EU benchmark air quality

Implementation of the air quality directives in industrialized areas

Air quality, IMPEL, PIAQ

DCMR

November 2010
final

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1 INTRODUCTION

1.1 General context

Air pollution has long been recognized as posing a significant risk to human health and the environment. In 1996 the Air Quality Framework Directive was adopted which established a Community framework for the assessment and management of ambient air quality in the EU. The Framework Directive also provided a list of priority pollutants for which air quality objectives would be established in daughter legislation. There have subsequently been four daughter directives in respect of particular pollutants and a Council Decision on exchange of air quality monitoring information.

- The Council Directive 96/62/EC on ambient air quality assessment and management ("Framework Directive");
- 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 ("Second Daughter Directive");
- Directive 2000/69/EC of the European Parliament and of the Council relating to limit values for benzene and carbon monoxide in ambient air ("Second Daughter Directive");
- Directive 2002/3/EC of the European Parliament and of the Council relating to ozone in ambient air ("Third Daughter Directive");
- Council Decision 97/101/EC establishing a reciprocal exchange of information and data from networks and individual stations measuring ambient air pollution within the Member States, ("Exchange of Information Decision");

In 2005 the EU directive on ambient air quality and cleaner air for Europe was proposed and approved later (2008/50/EC).

Over the past few years the air quality directive and its daughter directives have been implemented in the EU Member States. In 2007, an earlier IMPEL project (with Austria as lead partner) exchanged expertise on licensing of installations in ambient air polluted zones, based on an inquiry in some Member States. A limited scope study in 2009 showed that directives have been implemented in practice in different ways by the different IMPEL Member States. Contacts between experts in these countries confirmed these differences. These different practices lead to different air quality management activities with respect to permitting and enforcement of sectors of industries, traffic and shipping. The scope of this project is limited to industrial emissions. The goal of this programme is to learn form each other and find out which permitting, control or enforcement strategies can lead to the best air quality.

1.2 Objectives and scope

IMPEL[1] aims at improvement of implementation and enforcement of environmental legislation by Member States. Within the project Member States will exchange information and will continue to discuss their expertise and good practices of implementation (control and enforcement) of air quality directives in practice. To realize this goal the 'Comparison Program on the implementation and enforcement of Air Quality standards in relation to industrial air emissions (PIAQ)' has been established.

[1] IMPEL, the European Union Network for the Implementation and Enforcement of Environmental Law, is an international association of environmental authorities in Europe. The network is committed to contribute to a more effective application of European Community Environmental law by capacity building, awareness raising, sharing good practices, providing guidance and tools, enforcement cooperation and giving feed back to lawmakers and regulators on the practicability and enforceability of environmental legislation.

The main objective of the project is:
Identify best practices in the application of (implementation, control and enforcement) EU Air Quality Directives in relation to industrial air emissions.

The objectives will be achieved by:
1. Exchange of information on the implementation of the Air quality directives in relation to industrial air emissions by means of a questionnaire and a workshop.
2. Identify best practices in control and enforcement and its effects on emissions by main sectors of industry.
3. Assess the effectivity of the different practices, plans and programs on the ambient air quality.
4. Identify common EU best practices.
5. Making these best practices available to all IMPEL Member States.
6. Drafting of project report containing findings, conclusions and recommendations.

Only IMPEL Member States with industrial zones have been researched. The countries that took part in this programme are discussed in chapter 2.

To achieve the objectives the project is split up in to two phases:
Phase 1: Exchange of information and experiences on key regulatory issues
Phase 2: Identify best practices in the inspection and enforcement of industries, performed by the local, regional and national level, improving environmental effects in IMPEL Member States.

DCMR Environmental Protection Agency has given DHV the task to make the comparison within the PIAQ. How this comparison is made and what the results are described in this report.

2 METHODS OF RESEARCH

The PIAQ core team consists of members from DCMR Environmental Protection Agency, greater Rotterdam area, The Netherlands, Czech Environmental Inspectorate, Czech Republic and ARPA della Lombardia, Italy. As stated in chapter 1 the 'Comparison Program on the implementation and enforcement of Air Quality standards in relation to industrial air emissions (PIAQ)' consists of two phases. The first phase focuses on the exchange of information and experiences on key regulatory issues. The second phase has as the objective to identify best practices in the inspection and enforcement of industries.

Phase 1 was divided into two parts. In the first part a questionnaire was sent to all the IMPEL Member States with industrial zones. The list of all the IMPEL members addressed can be found in Appendix 1. In the second part of Phase 1 a workshop was held (on 14 and 15 June 2010) in the Chez Republic.

This chapter describes the details of the questionnaire and the workshop. The results of the returned questionnaires and the workshop are discussed in chapter 3.

2.1 Questionnaires

To gather information and identify best practices in permitting and enforcement and the effects on emissions by the main sectors of industry within a city/region or country a questionnaire was sent to all the IMPEL members whom might be interested to participate in the PIAQ project (see Appendix 1). Besides gathering information on best practices the questionnaire was also useful to gain insight into how permitting and enforcement are practiced in the different regions and what differences there are in implementation and culture.

It is a questionnaire on the implementation of the Air Quality Directive and follows the Directive's structure. The questionnaire is extended with some questions on permitting and enforcement. The complete questionnaire can be found in appendix 2.

The main issues in the questionnaire are:

1. General facts. These questions are aimed at gathering information on the industrial area(s) and the air quality in the different Member States.
2. Responsibilities. This section contains questions on how the Air Quality Directive is implemented into national and/or regional legislation, how are emissions from industry regulated and who is responsible for the implementation and enforcement of the industrial emissions.
3. Permitting and enforcement of air quality emissions. This part of the questionnaire looks in more detail into who controls the industries with regard to compliance with permit requirements, what do the (emission/air quality) reports look like, are there automatic measurements, are measures taken to reduce emission and are there consequences if the air quality limit values aren't met.
4. Ambient Air Quality Assessments. This part of the questionnaire looks into how the air quality is monitored (e.g. by the industries or government) and whether ambient air quality levels have a direct effect on permits, how unfavourable meteorological conditions are dealt with etc.

The final section of the questionnaire is a benchmark scenario. This is to assist in the development of best practices and was used extensively in the workshop. In this benchmark section the IMPEL members are asked to describe issues like year of construction, process conditions, thermal input, feed streams, fuel

type, load etc. as accurately as possible in order to characterize the installation and to make an indicative comparison between different Member States.

2.2 Workshop in Prague

All the IMPEL members that returned the questionnaire were invited to take part in a workshop held on 14 and 15 June 2010 in Prague, Czech Republic. The objective of the workshop was to:

- Share good practices in the participating countries,
- Analyze the preliminary results of the questionnaire on completeness, missing information and quality of information
- Prepare a list of the different practices in the different Member States; participating Member States have the task to identify best practices from them that could or may already work in their own countries.

To make the workshop most effective the members were divided into different working groups. In total four working groups were appointed. Each working group had its own focus and received several questions to focus on during the discussions within the working group. The following working groups were assigned:

a. Working group Permitting with the focus on:
   - How is the legislation implemented?
   - Who is responsible? For what?
   - What things are described in the permitting?
   - For how long does the permit last?
   - How are old plants dealt with?
   - Benchmarking of limits

b. Working group Inspection and enforcement with the focus on:
   - Who enforces?
   - Which tools are available to enforce? (Self monitoring, Automatic Measuring Systems)
   - What happens if limit values are exceeded?
   - What happens in the long term?

c. Working group Measures which focused on the main sources (and its measures):
   - steelindustry,
   - powerplant,
   - chemical industry,
   - transportation,
   - domestic heating.
   - Problems develop due to unfavourable whether systems and specific circumstances.
   - Finances for implementation of the measures.

d. Working group on Assessment which focuses on:
   - Models (kind, … what to do with the results)
   - dedication of the air quality network?
   - What are positions of stations?
   - What to do with the measurement data?

2.3 Follow up: preparation of phase 2

The second phase of this project will take place in 2011 and will build on the information and expertise gathered during the first stage of the project. This report will be used for the preparation of phase 2.

3 ANALYSIS OF FINDINGS

3.1 Results from the questionnaires

The Member States Cyprus, Czech Republic, Germany, Italy, Lithuania, the Netherlands (DCMR and VROM), Norway, Portugal, Romania and Slovak Republic returned their questionnaires. The appendices 3, 4, 5 and 6 give a summery of the returned questionnaires. The main results of the questionnaires are listed below.

General facts and background information

The main pollutants of interest identified across all IMPEL Member States are:

- Particulate Matter (PM_{10}),
- Oxides of Nitrogen (NO_x),
- Ozone (O_3),
- Carbon monoxide (CO),
- Ammonia (NH_3).

The main sources for these pollutants as identified across all Member States are:

- traffic,
- domestic use (specifically for heating),
- industrial sources,
- livestock and
- natural sources.

Exceendances are noted to occur, across many states/regions, however these are generally localized, being close to major roads or in the vicinity of industrial complexes. It is noted that there has been a general decrease in pollution concentrations over the past five years. More information on the questionnaires can be found in appendix 3.

Legal responsibilities

The EU air quality directives have been fully integrated and implemented in all Member States, some Member States/regions (shown in the following paragraph) have adopted even stricter limit values. At the permitting stage there is a check on consistency with the European BAT documents both for permits and direct working law. The Czech Republic has an additional set of limit values for poor meteorological conditions. More information can be found in the questionnaires in appendix 4.

Permitting and enforcement of air quality emissions

Local and national legislation in general require Industries to do the monitoring themselves, and to report usually on an annual basis to the Local or National Environmental Protection Agencies. These reports usually contain flue gas information, along with specific requests when needed depending on the industry. Where industries require it, automatic monitoring systems are required or at least recommended, it is then up to the industry to ensure these systems are up and running and that an accredited laboratory is used.

When emissions exceed the concentrations given in the permit, most Member States, will first provide assistance with the rectification before starting legal proceedings against the industry, It is up to the

Member States to operate, and manage monitoring stations, however many industries have their own measuring stations sometimes they are managed by the competent authorities.

Appendix 5 gives more information gathered through questionnaires on permitting and enforcement.

Ambient Air Quality Assessments

Industries in general have monitoring stations which are used for self regulation. The majority of countries do not have permits which refer to or even require meeting limit values for ambient air quality, and rely on industrial permits to regulate the ambient air quality concentrations. Where authorities do have monitoring stations in industrial areas, these are maintained and managed by the authorities, to determine exceedances. Very few Member States make real time forecasts or try to predictions pollution spell. Industries very rarely have to act before unfavourable conditions occur. Sometimes however they have to take measures during a pollution episode.
More detailed information on air quality assessment from the questionnaires can be found in appendix 6.

3.2 Results workshop

As stated in paragraph 2.2 the workshop was divided into working groups. Therefore the Member States could not join all the discussions. Therefore in the summery of the outcome of the workshop not all the members have contributed to each issue.

Permitting

It depends on the Member State who drafts the permits and who enforces the permit. In most Member States this is done by different organizations and if not at least by different people within an organization. , In Germany and Slovak Republic however the same person that drafts the permit enforces the permit. Their reason for working like this is the idea that the person then has a lot of knowledge on the industry and that this can be beneficial.

In the Czech Republic permitting and enforcement is regulated at a different level. The regional authorities grant the permits and the national inspectorate does the enforcement. In Germany the level on which permitting and enforcement take place depend on the Bundes Länder. In some Bundes Länder it is regulated at the municipality level, in others at a higher level. In Lithuania the permitting and enforcement are regulated at a national level but different departments are concerned. A downside is that often the knowledge of the people concerned on industrial processes etc is limited.

In most Member States there is no direct link between emissions and immissions (for instance in Germany, the Netherlands and Czech Republic). In Lithuania however there is a direct link and permits can be refused when air quality limit values are exceeded if no extra measures are taken. The Netherlands and Germany both work with a system that an emission is significant if it contributes 3% (1,2 µg/m³) of the limit value or more. When an immission is significant an air quality study must be conducted in greater detail. As the emissions of industry are mostly from high stacks an immission of more than 3% is highly unlikely. This threshold of 3% does not count for nitrogen deposition with respect to specially protected areas (Natura2000 habitat).

In all the countries an IPPC permit last for ever. However the following rule applies: If there are significant changes in emissions or in legislation than industries have a certain time period to make sure that their installations comply with new legislation (BAT proof system). In both cases they need a new revision

permit. In some Member States the industries can ask for an extension period once. Furthermore for new installations the requirements are stricter than for the older installations.
The escape in the IPPC directive with respect to fixed limit values (changing the limit values due to economy or other reasons) caused some discussion. The 'corridor' in Brefs is to wide, this is not good for a level playing field. Germany wants these limit values fixed for new installation and for the old installations a certain time period to comply. Lithuania and the Slovak Republic do not foresee any problems with new installations but foresee problems with the old installations, they will need a lot of time to renew them. Probably certain installations will have to be shut down.

In the Czech Republic industries can, ones BAT is used, try to compensate for their emission contributions to the ambient air quality by reducing the contribution of other sources with similar emissions (internally of externally)

When government does not have enough power to withstand the pressure coming from the industry, public awareness and NGO's can be used to pressure the companies. Public can be informed by for instance with name&shame or by making the emissions (and other information) available to the public by putting the data online.

Inspection and enforcement

The level on which inspection and enforcement is carried out depends on the size of the installation/factory. In general there are two levels: the national EPA and the regional EPA. For Cyprus there is only one governmental level and in the Czech Republic there are also regional inspectorates, directed by MoE. For inspection it is important to have enough field knowledge.

In all countries the IPPC plants and other larger plants monitor the emission themselves. This does not apply to smaller companies. The frequency of self monitoring (on stacks) differs per country. In Cyprus, Portugal, Czech Republic and Romania the frequency is twice a year, in Italy it is ones a year.

When limit values are exceeded the governments can take the industry to court. Generally companies will have to pay a sanction. When serious problems occur or when no measures are taken by the industry in extreme cases the permit will be revoked
In cases of exceedances or not compliance with the permit fines can be given. In the workshop this lead to the discussion whether this should be an administrative fine for offence or a criminal fine for hinder. No preference was given to one of the options. In many cases however national laws don't allow to give criminal fines for hinder.

Working group on measures

The r*esponsibility* for the implementation of measures lies with the industries. Regional or national authorities check if measures are implemented. In general the effectiveness of measures aren't monitored by the authorities. This makes it in some cases difficult to enforce certain measures. When non compliance with the implementation of measures is observed (e.g. not taking of badly taking measures) the authorities can penalise the company. This relates especially to periods of pollution spells.

In cases of *exceedances,* a short term measures could be to *reduce production* for some specific companies (this is for example the case in Rijnmond in the Netherlands and Czech Republic) especially in relation to NO_x, SO_2, PM_{10} (the latter specifically in Czech Republic). All measures implemented during these episodes have to be described in the action plans or in the permit to be legal, and this measure cannot be taken more than a few days per year.

For all countries except The Netherlands EU funds can be used to support companies to takes measures. In The Netherlands the EU funds can only be used for consultant companies (e.g. for making assessment of measures of the companies).

The kind of 'measures' that can or will be taken divers per country. In Cyprus and Lithuania for example a measure could be moving the people away from the industry so that there won't be any complaints about the company. In Lithuania the company which is responsible for the hinder has to pay for moving the neighbouring people. In the Netherlands this kind of measure is out of the question.
Another 'measure' for dealing with complaints from the public is giving free electricity to the hindered people (Lithuania) or for instance giving free access to the waste landfill.
In the Czech Republic they still have open coal mines. Because there is still enough space surrounding these mines a buffer zone around the mines can been seen as an air quality measure (no citizens living nearby so no complaints).

The DCMR in The Netherlands has got a lot of experience with a real time air quality system. This system is used to inform the public, the public can then use this data to exert a kind of pressure on the company and so the company is willing to take measures sooner.

Working group Assessment
All the Member States have air quality networks that can be accessed by the public. Besides these networks there often are industrial stations as well. Unfortunately not all data is used efficiently or effectively. Normally the private measuring stations are at locations were the highest concentrations are expected. For the interest of the public these should be there were the people live as well.

All countries use models for calculating the air quality. These models are either national of regional models. In most cases models are used in the permitting process to demonstrate that the factory is in compliance with the air quality limit values, or that limit values aren't exceeded even when including the industrial emissions. The models are generally not used for short term forecasting (24-48-72 hours). Having a system with which it is possible to predict the short term air quality was found te be interesting by the Member States. Besides advantages it has also drawbacks. Air quality measuring stations related to industrial areas aren't designed and used to forecast the air quality.

In all Member States the air quality network monitors the air quality in the vicinity of industrial sources (industrial stations) near busy roads (road stations) but also at urban background and at rural stations.

3.3 Discussion

Most Member States don't forecast the air quality for the days ahead. Hower the idea of doing so was regarded as interesting. Forecasting the short term air quality has as advantage that pollution spell can be foreseen and measures can be taken in advance. One of the measures that can be taken is shutting down the factories during the periods of exceedance of the air quality limit values. For a short term (several days) and only once or twice a year shutting down seems acceptable. But when this measure is used frequently it will be questionable whether this measure is legally possible. Most likely the industry won't accept it anymore.

An issue that is related to pollution spells is that in most cases it is not possible to relate the air quality to a single operator. Therefore it is hard to improve the air quality by acting on a single source. To improve the air quality one should act on emissions in permits than on air quality it self. The authorities can't legally ask for more then BAT. In order to reduce the emissions more than with BAT is required and improve the air

quality it is important to get the industry involved voluntarily. This can be achieved by starting the discussions with the industry in an early stage. It helps to get the industry involved in non-permitting ways in actions plans etc. In some cases the measures to reduce air pollution also can make it easier to compete with other industries or saves energy. This will motivate the industry to take these kind of measures. When the industry isn't willing to cooperate voluntarily pressure form the NGO's and the public can help to mobilise the industry. Data from nearby air quality measuring stations or short term forecast can be helpful in these discussions.
There isn't one way of getting the industry cooperate voluntarily, each Member State has his own approach.

As discussed above it is hard to require more than BAT. But when a company wants to expands its process in an area where the air quality limit values are already exceeded measures should be taken to improve the air quality. One of the options, besides BAT, is to localise other important sources of air pollution (like traffic and shipping) and try to reduce the contribution of these sources to the air pollution. This might give the industries extra opportunities to expand.

4 CONCLUSIONS

The overall conclusions of the questionnaire and workshop are:

- All Member States have fully implemented the EU directives.
- Industries need to comply with BAT and have to monitor themselves in all Member States The industries may choose an accredited laboratory.
- Most Member States don't have specific permits for ambient air quality. In order to improve the air quality it is better to focus on the emission of pollutants than on the air quality itself.
- When the authorities would like to improve the air quality and therefore the industry has to do better than BAT it is important to get the industry involved voluntarily because the authorities can't asked for more than BAT. To get the industry involved voluntarily the discussions with the industry (and public) should start in an early stage.
- Air Quality is measured in all Member States. However the automated systems are different in each country.
- The measurements are used for enforcement. But not all Member States make optimal use of the measurement data.
- Air quality modelling is hardly used to forecast the short term ambient air quality.

Table 1 Overview findings phase 1 PIAQ (questionnaire and workshop).

Country	Impel-contact	Responsible Authority	EU Directives Implemented	Stricter National Regulations	IPPC Regulation Implementation	Non-IPPC Regulation Implementation	Industrial Self Regulation	Industrial Ambient Monitoring	Government Ambient Monitoring	Ambient Air Quality in Permits	Best Available Technology (BAT)	Best Available Technology (BAT+)	Air Quality Modelling
Cyprus	Stelios Georghiades	Air Quality Section, Department of Labour Inspection	Yes	No	National Level	National Level	Yes	Yes	Yes	If Required	N/A	N/A	Yes
Czech Republic	Lenka Nemcova	Czech Environmental Inspectorate	Yes	Yes	Regional Level	Municipal Level	Yes	Yes	Yes	N/A	Mid Range	N/A	No
Germany	Kristina Rabe	Federal Ministry of the Environment, Nature conservation and nuclear safety. National IMPEL coordinator	Yes	No	Regional Level	Municipal Level	Yes	Yes	Yes	No	N/A	N/A	No
Italy	Guido Lanzani	ARPA della Lombardia	Yes	Yes	Provincial Level	Municipal Level	Yes	Yes	Yes	No	Improved	N/A	Yes
Lithuania	Audrius Želvys	Ministry for Environment. National IMPEL co-ordinator	Yes	Yes	Regional Level	Municipal Level	Yes	Yes	Yes	Yes	Upper	N/A	Yes
Netherlands - DCMR	Koen de Kruif	DCMR Environmental Protection Agency	Yes	No	Provincial Level	Municipal Level	Yes	Yes	Yes	No	Upper	N/A	Yes
Netherlands - VROM	Jan Teekens	Ministry of Housing, Spatial Planning and the Environment	Yes	No	Provincial Level	Municipal Level	Yes	Yes	Yes	Yes	Upper	Considered	Yes
Norway	Mr Erik Forberg	Norwegian Pollution Control Authority	Yes	No	National Level	Regional Level	Yes	Yes	Yes	Yes	Improved	N/A	Yes
Portugal	Isabel Santana	Ministry of environment and territorial planning. National IMPEL coordinator	Yes	No	Regional Level	Municipal Level	Yes	Yes	Yes	N/A	Upper	N/A	Yes
Romania	Michaela Beu	National Environmental Guard, general Commissariat Bucharest / Pollution Control Department. National IMPEL co-ordinator	Yes	No	National Level	National Level	Yes	Yes	Yes	No	Upper	Upper	Yes
Slovak Republic	Mr Daniel Geisbacher	Slovak Inspection of the Environment	Yes	No	National Level	District Level	Yes	Yes	Yes	No	N/A	N/A	Yes

Issues that should be further discussed are:

- To what extent is short term air quality forecasting interesting? And how is this related to taking measures during pollution spells (shutting down industries, how many times a year etc.)?
- To what extend is it possible to shut down industries in order to achieve ambient air qualities that meet the air quality limit values.
- What is the best way to penalize companies when they exceed the emission levels stated in the permits. Is this with an administrative fine for offence or a criminal fine for hinder.
- Can a permit be allowed even thou the emission ceilings are reached?
- Can NO_x-emission market be a solution or not?
- The escape in the IPPC directive with respect to fixed limit values (changing the limit values due to economy or other reasons)

5 COLOPHON

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APPENDIX 1 IMPEL members of interest

Country	Impel-contact	Name/organisation (Air Quality Dir/MoE)
Interested parties		
Spain	Carmen Canales	Ministero de Medio Ambiente. National IMPEL coordinator
Poland	Hanna Jasstrzebska	Chief Inspectorate for the Environment. National IMPEL coordinator
Cyprus	Stelios Georghiades	Savvas Kleanthous / Head of Air Quality Section, Department of Labour Inspection /
Turkey	Kemal Unsal	Ministry of Environment and Forestry. General Directorate of Environmental Management. National IMPEL coordinator
Bulgaria	Kalin Iliev	Ivan Angelov / Head directorate for Air Quality, Ministry of Environment and Water
Romania	Michaela Beu	National Environmental Guard, general Commissariat Bucharest / Pollution Control Department. National IMPEL co-ordinator
Finland	Markku Hetamaki	Ministryof the Environment, National IMPEL coordinator
Portugal	Isabel Santana	Ministry of environment and territorial planning. National IMPEL coordinator
Belgium/Flanders	Jean Pierre Janssens	Brussels Institute for Environmental Management Division of Inspection and Surveillance
Possible interested parties		
UK	Will Fawcett	Environment Agency. National IMPEL co-ordinator
Germany	Kristina Rabe	Federal Ministry of the Environment, Nature conservation and nuclear safety. National IMPEL coordinator
Greece	Epaminondas Toleris	Air Quality Department/Directorate for the Control of Air Pollution and Noise/Ministry for the Environment, Energy and Climate Change
DK	Ulla Ringbæk	Katja Asmussen, Ministry for Environment (Danish EPA)
Lithuania	Audrius Želvys	Audrius Želvys / Ministry for Environment. National IMPEL co-ordinator
Organizers		
Czech Republic	Lenka Nemcova	Czech Environmental Inspectorate
Italy	Guido Lanzani	ARPA della Lombardia
Netherlands	Koen de Kruif	DCMR Environmental Protection Agency

APPENDIX 2 Questionnaire

IMPEL - PIAQ-project 2010-2011

To: **IMPEL National Contact Members**
Date: 22 April 2010
Conc.: Questionnaire on implementation of Air Quality Directives

European Union Network for the Implementation and Enforcement of Environmental Law

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This questionnaire gives an overview as to the implementation of legislation on industrial activities in relation to meeting the EU Air Quality Directives by the city / region / country of ……..

Background
In general it is very difficult to relate the emissions of one single installation or site to the ambient air quality. Local air quality is often under pressure in areas with concentrations of emissions due to large industry. This brings up the question whether an additional company in such areas will have an additional significant effect on the local air quality, or on the national emission ceilings, as well as which permitting, control or enforcement strategies would lead to the best air quality.

Objective
This questionnaire's intent is to identify best practices in permitting and enforcement and its effects on emissions by the main sectors of industry within a city/region or country. It will also be useful to gain knowledge into how permitting and enforcement is practised in the different regions, what differences are there in implementation and culture.

Attached to this explanation you will find the questionnaire concerning the implementation of the Air Quality Directive. The questionnaire follows the Directive's structure and is extended with some questions about permitting and enforcement. The final section of this questionnaire includes a Benchmark scenario, to assist in the development of best practices and will be used extensively in the forthcoming workshops. We hope you are willing to cooperate with our study and fill in this questionnaire.

If you have any questions about this study or with respect to the content of the questionnaire, please contact one of the persons below.

Yours sincerely,

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Contact person

Name:	
Function:	
Employer:	
Telephone number:	
E-mail address:	

1. General facts:

1.1 Please give an overview of your city / region and of the main industries represented

(in picture or table format preferably)

1.2 What would you identify as your main air quality problems? Please give an overview of the ambient air quality levels within your city / region.

(in picture or table format preferably)

1.3 What would you identify as the main sources of emissions within your city / region? (not only industrial sources)

(in picture or table format preferably)

2. Responsibilities:

Emissions of pollutants can be regulated by national regulations other than regulations that come from the Air Quality Directive 2008/50/EC.

2.1 How and at what level are the European *air quality* directives implemented into your national regulation?

(National, Regional, Permitting, etc)

2.2 Are the limit values from the EU Air Quality directive the only objective targets set in you city/region/country, or are there more ambitious targets? If so, by whom are these set?

2.3 How are the emissions from industry regulated in your city/region/country? Please give short remarks by commenting on the following points, if applicable:

- *role of EU-directives (LCP-D, WI-D, EU VOC , IPPC-D)*
- *role of the BREF documents (is the upper or lower limit used)*
- *national emission ceilings (site or regional level)*
- *national regulations*
- *relation between regulations and permits*
- *possibilities and experiences in applying BAT+ (go further than BAT)*
- *local considerations*

2.4 Member States have designated various tasks to authorities and local bodies with regard to implementation and enforcement of industrial emissions. Please indicate which organizations are responsible for the tasks mentioned.

Task	Local (Regional/Provincial) organization / Local authority	National organization / National authority	Remarks
Implementation			
Controls \ Permitting - IPPC sites - Non-IPPC sites			
Enforcement			

3. Permitting and enforcement of air quality emissions

3.1 Do industries within your city/region/country control themselves with regard to compliance of permit requirements?

If so how? (measuring, modelling, continuous, occasionally)

3.2 If so to whom do they report?

3.3 What is provided in their reporting standards?

(tons/year, concentrations of emissions, etc.)

3.4 Are Automatic measuring systems prescribed?

3.5 If so, when are these prescribed?

3.6 What are the consequences when the permitted emission levels are exceeded?

penal / administrative sanctions?
is the permit revoked?
in which cases?

3.7 In what way do authorities support industry to take measures? Are these measures legally enforced and/or policy driven? Please provide examples of such?

measures (e.g. Voluntary +BAT)

3.8 Can the industry make use of subsidies, national funds for *implementation* of BAT?

3.9 Who is responsible for the implementation of these measures?

3.10 Is the introduction of these measures incorporated in local /national policies?

3.11 Are there special permit prescriptions, have industries special conditions for cases of high ambient air pollution during unfavourable meteorological conditions, if so please provide details?

3.12 What are the consequences when /if air quality limit values are exceeded?

(is some kind of production reduction required)

3.13 In which way are ambient air quality levels being monitored and by whom?

4. Ambient Air Quality Assessments

According to the Directive, Member States shall maintain the levels of those pollutants below the limit values and shall endeavour to preserve the best ambient air quality, compatible with sustainable development

4.1 Are ambient air quality levels being preserved through permits?

If differing methods exist between IPPC and non-IPPC industries, please provide details.

4.2 How is it determined if there is an exceedance of limit values?

4.3 To what extent are the agreed emission levels of the industry being monitored and enforced?

4.4 Are there air quality monitoring stations related to industrial activities and if so, who owns and maintains these stations?

4.5 If air quality monitoring stations are related to industrial activities, to what extent are the measurements of industrial air quality network used for assessing the ambient air quality?

4.6 How / for what is the output data of the (industrial) air quality modelling or data from the air quality monitoring stations used?

4.7 Is there a forecast alert system present based on modelling of industrial emissions?

4.8 Are there special air quality monitoring sites for cases with high ambient air pollution during unfavourable meteorological conditions?

5. Benchmarking

For the 9 typical industrial activities listed below, please give a representative example of 1 such activity in your region. Describe year of construction, process conditions, thermal input, feed streams, fuel type, load etc. as accurately as possible so that it is possible to characterise the installation and to make an indicative comparison between different Member States. The input will be used as part of the workshop discussions to be held in Prague in June.

Typical industrial Activities

1. *Power plant, GT + boiler, > 100 MW_{th}.*
2. *Power plant, coal fired, > 20 MW_{th}.*
3. *Municipal solid waste incineration plant*
4. *Cement kiln*
5. *Steelworks/ or: iron and steel installations*
6. *chemical installations (e.g. Crude oil refinery, production of organic substances, production of inorganic fertilizers, production of TiO_2)*
7. *glass production installations*
8. *wood processing installations (manufacturing OSB and MDF boards)*
9. *other types of plants with influence on air quality (ground emitting plants)*

For each representative example please address the following items:

- type of emissions for which emission limiting values (stricter or other than ELV's from the EU Directives) are set;
- emission limiting values (bubble approach, EL's for individual action, or both);
- monitoring requirements (frequency, quality assurance);
- emission reducing techniques applied;
- typical emissions based on measurements (concentrations with reference conditions);
- typical yearly mass emissions; and
- technical or organisational measures resulting in emission reduction and its effects.

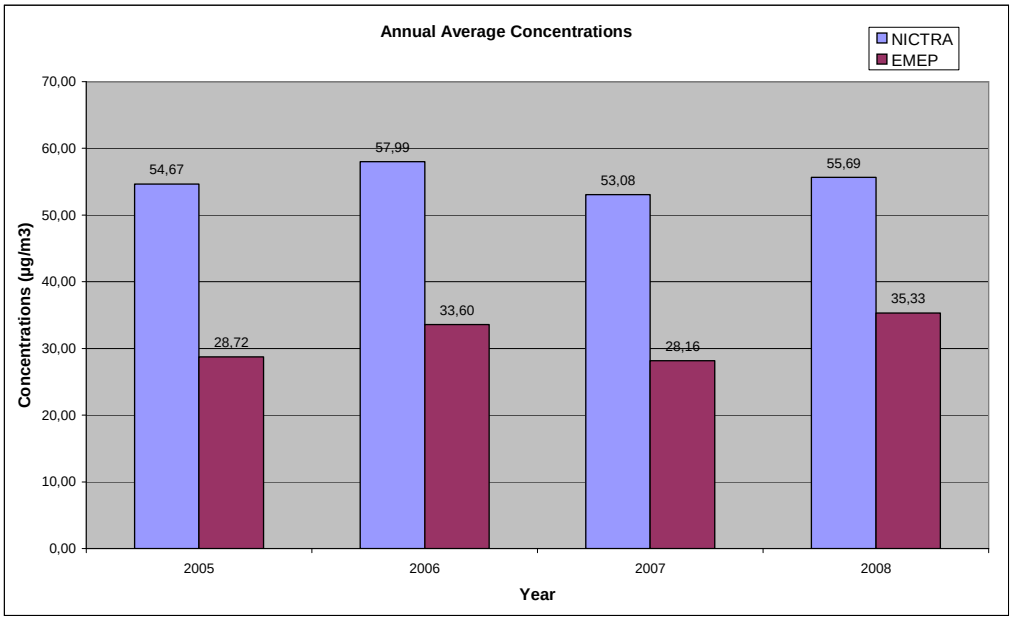
This section is of importance for the determination of best practice discussions during the forthcoming workshop. The more information provided in this section, the more informative and beneficial the workshops, and their outcomes.

APPENDIX 3 Results questionnaire on general facts and background Information

Cyprus

Largest concerns for Cyprus is PM_{10}, where there are exceedances not only of the annual limit value (40 $\mu g/m^3$) but also of the daily limit value (50 $\mu g/m^3$), especially in urban areas. These exceedances are caused mainly due to the PM_{10} emissions from natural sources (sea salt) and transboundary contribution (dust transport from the Sahara desert and other areas) but also due to the emissions from traffic, central heating and industrial installations. (see Figure below)

In the case of ozone, the exceedances of the 8-hour target value for 2010 (120 $\mu g/m^3$) that are measured mainly outside the cities, such as in Agia Marina village (EMEP station), are caused mainly due to the transboundary transport and the climatic conditions that exist in Cyprus and generally in the Mediterranean area (high temperatures and sunlight) favouring ozone formation.



Annual average PM_{10} concentrations in Cyprus at 2 stations.

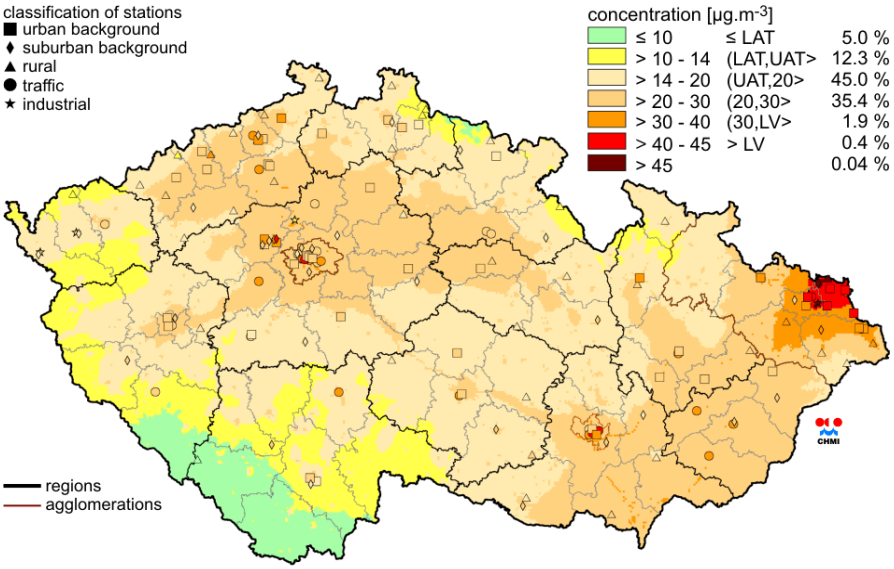
Czech Republic

Notable Industries present in The Czech Republic:

- Power Generation
- Extractive Industry (mining)
- Automotive and other Machinery Industry
- Chemical Industry
- Production of Steel and Iron
- Pulp and Paper Industry
- Glass Manufacturing Industry
- Agriculture

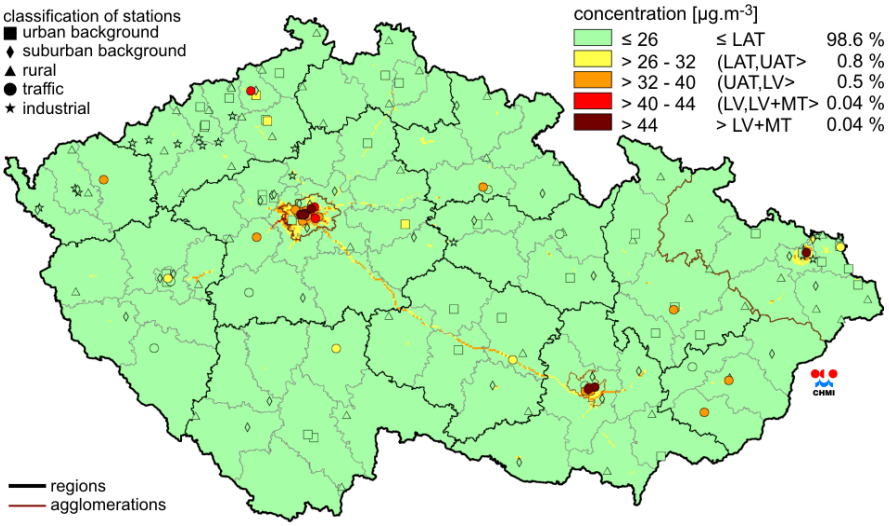
Concentrations of pollutants are strongly affected by meteorological conditions during the year.

PM_{10}



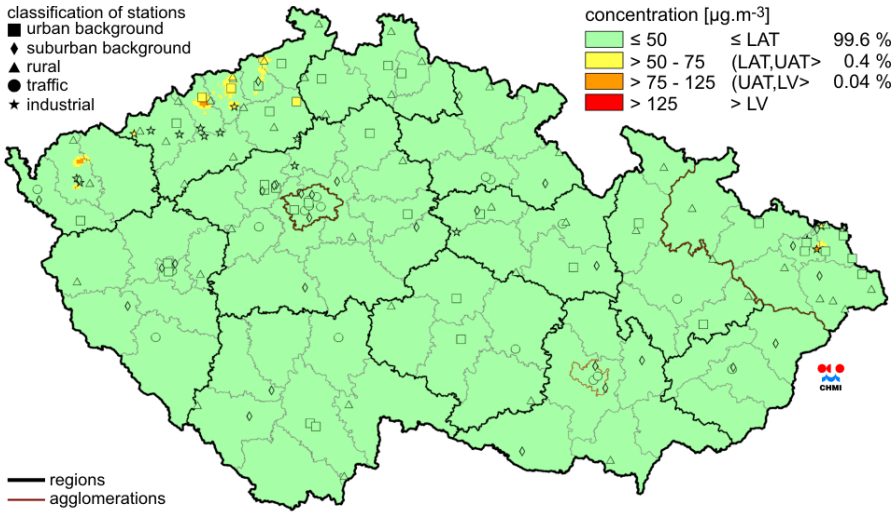
Field of annual average concentration of PM_{10} in 2008

NO_2:



Field of annual average concentration of NO_2 in 2008

SO_2:



Field of the 4th highest 24-hour concentration of SO_2 in 2008

Germany

The main environmental concerns are as a result of the following industries

- Traffic
- Agriculture
- Industrial activities

Italy

In Italy the following sources are identified as main sources of emissions:

- Traffic
- Domestic Fuel Use
- Agriculture
- Industry
- Energy Production
- Solvent production and use.

The main pollutants identified for Italy, and produced in the abovementioned sources are:

- Particulate Matter (PM_{10})
- Carbon Monoxide
- Oxides of Nitrogen
- Methane
- Ozone

With exceedances recorded for PM10 and Ozone.

Lithuania

Main air quality problem for Lithuania considered to be PM_{10} with daily limit values showing exceedances. Main reasons are winter sanding and heating. Ozone concentrations exceed long term objectives, but don't exceed target value.

For any pollutant no annual limit values were exceeded.

Netherlands – DCMR

Main Sources of pollution within the Rotterdam area are:

- Industry
- Road traffic
- Shipping

With the pollutants of concern being:

- Oxides of Nitrogen
- PM10

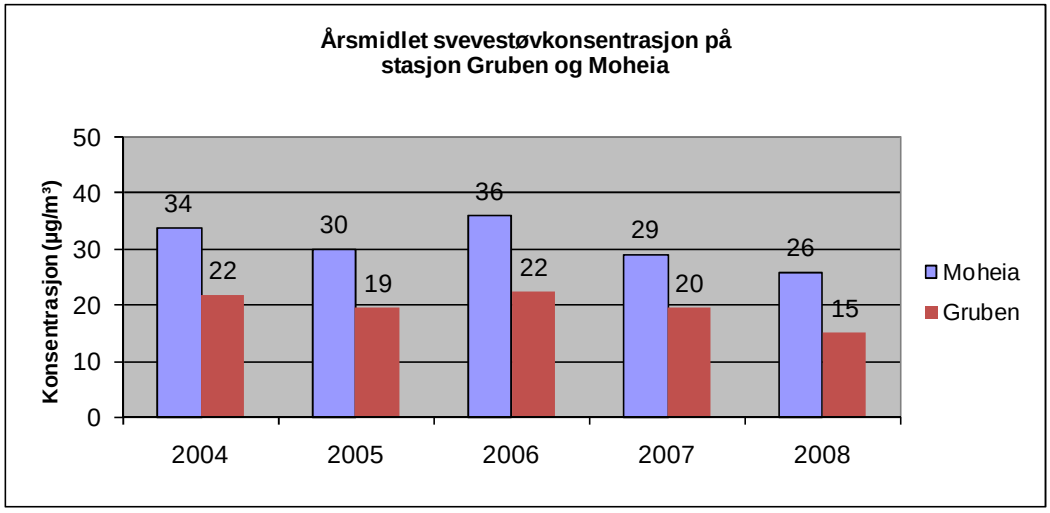
Netherlands – VROM

The standards are only still being exceeded in a highly localised fashion, alongside roads or close to businesses.

Figures from the National Institute for Public Health and the Environment (RIVM) (not shown here) have shown that concentrations of nitrogen dioxide (NO_2) and particulate matter (PM_{10}) are highest in the Randstad conurbation and lowest in the north-east of the country. The highest concentrations are measured alongside busy roads.

The VROM Inspectorate is mainly interested in NO_x , SO_2, PM_{10}, heavy metals, VOCs, NH_3 from industrial sources. Of course there also other sources in the Netherlands, mainly caused by the high population, traffic density and agriculture activities.

Norway



Example: Annual average of PM_{10} at two locations in Rana municipality

Portugal

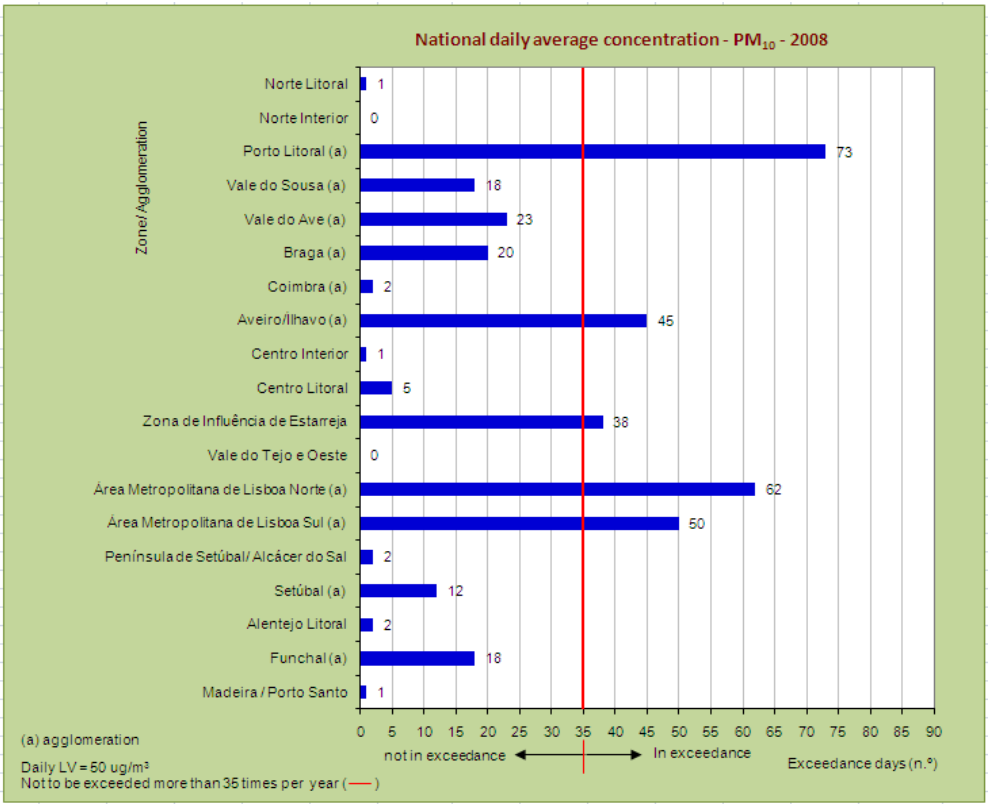
In Portugal the main industrial framework is characterized by small and medium enterprises, which are obligated to monitories its emissions periodically or continuous.

The main Portuguese industries (57), which have continuous monitoring of the pollutants, are:

Activity Sector	Number of plants
Agro-Industrial	1
Cal	2
Cement	8
Ceramic	11
Chemical	3
Cogeneration	6
Expanded clays	1
Glass	2
Hazardous waste incineration	2
Non-hazardous waste incineration	1
Power Stations	7
Pulp	6
Refinery	2
Synthetic fibers	1
Urban waste incineration	2
Wood fibers	1
Wood panels	1

In Portugal the main air quality problems are associated to pollutants PM_{10} and O_3.

There are some zones in Portugal where PM_{10}, still exceed limit values (daily basis) although showing a tendency to decrease whether considering the annual average concentration. This fact is reinforced by legislative requirements, since the margins of tolerance of these limit values have gradually reached its end (for PM_{10} in 2005). During the last 4 years the concentration of another important air pollutant, O_3 (ozone), has also decreased although information and alert thresholds for ozone continue being exceeded every year.



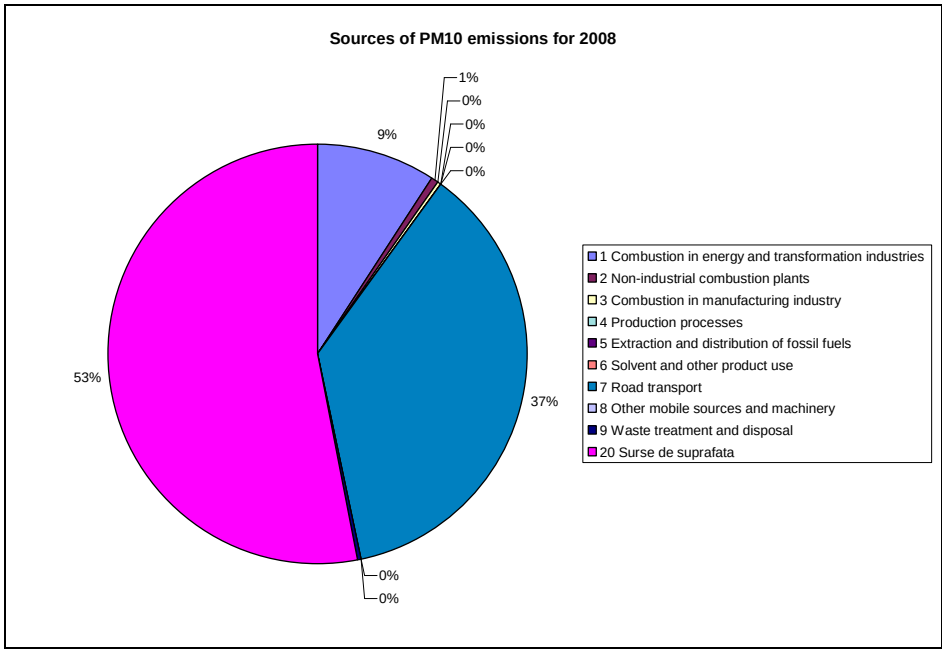
Based on the information provided, industrial activities are classified as the largest emitters within Portugal, with Traffic being classified as the second largest.

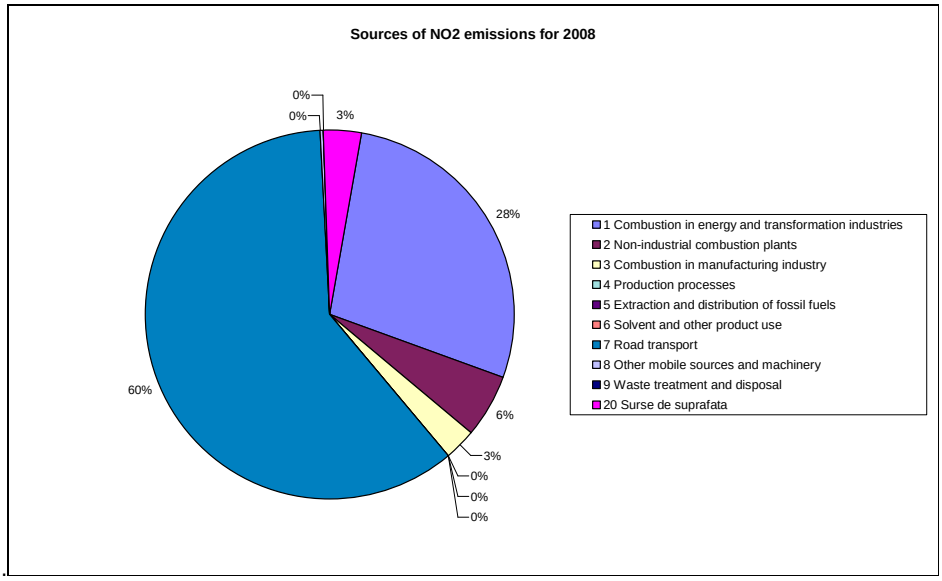
Romania

Main pollutants are

NO2 – Road Transport

PM10 – Surface Sources





Slovak Republic

Main air quality problems in Slovak Republic are particles PM_{10}, $PM_{2.5}$, PAHs (BaP), SO_2, NOx, O_3, benzene, heavy metals (Pb, As, Cd, Ni, Hg).

APPENDIX 4 Results questionnaire on legal responsibilities

Cyprus:

The Minister of Labour and Social Insurance issues Air Emission Permits to industrial installations. The permit specifies operating conditions and emission limits based on EU Directives as transposed into the Cyprus Legislation. Where applicable, emission limits are based on BREF documents.

Every effort is made to limit the total emissions within the national emission ceilings. Cyprus has not exceeded the National Emission Ceilings as specified in the NEC Directive so there was no need to take additional measures.

National regulations provide for several measures to enforce permit conditions such as Warning Notices, Prohibition Notices and Prosecution in cases of non-compliance.

Due to the local conditions (dry climate) emphasis is given on elimination of dust emissions from sources such as quarries and also on effects on local environment from emissions from small installations (such as VOCs from car and furniture painting).

Small capacity installations, as well as installations with simple processes that can be grouped together, for which there are no EU Directives, are considered under the Cyprus Legislation as “non licensable installations”. These installations include boilers with thermal input less than 50 MW, asphalt plants, concrete ready mix plants and installations with physical processes like quarries and so on. For the “non licensable installations” no permit is issued and the referred plant is controlled by the Control of Atmospheric Pollution (Non Licensable Installations) Regulations of 2004 and 2008. Operating conditions and emission limits are specified in these Regulations.

Due to the small size of the country everything is done at the National level. The Department of Labour Inspection of the Ministry of Labour and Social Insurance is responsible for the implementation, control/permitting of both IPPC and non-IPPC installations as well as enforcement of the environmental regulations for air emissions from industrial plants for the whole of Cyprus.

Czech Republic

Air quality directives are implemented into national legislation by Air Quality Act No. 86/2002 Coll. and its implementation regulations. Above mentioned legislation cover all limit values, target values, long term objectives, emission ceilings, emission limits, conditions for operation of sources, responsibilities of authorities (ministry, regional, local authority). Air Quality Act content appropriate tools (financial, conceptions) as well.

The responsibility in the area air protection is in the Czech Republic divided on the sectoral and regional basis. Ministry of Environment is the central state authority, responsible for state strategies in combating air pollution, providing guidelines for other bodies (municipal and regional authorities) and issuing authorisation for persons providing measurements of air pollution and expertises. Ministry of Environment is also an appeal body for revisions of permits for operation of stationary sources, issued by regional authorities.

The Czech Environmental Inspection is merely the control organ for stationary sources of air pollution that controls observance of the rules and imposes fines in cases of their violation. Inspection has also competence of imposing factual remedial measures in case of breach of the rules.

The regional authorities issue permits for operation of stationary sources and issue Regional Air Quality Plans.

The municipal bodies have responsibility for stationary sources, categorised as small sources of air pollution and imposes fines in cases of their violation.

The national authorities have set information and alert thresholds for PM10 (information threshold: 100 µg.m-3, alert threshold: 150 100 µg.m-3) for the situations with bad meteorological conditions. The thresholds are valid for all territory of the Czech Republic. Regional and local authorities have adopted short-term action plans for cases with exceedances of alert thresholds and deliver the information of exceedances. The action plans cover measures for the improvement of the air quality within the period with exceedance of alert thresholds.

Task	Local (Regional/Provincial) organization / Local authority	National organization / National authority
Implementation		Ministry of Environment
Controls \ Permitting - IPPC sites - Non-IPPC sites	Regional authority (permitting function)	Czech Environmental Inspection (control function) Ministry of Environment (permitting function for specific installations)
Enforcement		Czech Environmental Inspection (impose sanctions and remedial measures) National courts (execution)

Germany

The BREF documents have to be considered additionally to the given emission limits laid down in the different ordinances of the legislation and the Technical Instruction Air (TA Luft). Generally for the reason of prevention there is no space for local considerations.

Task	Local (Regional/Provincial) organization / Local authority	National organization / National authority	Remarks
Implementation		Federal Parliament and Federal Assembly of the Länder	
Controls \ Permitting - IPPC sites - Non-IPPC sites	Authorities of the Länder on regional level; for non IPPC-sites in some Länder Municipalities		
Enforcement	Authorities of the Länder on regional level; for non IPPC-sites in some Länder Municipalities		

Italy

In Italy we have not fixed NEC ceilings: since 2006 they have issued issued guidelines besides to other two laws (issued in 2005) which have been taken in WI-D and IPPC-D.

Regional laws can fix:

- ELV stricter than ELV's from EU directives

- Some procedures in relation to permit without modifying the national law of reference.

In Italy permits are obtained in relation to:

- Type of activity
- Amount of raw material or product

On the base of these two factors an industry obtains a permit which is referred to a national regulation

Lithuania

National law for about 360 pollutants has national limit values for 0,5 hour and/or average of 24 hour period was set on 2007 by both Ministry of Environment of the Republic of Lithuania and Ministry of Health of the Republic of Lithuania. The Ministry of the Environment provides a maximum emission level of stationary pollution sources, emissions from the whole territory of country and each district. Ministry of the Environment develops, adopts and implements environmental programs to reduce air pollution as well as maintains levels of pollution standards and establishes procedures for issuing permits. Additional IPPC requirements are included in IPPC permits as condition for implementation of action plan to reach the requirements. The new IPPC unit in the Environmental Protection Agency started operating from 2003. The IPPC unit aims at providing with information on BAT.

National emissions reduction plan is adopted by the Ministry of environment, so far there are no problems in issuing the IPPC permits in accordance with NEC. The emission ceilings of the Gothenburg Protocol to the UN/ECE CLRTAP and the EU NEC Directive for 2010 Lithuania have already reached the required emission levels.

Task	Local (Regional/Provincial) organization / Local authority	National organization / National authority	Remarks
Implementation	The IPPC permit conditions coordinate the municipal authorities.	Regional environmental protection departments (which are subordinate to the Ministry of Environment (state authority)) shall issue IPPC permit, coordinate stationary sources of pollution inventory reports and Impact environmental air assessment reports.	Air pollution from industries (industrial emissions) regulated by: 1. IPPC permits set conditions; 2. Stationary pollution sources inventory reports; 3. Impact environmental air assessment reports.
Controls \ Permitting - IPPC sites - Non-IPPC sites	Municipal authorities do not control the air pollution sources.	Regional environmental protection departments control the Stationary sources of pollution, IPPC permit conditions execution.	

Netherlands – DCMR

Pollutant	**Regulations**	**Remarks**
PM_{10}	BEES-A/B (total dust)	Combustion plants
	BVA (total dust)	Waste incineration
	NeR (Dutch emission guidelines)	Process emissions

NO_2 , NO, SO_2	BEES-A/B, (BEMS)	Combustion plants
	BVA	Waste incineration
	NeR (Dutch emission guidelines)	Process emission (no combustion)
NOx	National emission trading system	combustion & process emission
Pb	NeR (Dutch emission guidelines)	Process emissions
	BVA	Waste incineration
Benzene	NeR (Dutch emission guidelines)	Process emissions
	Protocol for fugitive emissions	Leak detection and repair program
	Oplosmiddelenbesluit	VOC's in general
CO	no regulation or guideline. Permit.	

Under the influence of international NEC ceilings, BREF documents in which BAT is described and European directives (LCP-D, WI-D, EU VOC) the above mentioned Dutch regulations were adjusted in the past and/or will change in the future.

The NeR is a guideline in which emission levels and monitoring strategies are given. The emission standards in the NeR are meant to be used as the basis for performance specifications in environmental permits. It is possible to deviate from the NeR but this should be very well augmented in the permit.
In addition each permit which involves (at least NO_x and PM_{10}) emission to the air, the effects on air quality has to be investigated. When the air quality limit values are exceeded and the extra NO_2 or PM_{10} concentration is too large, measures has to be taken in order to improve the air quality.

Netherlands – VROM

The role of permitting authorities and the role of the VI, the following can be stated:

- The permitting authorities follow the information from BREFs and national standards/regulations.
- In the permits it is for provinces formally not possible to take into account the NEC-values (that is why VI will take care of this issue).
- Local considerations take a considerable attention of the permitting authority.
- If attention has to be paid to BAT+ it is in general the VI asking for this, due to the danger of not applying to NEC-values.
- BAT+ is difficult to achieve legally, because it conflicts with the level playing field ambition within Europe.

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Task	Local (Regional/Provincial) organization / Local authority	National organization / National authority
Implementation		VROM / VI
Controls \ Permitting - IPPC sites - Non-IPPC sites	Provinces and municipalities	
Enforcement	Provinces/municipalities	

Norway

Pollutant	Regulations	Remarks
PM(10)	Industries with a significant pollution risk are	Emission limits are often tailor

	regulated through individual permits (National environmental authority). All IPPC – industry are regulated by the national authority. Smaller industries are regulated through permits given by the regional authorities and are often in compliance with national generalized regulations and emissions limits.	made according to the industries technology and local conditions. This applies mostly to the highly polluting industries which are regulated by the national authority
NO(x)	"	"
Heavy metals	"	"

All relevant industry has updated permits according to the IPPC- directive. In the update the BREF-documents where frequently used in order to set emissions limits and to argue for what was considered to be BAT for the industry. The permits reflect that the authorities in several cases have gone way further than what was considered as BAT for the industry. This accounts especially for the municipals secondary steel plant as well as its ferrosilicon plant.

Stricter individual permits have been the main driving force in order to achieve air quality in compliance with the Pollution regulations.

Portugal

The National Emission Ceiling Program (PTEN) defines the national strategy for compliance with the national emission ceilings (NEC) for SO2, NOx, NMVOC and NH3 for 2010 as established by the NEC Directive.

PTEN was updated during 2006 and the current version replaced the version of May 2004. This update was necessary due to the on-going revision of the NEC Directive, and mainly due to the update of national projections for 2010 regarding economic growth, energy demand, waste management and agricultural activities. These updated activity rates were considered in the most recent version of the National Program for Climate Change (PNAC 2006). PTEN and PNAC use the same activity rates to the extent possible to ensure national coherence. Some methodological changes were also made.

It is foreseen that the NEC will be complied for SO2 (133 kt SO2 in 2010 i.e. 27 kt below the ceiling); NOx (242 kt NOx in 2010 i.e 8 kt below the ceiling), and NH3 (69 kt NH3 i.e. 21 kt below the ceiling). It is expected that in 2010 the VOC will be of 194 kt (it means 14 kt (8%), above the ceiling).

Task	Local (Regional/Provincial) organization / Local authority	National organization / National authority	Remarks
Implementation	Regional – CCDRs (Regional Development and Coordinating Commission)	APA - Portuguese Environmental Agency	
Controls \ Permitting - IPPC sites - Non-IPPC sites	Regional - CCDR	APA	APA is the competent authority for issuing permits in the mainland and Azores and Madeira Environmental Regional Authorities for the installations in each of those Autonomic Regions. APA also

			controls the operators' results of continuous self-monitoring of the atmospheric emissions. CCDR controls the operators' results of self-monitoring of atmospheric emissions (in case of non continuous monitoring)
Enforcement	CCDRs	IGAOT	

Romania

The EU Regulations were transposed or adopted into Romanian legislation, with the current permit being an integrated system, providing security, that were undertaken and preventive measures for environmental protection. VLE should be based on BAT, or if possible and experiences in applying BAT+ (go further than BAT): In determination BAT the permit will always start from the general aim, the high level of protection environment.

Task	Local (Regional/Provincial) organization / Local authority	National organization / National authority
Implementation	REPA/LEPA/NEG	NEPA/NEG
Controls \ Permitting - IPPC sites - Non-IPPC sites	Permitting IPPC sites –REPA Permitting non IPPC sites-LEPA Controls IPPC sites and non IPPC sites-NEG	National Authority Permitting-NEPA Controls-NEG
Enforcement	NEG	NEG

Slovak Republic

Task	Local (Regional/Provincial) organization / Local authority	National organization / National authority	Remarks
Implementation		Ministry of Environment (MoE), Slovak Inspectorate of The Environment (SIE)	
Controls \ Permitting - IPPC sites - Non-IPPC sites	Controls/ Permitting SIE / SIE SIE / District offices Small sources to 0,3MW SIE / community		
Enforcement	District offices, SIE	SIE	

APPENDIX 5 Results questionnaire on permitting and enforcement of air quality emissions

Cyprus:
The permits include conditions about the pollutants to be measured, the type of measurements (continuous or non-continuous), the frequency of the non-continuous measurements as well as conditions about the quality of the data (in general both continuous and non-continuous measurements should be based on CEN standards).

The detailed monitoring results are reported on an annual basis to the Department of Labour Inspection. In some cases, monthly reports are also submitted. Reports submitted by the operator are required to include the flue gas concentration (mg/Nm^3) of the measured pollutants in a format which makes it possible for the competent authority to check the compliance of the installation with permit conditions (emission limit values). They also contain information about the measurements such as the standard on which the measurements are based, explanation of the results and the justification regarding the exceedance of air emission limits, if any. These reports should also include the total hours of operation, remarks on compliance with permit conditions, measures taken to use energy efficiently at the installation, the total yearly emissions of certain pollutants (Kg/year) and other plant specific information (for example the power stations have to report the percentage of sulphur in the fuel).

Automatic measuring systems are prescribed according to the obligations under specific Directives as transposed to the Cyprus legislation. At the stage of permitting, conditions for the installation and calibration of these systems are specified in the permit.

In the event of non compliance, the competent authority warns the plant operator in writing about the exceedances and asks for measures to be taken to restore compliance. Also, the competent authority may issue an Improvement Notice with a specific deadline obliging the company to take measures to restore compliance. In case the company fails to take the necessary measures the Department of Labour Inspection can issue a Prohibition Notice obliging the operator to stop the operation of the process responsible for the exceedances within a certain timeframe until the necessary measures are taken to restore compliance. A Prohibition Notice may be issued directly in cases where there is a violation of the permit conditions which can cause serious damage to humans or the environment. The competent authority may also proceed to the Prosecution of the company for the exceedances. There is no provision for administrative fines. The court decides about the penalty in cases of prosecutions. In cases of non-compliance with air emission permits the competent authority informs the plant operator of the need to take appropriate measures. The kinds of measures needed to comply are decided by the plant operator. If in order to comply with the permit air emission limit values the operator has to install new pollution abatement systems these can be partly financed under special grant schemes controlled by the Ministry of Commerce, Industry and Tourism.

The operators are responsible for the implementation of the appropriate measures to meet the air emission limits. The Inspectors of the Department of Labour Inspection make sure through inspections that there is compliance with permit conditions.

Czech Republic

Industries are required to undertake measuring at regular intervals, depending on the emission source. Continual measuring is applied as well with results being sent to the Czech Environmental Inspectorate. The reporting protocol includes measurement, including concentrations, mass per hour, emissions per unit of production.

For additional mitigation measures financial support from European Funds - Operational programme Environment (PO2, PO5), Operational Programme Enterprise and Innovations up to the maximum of 10 mil. CZK

In the case of large combustion plants according to the Article 2. 10. of the LCPD Czech Republic has opted for the national emission reduction plan, which in environmentally and economically effective way helps the operators of the plants to reduce the emissions of pollutants. The emission ceilings for dust, SO_2 and NO_x for the ELCPs for the year 2008 were calculated according to the Commission Recommendation of 15 January 2003 C (2003). The short term action plans includes measures for reduction of pollution during unfavourable meteorological conditions. The short term action plans are processed by regional or local authorities and cover the list of important sources of pollution in the area. The sources have the obligation to prepare the list of short-term measures for the case of extremely polluted air. The sources have to realize the measures as soon as it receives the information of exceedance of apparent alert threshold. Czech Environmental Inspectorate can supervise implementation of the measures. With the ambient air pollution being monitored by Czech Hydrometeorological institute (CHMI). The data from monitoring stations of CHMI (and from some others subjects who operates their own monitoring stations, such as municipal monitoring, source keepers, etc.) are saved in the ISKO (Air quality Information System).

Germany

In regulations (Art. 26ff. FICA, e.g. 13th ordinance) and permits monitoring regimes are foreseen to monitor the emission levels. The emission measurements have to be performed by the operators of the installations themselves and they have to comply with quality standards. For the monitoring they have to engage an accredited and independent expert. They have to report to the competent authority regularly; in cases of emissions exceed they have to report immediately; in most cases online. Measurement reports generally give the flue gas concentrations (e.g. dust, CO, NO, NO_2, SO_2) in mg/m^3. The annual emission report states the emissions in t/a according to the 11th ordinance of the FICA.

Dependent from the compounds and the kind of installation, automatic measuring systems are prescribed by the competent authority. The competent authorities support and supervise the operators to take the necessary measures to bring the operation of the site in line with the requirements of the permit, however no additional funding is available for this Primary the companies carry out there own enforcement; with the competent authorities being responsible for the correct supervision.

Italy

Industries within The Lombardy Region are required to monitor emission levels, usually annually, as prescribed, and have to comply with quality standards. These reports are submitted to ARPA (EPA of Lombardy), according to the monitoring frequency in the permit. The reports generally have the flue concentration in order to check compliance and in some cases, additional monitoring is requested.

Depending on the size of the industry and the type of compounds used, automatic measuring systems are required. Should mitigation measures be required based on the outcomes of the monitoring programmes, they are responsible for installation and sole financing of the mitigation measures.

Currently the ARPA manages a total of 150 monitoring stations to monitor and assist in the data collection for an emissions inventory and dispersion modelling.

Lithuania

Emission measurements are carried out by the companies themselves, in accordance with the authorization and quality standards. Emission measurements must be carried out in an accredited laboratory. Companies report their emissions on a regular basis, which is prescribed in the permit. These monitoring frequencies are well checked by the authorities. It should be reported immediately if emissions exceed the limit value. Measurement reports generally give the flue gas concentrations (mg/m^3) in order to check compliance with permit prescriptions. The annual emission report states the emissions in tonnes/year. Automatic (continuous) measurement of sulfur dioxide (SO_2), nitrogen oxides ($NO_{x)}$ and particulates made (execute) in the stationary source of pollution with a thermal capacity of 100 MW or more. There is hardly any control on the ton/year emissions. Companies themselves report this in their yearly emission reports.

Netherlands – DCMR

In regulations and in permits issued to industry, monitoring regimes are prescribed to monitor the emission levels. The emission measurements have to be performed by the companies themselves and they have to comply with quality standards. One of the most important quality standards is that a company that performs emission measurements has to be *accredited/approved* and has to be independent. Companies report their emissions on a regular basis, which is prescribed in regulations and/or the permit to the DCMR. These monitoring frequencies are well checked by the authorities. It should be reported immediately if emissions exceed the limit value. Measurement reports generally give the flue gas concentrations (mg/m^3) in order to check compliance with permit prescriptions. The annual emission report states the emissions in tonnes/year. Dependent from the compounds that have to be measured, automatic measuring systems are prescribed. The Dutch emissions guidelines (NeR) prescribe for which compounds this has to be done.
Stack emissions mg/m^3 are checked by measuring if permitted emissions are exceeded the company will get a reprimand. There is hardly any control on the ton/year emissions. The companies themselves report this in their yearly environmental reports. In the case of unfavourable meteorological conditions the DCMR Incident and Control Room can issue a so-called warning code. Some companies are for instance obliged to reduce the loading speed of odourous products. Prescriptions in relation to NO_x or PM_{10} are not in any licences. DCMR EPA has its own ambient air quality monitoring network

Netherlands – VROM

When the permitted emission levels are exceeded, normally first a warning is given by the authority concerned. If the violation of the permitted values continues, then administrative sanctions will come into effect (in general in the form of fines to be paid).
In extreme situations even revoking the permit may take place.

Norway

The industries control themselves whether to check if they are in compliance with their permit. However, the industry is regularly controlled by the authorities itself. The industry has different ways to measure their emissions. The method and time period of the measurements varies with the technology installed, the

component in question and the amount of the emissions from the pollutant. The industries that are regulated by the national authorities report to the same authority. The ones regulated regionally, report regionally. The industry report according to their given emission limits. They also report other relevant emission which often is reported in kg /year. In the coming year, however, the industry also has to reflect and quantify the uncertainty of their measurements.

Production reduction has been required earlier. Now, specific instructions are given to the industry in order to exam what and who contributes to the exceeding of the limit value. The data acquired from these examinations will be used to implement measured where it is most effective.

Portugal

Most are occasional measuring (2 measures / year) but in some cases continuous monitoring is mandatory. In other cases (of low emissions proved by historical data) monitoring may be allowed to be made every 3 years. Periodic monitoring results are report to competent CCDR and plants with continuous monitoring report to APA. All IPPC sites report to APA. The information provided in the reports is different regarding the monitoring is done periodically or continuously. The data necessary for the periodically reports is set in the Decree-Law no. 78/2004 in its Annex II.

The data provided in the continuously report is define in the "Despacho" 79/95, 12-01-1996. Most commonly concentrations of emissions are provided. For some IPPC industries tons/tons product or others accordingly to the specific BREF are reported too.

In general the continuously monitoring (and automatic systems) is prescribed always if the mass flow of a pollutant is above the maximum thresholds define in Ministerial Order 80/2006, of January 23rd. There are others cases where continuously monitoring (and automatic systems) is also required, for instant:

- Installations, that uses petrol coke as fuel, are obliged to continuously monitories SO2;
- Installations under the scope of specific legislations (LCP, WID and SED) for different pollutants.

If the competent authorities (APA) found that a particular installations is breaching the emission level first asked the operator for a justification for these breach. If this breach is recurrent then APA communicates this situation to IGAOT. Usually the consequences are penal / administrative sanctions. At renovation time, permit can be revoked.

There are some incentives that industry can use for investment, not specific to BAT investments. They can access PRIME and QREN. Those are not specific to introducing BAT but can be used to make investments in those areas. The environmental permits are used as a way to enforce industry to take measures.

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There is enforcement on Environmental Permits, as industries are compelled to make all efforts to comply with all EU directives.

The Decree-Law 78/2004, article 39º stipulates that when air quality limits are exceeded, the IGAOT or the CCDR can impose the implementation of several measures (by the operator) in order to minimize or eliminate this situation. These measures can involve the suspension of the operation of the installation responsible, the closing of the all (or part) of the installations or arrest of the all (or part) of the equipment, by sealing.

Romania

Based on the national legislation of Romania, industrial companies are required to carry out monitoring on a regular basis. The frequency is depended on the industrial type, and production rates for the industry.

The reporting of this monitoring usually consists of the type of the pollutant, the quantity, concentrations of the pollutants, the flow, the temperature and other kind of process parameters. For incinerators, large combustion plants and sometime for some type of IPPC installations automatic monitoring systems are required. The air quality is continuous monitored by Local Environmental Protection Agencies. The industrial companies have also the conditions to monitor their emissions stipulated within their environmental permits.

Slovak Republic

Industries in our country control themselves with regard to compliance of permit requirements continuous or periodic monitoring measuring. They report to authorities in permits (Slovak Inspection of Environment (SIE) and District offices), which are prescribed. In annual emission report is provided amount of emissions released (tons/year) and measurement report is complying with emission limits (concentrations of emissions). Dependent from the compounds that have to be measured, automatic measuring systems are prescribed by authorities in permits (SIE, District offices).

If there are excesses measures must often be taken. Stack emissions (limit value) are checked by measuring if permitted emissions are exceeded, the company will get penalty and administrative sanctions – corrective action. Permit is not revoked. The options is in the law, but practically not used. It is possible to restrict or suspend the operation services.

APPENDIX 6 Results questionnaire on ambient air quality assessments

Cyprus:

When specifying permit conditions, ambient air quality levels are taken into consideration. An exceedance of a limit value is determined by the assessment of Air Quality in Cyprus, using mainly monitoring data as well as air quality simulation models, in places where measurements are not carried out. Where applicable, the owner or industry carries out self monitoring and reports the results to the competent authority. Also, enforcement is ensured through inspections and emission measurements by the inspectors of the Department of Labour Inspection. There are six air quality monitoring stations located in inhabitant areas close to the three power stations of the Electricity Authority of Cyprus (EAC). The stations, which belong to the EAC, are on-line connected with the DLI. In addition, in a village close to the biggest power station and a cement factory, a fully automatic air quality monitoring station, which belongs to the DLI, has been installed, since 2003. The measurements from the six air quality monitoring stations around the EAC power stations are used to assess fully the air quality in the inhabited areas close to the industrial areas as well as to assess the impact of the industrial emissions to the air quality. The output data from the air quality monitoring stations and modelling are used for the assessment of air quality around industrial areas and the impact of the industrial emissions to the human health as well as the vegetation and the environment in general. A nowcasting/forecasting alert system exists, which predicts the air quality not only near the industrial areas but also all over Cyprus. This model can also run scenario analysis, which can be used to develop the proper strategy and appropriate actions to maintain ambient air quality where it is good or otherwise to improve it. The high number of the monitoring stations (13 stations per 10.000 km^2), the proper siting criteria (spatial coverage, morphology) as well as the simultaneous measurement of different meteorological parameters (wind speed, wind direction, temperature, relative humidity, solar radiation, UVA, UVB), allows the air quality assessment also during unfavourable meteorological conditions.

Czech Republic

In last few years there are problems with achieving of ambient air quality levels although sources meeting their emission limit values. For that reason we will make new air quality act and its executive regulations. This should bring closer connections with ambient air duality and permitting of sources and also stricter emission limits and conditions for operating of sources. There are also differences between IPPC and non-IPPC sources. We can give to the IPPC source stricter conditions if ambient air quality is changed. In present it is not possible or it is possible in limited manner for non IPPC sources – regional authorities can change the conditions if the source is making some changes in technology or in type of fuel.

The emissions from LCPs are monitored according to the LCPD, emissions of plants with rated thermal from 5 up to 50 MW are monitored according the national legislation, please see Governmental Order No. 205/2009 Coll. as amended. The data from industrial monitoring stations are used with low importance for assessment of air quality on national level. For these purposes are used data from background stations. For local assessment of local air duality, the importance of industrial monitoring stations can be much higher.

No forecasting alert system is based on ambient air quality monitoring (monitoring of trend of concentrations) and meteorological conditions (monitoring and prediction) is available. However, have list of monitoring stations which data are used in cases with high ambient air pollution during unfavourable

meteorological conditions. The list is different for short term action plans on national level and regional/local level

Germany
Schleswig-Holstein maintains 19 fixed stations to monitor AQ; these stations are related to all emissions (traffic, agriculture, household, industrial activities).

Italy
Permits contribute to keep the air quality levels under control, though they alone don't allow the targets to be met, this requires specific Plans and Programmes. Currently a public and private air quality monitoring network is in place, and should any single station report and exceedance, this is accepted as a breach of permit. It is generally accepted that the bigger industrial plants will put air quality monitoring stations around there factories, and maintain them, with the ARPA managing the stations, as well as assessing all the data. In a few cases forecasting alert systems are used, however there is no system to predict concentrations during unfavourable meteorological conditions.

Lithuania
In the annual report of the national AQ monitoring system any exceedances on a monitoring station will be reported. Monitoring data from air quality measurement stations are complemented with modelling data in hot spots (i.e. territories of the biggest towns of the country). Diffusive sampling campaign across all territory of Lithuania is performed every five year period as well. Regional Environmental Protection Department have specialists who, at random, can visit companies to check on the continuous and periodical emission measurements and the emission registration systems. Also competent authorities have the possibility to perform emission measurements themselves. Some stations of national air monitoring network are related to industrial activities. The owner of those stations as well as of the rest of stations for national monitoring is Ministry of Environment (MoE). Environmental Protection Agency of MoE and Regional Environmental Protection Departments of MoE are directly responsible to maintain air quality measurement stations.

Netherlands – DCMR
In the annual report of the regional AQ monitoring system any exceedances on a monitoring station will be reported. On the basis of the measurements region-wide calculations are performed to calculate concentrations for the locations where no monitoring stations are. These calculations take into account the proximity of roads and/or industries and can thus also determine the places where exceedances have occurred in the past year. *Provincial* authorities have specialists who, at random, can visit companies to check on the continuous and periodical emission measurements and the emission registration systems. Also competent authorities have the possibility to perform emission measurements themselves. At the DCMR about 10-15 installations every year are checked by emission measurements performed by the DCMR. DCMR has monitoring stations within the industrial area, but these stations are not specifically employed to relate to industrial activities. For reporting to Brussels, For spatial planning, for permits . Data from the monitoring network is used to calibrate models.

Netherlands – VROM
In the Netherlands we have a network of 48 air quality monitoring stations, they belong the government. It's the so-called Landelijk Meetnet Luchtkwaliteit LML. The air quality is measured continuously. The

National Institute for Public Health and the Environment (RIVM) owns and operates the network. These measured air quality is not only related to industrial activities; the ambient air quality is measured. Together with calculation models the RIVM describes the air quality on national, regional en local level.

Only few companies have their own air quality monitoring stations. These measurements are often used by the companies to show the impact of their own industrial activity on the overall air quality.

Some local authorities have their own network of air monitoring stations in the neighbourhood of industrial activities. They need the information for permitting. The stations are owned and maintained by themselves.

Norway

Monthly and annual reporting (as well as online monitoring) from the municipality includes all exceedances of the EU limit values. The industry itself is responsible for having a suitable monitoring program which is approved by the authority. If they are established according to the requirements in the AQD they are used for assessing AAQ.
For reporting to EFTA Surveillance Authority, AirBase, for permits, only in cities where road traffic and domestic wood burning are the main emission sources.

Portugal

After the process of annual data validation and control quality and assurance taken by APA, CCDR and DRA the statistics of the data from previous year are calculated and the specific parameters of LV exceedances determined once the accomplishment is verified in an annual bases looking at the measurement efficiency of the station. In accordance with national law, all the operators are obliged to monitoring the atmospheric emissions and send the reports to the competent authorities for analyze. In case of ELV breach the competent authorities (APA) communicates to IGAOT in order to this entities to act in accordance. The majority of these stations are owned by the large industries which have the responsibility to maintain them as stipulated under their permits. However some air quality stations of regional networks are classified as industrial stations so are maintain by CCDRs The stations belonging to private networks send the result to regional authorities for air quality assessment purposes. Regarding the air quality stations under CCDR management, its data are used for air quality assessment purposes and also to report under European legislation. The output data from air quality modelling (from industrial) in several studies (for instance Environmental Impact Assessment) is used for assessment and also to support the selection of the industrial locations and their air quality network, if applicable.

The data from the air quality monitoring stations are used under different purposes:

- to accomplish the legal requirements established by European AQ Legislation;
- to allow the establishment of the national air quality strategy and provide actions in case of higher levels of pollutants;
- to ensure, to the public and nongovernmental organisations, the access to of air quality data at local, regional and national level;
- to provide information as input into several kinds of models, which requires this type of information in order to contribute to the processes of validation (e.g. forecast models)

Romania

In the annual report of the Bucharest AQ monitoring system any exceedances of limit values of pollutants measured by each monitoring station will be reported to EC through NEPA. LEPA Bucharest (Local

Environmental Protection Agency) make each year the local emission inventory. Base on this the national authorities (Ministry of Environment and NEPA) can asses the air quality trough the modeling of the dispersion of emissions and the measurements. The emission limits and the monitoring plan are stipulated into the environmental permit. The competent authority (LEPA, NEG) have specialists to check periodical emissions, compliance with the monitoring plan and measurements. LEPA Bucharest has in total 8 monitoring station; 3 of them are related to the industrial activities. The companies monitor their own emissions periodically according to their environmental permits. Base on the provisions of the AQ Directives the measurements through the AQ Monitoring Network are use for assessing the ambient air quality. For establishing new actions plans for improving the air quality, for establishing conditions in the environmental permits, foe enforcing BAT , informing the public or reporting to EC or other authorities. Data from the monitoring network is use to calibrate models too.

Slovak Republic

In the annual report of the National Air Quality Monitoring Network (NAQMN) and Assessment Air Quality in Slovak Republic (AAQ) any excesses on a monitoring station will be reported. In AAQ are determining the places where excesses have occurred in the past year – declaration areas with air quality management. Industry have obligation or possibility (resulting from the license) to perform emission measurements themselves. State authorities (SIE or District offices) have specialist (own staff – inspectors or authorized accredited measuring groups) who, at random, can visit companies to check on the continuous and periodical emission measurements and the emission registration systems. Only one station NAQMN is in industrial area. Individual operators from industry have their own monitoring stations also maintain and provide the results for further processing. For reporting to Brussels, for permits, for spatial planning, for public information. Data from the monitoring network is used to calibrate models.