported. For the EU27 as a whole the total area covered by zones for the health related pollutants is above 90% for $SO_2$, $NO_2$ , $PM_{10}$ and $O_3$. Above 80% coverage have lead, benzene and CO.

In three Member States (CZ, GB and SE) the population totals are the same for all 10 pollutants (including 4$^{th}$ DD heavy metals) and are close to the 100% indicating that the total territory has been assigned. Finland also has full population coverage but did not yet report on the 4$^{th}$ DD yet. For the other countries the coverage may add to about 100% but it varies slightly for the various pollutants. This indicates (minor) inconsistencies in the zone designation and/or minor errors in the population numbers per zone.
A nearly complete coverage is in general found for $SO_2$, $NO_2$, $PM_{10}$ (with exceptions for LU, LV and PT) and $O_3$ (except BE, IT, LU, LV, RO and SI). Lower coverage's are found in the case of lead, benzene and CO.

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the population concentration is 250 000 or less, a population density per km2 which for the Member States justifies the need for ambient air quality to be assessed and managed (Council Directive 96/62/EC, 27 September 1996).

# 3 Air quality exceedances

The number of zones in Member States in 2007 where the limit or target value was exceeded was greatest for the $O_3$ (46%) target value to be attained in 2010. Concentration levels in 42% of the zones exceeded the $PM_{10}$ daily limit value.

The EU27 population affected by these exceedances was even greater. The percentage of population living in zones where the AQ threshold was exceeded is 47% for daily $PM_{10}$ and 48% for $O_3$ health.

The main reported single reasons for the zone-exceedances are local traffic ($PM_{10}$ day, $NO_2$ year), industry ($O_3$ health, $SO_2$) and domestic heating ($SO_2$ health day).

## Introduction

If measurements or model calculations show that a limit value or limit value plus margin of tolerance is exceeded somewhere in the zone, the whole zone is designated as being in exceedance of this threshold.

► *It should be noted that the number or percentage of zones in exceedance is only a crude indicator for the area in exceedance. In the first place, the exceedance area might be the entire zone area or just a few hundred square metres at a hotspot. In the second place, some Member States have made very large zones, so very few zones, for pollutants that are everywhere substantially below the air quality thresholds. Hence, the number or percentage of zones cannot be used to estimate the area in exceedance or to compare actual population exposure to air pollution between different Member States or even between regions within a Member State.*

## Number of zones in exceedance

### *Which pollutants exceed the limit or target value the most?*

The number of zones in Member Sates in 2007 where the limit or target value was exceeded was greatest for $PM_{10}$ daily (42%) and $O_3$ health (46%).

### *Has the air quality improved in 2007 compared with a year ago?*

Compared to the 2006 zone exceedances the most striking was the increase by 7% of the zones where levels were exceeding $O_3$ health target value to be attained in 2010. This is a second year in a row increase as between 2005 and 2006 the $O_3$ zones in exceedance increased with 5%. This is however not explained[19] by the specific 2007 weather conditions in Europe. During summer 2007 no elevated ozone levels have been observed throughout whole Europe.

[19] Air pollution by ozone in Europe in summer 2006, EEA technical report No 5/2008

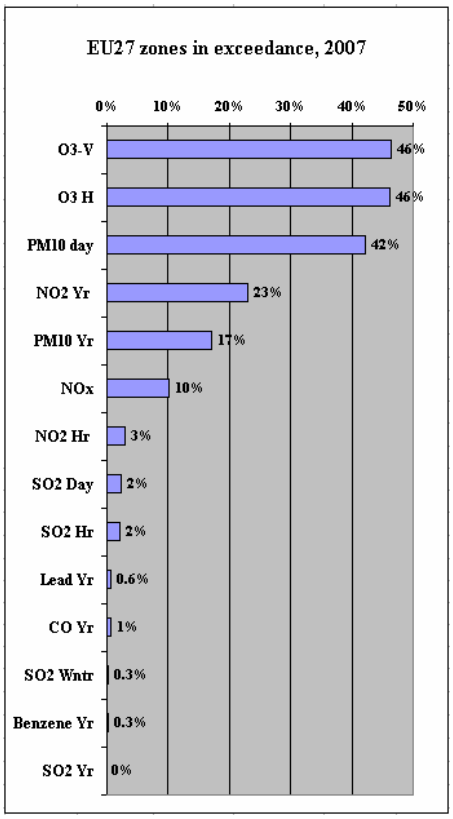


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**Table 11: Zone exceedances in 2007[20]**

On the whole for the EU27 (see Table 2), $PM_{10}$ zone-exceedances slightly decreased between 2006-2007, $O_3$ exceedances increased considerable, $NO_2$ zone-exceedances increased by 5% and for the rest of the pollutants zone-exceedances are of minor importance and/or were equal to 2006 zone-exceedances.

Table 30 and Table 31 show the number of zones in exceedance, per Member State and pollutant in 2007. There are some discrepancies between the number of zones listed in Table 7 and the numbers presented in Table 30 and Table 31. This is due to the fact that in a number of cases the air quality status has been given for a zone while this zone was not designated for this pollutant/protection target. To a large extent these discrepancies might result from mistakes (e.g. misprinting zone codes) in the respective forms. It is expected that the noted discrepancies in zone definitions has not influenced the conclusions at the aggregated level presented here.

## 2007 exceedance maps for $PM_{10}$ and $O_3$

Figure 1 and Figure 2 show the EU27 zone exceedance maps for $PM_{10}$ day and $O_3$ health target to be attained in 2010. The white areas in the maps represent areas in Member States that were not designated into zones. The yellow territories are areas that were designated into zones but air quality status was not reported on. In both cases those Member States did not comply with the framework Directive as zoning and reporting is mandatory for all health related pollutants.

Figure 1 shows exceedances of the $PM_{10}$ daily limit value in a number of isolated urban agglomerations and regions with well-documented high $PM_{10}$ levels (Po valley, Central Europe, Ruhr area, Netherlands, Northern Belgium, London, see for example the monitoring based maps presented

[20] For $NO_2$ and ozone the limit value and target value attainment date is 2010

in Horálek et al., 2008). On the other hand, it also suggests widespread exceedances in the Nordic countries. Here exceedance has been observed at one or two hot-spot station resulting in a whole non-compliance zone.

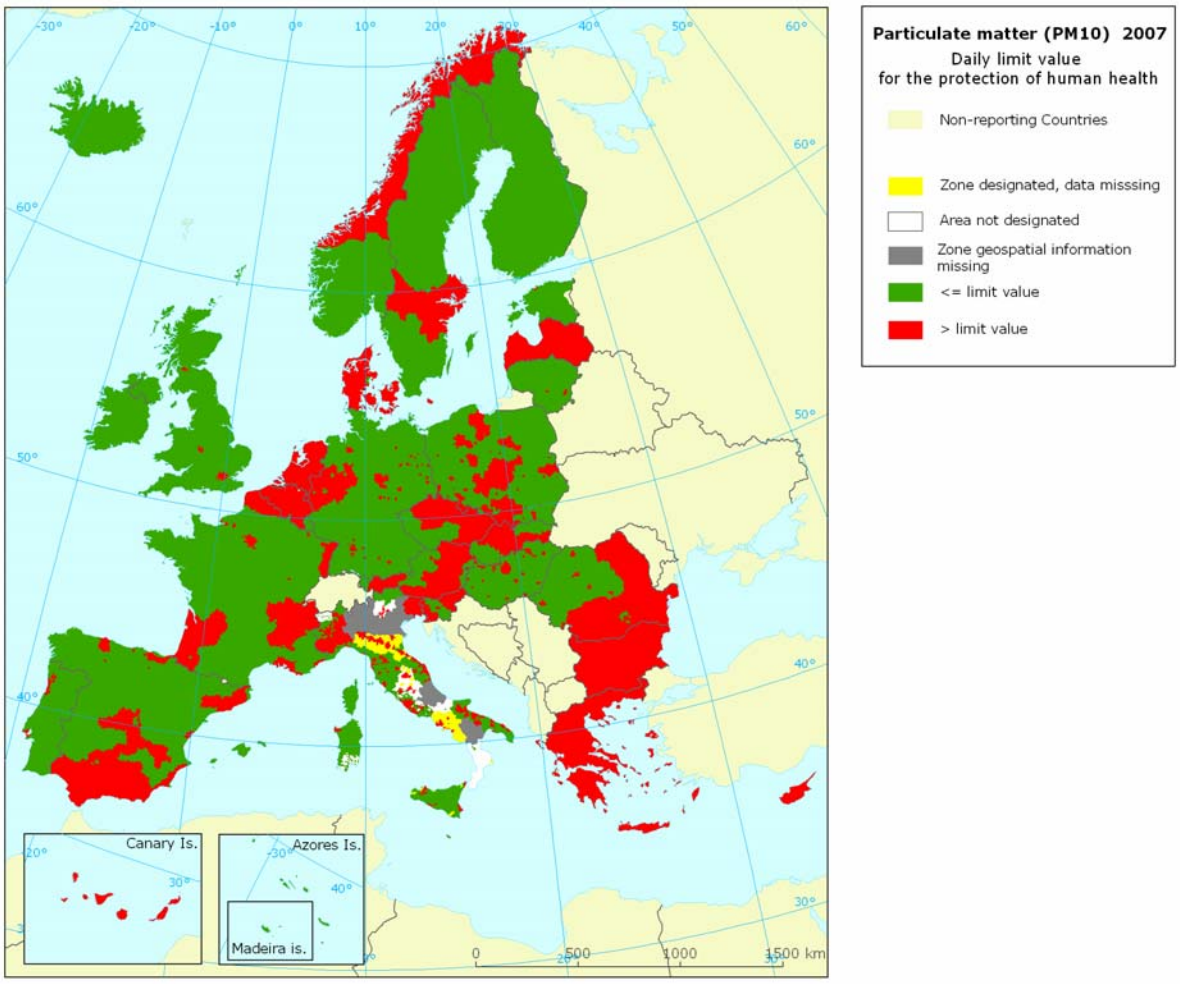



**Figure 1: EU27 $PM_{10}$ day zone exceedance, 2007**

The EU27 maps in the Annex of this chapter show the zone-exceedances for all the other reported pollutants in the Questionnaire.

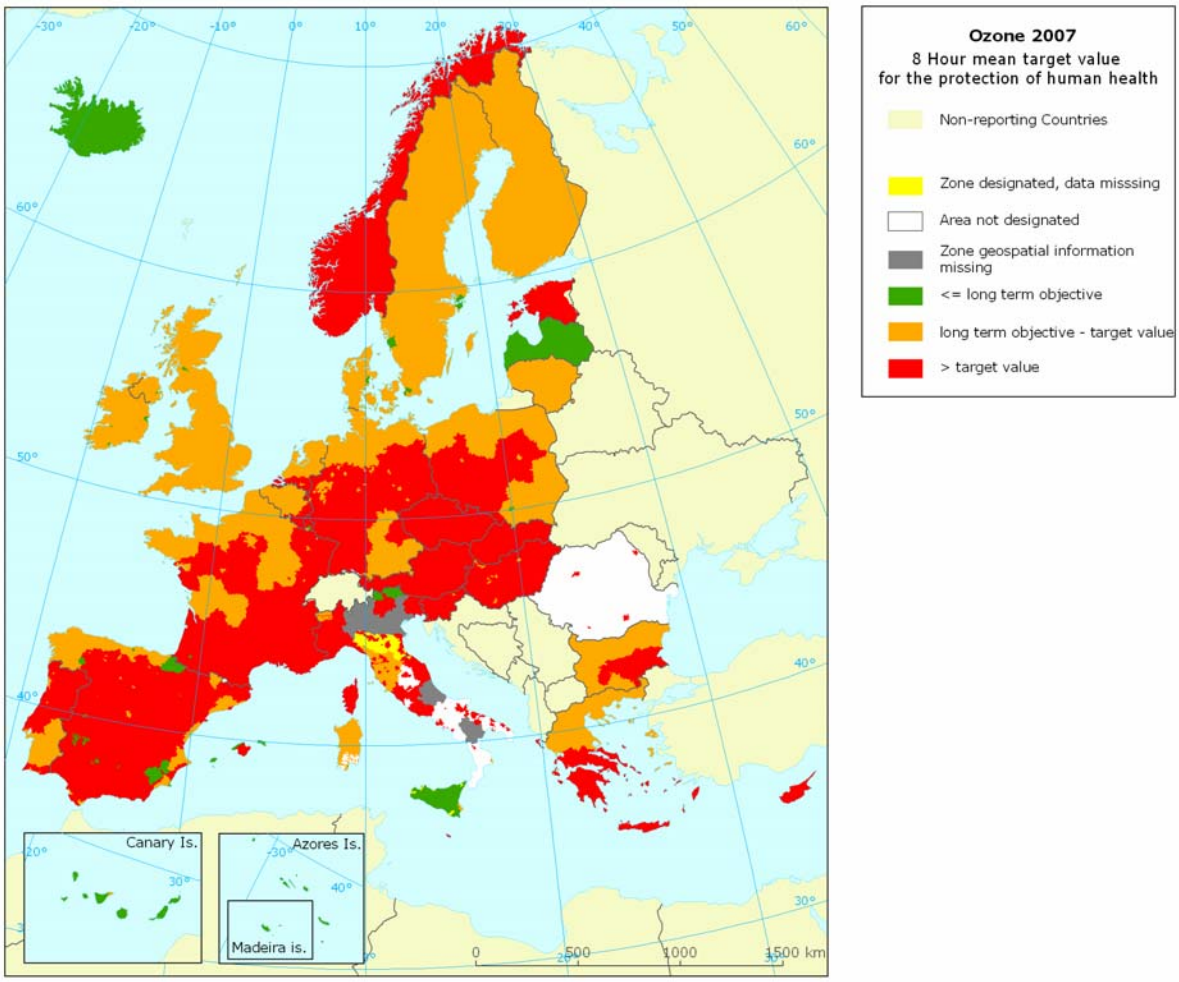
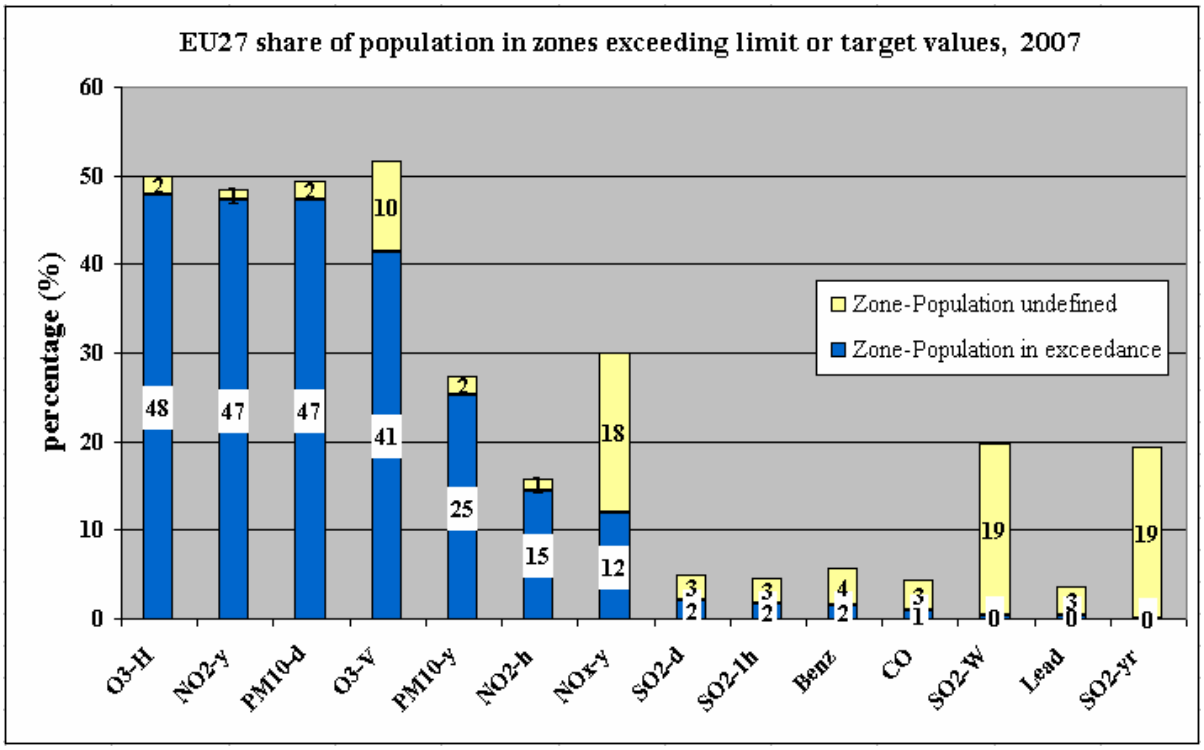



**Figure 2: EU27 $O_3$ health zone exceedance, 2007**

## Population in zones with exceedances

### *How many people live in zones where the limit or target value is exceeded?*

Figure 3 shows that 47% of the EU27 population lives in zones where the $PM_{10}$ limit value is exceeded. For $NO_2$ and $O_3$ health the percentages population affected are the same.
On the other hand, the number of zones that exceeded the AQ thresholds is 42% ($PM_{10}$ day); 46% ($O_3$ health) and 23% ($NO_2$ year).




*** form 8/9**

**Figure 3: Population in zones exceeding air quality thresholds, 2007**

## Reported reasons of exceedances

### *What are the reported reasons for the exceedances in the zones according to the Member States?*

For the daily $PM_{10}$ the most mentioned single reason mentioned exceedance causes are local traffic (31%) and industry (14%). $NO_2$ year exceedances are caused predominantly by local traffic (69%). For exceedances of the ozone alert threshold a reason has not been given in most of the cases. The main reported reasons for daily $SO_2$ health zone-exceedances are domestic heating (9%), local industry (18%) and local traffic (5%).

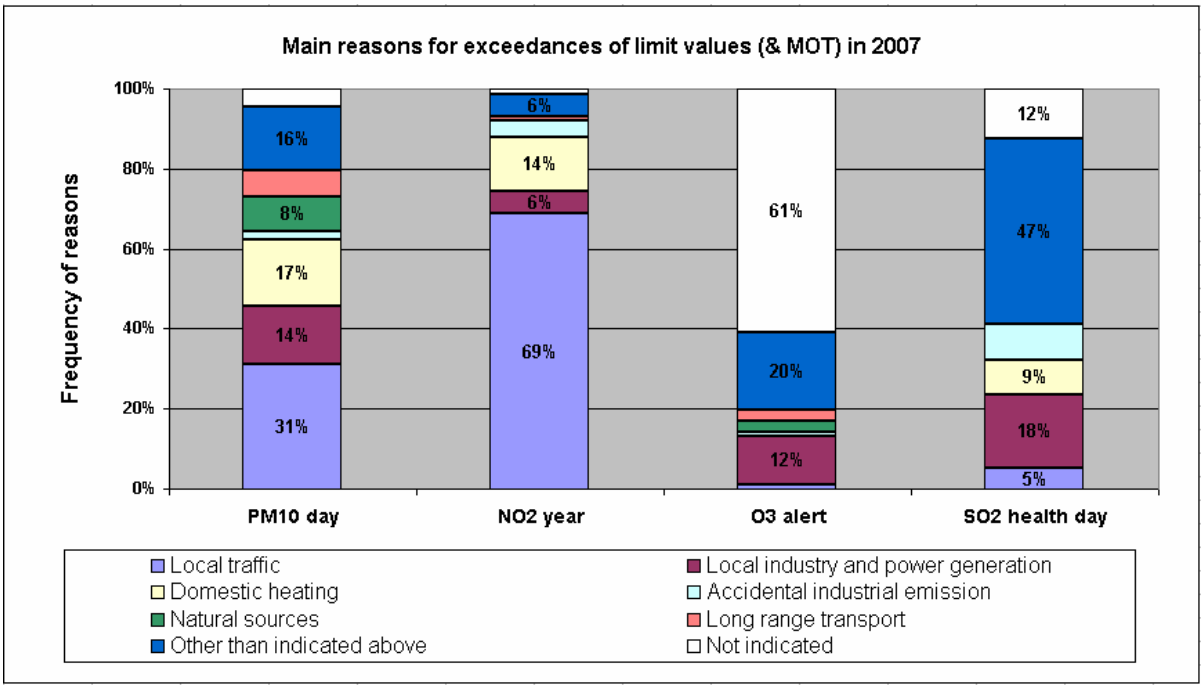



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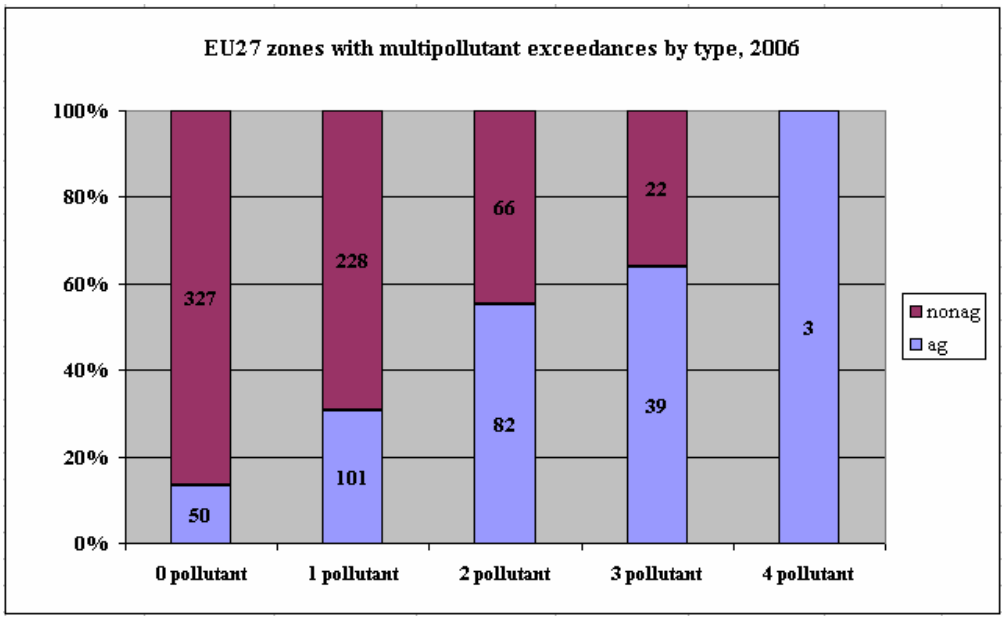
**Figure 4: Reported reasons for zone exceedances, 2007**

Figure 4 shows the main reasons mentioned for exceedances for daily $PM_{10}$, yearly $NO_2$, $O_3$ health and daily $SO_2$. The percentages mentioned are the shares from the total reported reasons by the Member States.

## Multi exceedances in the same zone

### *How many zones are there in the EU where air quality thresholds are exceeded for several pollutants?*




*** form 8/9**

**Figure 5: EU27 multi-pollutant exceedance zones by zone-type, 2007**

Figure 5 shows that in about 16% (148) of all zones (909) the limit or target values of two or more pollutants have been exceeded simultaneously. These zones require most challenging integrated air pollution assessment strategies. In 2007 there are 148 zones in the EU27 that have air quality thresholds exceedances for 2 pollutants. There are 71 and 3 zones that have zone exceedances for 3 and 4 pollutants.

## *In which Member States are these multi exceedances zones located?*

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**Table 34** in the annex of this chapter shows the numbers of multi exceedance zones per Member State. The Member States with zones where 4 pollutants exceed the air quality threshold are located in BG and RO.

There are 12 Member States with zones where 3 pollutants exceed thresholds. In this multi pollutant exceedance category Italy has 26 zones and France 9 zones.

## *How many people live in these zones with multi pollutant exceedances in the EU27?*

Table 12 shows the population that is affected by pollutant exceedances.The number of people living in zones with 4 pollutants in exceedance amount to 3.6 million in the EU27. 72 Million and 121 million people live in zones with respectively 3 and 2 pollutant zone exceedances.

**EU 27 population in zones per zone-type with multi pollutant exceedances, 2007**

| | | 0 pollutant | 1 pollutant | 2 pollutant | 3 pollutant | 4 pollutant | Grand Total |
|---|---|---|---|---|---|---|---|
| EU 27 | ag | 14 538 992 | 41 870 705 | 79 062 736 | 45 538 130 | 3 629 371 | 184 639 934 |
| | nonag | 190 279 897 | 182 534 210 | 42 674 345 | 26 712 138 | 0 | 442 200 590 |
| | Grand Total | 204 818 889 | 224 404 915 | 121 737 081 | 72 250 268 | 3 629 371 | 626 840 524 |

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**Table 12: EU27 Population in zones with multi-pollutant exceedances, 2007 (ag = agglomeration; nonag = other zones but agglomerations).**

# 4 Statistics on stations and methods

The total number of AQ measuring stations in 2007 in the EU27 (4064) used for the assessment under the ambient air quality directives was 322 stations less than in 2006 (EU27: 4386). This decrease is mainly explaned by the Polish restructuring of zones and stations.

Most of the EU27 stations measure the pollutants $NO_2$ (70%), $PM_{10}$ (61%), $SO_2$ (49%) and $O_3$ (48%).

The measuring stations can be qualified by type and location. The dominant station type is 'background' (56%) and the most occurred location is 'urban' (49%). It should be mentioned that this detailed station information does not originate from the Questionnaire reporting but from a link between Questionnaire stations and Airbase stations.

Almost all stations (88%) measure for health protection targets in 2006 which is about the same compared with the 2006 reporting cycle (86%).

Zone characteristics and pollutant type determine the minimum number of stations in a zone. The largest deficiency of monitoring stations is for $O_3$ (31%), $PM_{10}$ (20%) and benzene (5%) in 2007.

The most used measuring method for $PM_{10}$ is 'beta absorption' (41%). For $PM_{2.5}$ this is also 'beta absorption' (39%). The 'gravimetric' method (reference method) is both for $PM_{10}$ (24%) and $PM_{2.5}$ (28%) the second most used method.

## Number of stations and share of pollutants

### *What is the total number of monitoring stations in the EU27?*

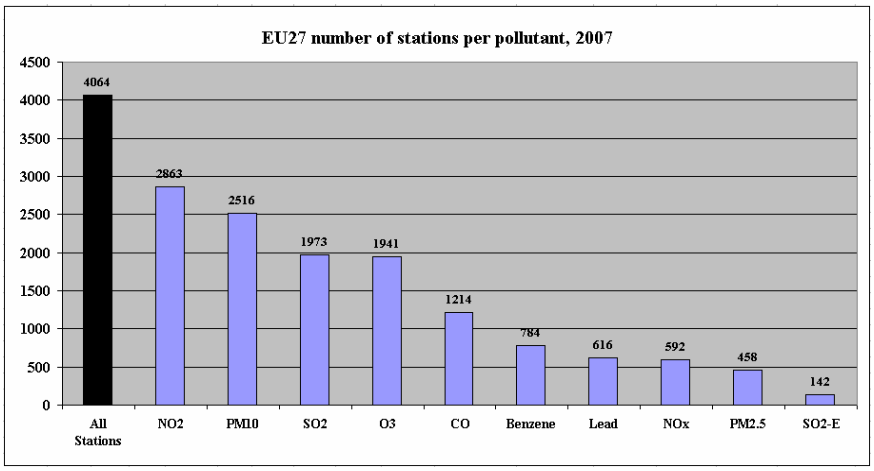


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**Figure 6: Total number of EU 27 AQ measuring stations per pollutant, 2007**[21]

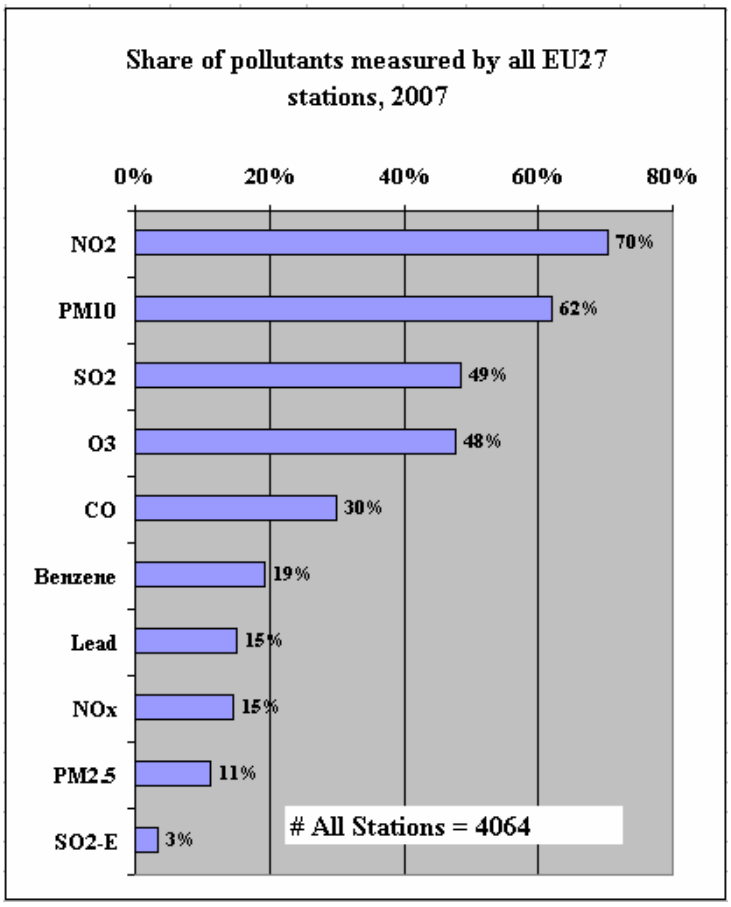
[21] Source: Airbase

Compared to the 2006 reported number of stations the total number decreased with 322. This reduction is especially due to Poland which reduced its number of zones from 362 to 186.The most widely measured pollutants are $NO_2$ (70%), $PM_{10}$ (61%) and $SO_2$ (49%) in 2007.

Depending on the level of air quality, Member States can use measurements, mathematical models and other methods for the assessment of their air quality. As required by the air quality legislation the monitoring networks are the backbone of the assessment system.

### *And which pollutants do the monitoring stations mainly measure?*

Figure 6 and Figure 7 show that the pollutants that are measured mainly are $NO_2$, $PM_{10}$ and $SO_2$. One and other is obviously related to the station density requirements and policy importance, which reflect the likelihood of exceedance of limit values and ozone thresholds. On top of this, there also seems to be a historic lag, causing 'old' pollutants ($SO_2$, $NO_2/NO_x$) to be measured more extensively than the newer ones ($PM_{10}$ and benzene). This is particularly true for $PM_{2.5}$. However, the absolute number of monitoring stations that measure $PM_{2.5}$ increased from 296 to 485 (= 61%) between 2006 and 2007 in the EU27.




*** form 3/4/5**

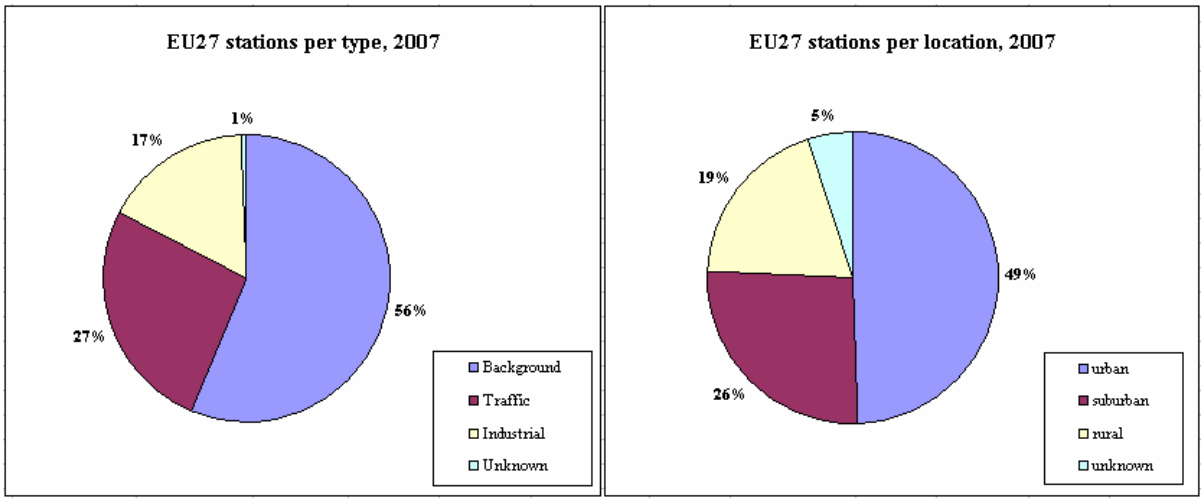
**Figure 7: Share of pollutants measured by all EU27 stations, 2007**

## Type and location of monitoring stations

### *What are the dominant type and location of the monitoring stations?*

Of all EU27 monitoring stations the dominant station types are 'background" (56%) and 'traffic'

(27%).




*** form 3/4/5**

**Figure 8: EU AQ measuring stations per type and location, 2007**[22]

The dominant locations for all monitoring stations are 'urban' (49%) and 'suburban' (26%) in 2007 (Figure 8). The type and location of the monitoring stations is generally in line with the directive requirements, focused at measuring the potential exposure of the population and to a lesser extent identifying highest concentrations in the zone. There is however strong variance between the Member states.

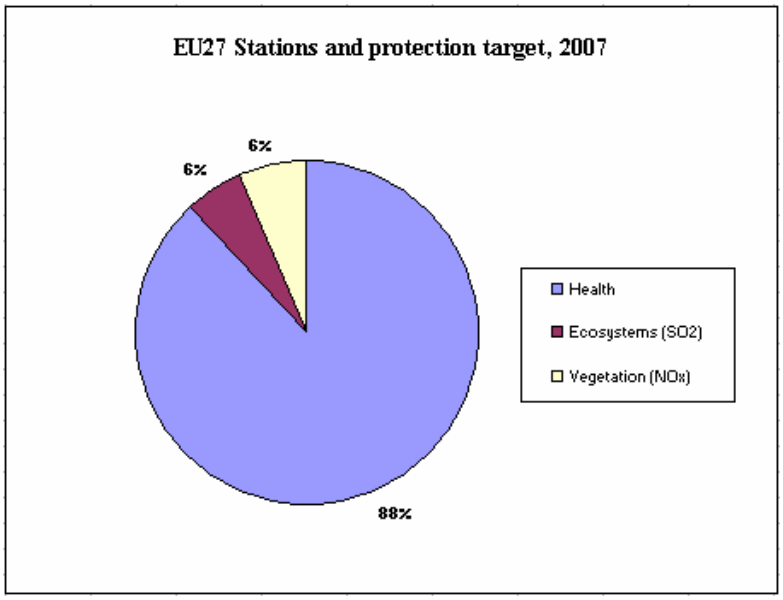
## Purposes of stations

### *What is the final purpose of the monitoring stations?*

Figure 9 and Table 36 in the Annex of this chapter show that stations mainly measure for the purpose of the health protection target (88%). Stations measuring for the purpose of the ecosystem and vegetation target both equal 7% in 2006. Compared to the 2005 reporting year the share of stations measuring for human health is down from 90%.

All stations should be used for the assessment of the air quality in relation to the limit values for health protection, but for the assessment in relation to the limit values for ecosystems ($SO_2$) and vegetation ($NO_x$), only stations should be used at sufficient distance from sources and representative of an area of at least 1000 $km^2$. As this excludes urban, industrial and traffic stations, the number is substantially lower: 7 % is used for ecosystem protection ($SO_2$) and also 7 % for vegetation ($NO_x$). The function of the stations was only filled in for 56 % of the total EU27 number of stations. Germany, Denmark, Poland and Slovenia didn't supply station function data.

[22] Source: Airbase




*** form 3/4/5**

**Figure 9: EU27 AQ measuring stations and protection target, 2007**

## Stations monitoring ozone precursors

### *How many stations reported on measurements of ozone precursors (Table 13)? And what was mainly measured?*

In 2007, 3 countries (CY, IS and NO) didn't report any results of VOC measurements, including benzene. Five Member States only reported on benzene (BG, EE, LU, LV and RO). The substances mainly monitored are benzene (491 stations), toluene (333 stations) and o-Xylene (257 stations).

The Third Daughter Directive requires Member States to measure ozone precursors, for trend analysis, for checking the efficiency of emission reduction strategies and the consistency of emission inventories and to help attribute emission sources of pollution concentrations. An additional aim is to support the understanding of ozone formation and precursor dispersion processes, as well as the application of photochemical models. Member States must take these considerations into account when choosing the number and siting of stations; there should be at least one station per Member State.

Mention should be made that reporting by the Member States of the reactive VOCs is very limited compared to the less reactive aromatic compounds.

| VOC | EU27 # Stations |
|---|---|
| Ethane | 27 |
| Ethylene | 27 |
| Acetylene | 27 |
| Propane | 27 |
| Propene | 27 |
| n-Butane | 35 |
| i-Butane | 34 |
| 1-Butene | 37 |
| trans-2-Butene | 44 |
| cis-2-Butene | 44 |
| 1.3-Butadiene | 34 |
| n-Pentane | 57 |
| i-Pentane | 46 |
| 1-Pentene | 39 |
| 2-Pentene | 25 |
| Isoprene | 40 |
| n-Hexane | 65 |
| i-Hexane | 26 |
| n-Heptane | 64 |
| n-Octane | 55 |
| i-Octane | 37 |
| Benzene | 491 |
| Toluene | 333 |
| Ethyl benzene | 209 |
| m+p-Xylene | 235 |
| o-Xylene | 257 |
| 1,2,4-Trimeth.benzene | 43 |
| 1,2,3-Trimeth.benzene | 36 |
| 1,3,5-Trimeth.benzene | 43 |
| Formaldehyde | 4 |
| Total non-methane hydrocarbons | 67 |

*** form 3/4/5**

**Table 13: EU27 number of stations monitoring ozone precursors, 2007**

## Zones where the number of stations was too low

### *For which pollutants was the number of stations in a zone too low?*

The three main pollutants (Figure 10) for which the number of stations in a zone was too low in 2007 were $O_3$ (31%), $PM_{10}$ (20%) and benzene (5%). Compared with 2006 the situation for $O_3$ has greatly worsened (was 12%), $PM_{10}$ is the same (was 21%) and for benzene is improving (was 24%).

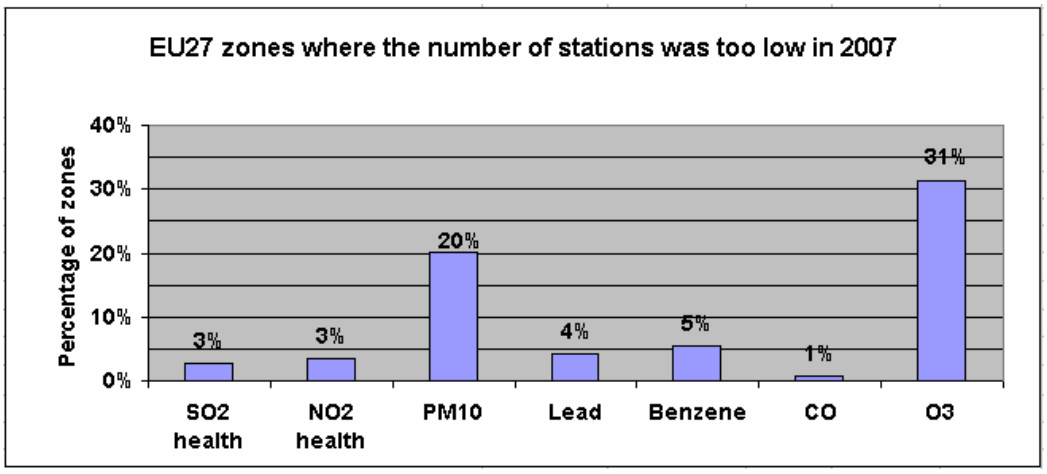
Information is based partly based on voluntary reported population and area data. The population and area coverage of the Member States has greatly improved in 2007 (99%) when compared to the 2006 (89%) reporting year. In 2007 only a few individual zones (in BE, DE and IT) did not report on the voluntary population and area data. The 'number of zones with too low a number of stations per assessment regime' and 'per Member State / pollutant' is shown in * form **10**
Table 39 and Table 40 in chapter 7.

### Stations related to health protection

The first two daughter directives list the minimum number of stations per zone for air quality

assessment in relation to diffuse sources and in relation to health protection limit values. This minimum number depends on exceedance of the upper or lower assessment threshold (the assessment regime) specified in the directives, the population of the zone and the agglomeration status, and on whether supplementary assessment had been carried out. Member States must also assess the air quality in the vicinity of point sources, but the directives do not specify the number of stations. Member States are responsible for having an adequate air quality assessment system in all of their zones; it is important to note that this may require more stations than the minimum that was checked here.

For the zones where no supplementary assessment had been carried out and on which Member States had, voluntarily, reported sufficient data on population in a zone, it could be checked whether the number of stations complied with the minimum number. Figure 10 shows the result, considering only the zones that could be checked and for which measurement was mandatory. The number of zones with too few stations was largest for $O_3$, $PM_{10}$ and benzene.The analysis also showed that in many zones the number of stations was considerably higher than the minimum used here.




*** form 10**

**Figure 10: Compliance with the minimum number of stations in zones, 2007**

### Stations related to ecosystem and vegetation protection

For zones exceeding the assessment thresholds for ecosystems and vegetation it is difficult to do a precise check, because the assessment thresholds are defined per zone, while the minimum number of stations is defined as one station per 20000 or 40000 km2 when respectively the upper or lower assessment threshold is exceeded. Most zones are smaller than these sizes. All large zones were found to have enough stations. Several Member States with a large territory did not report having any stations for ecosystems or vegetation.

## Matching station coding between 'Questionnaire' and 'Exchange of Information reporting'

### *How many monitoring stations that were reported in the Questionnaire could be matched with the Airbase database?*

Additional information (e.g. type, location) on stations can be retrieved through the EoI 'Airbase' database. To retrieve this, the "EoI station code" was needed to link the station data in the two reports.

| EU27 AQ Stations | $SO_2$ | $NO_2$ | $NO_x$ | Lead[2] | $PM_{10}$ | $PM_{2.5}$ | Benzene | CO | $O_3$ | All |
|---|---|---|---|---|---|---|---|---|---|---|
| Questionaire Station | 1973 | 2863 | 592 | 616 | 2516 | 458 | 784 | 1214 | 1941 | 4064 |
| Eoi (Airbase) Station | 1963 | 2829 | 584 | 588 | 2493 | 455 | 738 | 1200 | 1930 | 3964 |
| % EoI Stations cover | 99% | 99% | 99% | 95% | 99% | 99% | 94% | 99% | 99% | 98% |

*** form 3/4/5**

**Table 14: Number of reporting Stations in Questionnaire and corresponding EoI stations, 2007**

Theoretically speaking all reported stations should correspond with the stations in the Exchange of Information decision (EoI) 'Airbase' database. Of all measuring stations 98% were able to be traced in 2007. This is a great improvement compared to the 2006 reporting cycle as 83% of all monitoring stations could be traced then. The effects of two data quality checks and the restructuring of the Polish zones/stations are the main explicatory reasons here.

## Multi-pollutant stations

### *Which pairs of pollutants are monitored together at the same station?*

In almost all stations were $NO_2$ is measured CO is also measured (97%). Where $PM_{2.5}$ is measured $PM_{10}$ is also always measured (100%).

Most monitoring stations measure more than one pollutant. Table 15 gives the percentages of stations that measure pairs of pollutants as reported under Daughter Directives. The percentages are given as percentage of the total of each pollutant. For example, at 100% of the stations that measure $PM_{2.5}$ also $PM_{10}$ is measured. The lowest correlations exist between the pairs of pollutants, $NO_x$, lead, benzene and CO. Monitoring of $SO_2$, $NO_2$, $PM_{10}$ and $O_3$ is frequently collocated.

| $SO_2$ | $SO_2$ | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $NO_2$ | 60% | $NO_2$ | | | | | | | |
| $NO_x$ | 63% | 98% | $NO_x$ | | | | | | |
| Lead | 49% | 61% | 14% | Lead | | | | | |
| Benzene | 52% | 82% | 17% | 28% | Benzene | | | | |
| CO | 67% | 97% | 16% | 19% | 35% | CO | | | |
| $PM_{10}$ | 56% | 85% | 18% | 19% | 22% | 39% | $PM_{10}$ | | |
| $PM_{2.5}$ | 60% | 91% | 24% | 22% | 30% | 53% | 100% | $PM_{2.5}$ | |
| $O_3$ | 56% | 92% | 23% | 13% | 18% | 36% | 70% | 11% | $O_3$ |

*** form 3/4/5**

**Table 15: Multi-pollutant stations (percentage of pollutant pairs), 2007**

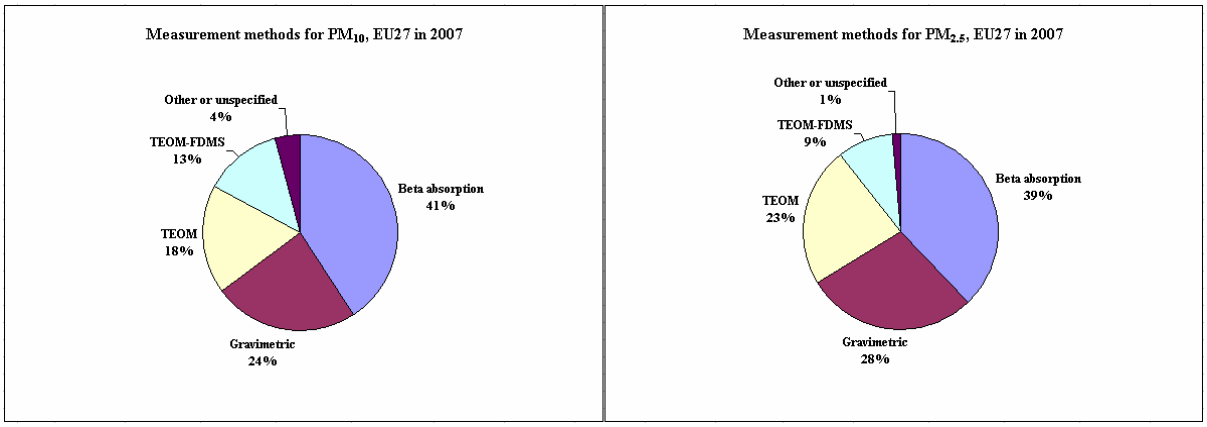
Before the air quality daughter directives came into force, Member States had different approaches in siting their stations. Since then, some convergence has taken place, but differences have remained. Table 37 illustrates this for the ratio of (sub) urban background and traffic stations, which varies strongly. In Poland for example 205 stations (of 269 total) is classified as urban background stations whereas in Finland 17 stations (of 40 total) are classified as urban traffic stations. The proposal for the new air quality directive reduces this to a variation between 2:1 and 1:2.
In Spain there is a relative high number of industrial classified stations (224 out of a total of 562 stations).

## Measuring methods particulate matter

### *What are the main measuring methods in use for $PM_{10}$ and $PM_{2.5}$?*

The main $PM_{10}$ measuring method is 'beta absorption' (41%). For $PM_{2.5}$ this is also the case (39%). The 'gravimetric method' is the reference method for both $PM_{10}$ and $PM_{2.5}$ and is described in standards EN12341:2000 and EN14907:2005 respectively. This measurement method is used for $PM_{10}$ and $PM_{2.5}$ in 24% and 28% of all stations in 2007.

Several measurement methods are in use for $PM_{10}$ and $PM_{2.5}$. The First Daughter Directive specifies the gravimetric method (collection on a filter and gravimetric mass determination) as the reference method but allows other methods to be used, provided that equivalence with the reference method can be demonstrated. To achieve this equivalence, Member States may apply a correction factor (or correction equation).




*** form 3/4/5**

**Figure 11: Measuring methods for $PM_{10}$ and $PM_{2.5}$ in 2007**

Within Member States there is often a clear preference for a particulate matter measuring method. In France for example the 'Oscillating microbalance method' (TEOM & TEOM FDMS) is the dominant measuring method for $PM_{10}$ and $PM_{2.5}$. See Table 41 for a breakdown of the $PM_{10}$ and $PM_{2.5}$ measuring methods per Member State in 2007.

## Correction factor Particulate matter

### *What are the $PM_{10}$ and $PM_{2.5}$ correction factor used and how many stations used it?*

For $PM_{10}$ 47% of all stations reported on the correction factor. Almost half (32%) the stations reported a CF of one and 43% reported a CF larger than one.
For $PM_{2.5}$ 24% of all stations reported on a CF. 50%% reported a correction factor of one and 29% of the stations reported a CF larger than one. Table 16 summarizes the results on correction factors for the EU27. Table 42 in the annex of this chapter shows the correction factor breakdown of monitoring stations using a non-reference method for $PM_{10}$ and $PM_{2.5}$ per Member State.

Added value from the knowledge of the actual correction is limited as the factor itself is crucially dependent on the implementation of the non-reference method (instrument version, internal calibration etc.) as well as on the local climatic conditions and PM composition. Report on the demonstration on equivalence (can be based on draft Guidance on the demonstration of equivalence published by the Commission in 2005[23]) provides more comprehensive information on the actual

[23] http://ec.europa.eu/environment/air/pdf/equivalence_report3.pdf

equivalence.

| Member State | CF>1 | CF=1 | CF<1 | CF Variable | CF Other | CF reporting PM10 stations |
|---|---|---|---|---|---|---|
| EU27 | 43% | 32% | 3% | 22% | 1% | 47% |

| Member State | CF>1 | CF=1 | CF<1 | CF Variable | CF Other | CF reporting PM2.5 stations |
|---|---|---|---|---|---|---|
| EU27 | 29% | 50% | 4% | 6% | 11% | 100% |

*** form 3/4/5**

**Table 16: Station correction factors for $PM_{10}$, $PM_{2.5}$ using a non-reference method, 2007**

# 5 Other statistics

Thirteen of the 27 Member States use modeling results to determine the exceedance status in their zones.
Lead (30.3%), benzene (21.7%) and CO (17.9%) are the pollutants where the exceedance status is most frequent based on modelling in 2007. The use of modelling for these three pollutants shows a steady increase since 2004 and a strong increase since 2006.

Supplementary Assessment (SA) or assessment other than measurement is carried out in eight Member States in 2007 (five in 2006). In the UK exceedance status for all DD1,2 and 3 health related pollutants was based 100% on SA. France is another Member State with a high share of supplementary assessment.

277 Stations in 25 Members States reported on $PM_{2.5}$. The Netherlands and Luxembourg did not treport on $PM_{2.5}$. In the EU27 the average annual mean concentration is 18µg/m$^3$ which is down from 20µg/m$^3$ in 2006. Member States in excess of 25µg/m$^3$ as average annual mean $PM_{2.5}$ concentration are BG, GR, IT.

Six Member States (CY, GR, ES, NL, SK and PT) claimed $PM_{10}$ derogation on the basis of natural events and four MS (EE, LT, LV and SK) due to winter sanding.

## *To what extent is modelling and supplementary assessment (Table 17) being used to assess the air quality?*

The use of modelling in the 2006 air quality assessment of zones varies per pollutant. In the case of $O_3$ only 6 % of the EU27 zones are based on modelling. At the other end of the range is lead where 30% of the zone air quality is based on modelling.

Mention has to be made that the modelling and SA statistics are based on only thirteen Members States that reported making use of modelling whereas only 8 report use of supplementary assessment (see Table 43 and Table 44).

| Exceedance based on modelling | | | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|---|---|
| SO2 | Health | Hr | 13.0% | 12.1% | 10.6% | 10,3% |
| | | Day | 8.0% | 8.8% | 7.7% | 9,7% |
| | | Yr | 21.0% | 14.4% | 7.2% | 6,9% |
| | Eco | Winter | 19.0% | 19.4% | 5.4% | 7,1% |
| NO2 | Health | Hr | 10.0% | 10.3% | 8.5% | 6,1% |
| | | Yr | 12.0% | 10.6% | 4.4% | 10,8% |
| NOx | Veg | Yr | 19.0% | 2.8% | 6.9% | 7.0% |
| PM10 | Day | | 10.0% | 9.3% | 7.2% | 8,1% |
| | Yr | | 9.0% | 8.0% | 6.0% | 7,1% |
| Lead | Yr | | 15.0% | 19.3% | 17.9% | 30,3% |
| Benzene | Yr | | 13.0% | 12.5% | 13.1% | 21,7% |
| CO | Yr | | 14.0% | 9.6% | 11.9% | 17,9% |
| O3 | Health | | 2.1% | 3.3% | 2.0% | 7,1% |
| | Veg | | 2.2% | 3.6% | 2.9% | 6,1% |

| Supplementary Assessment | 2004 | 2005 | 2006 | 2007 |
|---|---|---|---|---|
| $SO_2$ | 1.2% | 16.6% | 5.8% | 12,1% |
| $NO_2/NO_x$ | 1.4% | 16.7% | 6.2% | 13,1% |
| $PM_{10}$ | 2.5% | 16.5% | 7.7% | 12,5% |
| Lead | 4.8% | 25.9% | 11.9% | 12,4% |
| Benzene | 7.4% | 25.6% | 9.3% | 15,5% |
| CO | 4.7% | 19.0% | 6.5% | 11,4% |
| $O_3$ | 27.0% | 60.1% | 75.0% | 83,6% |

*** form 8/9**

**Table 17: EU27 share of zones - exceedance based on modelling or SA, 2007**

The Daughter Directives encourages Member States to assess their air quality not only with measurements, which gives the concentrations only at the locations of the monitoring stations, but also with other methods *e.g.* model calculations. This type of assessment is expected to become more important in future and a trend is already noticeable by the trend data (2004-2007) of the modelling shares of pollutants.

Member States could also report whether Supplementary Assessment, i.e. assessment based on information from sources other than measurement, such as emission inventories, indicative measurement methods and air quality modelling, was applied. The number of zones for which this was reported, is for some limit values lower than the number of zones for which the exceedance status was determined by modelling. This unexpected result – modelling implies Supplementary Assessment – may be point at lack of clarity in the concept of Supplementary Assessment.

## Statistics of $PM_{2.5}$ measurements

### *What are the Member States that have reported on $PM_{2.5}$? And what are the number of stations and reported concentrations?*

Two Member States (NL, LU) did not report on $PM_{2.5}$ (Table 45). The total number of $PM_{2.5}$ monitoring stations in the 21 reporting Member States is 276. The average annual mean of all reporting stations is 18 µg/m$^3$(Table 18) which is an improvement compared to the 2006 reporting year (20 µg/m$^3$).

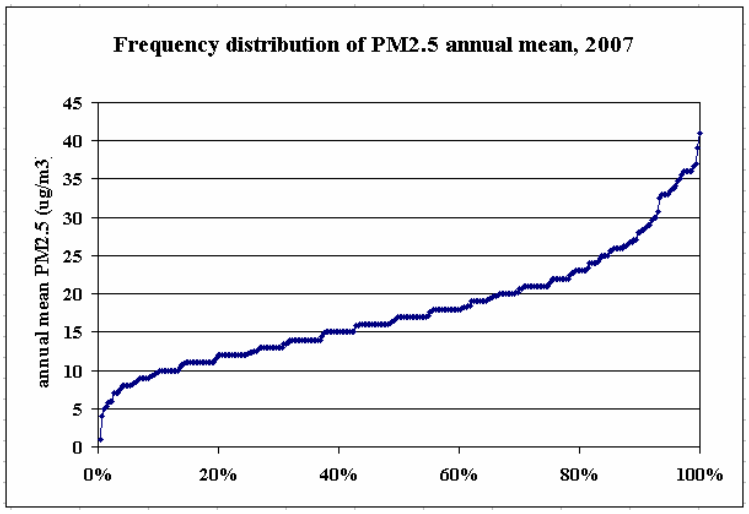
| MS | Number of stations | Averaged annual mean (µg/m$^3$) | Max of annual mean (µg/m$^3$) | Min of annual mean (µg/m$^3$) |
|---|---|---|---|---|
| EU27 | 276 | 18 | 41 | 1 |

*** form 18**

**Table 18: EU27 $PM_{2.5}$ monitoring stations statistics, 2007**

In order to gather data for evaluating a possible $PM_{2.5}$ threshold, the First Daughter Directive requires that "each Member State shall choose the number and the siting of the stations at which $PM_{2.5}$ is to be measured as representative of concentrations of $PM_{2.5}$ and to report the results of those measurements.

According to the newly adopted Air Quality Directive the proposed limit value to be met in 2015 is 25µg/m3. Stations with a measured concentration above 25µg/m3 are BG (29µg/m3), GR (30µg/m3), IT (26µg/m3) and RO (32µg/m3).




*** form 18**

**Figure 12: EU27 frequency distribution $PM_{2.5}$ annual mean, 2007**

The frequency distribution (Figure 12) shows that the level of 25µg/m$^3$ is exceeded at about 13% of

the stations; at 30% of the stations the annual mean is in excess of 20µg/m$^3$.

## Statistics of ozone (vegetation and forest)

### *What is the number of stations that measure for the ozone vegetation and forest targets? And are the reported concentrations in the Member States in line with the set out targets?*

The ozone AOT vegetation target value (to be met in 2010) is 18.000 µg/m$^3$, the long term objective (to be met in 2020) is 6000 µg/m$^3$. For the protection of forests the UNECE has defined an ozone critical level as an AOT of 10.000µg/m$^3$. Note that for forest the AOT is aggregated over the full summer period while for crops only the 3 months of the growing season are considered.
The EU27 average exceeds the vegetation 2020 LTO target. The EU27 average is under the vegetation 2010 target whereas this was above the target in 2006 (19513µg/m$^3$). The critical level for AOT forest concentration is exceeded more than 2 times in 2007 although it is down from the 2006 level (26707).

| | AOTvegetation (ug/m$^3$.h) | | | | AOT forest (ug/m$^3$.h) | | | |
|---|---|---|---|---|---|---|---|---|
| | Lowest[1)] | Average | Highest | Nr of stations | Lowest[1)] | Average | Highest | Nr of stations |
| EU27 | 0 | 11786 | 66591 | 1069 | 0 | 21460 | 91705 | 1027 |

*** form 15**

**Table 19: EU27 annual statistics of ozone, AOT threshold and annual average, 2007**

Seven Member States (2006: 10 MS) report above the AOT vegetation target of 18.000 µg/m$^3$(Table 46) in 2007.
Eleven Member States report under the Long Term Objective 2020 in 2007 (2006: two MS). The critical level for AOT forest is not exceeded by eight Member States, namely BE, EE, FI, GB, IE, LT, NL, and Sweden. Compared to the 2006 reporting year this is a big improvement as only two MS reported under the AOT forest average level in 2006.

## Statistics and derogation

### *How many Member States and incidents are reported on derogation situations for pollutants?*

In 2007 derogation was only applied for $PM_{10}$. Six Member States (CY, ES, GR, NL, PT and SK) reported (Table 20) on derogation - 'natural events', four Member States (EE, LT, LV and SK) reported (Table 21) on derogation – 'winter sanding'.

The First Daughter Directive gives Member States the possibility of subtracting the contribution due to winter sanding of roads and the contribution of natural events before comparing $PM_{10}$ concentrations with the limit values.

| MS | Number of stations with exceedance of $PM_{10}$: | | | |
|---|---|---|---|---|
| | Daily limit value | | Annual limit value | |
| | before correction | After correction | before correction | After correction |
| CY | 1 | 1 | 1 | |
| ES | 136 | 94 | 75 | 44 |
| GR | 13 | 11 | 12 | 12 |
| NL | 9 | 5 | | |
| PT | 4 | | 1 | |
| SK | 14 | 14 | 4 | 4 |
| Total | **177** | **125** | **93** | **60** |

*** form 23**

**Table 20: Influence $PM_{10}$ natural events correction, 2007**

*NB: The numbers indicate the number of stations to which the correction was applied, not the total number of stations with exceedance in the Member States mentioned*.

Table 20 shows the effect of the 'natural events' correction on the number of stations with $PM_{10}$ exceedance. The corrections brought 52 stations below the daily limit value; for the annual limit value the compliance status was brought down under exceedance status with 33 stations.

| MS | Number of exceedance reporting cases of $PM_{10}$ daily and estimated | | | |
|---|---|---|---|---|
| | Daily limit value | | Annual limit value | |
| | before correction | After correction | before correction | After correction |
| EE | 1 | 0 | | |
| LT | 2 | | | |
| LV | 2 | 2 | 2 | 1 |
| SK | 14 | 12 | 4 | 3 |

*** form 24**

**Table 21: $PM_{10}$ winter sanding correction, 2007**

*NB: between parentheses is the number of stations on which the number of exceedances is based.*

Table 21 shows the effects of the winter sanding correction for the $PM_{10}$ daily and annual limit value. Four Member States reported corrections on the daily limit value and 15% (3 out of 19) of the reported exceedance cases were adjusted. The adjustment for the $PM_{10}$ annual limit value was 30% (2 out of 6) based on two reporting Member States.

None of the Member States indicated exceedances due to natural $SO_2$ sources in 2007. No exceedances were also reported for lead 'specific sources', i.e. sources in an area in the immediate vicinity of specific sources designated according to Annex IV of the First Daughter Directive. Belgium reported two stations in the immediate vicinity of 'specific sources'.

# 6 Fourth Daughter Directive: heavy metals

Reporting on the DD4 heavy metals was op a voluntary basis in the 2007 Questionnaire reporting cycle.

Thirteen Member States reported. For As, Cd, Ni and B(a)P roughly 18% of all the EU27 zones reported which represented roughly 1/3 of the EU27 total territory and almost 40% of the EU27 population.
The zone-type classification 'agglomeration' or 'non-agglomeration' is almost evenly divided (100 / 95) in the submitted Questionnaire zones.

Zone exceedances occurred most often for B(a)P in 28 zones or 14% of all zones. Zone exceedances for As, Cd and Ni is limited to 3.1, 2.1 and 2.1% of all reporting zones in 2007.

The monitoring station characteristics are such that roughly 50% of all DD4 pollutants measuring stations have an 'urban' location.

## *How many Member States and zones reported voluntarily on the DD4 heavy metals?*

The total number of Member States that according to the results of the forms 1-2 of the Questionnaire report on the DD4 heavy metals is twelve (AT, BG, CY, CZ, DE, EE, FR, GB, GR, LT, LV and SE).
These 12 MS represent 169 zones for As, Cd, Ni and 159 zones for B(a)P. In the forms 8/9 of the Questionnaire however, 195 zones are reporting on exceedances.

| Member State | All Zones | As | Cd | Ni | BaP |
|---|---|---|---|---|---|
| EU27 | 909 | 169 | 169 | 169 | 159 |

*** Form 1-2**

**Table 22**: **Number of zones per Member States in 2007**

The zones that report on the DD4 heavy metals represent roughly 1/3 of the EU27 territory and almost 40% of the EU27 population (table 23 and table 24).

| Member State | Total area km2 | As | Cd | Ni | BaP |
|---|---|---|---|---|---|
| EU27 | 4 422 187 | 34% | 34% | 34% | 32% |

*** Form 1-2**

**Table 23: Total MS area covered by zones, in % of total area**

| Member State | Total population | As | Cd | Ni | BaP |
|---|---|---|---|---|---|
| EU27 | 492 975 207 | 39% | 39% | 39% | 37% |

*** Form 1-2**

**Table 24: Total MS population covered by zones, in % of total population**

## *How many of the DD4 reporting MS zones are in exceedance?*

On the basis of the limited voluntary reported zone exceedances of the DD4 heavy metals it can be concluded that more tha 14% of the zone exceedances occur for B(a)P. The other DD4 heavy metals exceed the target value in 3.1% (As) and 2.1% (Cd, Ni) of all reporting zones (table 25).

| | As | Cd | Ni | B(a)P |
|---|---|---|---|---|
| EU27 | 6 | 4 | 4 | 28 |
| | 3.1% | 2.1% | 2.1% | 14.4% |

*** Form 8/9**

**Table 25: Zones in exceedance, 4th DD pollutants 2007**

For B(a)P 28 zones exceed the target value divided over 7 Member States. Of these 28 zones in exceedance the Czech Republic accounts for more than 50%. The exceedances for the other DD4 pollutants As, Cd, and Ni occur in respectively four, two and three Member States which is a statistical poor basis (table 26).

| | As | Cd | Ni | B(a)P | Total |
|---|---|---|---|---|---|
| AT | 1 | | | 2 | 3 |
| BG | | 3 | | 5 | 8 |
| CY | | | | | 0 |
| CZ | 3 | 1 | | 15 | 19 |
| DE | | | 2 | 1 | 3 |
| DK | | | | | 0 |
| EE | 1 | | 1 | | 2 |
| FR | 1 | | | 1 | 2 |
| GB | | | 1 | 1 | 2 |
| GR | | | | 3 | 3 |
| Total | 6 | 4 | 4 | 28 | 42 |

*** Form 8/9**

**Table 26: Zones in exceedance per MS, DD4 heavy metals in 2007**

## *What are the monitoring station characteristics of DD4 heavy metals measuring stations?*

The monitoring station-type of the DD4 pollutants is mainly urban (>50%) (table 27). Rural monitoring stations account for approximately 28-30% (As,Cd, Ni) and 25% for B(a)P. Table 50 thru table 53 in chapter 7 shows a detailed division in the monitoring station types (background, industrial, traffic) and locations.

| Monitoring Stations | Rural | Suburban | Urban | Total # Stations |
|---|---|---|---|---|
| arsenic | 31 | 21 | 58 | **110** |
| cadmium | 29 | 19 | 48 | **96** |
| Nickel | 29 | 19 | 48 | **96** |
| benzo(a)pyrene | 20 | 17 | 41 | **78** |

*** Form 15**

**Table 27: EU27 station statistics heavy metals DD4, 2007**

# 7 Statistics per Member State

## Chapter 2

| Member State | Total area km2 | $SO_2$ | | $NO_2$ | $NO_x$ | $PM_{10}$ | Lead | Benzene | CO | $O_3$ | As | Cd | Ni | BaP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Health | Eco-Systems | Health | Vegetation | | | | | | | | | |
| AT | 83 870 | 100 | 99 | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| BE | 30 530 | 98 | 0 | 97 | 0 | 97 | 97 | 56 | 57 | 57 | 0 | 0 | 0 | 0 |
| BG | 110 910 | 100 | 23 | 100 | 23 | 100 | 100 | 77 | 100 | 100 | 100 | 100 | 100 | 100 |
| CY | 9 250 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0 |
| CZ | 78 870 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| DE | 357 050 | 100 | 22 | 100 | 22 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| DK | 43 090 | 102 | 102 | 102 | 99 | 102 | 102 | 1 | 102 | 102 | 102 | 102 | 102 | 1 |
| EE | 45 230 | 96 | 96 | 96 | 96 | 96 | 96 | 25 | 96 | 96 | 96 | 96 | 96 | 96 |
| ES | 505 370 | 100 | 72 | 100 | 76 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| FI | 338 150 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| FR | 643 427 | 99 | 83 | 99 | 83 | 99 | 35 | 37 | 47 | 97 | 5 | 5 | 5 | 0 |
| GB | 243 610 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| GR | 131 960 | 100 | 100 | 100 | 100 | 100 | 0 | 1 | 100 | 100 | 0 | 0 | 0 | 0 |
| HU | 93 030 | 100 | 0 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| IE | 70 270 | 100 | 99 | 100 | 99 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| IT | 301 340 | 82 | 67 | 90 | 75 | 83 | 36 | 61 | 66 | 81 | 0 | 0 | 0 | 0 |
| LT | 65 300 | 100 | 99 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| LU | 2 590 | 0 | 0 | 0 | 0 | 0 | 81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LV | 64 590 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MT | 320 | 99 | 86 | 99 | 86 | 99 | 12 | 99 | 12 | 99 | 0 | 0 | 0 | 0 |
| NL | 41 530 | 100 | 41 | 100 | 41 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| PL | 312 690 | 100 | 98 | 100 | 98 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| PT | 92 120 | 89 | 53 | 100 | 64 | 100 | 96 | 96 | 96 | 100 | 0 | 0 | 0 | 0 |
| RO | 237 500 | 101 | 0 | 101 | 0 | 101 | 101 | 100 | 101 | 1 | 0 | 0 | 0 | 0 |
| SE | 450 290 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| SI | 20 270 | 100 | 100 | 77 | 77 | 77 | 77 | 77 | 77 | 77 | 0 | 0 | 0 | 0 |
| SK | 49 030 | 100 | 100 | 100 | 100 | 100 | 83 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| **EU27** | **4 422 187** | **97%** | **72%** | **98%** | **72%** | **97%** | **81%** | **81%** | **88%** | **91%** | **34%** | **34%** | **34%** | **32%** |
| IS | 103 000 | 100 | 0 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| NO | 323 802 | 105 | 105 | 119 | 0 | 119 | 0 | 119 | 48 | 119 | 0 | 0 | 0 | 0 |

*** Form 0/1/2**

**Table 28: Total MS area covered by zones, in % of total area, 2007**

| Member State | Total population | $SO_2$ | | $NO_2$ | $NO_x$ | $PM_{10}$ | Lead | Benzene | CO | $O_3$ | As | Cd | Ni | BaP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Health | Eco-Systems | Health | Vegetation | | | | | | | | | |
| AT | 8 265 925 | 98 | 72 | 98 | 72 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| BE | 10 511 382 | 98 | 0 | 98 | 0 | 98 | 98 | 42 | 48 | 48 | 0 | 0 | 0 | 0 |
| BG | 7 718 750 | 100 | 15 | 100 | 15 | 100 | 100 | 85 | 100 | 100 | 100 | 100 | 100 | 100 |
| CY | 766 414 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 0 |
| CZ | 10 251 079 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 |
| DE | 82 437 995 | 98 | 11 | 100 | 11 | 120 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| DK | 5 427 459 | 101 | 101 | 101 | 78 | 101 | 101 | 18 | 101 | 101 | 101 | 101 | 101 | 18 |
| EE | 1 344 684 | 103 | 103 | 103 | 103 | 103 | 103 | 57 | 103 | 103 | 103 | 103 | 103 | 103 |
| ES | 43 758 250 | 102 | 25 | 102 | 26 | 102 | 102 | 102 | 102 | 102 | 0 | 0 | 0 | 0 |
| FI | 5 255 580 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| FR | 62 998 773 | 99 | 97 | 99 | 97 | 98 | 61 | 64 | 73 | 97 | 6 | 6 | 6 | 0 |
| GB | 60 393 100 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 |
| GR | 11 125 179 | 99 | 99 | 99 | 99 | 99 | 0 | 32 | 99 | 99 | 0 | 0 | 0 | 0 |
| HU | 10 076 581 | 100 | 0 | 100 | 0 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| IE | 4 209 019 | 101 | 59 | 101 | 59 | 101 | 101 | 101 | 101 | 101 | 0 | 0 | 0 | 0 |
| IT | 58 751 711 | 92 | 69 | 95 | 78 | 94 | 39 | 85 | 88 | 83 | 0 | 0 | 0 | 0 |
| LT | 3 403 284 | 99 | 73 | 99 | 0 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| LU | 469 086 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| LV | 2 294 590 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 0 |
| MT | 405 006 | 97 | 29 | 97 | 29 | 97 | 68 | 97 | 68 | 97 | 0 | 0 | 0 | 0 |
| NL | 16 334 210 | 100 | 20 | 100 | 20 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| PL | 38 157 055 | 100 | 67 | 100 | 67 | 100 | 100 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| PT | 10 569 592 | 87 | 25 | 96 | 34 | 96 | 93 | 93 | 93 | 97 | 0 | 0 | 0 | 0 |
| RO | 21 610 213 | 101 | 10 | 101 | 10 | 101 | 101 | 91 | 101 | 15 | 0 | 0 | 0 | 0 |
| SE | 9 047 752 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 | 101 |
| SI | 2 003 358 | 98 | 98 | 76 | 76 | 76 | 76 | 76 | 76 | 76 | 0 | 0 | 0 | 0 |
| SK | 5 389 180 | 100 | 100 | 100 | 100 | 100 | 79 | 100 | 100 | 100 | 0 | 0 | 0 | 0 |
| **EU27** | **492 975 207** | **98%** | **56%** | **99%** | **57%** | **102%** | **84%** | **88%** | **93%** | **92%** | **39%** | **39%** | **39%** | **37%** |
| IS | 299 891 | 104 | 0 | 104 | 0 | 110 | 104 | 104 | 104 | 104 | 0 | 0 | 0 | 0 |
| NO | 4 640 219 | 55 | 55 | 97 | 0 | 97 | 0 | 97 | 76 | 93 | 0 | 0 | 0 | 0 |

*** Form 0/1/2**

**Table 29: Total population area covered by zones, in % of total population, 2007**

# Chapter 3

| MS | SO2 health Hr | | SO2 health Day | | SO2 eco Yr | | SO2 eco Wntr | | NO2 Hr | | | NO2 Yr | | | NOx | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ↑lv | ↓lv | ↑lv | ↓lv | ↑lv | ↓lv | ↑lv | ↓lv | ↑mot | lv-mot | ↓lv | ↑mot | lv-mot | ↓lv | ↑lv | ↓lv |
| AT | 0 | 11 | 0 | 11 | 0 | 8 | 0 | 8 | 0 | 0 | 11 | 7 | 2 | 2 | 1 | 7 |
| BE | 0 | 12 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 1 | 3 | 7 | 0 | 0 |
| BG | 2 | 4 | 2 | 4 | 0 | 1 | 0 | 1 | 0 | 1 | 5 | 1 | 0 | 5 | 0 | 1 |
| CY | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| CZ | 0 | 15 | 1 | 14 | 0 | 15 | 1 | 14 | 1 | 0 | 14 | 2 | 5 | 8 | 15 | 0 |
| DE | 0 | 79 | 0 | 79 | 0 | 15 | 0 | 15 | 1 | 3 | 81 | 39 | 9 | 37 | 0 | 15 |
| DK | 0 | 3 | 0 | 3 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 1 | 0 | 2 | 0 | 3 |
| EE | 0 | 4 | 0 | 4 | 0 | 4 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 4 | 1 | 3 |
| ES | 4 | 134 | 3 | 135 | 0 | 34 | 0 | 34 | 4 | 5 | 129 | 9 | 10 | 119 | 0 | 38 |
| FI | 0 | 14 | 0 | 14 | 0 | 1 | 0 | 1 | 0 | 0 | 14 | 0 | 1 | 13 | 0 | 1 |
| FR | 3 | 72 | 3 | 72 | 0 | 42 | 0 | 41 | 3 | 1 | 73 | 12 | 5 | 60 | 1 | 32 |
| GB | 0 | 44 | 0 | 44 | 0 | 15 | 0 | 15 | 1 | 1 | 42 | 39 | 3 | 2 | 0 | 15 |
| GR | 0 | 4 | 0 | 4 | 0 | 2 | 0 | 2 | 1 | 0 | 3 | 3 | 0 | 1 | 0 | 2 |
| HU | 0 | 11 | 0 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 2 | 0 | 9 | 0 | 0 |
| IE | 0 | 4 | 0 | 4 | 0 | 1 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 4 | 1 | 0 |
| IT | 0 | 91 | 0 | 91 | 0 | 22 | 0 | 22 | 6 | 4 | 102 | 45 | 9 | 58 | 11 | 11 |
| LT | 0 | 3 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 |
| LU | 0 | 3 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 0 | 1 |
| LV | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 2 |
| MT | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 1 |
| NL | 0 | 9 | 0 | 9 | 0 | 1 | 0 | 1 | 0 | 0 | 9 | 7 | 2 | 0 | 0 | 1 |
| PL | 0 | 170 | 1 | 169 | 0 | 125 | 0 | 125 | 1 | 0 | 169 | 4 | 2 | 164 | 0 | 125 |
| PT | 1 | 23 | 1 | 23 | 0 | 7 | 0 | 7 | 0 | 1 | 24 | 3 | 0 | 22 | 0 | 6 |
| RO | 7 | 14 | 7 | 14 | 0 | 1 | 0 | 1 | 6 | 0 | 14 | 3 | 4 | 13 | 0 | 1 |
| SE | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 0 | 6 | 2 | 1 | 3 | 0 | 6 |
| SI | 0 | 9 | 0 | 9 | 0 | 9 | 0 | 9 | 0 | 0 | 6 | 0 | 0 | 6 | 2 | 4 |
| SK | 0 | 10 | 0 | 10 | 0 | 2 | 0 | 2 | 0 | 0 | 10 | 0 | 1 | 9 | 0 | 10 |
| EU27 | 17 | 754 | 18 | 753 | 0 | 320 | 1 | 318 | 24 | 16 | 756 | 183 | 57 | 556 | 32 | 286 |
| IS | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 |
| NO | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 4 | 2 | 1 | 0 | 0 |
| ALL | 18 | 757 | 19 | 756 | 0 | 322 | 1 | 320 | 24 | 18 | 763 | 187 | 59 | 559 | 32 | 286 |

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**Table 30: Zone exceedance per Member State and pollutant ($SO_2$, $NO_2$ and $NO_x$) in 2007**

| MS | PM10 Day | | PM10 Yr | | Lead Yr | | Benzene Yr | | | CO Yr | | Ozone Health | | | Ozone Vegetation | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ↑lv | ↓lv | ↑lv | ↓lv | ↑lv | ↓lv | ↑mot | lv-mot | ↓lv | ↑lv | ↓lv | ↑tv | lto-tv | ↓lto | ↑tv | lto-tv | ↓lto |
| AT | 7 | 4 | 0 | 11 | 0 | 11 | 0 | 0 | 11 | 0 | 11 | 11 | 0 | 0 | 8 | 0 | 0 |
| BE | 11 | 0 | 2 | 9 | 1 | 12 | 0 | 0 | 7 | 0 | 7 | 1 | 5 | 0 | 1 | 5 | 0 |
| BG | 6 | 0 | 6 | 0 | 1 | 5 | 0 | 0 | 5 | 1 | 5 | 1 | 5 | 0 | 0 | 1 | 0 |
| CY | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |
| CZ | 11 | 4 | 3 | 12 | 0 | 15 | 1 | 0 | 14 | 0 | 15 | 15 | 0 | 0 | 15 | 0 | 0 |
| DE | 17 | 65 | 1 | 81 | 0 | 72 | 0 | 0 | 84 | 0 | 84 | 26 | 37 | 0 | 30 | 19 | 1 |
| DK | 2 | 1 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 0 | 3 | 0 | 2 | 1 | 0 | 2 | 1 |
| EE | 2 | 2 | 0 | 4 | 0 | 4 | 0 | 0 | 3 | 0 | 4 | 3 | 1 | 0 | 1 | 3 | 0 |
| ES | 57 | 81 | 32 | 106 | 0 | 138 | 0 | 0 | 137 | 0 | 138 | 52 | 62 | 24 | 54 | 47 | 35 |
| FI | 0 | 14 | 0 | 14 | 0 | 14 | 0 | 0 | 3 | 0 | 14 | 0 | 2 | 0 | 0 | 0 | 2 |
| FR | 26 | 50 | 7 | 69 | 0 | 48 | 0 | 0 | 57 | 0 | 61 | 40 | 31 | 4 | 33 | 14 | 21 |
| GB | 7 | 37 | 2 | 42 | 0 | 44 | 0 | 0 | 44 | 0 | 44 | 0 | 42 | 2 | 0 | 4 | 40 |
| GR | 4 | 0 | 4 | 0 | 0 | 4 | 0 | 1 | 3 | 0 | 4 | 2 | 2 | 0 | 4 | 0 | 0 |
| HU | 5 | 6 | 3 | 8 | 0 | 11 | 0 | 0 | 11 | 0 | 11 | 7 | 4 | 0 | 0 | 0 | 0 |
| IE | 0 | 4 | 0 | 4 | 0 | 4 | 0 | 0 | 4 | 0 | 4 | 0 | 1 | 3 | 0 | 0 | 1 |
| IT | 61 | 38 | 24 | 75 | 0 | 37 | 0 | 3 | 82 | 1 | 99 | 63 | 10 | 10 | 45 | 2 | 1 |
| LT | 2 | 1 | 0 | 3 | 0 | 3 | 0 | 0 | 3 | 0 | 3 | 0 | 3 | 0 | 0 | 1 | 0 |
| LU | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 1 | 1 | 1 | 0 | 1 | 0 |
| LV | 2 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 1 |
| MT | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| NL | 9 | 0 | 2 | 7 | 0 | 9 | 0 | 0 | 9 | 0 | 9 | 2 | 7 | 0 | 0 | 6 | 1 |
| PL | 60 | 110 | 19 | 151 | 0 | 170 | 1 | 2 | 167 | 0 | 170 | 11 | 16 | 1 | 6 | 10 | 0 |
| PT | 8 | 17 | 3 | 22 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 10 | 12 | 2 | 4 | 14 | 4 |
| RO | 17 | 4 | 15 | 6 | 2 | 19 | 0 | 0 | 19 | 2 | 18 | 4 | 0 | 0 | 1 | 0 | 0 |
| SE | 2 | 4 | 1 | 5 | 0 | 6 | 0 | 0 | 6 | 0 | 6 | 0 | 3 | 3 | 0 | 1 | 5 |
| SI | 5 | 1 | 3 | 3 | 0 | 6 | 0 | 0 | 6 | 0 | 6 | 5 | 1 | 0 | 5 | 1 | 0 |
| SK | 6 | 4 | 3 | 7 | 0 | 10 | 0 | 0 | 10 | 0 | 10 | 2 | 0 | 0 | 2 | 0 | 0 |
| EU27 | 329 | 451 | 133 | 647 | 4 | 650 | 2 | 6 | 695 | 4 | 734 | 258 | 247 | 54 | 211 | 131 | 113 |
| IS | 1 | 2 | 0 | 3 | 0 | 2 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 2 |
| NO | 3 | 4 | 1 | 6 | 0 | 0 | 0 | 0 | 5 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 |
| ALL | 333 | 457 | 134 | 656 | 4 | 652 | 2 | 6 | 702 | 4 | 737 | 263 | 247 | 56 | 211 | 131 | 115 |

*** Form 8/9**

**Table 31: Zone exceedance per Member State and pollutant ($PM_{10}$, Pb, CO, benzene, $O_3$) in 2007**

| | | ag. | non-ag. | Total |
|---|---|---|---|---|
| $SO_2$-yr | <lv | 40 | 282 | 322 |
| | >lv | 0 | 0 | 0 |
| $SO_2$-w | <lv | 39 | 281 | 320 |
| | >lv | 0 | 1 | 1 |
| NOx-y | <lv | 31 | 255 | 286 |
| | >lv | 8 | 24 | 32 |
| $O_3$-v | <lto | 65 | 50 | 115 |
| | >tv | 56 | 155 | 211 |
| | lto-tv | 49 | 82 | 131 |

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**Table 32: EU 27 AQ zone status, vegetation 2007**

| | | ag. | non-ag. | Total |
|---|---|---|---|---|
| $SO_2$-d | <lv | 239 | 516 | 755 |
| | >lv | 10 | 9 | 19 |
| $SO_2$-h | <lv | 240 | 516 | 756 |
| | >lv | 9 | 9 | 18 |
| $NO_2$-h | <lv | 227 | 535 | 762 |
| | >mot | 23 | 1 | 24 |
| | lv-mot | 14 | 4 | 18 |
| $NO_2$-y | <lv | 100 | 458 | 558 |
| | >mot | 129 | 58 | 187 |
| | lv-mot | 35 | 24 | 59 |
| $PM_{10}$-d | <lv | 104 | 353 | 457 |
| | >lv | 160 | 173 | 333 |
| $PM_{10}$-y | <lv | 193 | 463 | 656 |
| | >lv | 71 | 63 | 134 |
| Lead | <lv | 203 | 449 | 652 |
| | >lv | 2 | 2 | 4 |
| Benzene | <lv | 234 | 468 | 702 |
| | >mot | 2 | 0 | 2 |
| | lv-mot | 3 | 3 | 6 |
| CO | <lv | 243 | 493 | 736 |
| | >lv | 4 | 0 | 4 |
| $O_3$-h | <lto | 27 | 29 | 56 |
| | >tv | 82 | 181 | 263 |
| | lto-tv | 129 | 118 | 247 |

| Member State | 0 pollutants | 1 pollutants | 2 pollutants | 3 pollutants | 4 pollutants |
|---|---|---|---|---|---|
| AT | 1 | 14 | 1 | 3 | |
| BE | 5 | 12 | 1 | | |
| BG | | 3 | 1 | 1 | 1 |
| CY | | | 1 | | |
| CZ | | 4 | 7 | 4 | |
| DE | 64 | 32 | 22 | 2 | |
| DK | 1 | 1 | 1 | | |
| EE | | 3 | 1 | | |
| ES | 47 | 62 | 25 | 4 | |
| FI | 18 | | | | |
| FR | 30 | 31 | 12 | 9 | |
| GB | 3 | 36 | 5 | | |
| GR | | 1 | 1 | 2 | |
| HU | 2 | 5 | 3 | 1 | |
| IE | 4 | | | | |
| IT | 54 | 34 | 29 | 26 | |
| LT | 1 | 2 | | | |
| LU | 1 | 2 | | | |
| LV | 1 | 1 | 1 | | |
| MT | | 1 | 1 | | |
| NL | | 1 | 7 | 1 | |
| PL | 119 | 58 | 8 | 1 | |
| PT | 12 | 8 | 7 | | |
| RO | 4 | 5 | 5 | 5 | 2 |
| SE | 3 | 2 | 1 | | |
| SI | 4 | 2 | 4 | | |
| SK | 4 | 6 | 1 | | |
| **EU27** | **378** | **326** | **145** | **59** | **3** |
| IS | 2 | 1 | | | |
| NO | | 2 | 3 | 2 | |
| **Grand Total** | **380** | **329** | **148** | **61** | **3** |

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**Table 33: EU27 AQ zone status, health 2007**

*** Form 8/9**

**Table 34: Number of zones with multi-pollutant exceedances per MS, 2007**

## Maps

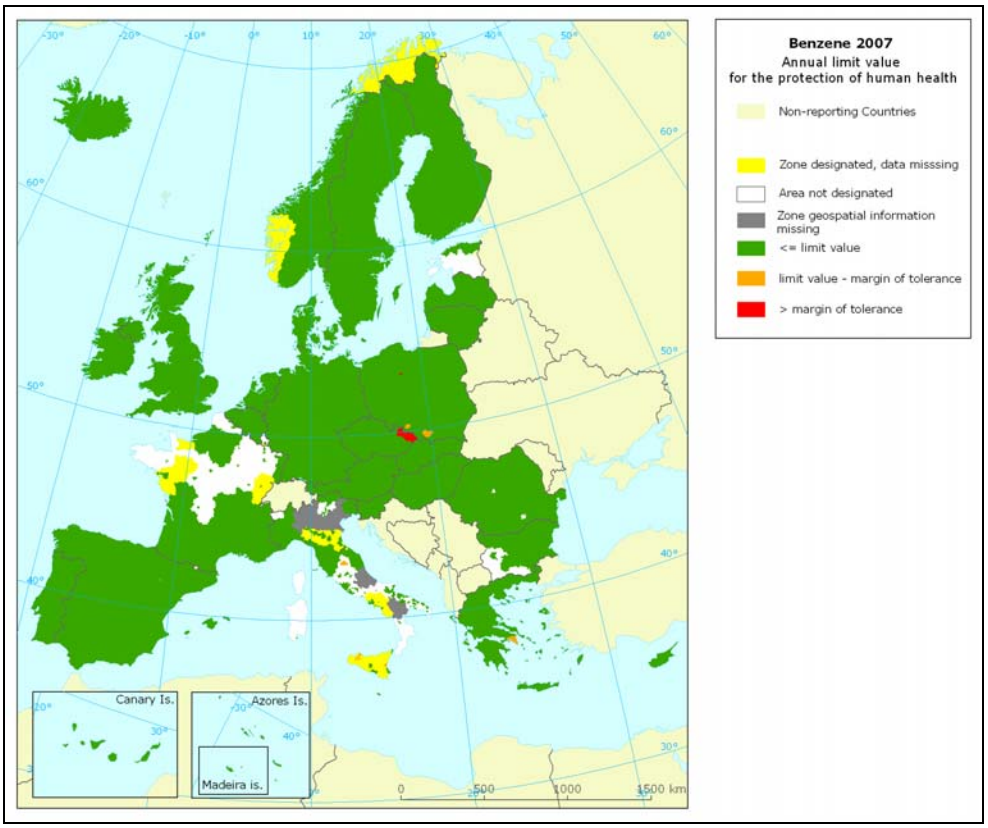


**Figure 13: EU27 zone exceedance benzene, 2007**

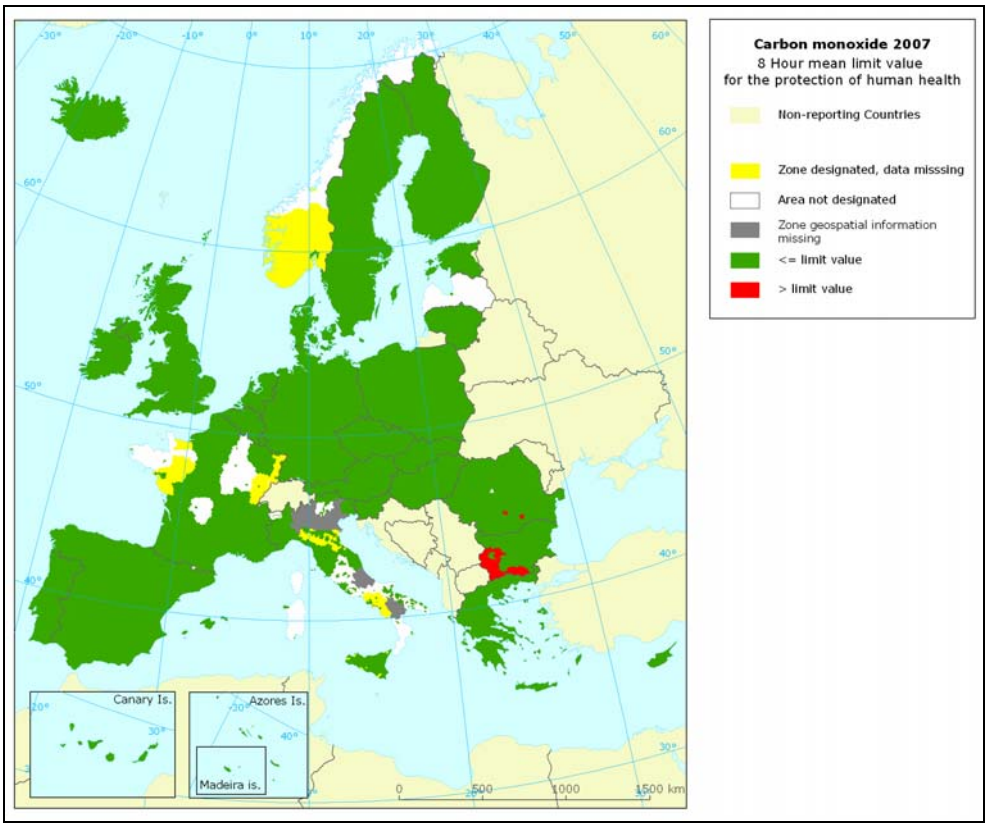


**Figure 14: EU27 zone exceedance CO, 2007**

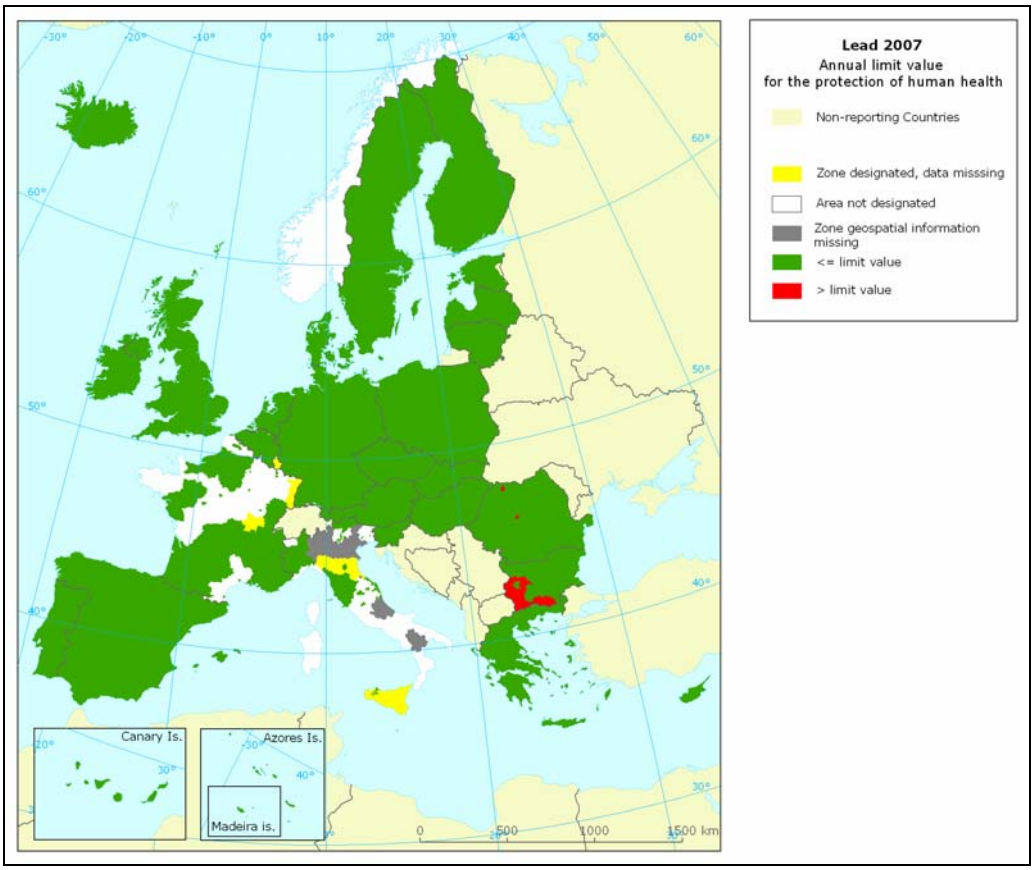


**Figure 15: EU27 zone exceedance Pb, 2007**

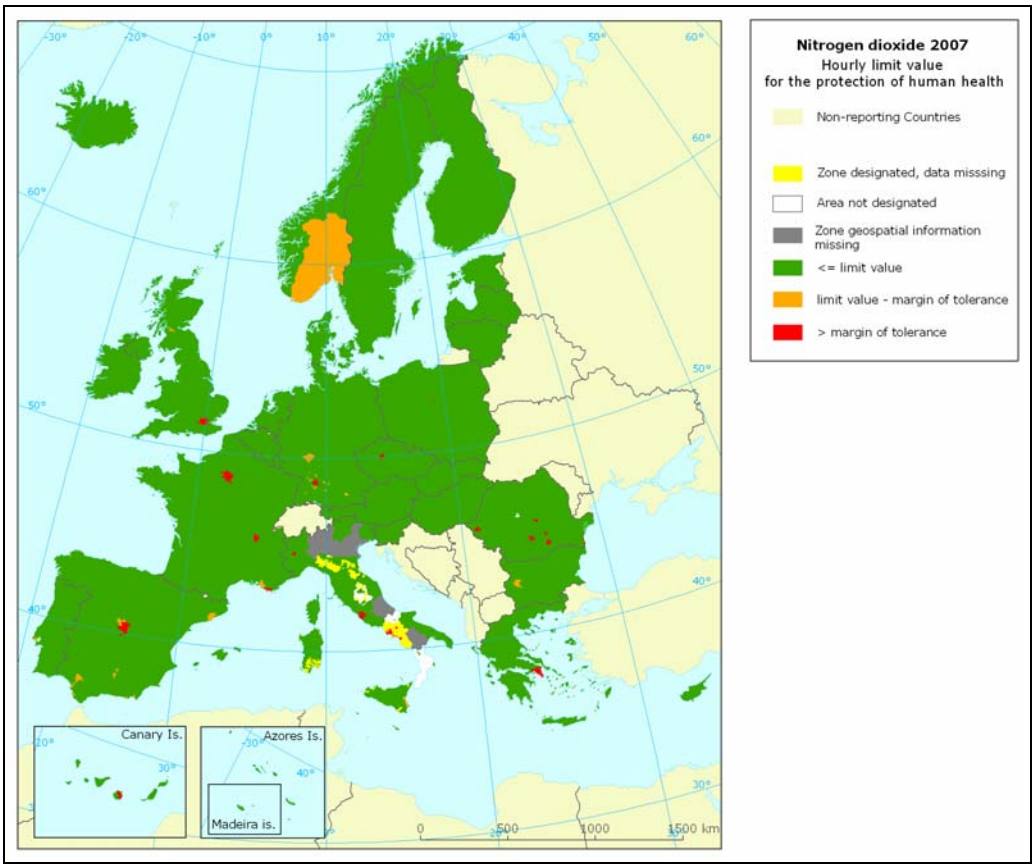


**Figure 16: zone exceedance $NO_2$ hour, 2007**

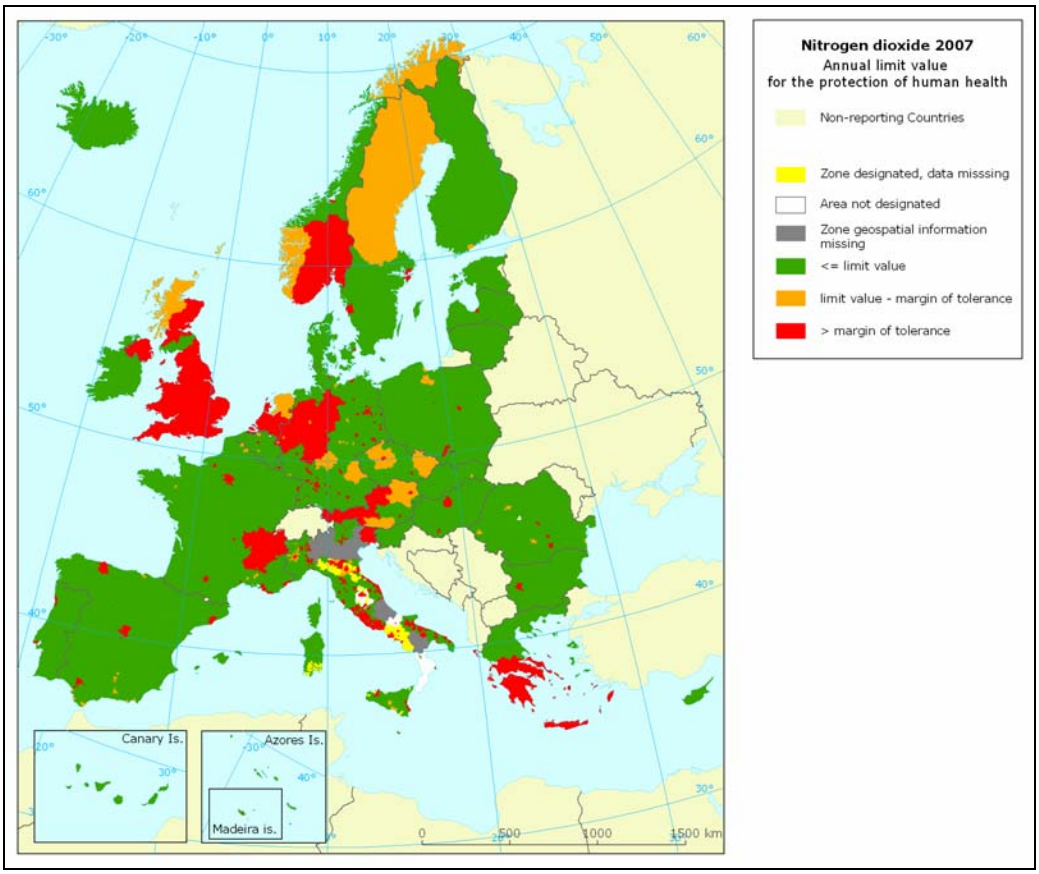


**Figure 17: EU27 zone exceedance $NO_2$ year, 2007**

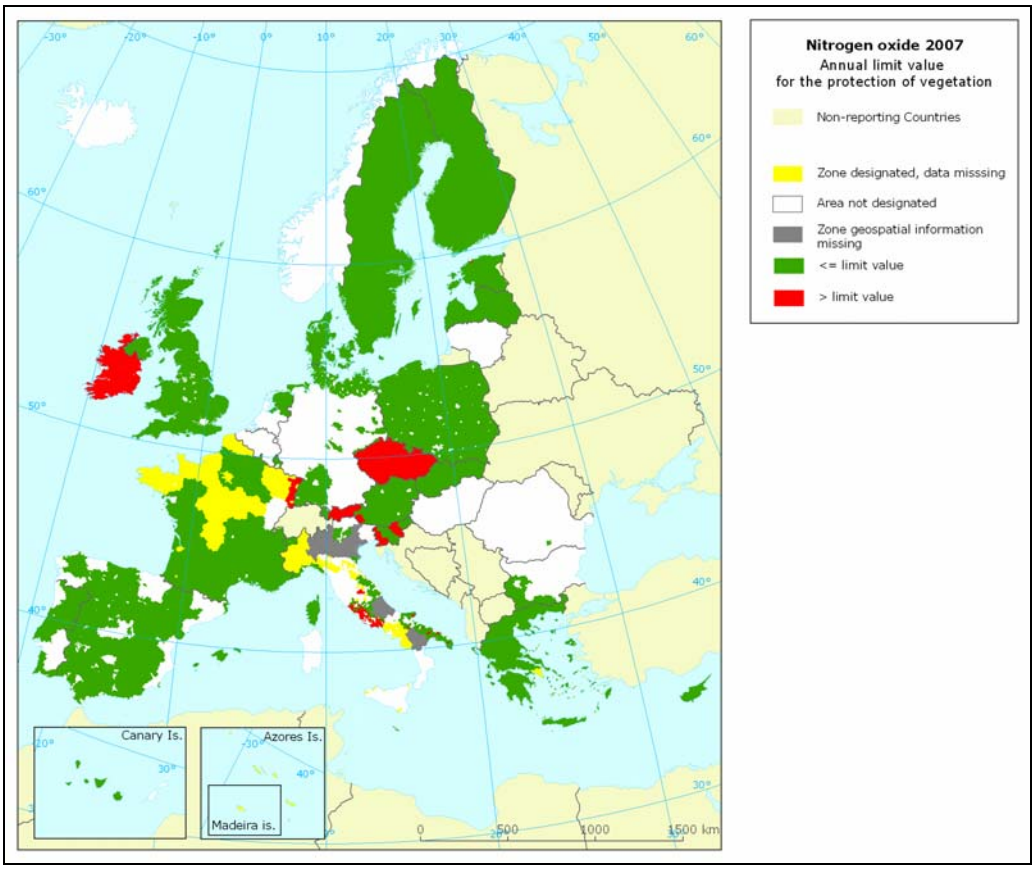


**Figure 18: EU27 zone exceedance $NO_x$ year, 2007**

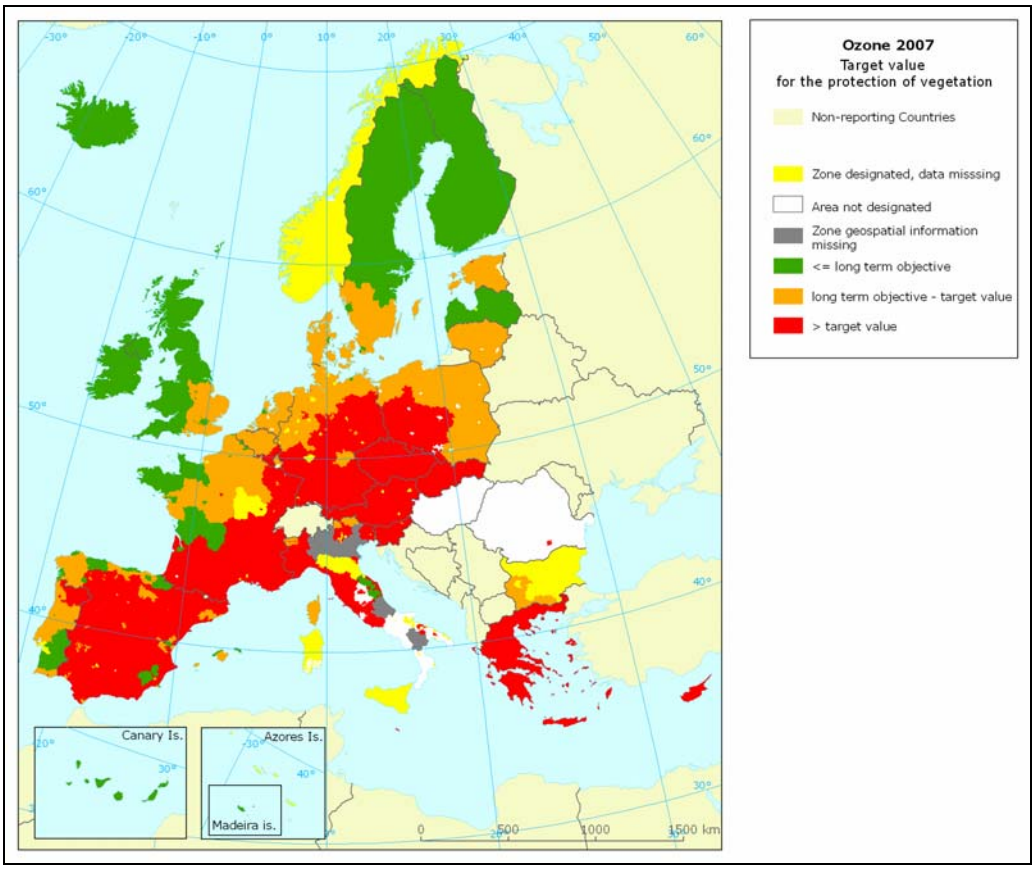


**Figure 19: EU27 zone exceedance $O_3$ vegetation, 2007**

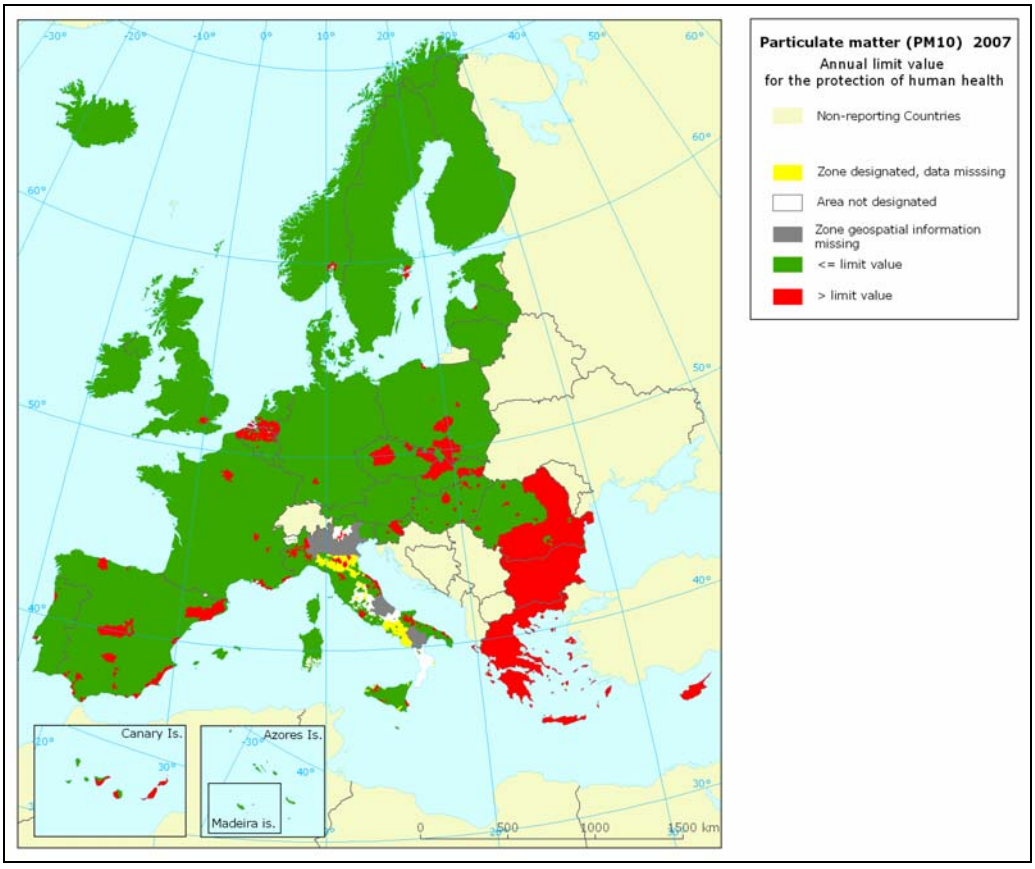


**Figure 20: EU27 zone exceedance $PM_{10}$ year, 2007**

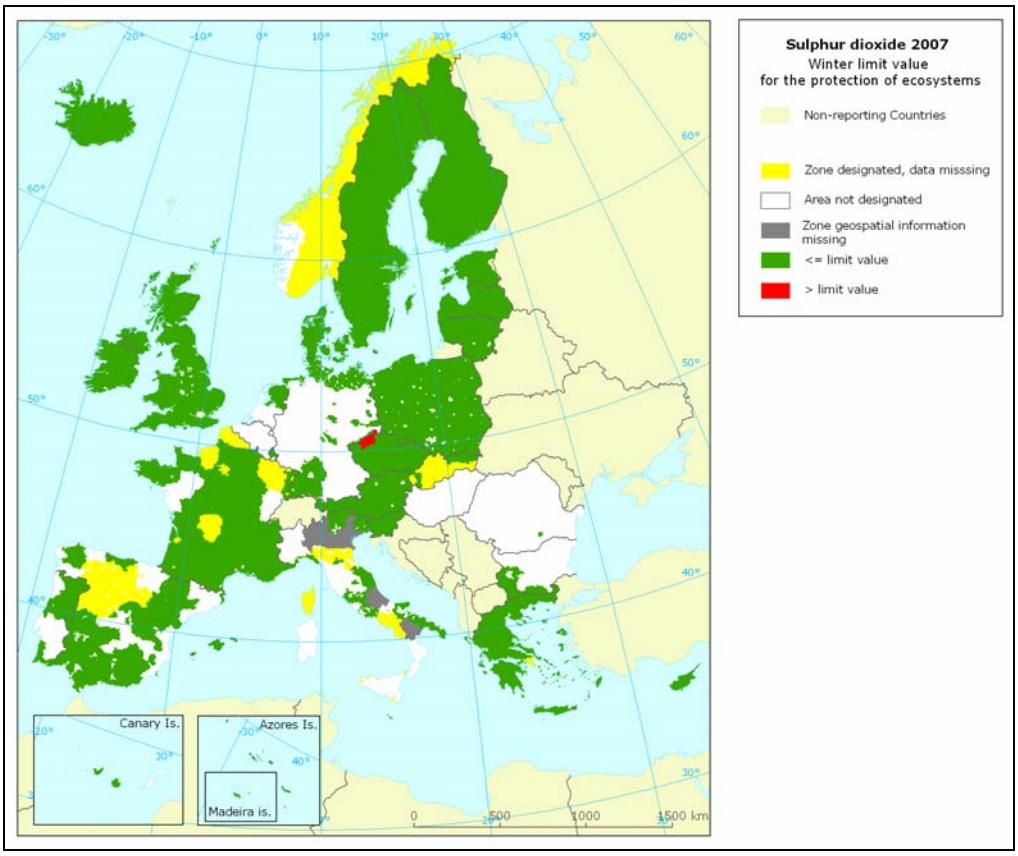


**Figure 21: EU27 zone exceedance $SO_2$ winter, 2007**

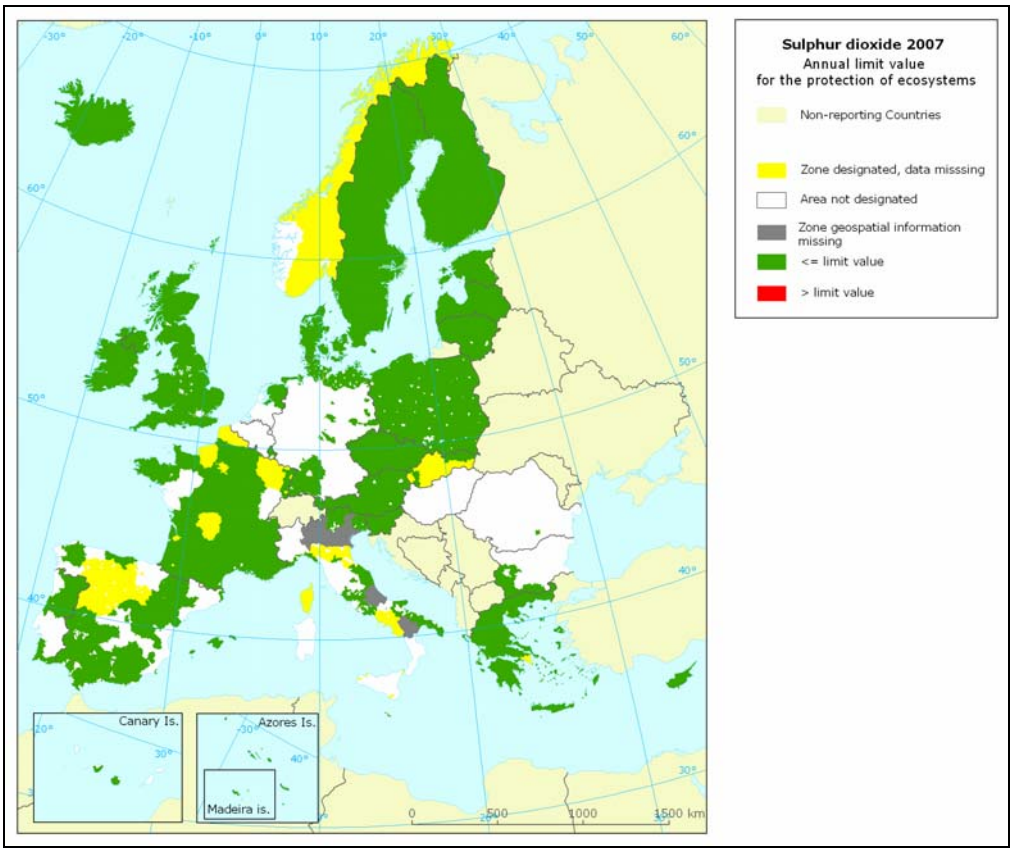


**Figure 22: EU27 zone exceedance $SO_2$ year, 2007**

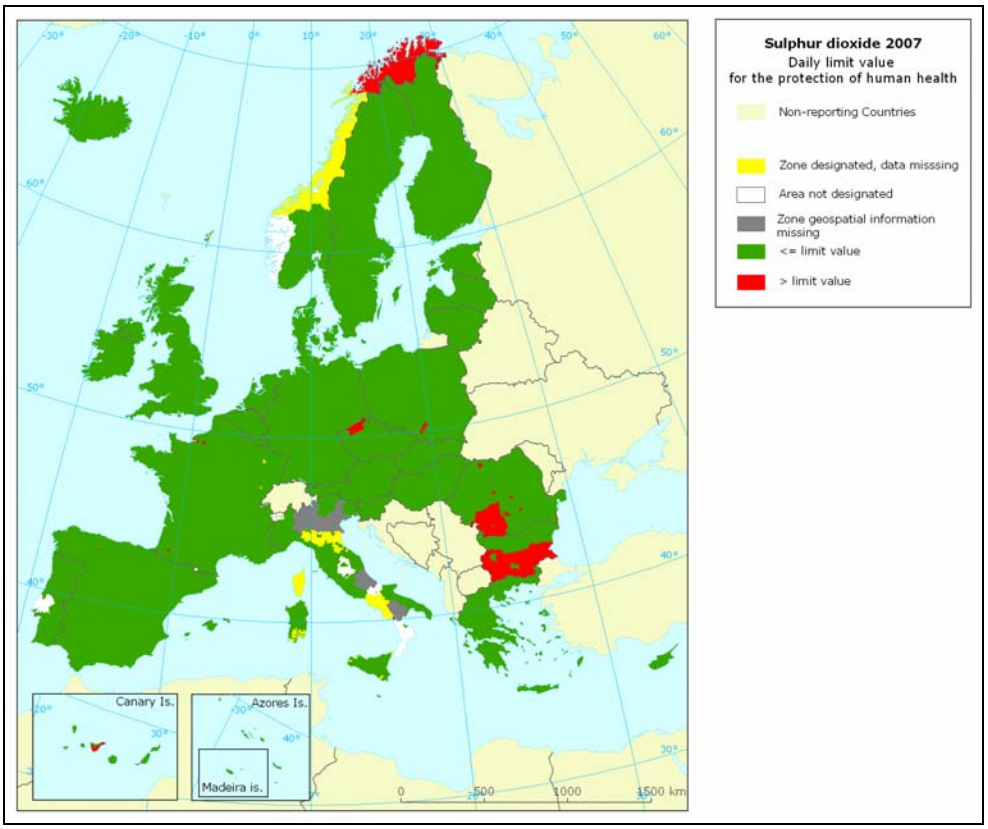


**Figure 23: EU27 zone exceedance $SO_2$ day, 2007**

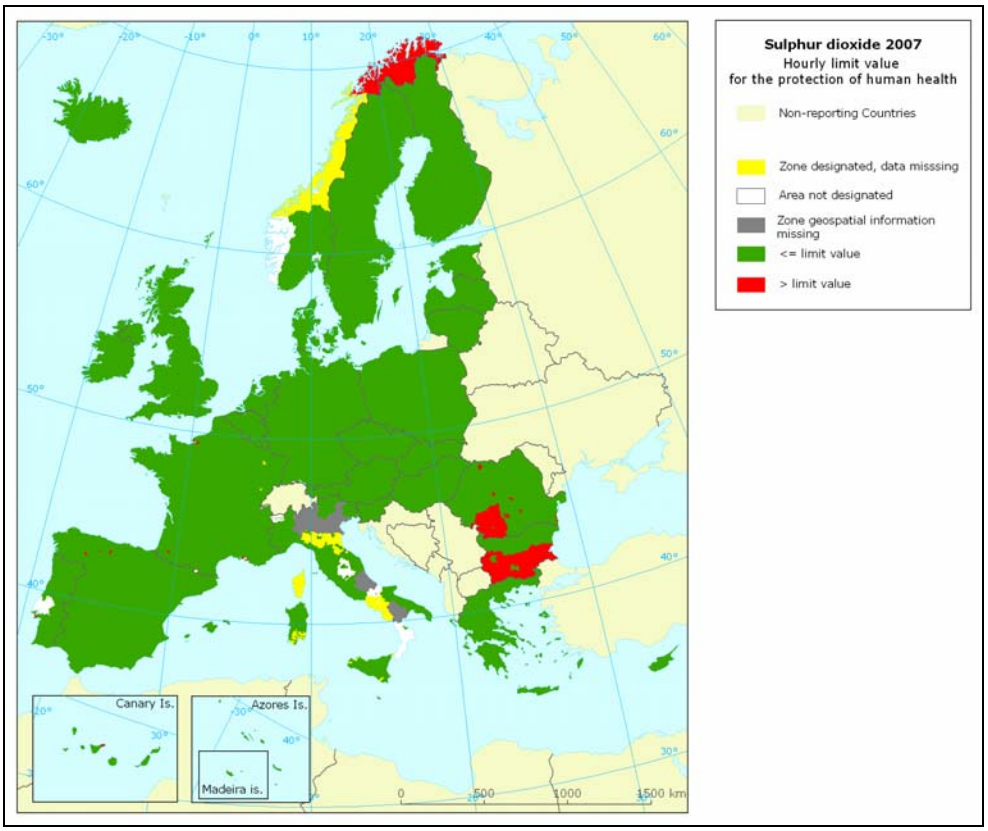


**Figure 24: EU27 zone exceedance $SO_2$ hour, 2007**

# Chapter 4

| MS | Health | Ecosystems (SO2) | Vegetation (NOx) |
|---|---|---|---|
| AT | 157 | 15 | 18 |
| BE | 155 | 0 | 0 |
| BG | 38 | 1 | 1 |
| CY | 2 | 1 | 1 |
| CZ | 126 | 23 | 23 |
| DE | 0 | 0 | 0 |
| DK | 0 | 0 | 0 |
| EE | 11 | 8 | 8 |
| ES | 533 | 40 | 43 |
| FI | 28 | 0 | 0 |
| FR | 526 | 16 | 20 |
| GB | 208 | 8 | 8 |
| GR | 61 | 2 | 2 |
| HU | 27 | 1 | 0 |
| IE | 22 | 3 | 3 |
| IT | 559 | 28 | 41 |
| LT | 17 | 4 | 0 |
| LU | 6 | 3 | 3 |
| LV | 12 | 2 | 2 |
| MT | 4 | 1 | 1 |
| NL | 52 | 1 | 1 |
| PL | 0 | 0 | 0 |
| PT | 51 | 4 | 5 |
| RO | 22 | 1 | 1 |
| SE | 48 | 5 | 6 |
| SI | 0 | 0 | 0 |
| SK | 26 | 4 | 4 |
| EU27 | 2691 | 171 | 191 |
| IS | 3 | 0 | 0 |
| NO | 26 | 1 | 0 |
| Total | 2720 | 172 | 191 |

| MS | All Stations | SO2 | SO2-E | NO2 | NOx | Lead | Benzene | CO | PM10 | PM2.5 | O3 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| AT | 183 | 110 | 15 | 148 | 18 | 16 | 24 | 41 | 126 | 9 | 115 |
| BE | 161 | 60 | | 66 | | 42 | 34 | 17 | 50 | 12 | 38 |
| BG | 38 | 16 | 1 | 15 | 15 | 19 | 12 | 13 | 38 | 3 | 9 |
| CY | 2 | 2 | 1 | 2 | 2 | 2 | 1 | 1 | 2 | 2 | 2 |
| CZ | 130 | 89 | 23 | 120 | 23 | 25 | 30 | 33 | 120 | 24 | 61 |
| DE | 586 | 191 | | 468 | 25 | 111 | 149 | 169 | 436 | 44 | 285 |
| DK | 13 | 2 | | 11 | 11 | 11 | 1 | 6 | 10 | 2 | 8 |
| EE | 14 | 7 | 4 | 7 | 7 | 7 | 3 | 5 | 8 | 5 | 7 |
| ES | 565 | 418 | 40 | 451 | 51 | 88 | 90 | 225 | 380 | 80 | 362 |
| FI | 40 | 1 | | 13 | | | | 2 | 24 | 7 | 16 |
| FR | 737 | 314 | 8 | 491 | 197 | 38 | 101 | 93 | 373 | 51 | 436 |
| GB | 217 | 79 | 2 | 116 | 14 | 29 | 41 | 79 | 128 | 128 | 92 |
| GR | 61 | 14 | 2 | 27 | 2 | 21 | 33 | 12 | 17 | 3 | 24 |
| HU | 27 | 25 | 1 | 25 | | | 12 | 22 | 26 | 3 | 17 |
| IE | 26 | 12 | 3 | 13 | 13 | 10 | 3 | 7 | 17 | 1 | 10 |
| IT | 701 | 281 | 20 | 502 | 76 | 42 | 141 | 327 | 327 | 35 | 241 |
| LT | 17 | 12 | 3 | 15 | 12 | 4 | 5 | 8 | 13 | 3 | 13 |
| LU | 7 | 6 | 3 | 6 | 3 | | 2 | 3 | 3 | 1 | 5 |
| LV | 12 | 7 | 2 | 9 | 1 | 6 | 6 | 1 | 7 | 4 | 8 |
| MT | 5 | 4 | 1 | 4 | 4 | 3 | 3 | 3 | 4 | 3 | 4 |
| NL | 52 | 35 | 1 | 44 | 1 | 5 | 8 | 22 | 40 | 0 | 37 |
| PL | 269 | 178 | | 185 | 72 | 104 | 46 | 66 | 226 | 4 | 58 |
| PT | 58 | 40 | 3 | 48 | 6 | 1 | 6 | 27 | 43 | 14 | 33 |
| RO | 22 | 21 | 1 | 20 | 1 | 19 | 6 | 13 | 19 | 1 | 16 |
| SE | 53 | 12 | 4 | 32 | 10 | | 14 | 4 | 35 | 11 | 16 |
| SI | 33 | 21 | | 11 | 10 | 3 | 2 | 4 | 13 | 4 | 15 |
| SK | 35 | 16 | 4 | 14 | 18 | 10 | 11 | 11 | 31 | 4 | 13 |
| EU27 | 4064 | 1973 | 142 | 2863 | 592 | 616 | 784 | 1214 | 2516 | 458 | 1941 |
| IS | 4 | 1 | | 2 | | | 1 | 1 | 3 | 2 | 2 |
| NO | 34 | 1 | 1 | 21 | 21 | | 9 | | 24 | 13 | 9 |
| Grand Total | 4102 | 1975 | 143 | 2886 | 613 | 616 | 794 | 1215 | 2543 | 473 | 1952 |

*** Form 3/4/5**

**Table 35: EU27 stations and protection targets, 2007**

*** Form 3/4/5**

**Table 36: Number of stations per pollutant per MS, 2007**

| MS | Background | | | | | Industrial | | | | | Traffic | | | | | Unknown total | All Stations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | rural | suburban | unknown | urban | Total | rural | suburban | unknown | urban | Total | rural | suburban | unknown | urban | Total | | |
| AT | 52 | 29 | 0 | 26 | 107 | 15 | 4 | 0 | 4 | 23 | 11 | 10 | 0 | 32 | 53 | 0 | 183 |
| BE | 35 | 44 | 0 | 7 | 86 | 7 | 45 | 0 | 2 | 54 | 0 | 9 | 0 | 12 | 21 | 0 | 161 |
| BG | 1 | 16 | 0 | 16 | 33 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 5 | 0 | 38 |
| CY | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 |
| CZ | 46 | 27 | 0 | 33 | 106 | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 21 | 22 | 0 | 130 |
| DE | 80 | 88 | 0 | 119 | 287 | 9 | 26 | 0 | 18 | 53 | 3 | 16 | 0 | 227 | 246 | 0 | 586 |
| DK | 3 | 0 | 0 | 5 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 13 |
| EE | 3 | 0 | 0 | 2 | 5 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 0 | 9 |
| ES | 64 | 61 | 1 | 57 | 183 | 83 | 95 | 0 | 46 | 224 | 0 | 32 | 0 | 123 | 155 | 0 | 562 |
| FI | 10 | 3 | 0 | 6 | 19 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 17 | 20 | 0 | 40 |
| FR | 71 | 156 | 133 | 136 | 496 | 26 | 59 | 29 | 6 | 120 | 5 | 20 | 18 | 33 | 76 | 9 | 701 |
| GB | 38 | 12 | 0 | 103 | 153 | 0 | 2 | 0 | 18 | 20 | 1 | 0 | 0 | 43 | 44 | 0 | 217 |
| GR | 1 | 7 | 0 | 3 | 11 | 0 | 1 | 0 | 3 | 4 | 0 | 1 | 0 | 13 | 14 | 0 | 29 |
| HU | 3 | 7 | 0 | 5 | 15 | 1 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 9 | 9 | 0 | 27 |
| IE | 8 | 9 | 0 | 0 | 17 | 2 | 0 | 0 | 0 | 2 | 0 | 4 | 0 | 3 | 7 | 0 | 26 |
| IT | 71 | 82 | 0 | 125 | 278 | 10 | 83 | 0 | 13 | 106 | 1 | 30 | 1 | 237 | 269 | 4 | 657 |
| LT | 4 | 0 | 0 | 4 | 8 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 6 | 6 | 0 | 17 |
| LU | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 2 | 2 | 0 | 7 |
| LV | 2 | 0 | 0 | 5 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 12 |
| MT | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 2 | 2 | 0 | 5 |
| NL | 20 | 7 | 0 | 7 | 34 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 16 | 18 | 0 | 52 |
| PL | 24 | 4 | 0 | 205 | 233 | 10 | 2 | 0 | 8 | 20 | 0 | 0 | 0 | 16 | 16 | 0 | 269 |
| PT | 10 | 8 | 1 | 16 | 35 | 1 | 2 | 0 | 2 | 5 | 0 | 3 | 0 | 15 | 18 | 0 | 58 |
| RO | 2 | 3 | 0 | 6 | 11 | 0 | 1 | 0 | 5 | 6 | 0 | 0 | 0 | 5 | 5 | 0 | 22 |
| SE | 10 | 1 | 0 | 21 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 18 | 20 | 0 | 52 |
| SI | 5 | 6 | 0 | 7 | 18 | 9 | 1 | 0 | 0 | 10 | 0 | 0 | 0 | 4 | 4 | 0 | 32 |
| SK | 7 | 3 | 0 | 19 | 29 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 5 | 5 | 0 | 35 |
| EU 27 | 575 | 573 | 135 | 934 | 2217 | 174 | 322 | 29 | 137 | 662 | 22 | 134 | 19 | 875 | 1050 | 13 | 3942 |
| IS | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 4 |
| NO | 9 | 2 | 0 | 9 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 13 | 14 | 0 | 34 |
| Grand Total | 585 | 575 | 135 | 944 | 2239 | 174 | 322 | 29 | 137 | 662 | 22 | 135 | 19 | 890 | 1066 | 13 | 3980 |

*** Form 3/4/5**

**Table 37: Number of stations per type, location and MS, 2007**

| MS | All Stations | | SO2 | | NO2 | | NOx | | Lead | | Benzene | | CO | | PM10 | | PM2.5 | | O3 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quest | Airbase | Quest | Airbase | Quest | Airbase | Quest | Airbase | Quest | Airbase | Quest | Airbase | Quest | Airbase | Quest | Airbase | Quest | Airbase | Quest | Airbase |
| AT | 183 | 183 | 110 | 110 | 148 | 148 | 18 | 18 | 16 | 16 | 24 | 24 | 41 | 41 | 126 | 126 | 9 | 9 | 115 | 115 |
| BE | 161 | 161 | 60 | 60 | 66 | 66 | | | 42 | 42 | 34 | 34 | 17 | 17 | 50 | 50 | 12 | 12 | 38 | 38 |
| BG | 38 | 38 | 16 | 16 | 15 | 15 | 15 | 15 | 19 | 19 | 12 | 12 | 13 | 13 | 38 | 38 | 3 | 3 | 9 | 9 |
| CY | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| CZ | 130 | 130 | 89 | 89 | 120 | 120 | 23 | 23 | 25 | 25 | 30 | 30 | 33 | 33 | 120 | 120 | 24 | 24 | 61 | 61 |
| DE | 586 | 586 | 191 | 191 | 468 | 468 | 25 | 25 | 111 | 111 | 149 | 149 | 169 | 169 | 436 | 436 | 44 | 44 | 285 | 285 |
| DK | 13 | 13 | 2 | 2 | 11 | 11 | 11 | 11 | 11 | 11 | 1 | 1 | 6 | 6 | 10 | 10 | 2 | 2 | 8 | 8 |
| EE | 14 | 9 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 4 | 3 | 1 | 5 | 4 | 8 | 5 | 5 | 2 | 7 | 7 |
| ES | 565 | 565 | 418 | 418 | 451 | 451 | 51 | 51 | 88 | 88 | 90 | 90 | 225 | 225 | 380 | 380 | 80 | 80 | 362 | 362 |
| FI | 40 | 40 | 1 | 1 | 13 | 13 | | | | | | | 2 | 2 | 24 | 24 | 7 | 7 | 16 | 16 |
| FR | 737 | 704 | 314 | 311 | 491 | 486 | 197 | 197 | 38 | 34 | 101 | 95 | 93 | 91 | 373 | 368 | 51 | 51 | 436 | 436 |
| GB | 217 | 217 | 79 | 79 | 116 | 116 | 14 | 14 | 29 | 29 | 41 | 41 | 79 | 79 | 128 | 128 | 128 | 128 | 92 | 92 |
| GR | 61 | 29 | 14 | 13 | 27 | 26 | 2 | 1 | 21 | | 33 | 1 | 12 | 12 | 17 | 17 | 3 | 3 | 24 | 24 |
| HU | 27 | 27 | 25 | 25 | 25 | 25 | | | | | 12 | 12 | 22 | 22 | 26 | 26 | 3 | 3 | 17 | 17 |
| IE | 26 | 26 | 12 | 12 | 13 | 6 | 13 | 13 | 10 | 10 | 3 | 1 | 7 | 7 | 17 | 17 | 1 | 1 | 10 | 10 |
| IT | 701 | 672 | 281 | 275 | 502 | 481 | 76 | 69 | 42 | 42 | 141 | 137 | 327 | 316 | 327 | 312 | 35 | 35 | 241 | 230 |
| LT | 17 | 17 | 12 | 12 | 15 | 15 | 12 | 12 | 4 | 4 | 5 | 5 | 8 | 8 | 13 | 13 | 3 | 3 | 13 | 13 |
| LU | 7 | 7 | 6 | 6 | 6 | 6 | 3 | 3 | | | 2 | 2 | 3 | 3 | 3 | 3 | 1 | 1 | 5 | 5 |
| LV | 12 | 12 | 7 | 7 | 9 | 9 | 1 | 1 | 6 | 6 | 6 | 6 | 1 | 1 | 7 | 7 | 4 | 4 | 8 | 8 |
| MT | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 4 | 4 | 3 | 3 | 4 | 4 |
| NL | 52 | 52 | 35 | 35 | 44 | 44 | 1 | 1 | 5 | 5 | 8 | 8 | 22 | 22 | 40 | 40 | 0 | 0 | 37 | 37 |
| PL | 269 | 269 | 178 | 178 | 185 | 185 | 72 | 72 | 104 | 104 | 46 | 46 | 66 | 66 | 226 | 226 | 4 | 4 | 58 | 58 |
| PT | 58 | 58 | 40 | 40 | 48 | 48 | 6 | 6 | 1 | 1 | 6 | 6 | 27 | 27 | 43 | 43 | 14 | 14 | 33 | 33 |
| RO | 22 | 22 | 21 | 21 | 20 | 20 | 1 | 1 | 19 | 19 | 6 | 6 | 13 | 13 | 19 | 19 | 1 | 1 | 16 | 16 |
| SE | 53 | 52 | 12 | 12 | 32 | 32 | 10 | 10 | | | 14 | 14 | 4 | 4 | 35 | 35 | 11 | 11 | 16 | 16 |
| SI | 33 | 33 | 21 | 21 | 11 | 11 | 10 | 10 | 3 | 3 | 2 | 2 | 4 | 4 | 13 | 13 | 4 | 4 | 15 | 15 |
| SK | 35 | 35 | 16 | 16 | 14 | 14 | 18 | 18 | 10 | 10 | 11 | 11 | 11 | 11 | 31 | 31 | 4 | 4 | 13 | 13 |
| EU27 | 4064 | 3964 | 1973 | 1963 | 2863 | 2829 | 592 | 584 | 616 | 588 | 784 | 738 | 1214 | 1200 | 2516 | 2493 | 458 | 455 | 1941 | 1930 |
| IS | 4 | 4 | 1 | 1 | 2 | 1 | | | | | 1 | 1 | 1 | 1 | 3 | 3 | 2 | 2 | 2 | 2 |
| NO | 34 | 34 | 1 | 1 | 21 | 2 | 21 | 21 | | | 9 | 1 | | | 24 | 24 | 13 | 13 | 9 | 9 |
| Grand Total | 4102 | 4002 | 1975 | 1965 | 2886 | 2832 | 613 | 605 | 616 | 588 | 794 | 740 | 1215 | 1201 | 2543 | 2520 | 473 | 470 | 1952 | 1941 |

*** Form 3/4/5**

**Table 38: Reporting stations in the Questionnaire and corresponding Airbase match, 2007**

| Assesment regime | Nr. of zones[1] | $SO_2$ health | $NO_2$ health | $PM_{10}$ | Lead | Benzene | CO |
|---|---|---|---|---|---|---|---|
| > UAT | Total | 45 | 145 | 440 | 1 | 30 | 9 |
| | Too few stations | 2 | 14 | 92 | 0 | 14 | 3 |
| | Modelled | 1 | 6 | 5 | 0 | 4 | 1 |
| >LAT <UAT | Total | 40 | 135 | 8 | 0 | 88 | 17 |
| | Too few stations | 6 | 2 | 0 | 0 | 0 | 0 |
| | Modelled | 10 | 1 | 0 | 0 | 18 | 0 |
| Aggls & < LAT | Total | 164 | 42 | 1 | 163 | 58 | 156 |
| | Too few stations | 0 | 0 | 0 | 7 | 0 | 0 |
| | Modelled | 12 | 0 | 0 | 17 | 0 | 0 |

*** form 10**

**Table 39: Zones with too few stations reported, per assessment regime, 2007**

| MS | SO2 health | NO2 health | PM10 | Lead | Benzene | CO | O3 |
|---|---|---|---|---|---|---|---|
| AT | | | | | | | |
| BE | | | | | | | |
| BG | 2 | 3 | | | | 3 | |
| CY | | | 1 | | | | |
| CZ | | | | | | | |
| DE | | | | | | | |
| DK | | 1 | 2 | | | | |
| EE | | | 1 | | | | |
| ES | | | 14 | | 1 | | |
| FI | | | 1 | | | | |
| FR | | | 9 | 2 | 2 | | |
| GB | 7 | 5 | 35 | 3 | 4 | | 21 |
| GR | 1 | 1 | 1 | | 1 | | |
| HU | | | 1 | | | | |
| IE | | | | | | | 1 |
| IT | 1 | 3 | 17 | | 3 | | |
| LT | | 1 | 1 | | | | |
| LU | | 1 | | | | | |
| LV | | | | | | | |
| MT | | | | | | | |
| NL | | | 3 | 2 | | | |
| PL | | | | | | | |
| PT | | | 3 | | | | |
| RO | | | | | | | |
| SE | | 1 | 1 | | 1 | | |
| SI | | | 2 | | | | |
| SK | | | 1 | | 2 | | |
| EU27 | 11 | 16 | 93 | 7 | 14 | 3 | 22 |

*** form 10**

**Table 40: Zones per MS and pollutant with 'missing' stations, 2007**

## $PM_{10}$

| MS | Beta absorption | Gravimetric | TEOM | TEOM FDMS | Other or unspecified | Total |
|---|---|---|---|---|---|---|
| AT | 33 | 41 | 30 | 22 | 0 | **126** |
| BE | 31 | 0 | 10 | 9 | 0 | **50** |
| BG | 12 | 26 | 0 | 0 | 0 | **38** |
| CY | 0 | 0 | 2 | 0 | 0 | **2** |
| CZ | 81 | 39 | 0 | 0 | 0 | **120** |
| DE | 234 | 168 | 87 | 0 | 4 | **493** |
| DK | 10 | 0 | 1 | 0 | 0 | **11** |
| EE | 8 | 0 | 0 | 0 | 0 | **8** |
| ES | 191 | 112 | 74 | 0 | 3 | **380** |
| FI | 10 | 0 | 15 | 0 | 0 | **25** |
| FR | 55 | 0 | 49 | 269 | 0 | **373** |
| GB | 2 | 7 | 63 | 25 | 0 | **97** |
| GR | 17 | 0 | 0 | 0 | 0 | **17** |
| HU | 25 | 1 | 1 | 0 | 0 | **27** |
| IE | 0 | 10 | 7 | 0 | 0 | **17** |
| IT | 220 | 43 | 50 | 0 | 16 | **329** |
| LT | 13 | 0 | 0 | 0 | 0 | **13** |
| LU | 0 | 0 | 3 | 0 | 0 | **3** |
| LV | 7 | 0 | 0 | 0 | 0 | **7** |
| MT | 3 | 0 | 0 | 1 | 0 | **4** |
| NL | 40 | 0 | 0 | 0 | 0 | **40** |
| PL | 52 | 148 | 47 | 1 | 89 | **337** |
| PT | 43 | 0 | 0 | 0 | 0 | **43** |
| RO | 0 | 19 | 0 | 0 | 0 | **19** |
| SE | 2 | 16 | 17 | 1 | 0 | **36** |
| SI | 0 | 1 | 11 | 0 | 0 | **12** |
| SK | 4 | 3 | 0 | 24 | 0 | **31** |
| **EU27** | **1093** | **634** | **467** | **352** | **112** | **2658** |
| **IS** | **2** | **1** | **0** | **0** | **0** | **3** |
| **NO** | **5** | **0** | **19** | **0** | **0** | **24** |
| **Total** | **1100** | **635** | **486** | **352** | **112** | **2685** |

## $PM_{2.5}$

| MS | Beta absorption | Gravimetric | TEOM | TEOM FDMS | Other or unspecified | Total |
|---|---|---|---|---|---|---|
| AT | 0 | 9 | 0 | 0 | 0 | **9** |
| BE | 5 | 0 | 2 | 5 | 0 | **12** |
| BG | 0 | 3 | 0 | 0 | 0 | **3** |
| CY | 0 | 2 | 0 | 0 | 0 | **2** |
| CZ | 24 | 0 | 0 | 0 | 0 | **24** |
| DE | 13 | 26 | 6 | 0 | 4 | **49** |
| DK | 0 | 0 | 2 | 0 | 0 | **2** |
| EE | 5 | 0 | 0 | 0 | 0 | **5** |
| ES | 29 | 43 | 8 | 0 | 0 | **80** |
| FI | 4 | 0 | 2 | 0 | 0 | **6** |
| FR | 0 | 0 | 31 | 20 | 0 | **51** |
| GB | 0 | 1 | 4 | 2 | 0 | **7** |
| GR | 3 | 0 | 0 | 0 | 0 | **3** |
| HU | 3 | 0 | 0 | 0 | 0 | **3** |
| IE | 0 | 1 | 0 | 0 | 0 | **1** |
| IT | 20 | 7 | 7 | 0 | 1 | **35** |
| LT | 3 | 0 | 0 | 0 | 0 | **3** |
| LU | 0 | 0 | 1 | 0 | 0 | **1** |
| LV | 4 | 0 | 0 | 0 | 0 | **4** |
| MT | 2 | 0 | 0 | 1 | 0 | **3** |
| NL | 0 | 0 | 0 | 0 | 0 | **0** |
| PL | 1 | 3 | 0 | 0 | 0 | **4** |
| PT | 14 | 0 | 0 | 0 | 0 | **14** |
| RO | 0 | 1 | 0 | 0 | 0 | **1** |
| SE | 0 | 2 | 8 | 1 | 0 | **11** |
| SI | 0 | 3 | 0 | 0 | 0 | **3** |
| SK | 1 | 0 | 0 | 3 | 0 | **4** |
| **EU 27** | **131** | **101** | **71** | **32** | **5** | **340** |
| **IS** | **2** | **0** | **0** | **0** | **0** | **2** |
| **NO** | **1** | **0** | **12** | **0** | **0** | **13** |
| **Total** | **134** | **101** | **83** | **32** | **5** | **355** |

*** form 3/4/5**

**Table 41: Measurement methods $PM_{10}$ and $PM_{2.5}$ per MS, 2007**

## $PM_{10}$

| Member State | CF>1 | CF=1 | CF<1 | CF Variable | CF Other | CF reporting stations | Total PM10 stations |
|---|---|---|---|---|---|---|---|
| AT | 56 | 1 | 0 | 8 | 0 | 65 | 126 |
| BE | 39 | 0 | 0 | 10 | 9 | 49 | 50 |
| BG | 12 | 0 | 0 | 0 | 0 | 12 | 38 |
| CY | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| CZ | 0 | 0 | 0 | 0 | 0 | 0 | 120 |
| DE | 187 | 145 | 7 | 94 | 0 | 433 | 436 |
| DK | 0 | 9 | 0 | 1 | 0 | 10 | 10 |
| EE | 8 | 0 | 0 | 0 | 0 | 8 | 8 |
| ES | 114 | 134 | 26 | 0 | 0 | 274 | 380 |
| FI | 6 | 18 | 0 | 0 | 0 | 24 | 24 |
| FR | 0 | 0 | 0 | 0 | 0 | 0 | 373 |
| GB | 0 | 12 | 0 | 65 | 0 | 77 | 128 |
| GR | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| HU | 11 | 14 | 0 | 1 | 0 | 26 | 26 |
| IE | 3 | 14 | 0 | 0 | 0 | 17 | 17 |
| IT | 0 | 10 | 0 | 30 | 0 | 40 | 327 |
| LT | 13 | 0 | 0 | 0 | 0 | 13 | 13 |
| LU | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| LV | 0 | 7 | 0 | 0 | 0 | 7 | 7 |
| MT | 0 | 4 | 0 | 0 | 0 | 4 | 4 |
| NL | 0 | 0 | 0 | 40 | 0 | 40 | 40 |
| PL | 0 | 0 | 0 | 0 | 0 | 0 | 226 |
| PT | 44 | 0 | 0 | 0 | 0 | 44 | 43 |
| RO | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| SE | 16 | 18 | 0 | 1 | 0 | 35 | 35 |
| SI | 0 | 0 | 0 | 10 | 0 | 10 | 13 |
| SK | 4 | 0 | 0 | 0 | 0 | 4 | 31 |
| EU27 | 513 | 386 | 33 | 260 | 9 | 1192 | 2516 |
| IS | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| NO | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| Grand Total | 513 | 386 | 33 | 260 | 9 | 1192 | 2543 |

## $PM_{2.5}$

| Member State | CF>1 | CF=1 | CF<1 | CF Variable | CF Other | CF reporting stations | Total PM2.5 stations |
|---|---|---|---|---|---|---|---|
| AT | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| BE | 0 | 0 | 0 | 0 | 12 | 12 | 12 |
| BG | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| CY | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| CZ | 0 | 0 | 0 | 0 | 0 | 0 | 24 |
| DE | 8 | 21 | 1 | 7 | 0 | 37 | 44 |
| DK | 0 | 2 | 0 | 0 | 0 | 2 | 2 |
| EE | 8 | 0 | 0 | 0 | 0 | 8 | 5 |
| ES | 3 | 6 | 3 | 0 | 0 | 12 | 80 |
| FI | 2 | 4 | 0 | 0 | 0 | 6 | 7 |
| FR | 0 | 0 | 0 | 0 | 0 | 0 | 51 |
| GB | 0 | 7 | 0 | 0 | 0 | 7 | 128 |
| GR | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| HU | 2 | 1 | 0 | 0 | 0 | 3 | 3 |
| IE | 0 | 1 | 0 | 0 | 0 | 1 | 1 |
| IT | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| LT | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| LU | 0 | 3 | 0 | 0 | 0 | 3 | 1 |
| LV | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| MT | 0 | 4 | 0 | 0 | 0 | 4 | 3 |
| NL | 0 | 3 | 0 | 0 | 0 | 3 | 0 |
| PL | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| PT | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| RO | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SE | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| SI | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| SK | 8 | 2 | 0 | 0 | 0 | 10 | 4 |
| EU27 | 31 | 54 | 4 | 7 | 12 | 108 | 458 |
| IS | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| NO | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| Grand Total | 31 | 54 | 4 | 7 | 12 | 108 | 473 |

*** form 3/4/5**

**Table 42: Stations using non reference-method CF for $PM_{10}$, $PM_{2.5}$ in 2007**

# Chapter 5

| MS | $SO_2$ | | | | $NO_2$ | | $NO_x$ | $PM_{10}$ | | $PM_{10}$ stage 2 | | Lead | Benzene | CO | Ozone | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hlth hour | Hlth day | Eco year | Eco winter | Hlth hour | Hlth year | Veg year | Day | Year | Day | Year | Year | Year | Year | Hlth | Veg |
| CZ | | | | 1 | | 4 | 2 | 4 | 1 | | | | | | | |
| DE | 2 | 2 | | | | | | | | | | 15 | 7 | 15 | | 3 |
| DK | | | | | | | | | | | | | 2 | | | |
| ES | 17 | 17 | 7 | 7 | 14 | 14 | 8 | 15 | 13 | | | 78 | 83 | 61 | 18 | 19 |
| FR | | | | | | | | | | | | 2 | | | | |
| GB | 18 | 19 | 11 | 11 | | 35 | 6 | 5 | 2 | 3 | 29 | 28 | 13 | 27 | 17 | 3 |
| HU | | | | | | | | | | | | 11 | 3 | | | |
| IT | 11 | 11 | 3 | 3 | 4 | 4 | | 5 | 5 | | | 15 | 16 | 9 | 5 | 5 |
| NL | | | | | | 9 | | 2 | 2 | | | 5 | 4 | | | |
| PL | 15 | 9 | 13 | 13 | 15 | 5 | 11 | 16 | 16 | | | 21 | 6 | 4 | | |
| RO | 17 | 17 | | | 16 | 16 | | 17 | 17 | | | 17 | 16 | 16 | | |
| SI | | | | | | | | | | | | 3 | 4 | 1 | | |
| SK | | | | | | | 8 | | | | | 3 | | | | |
| EU27 | 80 (10,3%) | 75 (9,7%) | 34 (6,9%) | 35 7,1%) | 49 (6,1%) | 87 (10,8%) | 35 (7,0%) | 64 (8,1%) | 56 (1,4%) | 3 (1,4%) | 29 (13,3%) | 198 (30,3%) | 154 (21,7%) | 133 (17,9%) | 40 (7,1%) | 30 (6,1%) |
| IS | 1 | 1 | 1 | 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 2 | 1 | 1 | | |
| Grand Total | 81 | 76 | 35 | 36 | 50 | 88 | 35 | 65 | 57 | 4 | 30 | 200 | 155 | 134 | 40 | 30 |

*** form 8/9**

**Table 43: Zones with exceedance status determined by modelling in 2007**

| MS | SO2 | NO2 | PM10 | Lead | Benzene | CO | O3 |
|---|---|---|---|---|---|---|---|
| DK | | 1 | | | 2 | | |
| FR | 12 | 10 | 9 | 6 | 18 | 2 | 18 |
| GB | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| GR | 1 | 1 | | 4 | 3 | | |
| IT | | 6 | 5 | | 3 | 1 | |
| NL | 9 | 9 | 9 | | | 9 | |
| LV | | 1 | 2 | | | | |
| SK | | 1 | | 1 | 2 | 1 | |
| EU27 | 65 | 72 | 68 | 54 | 71 | 56 | 61 |

*** form 8/9**

**Table 44: Zones with Supplementary Assessment in 2007.**

| MS | Number of stations | Averaged annual mean (µg/m³) | Max of annual mean (µg/m³) | Min of annual mean (µg/m³) |
|---|---|---|---|---|
| AT | 9 | 20 | 26 | 16 |
| BE | 11 | 18 | 26 | 13 |
| BG | 4 | 29 | 41 | 8 |
| CY | 2 | 20 | 26 | 14 |
| CZ | 24 | 21 | 36 | 14 |
| DE | 32 | 16 | 27 | 8 |
| DK | 1 | 23 | 23 | 23 |
| EE | 1 | 11 | 11 | 11 |
| ES | 54 | 17 | 29 | 6 |
| FI | 6 | 8 | 10 | 5 |
| FR | 42 | 18 | 36 | 10 |
| GB | 7 | 14 | 22 | 4 |
| GR | 3 | 30 | 37 | 20 |
| HU | 3 | 19 | 24 | 14 |
| IE | 1 | 8 | 8 | 8 |
| IT | 27 | 26 | 37 | 13 |
| LT | 3 | 12 | 17 | 9 |
| LU | n.a. | n.a. | n.a. | n.a. |
| LV | 4 | 21 | 24 | 18 |
| MT | 3 | 18 | 23 | 12 |
| NL | n.a. | n.a. | n.a. | n.a. |
| PL | 2 | 23 | 26 | 19 |
| PT | 14 | 12 | 24 | 1 |
| RO | 3 | 32 | 36 | 23 |
| SE | 13 | 10 | 13 | 5 |
| SI | 3 | 21 | 27 | 10 |
| SK | 4 | 21 | 27 | 13 |
| EU27 | 276 | 18 | 41 | 1 |

*** form 18**

**Table 45: $PM_{2.5}$ monitoring stations statistics per Member State, 2007**

| MS | AOTvegetation (ug/m$^3$.h) | | | | AOT forest (ug/m$^3$.h) | | | | Annual average (ug/m3) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Lowest[1)] | Average | Highest | Nr of stations | Lowest[1)] | Average | Highest | Nr of stations | Lowest[1)] | Average | Highest | Nr of stations |
| AT | 2754 | 20552 | 33935 | 109 | 12698 | 34154 | 63926 | 109 | 27 | 55 | 101 | 109 |
| BE | 1805 | 5034 | 8296 | 38 | 4592 | 9986 | 18536 | 38 | 28 | 40 | 57 | 38 |
| CZ | 12092 | 19588 | 26865 | 24 | 20713 | 33395 | 49458 | 24 | 49 | 64 | 74 | 24 |
| DK | 2671 | 5796 | 9260 | 7 | 4170 | 10289 | 16900 | 7 | 45 | 55 | 63 | 7 |
| EE | 124 | 4452 | 8051 | 7 | 191 | 7348 | 11632 | 7 | 35 | 52 | 65 | 7 |
| ES | 0 | 9109 | 32556 | 345 | 0 | 18003 | 60149 | 345 | 18 | 50 | 94 | 345 |
| FI | 363 | 2922 | 5753 | 16 | 465 | 4741 | 9288 | 16 | 38 | 53 | 66 | 16 |
| FR | 0 | 9569 | 29175 | 219 | 0 | 21330 | 66988 | 219 | 18 | 52 | 94 | 227 |
| GB | 13 | 2228 | 10128 | 75 | 24 | 4550 | 16468 | 75 | 17 | 45 | 68 | 75 |
| GR | 18529 | 25659 | 36225 | 9 | 31476 | 31476 | 31476 | 1 | 45 | 59 | 79 | 9 |
| IE | 519 | 2413 | 5180 | 6 | 1617 | 1617 | 1617 | 1 | 47 | 58 | 75 | 6 |
| IT | 643 | 27379 | 66591 | 98 | 3826 | 48692 | 91705 | 69 | 6 | 52 | 99 | 231 |
| LT | 3556 | 4982 | 6408 | 2 | 5463 | 7479 | 9220 | 4 | 45 | 51 | 59 | 4 |
| LU | 0 | 5318 | 9991 | 6 | 0 | 11340 | 21707 | 5 | 16 | 35 | 52 | 5 |
| NL | 791 | 4387 | 9531 | 27 | 1528 | 8115 | 15996 | 26 | 28 | 40 | 54 | 28 |
| PL | 9760 | 17369 | 31686 | 19 | 16577 | 28941 | 56273 | 19 | 27 | 51 | 92 | 58 |
| PT | 590 | 5365 | 11383 | 14 | 3295 | 19140 | 34775 | 14 | 45 | 58 | 85 | 14 |
| SE | 181 | 3462 | 7373 | 14 | 408 | 6708 | 15803 | 14 | 44 | 54 | 65 | 16 |
| SI | 8615 | 24034 | 41424 | 12 | 12878 | 39301 | 72083 | 12 | 36 | 53 | 96 | 12 |
| SK | 17466 | 22268 | 29146 | 13 | 28931 | 38202 | 50364 | 13 | 44 | 61 | 91 | 13 |
| **EU27** | **0** | **11786** | **66591** | **1069** | **0** | **21460** | **91705** | **1027** | **6.06** | **51** | **101** | **1253** |

*** form 15**

**Table 46: Annual ozone statistics, vegetation and forest, 2007**

# Chapter 6

| Member State | All Zones | As | Cd | Ni | BaP |
|---|---|---|---|---|---|
| AT | 19 | 11 | 11 | 11 | 11 |
| BE | 18 | 0 | 0 | 0 | 0 |
| BG | 6 | 6 | 6 | 6 | 6 |
| CY | 1 | 1 | 1 | 1 | 0 |
| CZ | 15 | 15 | 15 | 15 | 15 |
| DE | 120 | 66 | 66 | 66 | 68 |
| DK | 3 | 3 | 3 | 3 | 1 |
| EE | 4 | 4 | 4 | 4 | 4 |
| ES | 138 | 0 | 0 | 0 | 0 |
| FI | 18 | 0 | 0 | 0 | 0 |
| FR | 81 | 9 | 9 | 9 | 1 |
| GB | 44 | 44 | 44 | 44 | 44 |
| GR | 4 | 0 | 0 | 0 | 0 |
| HU | 11 | 0 | 0 | 0 | 0 |
| IE | 4 | 0 | 0 | 0 | 0 |
| IT | 143 | 0 | 0 | 0 | 0 |
| LT | 3 | 3 | 3 | 3 | 3 |
| LU | 3 | 0 | 0 | 0 | 0 |
| LV | 2 | 1 | 1 | 1 | 0 |
| MT | 2 | 0 | 0 | 0 | 0 |
| NL | 9 | 0 | 0 | 0 | 0 |
| PL | 186 | 0 | 0 | 0 | 0 |
| PT | 27 | 0 | 0 | 0 | 0 |
| RO | 21 | 0 | 0 | 0 | 0 |
| SE | 6 | 6 | 6 | 6 | 6 |
| SI | 10 | 0 | 0 | 0 | 0 |
| SK | 11 | 0 | 0 | 0 | 0 |
| **EU27** | **909** | **169** | **169** | **169** | **159** |
| IS | 3 | 0 | 0 | 0 | 0 |
| NO | 7 | 0 | 0 | 0 | 0 |
| **ALL** | **919** | **169** | **169** | **169** | **159** |

*** form 0/1/2**

**Table 47: Number of 4th DD reporting zones**

| Member State | Total area km2 | As | Cd | Ni | BaP |
|---|---|---|---|---|---|
| AT | 83 870 | 100 | 100 | 100 | 100 |
| BE | 30 530 | 0 | 0 | 0 | 0 |
| BG | 110 910 | 100 | 100 | 100 | 100 |
| CY | 9 250 | 100 | 100 | 100 | 0 |
| CZ | 78 870 | 100 | 100 | 100 | 100 |
| DE | 357 050 | 100 | 100 | 100 | 100 |
| DK | 43 090 | 102 | 102 | 102 | 1 |
| EE | 45 230 | 96 | 96 | 96 | 96 |
| ES | 505 370 | 0 | 0 | 0 | 0 |
| FI | 338 150 | 0 | 0 | 0 | 0 |
| FR | 643 427 | 5 | 5 | 5 | 0 |
| GB | 243 610 | 100 | 100 | 100 | 100 |
| GR | 131 960 | 0 | 0 | 0 | 0 |
| HU | 93 030 | 0 | 0 | 0 | 0 |
| IE | 70 270 | 0 | 0 | 0 | 0 |
| IT | 301 340 | 0 | 0 | 0 | 0 |
| LT | 65 300 | 100 | 100 | 100 | 100 |
| LU | 2 590 | 0 | 0 | 0 | 0 |
| LV | 64 590 | 0 | 0 | 0 | 0 |
| MT | 320 | 0 | 0 | 0 | 0 |
| NL | 41 530 | 0 | 0 | 0 | 0 |
| PL | 312 690 | 0 | 0 | 0 | 0 |
| PT | 92 120 | 0 | 0 | 0 | 0 |
| RO | 237 500 | 0 | 0 | 0 | 0 |
| SE | 450 290 | 100 | 100 | 100 | 100 |
| SI | 20 270 | 0 | 0 | 0 | 0 |
| SK | 49 030 | 0 | 0 | 0 | 0 |
| EU27 | 4 422 187 | 34% | 34% | 34% | 32% |
| IS | 103 000 | 0 | 0 | 0 | 0 |
| NO | 323 802 | 0 | 0 | 0 | 0 |

| Member State | Total population | As | Cd | Ni | BaP |
|---|---|---|---|---|---|
| AT | 8 265 925 | 98 | 98 | 98 | 98 |
| BE | 10 511 382 | 0 | 0 | 0 | 0 |
| BG | 7 718 750 | 100 | 100 | 100 | 100 |
| CY | 766 414 | 98 | 98 | 98 | 0 |
| CZ | 10 251 079 | 101 | 101 | 101 | 101 |
| DE | 82 437 995 | 98 | 98 | 98 | 98 |
| DK | 5 427 459 | 101 | 101 | 101 | 18 |
| EE | 1 344 684 | 103 | 103 | 103 | 103 |
| ES | 43 758 250 | 0 | 0 | 0 | 0 |
| FI | 5 255 580 | 0 | 0 | 0 | 0 |
| FR | 62 998 773 | 6 | 6 | 6 | 0 |
| GB | 60 393 100 | 98 | 98 | 98 | 98 |
| GR | 11 125 179 | 0 | 0 | 0 | 0 |
| HU | 10 076 581 | 0 | 0 | 0 | 0 |
| IE | 4 209 019 | 0 | 0 | 0 | 0 |
| IT | 58 751 711 | 0 | 0 | 0 | 0 |
| LT | 3 403 284 | 99 | 99 | 99 | 99 |
| LU | 469 086 | 0 | 0 | 0 | 0 |
| LV | 2 294 590 | 31 | 31 | 31 | 0 |
| MT | 405 006 | 0 | 0 | 0 | 0 |
| NL | 16 334 210 | 0 | 0 | 0 | 0 |
| PL | 38 157 055 | 0 | 0 | 0 | 0 |
| PT | 10 569 592 | 0 | 0 | 0 | 0 |
| RO | 21 610 213 | 0 | 0 | 0 | 0 |
| SE | 9 047 752 | 101 | 101 | 101 | 101 |
| SI | 2 003 358 | 0 | 0 | 0 | 0 |
| SK | 5 389 180 | 0 | 0 | 0 | 0 |
| EU27 | 492 975 207 | 39% | 39% | 39% | 37% |
| IS | 299 891 | 0 | 0 | 0 | 0 |
| NO | 4 640 219 | 0 | 0 | 0 | 0 |

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**Table 48: Total MS area and population covered by zones, in % of total.**

| | agglo | nonag | Total |
|---|---|---|---|
| AT | 3 | 8 | 11 |
| BG | 6 | | 6 |
| CY | | 1 | 1 |
| CZ | 3 | 12 | 15 |
| DE | 33 | 36 | 69 |
| DK | 2 | 1 | 3 |
| EE | 2 | 2 | 4 |
| FR | 15 | 12 | 27 |
| GB | 28 | 16 | 44 |
| GR | 2 | 2 | 4 |
| LT | 2 | 1 | 3 |
| LV | 1 | 1 | 2 |
| SE | 3 | 3 | 6 |
| Total | 100 | 95 | 195 |

*** form 0/1/2**

**Table 49: Reporting zones on heavy metals by zone-type, 2007**

| arsenic | Rural | | | | Suburban | | | | Urban | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Background | Industrial | Traffic | No Stations | Background | Industrial | Traffic | No Stations | Background | Industrial | Traffic | No Stations |
| AT | 0.63 | 0.33 | 0.36 | 6 | 0.31 | | | 2 | 0.59 | | | 4 |
| BG | 0.00 | | | 1 | | | | | | | 0.00 | 1 |
| CY | | | | | | | | | | | | |
| CZ | 0.76 | | | 7 | 1.45 | | | 4 | 2.70 | | 1.80 | 7 |
| DE | 0.59 | 1.00 | | 15 | 0.47 | 0.45 | 0.60 | 11 | 0.81 | 1.75 | 0.82 | 32 |
| EE | | | | 1 | | | | | 6.80 | | | 1 |
| FR | | | | | 0.38 | | | 4 | 2.54 | | | 7 |
| GB | | | | | | | | | | | | |
| GR | | | | | | | | | | | | |
| LT | | | | | | | | | 0.20 | | 0.25 | 3 |
| LV | 0.26 | | | 1 | | | | | 0.71 | | 1.00 | 2 |
| SE | | | | | | | | | | | | 1 |
| EU27 | 0.61 | 0.67 | 0.36 | 31 | 0.70 | 0.45 | 0.60 | 21 | 1.38 | 1.75 | 0.83 | 58 |

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**Table 50: Station and concentration statistics arsenic, 2007**

| cadmium | Rural | | | | Suburban | | | | Urban | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Background | Industrial | Traffic | No Stations | Background | Industrial | Traffic | No Stations | Background | Industrial | Traffic | No Stations |
| AT | 0.19 | 0.15 | 0.18 | 5 | 0.16 | | | 1 | 0.24 | | | 3 |
| BG | 0.11 | | | 1 | | | | | | | 10.37 | 1 |
| CY | | | | | | | | | | | | |
| CZ | 0.19 | | | 7 | 0.28 | | | 4 | 1.60 | | 0.30 | 4 |
| DE | 0.20 | 0.30 | | 14 | 0.18 | 0.19 | 0.20 | 11 | 0.25 | 0.55 | 0.19 | 29 |
| EE | 0.17 | | | 1 | | | | | 0.50 | | | 1 |
| FR | | | | | 0.20 | | | 3 | 0.30 | | | 5 |
| GB | | | | | | | | | | | | |
| GR | | | | | | | | | | | | |
| LT | | | | | | | | | 1.20 | | 0.95 | 3 |
| LV | 0.12 | | | 1 | | | | | 0.60 | | 1.09 | 2 |
| SE | | | | | | | | | | | | |
| EU27 | 0.19 | 0.23 | 0.18 | 29 | 0.21 | 0.19 | 0.20 | 19 | 0.40 | 0.55 | 0.99 | 48 |

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**Table 51: Station and concentration statistics cadmium, 2007**

| Nickel | Rural | | | | Suburban | | | | Urban | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Background | Industrial | Traffic | No Stations | Background | Industrial | Traffic | No Stations | Background | Industrial | Traffic | No Stations |
| AT | 1.27 | 1.99 | 1.55 | 5 | 1.28 | | | 1 | 2.02 | | | 3 |
| BG | 0.00 | | | 1 | | | | | | | 0.00 | 1 |
| CY | | | | | | | | | | | | |
| CZ | 0.51 | | | 7 | 0.83 | | | 4 | 1.45 | | 1.60 | 4 |
| DE | 1.21 | 2.10 | | 14 | 1.78 | 1.90 | 1.60 | 11 | 2.40 | 3.30 | 1.59 | 29 |
| EE | 2.10 | | | 1 | | | | | 13.40 | | | 1 |
| FR | | | | | 2.33 | | | 3 | 3.27 | | | 5 |
| GB | | | | | | | | | | | | |
| GR | | | | | | | | | | | | |
| LT | | | | | | | | | 0.90 | | 1.55 | 3 |
| LV | 0.61 | | | 1 | | | | | 3.30 | | 4.41 | 2 |
| SE | | | | | | | | | | | | |
| EU27 | 0.99 | 2.05 | 1.55 | 29 | 1.60 | 1.90 | 1.60 | 19 | 2.79 | 3.30 | 1.66 | 48 |

*** form 15**

**Table 52: Station and concentration statistics nickel, 2007**

| benzo(a)pyrene | Rural | | | | Suburban | | | | Urban | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Background | Industrial | Traffic | No Stations | Background | Industrial | Traffic | No Stations | Background | Industrial | Traffic | No Stations |
| AT | 0.51 | 1.29 | 0.67 | 4 | 1.02 | | | 2 | 1.28 | | | 4 |
| BG | 0.00 | | | 1 | | | | | | | 2.64 | 1 |
| CY | | | | | | | | | | | | |
| CZ | 0.30 | | | 2 | 1.13 | | | 4 | 1.38 | | 1.53 | 7 |
| DE | 0.19 | 0.21 | | 11 | 0.34 | 0.40 | 0.60 | 10 | 0.35 | 0.93 | 0.47 | 20 |
| EE | 0.09 | | | 1 | | | | | 0.70 | | | 1 |
| FR | | | | | 0.30 | | | 1 | 0.34 | | | 5 |
| GB | | | | | | | | | | | | |
| GR | | | | | | | | | | | | |
| LT | | | | | | | | | 0.40 | | 0.95 | 3 |
| LV | 0.21 | | | 1 | | | | | | | | |
| SE | | | | | | | | | 0.10 | | | 1 |
| EU27 | 0.21 | 0.93 | 0.67 | 20 | 0.66 | 0.40 | 0.60 | 17 | 0.62 | 0.93 | 1.04 | 42 |

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**Table 53: Station and concentration statistics benzo(a)pyrene, 2007**

# 8 List of tables and figures

## 7.1: list of tables

## 7.2: List of figures

# 9 References


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