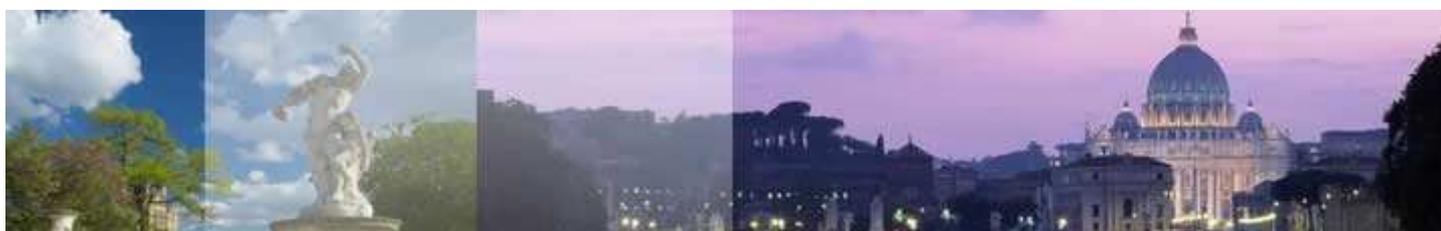




# Communicating air quality

A guidebook on communication with the public about air quality





## Component 3

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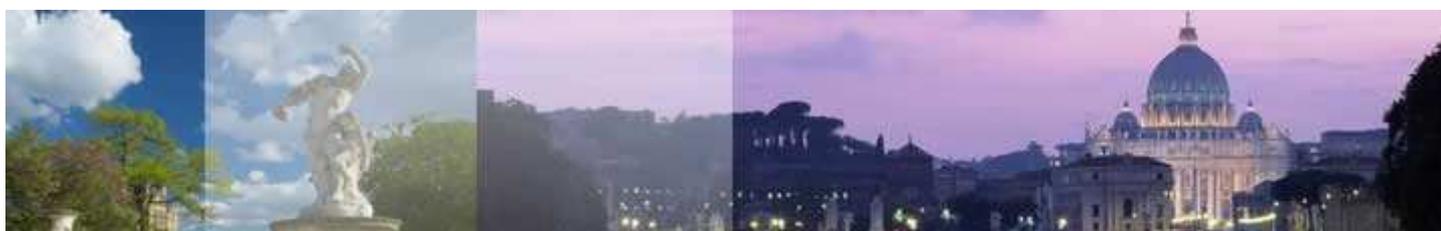
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# Foreword

This document is a result of the CITEAIR project (INTERREG IIIc contract 2W00251).<sup>1</sup>

The need for guidelines to public information on air quality became evident when five leading cities in Europe tried to compare the air quality information they presented to the public. Although the obligation of the respective air quality directives is generally fulfilled, there is room for improvement in a number of ways. Firstly, for technicians and politicians there is a need for a common format to present air quality information because it is currently very hard to compare the air quality situation in different cities (in different countries). Secondly, the air quality information is often being presented by the technical services responsible for collecting the data. Very often, it is not given much thought if the presented information corresponds with the public demand for information and whether the 'broadcasted' message arrives at the intended target groups. Lastly, a lot of public services and institutions are busy in this field so examples should be available. The CITEAIR participants hope that by making an inventory of what exists and what works in the field of communication with the public, a guidebook emerges that can help or inspire others.

The objectives for the CITEAIR project in Component 3 are/were:

- Collecting and developing formats and examples of public information on air quality
- Analysing existing technical air quality data and transforming this into accessible and interesting data for the public.
- The work will result in a communication guidebook (*this document*)
- A website will be developed where cities can present their air quality data in a common format that facilitates comparing cities (available at [www.airqualitynow.eu](http://www.airqualitynow.eu)), using a common index (described in "Comparing Urban Air Quality across Borders") that serves as a translation from technical details to an easily understandable figure.

This guidebook makes a difference between informing people and communicating with people. In the CITEAIR Component 2, a guidebook on reporting is being made ("City Annual Air Quality Reports"). This document focuses on communication. Chapter 2 of this document describes the context of this guidebook. Chapter 3 provides some communication theory and Chapter 4 provides examples of information on air quality. Many examples exist and the chapter highlights a few, more examples can be found in the annexes. Based on the work in this document and the document on the indices a concise conference paper was written for ISESS 2007. This paper is available as annex 11.

The annexes are available in a separate document (Communicating air quality – Annex). A website with examples that can be maintained is under consideration.

## Acknowledgements

Thanks are due to numerous people who have contributed bits and pieces or assisted with the editing. The review of a draft by Jean-Marie Rambaud, was greatly appreciated.

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<sup>1</sup> See annex 1 for more comprehensive information on CITEAIR.

# 1 Introduction

## 1.1 Communication and information

Why make a guidebook on air quality and communication? Communication on air quality resembles communication in general and this has been a booming science over the past decades. More specifically it resembles environmental communication. A nice concise example is the booklet "Communication on contaminated land" (NICOLE, 2004). An example of scientific literature on the communication of (environmental) risks is Gutteling and Wiegman (1996). We felt that it would be useful to compile a guidebook with both communication theory and a lot of practical air quality examples to give people who have to start communicating on air quality issues some guidance and a quick start.

Public information on the environment is of increasing importance. The public should be able to assess to what extent they are affected by air quality. On the one side, this is an obligation under the EU Framework Directive on ambient air quality and under the Aarhus Convention that was ratified by the EU in 2005; on the other hand, the public not only suffers from poor air quality, very often the public is also a source of pollution, especially when driving a car. In short, there is a need for 'customer-friendly', interesting and high quality information on air quality. In addition, organisations will need a more persuasive form of communication if they want to change the behaviour of the public!

The amount of information is ever increasing and the CITEAIR project is also contributing. Gutteling and Wiegman (1996) remark that:

*"Globally, each year the supply of information is estimated to increase by about 10% and the consumption by about 3%. Instead of this steadily growth of information, Van Cuilenburg (1991) argued that the public's knowledge hardly increases, due to the transfer of unguided information without specific informative goals, which has no bearing on the questions and needs of the public. One could say most information seems to answer questions nobody has asked."*

This word of caution does not mean that we should refrain from adding to the information that abounds but that we should think carefully about whom we want to reach, with what message and whether the message answers the questions, our audience might have.

## 1.2 Some definitions

Reporting, informing and communicating all deal with the production and dissemination of information. They are closely linked but different. The way they are used in this document is summarized below.

*Reporting:* Submitting a formal set of data and information to authorities (regional, national or European). Specifications and/or requirements on content (and lay-out) as well as the destination (target group) and the timing of the report are generally defined.

*Informing:* Making information and or data available to whoever is interested in them. Informing can be done in both passive (something is available on request) and active ways (copies are available in libraries, at the reception of an organization, on the internet). Informing tend to be a one way process. The value and credibility of information is based on its accuracy and its objectivity, related to the legitimacy and neutrality of the emitter.

*Communicating:* Information is actively used to inform people with the ambition to engage in a dialogue and/or to influence their knowledge, attitudes and even behaviour. It is a two way process.

A report can be used while informing the public. However, the well-defined content and target group might make it not very accessible to a wider public. Likewise actively informing the public can be part of a communication campaign but without additional efforts assuring a two-way flow of information true communication is not established. A document on reporting was made in CITEAIR Component 2. (Davison et al., 2006)

### **1.3 Working method**

This document is both a report of the work done and the results obtained. The basis of the work consists of a number of inventories: what is available (for example on the internet) in terms of communication examples, air quality indices (treated in a separate document: Elshout and Léger, 2006), etc. but also what is the state of affairs on public communication in the participating cities. The examples of communication that were found are being presented in this document, as this is one of the main objectives. Results of the review of the state of affairs have been included as it provides the basis for this work and justifies it. In addition, the results show the existing diversity and the way cities struggle with this issue.

This report is the work of many people and relies on information from many sources. Though references are occasionally given, no attempt has been made to be complete in accurately accounting for each and everyone's contribution.

The work relies on material that was known or close to the CITEAIR participants. This means that it depicts by no means a complete or scientifically representative situation of communication on air quality in Europe. Nevertheless, we felt that if it is based on the experiences of a number of major European cities, the insights and examples might be relevant to others.

Despite the fact that we will argue urban areas face similar air quality problems, it is obvious that there are differences. Not only are air quality problems different, the relative importance of air quality to other problems might also be different. When preparing the project the team aimed to cover the various cultural, policy and regional differences. If one talks about communication, raising awareness, etc. the latter is of particular importance. Some of the results in this document are derived from studies in the Netherlands. It should be noted that air quality problems in the Netherlands are relatively small and that episodes of poor air quality noticeable by the public are rare. Results from the Netherlands should be interpreted against this background.

## 2 Why inform or communicate?

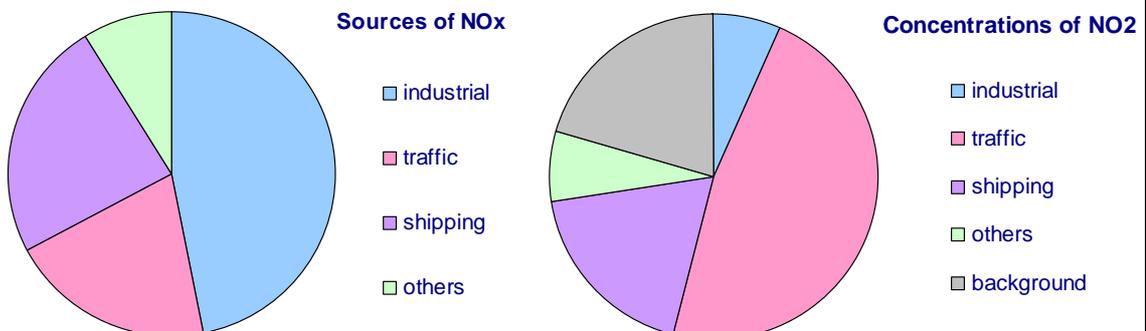
### 2.1 Introduction

There are three main reasons to inform the public on air quality issues:

- **Because one has to (do it):**  
Information is part of the EU air quality directives and of the Aarhus convention to which the EU is a signatory. In addition, in most national legislation there are provisions that (local) authorities have to inform or warn the public if certain air quality thresholds are exceeded.
- **Because the public asks for information:**  
People are increasingly concerned about their environment. Although air quality might not be the dominant aspect to base their choices upon, it might play a role in the decision where they live, to which school they send their children, what products they buy and whom they vote. In fact, because people might be looking for this kind of information, the “right to know” is laid down in legislation like the one mentioned above.
- **Because one wants to:**  
The public is not only a victim of poor air quality, particularly in urban areas the public is also a major source of pollution. Traffic related air pollution accounts typically for more than 50 percent of the NO<sub>2</sub> concentrations, even in cities with a considerable industry. See box 1.  
Communication really helps to create awareness, so eventually it can help influence peoples (travel) behaviour and change peoples attitudes. If this is the ambition, communication efforts will have to be elaborate and effective. Therefore, the information we *have to* supply is the bottom line, the least one can do. Many of the formal reporting requirements will be covered in the CITEAIR Component 2 part on reporting (Davison et al. 2006).

Box 1: Sources of air pollution in Rotterdam

*The greater Rotterdam area is 800 km<sup>2</sup> and hosts 1.2 million people. It has one of the world's biggest ports and a large industrial complex including petrochemical industries, power plants, etc. The distribution of the **emissions** shows that industrial emissions are the dominant problem. However if one looks at the composition of the ambient concentrations at a typical point in town, traffic has become the main concern, even in an industrialised area.*



## 2.2 Reporting and the formal supply of air quality information

### 2.2.1 The EU air quality directives

The Framework directive and the accompanying daughter directives spell out in detail what has to be monitored and how and when it has to be reported from local to national level and finally to the EU. The directives are not very specific on how the public in general has to be informed (what level of detail, frequency, etc.) but they do stipulate that the information have to be available to the public. In most member states, this was already covered by a public information Act. Where this is not the case, the EU directives form a new obligation.

For some pollutants, thresholds (alert, alarm) are specified. If a certain stage of air pollution is reached, the public has to be notified. Sometimes the same or similar thresholds and information mechanism existed in local legislation. On information on both the general reporting as well as the alert and alarm thresholds, the reader is referred to the Davison et al. (2006) and the original directives. (See for example: <http://europa.eu.int/comm/environment/air/ambient.htm>).

### 2.2.2 The Aarhus convention

The purpose of the Treaty of Aarhus is to contribute to the protection of the right of everyone to live in an environment that is proper for everyone's health and well-being. The EU has drawn up three directives to achieve this purpose. One of these directives has a link with communication. The directive "Access to environmental information" says that every citizen has to have enough access to environmental information and that public authorities have to make an effort to inform the citizens about the environment. The purpose to make environmental information generally known is to raise environmental awareness. With more and clear information, the public is also better able to take part in environmental decision-making.

To implement the directive means that public authorities have to inform the public about the environment in an active way. Information that is owned by the authorities has to be made available (under some restrictions) if the public asks for it. This implies that Aarhus in itself does not constitute a "research obligation": authorities cannot be forced to investigate a certain issue in order to be able to inform the public about it. However, the authority has to disclose what it does know. "Research obligations" might come under other directives e.g. the framework and daughter directives indicate where and how to monitor and report on air quality.

#### Active supply of information

Public institutions are obliged to group their environmental information and actively disclose it in a systematic way to the public. The Internet is the most practical method to accomplish this. Some examples for publication on the internet are:

- Permits with consequences for the environment;
- Surveys of areas of air pollution and the consequences for the public;
- Current weather conditions influencing air quality.

#### Passive supply of information

Authorities are obliged to inform the public which information is available in the organisation (passive information). References to the available environmental information have to be placed in a list on the Internet. Details like the relevant measuring methods have to be mentioned. The documents referred to should be available on request.

#### Prerequisites for providing information:

- Available information should be easily reproducibly presented. This means that (more) information has to be stored in a digital format if possible.
- "Aarhus" dictates that the language of these documents has to be clear, simple and understandable.
- Authorities have to be helpful in answering questions from the public about the environment. For example, if a citizen requests information about the air quality in his or her neighbourhood

the authorities have to examine and answer that question thoroughly. In addition, requests for survey reports, policy plans or planned measures aimed at improving the environment have to meet.

The directive has some exceptions: authorities have to be reasonably able to answer the questions. There might also be confidential information they cannot reveal. For example, in the Netherlands these exceptions are dealt with in the Public Information Act and the Environmental Control Act.

See box 2 for an excerpt of the EU website on Aarhus.

Box 2: The Aarhus Convention (<http://europa.eu.int/comm/environment/aarhus/>)

*The UN Economic Commission for Europe (UNECE) Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters was adopted on 25 June 1998 in the Danish city of Aarhus (Århus) at the Fourth Ministerial Conference in the "Environment for Europe" process. It entered into force on 30 October 2001. (For recent up-dates and the follow-up process please have a look at the UNECE Convention website).*

*The Aarhus Convention establishes a number of rights of the public (citizens and their associations) with regard to the environment. Public authorities (at national, regional or local level) are to contribute to allowing these rights to become effective. The Convention provides for:*

- *the right of everyone to receive environmental information that is held by public authorities ("**access to environmental information**"). This can include information on the state of the environment, but also on policies or measures taken, or on the state of human health and safety where this can be affected by the state of the environment. Citizens are entitled to obtain this information within one month of the request and without having to say why they require it. In addition, public authorities are obliged, under the Convention, to actively disseminate their environmental information;*
- *the right to participate from an early stage in environmental decision-making. Arrangements are to be made by public authorities to enable citizens and environmental organisations to comment on, for example, proposals for projects affecting the environment, or plans and programmes relating to the environment, these comments to be taken into due account in decision-making, and information to be provided on the final decisions and the reasons for it ("**public participation in environmental decision-making**");*
- *the right to challenge, in a court of law, public decisions that have been made without respecting the two aforementioned rights or environmental law in general ("**access to justice**").*

*Since signing the Convention in 1998, the EU has taken important steps to update existing legal provisions in order to meet the requirements of the Aarhus Convention by means of legislation directed to the Member States, but also for its own institutions.*

*In particular, the European Parliament and the Council adopted two directives concerning access to environmental information and public participation in environmental decision-making (first "and" second pillar of the Aarhus Convention) in 2003. They have to be implemented in national law respectively by 14 February and 25 June 2005.*

*In October 2003, the European Commission adopted three further Proposals, for a regulation to apply the Aarhus Convention to the Community institutions and bodies, for a directive on access to justice in environmental matters and for a decision to conclude (ratify) the Aarhus Convention.*

*The EC ratified the Aarhus Convention on 17 February 2005.*

### 2.2.3 Comparability of information across countries

The EU directives deal with the obligation of supplying local information to those it may concern. A citizen living in city A does not necessarily need to know the air quality in city B. However, as the Aarhus text clearly indicates, one of the objectives of the supply of information is the "participation in

environmental decision-making". In other words, information has to be supplied so that it can be used to influence political processes. In this context, it might be relevant to compare one's own air quality situation to that of another city. Someone in city A might be interested to know what city B is doing to fight air pollution and ask the local authorities and politicians why measures that seem to work elsewhere have not been introduced locally, etc. At the same time, local authorities might feel some consolation from the fact that they know, and can see, that they are not the only ones facing, at times, poor air quality and, as a consequence, tough decisions.

However, to be able to compare information, not only does it have to exist and be accessible, it should also be presented in a similar way, using similar criteria and points of reference for interpretation. On the monitoring and reporting side, the EU directives provide a basis for measuring and reporting air quality. However, a number of technical issues remain unresolved and this is beyond the scope of the CITEAIR project, though some suggestions are being in the context of reporting part of Component 2<sup>2</sup>. In Component 3, an effort is being made to make the disseminated information to the public more comparable by providing a common web platform. Although limit values are standard throughout the EU, what is being interpreted as good or poor air quality remains very different when air quality presentations on the internet are being compared. On top of that, there are language problems as only a few city websites provide an English translation.

The website [www.airqualitynow.eu](http://www.airqualitynow.eu) provides a platform to compare air quality in different cities. It does not aim to replace local websites but to complement them. This is mainly for the sake of making air quality data from different cities comparable by applying uniform classifying criteria to the local measurements and an international language interface. In the early days of the CITEAIR project, it already attracted questions from tourists wanting to visit Europe and wondering about air quality in different places.

## **2.3 Effective and persuasive communication**

### **2.3.1 The example of advertising**

As was mentioned in 2.1, apart from the official obligations to report, local authorities have to serve the information needs of their constituents. On top of that, they might want to influence the behaviour of their citizens. This is often referred to as persuasive communication or, in the commercial world, as advertising. Not only changing behaviour of people can be the main target of communication. In chapter 3, we will see that also increasing the knowledge of people or changing people's view or attitude can be the leading goal. When is communication effective? Let us have a closer look to the following examples. Communication is often directed at a specific target group. If you want to sell pop music to youngsters, ads in newspapers might not be the best medium for communicating with these groups. Similarly, on TV the type of commercials change in the course of the evening and according to the programs they accompany, commercials for cosmetics before or after a football match are unlikely, and publicity for alcohol will probably not be shown on a cartoon network.

The effectiveness of communication campaigns can be measured. In the advertising world, this is very common (and contracts depend on it). If the intention is to improve the brand awareness, the awareness is measured within the target group both before and after the campaign to determine if it has increased. (Familiarity of the public with a certain brand, before and after a campaign polls and interviews take place). If the objective is to improve sales, the records of the firm have to be monitored. If the goal is to improve market share the whole industry has to be reviewed.

Similar research is possible when communication efforts are made. Firstly, it is necessary to determine the main goal of communication; do you want a change in knowledge, attitude or behaviour of the public? The most difficult goal of communication is changing the behaviour of people. It is easier to

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<sup>2</sup> Like the way to measure and report data on particulate matter. Also the siting of monitoring stations and the way this is used in reporting air quality is not always as clear as one would wish.

increase the knowledge of people, but the question is whether an organisation will settle for just that. After this, the challenging job remains to determine the target groups, which people would be interested in my message?

Consumer panels and focus group discussions are important marketing & communication tools. People are approached to share their views on one particular product or 'community subject' (e.g. air quality). It is very interesting to hear their suggestions for improvements and to learn through which channels they want to receive the information. In addition, concepts of commercials or campaigns can be tested: is the message clear enough? The key issue here is to know who your clients are, and what they want.

The advertising examples show that to be effective it is often necessary to target your message to specific groups, using the appropriate channels. It also shows that effectiveness can only be established, if one has a clear idea of the things one wants to achieve and which target group has to be reached. The effectiveness of communication can be determined by establishing two-way communication: feedback on the information offered is needed.

Advertising and marketing is methodological examples are used here because everyone is/has been exposed to it, and their methodologies have been developed to great heights. However, good quality air is not a product to be sold so the supply of information on air quality (and the associated health consequences) and the communication on air quality provides numerous additional difficulties. See box 3.

**Box 3: Air quality communication**

*We can say that air pollution is a **non-object surrounded by uncertainty**. Communicating on air pollution prevention thus combines all sorts of difficulties:*

*A non-object:*

*It is invisible, odourless (the health effects are not reduced to smoke and odours. It is omnipresent and ubiquitous, in a wide variety of micro-environments. It has multiple scales, from proximity to global. It does not belong to anybody (who is responsible?). It has no value, it is not tradable. It is apparently and usually harmless*

*Combining all sorts of difficulties:*

*The air we breathe is a complex mixture only measured through a few regulated pollutants. Pollutants are issued from multiple sources, from local to regional, stationary or mobile, "home made" or imported, natural or "man made". Actual air quality results from a lot of transformations during transportation after emission by sources.*

*On the health effects assessment point of view:*

- *Health effects assessment only based on approximated collective exposure data (epidemiology).*
- *A huge amount of time series (short term) studies, but only a few long term health impact studies.*
- *No threshold relationship.*
- *Statistical odd ratios meaningless at the individual level. Only specialists can really understand the logics of statistically significant health impact on global populations.*
- *Lags between event and effect.*
- *No experimentally proven causality.*
- *Potential health improvement from abatement policies hardly possible to prove (except by intervention studies).*

*Jean-Marie Rambaud, APPA*

### 2.3.2. Communication on air quality, room for improvements

When dealing with air quality very often the public is the target group. This makes effective communication difficult because it is so widespread. Nevertheless, asking you certain questions might help in improving communication:

- Who are the people I want to reach?
- What do they want to know?
- How do they want the message delivered?
- Through what channels can they be reached?
- What message or information do I want to convey?
- What do I want to achieve?
- Will I need a change in people's knowledge, attitude, or behaviour?
- Am I being effective?

In 2004, CITEAIR assessed how communication on air quality was amongst the project participants<sup>3</sup>. An inventory was made of both the cities intentions as well as an inventory of information found on the internet. The review showed that most cities had given the questions mentioned above an implicit or explicit thought. Nevertheless, the survey also made clear that in most cases technicians decide what and how information is being supplied. Some results:

- The internet was the dominant way of providing information, not because it was effective, but because it was convenient for the organisation.
- Formal assessments whether the information supplied was suited to the needs of the audience are rarely made. In the case of websites, an implicit assessment of effectiveness is made by monitoring the number of hits. However, this does not show if the people one intends to reach are actually reached, nor if the intended message has come through. In addition, it does not tell if the visitors of the website really have found what they needed.
- Air quality, associated health and policy information on the internet show that there is an enormous diversity in what is being presented as well as in the way of presentation and interpretation.
- Occasionally feedback is stimulated by providing a phone number, an email address or even a questionnaire. However, very often the feedback option is lacking implying that in most cases the information supply is just that: a one-way communication.

The next chapter deals with some communication theory that might help you to be more conscious about communication and the supply of information.

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<sup>3</sup> The questionnaire sent to the CITEAIR cities is given in annex 5.2. Results of both the questionnaire and the website review are used throughout this document.

# 3 Communication theory

## 3.1 Introduction

This chapter deals with communication theory, target groups and demand oriented communication. An example is given from a survey done amongst Dutch medical practitioners: are they a target group for air quality information, what do they want to know and how can we best reach them? In addition, the extent to which people are likely to change their behaviour based on environmental information is discussed. It concludes with how information could be used to influence polluters (and likewise the authorities) based on an experience from the USA.

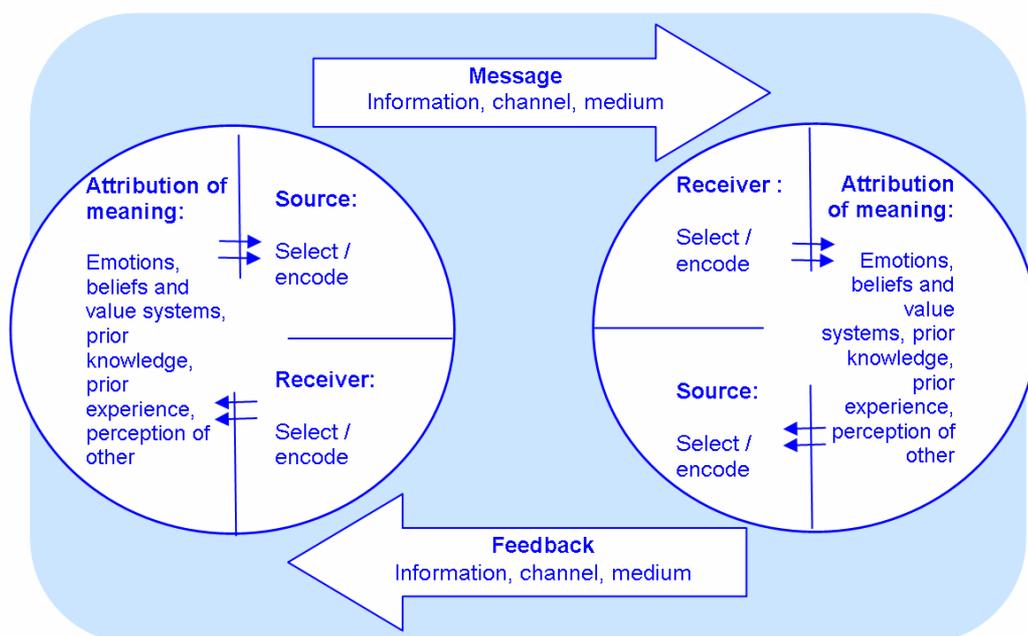
## 3.2 Effective communication, some theory

### 3.2.1 Two way communication

Though a great deal of information on air quality can be found (especially on the internet) it is often not clear, why this information is supplied and for whom it is intended. The question is what the goal is of the presented information and why it is placed on the internet. It is not advisable to supply information and use any communication channel, just because it is available or easy to use. The following choices have to be made:

- What is the message I want to convey?
- To whom do I want convey this message?

If you know to whom you want to convey the message, you have to find out how you can reach this person or group and what they find interesting or appealing. The chances that your message “sticks” are improved if you address someone on the right tone, at the right moment and in the right way. The most important aspect of effective communication is that the person who wants to transfer information (the sender) must adjust himself to the group of people he wants to transfer the message to (the receivers). The receivers must also be able to react to the message. The communication model is shown in this diagram by Gutteling and Wiegman (1996):



To get the right message across, an organisation must first gather more information of the receivers:

- What is their background knowledge: should the message be technical or simple?
- How can I relate to them: what are the concerns, emotions and issues that are important to them?

The sender must adjust his message to fit the receivers and realise that with “sending the message” the communication is not over yet. It is possible that the receivers do not properly understand the message, or that the message is of no use to them. In the best scenario, the receivers start to ask questions about the message received. This feedback is of utmost importance to the sender because it makes clear if the message was properly received, or if it must be clarified further. New messages have to be formulated and distributed, after which the circle of feedback can be repeated. This is how communication reaches its full potential, when there is contact between both parties and it produces valuable information for both parties.

In this two way process the question “who talks” seems obvious: the one who has the information, the local authority who wants to change peoples travelling habits, etc. However, the diagram clearly shows that meaning is being attributed (on both sides!) to the information and feedback that is being exchanged. In this interpretation process, reputation, image, etc. of the “source” plays a role. Likewise preconceived ideas on the receiver “colour” the interpretation of the feedback received.

### 3.2.2 Communication goals

In section 2.1, a number of reasons were given for communication on air quality:

- Legal obligations to supply air quality information;
- Give a reaction on requests for information from the public;
- Raise awareness on the role of the public as a polluter.

In addition to this formal list, publicity for the organisation could/should also be added. Though it might not be a formal reason, a nice and fancy website for instance adds to the prestige and the public profile of an organisation. In addition, funding depends often on, amongst others, visibility and prestige.

Another way to classify communication goals is according to the level of ambition one wants to achieve:

- A. the sender wants to increase the knowledge of the receiver on air quality: information as such
  - B. the sender wants to influence the attitude of the receiver towards air quality: create a positive attitude
  - C. the sender wants to change the behaviour of the receiver, e.g. take the bus or the train!
- Especially knowledge and attitude can be realised with communication. To change behaviour, other factors than communication, such as financial and social factors, play an important part as well.

#### A. Your target is to give information, “knowledge”- level

For example, the highest year average concentration of NO<sub>2</sub> was 48 microgram/m<sup>3</sup>. This exceeds the future limit value by 8 microgram/m<sup>3</sup> (to be attained by 2010).

If the communication is only meant as a way to improve the receiver’s knowledge, the sender should consider the following before launching a campaign:

- For whom is this information useful? Which target groups need this information?
- How much knowledge does the target group already have on the subject? In case of low knowledge levels, NO<sub>2</sub> must be explained and what effect it has on the air quality.
- What is the receivers’ need for information on air quality?
- What is the preferred way of being informed: an article in the newspaper, in a trade journal, on the website etc.?

#### B. Your target is to create understanding, “attitude”- level

For example, the highest year average concentration of NO<sub>2</sub> was 48 microgram/m<sup>3</sup>. This exceeds the future limit value (to be attained by 2010) by 8 microgram/m<sup>3</sup>. This concentration along the main north-south traffic route is caused for 80 percent by cars. The power plant just

south of town is also a major source of air pollution. The traffic department is considering measures to make sure that for those people who live next to the road, the ambient concentration meets the limit value as soon as possible but in any case by 2010.

If one wants to influence the receivers' attitude, one must show the usefulness of this information for the receiver, or at least indicate the general usefulness. It is important to make a link between the contents of the message and the receivers. As a sender, you must consider the following:

- How useful is the information to the receivers?
- What is important to the receivers? How do they "feel" about air quality?
- Can worries be taken away or problems solved?
- When do the receivers need this; when are the receivers receptive for air quality information?
- What is the preferred way of being informed?

### **C. Your target is to change people's behaviour, "behaviour"- level**

For example, the highest year average concentration of NO<sub>2</sub> was 48 microgram/m<sup>3</sup>. This exceeds the future limit value (to be attained by 2010) by 8 microgram/m<sup>3</sup>. This concentration along the main north-south traffic route is caused for 80 percent by cars. In fact, 40 percent is caused by traffic that needs to take the north-south route but cars making short trips (less than 4 km) cause the other 40 percent. Most of these trips could have been avoided by taking a bike or using public transport. Short trips are particularly polluting as it involves a cold start and the car (e.g. the catalytic converter) does not have enough time to warm up to become efficient. If this regards you, before you take your car, wonder if it is necessary. You will be helping those who live next to the road, and besides cycling is good for your own health!

How to influence or change the behaviour of groups of people is something policy makers and marketing people have been looking for, for years. For example, campaigns on smoking or drinking and driving: governments have been trying to change our behaviour for decades but the effects have always been moderate. Through communication you can make people aware of their behaviour, but generally you are not able to change their behaviour directly and/or substantially.

#### **Changing behaviour by using sanctions**

Communication that aims to change behaviour can only be effective if one manages to connect to the intended target group, either intellectually, emotionally or both. Just supplying facts is generally not enough: people have to be receptive to the facts before they have a consequence for behaviour. This is obviously very difficult so communication to change behaviour is most effective if (direct) rewards or sanctions are involved. For example, if you are caught driving under influence there is a fine and you might even end-up in jail. Likewise, speed limits to improve air quality will only work if they are strictly enforced. One might say that sanctions work even without communication. However, sanctions that are not explained and are perceived as unjust on a large scale create opposition and are not likely to be sustainable.

#### **Changing behaviour by using rewards**

Rewards, in terms of benefits, seem to have a smaller impact: the evidence of the benefits of not smoking is overwhelming, known, and accepted by most smokers. Still there is a very large group of smokers. In the field of the environment, there is some experience with campaigns to cut energy use during the oil crisis in the seventies. At the time, the Dutch government managed to create a national feeling that an energy shortage crisis was on its way and everyone had to economise the consumption of gas and electricity as much as possible. It worked for a period, even after the oil crisis was over. However, renewed efforts to make people energy efficient (this time to gain the CO<sub>2</sub> emission targets) hardly have an impact even though saving energy has (small) direct personal benefits in terms of reduced costs. When it comes to not using a car in order to improve air quality the benefits are even further away: "if I don't use my car but others do, it won't make a difference".

Communication directed at attitude and behaviour is important to create support for unpopular policies like price taxes on energy, traffic bans, speed limits, etc. Drivers are voters as well and politicians tend

to fear to take, or support measures that could be seen as anti-car. Communication (on all three levels) might make policies more acceptable and thereby easier to endorse by politicians.

A second lesson to be learned is that “better air quality” might not be an argument that “touches” or convinces people: the argument does not stick. So maybe it is better to “package and sell” the policy in a different way. Efforts to change the way people drive and use their car (maintenance, tire pressure, gear shifting, etc.), for example, have for some time been advocated as environmental measures with limited success. In some countries, the communication has started to emphasize the fuel economy of these measures. In a time with high fuel prices that might make a better incentive. Likewise, Toyota’s first hybrid car (Prius) was marketed as an environmentally friendly car. Though it found a niche market, the commercial success was limited. The second version is mainly marketed as economic and a ‘cool’ technical miracle. The car is a success. Of course, this is not only a matter of marketing but it shows that it is necessary to search for the best selling point and this is not necessarily an environmental issue.

### 3.2.3 Target groups

In the previous section under a. and b. some questions were formulated which should be considered before launching a campaign. Under c., it was mentioned that one has to “connect to people” and find “the best selling point”. The way people want to receive information will differ as will the kind of information they want to receive and what convinces them (or not). This implies that different messages and communication strategies have to be developed for different groups of people. A message targeted

Box 4: Possible target groups for air quality communication	
<i>Target group</i>	<i>Subgroups</i>
<i>Citizens in urban areas</i>	<i>Town occupants</i> <i>Motorists and users Public Transport</i> <i>Sporting people (outside)</i> <i>Tourists</i> <i>(Parents of) baby’s, toddlers and small children</i> <i>Schoolchildren</i> <i>Employees of industry/ companies</i> <i>Stock brokers</i> <i>Creators of big city events</i> <i>Shop owners</i>
<i>People sensitive to air pollution</i>	<i>Elderly people (55+)</i> <i>(Parents of) baby’s, toddlers and small children</i> <i>Asthmatics, patients association groups</i> <i>Allergic people</i> <i>Hart/Lung patients</i>
<i>Doctors / health staff</i>	<i>General practitioners</i> <i>Specialists (hospital)</i> <i>Public Health service</i>
<i>Non-governmental organisations (NGO’s)</i>	<i>Interest groups (in general)</i> <i>Consumer organisations</i> <i>Organised citizens</i> <i>Environmental groups</i> <i>Scientist/ research institutes</i> <i>Consulting companies</i>
<i>Journalists/ Media</i>	<i>National and regional newspapers</i> <i>Technical and Medical journals</i> <i>Target group-specific papers</i>
<i>Government/decision makers</i>	<i>City councils</i> <i>Provincial/regional authorities</i> <i>Ministry for the Environment</i> <i>Research and development institutions</i>

to a specific group is likely to be more effective than a general message aimed at the average person. The checklist in box 4 might help identifying target groups when it comes to communication on air quality.

Identifying and selecting one or more target groups is a first step. Getting to know them is the next. Like a general who has to base his strategy on information on his adversary, a communication strategy has to be based on information about the intended target group<sup>4</sup>. Information on target groups and the public opinion on environmental and, more specific, air quality issues can be gathered in quantitative or qualitative research.

### **Research**

Qualitative research (questionnaires, polls) is a frequently used instrument. Large groups can be reached for comparatively modest costs. Questionnaires provide data that can be analysed statistically so the results are straightforward, representative and as objective as possible. However, capturing the full heterogeneity of opinions from (usually pre-structured) questionnaire data is very difficult.

Quantitative research, like panel or focus group discussions, provides more in-depth information of the target group. Issues are directly discussed with the intended target group, which leads to richer information than the ordinary poll: the direct interaction is of considerable benefit. Quantitative research is usually done on a smaller scale than qualitative research, because otherwise it would become very costly. (The results of a quantitative research are shown in section 3.3.3)

### **Changing need for information**

An even more complicating issue is that the public's need for information about air quality matters will inevitably change when circumstances are changing. For example, when people are looking for a new house or a school or crèche for their children air pollution might become an issue. If someone is living in a surrounding where there are environmental aspects (like air pollution) which cannot be changed easily, they tend not to be interested in information concerning this subject. People tend to shield themselves from information on things they cannot influence (*and have to learn to accept!*) and that might worry them. If someone lives next to a polluting industry and has no option of moving somewhere else (it might even be the employer) the person will probably not want to be reminded on a regular basis that he lives in poor air quality conditions: what use is that information to him or her?

A second, more general, change in information requirements is prompted by trends in public opinion (these trends themselves can be brought on by public information). Whereas air quality was not an issue of major importance in the Netherlands (by the end of the nineteen eighties most easily perceptible problems had been solved) it has become since 2004. See box 5. The request for information and action from both the public and policymakers has shown marked changes therefore.

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<sup>4</sup> Good information - Generals can't do without it. Why do CEO's think they can?" (marketing specialist David Cowen).

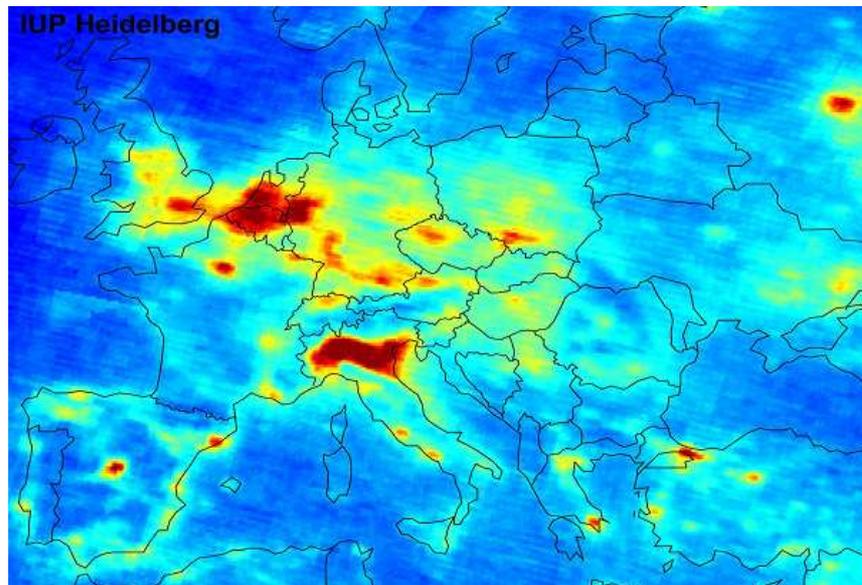
#### Box 5: Changing perceptions on air quality in the Netherlands

*Since the nineteen nineties, air quality in the Netherlands has not been a major issue. When asked about air quality problems people generally mentioned nuisance from dust or odor. Apart from people living next to known hotspots (e.g. busy roads with traffic jams during every rush hour) the air was generally considered to be clean. Scientists knew that there still were problems. For example, research into the performance of the lungs of schoolchildren attending schools next to busy roads showed that it differed significantly from the national average.*

*A major change in perception came with the arrival of the new EU air quality directives. Governments had to report on air quality and admit that the future standards were not always met. As the first year of compliance (2005 for PM<sub>10</sub>) approached, infrastructural works were blocked (development of housing, new roads, industrial developments). As of that moment, people started to wonder: "If the air is not good enough to built new house in a certain area, how good is the air around my house?"*

*A second major event was the publication of a satellite picture in the newspaper showing the NO<sub>x</sub> in the troposphere. Whereas the limit values for ground level NO<sub>2</sub> are generally met in the Netherlands (accept for some urban hotspots), the satellite image showed that the Netherlands was a top polluter. Scientists and certain policymakers also knew this but the public was shocked: the Dutch people thought that the Netherlands was about the cleanest place in Europe. However, from the sky it showed that the Netherlands was almost the dirtiest place; worse, the south-west of the country looked very much like most third world mega-cities.*

*In little of a years' time the perception of air quality changed dramatically: the need for information changed and the acceptance for previously unacceptable measures has improved markedly.*



#### 3.2.4 A demand-oriented information strategy

Communication is likely to be effective if the message that is sent is:

- Directed at a specific group;
- Tailor-made to the needs of the group;
- Given at the right time;
- Distributed by the appropriate channel.

Therefore, even though an organisation has its own reasons and objectives for having or wanting to communicate, a demand-oriented approach is the key to being effective. A demand-oriented approach is based on the following questions:

- What does the target group want to know about (urban) air quality?
- How do they want to be informed about this?

The development of demand oriented communication strategies can be guided by answering a number of questions:

1. Do people have a need for information on air quality?
2. If so, how do they want to be informed? Differentiate between the means of communication and the type of information: just facts, warnings, persuasive messages, etc.
3. What kind of information do they want and on which subjects: individual pollutants (PM10, NO<sub>2</sub>, etc), smog, nuisance (odour, dust), hay fever, health consequences, behavioural advice (health and or pollution prevention), measures taken by (local) government, policies, meteorological information, traffic, scientific information (tables, graphs, etc.), .....
4. Which target groups are likely to want a different kind of information, supplied by different means?
5. Which target groups do we want to reach or constitute our priorities?
6. Do the target groups always want the same information or do they want specific information under specific circumstances: during pollution episodes; when it is hot, foggy, etc; during industrial incidents; etc.
7. Under what conditions are target groups likely to be more receptive to certain information (on air quality)? E.g. during one-to-one talks or small group meetings; when people perceive a particular problem (e.g. the London Congestion Charge receives sufficient popular support as it helps to solve an acute and easily perceived problem: congestion<sup>5</sup>.)

Questions like these stress the position of the *receivers* of the information. A strategy anticipating on the information needs will provide appropriate information, to the right people at the right time. The survey on communication among the CITEAIR-cities showed that most cities heavily rely on the internet for supplying information. Only, this was not done because an assessment of the intended target groups had shown that this is the best way for supplying information. Internet was used because it is the most convenient way (for the organisation) to communicate information to the public. One can wonder if the internet is the best way to reach the public. Experience shows that air quality websites in the Netherlands generally receive relatively few hits: the average air quality is not a point of concern for most of the Dutch citizens. Experience in Paris shows that most people know the ATMO air quality index broadcasted on the daily news together with the weather information. The number of visits on that website shows a dramatic increase during episodes when people actually notice that air quality is poor: they seek conformation (or complementary information) on the website.

The fact that internet does not appear to be the main vehicle for information does not mean that it is not important: it is a back-up for more detailed information once people are triggered by another source of information. The feedback option on a website is important, especially when it offers the possibility to ask personal questions. For instance, a large share of the questions asked on the websites of the city of Rotterdam are very specific questions from people looking for a new house.

### 3.2.5 What if there is no demand?

Placing much emphasis on what someone wants to know might seem odd. For instance, how can someone be informed that his car is the main source of air pollution if the receiver does not want to be informed about the relationship between cars and environment? In this case, there is no point in just telling the message. There is no easy answer to this paradox, but the solution lies in finding a

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<sup>5</sup> According to air quality staff in London the measure like the congestion charge would never have been taken, nor would it have been accepted by the public, if it was meant (marketed!) as measure to improve air quality.

“connection” with the target group, a message that does ring a bell and might constitute an entry point for information. To raise awareness, information needs to be clear, personally relevant and contain clear suggestions on how to improve a situation. Partial knowledge of various sectors and disciplines needs to be integrated and presented in such a way that it has meaning to the intended target group and their values and beliefs (Funtowicz and Ravetz, 1993; Gibbons et al. 1994). Beside of the content, the tone of voice and framing of the message are also very influential (Duree, 2006). People often make self-serving judgments in order to maintain their self-esteem and sense of control (Price et al, 1997: 527). If information doesn’t suit the situation or the concerns of the receiver, or if the sender is considered biased, the information will simply be ignored.

The majority of the public perceives air pollution as an impersonal risk, without direct short-term health effects; hence air pollution information is not perceived to be highly personally relevant. Nevertheless, people seem motivated to seek and process information about impersonal risks when they feel others in their social network expect them to be informed (Kahlor et al, 2006). When issues emerge on the political agenda and in the media it becomes a topic people discuss in interpersonal relations and institutions (Morton & Duck, 2001). This may become a mutually reinforcing process, amplifying the sense of risk and urgency. This is referred to as the social amplification of risk (Frewer et al, 2002). For a responsible and trusted source this can be a communication opportunity but it can also pose problems (see section 3.5).

Box 6: What if there is no demand?

*This document is developed in the context of a project that somehow has its roots in the EU air quality directives. These directives deal with outdoor air quality. Outdoor air quality is the responsibility of the authorities whereas indoor air quality is the concern of each individual/household. Indoor air quality is often as much a health concern as outdoor air quality and this might provide an entry point for air quality communication in general.*

*It is well known that messages tend to have a bigger impact if it concerns issues that are close to people, if it is something within reach of them, something they can handle. Contrary to abstract issues such as global warming and air quality in general, indoor air quality is something that people can manage to a certain extent and where they will perceive the benefits of their actions. Work by APPA in France showed that measurement campaigns on indoor air quality not only helped in changing peoples habits and improving indoor air quality, it also raised additional interest in outdoor air quality.*

### 3.3 Examples

#### 3.3.1 Introduction

In this section, three surveys are being presented. The results are **mainly** given as examples of the theory discussed in the previous sections. Strictly speaking, the results presented here only apply to Rotterdam and/or the Netherlands, though some generalisation might be possible if one considers the Dutch circumstances, relatively moderate ambient air pollution with very rare episodes. The average healthy person will only notice poor air quality on very rare occasions. Except for certain urban hotspot areas air quality complies with EU-standards.

From a survey in Paris, it became clear that air quality is a top priority and a top concern for the inhabitants. Contrary to Rotterdam, a substantial part of the population of Paris lives in areas where the EU limit values for the year average are exceeded and where poor air quality is easily noticeable by the public. Conclusions reached in the Netherlands might therefore differ, not only because of potential cultural differences, but also because the net exposure in the Netherlands is relatively less than in other places. For example, air quality forecasts are not a big issue in the Netherlands. A TV page has been

developed on which a smog forecast is given especially for people with asthmatic problems. In Paris, the air quality index is part of the daily news and weather forecast.

Despite the fact that these kinds of differences influence the outcome of a study if it is repeated elsewhere, the results are presented as “food for thought” for organisations wanting to engage in target group oriented communication.

- The first study deals with medical practitioners in Rotterdam, the Netherlands. The survey is an example of a baseline survey of a well-defined target group. The results will be used by the regional public health service (GGD Rotterdam) to develop information material for this specific group.
- The second study consists of just a few questions on air quality added to a very large annual survey in the city of Rotterdam. The survey is conducted on behalf of all local government institutions and is used to solicit the views of the public on various policy issues ranging from visits to the public library, to the opinion on road maintenance, the security of public transport, etc.
- The third study gives an impression of the conclusions of a qualitative investigation done on behalf of the Dutch Ministry for the Environment. The study is useful because it provides information about the attitude of the public towards environmental issues.

All these examples deal with getting to know potential target groups. Surveys are also very useful to evaluate the impact of an information campaign, or the wording of messages and brochures. An example of the experimental evaluation of alternative formats of the US EPA air quality index can be found in Johnson (2003).

### **3.3.2 Air quality and medical practitioners as a target group in Rotterdam**

This study was carried out in the Framework of the CITEAIR Project (Jochems 2005). In this study, the medical practitioners in the Greater Rotterdam area were singled out as a specific target group for communication. Their information needs, and the way the information could best be provided were assessed. The results of this baseline survey will mainly be used to develop targeted information for the general (medical) practitioners.

#### **3.3.2.1 Methodology**

A quantitative method was used to obtain baseline information. The respondents are known and if the results lead to follow-up questions respondents can be addressed either as a group or individually.

- Response rate  
In the Netherlands, general practitioners are known for receiving a lot of questionnaires and requests to participate in studies and surveys. The response rate is generally not impressive. Therefore, beforehand attempts were made to increase the number of questionnaires returned. These attempts included:
  - Sending an appealing letter.
    - The letter was co-signed by a doctor and started with ‘dear colleague’ giving it credibility and informality at the same time.
    - In the letter, the importance of a high response was stressed.
    - The questionnaire was sent at a time when air pollution was a hot topic in the (local) media. The letter specifically referred to these recent news articles in local and national media concerning the poor quality of air in their region.
  - Making the questionnaire very easy to fill in.
    - The questionnaire consisted of only two pages.
    - Every questionnaire had its own code by which the concerning general practitioner could be tracked (they did not have to waste time by filling in name, address, etc.).
    - Most questions had multiple-choice answers and only required ticking the specific box.

Despite the fact that a list of e-mail addresses was available, the questionnaire was sent by ordinary mail because at that time it was not known how many general practitioners were actually ‘online’. By sending the questionnaire by mail, all registered general practitioners in the area could be reached.

- Response

The questionnaire, along with an introduction letter, was sent to 394 general practitioners in the Rijnmond area (e.g. Rotterdam and surroundings). The net response was 51.7%, which is considered high.

- Choice of questions

Besides examining the specific requirements general practitioners may need (or expect in the future) for data concerning air quality, we were also interested in whether or not general practitioners are regularly confronted with health problems they (or their patients) relate to air pollution. In addition, we wanted to know the general practitioner's assessment of his/her knowledge about the effects of air pollution on health. In addition, we were interested in how general practitioners and sensitive groups can best be kept informed about the effects of air pollution on health (e.g. will there be a need for a website?). Lastly, we wanted to find out how many general practitioners actually use the internet.

### 3.3.2.2 Results

- In their practice, general practitioners are not often consulted about health problems related to air pollution (or at least, they do not consider the questions as such).
- 91 percent of the general practitioners indicated that they are (sometimes) not sufficiently knowledgeable about the effects of air pollution on the health.
- There is no univocal choice for a specific means of communication for general practitioners.
- The general practitioners slightly preferred using an informative brochure as means of informing sensitive groups about the effects of air pollution on health.
- At this moment, around 40 percent of the general practitioners indicate that they (sometimes) require accurate information about the air quality in the Rijnmond region.
- Around 55 percent of the general practitioners expect to need this information in the future.
- Almost 65 percent of the general practitioners have access to internet and half of them use the internet for work on a daily basis. E.g., approximately 1/3 of the respondents would benefit from internet based additional information. For the others, other communication channels will have to be used.

A number of follow-up actions are foreseen:

- Inform general practitioners about the study results (by an article in a Dutch medical journal) both as a feedback to the participants and as an example for other public health services.
- Respond to the apparent gap of knowledge about the effects of air pollution on the health. Initially by a lecture or seminar during a refresher course, or by developing a leaflet.
- Use the suggestions to improve existing local air quality websites.
- Explore the need for targeted information for asthmatics and the potential to publish in the journal of the Dutch Asthma Foundation.

The full questionnaire with the answers, as well as the introduction letter is available in annex 3. In France, the Regional Director for Industry and Environmental Research (DRIRE) has published leaflets with specific information both for health staff and for patients. See annex 5.1 and 5.2 (in French!). In annex 5.3 a brochure on air quality and health linked to the UK air quality index is being presented.

### 3.3.3 The general public in Rotterdam and information on air quality

In 2005, a survey was done in Rotterdam to solicit people's views on the environment, and air quality in particular, and their information needs on environmental issues. The full questionnaire with the answers is available in annex 7. Some summary results are presented here:

- General perception of air quality (other than smell!):
  - 57% never notices poor air quality;
  - 43% does occasionally notice something;
  - 25% occasionally feels hampered and/or restricted by poor air quality.

- Access to air quality information:
  - 16% states that they are adequately informed on air quality;
  - 19% is confident that if they want to know something they can find the information themselves;
  - 22% does not want additional information;
  - 43% says that they feel they need more information but they do not receive the good information right now.
- The information one is looking for is:
  - 68% looks for general information on air pollution;
  - 49 % searches specific local information on relevant components;
  - 9% looks for hourly variation;
  - 4% does not know.
- The way people want to receive information:
  - 49% wants to get their information through the local newspapers;
  - 37% by local radio and TV;
  - 24% via the internet;
  - 8% prefers printed leaflets (e.g. at the doctors' office);
  - 2% prefers local information evenings with presentations.
- Air quality websites:
  - 7% has heard of one of one of the Rotterdam air quality sites (21% of the EPA website that contains air quality data as well)
  - 5% respectively 10% of the respondents have visited the air quality and the EPA website.
- 65% of the respondents has internet and 48% has a broadband connection.

The results show that a unique focus on the internet means that part of the potential target groups will not be reached. Further analysis of age, education, income groups, car owners, etc. will be done to determine if certain groups have specific preferences for information and/or communication means.

**Box 7: Some opinions on air quality in Rotterdam**

*It is interesting to see that the opinions of the doctors largely reflect common opinion: most air quality problems (e.g. the very apparent industrial ones) are solved and cars are a problem.*

- *Stronger lobby against car traffic and local congestion spots would not be such a bad idea.*
- *This should have been done 30 years ago, now it is useless.*

*One respondent (doctor) is particularly sceptical about the need to inform doctors on air pollution:*

- *It is more meaningful to put your energy in the prevention of air pollution.*

### **3.3.4 Scope of communication on environmental and health aspects**

Excerpts from a small-scale qualitative research into communication on health and safe living in the Netherlands are shown (Motivaction, 2003). The research was done with panel discussions; it preceded a larger quantitative research. The focus was on the role of communication and the attitudes of citizens towards environmental aspects that might pose health problems. The excerpts focus on air quality findings.

#### **3.3.4.1 Results**

- Environmental aspects considered  
Noise, soil pollution, water pollution, air pollution, very fine dust and asbestos, dirty streets, indoor smoke, humidity, fungi and indoor radon/radiation.
- General findings

People hardly experience risk factors in their own environment. Several environmental issues are known but are not considered a risk. Issues most commonly mentioned are noise (traffic, planes but also neighbours), smell and air pollution by cars. Attention to these noticeable environmental issues has the highest priority. People with a higher education tend to perceive more risk.<sup>6</sup>

Air pollution is occasionally mentioned as a reason for moving to a greener area (none of the other issues considered in the research). People consider it a task for the government to solve the air pollution problem. People are aware that they themselves do influence total pollution levels but the problems are not considered serious enough for changing their behaviour (e.g. not using their car occasionally).

People do not actively search for information on their environment and sometimes even try to ignore/deny it if it is made available.

- Attitude

People generally accept risks in their living environment: “there are worse things in the world” and seem more concerned about the situation for future generations than today’s potential threats. This is mainly because many environmental problems are not readily noticeable and that there is not much they can do about them. Environment is one (but a small one) consideration when choosing a place to live and once you have made the decision you have to live with it. Information does make people more sensitive to issues and it increases risk perception.<sup>7</sup>

- Behaviour

Problems under their control are accepted as a problem for which they have to find a solution. Problems perceived as beyond their control are ignored and no longer perceived as a problem: once you have decided to go and live somewhere, you should not complain about the circumstances. Generally, the size and type of a house and other considerations are much more important than environmental considerations.

- Government communication

People consider it a government’s duty to inform their citizens adequately. Most people believe that government information is objective (there is a slight difference in perception between native Dutch and migrant groups). There is a preference for passive information like TV, (local) newspapers, brochures. Internet where you actively have to search for information is less preferred. Younger people tend to use the internet for their information.

Information campaigns are considered useful though they are occasionally seen as ‘overkill’ (‘too much preaching’).

- Risk maps and other warnings

The people that were interviewed do not consider risk maps (maps with potential threats such as industrial sites, soil pollution, etc.) of the neighbourhood useful: they are not likely to influence people’s decisions. In fact, house owners fear loss of value of their property if potential environmental risks/problems are disclosed. On the other hand, a sensor for indoor air quality that would show when there is a need to increase ventilation would be very welcome.

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<sup>6</sup> From another survey DCMR knows that respondents (especially women) with children tended to be more concerned about air quality issues.

<sup>7</sup> General experience shows that new developments with environmental consequences (road extensions, waste incinerator, etc.) do meet with resistance (Not in my back yard – NIMBY behaviour).

### 3.3.4.2 Summary tables

#### Influence of education

<b>High</b>	<b>Low</b>
<p><i>Attitude/ behaviour</i></p> <p>Look for information actively Higher awareness of potential risks Receptive to information</p> <p>Less susceptible to overload of information; able to decide what is relevant In general no problem with (seemingly) contradictory information; less anxiety General interest in information Information might lead to change in behaviour</p>	<p>Passive toward Low awareness especially of invisible risks Less receptive especially if they can't handle accordingly Easily experience an information overload and shut-off all information Information is easily perceived as contradictory and might create anxiety. Interested in information when something is an issue Others are seen as responsible for taking action</p>
<p><i>Information channels</i></p> <p>Internet, newspaper, TV, magazines Routes to information or for lodging complaints are generally known Attach value to verifiable facts</p>	<p>TV, local newspapers, letters These routes are not always known</p> <p>Attach value to the authority of the person providing the information</p>

#### Influence of age on information channels

<b>Under 55</b>	<b>Over 55</b>
<p>Internet, newspaper Information is scanned for relevance to own situation Information may be confrontational and may not be patronising</p>	<p>TV, flyers, public health authority, direct letters Written information is studied carefully Information should be neutral and not create anxiety</p>

#### Influence urban - rural

<b>Urban</b>	<b>Rural</b>
<p>Higher sense of urgency Experience traffic nuisance (air, noise); environmental risks are more visible Passive attitude, accept their situation (part of the deal)</p>	<p>Lower sense of urgency Risks are often invisible.</p> <p>Sense that their environment is OK and no action is needed. Economic aspects (property value) play an important role.</p>

### 3.3.4.3 Conclusions of (quantitative & qualitative) research (in the Netherlands)

- Environmental risks are generally not an issue of popular concern in the Netherlands, except for noise, smell and exhaust fumes. Probably this is because these effects are easily noticeable.
- The choice for quantitative or qualitative research depends upon the focus of the researchers and the numbers of people who are concerned. If you want to have general conclusions and figures, you will choose the quantitative approach. If you would like to investigate a relatively small group of people and like to know their opinions, feelings or experiences, a qualitative approach will be most useful.
- People with health-problems are naturally more interested in environmental matters i.e. air-quality than healthy people. Accordingly, medical professionals are also interested, although they also felt a lack of information on air-quality matters.
- People with higher education seem receptive to information on environmental risks whereas people with lower education tend to ignore to reduce a sense of anxiety.
- Generally, the government is considered the "owner" of the problem and the one that should solve it.

- Nowadays the internet is the medium where you can find a lot of information on air-quality; not all the respondents liked this medium and use it! Not only elderly people, but also doctors preferred to get personal information, for example during a meeting. However, some even preferred a brochure, or tele-text (short information-texts on the television). Therefore, the GGD Rotterdam is organizing in 2006 an information meeting with medical practitioners to provide them with more information on air-quality. Here they can exchange information on a personal basis.

### 3.4 The power of information: How information can improve the environment

In 1984 an accidental release of methyl-isocyanate at an American pesticide manufacturing plant in Bhopal, India, killed approximately 3000 people and injured 100 of thousands. Similar smaller incidents occurred in the United States. These incidents raised public awareness about the risks, which are associated with chemical use and fed a swell of support for the public's right to know about chemicals used and released at industrial facilities. In 1986 Congress passed a national right-to-know law, EPCRA (Emergency Planning and Community Right-to know Act) and resulted in the Toxics Release Inventory (TRI) database. From that moment American manufacturers have to report annually to the EPA (Environmental Protection Agency) the amount of toxic chemicals they release into the environment or ship off-site as waste. The database is made public on the Internet.

After some doubts, it became clear that public disclosure of the levels of pollution generated now enjoys wide acceptance. An increasing number of corporations recognise the positive links between public accountability and business performance. Improved environmental reporting also improved environmental and organisational performance. National environmental groups started to compile data to identify the top polluters in the United States. Because of this list, many manufacturers moved quickly to reduce their emissions. Local citizen groups found themselves better armed to substantiate their concerns and to force companies to address their concerns. Direct pressure from local community groups led to company commitments to reduce pollution discharges into their neighbourhood.

Often the "name and shame" aspect of disclosing information is sufficient bad publicity to persuade a company to change its behaviour and or reduce its use of toxics. Greenpeace and other groups use "name and shame" as a key strategy and the bad publicity surrounding Shell's handling of the Brentspar incident has caused Shell to rethink its public relations policy on environmental issues. What applies to the "image" of companies also applies, although to a lesser extent, to the image of (local) politicians and authorities.

The success in the United States shows that disclosure of the levels of pollution leads to public awareness. By using environmental information, citizens can draw the attention of manufactures and public authorities. The manufactures can be forced to improve their processes and reduce waste into air, soil and water. The public authorities can be forced to improve their environmental policy. It also improves the democracy, because the citizens have an instrument to practice their influence to improve their living circumstances.

In Europe, information is increasingly used in a similar way. Whether it can be as successful as in the United States depends on cultural and political differences. For example, the possibilities to take someone to court are generally less in Europe and the "culture of suing" is generally absent. The level of direct democracy also plays a role: the more people are up for period elections, the more likely they are to be influenced by the public opinion in their constituencies. Even if information is not used to influence companies or policies in an organised way, it can be used to suit individual needs and concerns, for example to find out if it is healthy or safe to live in a particular neighbourhood.

In 2003, the European parliament and the council published directive 2003/4/EC on public access to environmental information. The directive talks about access to environmental information upon request and the dissemination of environmental information. Member states have to take the necessary measures to ensure that public authorities organise environmental information, which is relevant to their functions and which, held by or for them, is made public by means of computer telecommunication or another electronic technology. Member states also have to ensure that environmental information

progressively becomes available in electronic databases that are easily accessible to the public through public telecommunication networks. This directive is the ratification of 'the Aarhus convention' of 1998 about public access to information in environmental matters.

A lot of environmental information is already available in Europe. Several countries have legislation that forces authorities to disclose information (including environmental information) on request. Increasingly, information is being published on the internet. There are different websites from public authorities that give the citizens some information on air quality, emissions and health. Environmental information is also available from annual environmental reports made public by industry. A European equivalent of the TRI database in the United States does not exist. For example, in the Netherlands, there is a website with a categorised emission database ([www.emissieregistratie.nl](http://www.emissieregistratie.nl)), but it is not possible to retrieve environmental information per individual company. On the European level there is an emission database: European Pollutant Emission Register (EPER), a European-wide register of industrial emissions into air and water (<http://eper.cec.eu.int/eper>).

In 2003, environmental groups in the Netherlands (Milieufederatie) published a "right to know" website where you could type your zip code and find out your cancer risk due to industrial emissions. The website attracted many comments from the industries included in the inventory and the local governments in the areas concerned. The website was far from complete, as industrial carcinogenic emissions are indeed a minor risk, but completeness was not the ambition of the developers. They wanted to show the kind of information (system) that was needed and considered it a government task to make sure that the websites were complete with all the relevant sources. The itchy reaction of both industries and (local) government shows that "name and shame" seems to work in the Netherlands as well.

In the United States, the first ten years of TRI (1989-1999) led to a decrease of emissions by 46% despite the rapidly growing economy, a trend that led EPA to call TRI "one of the most effective environmental programs ever legislated by Congress and administered by EPA." On TRI see for example: annex 4 and Beierle (2003).

### **3.5 Does information solve or create problems?**

As mentioned before, raising awareness on air quality with the ambition of changing, for example, people's car use behaviour is often thought of as one of the ways of improving urban air quality. As changing people behaviour through communication is difficult it is tempting to think that a constant flow of (technically, medically, scientifically, etc. sound) information and arguments might eventually persuade people to change. The example of advertising was mentioned and that too seems like a simple but successful bombardment with tempting information. We believe that the situation is more complicated and that simply hammering home a message might even be counterproductive. Gutteling and Wiegman (1996), mention that the impact of commonly used "fear arousal" communication strategies is unclear. They cite Sutton (1982), who observes that fear arousal increases the perceived fear (perception of risk) but it does not necessarily lead to persuasion.

Increasing a perceived fear/problem is not without side-effects. In many industrialised areas the air quality is much better today than the air quality some 50 years ago, yet today people are more worried about it and more bothered by it. On the one hand this reflects a real development: with life expectancy increasing, a larger part of the population is found in vulnerable groups. On the other hand fear arousal and the social amplification of perceived risk could also play a role. And apart from increased worries, Kofler discusses a kind of placebo-effect of information demonstrating that it can make people physiologically more sensitive to certain pollutants. This is something one obviously wants to avoid! A similar, unwanted, effect of information is discussed in a study on noise nuisance near the Schiphol airport. Though the exposure to noise near Schiphol is smaller than near other major airports, the number of complaints about noise nuisance are much larger. This is attributed to the existence of noise abatement policies and the way they are implemented. The mere existence of a policy reinforces the notion of noise nuisance, makes it possible to complain and creates expectations for solutions. The constant attention to noise nuisance increase the perception of nuisance (press release UvA on the PhD

research of Broër, 2006). This mutual reinforcement of a perceived problem and the official or media attention to it has happened to air quality in the Netherlands in the past few years as well. See box 4.

### 3.6 Summary

This extensive introduction to communication theory is concluded by a practical summary. This section sums up which steps you should take in order to make up a communication plan.

#### **Step 1: What is your target group?**

First, you have to determine whom you want to address. This can be several groups of people. Try to be as specific as possible when determining your target group. If they have some homogeneous characteristics in common, it will make it easier to reach them because you can use the same means of communication.

Next to knowing the demographics (sex, age, education levels etc.) of your target group, it is very helpful knowing more specific information, such as:

- What do they want to know?
- How do they want the message delivered?
- What is their need for information?
- What is their current knowledge and attitude on the subject you want to convey?
- Etc.

This information can be retrieved through research (qualitative or quantitative).

#### **Step 2: Determine your communication goals**

Communication goals can be set at three different levels:

- Knowledge: what does the target group need to know?
- Attitude: what should their attitude be?
- Behaviour: what should they do?

The goals must be made measurable so that the effect of communication can be determined afterwards. Also, the goals must be made per target group.

For instance, a knowledge goal could be:

80% of that target group knows that the current state of the air quality can be found on our website

#### **Step 3: What is the key message?**

It is important that the same message be conveyed in all communication. Communicating the same message constantly increases the chances of getting your message across. If the message is not exactly the same, it could create confusion and communication becomes less effective.

#### **Step 4: Determine means of communication**

There are mainly two important questions when determining which mean(s) to use:

- Through which mean(s) can the message best be communicated?
- Through which mean(s) can the target group best be reached?

The choice for means of communication is also influenced by the available budget. In the summary of chapter 4, you will find an overview of the advantages and disadvantages of the means of communication.

#### **Step 5: Planning and budget**

Which steps can be marked as communication moments? When will there be communicated to which target group? Making a communication calendar gives insight in these kinds of questions. In addition, it makes it clear when the means should be developed in order to have them ready in time.

After having made a planning, insight must be given in how the budget is divided. The question can arise if the chosen means of communication fit within the available budget.

**Step 6: Evaluation**

To be able to determine the effect of your communication efforts, the effects must be measured. It should be decided up front how this can be done best. A common manner of measuring is by determining the knowledge, attitude and/or behaviour levels before having communicated and afterwards.

## 4 Examples of information on air quality

### 4.1 Introduction, guide to users

Chapter 4 deals with examples of information. The examples might be helpful in developing your own material. Obviously, this section is not exhaustive and the fact that an example is included here only means that we think it is relevant, not necessarily, that it is the best in its kind. As the internet is often used for disseminating information, it receives a great deal of attention. For other sources, the examples given are more limited.

- In line with communication theory, in this chapter you will find examples of very general information to highly targeted information. The SMS service is the most specific at the time being.
- When brochures had to be translated the layout, pictures, etc., which are often as important as the text, are lost. Some translated originals are attached in the annexes.
- The annexes contain a lot of material. Sometimes reference to the annex is made from the main text, sometimes not. If one is looking for examples: study the table of content for the Annex.

In general, every communication-tool has its advantages and limitations at the same time. With every given example, we will mention the pro- and cons, so the reader can make its own decision to use it or not. The chapter starts with a review of several air quality websites. The review presents an assessment of the current situation and some ensuing remarks.

### 4.2 Website review, what is a good website?

What makes a good website? Firstly, reading text from screen will require short texts, clear text blocks, and clear headlines. In addition, the visitor of the site should be able to find the needed information within just a few 'clicks'. In order to make this happen, the website should be organised from visitor's point-of-view instead of an organisational point-of-view. We have looked around to see if there are inspiring examples. The Air Quality Management Magazine used to make an annual review of UK (and some well known international) air quality websites. The magazine provides some of the criteria being used and mentions the best sites according to them. This might be a useful start. However, the magazine is no longer online (2006) but an annual review is still being done by the author. Information can be found through <http://www.empublishing.org.uk/air/index.htm>. A website voted one of the best on several occasions is the CLAIRE website (<http://www.chiltern.gov.uk/claire/site/index.php>) it also has a section specifically for kids. See annex 12.

In general, the advantages of a website are:

- It's a fast medium, you can provide actual information to different target groups in 'no time'
- People can easily find the information they need
- The costs of providing new information are relatively low

Its limitations are:

- It is less suitable for large amounts of texts
- As organisation, you are dependant from the actions of your target group, to reach them they will have to take action and go to YOUR website! If they surf to another website, your information will not reach them.
- You don't know for sure if you reach all of your target groups; for example elderly people are less used to the internet
- Good maintenance of the website is absolutely necessary. People will loose interest when they find old information on your website.

#### 4.2.1 CITEAIR Review

A total of 41 air quality websites from France, Sweden, Norway, Finland, Austria, Germany, Italy, UK, Netherlands, Belgium, Czech Republic, Hungary and the US were more or less extensively reviewed and assessed. (See annex 9 for address details). A number of different people using a semi structured assessment grid did this. As was to be expected, making a ranking is impossible. Both the websites and the assessment (by different people) varied too much. Nevertheless, the review yields useful information on current practices. The (mainly qualitative) findings and interpretations are presented in this section. Some of the recommendations do not result from the review but are based on other experiences.

##### *Findings*

Some consistency in the approaches within a country was found though this might be because the reviewers looked for the websites they already knew and found inspiring. Still there is an enormous diversity in presentation and content. This is surprising, as copying good examples is relatively easy if it comes to electronic media. There are major differences in the nature of background and accompanying information: some websites have many health recommendations, others hardly anything. More surprisingly, the health advice and what is considered good and bad air quality shows major differences. Local government sites tend to have a lot of information on abatement plans and recommendations whereas websites with a monitoring background (EPA-s) hardly have any. Another striking difference between websites with a background in air pollution and more general websites is the attention given to indoor air pollution or greenhouse gasses. The "EPA websites" tend to focus on the ambient air quality they are and have been monitoring for a long time.

The general websites tend to look at air quality from the user perspective: what goes into the air? What is in the air that I breathe? For the average outsider the difference between a CO<sub>2</sub> and an SO<sub>2</sub> or benzene emission is not very obvious. This is the reason that every website on air-quality should start with a general introduction of the subject, the actual situation in the country, and naming and explaining the main pollutants.

The background information on the websites reviewed is occasionally provided as links to other websites. Though this is a convenient way to assure that the information is available, it sometimes involves a lot of "clicking around" and backtracking becomes difficult. Including links also implies that they have to be checked on a regular basis to avoid dead-ends. If maintenance of the website is an issue, it is better to include the information in the website itself.

##### 1. Air quality monitoring information

Main components are NO<sub>2</sub>, PM<sub>10</sub>, O<sub>3</sub>, CO and SO<sub>2</sub>. These were generally mentioned on 50 % or more of the sites. Benzene was found in 10 % of the cases. Toluene, lead, PM<sub>2.5</sub>, etc. were found only once or twice.

- Not all sites reviewed had air quality data. Several sites (e.g. UK) of national or local government organisations provided links to the national or regional network for actual measurements.
- Daily (PM<sub>10</sub>, SO<sub>2</sub>) or 8 hour (O<sub>3</sub>, CO) time resolution are the most common. Even NO<sub>2</sub> is often found in a daily kind of presentation (highest hourly average of the day). Year average information is occasionally supplied, sometimes in a report that has to be downloaded.
- Maps occur in half of the cases where data are being presented. Sometimes a map is presented showing concentrations. Sometimes a map showing the monitoring sites colour coded for the current concentration or index value.
- Difference between roadside and city background or regional background is made in about half of the cases. Sometimes this is explicitly mentioned; in other cases people looking for such a difference can derive it from the accompanying information. In several websites, the user can choose whether he wants to see all the details for a particular site or a table of all sites for a certain component.

- Forecasts for individual components are rare (less than one third) and in general only for ozone and sometimes for NO<sub>2</sub> or PM<sub>10</sub>.
- In most of the cases, the data is being presented with an indication of the air quality using scales from 1 to 3 up to 1 to 10.
- The common way of interpreting air quality is by using an index with a set of sub-indices for different components. Almost all indices have a daily time resolution. Quality interpretation for hourly values or the year average is rare.
- Index forecast is in about 50 % of the cases where an index exists.
- Most sites provide semi real time data though some have a time lag of several days or more.
- The presentation of data differs considerably. Many sites present a fixed format but some allow the user to select the precise period for which data are being presented.

*Remarks:*

- NO<sub>2</sub>, PM<sub>10</sub>, O<sub>3</sub> are the minimum to be supplied. They seem to be the most challenging components considering the EU-legislation and most networks have them.
- CO and SO<sub>2</sub> do not seem to pose a big air quality problem any more (?). Whether or not to include them is a matter of taste: how relevant is it to show a parameter that is always good ⇔ be complete if you can (and why not include some good news as well).
- Maps are nice to have. A complete (modelled) map for a whole city or region, and especially one where you can play a video for the past 24 hours, is very appealing.
- A map showing year average concentrations for the main components (or number of exceedances in case of O<sub>3</sub>) will be good to have. A map showing the spatial distribution of the year average of the index would be interesting especially for the general public.
- Differentiating between city background and roadside stations is a must if one wants to compare one city to the other.
- A table with the year average data (concentrations, index, number of daily exceedances, of EU-limit values, etc.) of the previous year is a must have.
- Hourly quality interpretation poses particular problems and is not quite common. The main question is what you want to achieve with hourly data:
  - for the general public: hourly data change often and might be attractive to track, implying repeated visits. (New years eve fireworks are impressive to track in a PM graph with hourly concentrations and boring in a graph with a 24h moving average!) It will also allow people to link every day events like the rush hour, to the concentration graphs they see. On the other hand, interpretation of quality is difficult and the public might be swamped with data: a general daily index figure is easier.
  - for technical staff: they can interpret the hourly data themselves. If they are the main audience for hourly data, a quality interpretation is hardly needed.

## 2. Index

It is clear that there are almost as many air quality indices as websites. Even the indices used in a single country are not always identical (e.g. Netherlands, Italy). The information on how the indices operate was sketchy but as far as the information was available the following things can be observed:

- There is an index per component and the worst of the sub-indices determines the overall index. Sometimes the main culprit is mentioned as well, e.g. "Today's index is 5 due to ozone".
- Class borders for the indices are derived on the basis of national legislation, EU-legislation, health risks or a combination of both.
- In general, there is some consistency at the higher end of the scale (what is bad or very bad) but the handling of the lower end of the scales varies enormously.

## 3. Alert values

Real time information on the exceedance of alert values is not common though on those sites with real time data or an index, visitors might draw their own conclusions. Sometimes the number of exceedances in a given reporting period is mentioned.

*Remarks:*

- If, in real time, the exceedance of alert values is explicitly mentioned it should be accompanied by explanations of what it means and behavioural recommendations. There is no point in ringing an alarm without giving some directions!
- Often the website is not used to alert people, but to provide the additional information related to an alert send out by other media (SMS, a teletext page).

#### 4. Sources of air pollution and other background information

- Almost one third of the sites have information on the main sources of pollution. Often this is general descriptive information or information on a national level.
- Pie charts showing the distribution of the emissions are rare.
- Spatial images of the main sources are virtually absent.
- Some websites explain the relation between weather conditions (or time of the day, day of the week, etc.) and the occurrence of poor air quality.

*Remarks:*

- Though an explanation of the driving forces of air pollution is not common it is a “must have” on any educational website. For example if one of the communication aims is to change people’s behaviour, a good explanation of the link between sources and concentrations is essential.
- There are two ways of looking at emissions:
  - The actual emissions per sector: traffic, households and small business, large industries/power supply, shipping/airports (if applicable)
  - The contribution of each sector to ambient conditions. This depends on location and can only be established by modeling.

The second point is important in cities with a considerable industrial section: here actual traffic emissions might seem small but as they are ground level emissions they still play a dominant role in ambient concentrations.

- If local (city) data are not available national emission inventory data can be used though they are not necessarily representative.
- An explanation of the role of weather and other conditions is an asset.
- Information on climate change, the two types of ozone (the one that protects us and the one that harms us), CO<sub>2</sub>, etc. is important. It is generally not part of the air quality websites and seen from the perspective of air quality managers and monitoring staff, the two are completely different but seen from the public perspective it is all about air.

#### 5. Health information

- General health information is available on half of the websites.
- Explications on short and long-term exposure are found on a quarter of the websites.
- If health info is available, it is often specific for each component.
- Links to other more specific health related sites occur on less than a quarter of the websites.
- Behavioural recommendations in case of pollution episodes are rare.
- Sometimes the health information is part of the index description (e.g. UK, US).
- Statistics on the number of people exposed to certain conditions (e.g. EU-non-compliance) is absent from the websites but is sometimes available in documents that can be downloaded from the site.
- Some sites provide health information together with other impact information like the impact of pollutants on vegetation, buildings and monuments, etc. Also a link to greenhouse gasses and global warming is occasionally provided.

*Remarks:*

- Health information and recommendations are essential if alert warnings are being provided.
- General health and impact information (per component) is useful. Especially if one wants the website to have an educational purpose as well.
- The number of people exposed (as part of the total population, or as map) is an important monitoring parameter to be included.

- A section on indoor air quality is an asset. Like climate change, it is not related to traditional air pollution monitoring. However, especially in a health section, it is worthwhile putting outdoor air pollution into perspective: indoor air quality can be as poor as outdoor air quality especially if ventilation is poor.

#### 6. Responsibilities

- Few websites (less than a quarter) present a section on the relation between sources of emissions and responsibilities of (local) government. Some provide general information on legislation or government policy, or offer links to it.
- Local government sites tend to be more explicit about measures and responsibilities than websites that have their origin in scientific or monitoring organisations. Some sites provide information on local measures or plans such as traffic measures, low emission zones, etc.

#### *Remarks:*

- It depends on the objectives of the website whether one wants to include this kind of information. In general it is useful to inform the public to whom they should address themselves if they are not happy with the air quality as it is.
- Right-to-know initiatives in the US have helped government and NGO's to put pressure on polluting industries (see the literature on the Toxic Release Inventory). Likewise, if we don't want to accept bad air as natural phenomena (bad weather), people at all kinds of levels (individuals up to international bodies) can do something and have to do something. The recently ratified (by the EU) Aarhus convention is also a reason to explain who is responsible for what, and where people can get information on abatement plans, etc.

#### 7. Personal responsibilities/actions that people themselves can take

A mixed image on this question: few sites have recommendations to the public, but those who have them tend to be elaborate. Examples given relate mainly to:

- Traffic, the use of public transport, advocacy of walking/cycling, car sharing (including a link to a local website where you can subscribe to this kind of service), clean vehicles, driving behaviour, etc.
- Projects with schools.
- Tips on pollution control by businesses.
- The role of bon fires, garbage burning, etc.
- Work at home
- Tips how to influence others .....

Some websites mention other types of information campaigns on this issue (flyers, brochures) the printed information is generally downloadable or can be ordered on the website.

#### *Remarks:*

- Like point 6. Whether to include it or not depends on the objectives of the website. However, I consider a selection of these topics a "must have" on a website. Even in cities with considerable pollution due to industries and shipping (like Rotterdam) 50 % or more of the pollution is traffic related. If we are to be successful in reducing air pollution, the general public is not only victim of poor air quality but also part of the solution as they are a substantial source of pollution.
- Information on "what you can do yourself" runs the risk of making a moralizing impression. Particularly in the case of open access resources like air, the impact of behavioural change of a single individual is very minor. A moralizing message on not using a car can achieve the opposite of what you want. In a recent campaign Dutch NGO's are now asking people to support policies that restrict traffic rather than trying to convince individuals to take the bus. This "cause" seems both more efficient and equitable and therefore more acceptable.

#### 8. The intended public

- Almost all of the websites cater for the general public. In local government sites with a lot of information as discussed under 6 and 7 this is more obvious than in other sites.

- Most of the sites also have sufficient technical detail to be relevant for technical staff. On some sites this is catered for by downloadable reports.
- Only a few sites seem to have made an explicit effort in structuring information purposely for different target groups.
- Some sites have specific sections/entries for schools and kids (including puzzles and games) though this might also be appealing to the public in general.
- Few are (or have sections) directed at air quality professionals in the sense that they provide sections with highly specific technical information.

*Remarks:*

- Define clear sections of the website designated for different audiences. E.g. don't hope that outsiders will find what they are looking for in the kids section: they might, but it might also put them off. Likewise, someone looking for pure concentration data might not want to click his way through behavioural information and a general story on greenhouse gasses.
- Don't call the section for air quality professionals by that name: it might put others off: The naming of the sections should be carefully considered.

#### 9. Solicit and handle feedback

- Surprisingly a number of sites do not present any possibility to react or respond to the website.
- A good number of sites have an address somewhere on the site and/or a button that launches a form or the e-mail program.
- Some sites provide (free) phone numbers for further queries.
- On one site a forum page was found, though it was hardly used.

*Remarks:*

- An email address (preferably a button that launches the e-mail program) is a "must have".
- If reports are not available in downloadable PDF-s, it is useful to have a form on the site for ordering printed information.
- If feedback is solicited make sure that there is a general (person independent) e-mail address that is adequately monitored so that quick replies are possible.
- A forum page or a questionnaire to solicit feedback might be useful in the early days of establishing a website. Probably the launch will be accompanied by publicity and will temporarily attract extra traffic. At this point extra feedback is useful for finishing touches to the website. As soon as feedback drops it is probably better to remove these items: a discussion forum where the last entry is 3 months old puts the whole website in a poor perspective.

#### **4.2.2 Air quality indices used on the internet**

THE COMMUNICATIVE PROPERTIES OF AN AIR QUALITY INDEX ARE DISCUSSED IN ELSHOUT ET ALL. (2007). THE WHOLE ARTICLE IS AVAILABLE IN ANNEX 11. THE MAJORITY OF THE PART ON INDICES IS REPRODUCED HERE.

##### *Different perspectives on air quality indices*

Air quality indices are meant to translate individual concentration measurements of a complex mixture of pollutants into a single figure indicating the relative quality of the ambient air. This can be done in numerous ways and many different indices exist. An index, is often thought of as a communication tool: an essential simplification of complex information. Though this sounds convincing, this hypothesis has never been tested as far as we know. Shooter and Brimblecombe (2005), in a review article on air quality indices, mention (citing Burden and Ellis, 1996) that in Australia, public confidence in reporting on air pollution fell following the introduction of an index. Apparently, making complex information simpler does not necessarily improve the communicative powers of the information. Other issues, as discussed in the previous section, probably play a role as well. (For other reviews of indices see for example Garcia and Colosio, 2002 and Elshout and Léger, 2006).

The type of air quality index Shooter and Brimblecombe advocate has a strong base in science and is mainly directed at communicating short-term changes in pollution in view of making health recommendations. Hence they advocate forecasted concentrations (yesterday's, or today's

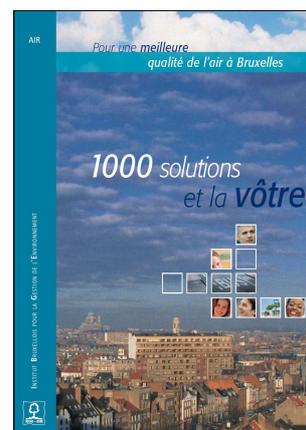
concentrations are still the most common presentation form on the internet) and stress the need for a correct translation of the public health effects of the pollutants into an index. The latter is a particularly complicated question, new information on health effects of pollutants and pollutant mixtures is published regularly and the relative importance of each pollutant in a pollutant mixture remains inconclusive. Most indices take a pragmatic approach: calculating sub-indices for each pollutant and the worst sub-index determines the overall index.

Shooter and Brimblecombe argue that with timely delivered information (forecasting) and scientifically correct assessment of health impacts the public has the opportunity to adapt its behaviour in appropriate response to changing air quality. However, they also cite a study by Johnson (2003) that observed that different versions of the USA's index did not particularly well at increasing public knowledge or changing people's behaviour in case of episodes. Though this could mean that air quality indices (and their delivery) still have to be improved, it could also mean that the general public is not overly concerned about air quality and does not feel a need to change their habits. As was mentioned before: in large parts of Europe and the US, pollution episodes are increasingly rare so alerting the general public (sensitive target groups is a different issue) by means of a website and an index might not be the only, or the most relevant objective of having an air quality index.

An important disadvantage of indices based on health impacts is that they tend to trail at the good end of the scale as short-term exposure to air pollution (particulate matter probably being an exception) is seldom a problem. For the general public this implies that the index hardly changes and seems to convey the message that air quality is good. At the same time annual limit values are exceeded, action plans have to be made, infrastructure development is blocked, etc. This way, an air quality index confuses rather than informs the public. Feedback of this nature was received both in Rotterdam and in the UK (Fuller p.c.), where the index is firmly rooted in health-based recommendations. This paradox between short and long-term exposure is hard to solve on a website.

### 4.3 Printed information material

The Brussels Institute for Management of the Environment developed a 16-page brochure ("1000 solutions et la vôtre"). The brochure provides a short description of air pollution and many suggestions for things people themselves can do to reduce their contribution. The brochure is available in French and Dutch. Annex 6 provides an English translation of the main texts. To get a glimpse of the original design and layout the front cover page is shown.



### 4.4 Information exchange platforms

In areas where particular problems occur and/or where the public has organised themselves into pressure groups the creation of a more or less permanent information channel might be useful. This permanent exchange of information can take place in the form of periodic meetings between the population concerned, relevant government services (EPA, public health department, local government), and people responsible for the source of nuisance. Two examples are provided in this section.

#### 4.4.1 Communication between industry and public on environmental matters

In the last 10 years, the communication between the industries in Rijnmond and the residents of the surrounding towns has grown and improved. The Rijnmond area is densely populated and heavily

industrialised. The closeness of the industry to residential areas often causes nuisance (odour, noise) or concern (flares, sirens). To improve the mutual understanding, DCMR Environmental Protection Agency in 1998 took the initiative to form a regional “nuisance and safety platform”. In this first platform, representatives of neighbouring communities met with representatives of Shell Refinery to discuss various environmental and safety matters. After a slow and tentative start, this form of communication proved to be very successful. It has resulted in similar platforms elsewhere in the region.

The platform around Shell has changed its name to Residential Advisory Board and on occasion of its 5-year existence, published a brochure, which can be used as a model for other communities who want to start as well. This brochure is added as an annex to this report.

Experience shows that there is willingness among the industries in the area to listen to the complaints and concerns of the people living near to them and to be open about their activities. On the other hand, the members of the platforms are willing to listen to the representatives of the industries and discuss the different options for improvement. It is, of course, of great importance that the discussions within the platforms are not kept to the meeting rooms. Results of the discussions should be published in local newspapers and once or twice a year a public meeting should be held. On such a meeting a subject should be addressed that has general attention value, e.g. because of a recent event or a recent press publication. A visit to an industrial site is also a much-appreciated form of information transfer.

See annex 8 for excerpts of an internal Shell brochure dedicated to this project.

#### **4.4.2 Information to the public on traffic-related air pollution**

Similar to the existing “exchange platforms” with the industries an evening was organised near a traffic hotspot. In close co-operation with local pressure groups, DCMR has organised a meeting in one of the boroughs of Rotterdam, through which a very busy motorway runs and where high concentrations of air pollution occur. The public health service, DCMR (air quality department) and a national research institute gave presentations. The main theme was the level of air pollution and the health effects caused by these levels. Though there was a presentation on expected future levels, talk about ways to solve the problems was avoided. A report of the meeting was published shortly after. The report provided answers to most of the questions that were raised during the meeting, including those questions that were too difficult to answer on the spot and had needed further inquiry/research. This document was also published on the internet. After this initial meeting, there have been follow-up contacts with locally active groups of concerned citizens, the borough council, etc.

The initial meeting was a success though it did not meet all the objectives. The pressure groups had been frustrated about the way that they had been handled by, for example, the roads department of the Ministry of Transport. Confusion over traffic intensities and traffic projections had given them the impression that there was a cover-up of the real problems. Some of the mistrust remained after the meeting but a good basis for a future exchange of information had been created. The organisers felt that the strong points had been that: facts were presented by independent and credible organisations; that the roads department was not on the panel; that controversial issues like proposing solutions had been avoided. Though controversial issues probably cannot be avoided forever, it is imported to establish “working relations” before they are raised.

### **4.5 Highly targeted information**

#### **4.5.1 Introduction**

Targeted information can be seen in two ways: targeted to a narrowly defined group such as doctors, or targeted to a specific moment. Examples of brochures to a specific target group (doctors and patients) are given in annex 5.1 and 5.2.

Examples of time specific messages are pollution bulletins during episodes. Some of this information is mandatory: for several pollutants, information thresholds are specified in the directives. Generally, these warnings will be given in through ordinary mass media, if necessary with back-up information on a website.

New technology like SMS and e-mail make it technically feasible to deliver specific messages, to specific clients at specific moments. In some countries experiments are under way to replace (or complement) the traditional disaster alert sirens with SMS messages. The idea is that the siren just signals that something is happening and people have to check the local media to find out what behavioural advice is given. SMS will inform you both on the event and provide a first recommendation.

#### 4.5.2 Air quality information through SMS

In Norway, SMS information on air quality is offered. It was developed as part of an EU-funded project, Air Pollution Network for Early warning and on-line information Exchange in Europe (APNEE,

News release on the NILU website, 27 Oct 2004.

**Wherever you are... now you can receive information about the air quality in Oslo on your mobile phone or by e-mail. The service will also be offered to other Norwegian cities in the near future. The system is enabled by the AirOnline application developed by NILU.**

*The service includes a daily forecast service and messages with information about the air quality status. The status is based on measurements from several locations in Oslo. The air quality status is given as an Air Quality Index, based on measurements of particles (PM<sub>10</sub> and PM<sub>2.5</sub>) and NO<sub>2</sub>. **The user defines the level of pollution for which she wishes to receive information on the air quality status and for which areas.** (my emphasis, se)*

*The service includes SMS and e-mail. The user can either subscribe to daily messages by SMS and/or e-mail, or request information via SMS when needed. The e-mail messages include health information and recommendations. The e-mail messages are free of charge. The SMS messages are also free of charge for the time being, but will cost NOK 1 in the near future.*

*More detailed information is available on: [www.luftkvalitet.info](http://www.luftkvalitet.info), which is the Norwegian national parallel of international AirOnline system.*

#### **Air quality on the Internet**

*The most advanced and yet easy solution to implement air quality information services, including SMS, on the Internet is using the AirOnline web system developed by NILU. AirOnline is a NILU hosted web-solution for on-line dissemination and presentation of air quality data and information from monitoring stations located within one or several cities.*

*AirOnline consists of public pages as well as administrative pages. The administrative pages enable the representatives of the monitoring network within a city, or at the national level, to control all the information and data that is displayed on the public pages.*

*The public pages consist of the following features:*

- *City pages that include status of the air quality - Air Quality Index (AQI)*
- *Graphical presentation of air quality data from the stations,*
- *Dynamic map showing the stations within a city, and also showing the AQI*
- *Information on the monitoring network in the city*
- *Relevant links.*

*The AirOnline application also offers a national portal solution where several cities can have one common national network. The national portal displays a list of all the cities, the air quality index for each city and provides the public with a good overview of the air quality situation within their country at any time.*



<http://www.apnee.org>). The services were field tried in five countries. One of the findings in APNEE was that it was important for the users to receive information about health implications and advised action. This kind of information is included in the email messages. It is also important that such a service is backed by an Internet solution, which offers more detailed information about the air pollution situation.

Recently the London borough of Croydon has launched an elaborate web based air quality information and forecasting platform including a text messaging service. See the ESA news release [http://www.esa.int/esaCP/SEM2AS1DU8E\\_index\\_0.html](http://www.esa.int/esaCP/SEM2AS1DU8E_index_0.html) and the Croydon website where people can register for the SMS service [http://www.croydon.gov.uk/environment/nrqp\\_1/air/airtext](http://www.croydon.gov.uk/environment/nrqp_1/air/airtext).

#### **4.5.3 Voice and text targeted messages**

One of the drawbacks of SMS messages is that it targets people with mobile phones. For the time being SMS is less likely to appeal to a particularly sensitive group: the elderly. The Sussex Air Quality Partnership offers people the possibility to subscribe to an automatic warning system called "airALERT". Subscribers can choose if they want to receive an SMS or a voice message on their home telephone. Subscribing schools receive e-mail messages and an arrangement was made with the local radio. This is an example of a system targeted both in time and in delivery mechanism. Brief information on airALERT and a summary of findings of the 2006 evaluation is available in annex 10. the website is <http://www.sussex-air.net/index.html>.

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# Annex

Annex 1, describing the CITEAIR project, is included in this document but all other annexes, mainly examples or reference material, are presented in a separate document. The table of content of that document is repeated here.

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## A.1 Description of the CITEAIR project

### Introduction

The development of Europe's urban centres is in many ways linked with the development of sustainable mobility options. Changes in behaviour, economic growth or recession and structure of the population are factors that have an immediate impact on mobility patterns, transport and the environment. Cities and regions are the places where the most complex challenges in transport and environment need to be solved.

Air quality has unquestionably adverse effects on human health. Because the dominant source of environmental impacts in most urban areas is traffic, local and regional authorities must find efficient and integrated solutions for their environmental and traffic problems to increase the quality of life for its citizens. The pressure on European cities and regions to implement the related EU regulations on air quality has led to a multitude of initiatives to develop a concrete sustainability perspective, which compromises between environmental quality and economic growth.

However, the absence of a common approach for the implementation of these regulations has led to isolated solutions. For developing better and more efficient solutions and creating synergies, an initiative for sharing expertise, knowledge and experiences is required.

The overall objectives of CITEAIR are:

- to jointly develop better and more efficient solutions for assessing the impact of traffic on air quality in large urban areas using Information Society Technologies,
- to inform professional users and the public on the air quality based on common guidelines and
- to give guidance on efficient measures to abate adverse environmental situations through close co-operation, experience exchange and joint developments with European Cities and Regions.

The CITEAIR project started in March 2004, and lasted 46 months. It was led by Leicester (UK), in collaboration with Paris (FR), Prague (CZ), Rotterdam (NL), Rome (I) and supported by the Region Emilia Romagna (I) and the cities of Munich (DE), Coventry (UK) The Hague (NL) Bratislava (SK) and Brussels (BE). The project contributes to the development and implementation of efficient solutions to assess and reduce the impact of traffic on air quality in large urban areas. Through close co-operation, exchange of experiences and joint developments between European regions and cities, the project develops solutions to inform the public and local authorities about the environmental situation in a comparable and easy understandable way and offers guidance on efficient measures to reduce environmental damage mainly caused by transport. Other municipalities are encouraged to contribute to the initiative via a user network.

### The products

CITEAIR project partners have developed of the following products:

#### **The guidebook “Air quality management”**

Built on experiences in European cities and regions, it identifies gaps in knowledge and strategies in air quality management and proposes solutions for efficient environmental management. The guidebook was developed to inform professional users on efficient abatement measures.

#### **The guidebook “City annual air quality reports”**

The aim of this guidebook is to recommend a common reporting format for air quality applicable for European cities. The format obviously contains all data that have to be reported under the EU obligations but also suggests additional sections that facilitate the use of the report for city to city comparison and help in making action plans. The ultimate goal is to develop an automated form where the relevant pollutant concentrations can be inserted and a complete report is generated.

#### **The Guidebook “Communicating air quality”**

In many cities efforts are being made to inform the public on air quality – which is an obligation under the EU Framework Directive on ambient air quality and under the Aarhus Convention ratified by the EU in 2005 - and to influence behaviours, particularly where traffic is the dominant source of air pollution in urban areas. The guidebook is an introduction to communication theory applied to air quality. It also contains good practices, which could be used as examples.

#### **The air quality index document “Comparing air quality across borders”**

As one of the cornerstones in public information CITEAIR developed the first air quality index for use at the European level. This common air quality index (CAQI) is a set of two indices: one for roadside monitoring sites and one for average city background conditions. Differentiating between roadside and general city conditions is a first step in assuring consistence in the parameters that are being compared. It is not aimed at replacing existing local indices. It is dedicated to comparing air quality in European cities and bringing simple information to the European citizens, easily accessible. The full description of the CAQI is available in the document “Comparing air quality across borders” at <http://citeair.rec.org> and at [www.airqualitynow.eu](http://www.airqualitynow.eu)

#### **The website [www.airqualitynow.eu](http://www.airqualitynow.eu)**

As environment is a theme of high importance, the public should be able to assess to what extent they are affected by air quality. The website [www.airqualitynow.eu](http://www.airqualitynow.eu) provides an attractive platform to compare air quality in different participating cities in real time applying the CAQI. It is operational since March 2006 and displays data from 21 cities (status July 2007) in real time.

#### **The guidebook “Transferring a traffic-environmental models chain”**

This guidebook allows the transfer of experiences in developing a Decision Support System (DSS) based on a previous European project (HEAVEN, <http://heaven.rec.org>) that assesses the environmental impacts of urban traffic in near-real time, from a local scale to a wide area (regional scale). The main asset is a concrete implementation plan for the DSS definition that meets the needs and requirements of the Emilia-Romagna region. In addition it presents guidance for future transfers to other European cities and regions.

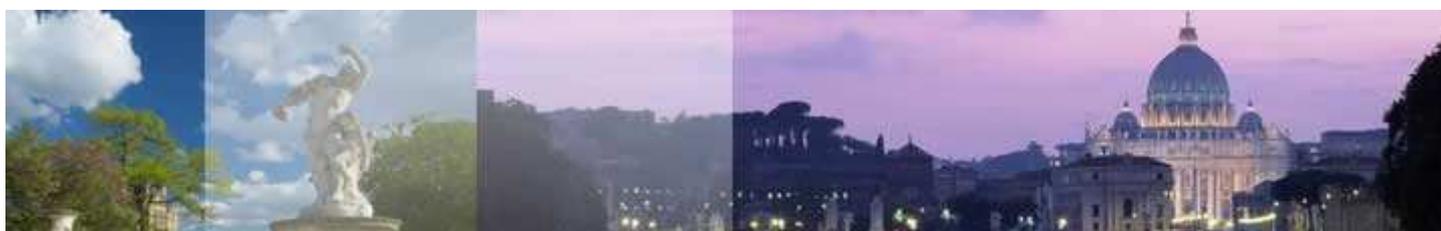
For more **information** on CITEAIR or to **download** CITEAIR products: <http://citeair.rec.org>  
To **contact** the CITEAIR team: [info-citeair@rec.org](mailto:info-citeair@rec.org)



# Communicating air quality

A guidebook on communication with the public about air quality

ANNEX





## Component 3

# Communicating air quality

A guidebook on communication with the public about air quality

ANNEX

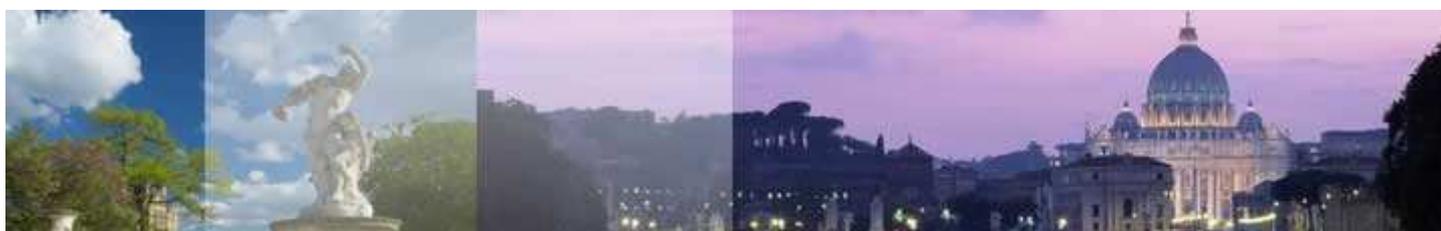
July 2007, final document

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## Foreword

This document is a result of the CITEAIR project (INTERREG IIIc contract 2W00251).<sup>1</sup>

This document contains the annexes referred to in the document "Communicating Air Quality" except Annex 1, describing the CITEAIR project, which is included in the main document. The documents were separated as the whole was becoming too bulky and the annex is more of a working document where examples can continue to be added than the main text.

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<sup>1</sup> See annex 1 of the main text for more comprehensive information on CITEAIR or <http://citeair.rec.org>.

## A.2 CITEAIR internal questionnaire on communication

1. Do you communicate to your citizens on air quality issues? no further questions

1.1. No, not at all and we have no intentions to do so. Go to 1.2.1

1.2. No not actively but citizens can demand the official reports we produce Go to 1.3.1

1.3. No, not yet but we have plans because:  
 Go to 1.4.1

1.4. Yes we actively try to make information available to the general public Go to 1.4.1

1.2.1 What kind of official reports do you produce that citizens can request to receive? (e.g. annual report, reports on industrial or other incidents, reports on pollution episodes, ....?)  
 no further questions

1.2.2 Do you have plans to increase your communication? YES/NO If yes, continue with 1.3.1; else no further questions

1.3.1 Our plans and our priorities are:  
 Go to question 2. Several of the following questions won't apply. However, you might have given them a thought. Please answer where you can.

1.4.1. We make information available because **(choose one of the two or both at this level)**:

1.4.1.1. We have to communicate to the public because of national/local legislation.

1.4.1.1.1. If so, was this legislation specifically directed at air quality issues or on environmental issues in general? YES/NO

1.4.1.1.2. Does this legislation stem from EU guidelines or directives? YES/NO

1.4.1.1.2.1. If yes, which directives?

[ ]  
1.4.1.1.2.2. If no, can you briefly describe the other legislation compelling you to provide information to the public?  
[ ]

1.4.1.1.3. Does the legislation in any way indicate how you have to communicate? E.g. does it provide criteria on the kind of information you have to supply, the means to communicate, the frequency, the level of detail, etc.  
[ ]

1.4.1.2. We want to communicate to the public because we have our own objectives to do so **(more than one answers are possible at this level)**:

1.4.1.2.1. People have the right to know what the condition of their environment is and what the quality is of the air they are breathing.

1.4.1.2.2. We use it as publicity for the work of our own department/unit.

1.4.1.2.3. We want to create awareness on environmental and air quality issues hoping that it will generate public support for sound environmental policies.

1.4.1.2.4. We think that the public might be part of the solution to improving air quality so we provide information on their role as a source of pollution and what they can do (e.g. energy efficient, use public transport, etc.).

1.4.1.2.5. We think that it might be interesting for the public but we do not have a clear objective of our own.

1.4.1.2.6. We want to inform people with health problems when they can expect problems and what they should do or not do during these periods/episodes.

1.4.1.2.7. Other:

[ ]

1.4.2. Do you expect changes in your communication in the near future? YES/NO

1.4.2.1. If yes, why?

[ ]

1.4.2.2. If yes, what kind of changes?

[ ]

2. Communication might be more effective if you have a specific message and a specific means of communication for each specific target group. Does your communication strategy consider different target groups?

2.1. No, we never thought about different target groups.

2.2. No, differentiating between target groups might, or might not be useful but it is too much work/too costly.

2.3. No, we have thought about differentiating between target groups but we do not know which target groups to consider.

2.4. Yes, we have identified a number of target groups for which we have a specific message/means of communication. The target groups are:

[ ]

2.4.1. Did you do a survey to identify these target groups? YES/NO

2.4.2. Can you explain why you chose these target groups in particular?

--

2.4.3. Can you explain if and how these target groups relate to your reasons to communicate (see point 1.4) by making a kind a matrix as shown below:

Reasons→	a.	b.	c.	Etc.
↓ Target group				
x.				
y.				
z.				
Etc.				

2.4.4. Do you have separate communication messages for these target groups? YES/NO

2.4.4.1. If yes, can you indicate the combinations by making a kind a matrix as shown below:

Message→	a.	b.	c.	Etc.
↓ Target group				
x.				
y.				
z.				
Etc.				

2.4.5. Do you use different communication means (flyers, internet, reports, etc.) for each of the target groups? YES/NO

2.4.5.1. If yes, can you indicate the combinations by making a kind a matrix as shown below:

Means→	a.	b.	c.	Etc.
↓ Target group				
x.				
y.				
z.				
Etc.				

3. What communication means do you commonly use (**more than one answers are possible**)?

3.1. The internet providing static historical and/or year average data?

3.1.1. If so, why use the internet for this purpose?

3.2. The internet providing daily and/or hourly data?

3.2.1. If so, why do you provide hourly daily/hourly data?

3.2.2. If you provide daily or hourly data, do you also provide forecasts? YES/NO

3.2.2.1. If yes, why do you provide forecasts?

3.2.2.2. If no, why don't you provide forecasts?

3.3. Other media (radio,tv, newspaper) on a regular basis

3.3.1. What kind of information do you supply through the media on a regular basis and why?

3.4. Other media (radio,tv, newspaper) in case of incidents or episodes

3.4.1. Can you give examples (in English, French, German or Dutch)?

3.5. Highly targeted messages such as sms, email, etc.?

3.5.1. In what kind of circumstances do you use this and to whom are you sending them? Can you give examples (in English, French, German or Dutch)?

3.6. Temporary (awareness) campaigns using billboards, posters, flyers, etc.

3.6.1. In what kind of circumstances do you use this? Can you give examples (in English, French or Dutch)?

3.7. Annual reports designated at non-technicians.

3.7.1. Can you give examples (in English, French or Dutch)?

3.8. Other:

4. Did you ever assess the effectiveness of (one of) your information strategies? YES/NO

If no, go to 4.2

4.1. If yes, which strategies or messages did you evaluate?

4.1.1. Was there a particular reason for evaluating a certain strategy?

4.1.2. What were the outcomes/what did you learn?

4.2. Did you ever abandon a certain information strategy? YES/NO

If no, go to 4.3

4.2.1. If yes what was it and why?

4.3. Do you have an idea whether your information is in demand (like reports requested, hits on a website, etc.) YES/NO?

4.3.1. If yes, can you provide details?

4.4. Is air quality a public concern in your city or region? YES / NO / DON'T KNOW

4.5. Did you ever think about of an information strategy or saw examples that you think might be useful but you have not used it so far? YES/NO

If no, go to 5

4.5.1. If yes, what was it?

4.5.2. Why has it not been applied yet?

5. Air quality related information

5.1. If you provide air quality information, do you provide this in relation to health information? YES/NO

5.1.1. If yes, do you provide the health information (**chose one**):

5.1.1.1. mainly during episodes or smog periods

5.1.1.2. there is always some kind of health information accompanying the air quality information

5.1.2. Can you give examples of the information you give (in English, French or Dutch)?

5.2. Do you present air quality information in relation to other kinds of information (traffic, meteo, etc.) YES/NO

5.2.1. If yes, what kind of information

5.3. Do you collaborate with other organizations while providing or developing information (public health authorities, concerned citizens groups, organizations of patients, .....)? YES/NO

5.3.1. If yes, what organizations?

6. From the above we have some idea what kind of communication strategies you employ and why. If you have a website, please provide the address (and an English summary of the navigation structure). If you have other examples of reports, leaflets, newspaper, ads, etc. of the means you employ and the information you provide please send them (or an English description) as well (electronically or on paper). The remaining questions deal with examples you provide.

6.1. Concerning your current efforts in the domain of public information and the communication strategies in use, what are your main worries, the aspects you would like to improve? Why?

6.2. Which of your existing communication strategies are performing really well and might serve as an example, or inspire others? Why?

6.3. Which examples of communication strategies do you know of that you think are very useful and/or inspired you to develop your communication strategies? Why?

6.3.1. Do you have them or where can we find them?



### A.3 Questionnaire medical practitioners Rotterdam Survey + Results

This annex presents the questionnaire + the answers given. The introduction letter is given at the end of the annex.

The questionnaire is in a black font, the answers obtained are in blue.

1. In your practice, are you consulted about health problems related to air pollution?
  - Seldom or never 68.7 %
  - Monthly 20.2 %
  - Weekly 10.6 %
  - Daily 0.5 %
  
2. Do you consider that you are sufficiently knowledgeable about the effects of air pollution on the health?
  - Yes, I know enough. 8.5 %
  - I know a lot about it, but sometimes I would like more (detailed) information about the possible effects of air pollution on health. 27.1 %
  - No, I do not know enough about it. 64.3 %
  
3. How do you think that general practitioners can best be kept informed about the effects of air pollution on health? (-> Tick one or more answers).
  - Internet. 41.8 %
  - An informative brochure. 46.3 %
  - An article in a professional journal. 43.8 %
  - A lecture or seminar during a refresher course. 44.3 %
  - Other... 4.0 %

#### Other suggestions concerning communication with general practitioners:

- 
- Via periodical writing of the Municipal Health Service Rotterdam.
  - Newsletter of the Municipal Health Service Rotterdam, with up-to-date information.
  - Evening refresher course, only with essential information, which I, as general practitioner can use to really help the COPD/asthmatic patient.
  - Refresher course when there is a relevant situation for it, for example with industrial fires.
  - Article sent by e-mail, fax.
  - Update by e-mail.
  - Local radio station.

4. How do you think that sensitive groups (for example asthmatics) can best be kept informed about the effects of air pollution on health? (-> Tick one or more answers).
  - Internet. 46.3 %
  - An informative brochure. 56.2 %
  - An article in, for example, Contrastma.\* 26.4 %
  - Special information meetings for, for example, asthma patients. 26.9 %
  - Via their general practitioner, for example during a normal visit. 41.3 %
  - Other... 19.4 %

\* Contrastma is a magazine for members of the Dutch Asthma Foundation (Astmafonds) and appears every two months.



Other suggestions concerning communication with sensitive groups:

- (Lokal) television.
- (Lokal) radio.
- Forceful press briefing, articles in medical sections of newspapers.
- Media with correct information.
- National and local newspapers, television-programs, popular (women's) magazines.
- Only when relevant: for example warning to stay inside. Otherwise pointless.
- Television teletext service.
- Commercial on (local) television station.
- Information via specialized nurses / medical receptionist at the practice.
- At "weather"-section in paper/teletext (e.g. pollen messages, will be read a lot).
- An educational course on television.
- Recurring item in a free local paper.
- A television program: "Air pollution, what is it to me?"

5. Does your practice at this moment require accurate information about the air quality in the Rijnmond region (for example a daily updated index)?
- Yes, this would (sometimes) be useful. 40.7 %
  - No, this is not necessary. 59.3 %
6. Do you think that in the future to do your work you will need accurate information about the air quality in the Rijnmond region (for example a daily updated index)?
- Yes, I expect that in the future it would be useful. 55.7 %
  - No, I do not expect it to be necessary. 44.3 %
7. If you do need information about the air quality (or expect to need this information in the future), at what level would you like to receive this information? Consider for example an index on the scale of 1 to 10 for the general air quality at a particular moment. \*\*
- An index for the whole of the Rijnmond region. 36.6 %
  - An index for each city/town/village. 32.3 %
  - An index for each district. 28.6 %
  - An index for each street. 2.5 %
  - An index for each house. 0 %
- \*\* Further analyses indicated that the choice for a specific level was strongly related with the practice location. Practitioners in a relatively small town (e.g. Capelle aan den IJssel) generally prefer a less detailed level than practitioners in Rotterdam.
8. Do you have access to internet at your practice?
- Yes 62.7 %
  - No 37.3 %
9. If you have access to internet at your practice, do you use it regularly for your work?
- Seldom or never 24.2 %
  - Monthly 6.5 %
  - Weekly 20.2 %
  - Daily 49.2 %
10. May we contact you again (this time by telephone) to answer additional questions concerning this survey?
- No, I would prefer it if you did not. 41.8 %
  - I have no objections. 32.8 %
  - I have no objections; however, I would prefer you to contact me in a different way, via... 25.4 % (by mail, e-mail, fax...)

If you have comments or suggestions concerning this survey, we would be very interested to read them:  
8.0 % did

Suggestions / comments that were given:

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- In our practice, we have specialized nurses who focus on asthma, COPD, spirometry, medicine information. They should also be educated about this topic.
- Stronger lobby against car traffic and local congestion spots would not be such a bad idea.
- A tax on spray cans.
- Forecasts for example for one or two weeks.
- Mail by 'Lifeline' (-> secured web for medics!).
- I am not working as a general practitioner but as a nursing home doctor. The situation seems less relevant.
- It is more meaningful to put your energy in the prevention of air pollution.
- I hope that something will come of this study soon.
- This should have been done 30 years ago, now it is useless.
- I would like to receive your conclusions and suggestions.
- Good cause seems like an underestimated problem.
- Smog / satellite photos with caption "worst polluted part of Europe" seem oversimplified to me. What of it is actually proven?
- The concept air quality and/or air pollution is known but medical-scientifically difficult to reduce to patient level, except for critical danger / threat etc.
- This questionnaire is the rationalizing chq. intellectualising of an existing and growing problem.



**GGD**

**Rotterdam en omstreken**

Department For Environment and Hygiene



Sector General Health  
Department for Environment and Hygiene

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To all general practitioners in Rotterdam  
and surrounding districts

**Our Ref:** CITEAIR/DJ/321

**Nr pages:** 1

**Nr enclosures:** 2

**Concerns:** Investigation into the  
information required by general practitioners  
concerning air quality data

**Date:** 19 November 2004

Dear Colleague,

You receive many requests to take part in surveys, for which you do not always have the time and/or the interest. However, we would like to draw your attention to this questionnaire in the hope that you will take a few minutes to complete it. During recent months, you may have been aware of reports concerning the poor quality of the air in our region. Satellite photos with air pollution in colour showing Rijnmond as a red blotch on the map have made a huge impression. You yourself may have questions or perhaps your patients have questioned you about the situation. The enclosed questionnaire addresses this issue.

A number of cities including Paris, Rome, Leicester, Prague and Rotterdam are involved in a European research project CITEAIR (Common Information to European AIR). One of the aims of this project is to set up a website presenting current, accurate information concerning the quality of the air in the various cities in a uniform way. In addition, investigations are being carried out into how information about the air quality can best be made available to those interested (politicians, doctors, technicians, public).

The DCMR Environmental Services Rijnmond and the Rotterdam City Development Corporation (OBR) are responsible for the Rotterdam input. Where possible the GGD contributes to the content. More information about CITEAIR is available on the internet site <http://citeair.rec.org/>. Within the framework of this European project, we would like to ask you, as general practitioner in the Rijnmond region, a few questions about your requirements for data concerning the air quality and its relation to health. In order to build up a realistic picture it is important that the response to the questionnaire is high. Please will you complete the questionnaire and return it before 10 December using the enclosed freepost envelope.

If you have any questions or difficulties completing the questionnaire, please contact us using the telephone number or e-mail address above.

Thanking you in advance,

Drs. R. van Doorn, toxicologist  
Head of Department Environment & Hygiene  
GGD Rotterdam and districts

Mw. C. Hegger, doctor medical environmental studies  
Department Environment & Hygiene  
GGD Rotterdam and districts

**Enclosures:** Questionnaire information required by general practitioners concerning air quality  
Freepost reply envelope

## A.4 Tracking toxics: chemical use and the public's "right-to-know."

By: **Shelley A. Hearne.** (Excerpt without notes)

Industry, government, and community representatives alike consider the Toxics Release Inventory (TRI), enacted in 1986 as part of the Emergency Planning and Community Right-to-Know Act (EPCRA), one of the most successful environmental laws in U.S. history. (1) TRI is distinctly different from most other U.S. regulations, which either attempt to closely control how business manages its waste or rely on market incentives to minimize pollution. TRI is a simple pollution accounting system. It requires major industrial plants to publicly disclose every year the levels of pollutants that they have discharged into the air, water, and land or transferred to other sites for incineration, recycling, and disposal. TRI also differs from most other U.S. regulations in one other key respect: For the first time ever, EPCRA made the comprehensive environmental database generated from the annual TRI disclosure statements accessible to the public via computer. Arguably, the public disclosure component has been pivotal in motivating companies to reduce pollution. The open airing of their activities has encouraged industry to implement better environmental practices without the hammer of regulations. A number of major companies, including Monsanto and Boeing, initiated voluntary programs to reduce pollution by as much as 100 percent after TRI data revealed the voluminous quantities of expensive and dangerous chemicals that they were releasing into the environment.

Despite its power, however, public information cannot substitute for strong environmental laws and enforcement. Acknowledging the public's "right to know" about the release of toxic substances does not mean that the burden of safeguarding the environment and public health should shift to the public. But, as the experience with TRI attests, public information, in tandem with strict environmental laws, can exert a positive influence on corporate decision makers, provide government officials with accountability tools, and empower community groups to work intelligently with local operations to develop more effective environmental protections and to lower the release of carcinogens and other dangerous chemicals.

Currently, TRI only collects information on what comes out of the smokestack, is discharged into the sewer, or is buried in landfills. This "end-of-the-pipe" emphasis does not measure changes that are made upstream to reduce toxic chemical use or the generation of pollution. However, if TRI were expanded to include a full accounting of all the toxic chemicals that flowed through an industrial facility (a process known as materials accounting), the complete effects of pollution prevention efforts could be measured. In its present form, TRI cannot effectively distinguish between pollution prevention measures and other practices that reduce pollution releases. In fact, the database is often blind to risk-reducing changes made upstream. A materials accounting would not only reveal the effects of such changes but would record the volume of chemicals used at a facility. Expanding TRI to include materials accounting data would thus give the public access to greater information about the toxic chemicals used in consumer products, chemicals that are routinely transported through neighborhoods and are part of the work environment.

The U.S. Environmental Protection Agency (EPA) is currently considering expanding TRI in just this way. The success TRI has had in propelling industry toward voluntary release reduction makes a convincing case for transforming it from a pollution accounting system into a materials accounting system. The benefits companies would accrue through more accurate evaluation of the success of their pollution prevention activities are substantial. Yet, some do oppose expanding TRI to include materials accounting data. As was the case in the original debate surrounding EPCRA, issues of efficiency, cost, and the appropriate level of public disclosure top the critics' list of concerns. Before examining these, however, it would be useful to look at some aspects of TRI's history.

### *The Right to Know*

On 3 December 1984, an accidental release of methyl isocyanate at Union Carbide's pesticide manufacturing plant in Bhopal, India, killed approximately 3,000 people and injured hundreds of thousands. Around the same time, several similar (though much smaller) incidents occurred in the United States.(2) One particularly striking incident occurred eight months after Bhopal at another Union Carbide facility in Institute, West Virginia, where more than 100 residents of the town were hospitalized after being exposed to

toxic fumes released from the plant's pesticide manufacturing operations.(3) Together with the Bhopal spill, these events raised public awareness about the risks associated with chemical use and fed a ground swell of support for the public's right to know about chemicals used and released at industrial facilities. Momentum had already been building at the local level in the United States for this kind of disclosure: By 1986, approximately 30 states or cities had some form of pollution disclosure requirements on the books. (4) In 1986, as part of the Superfund reauthorization, Congress passed a national right-to-know law, EPCRA. Section 313 of this act stipulates that U.S. manufacturers must report annually to EPA the amount of toxic chemicals they release into the environment or ship off-site as waste. This reporting law covers all major manufacturing facilities, ranging from pharmaceutical companies to food producers. (5) Today, TRI covers approximately 650 toxic substances and roughly 23,000 factories. The federal Pollution Prevention Act of 1990 broadened TRI in 1991 to include a source reduction, recycling, and treatment report. (6)

Different conceptual models of the required level of public disclosure emerged during the congressional debates on EPCRA. The original Senate version of the bill required industrial facilities to publicly provide a materials accounting of all hazardous substances that came into and out of manufacturing operations, including "the quantity of chemical substances transported to the facility, produced at the facility, and transported from the facility as wastes or products."(7) In contrast, the House of Representatives' version only required facilities to publicly report the actual quantities of hazardous substances released or transferred from the plant. Industry lobbyists who opposed materials accounting argued that materials accounting data had no legitimate environmental purpose but were very valuable to competitors.(8) In the end, the congressional conference committee compromised, drafting a bill that required only release and transfer reporting and commissioning a National Academy of Sciences study to evaluate the concepts and utility of mass balance information.(9)

Although the compromise bill did not include mass balance data elements, industry officials remained strongly opposed to the on-line environmental reporting system that was part of TRI.(10) Industry concerns ranged from fear of potential public overreaction to worries about the potential loss of trade secrets. Critics argued that the public would not respond rationally to reports detailing the large volumes of chemicals being released even though those volumes were technically legal. Government regulation classified such levels to be of "acceptable risk." Industry officials recommended that reporting are limited to acute toxins and that long-term toxicants such as carcinogens be eliminated from the account. They also sought to restrict access to the TRI information to government health and safety officials. As it turned out, lawmakers retained the on-line reporting system as originally proposed without restricting access and did not limit release reporting in any way.

#### *The Aftermath*

Despite their initial reservations, TRI has generally proven to be positive for the business community. In many instances, top-level managers had been unaware of the extent of pollution generated and its related financial costs until confronted with TRI information. When faced with these facts for the first time, numerous firms began aggressive voluntary reduction efforts. (11) Public relations concerns put additional pressure on business to initiate changes. Beginning in late 1988, national environmental groups started to routinely compile TRI data to identify the top polluters in the United States. Major corporations had powerful incentives to avoid membership in the "Dirty Dozen" club, and many moved quickly to reduce their emissions. Locally, citizen groups armed with TRI information found them better able to substantiate their concerns and to force previously reluctant companies to address these issues. In several cases, direct pressure from local community groups led to company commitments to reduce pollution discharges into neighborhoods. For example, BF Goodrich reduced toxic emissions into the air by 70 percent after the citizens of Akron, Ohio, brought pressure to bear on the company after reviewing its TRI data. (12) Today, many sectors of the business community embrace TRI. They view the law's element of public disclosure as an important tool for public outreach and performance monitoring. As one Monsanto official noted, public disclosure of the Toxics Release Inventory has been a powerful motivator to companies . . . to increase our efforts to reduce emissions. The TRI provides a means where the public can track our progress and do so on a consistent, measurable basis. We are convinced that this activity will ultimately result in cost savings for the company and a competitive advantage. (13)

Since the advent of TRI, an increasing number of corporations recognize the positive links between public accountability and business performance. Public Environmental Reporting Initiative (PERI), an industry group formed to advocate public reporting, points to the "strong connection between improved environmental reporting, improved environmental performance and therefore improved organizational performance."(14) In fact, over the past five years, more than 100 corporations have begun issuing annual environmental reports - available to investors, community members, environmental groups, and government agencies - that map out their environmental goals, achievements, and setbacks, mostly on the basis of TRI data. (15)

In addition to eliciting many voluntary business responses, the information distilled from the TRI database has helped government officials and policymakers design more effective programs. Pollution information has been used to better target enforcement actions, identify potential workplace hazards, and create voluntary reduction initiatives such as EPA's "33/50" program. Begun in February 1991, this program encouraged manufacturers to reduce the release of 17 hazardous substances by 33 percent in 1992 and to reach a goal of 50 percent reductions by 1995. (16) The jury remains out on the success of this initiative, but early data indicate that most of the 1,294 volunteer companies will meet their individual release-reduction goals.(17) As many as 15 states have enacted innovative pollution prevention laws as a result of access to TRI data. Recognizing the excessive levels of legally permitted releases, these laws implemented mandatory planning requirements designed to encourage businesses to use less toxic substances. They require companies to systematically account for most chemicals used and released throughout their facilities and to identify cost-saving opportunities for more efficient production operations. Legislative strategies like these represent the movement away from more traditional end-of-the-pipe regulation.

While public disclosure of the levels of pollution generated now enjoys wide acceptance, the current accounting system still has shortcomings. Critics point to the uncertainty underlying industry's claim that it has reduced pollution by 50 percent since 1988. Environmentalists charge that this figure includes "phantom reductions," changes that reduce a company's releases on paper only, e.g., accounting practices, downturns in production, or shifts to unreported waste management activities.(18) A study conducted by EPA in 1991 isolated three key factors contributing to reported reductions: changes in measurement or estimation techniques, production changes, and source reduction activities.(19) Fluctuations in production were the most frequently cited reason for change and accounted for the largest absolute change. Approximately 70 percent of all respondents attributed total release and transfer changes in part to different levels of output. (20)

Aside from the issue of phantom reductions, TRI's coverage of toxic substances and large polluting industries is incomplete. After reviewing the number of chemicals regulated as toxic under other environmental laws and programs, EPA did expand TRI's list of reportable toxic substances from 330 to approximately 650 in 1995. But even this expanded list excludes many highly persistent toxic substances. Dioxin, which is emitted from factories and incinerators in small but potentially hazardous amounts, escapes reporting because the amounts released fall below established thresholds. Many major industrial sources of pollutants, including power utilities, mining operations, and recycling firms, are currently not required to report under TRI. This leaves significant gaps in the perspective afforded by the data.

Despite these deficiencies, TRI has encouraged business to better control its environmental releases. But TRI's inability to measure the success of pollution prevention activities stands in the way of its motivating industry to adopt cleaner production and closed-loop systems.

#### *The Measurement Challenge*

Pollution prevention, also defined as source reduction in the federal Pollution Prevention Act, is any practice that reduces the use or generation of hazardous substances prior to recycling, storage, treatment, or control. (21) This approach is an integral component of industrial ecology theory, which emphasizes the management of products throughout their full life cycle. (22)

Pollution prevention differs in fundamental ways from most other release-reduction activities. Typical source reduction involves some form of productive efficiency, product redesign, or reduced production inputs. For example, the makers of Liquid Paper, a popular correction fluid, removed 1,1,1 trichloroethane - an ozone

depleter - from their product and replaced it with a water-based formulation; Hoffman LaRoche retooled its pill production line to allow for in-process recycling of its coating solution. In all cases, pollution prevention reduces the quantity of toxic chemicals used, thereby lowering the risk of harmful chemical exposures to workers, consumers, and communities. The most effective means of protecting public health and the environment, pollution prevention strategies directly benefit industry: Increased production efficiency translates into cost savings. Less preferred release-reduction activities, ranging from recycling to transferring production overseas, are cost intensive and often have little environmental or economic benefit.

But TRI is often blind to the kinds of risk-reducing changes made upstream that are the hallmark of pollution prevention strategies. A review of 1991 TRI data from two New Jersey firms using phosgene, an extraordinarily hazardous gas, provides a dramatic example. These data show that one firm released significantly lower levels of this acute neurotoxin in that year than the other: Hatco Corporation released 10 pounds while Dupont emitted 1,298 pounds. What the data do not reveal, however, is that Hatco ships in almost 5 million pounds of phosgene annually, creating a risk of a potentially fatal transportation spill or storage accident. Dupont, on the other hand, designed its production line to produce phosgene on-site; most of the gas is consumed shortly afterwards as an intermediate component. This approach has several advantages over Hatco's, but in TRI's one-dimensional view it appears that Hatco manages its phosgene better. (23)

Because pollution prevention requires more profound system changes than simple release reductions, an expanded TRI capable of tracking pollution prevention would need to take into account all the different angles of impact. Thus, in addition to measuring total waste generation, such a system would incorporate two more key pieces of information: the amount of the toxic substance used and the amount incorporated into the final product. (24)

Whether through materials substitution or better inventory practices, all pollution prevention techniques reduce the use of toxic substances, thereby lowering occupational and consumer exposures and communities' risks from transportation accidents. But use reduction does not always translate into a reduction in discharge levels. Consider, for example, a company that uses ethylene oxide for a wide variety of purposes at its plant. If the company reformulates surfactant production so that ethylene oxide is no longer included, its use of this hazardous carcinogen (and the attendant risk) will decline. But because fugitive emissions from storage tanks account for most of the plant's releases and these remain more or less constant regardless of volume, the TRI data would not reveal any reduction of risk.

Typically, a number of factors influence a company's TRI numbers, ranging from variations in production to different equipment lines. Use information can provide insight into the efficiency of the production process, which can be critical for discerning source reduction impacts. Ironically, according to TRI data as currently collected, a company could be labeled a laggard because its releases increased due to a rise in production even though it had instituted pollution prevention practices that increased efficiency. During economic upturns, this masking phenomenon would be more pronounced.

Take a recent experience of the Polaroid Corporation. Although Polaroid instituted an aggressive toxics use reduction program that achieved significant results, its 1994 TRI data indicate an increase in releases that year. It turns out that the company had a banner year in 1994, which required it to keep using older manufacturing processes not yet retooled for waste reduction. This accounted for the higher emission levels. Even though many more of the company's product lines had actually increased efficiency, the TRI data could not discern their impact. When measuring its pollution prevention gains, Polaroid relies on chemical use information. In its 1994 corporate environmental report, the company verified its success in virtually eliminating ozone-depleting chemicals by listing actual quantities of the substances used, not just released. In 1988, 125,949 pounds of ozone-depleting chemicals were used corporation-wide; in 1994, only 8,642 pounds were used. Polaroid noted in the report that it felt it was necessary to provide use-based information because TRI and EPA's 33/50 program "measure only releases; [they do] not directly measure waste reduction as the means for reducing releases."(25)

By reducing the toxicity of consumer products, pollution prevention activities can limit residential exposures from volatilization during use or eliminate eventual environmental releases from disposal. But TRI sheds no light on this area of source reduction impacts because it does not track toxic substances in consumer products. This is a significant gap. By providing this kind of information to the public, an expanded TRI could actually encourage cleaner production. Currently, consumers have limited access to information about

commercial goods' toxic components. Many chemicals are not identified because they are not part of the active ingredients, and most are not quantified. For example, if a company changed the methylene chloride concentration in a cleaning product to make it "new and improved," the public would never know about their increased or decreased exposures to a suspected carcinogen.

Experience shows that better public accountability on this score powerfully influences companies to design cleaner products. California's Proposition 65, which requires a hazard warning on all consumer products containing reproductive toxins and carcinogens, has prompted numerous manufacturers to reformulate and redesign products to avoid the negative labeling. Both product labeling and access to more detailed information about the hazardous substances contained in consumer products help the public make more informed decisions about their purchases and increase awareness of any risks they might be exposing themselves to. Through such decisions, the public can encourage companies to produce more environmentally sound products.

#### *Retooling TRI*

Ultimately, if TRI cannot effectively measure pollution prevention, it cannot promote it. If it is to play a role in promoting pollution prevention, TRI must be transformed into a materials accounting system.

A materials accounting system determines the quantity of a chemical present at key points in the production process, as Figure 1 on page 29 shows. By including six additional throughput measures, TRI could provide a complete materials accounting along with the release and transfer data it already supplies. These measures (in pounds of toxic chemicals) are as follows: starting inventory (as of 1 January) ([Q.sub.si]); quantity brought on-site ([Q.sub.B]); quantity produced on-site ([Q.sub.P]); quantity consumed in the production process ([Q.sub.CONSUMED]); quantity shipped off-site as or in products ([Q.sub.CONTENT]); and ending inventory (as of 31 December) ([Q.sub.EI]).

Materials accounting is a simplified mass balance statement of what comes in and what goes out of a plant. It can provide a critical facility-wide perspective of toxics use and industrial efficiency. (26) This information differs significantly from that provided by an engineering mass balance, which is a complex, costly exercise. Materials accounting relies on readily available accounting and production information, such as that for raw material purchases, inventory, sales, and product composition. (27) It supplies the public, government, and industry with a host of highly valuable tools for more effective and efficient operations.

Transforming TRI into a materials accounting system would answer the need for an effective pollution prevention measurement tool. The data produced by an expanded TRI would provide three key metrics that would reveal pollution prevention impacts that might otherwise go unnoticed: the quantity of chemicals used, the production efficiency, and the amounts of toxic substances contained in consumer products.

Because pollution prevention activities will always reduce the amount of toxic substances used, chemical use information is the logical foundation of any effort to record the impacts of source reduction at a facility. Because the cause for changes in pollution releases is often unclear, a combination of chemical use and toxic release information is necessary to discern how successful a company's source reduction efforts have been. Use data can also serve as a basis for measures of productive efficiency. When a chemical is used as a reagent, efficiency can be measured as the amount consumed in the production process compared with the total quantity used. (Reagents are chemicals that are used to create different chemicals. Phosgene, mentioned above, is generally used to create other, less toxic substances.) Another measure, known as a loss rate, (28) compares the total waste generated with the total quantity of the chemical used. By providing a picture of how a chemical moves through the production process, use data can also indicate changes in the quantities of hazardous substances used or contained in commercial products. In this way, use data gives insight into potential consumer risks and serves as a means of tracking changes in toxic formulations.

An analysis of the operations of the Witco Company of Phillipsburg, New Jersey, illustrates how materials accounting can provide a more complete and representative picture of a company's pollution prevention activities. Their publicly reported TRI and materials accounting data for 1989 and 1990(29) indicate that Witco's total releases of hydrochloric acid increased by 18 percent while production increased by only 4 percent. On the surface, it would seem that Witco became less efficient and had fallen behind in pollution control efforts during these two years. The materials accounting data recorded during this same time period,

in contrast, reveal that hydrochloric acid use and generation decreased by 9 percent. This decrease indicates an improvement in production efficiency. An investigation determined that Witco had actually prevented pollution by implementing new operating procedures to increase product yield, which did result in the generation of less hydrochloric acid. However, an accident at the plant caused a spill, which accounted for the increase in releases recorded by the TRI data. While TRI now includes separate reporting for accidental spills, the full impacts of Witco's pollution prevention activities would still have gone unrecognized without materials accounting data. (30)

Materials accounting can also help industries improve materials management. Major companies, including Polaroid, General Motors, and Hoffman LaRoche, have established corporate materials accounting systems to assist with internal decision making. Many businesses have achieved significant savings by using these types of systems. Sandoz, a large pharmaceutical manufacturer, uses materials accounting for each batch processing step to calculate "ecograms," which are the company's measure of waste efficiency.(31) Sandoz cites savings of several million dollars per year as a result of these efforts. One semiconductor firm holds monthly "chemical user" meetings to get departments focused on reducing the use of toxic (and expensive) chemicals. (32)

In addition to more accurately appraising the effects of pollution prevention activities, expanding TRI would provide the public with a more complete picture of the risks associated with using toxic substances. Generally speaking, those risks are often greater than the risks posed by toxic releases alone [ILLUSTRATION FOR FIGURE 2 OMITTED]. TRI's current limitations make it impossible for the public to track the amount of toxic materials stored or transported near their homes, the extent of workplace exposures, or the number of toxic chemicals contained in consumer products, many of which end up in the nation's waste stream. While increasingly aware and concerned about these different routes of exposure, people lack the necessary information to make informed decisions about the risks associated with toxic substances.

#### *Industry Opposition*

Despite all the apparent benefits of materials accounting, a wide cross section of industry groups oppose this kind of reporting. As they had been during the original congressional debates about EPCRA, industry supporters remain concerned about the information's relevance and usefulness to the public. In a recent letter to EPA Administrator Carol M. Browner, 40 major industry groups outlined their position, stating the goals of the TRI are to provide the public information so that they can make informed decisions about risk. Chemical use is not a good indicator of risk. It is not a surrogate for exposure; therefore chemical use reporting is not needed nor is it good public policy. (33)

This directly contrasts with the position held by environmental, labor, and community organizations, who all feel that chemical use information is a vital component of risk analysis, particularly in relation to transportation, storage, and occupational accidents.

The arguments against public reporting of chemical use information are primarily based on concerns about confidentiality and resource burden.(34) The potential ability of competitors to back calculate actual formulas, ingredients, and other trade secrets from facility-level materials accounting data accounts for much of the anxiety. While the ability to do this has not been demonstrated, protecting business interests, market shares, and trade secrets remains a priority for policymakers. The issue of additional regulatory burdens also plays a role. At a time when policy-makers are trimming excessive regulation to create a more streamlined and effective government, proposals for additional reporting requirements seem out of place. Industry estimates that adding the six throughput questions to the TRI form will increase costs substantially. A 3M representative calculates start-up costs for materials accounting to be almost half a million dollars at a large facility, less at a smaller facility. (35)

Massachusetts and New Jersey's experiences with mandatory chemical use reporting directly contradict these fears. Both states have developed comprehensive trade secret provisions that automatically grant companies protection upon request. However, despite the ease of obtaining confidentiality, less than 2 percent of all companies make this claim. In one analysis of New Jersey firms' materials accounting activities, researchers found that industry representatives did not consider facility-level chemical use data confidential because it did not provide detailed product specifications.(36) This opinion was even confirmed

at a facility that manufactured a single product.(37) That same study showed that firms needed approximately 7.5 hours, in addition to the staff time allocated to filing TRI information, to complete materials accounting forms. The National Roundtable on Pollution Prevention has recommended a phased-in approach for expanding TRI to include chemical use information. Under its model, special consideration would be given to protecting confidential business information and investigations of how to reduce other reporting burdens would be completed before the expansion. (38)

#### *The Corporate Future and TRI*

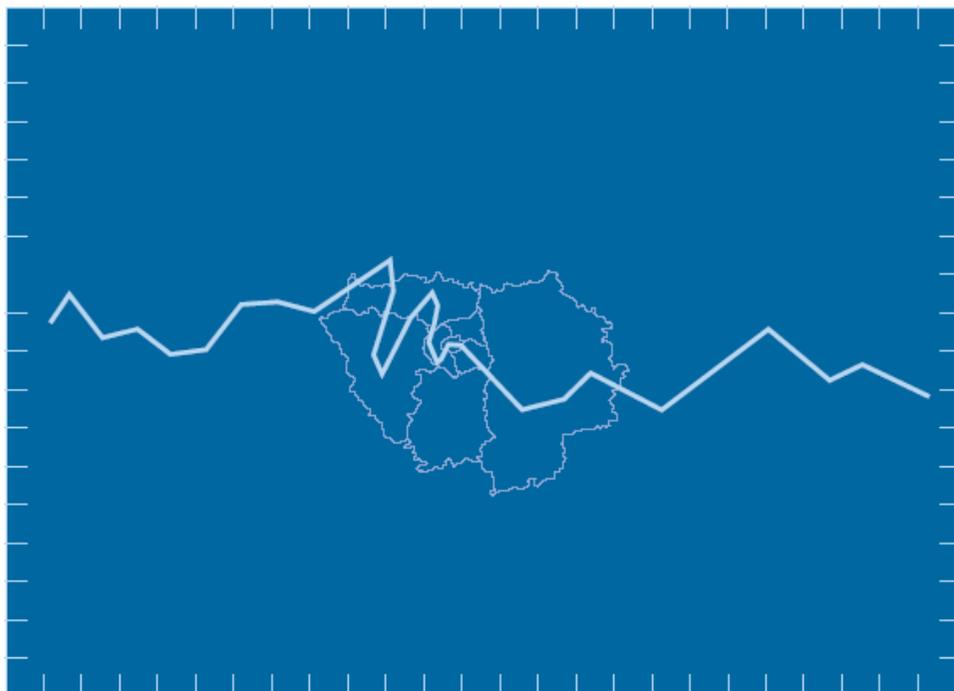
As the 21st century approaches, U.S. businesses increasingly recognize waste as an indicator of inefficiency and are actively looking for ways to deal more intelligently and efficiently with input materials, product design, and production operations. In a shift from the old methods of treating symptoms at the end of the pipe, companies now look upstream at the sources of toxic substances to find ways to prevent pollution. This approach requires that businesses know what they use and how they use it. Simultaneously, the public needs tools to motivate industry to move toward cleaner, closed-loop production. An expanded TRI could support both these ends.

The debate surrounding the expansion of TRI to include chemical use information has become polarized. Critics and supporters draw two starkly different pictures of materials accounting. Environmentalists, labor, and other community interests see it as fulfilling both the public's right to full disclosure about toxics in commerce and as an effective motivator for pollution prevention. The other side portrays materials accounting as another regulatory burden that does not serve the public interest and that will compromise American competitiveness.

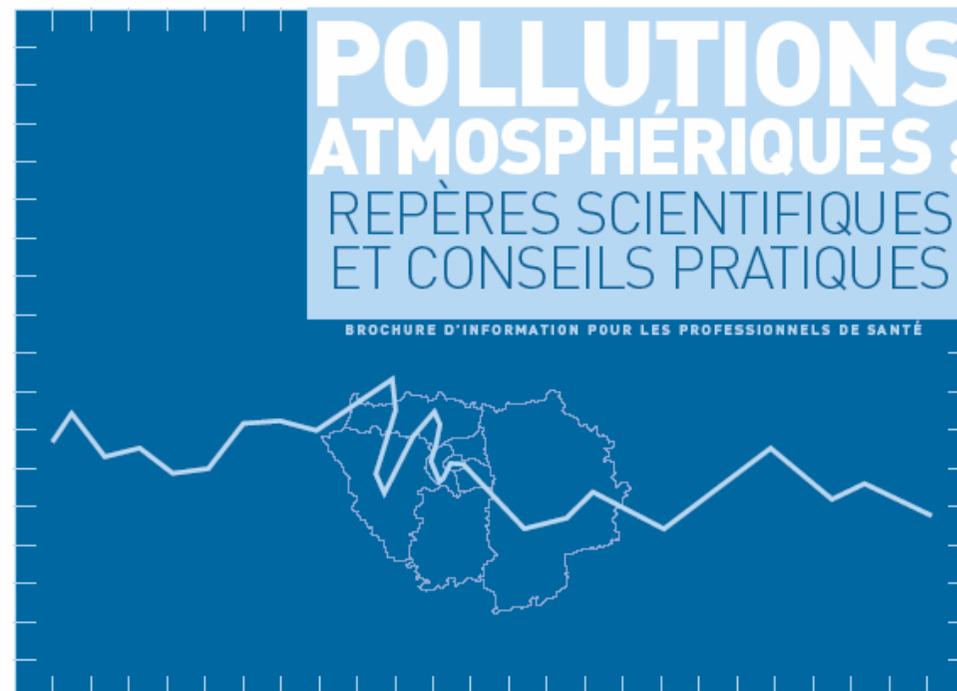
The experience with TRI has taught us many lessons about the value of public information. Despite their earlier concerns, many corporate chief executive officers, EPA administrators, and environmental leaders now call this quasi-nonregulatory approach the success story of the 1980s. TRI has stimulated constructive change without regulatory prescriptions. Materials accounting data have similar potential. A revised TRI system could jump-start industry into the next millennium by encouraging efficiency and establishing greater openness through public reporting.

## A.5 Examples of targeted information: leaflets for doctors and patients

### 1 Information for doctors (in French)



Ce document a été conçu dans le cadre des actions de sensibilisation et d'information mises au service du plan pour la qualité de l'air en Île-de-France, et financé sur les crédits du Contrat de plan État-Région. Nous remercions les partenaires du Groupe de travail pour leur participation éclairée à sa réalisation :



NO<sub>2</sub> O<sub>3</sub> PM<sub>10</sub> C<sub>6</sub>H<sub>6</sub> CO SO<sub>2</sub>

## INFORMER : LA CLÉ DE LA PRÉVENTION

La pollution atmosphérique est un problème complexe mais abordable. Vous pouvez contribuer efficacement à une information éclairée du grand public sur les bonnes pratiques collectives et individuelles à mettre en œuvre pour s'en prémunir.

**En Île-de-France**, la concentration des principaux polluants atmosphériques est en baisse sensible depuis plus de dix ans. Les mesures réglementaires qui sont à l'origine de cette amélioration ont contribué à l'échelle nationale à la diminution des émissions industrielles, domestiques et, plus récemment, celles des effluents automobiles. En 1996, la loi sur l'air et l'utilisation rationnelle de l'énergie a défini, en synergie avec les directives européennes, des objectifs pour la qualité de l'air sur tout le territoire. Elle a aussi permis le renforcement du système de surveillance de la qualité de l'air « extérieur ». Ce dispositif a été complété par la création, en juillet 2001, d'un observatoire dédié à la qualité de l'air intérieur des locaux.

**Du côté des connaissances sur l'impact sanitaire** de la pollution atmosphérique, des études épidémiologiques continuent d'apporter des réponses. Même si des incertitudes persistent, on peut affirmer actuellement que les polluants de l'air peuvent avoir des effets sur la santé à court comme à long terme. Ceux-ci se concrétisent par une augmentation de la mortalité et de la morbidité en zones urbaines, et cela même lorsque les normes en vigueur sont respectées. La pollution atmosphérique apparaît aujourd'hui comme un

cofacteur susceptible de favoriser l'apparition de symptômes irritatifs et de fragiliser les patients plus vulnérables ou plus sensibles. Pour autant, le risque reste bien inférieur à celui auquel expose le tabagisme. Mais ce risque existe et ne doit pas être négligé puisqu'il concerne l'ensemble de la population et aggrave des pathologies aussi fréquentes que l'asthme et les allergies respiratoires, la bronchite chronique ou l'insuffisance coronarienne.

**Une prévention collective et adaptée à chacun** est l'une des clés dans la lutte pour résoudre ce problème de santé publique. Or, même si la qualité de l'air arrive au deuxième rang des préoccupations des Français en matière de santé\*, la mise en œuvre individuelle de comportements plus adaptés n'est pas encore entrée dans les mœurs. Face au discours anxigène des médias, ils attendent des réponses simples et objectives. En tant qu'interlocuteurs privilégiés sur les questions de santé, c'est vous qu'ils sollicitent souvent pour répondre à leurs interrogations. Ce document a été conçu pour vous aider à leur délivrer une information claire et pragmatique. Il regroupe les questions qui vous sont le plus fréquemment posées et les mesures de prévention que vous pourrez utilement rappeler. ■

\* Sondage Ifop - «L'Express» - La Mutualité française, 2001.

“ Les professionnels de santé jouent un rôle majeur pour le diagnostic et le traitement des affections associées à la pollution atmosphérique. Ils représentent, pour le public, une certaine sécurité sanitaire qui peut aussi, par l'information et les conseils de prévention, contribuer au développement de la santé environnementale, à laquelle le corps social aspire. ”

Professeur Alain Grimfeld, chef de service à l'hôpital d'enfants Armand-Trousseau

## Qu'est-ce que la pollution atmosphérique ?

L'air « pur » est composé de 78 % d'azote, 21 % d'oxygène et 1 % de gaz rares (argon, néon et hélium, notamment). À ce mélange atmosphérique s'ajoutent, en proportions variables, de la vapeur d'eau et du gaz carbonique, sans oublier d'autres gaz et des particules en suspension, que l'on appelle « polluants » dès lors qu'ils sont potentiellement gênants, ou nocifs, pour l'homme et l'environnement. Il s'agit d'aérocontaminants chimiques, biologiques (pollens, micro-organismes) ou physico-chimiques (particules). Leur combinaison et leur concentration diffèrent selon le lieu (ville ou campagne, intérieur ou extérieur), l'heure, les conditions météorologiques (soleil, brouillard, vent ou anticyclone) et les émissions.

La pollution atmosphérique extérieure peut être d'origine naturelle (allergènes aéroportés, fumées de volcan). Le plus souvent, elle résulte de l'activité humaine, qui produit les principaux polluants indicateurs surveillés :

- le dioxyde de soufre (SO<sub>2</sub>), qui provient surtout de la combustion du fioul lourd, du gasoil et du charbon ;

- les particules en suspension (PM), qui représentent un ensemble hétérogène dont font partie les particules dégagées par la combustion des énergies fossiles – notamment celles émises par les moteurs Diesel – mais aussi les pollens ;

- les oxydes d'azote (NO, NO<sub>2</sub>), qui proviennent pour deux tiers des gaz d'échappement automobiles. Les pots catalytiques n'en diminuent la production que si le trajet est supérieur à 3 kilomètres ;

- le monoxyde de carbone (CO), produit par les transports routiers et les dispositifs de chauffage mal entretenus ;

- l'ozone (O<sub>3</sub>), qui résulte de la transformation d'autres polluants – NOx et composés organiques volatils (COV), notamment – sous l'effet des rayons ultraviolets. ■

EN SAVOIR PLUS : « Pollution atmosphérique », Pr Bernard Festy, Dr William Dale, « Encyclopédie médico-chirurgicale », 14-001-C-10. ■ « La Pollution atmosphérique », rapport de la Commission de l'Assemblée nationale, mai 2001 [www.assemblee-nat.fr](http://www.assemblee-nat.fr).

**Un humain adulte inhale en moyenne 14 400 litres d'air par jour.**

### CONSEILLER / PRÉVENIR

#### PERSONNES SENSIBLES

» Une personne est dite sensible si :

- elle présente des symptômes significatifs : difficultés respiratoires, essoufflement, douleur thoracique, maux de tête, toux sèche, irritation des yeux, du nez ou de la gorge, notamment en cas

- de pic de pollution. • Dans ce cas, s'abstenir de faire du sport à proximité d'un axe routier ou dans une zone fortement industrialisée. • Respirer par le nez : celui-ci arrête les particules en suspension dont le diamètre est supérieur à 10 microns.

POLLUTION ATMOSPHÉRIQUE : REPÈRES SCIENTIFIQUES ET CONSEILS PRATIQUES

## La pollution atmosphérique présente-t-elle un danger pour la santé ?

Même lorsque les valeurs limites réglementaires des principaux polluants sont respectées, la pollution atmosphérique est susceptible d'avoir des effets sur la santé. De nombreuses études épidémiologiques ont établi l'existence d'effets à court terme sur la mortalité et la morbidité. En Île-de-France, l'étude ERPURS\* observe, entre les dix-huit jours les moins pollués de l'année et les niveaux de pollution atteints ou dépassés la moitié de l'année, des augmentations de :

- 79 % des hospitalisations pour asthme et 5,1 % des hospitalisations pour maladie respiratoire des moins de 15 ans ;
- 2 % de la mortalité non accidentelle, 4,7 % de la mortalité respiratoire et 2,4 % de la mortalité cardio-vasculaire ;

- 3,3 % des hospitalisations pour maladie de l'appareil circulatoire et 1,9 % des hospitalisations pour bronchopneumopathie chronique obstructive (BPCO).

Les effets de la pollution atmosphérique à long terme ont fait l'objet d'études épidémiologiques moins nombreuses. Certains travaux concluent cependant à une réduction de la fonction pulmonaire dans les zones les plus polluées, d'autres à une augmentation du risque de cancer du poumon – néanmoins très inférieure à celle imputée au tabac.

L'ensemble de ces éléments conduit à suspecter la pollution atmosphérique de jouer un rôle de cofacteur dans l'apparition ou l'aggravation de symptômes et de maladies, surtout respiratoires et cardio-vasculaires. Les effets sur la santé sont fonction des concentrations de polluants inhalés et de la durée d'exposition. Ils dépendent également de paramètres individuels. Les patients les plus vulnérables sont ceux ayant un terrain fragile, qui sont exposés à d'autres facteurs de risques (tabagisme, polluants dans le cadre professionnel...) ou qui présentent une sensibilité particulière. ■

**Une baisse de 20% du niveau moyen de NO<sub>2</sub> éviterait 3,4% des hospitalisations pour asthme des moins de 15 ans\*\*.**

EN SAVOIR PLUS : « Politiques publiques, pollution atmosphérique et santé », rapport du Haut Comité de la santé publique, juillet 2000, éditions ENSP. \* Étude ERPURS 1997-2000, Observatoire régional de santé d'Île-de-France 1995, 4 : 343-74. \*\* « Pollution atmosphérique et santé », P. Quénet, Institut de veille sanitaire, à consulter sur [www.allergonet.com/articles](http://www.allergonet.com/articles).

- Éviter les tunnels et les parkings mal ventilés.
- Porter des lunettes de soleil, pour empêcher une partie des particules en suspension (notamment les pollens) de se déposer sur l'œil.
- Aérer quotidiennement son habitation. • Pour les asthmatiques, ne jamais se déplacer sans

- son traitement habituel. • Si les seuils d'alerte sont dépassés, il est possible de téléphoner à la ligne Allô air santé (01 40 34 76 14) pour avoir de plus amples renseignements sur les symptômes possibles et savoir quel comportement adopter en cas d'épisode

POLLUTION ATMOSPHÉRIQUE : REPÈRES SCIENTIFIQUES ET CONSEILS PRATIQUES

## Qui est sensible à la pollution atmosphérique ?

**Les asthmatiques non protégés par un traitement de fond sont particulièrement sensibles aux effets aigus des polluants.**

Chacun peut être affecté par la pollution atmosphérique, notamment en cas d'exposition prolongée et/ou excessive. Cependant, certaines personnes sont plus vulnérables ou plus sensibles que d'autres aux

altérations de la qualité de l'air.

– Enfants : la maturation pulmonaire n'est que partielle à la naissance. Le stock d'alvéoles continue à se développer jusqu'à l'âge de 8 ans.

– Personnes âgées : les capacités respiratoires décroissent avec l'âge (la  $VO_2$  max. diminue de 10 % chaque décennie à partir de la trentième année). Les personnes âgées sont aussi plus nombreuses à présenter une pathologie cardio-vasculaire ou respiratoire.

– Insuffisants coronariens et cardiaques : certaines études ont montré un lien entre polluants et infarctus du myocarde par le biais d'une diminution de l'oxygénation périphérique, d'une augmentation de la viscosité sanguine et de modifications du rythme cardiaque.

– Asthmatiques : les polluants atmosphériques (ozone, COV, particules,  $SO_2$ ,  $NO_2$ ) sont des facteurs aggravants. Ils augmentent la réactivité bronchique et rendent plus sensible aux allergènes.

– Insuffisants respiratoires, bronchitiques chroniques : la pollution atmosphérique favorise les décompensations.

– Tabagiques : les polluants liés au tabac sont à eux seuls des irritants très puissants, qui amplifient l'action des autres polluants et augmentent considérablement la sensibilité des fumeurs et de leur entourage.

– Femmes enceintes.

Chez certaines personnes bien portantes, la moindre augmentation de concentration des polluants dans l'atmosphère provoque une toux, une irritation de la gorge ou des yeux, alors que d'autres ne présentent ces symptômes qu'à des niveaux bien plus élevés, ou pas du tout. Aucun examen ne permet de diagnostiquer l'hypersensibilité. Seule l'apparition de symptômes évocateurs, notamment lors d'épisodes de pollution, permet de la suspecter. ■

**EN SAVOIR PLUS :** Étude APHEA (méta-analyse européenne sur les effets à court terme de la pollution atmosphérique), *Epidemiol Community Health*, 1996 ; 50 (suppl 1) : 5 12-18. • « Relations à court terme entre la pollution atmosphérique urbaine et la mortalité respiratoire », *Revue médicale respiratoire*, 2001, 18, 387-395.

## Est-ce que la pollution atmosphérique donne le cancer ?

De nombreuses études expérimentales chez l'animal ont permis d'évaluer le rôle de plusieurs polluants atmosphériques dans l'apparition de cancers. Le benzène, un hydrocarbure qui provient essentiellement du trafic routier et du tabac, est considéré par le Centre international de recherche sur le cancer (CIRC) comme un cancérigène certain chez l'homme. Les effluents des moteurs Diesel sont classés comme cancérigènes probables et ceux des moteurs à essence comme cancérigènes possibles, avec des preuves suffisantes chez l'animal, mais absentes ou insuffisantes pour l'espèce humaine. Les études épidémiologiques menées en milieu professionnel montrent cependant une élévation du risque de cancer du poumon dans les groupes particulièrement exposés aux échappements Diesel (travailleurs des compagnies d'autobus, routiers, conducteurs de taxi, employés des chemins de fer, dockers...). Pour eux, le risque relatif de cancer du poumon est de l'ordre de 1,35 et il s'accroît avec la durée d'exposition\*. Cependant, ces résultats relèvent d'expositions à des concentrations beaucoup plus élevées que celles auxquelles la population générale est soumise. Et si les études épidémiologiques menées dans les zones urbaines et industrialisées

**Pour le tabagisme actif, le risque relatif de cancer du poumon va de 6,2 à 34,6 selon l'intensité et la durée de l'intoxication.**

confirment une incidence plus élevée de cancers, du poumon notamment, elles ne mettent pas en cause un polluant mais un ensemble de substances dont seules certaines ont fait l'objet de mesures spécifiques. En outre, elles ne permettent pas d'établir un lien direct entre l'exposition réelle et le risque de cancer. En effet, ces études épidémiologiques se basent sur des concentrations de polluants atmosphériques mesurées à partir de capteurs fixes qui peuvent être très différentes des doses de polluants effectivement inhalées par chacun. D'autres études seront donc nécessaires pour lever les incertitudes actuelles. ■

**EN SAVOIR PLUS :** Bhatia R., « Diesel exhaust exposure and lung cancer », *Epidemiology* 1998 ; 9 : 84-91. • \* « Le Coût des effets de la pollution atmosphérique sur la santé de la population française », Agence de l'environnement et de la maîtrise de l'énergie ([www.ademe.fr](http://www.ademe.fr)).

### CONSEILLER / PRÉVENIR

de pollution. Un médecin spécialisé répond en permanence, de jour comme de nuit.

• Il est possible de suivre l'évolution de la qualité de l'air au quotidien via les médias régionaux ou directement auprès d'Airparif ([www.airparif.asso.fr](http://www.airparif.asso.fr)) ou Minitel 36 15 code AIRPARIF. Ceux qui sont

allergiques aux pollens (rhumes des foins, conjonctivites) peuvent se renseigner auprès du Réseau national de surveillance aérobiologique ([www.rnsa.asso.fr](http://www.rnsa.asso.fr)), qui diffuse bulletins d'alerte et cartes polliniques. • En période de vacances, mieux vaut éviter des séjours prolongés dans

les mégapoles des pays où les normes antipollution sont balbutiantes. En cas de séjour en France, consulter le « Bulletin quotidien de la qualité de l'air » de sa région de destination, diffusé par l'Agence de l'environnement et de la maîtrise de l'énergie ([www.ademe.fr](http://www.ademe.fr)).

### À L'EXTÉRIEUR

» **Transports** • Limiter les parcours en voiture : c'est le moyen de transport dans lequel on est le plus exposé à la pollution atmosphérique. • Préférer les transports en commun, la marche ou le vélo, surtout pour les petites distances.

## À l'extérieur, où est-on le plus exposé à la pollution atmosphérique ?

À l'extérieur, les doses de polluants inhalées par chaque individu dépendent de trois paramètres :

– le nombre d'heures passées dans les ambiances polluées : sont particulièrement exposés les conducteurs d'autobus ou de taxi, les routiers, les agents de la circulation, les employés de station-service, les commerçants sur rue ;

– le moyen de transport utilisé : en circulation dense, c'est dans les voitures que l'exposition aux principaux polluants atmosphériques est maximale. En deuxième position, avec des niveaux d'exposition d'une fois et demie à deux fois moindres, on trouve l'autobus et la bicyclette. Le mode de transport où l'on est le moins exposé reste la marche à pied ;

– le niveau d'activité physique : il détermine la quantité d'air respiré. En faisant du sport, on consomme en moyenne quatre fois plus d'air qu'au repos. Si l'activité sportive a lieu dans une zone très polluée, à proximité d'un axe routier par exemple, les doses de polluants inhalés sont très importantes. Quant aux enfants, ils sont souvent plus exposés du fait de leurs activités récréatives à l'extérieur, qui augmentent leur volume respiratoire.

La question se pose souvent, quand on fait du sport ou lors des pics de pollution, de l'utilité de se munir d'un masque pour sortir. Les plus sophistiqués sont munis d'un filtre à charbon (comme les hottes aspirantes qui équipent les cuisines). Attention, ces masques n'arrêtent pas les particules fines et de nombreux gaz potentiellement nocifs pour la santé. Les autres, fort nombreux dans le commerce, sont d'une efficacité médiocre. Quant aux masques chirurgicaux et autres foulards, ils ne filtrent que les grosses particules ( $\geq 10$  microns), qui auraient de toute façon été arrêtées lors de leur passage dans le nez. ■

**Une fois sur deux, les Européens utilisent leur voiture pour faire moins de 3 kilomètres, une fois sur huit, pour faire moins de 500 mètres.**

**EN SAVOIR PLUS :** « Quelles sont les expositions humaines à la pollution atmosphérique ? », programme Primequal-Predit, Mickaël Derbes, Luc Mosqueron, Vincent Nedellec, La documentation française, juin 2001. • « Recommandations pour améliorer la connaissance sur l'exposition et sur l'impact de la pollution atmosphérique d'origine automobile », rapport de la Société française de santé publique, juin 2000 ([www.sfsp-france.org](http://www.sfsp-france.org)).

### CONSEILLER / PRÉVENIR

• Pratiquer autant que possible le covoiturage pour aller travailler. • Au volant, adopter une conduite calme (pas de freinage ni d'accélération brusques). Ne pas laisser tourner longtemps le moteur au ralenti. Faire effectuer régulièrement le contrôle antipollution de sa voiture, surtout si elle est

ancienne, et prendre en considération l'impact environnemental lors de l'achat d'un véhicule neuf.

• Éviter de faire le plein aux heures les plus chaudes de la journée (évaporation d'hydrocarbures).

» **Sport** • Pour profiter des incontestables bienfaits du sport pour la santé sans souffrir des

## L'intérieur des bâtiments peut-il être pollué ?

La qualité de l'air dans une habitation, une entreprise ou d'autres espaces clos dépend bien évidemment des niveaux de pollution qui règnent à l'extérieur, mais également de l'existence de sources polluantes à l'intérieur même du bâtiment. Outre les produits spécifiques utilisés dans le cadre professionnel, les principaux responsables de la pollution atmosphérique intérieure aux logements sont :

– les oxydes d'azote (fumée de tabac, cuisinières et chauffe-eau à gaz, poêles à bois...);

– les composés organiques volatils (COV) (peintures, colles, cosmétiques, solvants...), notamment le formaldéhyde (mousses isolantes, panneaux de particules) et le benzène (fumée de tabac...);

– le monoxyde de carbone (chauffage et chauffe-eau à gaz, fioul, charbon ou bois qui fonctionnent mal);

– les allergènes générés par les acariens, les animaux domestiques (chat, chien, rongeur), les blattes, les moisissures, mais aussi les plantes d'appartement (figus) et les pollens des fleurs (toumeols, tulipes, mimosa);

– les particules en suspension, fibres en provenance des papiers manipulés et des matériaux de construction ou de décoration, plomb (ponçage de peintures anciennes), fibres d'amiante.

**Dans un bâtiment, les concentrations de COV et de formaldéhyde peuvent être jusqu'à dix fois plus importantes qu'à l'extérieur.**

À sources données, la concentration intérieure en polluants fluctue en fonction de la ventilation du local. Or, l'heure est au calfeutrage extrême des bâtiments, économie d'énergie oblige. Cette surisolation gêne la dilution des polluants intérieurs. Elle favorise aussi l'augmentation du taux d'humidité et de la température, deux conditions propices au développement des acariens et des moisissures ainsi qu'à l'augmentation des concentrations de formaldéhyde. En entreprise, la ventilation est souvent bien plus perfectionnée que dans les logements, qui tendent cependant à être équipés d'un système de ventilation mécanique double flux qui renouvelle en permanence l'air ambiant. Reste que, pour être efficace, tout système de ventilation doit être régulièrement entretenu (au minimum une fois par an) et ne doit pas être obstrué, comme on le constate trop souvent. ■

inconvenients liés à l'inhalation à pleins poumons de polluants, mieux vaut s'abstenir de toute pratique d'exercices physiques pendant les heures de pointe, à proximité d'un axe routier et au moment de la journée où il fait le plus chaud (concentrations maximales d'ozone).

### À L'INTÉRIEUR

» **Chauffage** • Ne pas surchauffer son habitation ( $\leq 22$  °C). • Faire vérifier son installation de chauffage au moins une fois par an (deux fois pour un chauffage au fioul). Le ramonage des cheminées de raccordement des appareils

## La pollution se résume-t-elle aux pics de pollution ?

**La concentration de la plupart des polluants est plus forte le matin et le soir, sauf celle de l'ozone, qui atteint un maximum quotidien unique vers 15 heures.**

En ville, les niveaux les plus élevés de pollution atmosphérique sont atteints quand se conjuguent fortes émissions de polluants et conditions météorologiques défavorables, par exemple en l'absence de vent susceptible de favoriser leur dispersion. Lorsque les concentrations de certains polluants dépassent les valeurs limites réglementaires, on parle de «pics» ou «épisodes» de pollution, qui déclenchent des procédures d'information et de recommandations à destination des populations particulièrement sensibles (quatre épisodes pour l'agglomération parisienne en 2002), voire d'alerte entraînant des mesures d'urgence (aucune alerte depuis le 30 septembre 1997).

En dehors de ces pics, il existe un fond de pollution permanent, qui concerne l'ensemble de la population. Or, de nombreuses études ont démontré une association signi-

ficative entre de petites variations des concentrations en polluants, même en deçà des valeurs seuils qui caractérisent les pics de pollution ou des objectifs de qualité de l'air et valeurs limites fixées pour la protection de la santé humaine. Ainsi, le programme de surveillance «Air et santé»\* observe qu'une élévation de 10 µg/m<sup>3</sup> du niveau des indicateurs de pollution est associée à court terme (deux jours) à un excès de risque de mortalité d'environ 1%. Cette association est linéaire et sans seuil. C'est-à-dire qu'il n'existe pas, à l'échelle de la population, de valeur d'exposition au-dessous de laquelle le risque pour la santé serait nul.

Les effets spécifiques des pics sont mal explorés, mais en tout état de cause, leur impact en termes de santé publique reste marginal par rapport à la pollution quotidienne «habituelle». ■

**EN SAVOIR PLUS :** Étude PSA5-9 : Revue de synthèse phase II, Programme de surveillance Air et Santé 9 villes, Institut de veille sanitaire.\*

### CONSEILLER / PRÉVENIR

est impératif deux fois par an pour les installations au fioul ou au charbon, une fois pour celles qui fonctionnent au gaz. • Ne jamais bricoler son chauffe-eau ni son système de chauffage. Pour l'entretien comme pour l'installation, faire appel à un professionnel qualifié. • Ne pas utiliser trop

longtemps les appareils non raccordés à un conduit de fumée [poêles à pétrole, radiateurs à gaz mobile...], respecter leurs consignes d'utilisation et vérifier que le local est bien ventilé.

» **Utilisation de produits chimiques** • Ne pas manipuler des produits de bricolage dans

## Que faut-il faire pendant les pics de pollution ?

Pour les populations vulnérables, c'est-à-dire les enfants, les personnes âgées, les femmes enceintes, les insuffisants respiratoires ou cardiaques, les asthmatiques, les fumeurs et les patients en bonne santé mais qui se sont montrés particulièrement sensibles à la pollution lors de pics précédents :

– limiter le séjour en plein air : éviter les promenades et les activités à l'extérieur, a fortiori s'il s'agit d'une pratique sportive. En moyenne, les concentrations en ozone et en SO<sub>2</sub> sont moins élevées dans les habitations que dans l'air extérieur ;

– continuer d'aérer son habitation, pendant cinq minutes deux fois par jour, mais éviter de le faire au moment où les concentrations en polluants sont les plus fortes. Par exemple, s'il s'agit d'un pic d'ozone, aérer le matin et la nuit, mais pas pendant les heures d'ensoleillement maximal ;

– concernant les patients sous traitement, poursuivre scrupuleusement celui-ci pendant la durée du pic de pollution. Un traitement préventif peut venir s'ajouter au traitement de fond

Pour les personnes bien portantes et qui ne sont pas particulièrement sensibles à la pollution :

– s'abstenir de tout exercice physique à l'extérieur qui nécessite un effort soutenu : activités d'endurance (marathon, cyclisme...), compétitions sportives. En revanche, les activités

physiques légères demeurent possibles (promenade, jeux, pique-nique...).

Pour tous :

– éviter d'aggraver les choses par l'usage d'autres fac-

teurs irritants : le tabagisme (absorption active et passive), les produits de bricolage ou de jardinage (peintures, colles, solvants, insecticides...);

– autant que faire se peut, ne pas utiliser sa voiture. ■

**Un individu qui marche inhale 15 litres d'air par minute, 40 litres s'il monte un escalier et jusqu'à 100 litres lorsqu'il grimpe une côte à vélo.**

**EN SAVOIR PLUS :** «Conseils sanitaires en cas d'épisodes de pollution atmosphérique», avis du Comité supérieur d'hygiène publique de France, 18 avril 2000 ([www.sante.gouv.fr](http://www.sante.gouv.fr)).

une pièce mal ventilée. Les personnes particulièrement sensibles aux polluants ont tout intérêt à quitter la maison pendant les grands travaux d'aménagement ou de décoration (peintures, fixation de moquettes ou de parquets avec de la colle, utilisation

de produits décapants...). • Ne jamais mélanger de l'eau de Javel avec un produit détartrant : il se dégagerait des vapeurs qui peuvent déclencher une irritation des voies respiratoires et des yeux, une crise d'asthme, voire un OAP. » **Au quotidien** • Ne pas fumer dans la maison,

## Y a-t-il plus de pollution atmosphérique en Île-de-France qu'ailleurs ?

C'est le degré d'industrialisation et d'urbanisation des villes ainsi que leurs spécificités géographiques et climatiques qui déterminent les différences dans les niveaux et la nature de la pollution atmosphérique. Située en plaine, l'agglomération parisienne bénéficie, la plupart du temps, d'un climat qui

**72%**  
de la population francilienne déclarent avoir ressenti une gêne due à la pollution.

favorise la dispersion (par le vent) ou le lessivage (par la pluie) de l'atmosphère. Deuxième «atout» climatique, les journées d'ensoleillement sont moins nombreuses que dans le sud de la France, d'où des niveaux moyens d'exposition à l'ozone qui varient du simple au double entre Paris et Marseille. Quant à savoir s'il vaut mieux s'installer à la campagne qu'en ville... Il est vrai que la qualité de l'air y est meilleure en ce qui concerne la plupart des polluants. Cependant, l'ozone fait exception à la règle. En effet, les niveaux d'ozone sont plus élevés en grande banlieue qu'à Paris lors des pics estivaux. Cela est dû à la for-

mation continue d'ozone dans la masse d'air lors de son déplacement du centre-ville vers la périphérie\*.

Depuis une quarantaine d'années, la pollution d'origine industrielle et domestique a fortement baissé dans la région. Les transports routiers sont devenus les premiers responsables des émissions de certains polluants (NO<sub>x</sub>, CO, COV, notamment), et ce malgré diverses mesures réglementaires (généralisation progressive de l'essence sans plomb, pots catalytiques). La région compte aujourd'hui plus de quatre millions de voitures particulières, dont plus d'un million de véhicules Diesel. Un parc dont l'augmentation constante augure mal de la maîtrise de la pollution d'origine automobile dans les années à venir. ■

**EN SAVOIR PLUS :** \* Brochure « La Pollution de l'air et notre santé » (à consulter sur le site [www.ors-idf.org](http://www.ors-idf.org)), Observatoire régional de la santé (ORS) d'Île-de-France. \* « Plan régional pour la qualité de l'air d'Île-de-France », à consulter sur [www.drife-ile-de-france.fr](http://www.drife-ile-de-france.fr) ou à commander au 01 44 59 48 37.

### CONSEILLER / PRÉVENIR

ni au bureau en dehors du local prévu à cet effet.

- Aérer son habitation deux fois par jour, le matin au réveil et le soir avant de se coucher, pendant cinq minutes.
- Interdire l'accès des chambres aux animaux de compagnie.
- Ne jamais boucher les grilles d'aération.
- Les allergiques peuvent

demander à un conseiller en environnement de venir visiter leur habitat. Rattaché aux services de pneumologie de certains hôpitaux, celui-ci peut diagnostiquer la présence d'allergènes, mais aussi fournir de précieux conseils d'aménagement et d'entretien de l'habitation.

POLLUTION ATMOSPHÉRIQUE: REPÈRES SCIENTIFIQUES ET CONSEILS PRATIQUES

## Que signifient les niveaux de pollution annoncés par les médias ?

Quarante associations agréées de surveillance de la qualité de l'air (AASQA) agissent sur le territoire français. Placées sous la tutelle du ministère chargé de l'Environnement, elles mesurent en permanence la concentration de nombreux polluants atmosphériques (SO<sub>2</sub>, PM, NO<sub>x</sub>, CO, COV et ozone, notamment). En Île-de-France, ce rôle revient à Airparif, qui dresse chaque jour un bilan de la qualité de l'air dans un rayon de 100 kilomètres autour de Paris. Elle diffuse ses résultats à l'intention de la population francilienne sous la forme d'un chiffre, l'indice Atmo. Celui-ci prend en compte l'ensemble des données collectées sur la région et s'échelonne de 1 (excellent) à 10 (très mauvais). Chaque jour, Airparif établit l'indice de la journée en cours, mais aussi celui prévu pour le lendemain. En outre, un indice spécifique est calculé pour chacune des communes d'Île-de-France.

En cas de pic de pollution en ozone, dioxyde de soufre et/ou dioxyde d'azote, le préfet de police, informé par Airparif des niveaux de pollution, peut déclencher deux procédures, d'intensité croissante. La première est dite « d'in-

formation ». Elle est mise en œuvre lorsque la concentration de l'un de ces trois polluants dépasse une valeur au-delà de laquelle une exposition de courte durée peut avoir des effets sur la santé des personnes particulièrement sensibles. La procédure comprend l'information de la population et des recommandations sanitaires aux personnes sensibles, diffusées via les médias régionaux et nationaux. La seconde procédure, dite « d'alerte », est déclenchée lorsque la concentration

**Chaque jour, Airparif établit près de 16 000 données.**

de l'un des trois polluants dépasse une valeur au-delà de laquelle une exposition de courte durée présente un risque pour la santé de l'ensemble de la population. Elle entraîne l'information du grand public, mais aussi l'entrée en application de mesures préfectorales qui visent à réduire les émissions polluantes (limitation de vitesse, notamment). ■

**EN SAVOIR PLUS :** [www.airparif.asso.fr](http://www.airparif.asso.fr), le site d'Airparif, association agréée chargée de la surveillance de la qualité de l'air en Île-de-France. \* « Lutte contre les épisodes de pollution atmosphérique en Île-de-France », mesures préfectorales prévues en cas de pics de pollution ([www.prefecture-police-paris.interieur.gouv.fr](http://www.prefecture-police-paris.interieur.gouv.fr)).

- Éviter de faire sécher le linge dans les pièces communes.
- Plutôt que le balai, utiliser un aspirateur équipé d'un filtre à très haute efficacité (HEPA)
- S'abstenir d'utiliser des aérosols.
- Éliminer la poussière avec un chiffon humide.
- Recouvrir son matelas d'une housse

- anti-acariens.
- Laver au moins une fois par an rideaux, couettes, couvertures et oreillers.
- Éviter la moquette, les tapis, les doubles rideaux.
- Limiter le nombre de peluches dans les chambres et les laver une fois tous les deux mois à 40 °C.

POLLUTION ATMOSPHÉRIQUE: REPÈRES SCIENTIFIQUES ET CONSEILS PRATIQUES

## MÉMO DES CIRCONSTANCES ÉVOCATRICES

Le tableau clinique n'a rien de spécifique. Considéré isolément, il ne permet pas d'orienter le diagnostic étiologique. Dans ces conditions, l'interrogatoire revêt toute son importance. Il doit s'attacher à rechercher :

- un terrain vulnérable : nourrissons et jeunes enfants, personnes âgées, antécédents personnels ou familiaux d'allergies ;
- l'existence concomitante de cas similaires dans la famille, le voisinage, la patientèle ;
- l'installation de la symptomatologie à l'occasion :
  - d'un déménagement en provenance d'une zone moins polluée ;
  - d'un changement de poste de travail, ou de métier ;
  - d'un épisode de pollution atmosphérique (à rechercher auprès d'Airparif, qui retrace un historique des pics de pollution sur les différents secteurs de la région) ;
  - de travaux récents (rénovation, décoration) au domicile ou sur le lieu de travail ;
  - de la modification d'une installation de chauffage, de ventilation ou de climatisation, au domicile ou sur le lieu de travail ;

## MÉMO DES CIRCONSTANCES ÉVOCATRICES

- une exposition notable à la pollution atmosphérique :
  - résidence principale en centre urbain et/ou au voisinage d'une industrie réputée polluante ou d'un axe routier très fréquenté ;
  - fumeur ou entourage d'un fumeur, professions au contact de la pollution atmosphérique (agents de la circulation, commerçants sur rue, chauffeurs routiers, conducteurs d'autobus ou de taxi, garagistes, employés de station-service...) ou de polluants spécifiques (travailleurs du bâtiment, industrie...);
  - utilisation de la voiture comme mode de déplacement privilégié ;
  - habitat insalubre, présence de moisissures, de poussières, d'animaux domestiques, chauffage mal raccordé ou mal entretenu (risque d'intoxication au monoxyde de carbone).

La mise en évidence d'un lien éventuel avec la pollution atmosphérique doit conduire à des mesures de prévention afin de limiter les niveaux d'exposition. À défaut, il s'agira de réduire l'impact de la pollution sur le plan organique. L'arrêt de tout tabagisme reste, à cet égard, un impératif majeur.

## >>> PETIT RÉPERTOIRE DES SYMPTÔMES

Ces symptômes peuvent éventuellement avoir pour cofacteur la pollution atmosphérique.

### Symptômes à caractère réactif

- Larmoiements, irritations et douleurs oculaires
- Rhino-pharyngites
- Écoulement nasal postérieur
- Céphalées
- Toux sèche
- Difficultés respiratoires
- Bronchites
- Bronchiolites
- Crises d'asthme

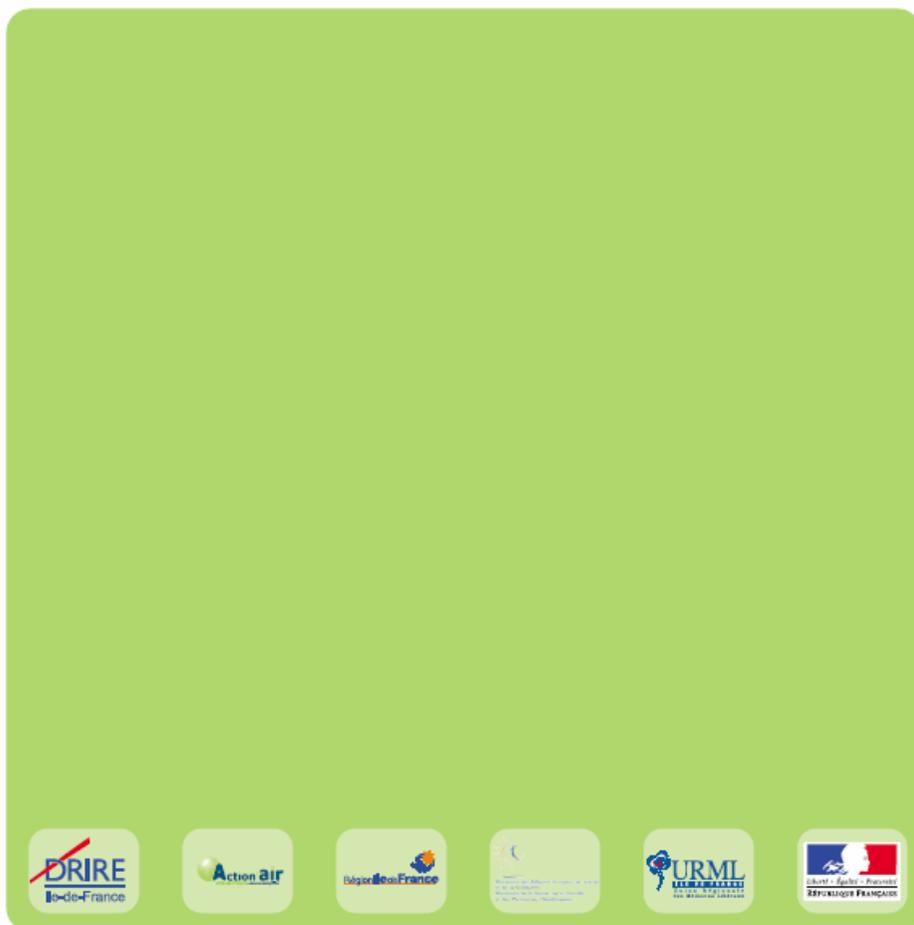
### Déséquilibres d'un état de santé déjà fragilisé

- Aggravation d'un asthme, décompensation d'une insuffisance respiratoire, d'une broncho-pneumopathie chronique obstructive (BPCO), d'une maladie cardio-

vasculaire (insuffisance coronarienne, insuffisance cardiaque)  
• Majoration du risque de surinfection, fragilisation et hypersensibilisation aux germes et microbes ambiants

Sur le long terme, on notera la possibilité d'une intervention de la pollution atmosphérique comme cofacteur dans l'apparition de certains cancers, pulmonaires et bronchiques notamment.

2 Information for the public / asthmatics (in French)



## AVANT-PROPOS

# La qualité de l'air, c'est l'affaire de tous

Tout le monde est concerné par la qualité de l'air, parce que tout le monde respire. Source d'inquiétudes et d'interrogations, la pollution atmosphérique est un phénomène complexe ; la réduire et s'en protéger restent un défi pour l'avenir.

Aujourd'hui, les études menées permettent de mesurer un certain impact de la pollution atmosphérique sur la santé de la population en général, en zone urbaine notamment. Le risque reste bien inférieur à celui auquel expose le tabagisme actif mais ne doit pas être ignoré.

Si, sur le plan individuel, le risque pour la santé à court terme est relativement faible, chacun doit cependant contribuer à sa prévention. Or, bien que la qualité de l'air arrive au deuxième rang des préoccupations des Français en matière de santé\*, les comportements ne suivent pas. Trop peu de gens savent ce qu'il faut faire pour se protéger et lutter contre la pollution

2

POLLUTION ATMOSPHÉRIQUE: S'EN PROTÉGER, LA PRÉVENIR

## AVANT-PROPOS

atmosphérique, individuellement et collectivement. Aussi, ce document est destiné à vous informer sur les moyens de prévention et à vous aider à agir au quotidien pour une meilleure qualité de l'air. Et si vous avez des questions particulières, parlez-en à votre médecin ou à votre pharmacien !

En Île-de-France, la pollution atmosphérique est en diminution globale depuis plus de dix ans. Ce sont surtout les mesures réglementaires qui ont permis, à l'échelle nationale, la diminution des émissions industrielles, domestiques et, plus récemment, automobiles. En 1996, la loi sur l'air et l'utilisation rationnelle de l'énergie a défini des objectifs pour la qualité de l'air sur tout le territoire. Elle a aussi permis le renforcement du système de surveillance de la qualité de l'air extérieur, et un observatoire dédié à la qualité de l'air intérieur a été mis en place en juillet 2001.

\* Sondage Ifop - « L'Express » - La Mutualité française, 2001.

“Préoccupés par les effets potentiels de la pollution atmosphérique sur leur santé, les Français pensent, à juste titre, que la réduction de cette pollution doit rester une action prioritaire de l'État. Mieux informés, ils comprendront aussi que chacun de nous, à son niveau, peut également contribuer, par des gestes simples, à l'extérieur comme chez lui, à l'amélioration d'ores et déjà en cours de la qualité de l'air et à la préservation de son capital santé.”

Bernard Festy, président de l'Association pour la prévention de la pollution atmosphérique

POLLUTION ATMOSPHÉRIQUE: S'EN PROTÉGER, LA PRÉVENIR

3

## Qui est concerné par la pollution atmosphérique ?

Nous sommes tous concernés par la pollution atmosphérique. Mais certaines personnes y sont plus sensibles et en souffrent plus que d'autres, notamment lors des pics de pollution, et doivent donc prendre davantage de précautions.

Certaines personnes sont plus fragiles face à la pollution atmosphérique, en raison de certains facteurs.

- Les enfants, car leurs poumons continuent de se former jusqu'à l'âge de 8 ans.
- Les femmes enceintes, qui transmettent une partie des polluants respirés à leur enfant.
- Les personnes âgées, car la capacité respiratoire diminue dès l'âge de 30 ans.
- Les asthmatiques, que leur maladie rend plus sensibles au pouvoir irritant des polluants.
- Les insuffisants respiratoires et cardiaques, dont la santé est déjà fragilisée.
- Les fumeurs, dont l'appareil respiratoire est déjà irrité par l'usage du tabac.

Les personnes vulnérables peuvent développer une sensibilité particulière lors de pics de pollution. Mais la pollution peut agir sur la santé au quotidien, et pas seulement au cours des pics.

La qualité de l'air arrive au deuxième rang des préoccupations des Français en matière de santé environnementale.

### LE ? SAVIEZ-VOUS

L'air « pur » est composé de 78% d'azote, 21% d'oxygène et 1% de gaz dits rares (argon et hélium, par exemple).

L'air contient également d'autres gaz et des particules en suspension, qualifiés de « polluants » quand ils sont considérés comme gênants ou nocifs pour l'homme et l'environnement. Dans l'air extérieur, les polluants atmosphériques proviennent principalement des gaz d'échappement (deux tiers), mais aussi des dispositifs de chauffage, des activités industrielles et commerciales.

POLLUTION ATMOSPHÉRIQUE: S'EN PROTÉGER, LA PRÉVENIR

## Que faire en cas de pic de pollution ?

Lors des pics de pollution, les autorités diffusent par les médias des recommandations pour les personnes vulnérables ou, si le pic est plus élevé, pour l'ensemble de la population.

Pour les personnes présentant une sensibilité particulière

- Éviter les efforts physiques soutenus en plein air (activités sportives d'endurance, par exemple).
- Suivre scrupuleusement son traitement (asthmatiques, insuffisants respiratoires ou cardiaques) et ne pas hésiter à consulter son médecin ou son pharmacien.
- Pendant les pics élevés (procédure d'alerte), s'abstenir de sortir pendant les heures les plus chaudes de la journée.

Pour tout le monde

- Ne pas modifier les pratiques habituelles d'aération et de ventilation, car la situation ne le justifie pas.
- Éviter d'aggraver les effets de la pollution par des facteurs irritants (tabac, peinture, solvants, colles...).
- Pendant les pics élevés (niveau d'alerte atteint), s'abstenir de toute pratique sportive intensive.
- Dans la mesure du possible, ne pas utiliser son véhicule. D'une part, parce que c'est là que l'on est le plus exposé à la pollution, d'autre part, parce que son utilisation contribue à accroître le pic de pollution.

En 2002, il y a eu quatre pics de pollution sur l'agglomération parisienne, mais aucun déclenchement d'alerte depuis 1997.

### LE ? SAVIEZ-VOUS

Le pic de pollution se produit quand il y a des niveaux élevés de polluants et une météo propice (fort ensoleillement, vent nul etc.).

Les jours, par exemple, où le trafic routier est dense et qu'il n'y a pas de vent pour disperser les polluants favorisent les pics de pollution. Mais il existe en outre une pollution « de fond », moins forte mais présente en permanence. Il faut donc agir au quotidien, et pas seulement à l'occasion des pics.

POLLUTION ATMOSPHÉRIQUE: S'EN PROTÉGER, LA PRÉVENIR

## Quel mode de transport préférer pour être moins exposé ?

La marche à pied est généralement le mode de déplacement qui expose le moins à la pollution atmosphérique, suivie du vélo et des transports en commun.

La voiture est le mode de transport dans lequel on est le plus exposé à la pollution atmosphérique, surtout aux heures de pointe. Mieux vaut préférer les transports en commun. Si vous êtes néanmoins contraint de prendre votre voiture, voici quelques conseils pour votre protection et celle d'autrui.

- Au volant, adopter une conduite calme. Éviter les freinages et accélérations brusques, qui multiplient l'émission de polluants.
- Faire effectuer régulièrement le contrôle antipollution de son véhicule, surtout s'il est ancien.
- Laisser le moins possible le moteur tourner au ralenti.

- Éviter de faire le plein aux heures chaudes de la journée, à cause des vapeurs d'essence.
- Ne pas ouvrir sa fenêtre dans les tunnels ou les parkings.
- Lors de l'achat d'un véhicule neuf, prendre en considération la dimension environnementale dans son choix.

Une fois sur deux, les Européens utilisent leur voiture pour faire moins de 3 kilomètres, une fois sur huit, pour faire moins de 500 mètres.

### LE ? SAVIEZ-VOUS

En Île-de-France, les polluants présents dans l'air proviennent principalement des gaz d'échappement.

Les pots catalytiques ne deviennent efficaces qu'après 3 kilomètres de trajet. La région parisienne compte aujourd'hui plus de quatre millions de voitures particulières, dont plus d'un million de véhicules Diesel. Malgré les progrès techniques, l'augmentation du nombre de voitures ne permettra pas d'obtenir les améliorations de la qualité de l'air souhaitées. Préférer les transports en commun, le vélo ou la marche, c'est préserver sa santé et agir pour la qualité de l'air.

## Quelles précautions prendre dehors ?

Nous passons en moyenne 20% de notre temps à l'extérieur. Il y a, là aussi, quelques précautions simples à prendre.

- Ne pas laisser les enfants jouer à proximité des axes routiers. Dans la mesure du possible, les emmener plutôt dans les parcs ou les endroits éloignés de la circulation.
- Dans les rues à trafic dense, éviter de laisser les jeunes enfants dans leur poussette à proximité des pots d'échappement.
- Mieux vaut s'abstenir de faire du sport à proximité des axes routiers ou des zones fortement industrialisées. Là aussi, préférer les parcs ou, si l'on court dans la rue, le faire aux heures de faible circulation.

- Certaines personnes se demandent s'il faut porter un masque, lorsque l'on fait du sport ou du vélo, par exemple. Seuls les masques avec filtre à charbon peuvent avoir une certaine efficacité. Il faut cependant savoir qu'ils n'arrêtent pas les particules fines, ni de nombreux gaz. Les foulards et les masques chirurgicaux n'arrêtent pas plus de particules que ne le fait la respiration par le nez et sont donc inutiles.

Nous respirons en moyenne 14 000 litres d'air par jour.

### LE ? SAVIEZ-VOUS

La pollution atmosphérique est plutôt moins importante en région parisienne que dans les autres grandes agglomérations européennes.

En effet, le climat souvent venteux et pluvieux de l'agglomération parisienne aide à disperser les polluants et à « laver » l'atmosphère. De plus, les journées d'ensoleillement sont moins nombreuses que dans le Sud, par exemple, et la concentration en ozone est donc souvent moins importante à Paris qu'à Marseille.

## Quelles précautions prendre chez soi ?

On parle souvent de la pollution atmosphérique extérieure, mais beaucoup moins de la pollution intérieure. Pourtant, celle-ci existe bel et bien, même si les polluants concernés sont un peu différents. Sachez la réduire et vous en protéger.

- Ne pas fumer dans la maison. La fumée de tabac est le polluant intérieur le plus nocif.
- Aérer son habitation matin et soir, pendant cinq minutes.
- Interdire l'accès des chambres aux animaux de compagnie, qui peuvent transporter des allergènes.
- Limiter le nombre de peluches dans les chambres et les laver deux fois par mois à 40 °C.
- Laver au moins une fois par an les rideaux, couettes, couvertures et oreillers.
- Recouvrir son matelas d'une housse anti-acariens.
- Plutôt que le balai, utiliser un aspirateur car il empêche la poussière de se redéposer ailleurs. Si possible, préférer un aspirateur équipé d'un filtre à très haute efficacité (HEPA) pour éviter les rejets de poussière.
- Éviter de faire sécher le linge dans les pièces communes ou les chambres : cela favorise l'humidité.
- Éliminer la poussière avec un chiffon humide, qui la retient mieux qu'un chiffon sec.
- Ne pas manipuler des produits de bricolage (peinture, colles, solvants...) dans une pièce mal ventilée.

**Nous passons en moyenne 80 % de notre temps dans des endroits clos.**

## Comment se chauffer sans manquer d'air ?

Aujourd'hui, les habitations sont souvent surchauffées. De plus, comme elles sont de mieux en mieux isolées, une ventilation insuffisante gêne la dispersion des polluants et favorise l'humidité. Il faut donc prendre certaines précautions pour ne pas vivre au quotidien dans un intérieur trop pollué.

- Ne jamais boucher les grilles d'aération.
- Ne pas chauffer son habitation au-delà de 22 °C.
- Faire vérifier son installation de chauffage au moins une fois par an (deux fois pour un système de chauffage au fioul).
- Faire ramoner les cheminées de raccordement des appareils deux fois par an pour les chauffages au fioul ou au charbon, une fois pour les chauffages au gaz.
- Ne jamais bricoler soi-même son système de chauffage ou son chauffe-eau. Faire toujours appel à un professionnel qualifié.
- Ne pas utiliser de manière prolongée des appareils d'appoint comme les poêles à pétrole ou les radiateurs à gaz mobiles. Respecter les consignes d'utilisation et toujours s'assurer que la pièce est bien ventilée.
- Ne pas arrêter les systèmes de ventilation mécanique ou en obstruer les bouches.

**13% des gens obstruent les bouches d'aération.**

### LE ? SAVIEZ-VOUS

La pollution atmosphérique existe aussi à l'intérieur.

À la maison, on retrouve en partie les polluants de l'extérieur, mais aussi ceux provenant des acariens, des blattes, des moisissures, des animaux de compagnie ou de certaines plantes, sans oublier la fumée de tabac et les produits de bricolage et d'entretien.

### LE ? SAVIEZ-VOUS

De mauvaises installations de chauffage peuvent libérer du monoxyde de carbone, gaz très toxique.

C'est le cas des chauffages au gaz, au fioul, au charbon ou au bois et des chauffe-eau, quand ils sont mal raccordés ou mal entretenus. Il est donc très important de faire vérifier régulièrement son installation de chauffage par des professionnels. On déplore encore de nombreuses intoxications et des décès dus au monoxyde de carbone.

## Comment bien s'informer ?

Différents services d'information et d'alerte de la population sont mis en place en région parisienne. Ils sont très utiles lors de pics de pollution ou pour mieux s'informer au quotidien. Mais vous pouvez aussi en parler à votre médecin ou à votre pharmacien, qui sauront vous conseiller (en cas de problème de santé particulier).

- Lors d'un pic de pollution, le préfet de police peut déclencher deux types de procédure.
- La première informe le grand public lorsque la concentration en ozone, dioxyde de soufre ou dioxyde d'azote est assez importante pour présenter des risques pour la santé des personnes sensibles ou vulnérables.
- La seconde est une procédure d'alerte du grand public lorsque la concentration de l'un des trois polluants peut présenter des risques pour la santé d'une plus large population.
- Sur le site d'Airparif ([www.airparif.asso.fr](http://www.airparif.asso.fr)), vous pouvez prendre connaissance quotidiennement

- de la qualité de l'air en Île-de-France.
- Pour les personnes sensibles à la pollution, la ligne Allô air santé assure une permanence lors des procédures d'alerte. Des médecins vous répondent au 01 40 34 76 14.
- Pour les allergiques aux pollens (rhumes des foins, conjonctivites), il existe un réseau de surveillance aérobiologique, sur le site [www.rmsa.asso.fr](http://www.rmsa.asso.fr)
- Lorsque vous partez en vacances en France, vous pouvez consulter le «Bulletin quotidien de la qualité de l'air» de la région dans laquelle vous allez, diffusé par l'Agence de l'environnement et de la maîtrise de l'énergie ([www.ademe.fr](http://www.ademe.fr)).

Airparif analyse près de 16 000 données par jour.

### LE ? SAVIEZ-VOUS

L'association agréée Airparif fait chaque jour un bilan de la qualité de l'air dans un rayon de 100 kilomètres autour de Paris.

Airparif diffuse ce bilan sous la forme d'un chiffre, appelé l'indice Atmo. Ce chiffre prend en compte l'ensemble des données collectées dans ce rayon de 100 kilomètres et s'échelonne de 1 (air d'excellente qualité) à 10 (air de très mauvaise qualité). Cela permet aux personnes sensibles de prendre des précautions supplémentaires si la qualité de l'air est annoncée comme très mauvaise.



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POLLUTION ATMOSPHÉRIQUE: S'EN PROTÉGER, LA PRÉVENIR

## Si vous avez des problèmes particuliers, parlez-en à votre médecin ou à votre pharmacien

### Vous ressentez ces symptômes :

- vos yeux sont irrités
- vous avez une toux sèche
- vous avez du mal à respirer
- vous avez eu une crise d'asthme

### Vous correspondez à l'une des propositions ci-dessous :

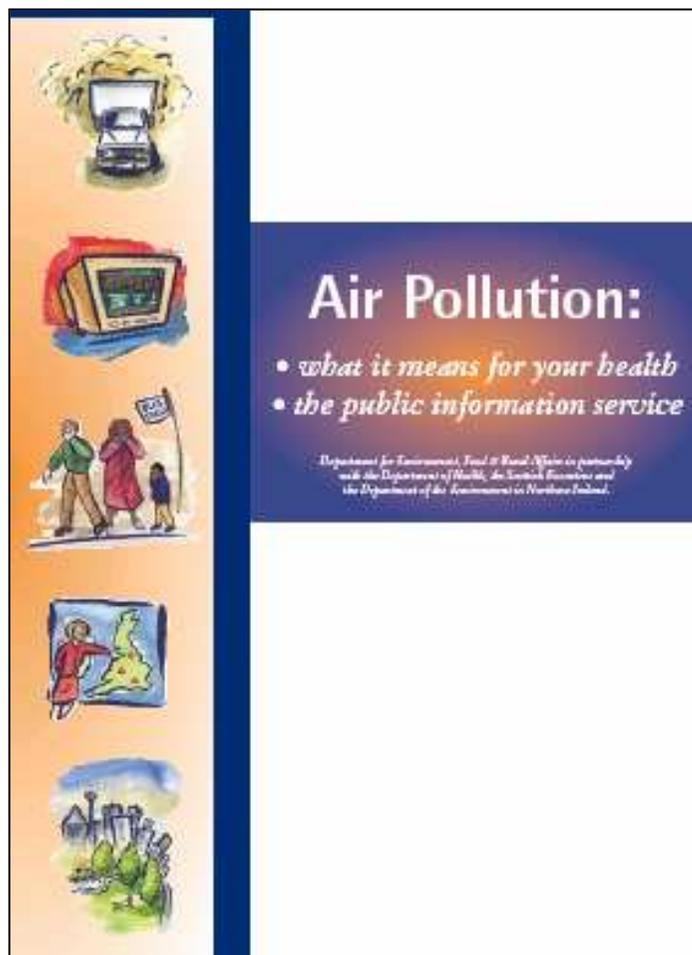
- vous habitez près d'un axe routier très fréquenté
- vous fumez, ou quelqu'un de votre entourage fume
- vous utilisez très souvent votre voiture
- vous avez chez vous des sources de pollution particulières (telles que celles énumérées au bas de la page 8)

POLLUTION ATMOSPHÉRIQUE: S'EN PROTÉGER, LA PRÉVENIR

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### 3 Air pollution: what it means for your health

A DEFRA (UK) brochure on health and air quality, linked to the UK index. Some advice on pollution prevention is given as well. (Original at: [http://www.defra.gov.uk/environment/airquality/publications/airpoll/pdf/airpollution\\_leaflet.pdf](http://www.defra.gov.uk/environment/airquality/publications/airpoll/pdf/airpollution_leaflet.pdf))



*These days, many people are concerned about air pollution and whether it might affect their health. The fact is that most of the time, air pollution levels are low. The air is certainly a lot cleaner today than in the days of the smogs of the 1950's, when factory chimneys belched out smoke and nearly everyone had a coal fire. But if you are concerned about air pollution, there is a free and easy to use service that allows you to check levels in your area.*

*The Government and the devolved administrations' Air Pollution Information Service is managed by the Department for Environment, Food and Rural Affairs (DEFRA). It provides detailed and easy-to-understand information on air pollution, completely free of charge. This information can be particularly important to people with medical conditions which air pollution may make worse.*

## INTRODUCTION

Everyone has a right to accurate, comprehensive and up-to-date information on the air they breathe.

This booklet is designed to be an easy to understand guide to the Air Pollution Information Service and to air pollution and health. It explains what the service is and tells you:

- how to use the service;
- the bands (or levels) of air pollution and how to understand the 1 to 10 index;
- the health effects of different levels of air pollution;
- what to do if air pollution affects your health;
- which pollutants the service covers;
- where air pollution comes from and what affects people's exposure; and
- where to find out more about air pollution.



It also advises on:

- "does it make a difference where I live?"; and
- how we can all help reduce air pollution.

## WHAT IS THE AIR POLLUTION INFORMATION SERVICE?

The service gives up-to-the-minute information at your fingertips, including:

- concise, easy-to-understand summaries;
- detailed information on individual pollutants, based on the latest medical and scientific research;
- health advice – essential for people whose health may be affected by air pollution; and
- forecasts for the following urban areas and regions are available on the internet, teletext and freephone:

### Urban areas

Birmingham  
 Manchester  
 West Yorkshire  
 Tyneside  
 Liverpool  
 Sheffield  
 Nottingham  
 Bristol  
 Brighton/  
 Worthing/  
 Littlehampton  
 Leicester  
 Portsmouth  
 Swansea  
 Cardiff  
 Belfast  
 Edinburgh  
 Glasgow

### Regions

North East  
 North West  
 Yorkshire and  
 Humberside  
 East Midlands  
 West Midlands  
 Eastern  
 Greater London

South East  
 South West  
 North East Scotland  
 Highlands  
 Central Scotland  
 Scottish Borders  
 North Wales  
 South Wales  
 Northern Ireland



3



A free leaflet *Working Together for Clean Air* (ref. 99EP0865) explains what the Government, the devolved administrations in Scotland, Wales and Northern Ireland and local authorities across the country are doing to improve air quality. Copies are available from DEFRA Free Literature at the address at the end of this leaflet.

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#### WHAT INFORMATION DOES THE SERVICE PROVIDE?

The service is available through TV teletext pages, freephone and the internet. The teletext and freephone services provide all the basic information, while there is more detail on the internet.

The service reports levels of the five main air pollutants that can cause immediate health effects, against a numerical index as:

- 1-3 (low)
- 4-6 (moderate)
- 7-9 (high)
- 10 (very high)



The descriptions are based on the latest medical and scientific research. They are available on:

**Teletext:** pages 155 and 169

**Freephone:** 0800 55 66 77

**Internet:** <http://www.airquality.co.uk>

(also see *How does the air pollution banding system work?*)

### TV teletext: pages 155 and 169

The information is in three categories:

- national and regional forecasts for the next 24 hours (p. 155);
- air pollution and health advice (p. 169); and
- Alert messages when air pollution is high (p. 155).

### Up to date levels of air pollution are given for three types of area:

- in towns and cities nearer busy roads;
- elsewhere in towns and cities; and
- in rural areas.

### Freephone 0800 556677:

- available 24 hours a day;
- fast-track service for frequent callers to access their region's forecasts quicker;
- three types of area as those on teletext; and
- more detailed information, particularly on health effects.

### Internet

• National Air Quality Information Archive <http://www.airquality.co.uk>

- same information as teletext and freephone.

### The Archive also has:

- a comprehensive range of new and historic air pollution information;
- data on the concentrations of a large number of individual pollutants, measured on an hourly or longer basis at over 110 automatic and over 1,100 non-automatic monitoring sites around the UK.

### Who might want to use the service?

- people with heart conditions or lung diseases, including asthma, bronchitis and emphysema;
- people whose breathing gets worse when air pollution increases;
- people who want to know more about air pollution levels and who want to help reduce it.

### How does the air pollution banding system work?

The system is a way of telling people of the daily changes in air pollution. It is especially helpful to those affected by air pollution, as it can help them adjust their medication or activities for the day.

The system uses a numerical index grouped into four bands to describe levels of air pollution. The bands, or levels, are 1–3 (low), 4–6 (moderate), 7–9 (high) and 10 (very high).

Information on each of the five main pollutants with short-term health effects is gathered every hour from over 110 automatic monitoring sites. The five main pollutants are:

- sulphur dioxide;
- nitrogen dioxide;
- ozone;
- carbon monoxide; and
- particles ( $PM_{10}$ ).

The air pollution level reported in the forecasts and summaries is the highest for any single pollutant. For example, if all but one of the pollutants in a region or city were 1–3 (low), with just a single pollutant registering 7 (high), the summary would describe air pollution as 7 (high). In the UK, very high levels of air pollution are rare. That is why the 'very high' band is only a single number – 10.

The service also issues special messages when air pollution levels are high. These report where and when exceedences occur and explain their likely cause. They also give a forecast of levels and specific health advice to sensitive people in the area affected.

### How might air pollution affect me?

If your health is good, the levels of air pollution we usually experience in the UK are unlikely to have any serious short-term effects. But on the rare occasions when air pollution levels are high, some people may feel eye irritation, others may start to cough, and some may find that breathing deeply hurts.

People with lung diseases or heart conditions are at greater risk, especially if they are elderly. Daily changes in air pollution trigger increased admissions to hospital



and contribute to the premature death of those who are seriously ill.

The table below describes how the health of people who are sensitive to air pollutants might be affected by pollution at the different levels or bands.

People with heart conditions or severe lung diseases (for example, chronic bronchitis or emphysema) might be more sensitive to changes in air pollution than the descriptions suggest.

Pollution band and numerical index	Health effect
1-3 (LOW)	Effects are unlikely to be noticed, even by people who know they are sensitive to air pollutants
4-6 (MODERATE)	Mild effects are unlikely to require action, but sensitive people may notice them
7-9 (HIGH)	Sensitive people may notice significant effects, and may have to act to reduce or avoid them (for example, by reducing time spent outdoors). Asthmatics will find that their reliever inhaler should reverse the effects of pollution on their lungs
10 (VERY HIGH)	The effects of high levels of pollution on sensitive people may worsen when pollution becomes very high

*Sensitive individuals are people who suffer from heart and lung diseases, including asthma, particularly if they are elderly.*

The changes from band to band are not sudden steps. The effects of air pollutants on health increase gradually as air pollution levels rise.

It is important to look at the levels and bands in the light of personal experience. Some people – especially those who are sensitive to air pollution – will learn from experience how air pollution affects them. Some may still notice the effects for several days after pollution levels have fallen to low or moderate levels.

The information service only provides information about the health effects of short-term exposure to certain air pollutants. Air pollution is also likely to affect health over the longer term. Understanding of the long-term health effects of exposure to air pollution is currently rather limited, but experts suggest that cutting long term exposure to fine particles by half could increase life expectancy by between 1 and 11 months on average. This is not as great as the effect of smoking on life expectancy (on average, non-smokers live 7 years longer than smokers).

### Asthma

There is little evidence that air pollution itself causes asthma.



Research is continuing on this subject. However, if you already have asthma, you may find that air pollution triggers an attack, although infections and allergens are more likely to do so.

If you suffer from lung diseases or a heart condition, you might like to follow the advice below.

#### HEALTH ADVICE FOR PEOPLE WITH LUNG DISORDERS AND OTHERS SENSITIVE TO AIR POLLUTION

*If you have asthma or another lung disease, your symptoms are unlikely to change when air pollution levels are 1-3 (low) or 4-6 (moderate). This applies whatever the time of year.*

*However, your symptoms may get worse when air pollution reaches the 7-9 (high) or 10 (very high) bands, especially if you are elderly. If this happens, you may need to change your treatment in the usual way. If these steps don't help, consult your doctor.*

### Heart Disease

**HEALTH ADVICE FOR PEOPLE WITH HEART DISEASE**

*If you suffer from a heart condition and you notice a change in your symptoms, get medical advice as you normally would. Do not try to change your treatment yourself.*

#### In winter

- If traffic fumes make breathing harder, avoid busy streets as much as you can.
- If you are elderly, stay indoors as much as possible and keep warm.

#### In summer

- If you find it harder to breathe on hot sunny days, avoid energetic outdoor activities, especially in the afternoons when pollution levels tend to be higher.
- If your child has asthma, they should still be able to take part in games as normal, but they may need to use their reliever inhaler more before they start. They do not need to stay away from school.

### Smoking



Smoking is likely to have a much more serious effect on your health than air pollution. Giving up smoking will reduce your risk of lung and

heart disease considerably. It will also make you less vulnerable to the short-term effects of air pollution.



The table below describes the health effects that sensitive individuals might experience at very high levels of these pollutants.

With the exception of carbon monoxide, very high levels of all these pollutants can irritate the

lungs and cause inflammation. People with lung diseases, especially the elderly, may feel less well than usual. In some cases their symptoms may increase to such an extent that they need a change in treatment, or admission to hospital.

Pollutant	Health effects at very high levels
Nitrogen dioxide Sulphur dioxide Ozone	These gases irritate the airways of the lungs, increasing the symptoms of those suffering from lung diseases.
Particles	Fine particles can be carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases.
Carbon monoxide	This gas prevents the normal transport of oxygen by the blood. This can lead to a significant reduction in the supply of oxygen to the heart, particularly in people suffering from heart disease.

### WHERE DOES AIR POLLUTION COME FROM?

The service reports daily outdoor levels of pollution, mostly from outdoor sources. Different sources are responsible for different pollutants. Road transport is the main source of nitrogen dioxide and carbon monoxide. Power stations and other industrial sources also produce nitrogen dioxide. Industry is the main source of sulphur dioxide. Particles

come from many sources, including road transport, power stations and other industry. The burning of wood or coal for home heating can also be an important source of sulphur dioxide and particles. Ground level ozone is not emitted directly from any source. Instead it is formed when sunlight acts on nitrogen dioxide and other atmospheric substances close to

the ground. The pollutants that cause ground level ozone come from a range of sources, including petrol and other fuels. Ground level ozone is different to the

ozone layer, which is affected by ozone depleting substances, such as CFCs, that have been released into the atmosphere.

### EXPOSURE TO AIR POLLUTION

Air pollution levels vary from area to area and from day to day. Levels of pollution can be influenced by a number of things:

- local landscape features and surroundings;
- local and regional sources of pollution; and

- seasonal variations and prevailing weather conditions.

For example, the following locations and weather conditions might lead to higher or lower levels of pollution.

Higher pollution	Lower pollution
Cities/towns in deep valleys	Cities/towns on hills
In summer, during sunny, still weather, particularly ozone in suburban and rural areas	Windy or wet weather at any time of year
In winter, in cold, still foggy weather, particularly vehicle pollutants in large cities	Rural areas away from major roads and factories (for most pollutants except ozone)
Busy roads with heavy traffic next to high buildings and busy road junctions	Residential roads with light traffic
High levels of solid fuel, for example coal and wood, used for heating in the local area	Smoke control area or areas with high levels of gas or electric used for heating

### DOES IT MAKE A DIFFERENCE WHERE I LIVE?

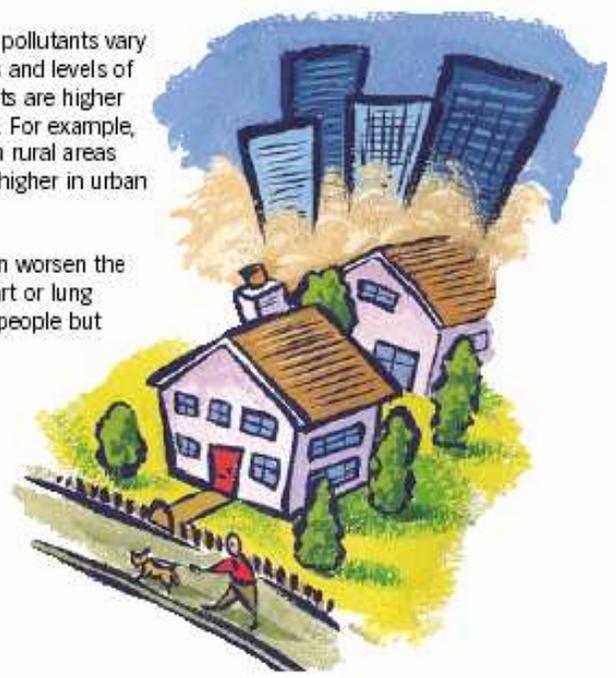
People often ask whether they should move home to reduce the risks to their health from exposure to air pollution. This is a difficult question to answer.

#### What we do not know:

- It may be unclear whether a person is truly sensitive to air pollution. For example, there are many triggers for asthma and reducing exposure to air pollution will not help if in fact it is another trigger that is more important.
- Despite the fact a person appears to be sensitive to air

#### What we do know:

- For an individual pollutant, levels vary across the country. Levels also vary between different places in the same area for example beside roads.
- Levels of some pollutants vary more than others and levels of different pollutants are higher in different areas. For example, ozone is higher in rural areas but particles are higher in urban areas.
- Air pollution can worsen the symptoms of heart or lung disease in some people but not in others.
- Some studies find that asthma symptoms are greater in those living beside roads but other studies do not.



pollution, they may not know which pollutant is having an effect.

- It may not be obvious how much of a reduction in exposure is required to make a significant difference.

It is therefore very difficult to give advice which is relevant to everyone in the same area. Moving home is a major life event and may have other consequences for

people's health. It is unlikely to be worthwhile for people to move simply because of concerns about possible effects of air pollution. However, if a person is in the process of moving, they could consider choosing a lower pollution area. Information is available (details at the end of this leaflet) on levels of air pollutants in different areas to enable people to make their own choice.

## HELPING TO REDUCE AIR POLLUTION

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland sets the framework for local action to reduce pollution. Local authorities monitor and assess air quality and prepare action plans where they identify pollution hot-spots. The Environment agencies and local authorities are monitoring and regulating emissions from industry. The European Union and other international organisations are acting to reduce global pollution. The Government and devolved administrations have introduced a wide range of measures, which have substantially cut harmful emissions from road vehicles and encouraged people to use cleaner fuels and vehicles.

But everyone can do their bit to reduce air pollution, especially when pollution levels are high.

### On the road

Road vehicles are a major source of many pollutants in urban areas. They produce over 50 per cent of the emissions of nitrogen oxides and over 75 per cent of carbon monoxide emissions in the UK.



Before using your car, ask yourself:

- do I really need to make this journey?
- could I walk or cycle instead of taking the car?
- could I take a bus, tram or train?
- are the levels of air pollution already too high today?



### At home

If you must drive:

- drive smoothly. You'll save fuel, and your engine will also pollute less;
- don't rev your engine unnecessarily;
- maintain your car. Keep the engine properly tuned and the tyres at the right pressure; and
- turn off the engine when your car is stationary.



- Buy water-based or low-solvent paints, varnishes, glues and wood preservatives.

- Avoid burning solid fuels if possible. If you live in a smoke control area, burn only authorised smokeless fuels (your local authority can advise you).
- Avoid lighting bonfires, but if you must, don't light them when pollution levels are high or while the weather is still and cold. Only burn dry material and never burn household waste, especially plastic, rubber, foam or paint. Levels of pollution can be quite high on bonfire night and other events/festivals with bonfires, and sensitive people, including people with respiratory conditions, may notice some effects. However exposure can be considerably reduced by remaining indoors and keeping windows closed.

### MORE INFORMATION IS AVAILABLE FROM:

Teletext: pages 155 and 169

Freephone: 0800 55 66 77

Internet: <http://www.airquality.co.uk>

Department for Environment, Food and Rural Affairs and air quality issues in England:

<http://www.defra.gov.uk/environment/airquality>

National Assembly for Wales:

<http://www.wales.gov.uk/linksenvironment>

Northern Ireland: <http://www.ehsni.gov.uk/environprotect>

Scottish Executive: <http://www.scotland.gov.uk/environment/airquality>

Department of Health, Committee on the Medical Effects of Air Pollutants and air quality issues:

<http://www.doh.gov.uk/hef/airpol/airpolh>

This website includes further details on the health effects of pollution discussed in this leaflet.

A leaflet/poster *Winter Smog, Summer Smog* (ref 97EP0353) and further copies of this leaflet (ref PB6472) are available from:

DEFRA Publications

Admail 6000

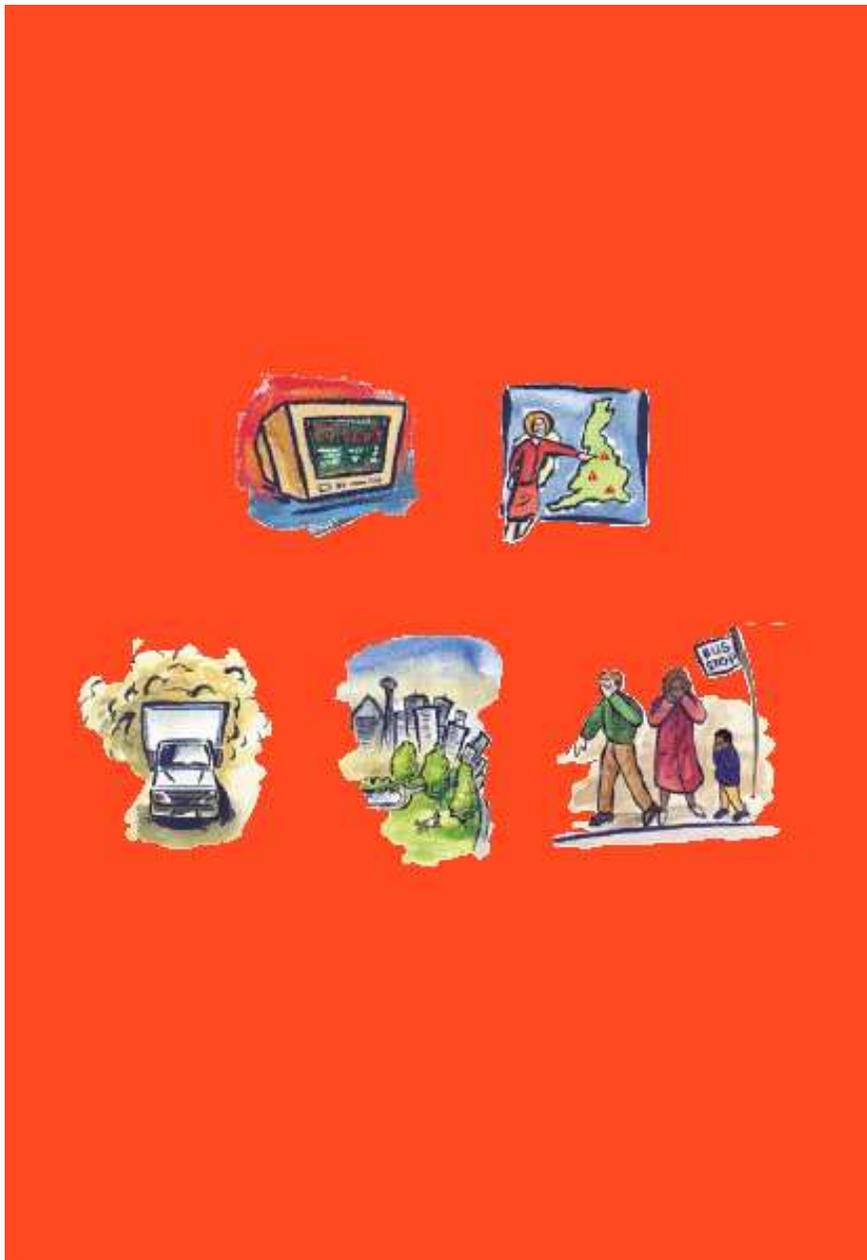
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**DEFRA**  
Department for  
Environment,  
Food & Rural Affairs

**DH** Department  
of Health

**SCOTTISH EXECUTIVE**

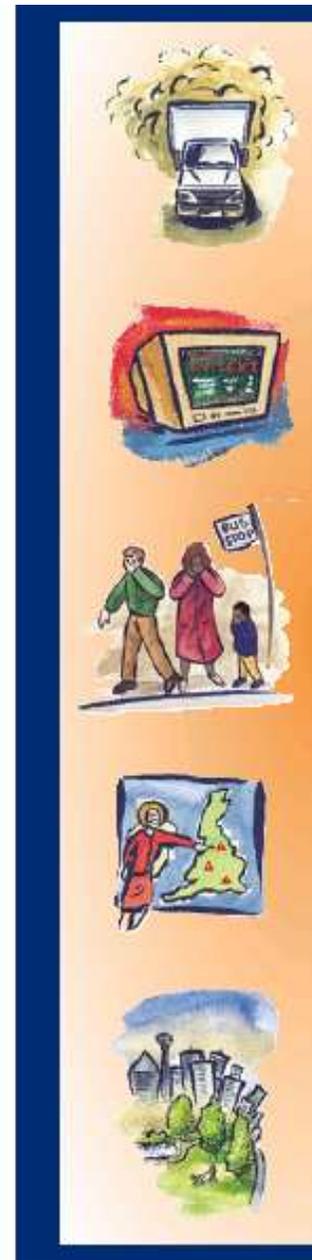
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- Department for Environment, Food & Rural Affairs
- Department of Health
- The Scottish Executive
- Department of the Environment in Northern Ireland

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PB6472



## A.6 1000 solutions and now yours ?

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### ***The air around our earth, the air in Brussels***

“Air quality” is an intangible concept that is hard to visualize or define. The only clear aspect is the repercussion that poor air quality can have on our health. When we notice how bad for our health the air that we breathe actually is, we start to realize how important our actions are. Nevertheless, for more than 20 years governments have been concerned about air pollution at both local and global levels. European guidelines have been drawn up and decrees have been passed in Brussels to combat well-known phenomena such as climate change, ozone peaks, acid rain etc. and to improve the quality of the air in the city. The industrial sector has to satisfy increasingly stricter environmental standards and monitoring is becoming sharper.

Many measures have already been taken towards achieving an acceptable air quality. Now it is time to go one-step further. That is exactly what the Brussels authorities intend doing with their plan for the structural improvement of the air quality in the Brussels-Capital Region. In addition, we as individual citizens are expected to make our own contributions. How? By changing a number of our everyday habits.

In this brochure, you can discover which life and consumer choices a number of residents of Brussels are making in order to make our city and our world, a better place in which to live. I hope that these invaluable testimonies will give you ideas and tips which you will be able to incorporate into your daily life.

Minister for the Environment – Brussels-Capital Region

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### Table of contents

- What causes air pollution, and what are the consequences?
- Alternative transport, why?
  - Which form?
  - How should I choose my car?
  - How should I drive my car?
- Save Energy, why?
  - How should I heat my house
  - How should I choose electrical appliances
  - How should I use my electrical appliances
- Do-it-yourself, do-it-differently, why and how?
- Alternative gardening, why and how?
- Not just hot air

### ***Foreword***

The earth is gasping for fresh air, and so is our city. For more than twenty years scientists, environmental organizations and governments have been active. Measures have been taken, standards have been made stricter, research has been carried out and efforts have been made in Brussels and elsewhere ... improvements can be seen but even so, the quality of our air is still far from good.

Year after year our consumption increases, year after year more and more pollutants are emitted. Traffic, heating, electricity consumption, use of solvents, paints and glues, spraying pesticides ... all of these trivial, everyday actions release all kinds of gasses and dusts that pollute the air. This is happening to such an extent that the earth's atmosphere and the climate have been brought out of balance.

A complex situation is continually evolving and is a source of great concern for climate specialists, health services and governments. The situation is so serious that it should incite everyone to change his or her daily habits. This is the aim of this brochure: make everyone aware of his or her power to improve the quality of the air.

There are a thousand and one possibilities. A thousand and one small gestures that can lead to good results. An extensive range of suggestions from which everyone can choose what best suits them. Do it for your health, for your comfort, for fun, to save ... whatever the reason, do it!

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*From **Global** thinking to local actions: **Do** something about it yourself*

The international community agrees: people influence the environment and in particular, the global phenomena concerning air pollution are becoming clearer and grimmer.

The intensity with which we emit all kinds of dusts and gasses into the atmosphere (energy, transport, industrial processes, consumption...) has reached such proportions that air pollution is even effecting the environment, is ruining the quality of life both globally and locally, is affecting public health (in particular the breathing and nervous systems), is retarding plant growth and eroding buildings. As if this is not complicated enough, new compounds are constantly being formed which then react with each other.

In many areas of the world, including the Brussels-Capital Region, measures are being taken to improve the situation. Every citizen can and must play his or her own part in the battle against pollution. Fortunately, here and there, projects are being set up and some people are developing a new awareness of shared responsibility.

- *Not an airy subject*

Air pollution is so complicated that it is not possible to express it in clear figures. The sources of and the interactions between the various pollutants are continually changing and new areas for action are being discovered by scientists daily. Within this context, it is difficult to make judgments or to determine standards and thresholds. Because of this, the precaution is needed more than ever and many standards are becoming increasingly stricter.

- *When the weather has its say*

Particular weather conditions can cause air pollution to increase. Temperature inversion sometimes occurs in winter, whereby a warm layer of air prevents the lower polluted air from rising. This means that the concentration of pollutants in the air increases. In the summer, high temperatures and solar rays mean that certain exhaust gasses react together forming new harmful substances such as ozone. Summer or winter, when the air pollution reaches such a level that public health is endangered the government sounds the alarm. Sometimes the solution is to tackle the pollution at its source and for example curb or completely forbid the use of the car.

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*I leave my car at home, an action with **results***

The air in the Brussels-Capital Region is "carsick".

Brussels is economically attractive, it is a business and administrative centre and a meeting point for culture and education. About 186,000 cars belonging to commuters and an equal number belonging to residents circulate in the city daily. Car traffic is the largest source of pollution, emitting significantly more pollution than industry. Nevertheless, it does not have to be this way. There are alternatives and some people are making use of them:

- they switch to a different type of transport such as cycling or using public transport.
- they choose a more environmentally friendly car
- they alter their driving style

- The car, the most important source of air pollution  
In the Brussels-Capital Region car traffic is responsible for 91% of carbon monoxide (CO) emissions, 89% of polycyclic aromatic hydrocarbon (PAK) emissions, 57% of nitrogen oxides (NOx) emissions, 44% of all emissions of volatile organic compounds such as benzene and 19% of carbon dioxide (CO2) emissions. During warm and sunny weather some of these gasses react together to form ozone. This ozone remains in the lower air layers and can affect our respiratory system.

- *Faster by bike*  
An average journey in Brussels is only 6km and a car emits the worst pollution during the first three kilometres of any journey. If you add to this, the time required to find a parking space then there is no beating the bike!
- *On four wheels the air is less healthy than on two*  
Within the car, the air pollution is actually from two to eight times worse than that registered by the measuring stations along the road. A large part of this pollution comes from the vehicle itself as gasses and vapours from the exhaust and the fuel tank penetrate inside the car.

Small gestures that spare the environment!

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***Tomorrow I will leave my car at home***

- Sometimes I have the car, sometimes I do not
- My daily training / I am sportive  
Research has shown that people who cycle to work

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But I am able to use the car whenever I need it, and for an agreed period. Neighbours can agree amongst each other to share one or more cars. A book for reservations, another to register the mileage and usage, a communal insurance, one person responsible for maintenance and Bob is your Uncle! This is known in trendy terms as “car sharing”. In a number of cities, this system has become professionalized. Those joining are freed from bureaucratic nonsense, technical controls and maintenance and parking problems. Parking places are reserved at various designated sites. In 2003, this system will be introduced in Brussels.

- Cycle to school

In some districts, groups cycle to school. Parents or supervisors ensure the safety of the group. It is an excellent way for the children to become more experienced in cycling, to learn about traffic safety, to stay fit and ... it is good for the air quality.

- A Drenching? Seldom!

The chance that a Belgian cyclist gets wet during his daily journey, assuming an average cycle ride of one hour, is only about 7.6%.

daily are fitter than their colleagues who go by car.

- My employer supports me

Since the first of January 1998, all homework-travelling expenses awarded by an employer to his cycling-employees, up to a maximum of 0.15 euro per km, are tax-free.

- I carpool

For frequently recurring routes, such as to work or to school, carpooling is a good alternative. Whether a group of friends joins or whether it is more organised (see the section “for more information” on the last page of this brochure) carpooling offers many advantages: fewer cars on the road, less pollution, save money, companionable.

- More people, less pollution!

Within the Brussels-Capital Region alone, cars annually drive 3 thousand million km, enough to drive round the world 80,000 times! The public transport covers 100 x fewer kilometres. Such a shame considering that public transport consumes much less fuel and emits far less pollution per traveller.

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*I have been using the bicycle on a daily basis for a long time now, but I recently bought a folding-bicycle. This is ideal to take on the train or in combination with the bus, tram or metro. I commute between Namen and Brussels and that journey has become much easier. An additional advantage is that many people regard my bike as a curiosity, which frequently leads to the start of a conversation.*

Arnold J

*I was immediately attracted to the idea of car sharing! I live in Brussels but for my work, I often have to go to an area near Namen. Because of this, I joined a car-sharing project in Namen. When I get off the train, a car is waiting for me. It is very relaxing to know that a new, well-maintained car is always available.*

Barbara C.

*I manage fine without a car: depending on where I want to go to and on the weather, I choose between the metro, the car, public transport and carpooling. If car sharing is introduced, I will definitely make use of it!*

Fabrice L.

*I frequently cycle through Brussels and it makes me feel good. Preferably, I take the narrow streets, crossing the various districts. I make sure that I am given my fair share of the road; it is a question of being clearly visible. And something that I never forget – my helmet!*

Anne V.

*In the car, I was always stressed and never sure that I would reach my destination on time. On the bicycle, I never have trouble with traffic jams and I can plan my engagements much better.*

Amélie S.

*I am 70 years old and I still cycle everywhere. I have never had a car, let alone driven one. If it is not far so I do everything by bike, shopping at the market or supermarket, going to the dentist, visiting the family etc. If I have to travel further or if the weather is bad then I use public transport. For many years, I lived in Paris where a car is more trouble than it is worth. I always used the metro and continued this here in Brussels. It is much more convenient and quicker than the car! By the way, I am convinced that the fact that I feel so healthy and fit today is thanks to my bike!*

Janine T.

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**Rather a Clean car**

- New cars pollute less

Generally, older cars with an equal cylinder capacity and usage pollute more. In particular, cars from before 1<sup>st</sup> July 1992, which do not satisfy the European standard EURO 1, are significant polluters. They make up a third of the total number of cars and are responsible for half of all exhaust gas air pollution. It is of course also true that, old or new, the less you consume the less you pollute. A smaller cylinder capacity is better for the environment.

- The catalytic converter does not solve everything  
All new cars currently on the market in Europe are equipped with a catalytic converter. On their journey through the exhaust pipe, all combustion gasses pass through this catalyser where chemical reactions enable them to be changed into products that are no longer damaging the health. However, they are still greenhouse gasses and they do contribute to warming up the earth. It remains difficult to establish standards and values!

- Technical gadgets in the car: Do I really need them?

All electronic accessories (airco, high-beam headlamps, headlamp washers, heated back windscreen) cost energy thereby increasing fuel consumption and generating more pollution. When buying a new car it is worthwhile seriously considering whether all these extras are actually necessary. If they happen to be part of the standard equipment, we should consider whether we actually need them.

- Have you seen my CO<sub>2</sub> sticker; first rate!

Recently all new cars have a sticker showing information concerning fuel consumption and CO<sub>2</sub> emissions. There is quite a difference between the various makes and models. Consult the purchase guide (see "for more information" on the last page of this brochure). Less tax has to be paid on the most recent models and for cars that run on LPG.

- I care for my car

By regular maintenance and timely replacement of parts that are susceptible to wear and tear you prevent larger repairs, drive more safely (and quietly), consume less fuel and, last but not least, you pollute less.

- My tyres are always hard enough

Tyres that are not hard enough greatly increase fuel consumption, up to 3% per 0.5 bar. That is not even considering safety aspects and the increased wear and tear. Do not wait until the last legally allowed millimetre before you replace tyres; this is also a way to save fuel and to reduce pollution.

*I try to drive as smoothly as possible without sudden movements and at an appropriate speed. My on-board computer continually indicates fuel consumption, which I find extremely useful. Depending on the journey that I intend to make, I give myself a specific target and try not to exceed that figure.*

*Alain W.*

### ***I changed my Driving Style***

- A good driver pollutes less

By a good driver, we mean someone who drives the car smoothly, without accelerating or braking suddenly, who sticks to speed restrictions, who changes to the correct gear timely and who does not try accelerating until the engine is sufficiently warmed up. With these simple rules of thumb, you can make fuel savings of between 20% and 50%. Savings that quickly mounts up and cause a lot less pollution!

- No airco for me

Driving with air conditioning on consumes 30% more fuel. Opening your window also consumes more fuel, but only 5%.

- My bicycle follows!

Baggage on the roof of a car increases fuel consumption – and therefore air pollution – by 20 to 30%. It is much better for bicycles to be attached on sturdy bicycle holders at the back of the car.

- I wait with fast accelerations until the engine has warmed up.  
A cold engine consumes up to 50% more fuel. The engine warms up more quickly when the car is driving than when it is stationary. This boils down to driving away gently with smooth gear changes. With modern cars, 'stepping on it' is definitely worse than

*I have always driven using LPG. It is noticeable that there are more and more cars with the green LPG sticker: where I never used to have to wait at the petrol station, now I regularly have to join a queue! Fortunately, more petrol stations have started supplying LPG, even in the city.*

*When I am in the neighbourhood of a school I am always concerned about the many parents waiting for their children; their car (illegally) parked right by the school gates with the engine running. The same applies to school buses. In addition to the safety of the pupils, schools should also consider their health and set up an 'exhaust free' zone around the school.*  
*Anne V.*

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unnecessary.

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### **Saving Energy – and Action with Results**

- The Brussels-Capital Region welcomes you warmly

Brussels has many houses, apartments, offices, places of work and businesses that all require heating, lighting and decorating. The installations to do this consume energy and emit pollutant gasses into the atmosphere. Electricity as such is not immediately a source of air pollution, however the generation of electricity is. Here it is also true: the less we use, the less we pollute... and the less we pay. This is possible without having to wear three jumpers to keep warm at home, or having a cold bath, replace the vacuum cleaner with a broom or throw away the television, washing machine, computer, stereo or the children's night light.

There are other solutions, and some people in Brussels are making use of these:

- they experiment with other forms of heating
- they choose a more efficient electrical appliance
- they change their bad habits

- A small Rectification

Rational Energy use (abbreviated to RE) is the challenge for all of us: less energy and less pollution but retaining the same comfort. In the first place we must all be aware of how much energy our daily actions and habits actually consume. Only then do we have enough information to be able to decide whether to purchase different appliances or to use our existing appliances more rationally.

*We were concerned that our solar-installation for hot water would not be sufficient. However, to our surprise, it works so well that we nearly always have to mix our heated water with cold water!*

*Jacqueline S.*

*We have applied for all possible subsidies related to solar-energy, and once our applications have been dealt with, the solar part of our hot water installation will not have cost us more than 20 to 25% of the true price. In other words, our investment can be paid back very quickly!*

*Alain W.*

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### **My living room is not a hothouse**

- Focus on heating

More than half of our household energy consumption (car fuel not included) goes towards heating the house. In the Brussels-Capital Region, this represents an important source of air pollution, further increased by the contributions from the countless offices, businesses and places of work. Heating fuels are responsible for 70% of the emission of carbon dioxide (CO<sub>2</sub>), 84% of the sulphur oxides (SO<sub>x</sub>), and 84% of the dust particles. Enough reason to pay a little attention to your heating installation and the way in which you use it.

- A new boiler: warmly recommended

The installation of a modern, economical boiler is a large step towards better quality air and should therefore be encouraged. Within the framework of private person's tax reforms, the amount that households invest in RE can be tax deductible, up to a maximum of 495.79 euros. Eligible investments include certification, replacement of a boiler that is older than 20 years, the installation of a water heater powered by solar energy, extra-insulating glazing...

- Being less warm will not make you poorer!

If you reduce the temperature of your living room or office from 20°C to 19°C, you will save 10% on your heating bills. Setting the thermostat at 19°C instead of 22°C will even halve your heating costs! In addition: if

- Insulation? Naturally!

The golden rule concerning insulation is to prevent heat loss (via walls, floors, windows, roofs etc.) while retaining enough ventilation.

- Hot water on demand

Gas water heaters in the kitchen and bathroom that only activate when the tap is opened are generally more economical than accumulation appliances such as boilers. They create less air pollution and are cheaper in their use. If they are also equipped with automatic ignition there is the additional saving on the pilot flame.

- Sun in the home

Water heating covers only about 10% of our energy costs but is an aspect where we can easily make savings. After all we can make use of the 1555 hours of sunshine that our country receives, free of charge on average each year. In this way, a family that has the right equipment can be supplied with half of their warm water requirements. By way of encouragement, Brussels has made subsidies available for the installation of solar panels (see the section on further information).

- Night time cooler than during the day

Adding a programmable thermostat to your heating installation enables you to adjust quite precisely the temperature of the rooms: if you are not at home, or when you are asleep, the heating can be turned

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you use less... you pollute less!

down quite low ready to heat up again just before you arrive home or get up. Yet another way to reduce air pollution.

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### *Not all Appliances are equally Environmentally Friendly*

- I use elbow grease

Electrical appliances make up a significant 18% of the household energy budget. We all need a stove, but how about an electrical tin opener? Many electrical appliances are definitely useful for some people, but for most of us are no more than a gadget.

- What does the label tell us?

In the same way that there are low-energy light bulbs there are other low-energy appliances. The purchase price is frequently more expensive but they are more economical in use so that the investment quickly repays itself. Several years ago the European Commission issued rules applying to the labelling of a number of appliances. The letter A (green) stands for a low-energy appliance. At the other end of the scale, the letter G (red) alerts the buyer to the fact that the appliance gobbles up energy.

- Light for a song

A 15 W low-energy light bulb gives just as much light as an ordinary 75 W bulb and consumes only a fifth of the electricity. This quickly generates a saving of 80%, whereby the more expensive purchase price of these bulbs comes under a very different light! Especially when you bear in mind that these bulbs last up to ten times as long as an ordinary bulb. You kill two birds with one stone: healthier air and less waste!

*We have installed timers for the lights in our passageways and stairways, so that the lights only stay on for as long as is required to pass through. At other places in the house, we have got into the reflex habit of always turning the light off when we leave the room. In addition, we do not turn lights on unless it is necessary.*

*Alain W.*

*My washing machine has inbuilt scales which weigh the washing so that only the required amount of water is used. I always try to wash at the lowest temperature possible, and believe me; it does not make my washing any less clean.*

*Sophie D.*

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### *I know a few clever tricks!*

- Environmentally friendly tips

Savings that will eventually benefit the air quality are also possible in the kitchen. Cooking with the lid on the pan for example means an energy saving of 60-70%. Using a pressure cooker reduces the energy requirements by half. There are also a few simple rules for washing machines and dishwashers. Do not turn the machine on until it is completely full and do not wash any hotter than necessary: in this way, less energy is consumed and the atmosphere becomes less polluted.

- Put the finger on the button

What is more natural than to turn the light off and to switch the radio, television, cd player etc off when you leave the room? Less hothouse gasses in the air, and once again the opportunity to see stars in the skies, for so little effort? The solution is sometimes less than a finger movement away.

- Over and ... out

Many electrical appliances are on 'stand-by' for hours on end. In this state, they do not use much energy (1 to 8 W) but added together the costs can mount to 150 euros for a household annually. It is definitely worth the trouble to switch them off and even to unplug them!

- Thawing before your money melts away

Inducing cold requires an enormous amount of energy. Freezers and fridges consume about 25% of the total household energy. Two millimetres of ice on the inside wall of a freezer increases energy consumption by 10%. Take care that air circulates sufficiently round the freezer. Put the freezer in a room that is cool – in the cellar rather than in the kitchen. Regularly dust the outside of the freezer, especially the back. Let products cool completely before putting them in the fridge and leave them to further cool there before putting them in the freezing compartment. Keep the freezer well stocked; if necessary fill the gaps with polystyrene.

*I have just bought a new fridge with freezing compartment. Because I knew that a fridge consumes a lot of electricity, I wished to purchase a class A appliance. But what pleasantly surprised me were all the interesting tips that were given in the manual. I learnt for example that you can set the temperature of the fridge part separately to that of the freezing compartment and that it is possible to defrost them separately (very practical when going on holiday). No, really, I was surprised that there was so much information concerning the environment, encouraging the user to use the appliance as economically as*

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**Chores at home or in the garden: it can be *different***

In the Brussels-Capital Region, the air indoors is not always healthy. More than 80% of our time is spent indoors: at home, at the office, at the workplace, at school, in the business. The air that we breathe there is often even more polluted than the air outdoors. This has a lot to do with the various products that we use to decorate the interiors or that we use for the many chores at home or in the garden: floor coverings, panels, varnish, paint, solvents, glue, pesticides,

It does not have to be like this! and some people in Brussels are already changing their ways:

- By using products that are less harmful
- By switching to less harmful procedures

Small gestures that spare the environment!

- Paints and varnishes, keep it natural or check the label

Poisonous paint fumes generate at least 20% of the volatile organic compounds in the surrounding air. The danger to both the nervous system and the environment is formed by the presence of solvents. Natural paints based on water, without solvents, have been developed. A European eco-label has been designed for synthetic paints and varnishes.

- The message is: Good ventilation  
It is not hard to find reasons for ventilating your house: for your health, your comfort, to get rid of stuffy smells... A closed interior starts smelling musty, fungi start growing and you risk breathing difficulties or even losing consciousness (caused by too much carbon monoxide CO). Those who like a pleasant smell about the house do not need to buy a spray can of some chemical product or other, but simply put a few cloves in a bowl, some cardamom seeds, a sprig of rosemary, a few orange skins or let a few drops of essential oil evaporate on a bulb or radiator.

*I had no idea what to do with all my garden waste. Now that Net Brussels collects my green bags, I no longer need to burn any of it. My neighbours are delighted.*

Frédérique B.

- A suspicious smell? The RCIB is on guard  
The worst chemical pollution is usually found in the kitchen. Although this is of course not exclusive and other rooms are also often affected. If your family doctor suspects that your health problems are related to an unhealthy interior, then it can be investigated. The BIM (Brussels Institute for Management of the Environment) has set up a special intervention team, the RCIB, (Regional Cell for Intervention by Pollution Indoors) that uses a mobile laboratory to sample and analyse.

*Our baby is only a few weeks old so the decision is easily made: no solvent-based paint with damaging vapours. We choose natural products.*

Edwin W.

- When the remedy is worse than the disease  
In most of the houses where samples have been taken, there were clear signs of pesticides. Why not try something different? A few drops of vinegar on the cooking ring, an orange or lemon with cloves, a few drops of citronella or lavender oil, an insect screen, a mosquito net, blocks of cedar wood or the good old fly swat. Here too, prevention is better than a cure. With the windows open and the lights on you are almost guaranteed that mosquitoes will find their way inside; filth and nests of (damp) dust are ideal breeding places for cockroaches.
- Light a fire? Only the barbecue  
Burning (organic) waste in the garden does not only annoy your neighbours but also sends in an uncontrolled manner all kinds of harmful materials (including dioxins) into the air. This practice is illegal in the Brussels-Capital Region. Separate your rubbish and Net Brussels (Brussels' refuse disposal company) takes care of the rest. This includes your organic waste, although you can of course compost it yourself.

*We have selected natural paint, without solvents, for both the undercoat and the top layer. The price is similar to the classical "quality paint" and natural paint is readily available.*

Jacqueline S.

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**Take care that you do not breathe *hot air*.**

- The air is monitored  
The Laboratory for Environmental Research within BIM continually monitors the air quality in the Brussels-

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Capital Region. Using a network of measuring stations, information about the surrounding air is permanently gathered and analysed. In addition, a general index of the air quality is calculated daily for the whole Brussels region. A traffic index for the zones with heavy traffic is also calculated. If the pollution exceeds a given threshold then the government uses the press to inform the public.

If you wish to know the status of the air quality then phone 02 775 75 98, available 24 hours a day. On internet surf to the BIM pollumeter on [www.ibgebim.be](http://www.ibgebim.be) or consult the IRCEL, Interregional Cell for the Environment, website [www.irceline.be](http://www.irceline.be)

### **List of organisations**

- Alternative methods of transport

Information about carpooling and car sharing:

Taxi-stop tel: 02 223 23 10

[www.taxistop.be](http://www.taxistop.be) and [www.carsharing.be](http://www.carsharing.be)

Public Transport Information: TEC, The Line, NMBS, MIVB.

Purchase guide for environmentally friendly cars:

“Clean driving, your choice”. Free of charge from the Federal Department for the Environment, Pachecolaan 19 bus 5 – 1010 Brussels.

[environment@health.fgov.be](mailto:environment@health.fgov.be)

Brussels Environmental Association (BRAL) tel: 02 223 01 01

[www.bralvzw.be](http://www.bralvzw.be)

Everything about cycling in Brussels: vzw pro-velo, tel: 02 502 73 55

[www.provelo.org](http://www.provelo.org) or [www.fiets.irisnet.be](http://www.fiets.irisnet.be)

- Saving Energy

Heating and energy in the home: ABEA Brussels Energy Agency, Sint-Gorikshallen (Sint-Goriksplein, 1000 Brussels) tel: 02 512 86 19

[abea@curbain.be](mailto:abea@curbain.be) [www.curbain.be](http://www.curbain.be)

For subsidies regarding renovations: City Shop and the Ministry of Brussels-Capital Region

- Gardening and Chores differently

Brussels Observatory for Sustainable consumption:

[www.observ.org](http://www.observ.org)

Information on pollution indoors: Sandrine project

[www.ful.ac.be/hotes/sandrine/maison/index.htm](http://www.ful.ac.be/hotes/sandrine/maison/index.htm) or

vzw Habit-Santé, tel: 02 242 02 92

### **For all additional information:**

Brussels Institute for Management of the Environment, the environmental administration for the Brussels-Capital Region.

Info-Environment

Gulledelle 100, 1200 Brussels

tel: 02 775 75 75 Fax: 02 775 76 21

E-mail: [info@ibgebim.be](mailto:info@ibgebim.be) / [www.ibgebim.be](http://www.ibgebim.be)

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## A.7 Questionnaire on the public perception of air quality and information needs

*NB: the way this research is done and the results apply to Rotterdam only. Nevertheless, the description of the research may serve as an example for those who want to embark on something similar.*

### Introduction

Good quantitative research on large and diverse populations is difficult and very expensive. To facilitate access to policy supportive socio-economic research the municipality of Rotterdam organises an annual survey conducted by their centre for statistics and research (COS). All municipal services can add questions to this survey (the so-called omnibus survey). The advantage of participating in such a survey is that professionals take care of methodological issues such as sample representativity, non-response, etc. Furthermore the sample is fairly large whereas the costs remain moderate due to economics of scale and because the general information is shared by all participants.

For the CITEAIR research on air quality and information 8 questions were submitted (and paid for). Additional questions, on the environment in general, were submitted by the environmental policy section of the municipality of Rotterdam. The results are analyzed and presented together.

Some basic statistics beforehand.

- The population of Rotterdam municipality is 596000. The greater Rotterdam area, including in addition 17 smaller municipalities, has a population of 1.2 million. The survey is restricted to the population of Rotterdam. As the main port-industrial areas are part of Rotterdam, the survey covers the area where population, traffic, shipping and industries meet.
- The population older than 16 years (the target for this survey) is 487,000. In this population, 3,500 questionnaires were distributed and the response was 45%.
- Women are slightly over represented in the replies (56% with a population average of 51%) as is the age group 45 - 75 years. In the response, youngsters and very old people are underrepresented.
- The different ethnic minorities tend to be underrepresented: 71% of respondents are ethnic Dutch (population average 58%). The ethnic Turkish and non-Dutch western groups were correctly represented (both groups make up 6% of the response and of the population).
- The different city districts and income groups are fairly well represented, though there is some bias: jobless and poorer people are slightly underrepresented.

Overall, the representativity is sufficient and typical for this type of research in the Netherlands (COS, 2005). In the results below, no corrections are made. Some results are taken straight from the COS report, some come from own analysis on the original dataset.

*At most questions there are always respondents who give no answer. Other possibilities are expressions like 'not mentioned', 'not applicable', 'don't know' and 'other'. All these expressions are contained in the abbreviation n.a.*

### Results

#### General Information

This information can be used for cross tabulations of other questions, like sex, age, household size, children, ethnic group, district, ward, how long do you live in Rotterdam, what is your highest education, what is the total household income?

General information that might be relevant for air quality issues	%	%	%
	yes	no	n.a.
Do you have a driving license	68	31	1
Do you have access to a car	51	11	7
Do you have a bicycle	75	24	1
Do you have a computer	74	25	2
Do you have internet	65	8	28

What kind of internet connection do you have	%
• phone	11
• broadband/cable	48
• ISDN	4
• n.a.	37

#### *Relative importance of concerns and the environment*

Rotterdam has a long history as an industrial area and still has an image of a working town ('don't whine, we are earning money'). However, already in the 1970ties, people were complaining about air pollution and gradually a consensus emerged that a balance had to be struck between environment and the economy.<sup>2</sup> Since the 1970ties, the air quality has markedly improved and by the end of the 1990ties, it was hardly an issue. If there was a problem, people tended to attribute it to industrial sources (as it had been before). In the past few years, air quality has surfaced again as an environmental concern. Not because people notice poor air quality (see results below), but mainly because of the attention given to the subject on behalf of the EU directives. However, in some areas next to busy roads, people do notice poor air quality and health research has shown that lung capacity of children was impaired. People are becoming increasingly aware that air quality might have "invisible" impacts.

The next block of questions helps to fix an idea of the relative importance of air quality as a concern in Rotterdam.

What are the priority problems in Rotterdam (ranked )	%
1. (Petty) crime/insecurity	64
2. Dirt / destruction in public spaces	34
3. Youth	16
4. Traffic	15
...	...
18. Air quality/environment	3

How important (imp.) are the following environmental issues for you? (ranks from very important to totally unimportant)	% (very) imp.	% (very) unimp.	% not so imp./ n.a.
• good environment in general	93	0	5
• nature (diversity of species)	89	0	10
• health (e.g. air quality)	92	0	8
• residential environment (e.g. trees, quietness, cleanliness)	94	0	6
• safety (e.g. firework depositories, transport of chemicals)	89	1	10

What, according to you, is the biggest environmental problem in Rotterdam (select 3 issues and rank them)	% 1st	% 2nd	% 3rd	% n.a.
• noise	25	36	35	4
• soil pollution	29	26	32	13
• dirt in the street, dog shit	49	25	23	2
• smell	19	37	36	8
• industrial risks	36	29	31	5
• water pollution	22	42	29	8
• air pollution	47	30	21	2

<sup>2</sup> Though there is ample evidence that the two can go together, they are still considered as opposing sides of the same coin as can be seen from some of the questions asked and the answers given!

• diminishing green areas	25	39	32	3
• traffic related environmental problems	31	33	32	5
What, according to you, has the biggest negative impact on the environment in Rotterdam (select 3 issues and rank them)	% 1st	% 2nd	% 3rd	% n.a.
• shipping	13	34	46	7
• consumers	32	30	36	2
• industries	38	35	27	0
• traffic	46	35	18	1
• aviation	14	39	41	6
• foreign sources (like in water and air pollution)	29	29	40	2
Opinions on Rotterdam and the environment	disagree	0 <sup>3</sup>	agree	
• Rotterdam is the most polluted city in the Netherlands	32	50	18	
• As Rotterdam is a place where money is being made with industrial activities we can not expect a lot of attention to environmental issues.	70	25	5	
• In Rotterdam we cause extra pollution so we must take an extra step in environmental protection.	10	20	70	
• As an inhabitant of Rotterdam you have to except noise and smells; it is not a national park.	35	32	33	
• Big polluters escape from government action	11	45	45	
• If environmental policies are tightened, businesses will move somewhere else	24	47	29	
• Rotterdam is a green city	44	44	12	
Do you feel that you do enough to protect the environment <sup>4</sup>	no	yes		
	30	69		
What would make you do more to protect the environment		%		
• If more public facilities were near		34		
• if others also do more		21		
• if it does not cost additional money		24		
• n.a.		21		
<i>Questions on air quality</i>				
Do you experience smells or odour nuisance in your residential area		%		
• never		48		
• sometimes, less than once a month		32		
• regularly		12		
• often, more than once a week		6		
• n.a.		3		
What, according to you, causes these smells usually?		%		
• industry		23		
• traffic		10		
• something else		9		
• don't know		7		
• n.a.		50		
What do you think about your air quality (mind: here we don't mean				

<sup>3</sup> 0 = not agree, not disagree or no answer

<sup>4</sup> No = little, too little or no answer; yes = enough, much, too much

smells)	%
> I do notice something like irritated eyes, nose or throat	
• never	56
• sometimes, less than once a month	26
• regularly	10
• often, more than once a week	5
• n.a.	2
> The air quality bothers me and it hampers my activities	
• never	75
• sometimes, less than once a month	15
• regularly	4
• often, more than once a week	3
• n.a.	3

*Information (requirements, delivery method, scale of information, etc.)*

	no	yes	n.a.
Did you ever search for information on the environment in Rotterdam in the past two years?	79	19	2

Was the information easy to find?	%
• no	3
• yes, in the newspaper	6
• yes, on the internet	10
• yes, in the public library	2
• yes, on the phone	2
• n.a.	79

What do you want to know about the quality of the environment in Rotterdam	%
• the current situation (e.g. the day to day changes)	7
• the long term situation	31
• both	39
• don't know	20
• n.a.	3

On which environmental issue do you want information	%
• on the environment in general	46
• on nature (e.g. conservation of species)	29
• health (e.g. air quality)	49
• residential environment (e.g. trees, quietness, cleanliness)	59
• safety (e.g. firework depositories, transport of chemicals)	32
• development plans	35
• n.a.	4

If you look for environmental information, what is the area you look at	%
• my residential area	31
• my district	15
• Rotterdam	23
• the region	26
• n.a.	12

Do you think that you receive sufficient information on the air quality	%
• yes	15
• yes, when I need something I know how to find it	18
• no, I need more info	41
• no, I don't need info on air quality	22

• n.a.				4
<u>On what aspects of air quality would you like to know more</u>				<u>%</u>
• general info on air quality and health				28
• specific information on the pollutants in my environment				20
• I want to know the situation on an hour by hour basis				4
• n.a.				60
<u>In what way do you want to be informed on air quality</u>				<u>%</u>
• newspapers, free local papers				37
• flyers, leaflets e.g. in the public library, at the general practitioners'				6
• information evenings in the community house				2
• the internet				18
• local media (radio, tv)				29
• n.a.				25
<u>Did you ever here about these websites?</u>				<u>yes</u> <u>no</u> <u>n.a.</u>
• <a href="http://www.bodem-kwaliteit.rotterdam.nl">www.bodem-kwaliteit.rotterdam.nl</a> (soil)	8	86		6
• <a href="http://www.luchtkwaliteit.Rotterdam.nl">www.luchtkwaliteit.Rotterdam.nl</a> (air quality - Heaven project)	7	83		9
• <a href="http://www.dcmr.nl">www.dcmr.nl</a> (general EPA)	21	70		9
<u>Did you ever visit one of these websites?</u>				<u>yes</u> <u>no</u> <u>n.a.</u>
• <a href="http://www.bodem-kwaliteit.rotterdam.nl">www.bodem-kwaliteit.rotterdam.nl</a> (soil)	4	90		6
• <a href="http://www.luchtkwaliteit.Rotterdam.nl">www.luchtkwaliteit.Rotterdam.nl</a> (air quality - Heaven project)	5	86		10
• <a href="http://www.dcmr.nl">www.dcmr.nl</a> (general EPA)	10	81		9

## **A.8 Information platforms: the case of towns near an oil refinery**

*Copied from a brochure made by the Shell Netherlands Refinery in Pernis the Netherlands.*

### **MODEL FOR A RESIDENTIAL ADVISORY BOARD**

#### **1. THE PRINCIPLE: WHY DO WE NEED A RESIDENTIAL ADVISORY BOARD?**

This guide is about setting up and running a Residential Advisory Board. The process has been broken down into the steps required for a successful Residential Advisory Board. These steps are:

- Step 1 the right people: Choosing the members
- Step 2 consultation: What do the local residents want and what does the company want? Goals and expectations
- Step 3 giving and receiving information: The importance of open communication
- Step 4 taking steps: What can the board and the company achieve together?
- Step 5 checks: What works and what does not? Future plans
- Step 6 moving forward: Continuity and acceptance

Each step is described in detail in this guide. To illustrate each step we have also included details of our experience over the last five years. Before we commence with the steps, first we need to answer the following questions: What is a Residential Advisory Board, how can it be useful and what is its purpose?

#### **What is a residential advisory board?**

A Residential Advisory Board is an organised form of consultation with the local community. A Residential Advisory Board enables local residents to discuss with the company anything, which may directly or indirectly affect them as neighbours of the company.

#### **When is it useful to have a residential advisory board?**

A Residential Advisory Board can serve a useful purpose where large companies operate in an urban setting and where nuisance or risk situations can relatively easily arise in the residential environment.

In such situations, direct communication between the company and individual residents is not always easy; therefore, a Residential Advisory Board can serve as an intermediary.

#### **A Board can only work if:**

- The company really wants it;
- The residents are sufficiently independent;
- Everyone accepts that it is and always will be a voluntary role;
- A minimum level of civic experience is represented on the Board;
- There is a mediator or facilitator available with sufficient authority and management skills.

#### **2. THE SHELL PERNIS RESIDENTIAL ADVISORY BOARD**

In the Spring of 1998, the Shell Pernis Residential Advisory Board was set up as trial. The initiative was taken by the Regional Platform on Nuisance and Safety, in which local councillors, government services, local people and businesses regularly met to discuss how to improve the quality of the surroundings in the Rijnmond area. Shell Pernis and the local residents were willing to set up a joint pilot project for the purposes of regular consultation between neighbours.

The emphasis in these meetings is on nuisance, and on environmental and safety aspects, since these contribute to the quality of life in the immediate surroundings of Shell Pernis where more than 450,000 people happen to live on both riverbanks. Therefore, the Board has representatives on it from Pernis, Hoogvliet, Spijkenisse, Albrandswaard, Vlaardingen and Schiedam. Most of them were already active members of the community involved, e.g. in residents' and community associations, business organisations or environmental

groups. The autonomous Board has an independent chairperson. A representative of the Environmental Protection Agency Rijnmond (DCMR) is a permanent advisor and attends all the meetings.

In principle, the Board meets four times a year. A sub-committee of the Board prepares the meetings and draws up the agenda. Usually, one subject per meeting is covered in depth. There is always a Shell expert on hand and usually an independent expert from outside Shell is there to provide explanations. There are also 'regular' items on the agenda, including a report by Shell on its current environmental performance and any incidents.

#### **WHY DO YOU NEED A RESIDENTIAL ADVISORY BOARD?**

The main reason for setting up a Residential Advisory Board is that direct, frank and open communication is in the interests of both the company and its neighbours.

##### **The benefit for the company is that:**

- It shows accountability towards the people living in the immediate area and for the quality of life in that area;
- It helps to maintain/improve company image;
- If nuisance occurs, local residents may be more understanding and tolerant;
- The company is given a "residence permit" and a "licence to grow"; acceptance by the local community;
- The concerns of local residents and their perceptions/views are always considered in the operations;
- Feedback is provided for the preparation of external communications material.

##### **The benefit for local residents is that:**

- Attention is focused on the quality of life for residents in the area;
- Information is provided about company activities, risks, safety and the environment;
- Easy access to the company is provided;
- The company is constantly reminded of and concerned with the observations/views of local residents.

##### **The joint benefit for the company and the residents is that:**

- Networking/communication opportunities are created;
- An opportunity to maintain or improve the quality of the local environment is provided;
- Economic development and employment in the area is promoted.

#### **THE RESIDENTIAL ADVISORY BOARD NEVER TAKES ON THE ROLE OF THE AUTHORITIES:**

- It is not a representative body;
- It has no official membership;
- It does not discuss statutory requirements, licences, etc.

#### **THE INDEPENDENCE OF THE RESIDENTIAL ADVISORY BOARD IS PARAMOUNT**

However good relations are between the company and local residents, it is of paramount importance that the Board is autonomous and independent. Independent means that:

- The make-up of the Board is decided by the Board itself;
- Company information can be assessed by external experts;
- Only functional funding is accepted from the company;
- The chairperson is independent and so is the agenda;
- Communications and presentation of information to the outside world take place independently of the company.

#### **THE INITIATIVE: KEY ROLE FOR A MEDIATOR OR FACILITATOR**

Setting up a Residential Advisory Board is more likely to succeed if the step is taken and supported by a third party. The company and local residents are generally not objective to begin with; an independent mediator or facilitator can break through any mistrust on both sides.

Who can play this part? It could be:

- An administrative or public organisation (In the case of the Shell Pernis Residential Advisory Board it was DCMR EPA which took on the role);
- A political organisation;

- A civic organisation with broad-based support.

### **Key role of the environmental protection agency Rijnmond**

DCMR - Environmental Protection Agency Rijnmond - is an agency of the combined municipalities covering the Rijnmond region and the province of Zuid-Holland. Without DCMR, there would have been no Shell Pernis Residential Advisory Board. DCMR organised the initial phase. To start with, an independent chairperson was found through its extensive network: someone with administrative experience as a council member in one of the largest municipalities in the Shell area, who, as former head of the environmental policy department of the Rotterdam municipality, already knew Shell as a company and the area very well. Next, with the agreement of the chairperson, DCMR looked for volunteers from each of the local communities. Active members of local residents' associations, environmental organisations, unions, from the education world, business organisations and former councillors. DCMR then organised and supported the initial meetings. DCMR was able to provide a communications consultant for this job with plenty of experience in networking, supporting residents' associations and bringing public officials and local people together. She also had access to the expertise available within the environmental agency itself and knew many specialists outside. In the role of facilitator, she brought people together for the initiative and organised access to the available expertise. This support turned out to be critical to the successful launch of the initiative.

## **3. STEP BY STEP**

### **STEP 1, THE RIGHT PEOPLE: CHOOSING THE MEMBERS**

#### **Who should sit on the board?**

The Board should include representatives of the local community and the company. The facilitator should look for an initial group of people, including a chairperson, who represent the local residents. The company must also be represented on the Board because the company is the local residents' neighbour just as the local residents are the company's neighbour: they are equal parties, not opponents. In the case of Shell Pernis, there are six surrounding municipalities or boroughs with residential areas. Two or three residents of each area have a place on the Residential Advisory Board.

#### **Residents' profile:**

- Actively involved residents with a natural following. They do not speak on behalf of any given organisations, they are not formal representatives, but they are in touch with "their sector" of the local community.
- They may be from environmental groups, residents' associations, unions, business organisations, youth clubs or senior citizen societies, or they could also simply be individual citizens (local opinion leaders) or former employees.
- They do not have a direct (business) relationship with the company.

#### **Company representatives:**

In any event the director! The management responsible must take part — with a mandate. This means that hard agreements can be made which the company will stick to. Together with a small number of staff, e.g. from the communications and/or environment and safety departments.

### **DCMR-Environmental Protection Agency Rijnmond - on the board**

Head of the incident room, René Kuijper:

"The role played by DCMR on the Board is that of an advisor. For the local residents it is often necessary to explain what takes place between DCMR, as the authority which issues permits and enforces them, and Shell Pernis. At the same time, the local residents give us their views about DCMR's working procedures, which we can learn from. I also think it is important to raise topics which the local residents would not necessarily know about but which, I think, are relevant in order to gain a clear picture. Shell will often raise these matters any way, but if that doesn't happen, I will mention them. In this way the local community receives objective information and can form a balanced view as a result.

I believe that a Residential Advisory Board is strengthened by the presence of local authorities, which prevents too much emphasis being placed on the PR value of the corporate side of the story. While, for its part, the company can dampen any excessive 'enthusiasm' on the part of the authorities. Based on this method and the expertise of each of the Board members, frank and open communication takes place. I am really proud of the Residential Advisory Board and the way in which Shell wants to get along with its neighbours."

### **Permanent advisors:**

In addition, permanent advisors may also sit on the Board to ensure that sufficient Counter expertise is available. These could be people from local or regional government or other organisations with expertise in the fields of safety and the environment. On the Shell Pernis Board, for example, DCMR is the permanent advisor.

### **Choice of chairperson and secretariat**

The Board needs an independent chairperson, someone who is also a neighbour of the company. Other qualities required of the chairperson include:

- Authority and respect, as perceived by both local residents and the company;
- Administrative experience;
- Ability to bring people together.

The secretariat to a Residential Advisory Board should be independent and competent. Under these conditions an employee of the company can also provide this function at a later stage in the form of an "administrative secretary", it should be someone who is not a member of the Board themselves.

Lia Mets (Spijkenisse): "I was once chairperson of the environmental group in my area, that is why I was asked to join the Board. It is important that we take a critical look at the impact on nature and the environment, certainly when there are such large companies in the area."

Loes Op Ten Noort-Oppedijk(Pernis): "They asked my husband first, who is a GP, but he didn't have the time. Then I was asked. I also work in the practice and know lots of people in the village – I belong to many organisations. I also teach on the subject of health and hygiene, which is an aspect which particularly interests me. As a member of the Pernis business association I also talk a lot about Shell."

Arie Stolk (Vlaardingen): "I am very concerned about the quality of the environment we live in. I am actively involved in trade union work and am a member of the Works Council of the company where I am employed. I believe that companies should accept their corporate social responsibility."

Jeanne V.D.Velden (Hoogvliet): "In Hoogvliet I am the "Tree Saviour". I step into the breach to save trees and greenery in the city. Sometimes this means that you have to take action and sometimes you have to discuss the matter and reach agreement; which is what I do on the Residential Advisory Board!"

Margreet Scholten (Albrandswaard): "I am astonished by how neglected parts of the site and the plant look from the outside. Companies often pay far too little attention to these things. As an artist on the Board, I was able to take some steps to improve the situation."

MARTINUS DE GROOT (SCHIEDAM): "I am chairman of a residents' association in Schiedam. Companies should make more effort to inform local residents about what is going on, and do their best to reduce smells and nuisance as much as possible."

## STEP 2, **CONSULTATION**: WHAT DO THE LOCAL RESIDENTS WANT AND WHAT DOES THE COMPANY WANT? GOALS AND EXPECTATIONS

### **Local residents get to go first: setting an agenda**

The local residents take first turn — an initial group meets to discuss goals and expectations and draw up the agenda for the Residential Advisory Board. Its task is to:

- Formulate goals;
- Set up a secretariat;
- Draw up a list of items for discussion with the company at the first meeting;
  - relationship — introductions;
  - information — what do you want to know?
  - setting goals — what does the Board want to address?
- Obtain information from third parties beforehand.

The company will also be doing the same thing at the same time. Here too, the goals and areas of concern will be identified.

### **Meeting the company, tuning-in**

Now the first meeting with the company can be organised to cover the following:

- Agreement on methods and goals;
- Agreement on a trial period (in our view a trial period of 2 years would be ideal) after which progress can be evaluated;
- Agreement on the first programme/list of topics to be discussed.

Based on these agreements the Residential Advisory Board has every chance of making a successful start!

### **Run up and preparations**

CHAIRMAN OF THE RESIDENTIAL ADVISORY BOARD, BERT KANDEL:

"When the Board started, DCMR brought people together from all the residential areas around Shell. First of all, we had a few meetings with the residents and DCMR, without Shell. We were a little worried that Shell would run rings around us and therefore we first wanted to sort out for ourselves what we wanted to achieve. So we agreed on a number of subjects which we wanted to talk about with Shell. I have to say that many people had their doubts about whether it would be possible to have a serious talk with Shell. People were therefore very guarded at first and wanted to see what would happen. When we went to talk to Shell, we met with two very engaging and communicative people, the director and the head of communications. We felt that we were made welcome as neighbours and that they also wanted to achieve something. But we realized that they were also uncertain about the new venture, because even in this first meeting they wanted to make all sorts of formal working agreements. 'We use protocols a lot', they said. 'Well, we don't! Let's just talk', we said. And that's what happened".

### **Scepticism and some mistrust**

HEAD OF COMMUNICATION AT SHELL PERNIS, JOS JANSSEN:

"Initially, there was scepticism, doubt and even mistrust within the company. Yet another branch on the already densely-overgrown consultation tree which is the Dutch polder model. But we also saw that there were opportunities and challenges. Repeated surveys done by Shell among local residents had shown us that there was plenty of room for improvement in our relationship with them. And this independent Residential Advisory Board initiative appeared to fit in well with our local Pernis interpretation of the 'licence to grow' concept promoted worldwide within the Shell Group since the Brent Spar incident. The practical difficulties which the concept of a 'residence permit' brings with it were something which we could work on with this Residential Advisory Board. And finally, something which should not be overlooked, the Board was essentially presented to us on a platter. All we had to do was get involved".

## STEP 3, **GIVING AND RECEIVING INFORMATION**: THE IMPORTANCE OF OPEN COMMUNICATION

The initial period of the Residential Advisory Board is essentially a period of information exchange and open communication. Information is exchanged about any subjects raised, generally with one topic per meeting covered in more depth.

### **Structure of meetings and setting the agenda**

It is a good idea for the Residential Advisory Board to meet four times a year. The agenda is set at a preparatory meeting held two weeks in advance of the Board meeting. A core group of different people attends this preliminary meeting, but the chairperson, secretary, a representative of the company and the facilitator should always be there. Any other persons attending may vary depending on specific circumstances. Practical aspects relating to the meeting itself include:

- Take time for everyone to introduce themselves — name boards for everyone attending;
- Limit the number of topics for each meeting;
- Allow time for discussion;
- Determine what can be dealt with in writing;
- The meeting should last no longer than two hours;
- Set one or two main topics, with a presentation;
- Allow plenty of time for Any Other Business (questions at the end of the meeting);
- Regular agenda item for company: overview of the safety figures and environmental performance for the previous quarter;
- Regular agenda item for chairperson: notices/correspondence;
- Ensure minutes are taken and approved.
- The agenda is drawn up based on:
  - An annual plan (drawn up by the preparation group);
  - Current developments; therefore subjects will be added to and dropped from the agenda;
  - Contributions/questions from individual Board members.

### **Subjects covered by a residential advisory board**

The subjects discussed at a Board meeting will, of course, depend on the nature of the company and the environment in which the company is situated. These are some general topics, which are generally relevant:

- Safety and risks to local resident;
- Health;
- The environment and sustainability;
- The appearance of the company site;
- Transport and mobility;
- Economic development;
- Communications;
- The relationship between the company and its surroundings;
- Dealing with complaints;
- Topical items:
  - incidents;
  - nuisance as perceived by local residents;
  - reports in the media.

### **Two-way traffic**

HEAD OF COMMUNICATIONS AT SHELL PERNIS, JOS JANSSEN:

“The Residential Advisory Board generates a flow of information to and from the company and the local residents. Something which can justly be described as ‘two-way traffic’ in terms of communications. Shell people are increasingly beginning to realize that matters which are considered simply a matter of course within the company may be seen or perceived quite differently by those outside the perimeter fence. Conversely, more local residents now know that a complex plant cannot be simply switched on and off by pressing button and that situations have developed over a period of sometimes more than 40 years, which can only be improved step by step in close consultation with all the stakeholders. As the Board became more settled so the information being provided to Shell staff became more significant. Contact was made with individual Shell employees and the Staff Council. At the request of a group of Shell personnel, the Board helped with the making of a frank Shell video “ Het woord is aan de burens”(The neighbours have something to say). This video is used internally in work meetings to make Shell people more aware of the feelings, ideas and perceptions of local residents concerning safety, health, and nuisance. Members of the Staff Council also sat on the Board working group on “Improving the appearance of the Shell site”. This working group developed proposals for making the Shell site look tidier and more cared for from the outside. This helped to reduce the underlying feeling of lack of safety among local residents.”

### **Providing information and discussion**

One way of providing a structure for information and communications on the most important topics are as follows:

- Start with an introduction to the topic given by a company expert (remember to avoid jargon);
- Then an independent expert gives a (prepared) response: this expert is chosen by the Board or by others.
- Next: the board members' respond, there is a discussion;
- Out of which the action points will arise:
  - additional information from the company (at the next meeting);
  - specific steps to be taken.

### **Getting to know the company**

Company visits made by Board members will certainly be useful during the initial phase to get to know the company and its staff. It is also a good idea to meet the Works Council. Company publications can also be sent to Board members to provide background information.

## **STEP 4, TAKING STEPS: WHAT CAN THE BOARD AND THE COMPANY ACHIEVE TOGETHER?**

### **From words to deeds**

Specific action points are agreed and recorded in the minutes: who will do what and when? For major topics, it is best to set up temporary working groups.

### **What the company can do**

Most action items will have to be carried out and paid for by the company, as most of the activities will relate to the operations. What does this require?

- Willingness and acceptance has to be created within the company — not just to carry out the action items but also in recognition of the Board itself and the agreements made. The company's normal internal communications tools can be used for this.
- The planning and execution of the action items has to be organised through the management team.
- Completed action items must be reported back to the Board.

### **Steps taken so far by Shell, which were agreed with the board:**

- Reduction in the number and duration of large flares;
- Reduction in the level of water pollution in the harbours;
- More extensive and rapid communications about nuisance around the clock, through Radio Rijnmond and the local media;
- Publication of a millennium brochure;
- Placement of informative advertising in free local newspapers about flaring, maintenance shut-downs and incidents causing nuisance;
- Planned improvement of the appearance of the site by painting, including use of colour, and planting of shrubs and greenery.

### **What the residents can do**

Local residents can also play an active role in the implementation of action items:

- They are the liaison/intermediary for their group or supporters;
- They play a part in the external dissemination of communications, summaries of minutes to their groups and local media contacts;
- They take part in the working groups;
- They take a close interest in the activities of the company.

### **Publicity**

- Publish summaries of minutes in free local and regional papers;
- Send newsletters/press releases to the media;
- Give interviews about the activities of the Board;
- Arrange meetings for target groups/supporters on the purpose, structure and procedures of the Board.

**Activities carried out by the board sofar in the areas of publicity and communications:**

- Sending press releases and summaries of minutes;
- Assisting with interviews and articles;
- Assisting with studies and theses;
- Organisation of information evenings for local politicians and council officials;
- Taking part in company video.

**STEP 5, CHECK: WHAT WORKS AND WHAT DOES NOT? FUTURE PLANS****Evaluation and monitoring**

At the end of the agreed trial period, it is time for a critical self-evaluation:

- Do a SWOT analysis (strengths/weaknesses - opportunities/threats) — what went well and what did not?
- Discuss the results of this analysis at a separate meeting;
- Draw up conclusions and areas for improvement;
- Take the decision: shall we continue or not?

**Adjusting the agenda and future plans (annual and long-term)**

Further to the evaluation, the agenda can be adjusted — important points, which have not been properly covered in the past, can be given priority. Successful activities can be continued and expanded and a new year plan drawn up. Usually, because of the evaluation, longer-term plans can be made. Subjects, which need more time to actually create an improvement, can now be included in the planning.

**The evaluation**

RESIDENTIAL ADVISORY BOARD CHAIRMAN, BERT KANDEL:

"After a trial period, which lasted from 1998 until 2000, the Board evaluated itself. A small group of us wrote down the strengths and weaknesses and made an overview of the results we had achieved. We then had a long session with the complete Board – an afternoon and an evening – to go through the findings and draw conclusions. The Board as a whole decided to continue and to make improvements in certain areas. The areas for improvement were, for example, that we should provide more information to the outside world about what we were doing. We then held meetings to inform our respective 'groups' and for the local government officials in the area. Continuity was another point of concern. Getting new people 'up - to - speed' also needed to be improved. And to make people more motivated to take part a nice form of compensation was agreed. For each meeting that a Board member attended, Shell would donate a sum of money to a good cause nominated by the Board member concerned. This could be an environmental cause, or it could be something cultural or sports-related. We also noted that we sometimes tried to cover too many topics in one evening. We now have a long list of subjects that we want to cover, but we spread them out over four meetings a year. We will go on with the Residential Advisory Board, so we have all the time in the world. For example, there is now a plan to paint some of the large oil storage tanks a round the perimeter of the site a nice colour whenever such tank has a major maintenance overhaul. That's something which will take many years. But that's not a problem, we have plenty of time."

**STEP 6, MOVING FORWARD: CONTINUITY AND ACCEPTANCE**

It is there, it works and we know what we are going to be doing in the near future. Therefore, it is time to set down a few things.

**Formalising matters**

The procedures agreed upon further to the evaluation should be defined and written down in a set of rules, covering:

- The aim of the Residential Advisory Board;
- Who the neighbours are;
- The status of observers;
- How the meetings are organised;
- The roles of the chairperson and secretary;
- The budget;

- Minutes and reports;
- Dissemination of information;
- Board members' term of office;
- Their replacement;
- Attendance money (donation to a good cause).

### **New board members**

Local residents do not sit on the Board forever. Those taking part leave the Board after an agreed period and are replaced by "new blood", which means that experience is lost. Therefore, it is important to make proper arrangements for the hand-over to successors:

- Well before the end of his or her term of office the member tries to find a suitable replacement from within their own "group" or the borough, municipality or region which he or she covers on the Board;
- The new member on the Board is introduced or presented through the chairperson;
- The departing member arranges a number of hand-over meetings before and during the initial period when the new member joins the Board, to help him or her get settled in.

### **Introduction programme**

It is also useful to have an information system available for newcomers, to enable them to get up-to-date quickly.

- Make a file/CD/web page with topical information, background information and meeting documentation on the most important topics;
- If several new members join at the same time, organise an introductory meeting.

### **Acceptance of the board by the local community: contact with municipalities and groups**

Finally, remember to keep the community informed! A good way to do this is to organise a special meeting for local politicians from the area so they can find out how the Residential Advisory Board works.

## **4. EPILOGUE**

"The Residential Advisory Board constantly holds a mirror up to the company. My experience has been that the Board follows our activities with a critical eye but with understanding, and based on the trust which has now been built up on both sides. I have great admiration for the voluntary work done by the members in the service of improving the quality of life in the environment around us, where people live. With hindsight, perhaps we should have started a Residential Advisory Board much sooner. But it was only in the late 1990s that the time was ripe for this idea, when there was enough support for it inside and outside the plant. Particularly now that the Pernis site is changing from an exclusively Shell-owned industrial site to one with more companies and owners, the independent Residential Advisory Board can serve as an effective platform to carefully steer this process for local residents. Initially, Shell Pernis had to get used to the idea of having an independent Residential Advisory Board as new discussion partner in the areas of company policy and operations. I am now totally convinced that this very Dutch Residential Advisory Board model could well be applied in other areas and become a highly practical tool for companies and their local communities. I would be more than willing to expand on this, if requested."

John Kvitvang  
Director of the Shell Refinery

## A.9 Web addresses of the sites reviewed

*List of active addresses leading to air quality information. The sites were reviewed in the course of the project. NB: some sites are only in the local language. (Links were correct July 2006!)*

<http://www.irceline.be/>  
<http://www.vmm.be/servlet/be.coi.gw.servlet.MainServlet/standard?toDo=open&>  
[http://www2.dmu.dk/1\\_Viden/2\\_miljoe-tilstand/3\\_luft/4\\_maalinger/5\\_maaleprogrammer/oversigtskort\\_en.asp](http://www2.dmu.dk/1_Viden/2_miljoe-tilstand/3_luft/4_maalinger/5_maaleprogrammer/oversigtskort_en.asp)  
<http://www.env-it.de/luftdaten/start.fwd>  
<http://www.hamburger-luft.de/>  
<http://www.umwelt.schleswig-holstein.de/servlet/is/1448/>  
[http://www2.lfu.baden-wuerttemberg.de/lfu/abt3/luft/aktuelle\\_luftmesswerte/index.html](http://www2.lfu.baden-wuerttemberg.de/lfu/abt3/luft/aktuelle_luftmesswerte/index.html)  
[http://62.8.156.193/cgi-bin/db4web\\_c.exe/Projekt3/Projekt3/index.htm?th=2&kn=250145&adresse=1](http://62.8.156.193/cgi-bin/db4web_c.exe/Projekt3/Projekt3/index.htm?th=2&kn=250145&adresse=1)  
[http://www.lua.nrw.de/luft/immissionen/aktluftqual/eu\\_luft\\_akt.htm](http://www.lua.nrw.de/luft/immissionen/aktluftqual/eu_luft_akt.htm)  
<http://www.ytv.fi/eng/airquality>  
<http://www.airparif.asso.fr>  
<http://www.atmo-alsace.net>  
<http://www.airpl.org>  
<http://www.airmaraix.com>  
<http://www.atmo-rhonealpes.org/site/index.php>  
<http://members.chello.hu/dasy.kft/forecast/Budapest.htm>  
<http://www.arpa.emr.it>  
<http://www.arpalombardia.it/qaria/>  
[http://www.arpat.toscana.it/aria/ar\\_monitoraggio.html](http://www.arpat.toscana.it/aria/ar_monitoraggio.html)  
<http://www.comune.torino.it/ambiente/inquinamento>  
<http://www.arpa.umbria.it/canale.asp>  
<http://www.arpa.veneto.it/aria.htm>  
<http://www.lml.rivm.nl/data/smog/index.html>  
<http://www.dcmr.nl/nl/cijfers/luchtmetingen/index.html>  
<http://www.dcmr.nl/heaven/index3.htm>  
<http://www.limburg.nl/luchtkwaliteit/>  
<http://www.nilu.no>  
[http://www.umweltbundesamt.at/umwelt/luft/luftguete\\_aktuell/tgl\\_bericht/](http://www.umweltbundesamt.at/umwelt/luft/luftguete_aktuell/tgl_bericht/)  
[http://www2.land-oberoesterreich.gv.at/imm/Start.jsp?SessionID=SID-3DCFCFC3-B9FA40FB&xmliid=was\\_imm\\_luftguete\\_ooe\\_DEU\\_HTML.htm&forward=IMMLuftgueteAktuellLandkarteOoe](http://www2.land-oberoesterreich.gv.at/imm/Start.jsp?SessionID=SID-3DCFCFC3-B9FA40FB&xmliid=was_imm_luftguete_ooe_DEU_HTML.htm&forward=IMMLuftgueteAktuellLandkarteOoe)  
<http://www.airquality.co.uk/archive/index.php>  
<http://www.londonair.org.uk/london/asp/PublicBulletin.asp>  
<http://www.ivl.se/miljo/projekt/urban/intro.asp>  
<http://www.slb.mf.stockholm.se>  
[http://www.umwelt-schweiz.ch/buwal/de/fachgebiete/fg\\_luft/luftbelastung/aktuell/grafiken/](http://www.umwelt-schweiz.ch/buwal/de/fachgebiete/fg_luft/luftbelastung/aktuell/grafiken/)  
<http://oldlabs.eea.europa.eu/neighbourhood/ozone-web/welcome>  
<http://airnow.gov/>  
[http://www.gemsnet.org/can/templates/mn\\_hometemplate.asp?id=h](http://www.gemsnet.org/can/templates/mn_hometemplate.asp?id=h)  
<http://www.ace.mmu.ac.uk/eae/english.html>  
<http://airnet.iras.uu.nl/>  
[http://www.esa.int/export/esaEO/SEM340NKPZD\\_index\\_0.html](http://www.esa.int/export/esaEO/SEM340NKPZD_index_0.html)  
<http://ec.europa.eu/environment/air/index.htm>

## **A.10 AirAlert**

### **Air-quality alerts for asthma sensitive people in Sussex.**

(Copied from: <http://www.sussex-air.net/airalert.html> on 27-07-2007)

- **WHAT is airALERT:**

airALERT is a service, provided by the Sussex Air Quality Partnership (Sussex-air), that will send free messages to your mobile or home telephone, informing you that high air pollution is predicted in your area of Sussex .

- **WHO will benefit from airALERT:**

We want to inform asthma sufferers, the day before a pollution episode is predicted, so that it can help them make informed choices about managing their respiratory health. We are recruiting volunteers through the PCT's and asthma clinics in Sussex , who will test this service for free.

- **WHEN will airALERT happen:**

The service was established as a pilot project for 2006 and operated through-out the summer of 2006. The summer service for 2007 will commence in May, with registration opening early 2007.

- **HOW does it work:**

Each day we produce air-quality forecasts for the following 24 hrs or weekend (on Fridays), these "pollution" forecasts are converted to a text and voice "messages" and sent out to recipients each afternoon. The messages will only be sent if a forecast of "moderate" or "high" " air-quality is predicted, i.e. pollution levels which may trigger symptoms. (These in accordance with the UK (DEFRA) Air Quality Bandings for air pollutants.)

- **WHY are we doing this:**

airALERT allows us to provide information about air pollution to those who would benefit from it the most, in this case asthma sufferers. During 2006 we will assess the benefits of the service and hope to widen the number of vulnerable people who could benefit from the service in 2007.

### **Feed-back from 2006 airALERT pilot**

To assess the success of the pilot, The University of Brighton carried out research into the service to determine the effectiveness and areas of improvement that could enhance airALERT for 2007.

#### **airALERT 2006:**

During the summer of 2006 (July - September) airALERT operated with 136 volunteers with asthma across Sussex. Each person received registration info-packs and airALERT cards to inform them of how the service worked, what the messages meant and described what actions they could take when they received a message. During the summer airALERT sent out 27 alerts over the period of 92 days, the alerts were sent via text (to mobiles) and voice (land-line) message.

#### **Health management Tool:**

Feed back on the service from the service users contributed comments and statements which supported airALERT as a viable Health Management Tool. An example of a comment:

"It put the ball in my court. Its just another management thing, because you manage your condition yourself anyway & its just another way of managing the condition".

#### **Behaviour Modification:**

The change in behaviour was significant for those people using the service. When people received the airALERT messages:

- \* 67% of people modified their behaviour, of these people
- \* 50% ensured they carried their inhaler
- \* 44% took a preventative dose of medication
- \* 39% took medication to relieve symptoms
- \* 27% took less strenuous exercise
- \* 25% avoided areas specified in the alerts

#### Well Being:

The overall well-being of asthma sufferers was also looked at, to assess whether just informing people about pollution provided useful health related information which would help their personal well-being: -

"It [airalert] has made me feel much more in control. That somebody actually rings me up, that confirms it, because I did at times tend to think I was imagining things. You know a lovely sunny day why do I feel poorly? It has taken that away, it's given me more confidence".

#### *Conclusions:*

The pilot airALERT service in 2006 provided very useful information to enable the Sussex Air Quality Partnership to improve the service for 2007, it also provided evidence of significant health management improvements for patients and ultimately service providers such as the Primary and Secondary Care Units.

#### Key areas of where airALERT helped were:

- Raised awareness of pollution episodes: Asthma patients found that they could relate periods of high pollution to when they experienced symptoms. In some cases it was the first time they realised the link.
- Produced health behaviour modification: Resulting information and awareness enabled service users to make informed choices and behavioural changes if they wished. These included taking prevention medication, choosing activities to lessen exposure or where they chose to go.
- Enabled health empowerment: The service users were able to be informed and had the power to make their own decisions. This information had the impact of reducing likely asthma attacks and provided patients with confidence (well-being) to go about their business without some of the worries associated with asthma.

## A.11 Paper “Communicating Air Quality”

Presented at the ISESS 2007 Conference.

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### Abstract

Though the air quality has markedly improved over the past decades air pollution is still a problem. The EU has issued directives on ambient air quality, setting standards that are hard to meet in many European cities. This is an issue in urban and infrastructure development and it stirs the public debate. The EU directives, reinforced by the Aarhus convention, stipulate that the public should be informed about the air quality. Furthermore, several local governments have identified communication as a potential abatement strategy: if one could persuade people to reduce the use of their cars, change their heating habits, etc. it helps to reduce pollution.

However, ‘air quality’ is a particularly elusive concept. For a number of pollutants concentrations tend to be monitored. The health impacts of each individual pollutant at the prevailing concentrations are vague at the individual level and tend to relate to long-term exposure. The impact of pollutant mixtures is even more unclear. During pollution episodes the communication is relatively straightforward. However, providing information on general air quality is difficult and changing attitudes is even more complicated. This paper describes a number of issues concerning air quality communication based on the experiences of the CITEAIR project. Specific attention will be given to the use of the internet. In addition we reflect on possible side effects of intensive air quality communication campaigns. Lastly we discuss how pollutant concentrations can be transferred in an air quality index and how the look and feel of the index, and its presentation on the internet, is different if it is made for scientists/technicians or for the lay public.

### 1. Introduction

Air pollution used to be a big and easily noticeable problem in most cities and industrialized areas up till the 1970-80ies. People could see black smoke coming out of their chimneys and huge plumes being emitted from stacks. Occasionally people had to stay inside and schools were closed because of episodes of photochemical smog. The extra mortality during the great London smog in 1952 made people very much aware of the acute health risks of black smoke and sulphurdioxide pollution. A lot has changed since then. In most European cities people no longer use coal for heating their houses and industrial processes have become cleaner, more reliable and more efficient. Industrial emissions of nitrogenoxides, sulphurdioxide and volatile organic carbons, the main precursors to photochemical smog, have gone down substantially despite rapidly growing industrialisation. Nowadays, the sky looks fairly clear over most urban or industrial areas, with pollution episodes being limited to unfavourable meteorological conditions during hot summer days or winter inversions.

Despite noticeable improvements, air quality remains a concern. Some pollutants are on the increase, background ozone has considerably risen in the northern hemisphere, and for others recent epidemiological studies suggest that there are no safe threshold concentrations when long-term exposure is considered. Even at low concentration levels, hardly noticeable by the healthy general public, pollution is a menace to young children and people with respiratory problems and it reduces life expectancy in general. The European Union (EU) has issued a Framework and daughter directives (EU, 1996) setting limit values and the dates by which they have to be achieved. Most limit values deal with long-term exposure, e.g. a limit value for the year average concentration, though criteria for short-term exposure (hours, days) are mentioned as well. In most urban areas the limit values for the year average concentrations of nitrogendioxide and particulate matter are exceeded, especially in streets with dense traffic. Whereas air pollution in Europe used to be a visible, noticeable, largely industrial problem, it has now become a much less visible mainly transport related problem. Formerly local authorities having to deal with air quality used to face a limited number of industrial plants, nowadays, especially in city

centres, they have to deal with hundred thousands of car owners and travellers, cherishing their mobility. A number of European cities have collaborated in the HEAVEN project, modelling in real time the air quality impact of traffic, making this information available for decision makers and the public. The cities have continued their collaboration in the CITEAIR (2004) project and communication is a key topic. This paper is based on part of the CITEAIR work. It starts with communication concepts and relates this to air quality websites and air quality indices.

## **2. Information on air quality, obligations and ambitions**

The air quality directives issued by the EU stipulate the way air quality has to be monitored and reported to the EU. They also instruct that the public should be informed about their ambient air quality. In addition, the Aarhus convention, ratified by the EU, imposes on public authorities obligations regarding access to information on the environment. In a lot of countries this “right to know” principal exists in national legislation as well. Neither the EU directives nor the Aarhus convention are very particular about the way the public has to be informed, the bottom line is that the public has access to the information. The Aarhus convention indicates that information should easily be available and mentions the use of the internet.

In addition to the obligation to inform the public, many local authorities having to deal with limit value exceedences in their city centres, think that raising awareness on air quality could be a useful pollution abatement strategy. After all, the general public is not only a victim of poor air quality, they are also an important source of air pollution. In most urban areas cars are a dominant source of air pollution due to their omnipresence and low emission height. However, changing people’s habits and preferences is very hard even when it concerns issues where personal benefits from a change in behaviour are very obvious (e.g. campaigns on smoking). Raising awareness on air pollution is difficult: despite its long-term impact it is no longer a noticeable threat in most cities, most of the time. And, air is so-called open access source, where someone’s efforts to improve it will be to the benefit of everyone, also to those making no efforts or even polluting it. E.g. in Paris drivers tend to say that air pollution is bad, but due to “others”, those excessively using their cars.

## **3. Communicating air quality**

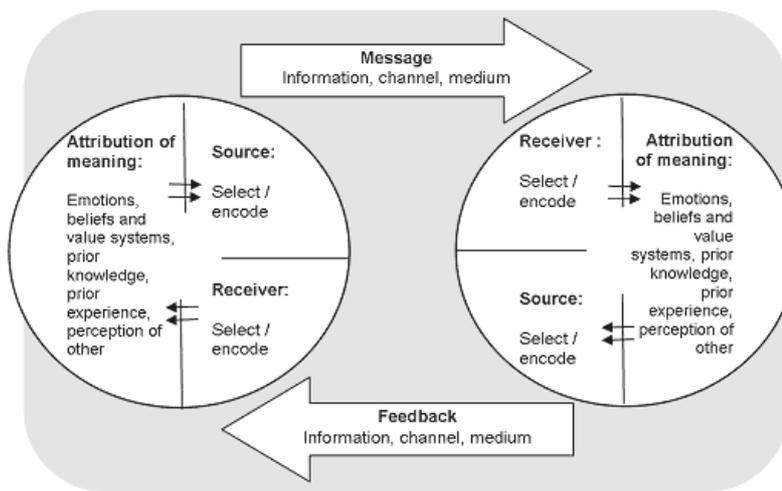
### **Information and communication**

There is a difference between “informing” and “communicating” though the former can be part of the latter. Just making information available, even in a user-friendly form, is not likely to make people aware, nor change people’s habits. If raising awareness is the ambition the “sender” of the information has to engage in a dialogue with the “receivers”, the people the sender wants to influence. Communication implies a two-way flow of information. First, the sender needs to make sure that the information is delivered in an effective way: Whom do I want to reach? How do they want to be informed? What is the information I want to deliver and what is the information my intended target group wants to receive? What does my intended target group already know about the subject? How can I attract their attention? Then, the sender has to ensure that feedback from the receiver is obtained: Did you get the information? Was it interesting, relevant, did it suit your needs? Is there anything else you want to know, how can I better inform you? These are only very basic elements of assuring the two-way flows and of making sure that the right information is delivered to the intended people. E.g. it is good to know if one addresses young parents who tend to be more concerned about air quality, environmentalists likely to be interested in the topic, habitual car drivers who haven’t considered alternatives yet, or “car addicts” for whom driving is fun or prestigious.

To raise awareness, information needs to be clear, personally relevant and contain clear suggestions on how to improve a situation. Partial knowledge of various sectors and disciplines needs to be integrated and presented in such a way that it has meaning to the intended target group and their values and beliefs (Funtowicz and Ravetz, 1993; Gibbons et al. 1994). Beside of the content, the tone of voice and framing of the message are also very influential (Duree, 2006). Lastly the sender has to ask himself: What is the opinion of the receiver about me, am I being trusted, am I considered a relevant authority to speak about this topic, am I considered independent? The sender has to be aware about his own position and his own beliefs and values. People often make self-serving judgments in order to maintain their self-esteem and sense of control (Price et al, 1997: 527). If information doesn’t suit the situation or the concerns of the receiver, or if the sender is considered biased, the information will simply be ignored.

The majority of the public perceives air pollution as an impersonal risk, without direct short-term health effects; hence air pollution information is not perceived to be highly personally relevant. Nevertheless, people seem motivated to seek and process information about impersonal risks when they feel others in their social network expect them to be informed (Kahlor et al, 2006). When issues emerge on the political agenda and in the media it becomes a topic people discuss in interpersonal relations and institutions (Morton & Duck, 2001). This may become a mutually reinforcing process, amplifying the sense of risk and urgency. This is referred to as the social amplification of risk (Frewer et al, 2002). For a responsible and trusted source this can be a communication opportunity but it can also pose problems (next section).

Figure 1: A communication model according to Gutteling and Wiegman (1996)



### Air quality communication

In the advertising business and in political campaigning, communication science has developed to great heights. Well-defined target groups are used, these groups are researched using surveys or focus group discussions, messages are fine-tuned to individual (sub)groups, communication channels are differentiated according to target group profile, etc. Last but not least, the impact of an advertising strategy or political campaign is carefully evaluated leading to adjustments to improve the impact of the messages. In environmental communication the situation is often completely different. There is a fair amount of literature on risk communication but literature on air quality communication is scarce to our knowledge. This is a particular problem because in many cases the supply of information and communication on air quality is being done by people with a technical background in air quality not familiar with communication literature.

The CITEAIR project looked at the air quality communication strategies of its ten participating cities and found that consciously planned strategies were virtually absent (Elshout, 2006). This is of course by no means a representative sample. However the cities were interested in the subject and most of them are active in this field, having their own air quality website. There is reason to believe that in a larger, more representative sample, the outcome would not have been much better. The review showed that information was mainly disseminated using the internet. The internet was not a conscious choice in the sense that it was convenient for the receivers, it was convenient for the senders. It is a small step for an organization with the IT infrastructure for automatic hourly data acquisition (and modelling) to display the acquired information on the internet. Most had websites with a "reply button", but feedback was scarce and with some exceptions the websites were never evaluated. The objectives (from the senders point of view) for putting the information on the website were very broad "providing information", "warning in case of episodes" "raising awareness". The website is often a showcase for the monitoring organization and it fulfils the "access to information" requirements. Some organizations used other means as well such as flyers, newspaper articles, meetings, etc. However the concept of target groups, requiring different

messages and message delivery strategies was virtually absent. Gutteling and Wiegman (1996) remark that: "Globally, each year the supply of information is estimated to increase by about 10% and the consumption by about 3%. Instead of this steadily growth of information, Van Cuilenburg (1991) argued that the public's knowledge hardly increases, due to the transfer of unguided information without specific informative goals, which has no bearing on the questions and needs of the public. One could say most information seems to answer questions nobody has asked." We fear that a lot of air quality information currently available fits this description.

There are of course also numerous positive exceptions: targeted information on smog or pollen directed at sensitive people exists in many countries. Often this is included in weather forecasts in the traditional media (videotext pages, newspapers, TV bulletins) and websites then serve as a back up for additional information. Lately the arrival of highly targeted information systems using text messaging services in case of a pollution alert (Oslo and the London borough of Croydon) are examples of effective delivery of relevant information (people have to subscribe). In Rotterdam there are positive experiences with community meetings in hotspot or nuisance areas, both where it concerns industrial as well as traffic related pollution.

In the context of the CITEAIR project, two surveys were done in Rotterdam: one directed at general practitioners and one at the public at large. In both surveys it was mentioned that the internet is not the preferred channel for receiving background information on air quality. This even applies to those in the sample having internet (65%, of which 2/3 broadband) connections. General practitioners preferred to have information included in their regular refresher courses and the general public preferred the local newspapers or local radio and TV. Similar results were obtained in surveys where the French organization APPA was involved (Rambaud, p.c. 2006). Surveys like these improve information delivery.

#### *Does information solve or create problems?*

As mentioned above, raising awareness on air quality with the ambition of changing people's car use behaviour is often thought of as one of the ways of improving urban air quality. As changing people behaviour through communication is difficult it is tempting to think that a constant flow of (technically, medically, scientifically, etc. sound) information and arguments might eventually persuade people to change. The example of advertising was mentioned and that too seems like a simple but successful bombardment with tempting information. We believe that the situation is more complicated and that simply hammering home a message might even be counterproductive. Gutteling and Wiegman (1996), mention that the impact of commonly used "fear arousal" communication strategies is unclear. They cite Sutton (1982), who observes that fear arousal increases the perceived fear (perception of risk) but it does not necessarily lead to persuasion.

Increasing a perceived fear/problem is not without side-effects. In many industrialised areas the air quality is much better today than the air quality some 50 years ago, yet today people are more worried about it and more bothered by it. On the one hand this reflects a real development: with life expectancy increasing, a larger part of the population is found in vulnerable groups. On the other hand fear arousal and the social amplification of perceived risk could also play a role. And apart from increased worries, Kofler discusses a kind of placebo-effect of information demonstrating that it can make people physiologically more sensitive to certain pollutants. This is something one obviously wants to avoid! A similar, unwanted, effect of information is discussed in a study on noise nuisance near the Schiphol airport. Though the exposure to noise near Schiphol is smaller than near other major airports, the number of complaints about noise nuisance are much larger. This is attributed to the existence of noise abatement policies and the way they are implemented. The mere existence of a policy reinforces the notion of noise nuisance, makes it possible to complain and creates expectations for solutions. The constant attention to noise nuisance increase the perception of nuisance (press release UvA on the PhD research of Broër, 2006). This mutual reinforcement of a perceived problem and the official or media attention to it has happened to air quality in the Netherlands in the past few years as well. Air quality was not much of a concern until a few years ago as it has improved markedly. From 2004 onward particulate matter concentrations blocked a number of road and infrastructure developments as the EU limit values were exceeded. This led to debates, court cases and media attention. In October 2004 a satellite image displaying tropospheric NO<sub>2</sub> appeared in the national press and from space most of the Netherlands looked as polluted as the worst spots in Europe, and worse, similar to parts of China. Previously the common opinion was that air pollution was mainly a problem abroad. The map also clearly shows that it is not only the industrial areas in the Netherlands, Belgium and Germany that cause the dark spots over

the southern part of the Netherlands but also the intensely used road network connecting these industrial and population centres. Transport measures however remain as unpopular as before. Changing people's behaviour is often a matter of "carrots and sticks" supported by communication campaigns. Though it might be impossible to talk people voluntarily out of their cars, communication is essential to create public support for unpopular measures such as speed-limits, closing down roads and restricting parking, low-emission zones, etc.

#### **4 Air quality websites and indices**

The CITEAIR project is developing a website ([www.airqualitynow.eu](http://www.airqualitynow.eu)) and a new air quality index. Both are dedicated to comparing air quality in cities in different countries because it appeared that, despite common European air quality legislation, for the general public it is virtually impossible to compare cities in different countries. In the process, CITEAIR reviewed some 50, mainly European, air quality websites and the air quality indices used (Elshout, 2006; Elshout and Léger, 2006). This section describes elements of this review keeping in mind some of the communication issues outlined in the previous section.

##### *Websites*

Most air quality monitoring networks have an internet site where air quality is displayed in near real-time. In addition several cities have air quality pages where annual reports, city action plans, etc. are available. Most sites do include some background information on the different pollutants (sources, health impacts) and some include educational material or even a specific kids section (e.g. <http://www.chiltern.gov.uk/claire/site/index.php>). Some sites include modelled results and forecasts and play a role in warning the public of adverse conditions (e.g. <http://www.airparif.fr/>, <http://www.cerc.co.uk/YourAir/Croydon/index.asp>). The air quality information is presented through concentration measurements of the different pollutants, as an air quality index indicating the relative air quality, or both. The variety of websites and ways of presenting information is enormous but some observations can be made.

- Websites are sometimes highly specific, showing only the information that the organisation owns. In Rotterdam some monitoring stations are displayed on the website of the national network, others on the website of the regional EPA, a third website deals with traffic related air quality only. Though this has a reason, everyone is responsible for his own data and competent in his own field of work, it is obviously undesirable from a communication point of view. People interested in Rotterdam's air quality have to check three websites, with three different presentations and interpretations of air quality. This is an extreme example but a division of information along organisational/administrative lines is quite common.

- A similar disintegration of information exists when it comes to indoor and outdoor air pollution, and to greenhouse gasses. If a website is run by an authority monitoring outdoor air pollution one will rarely find information on indoor air pollution or greenhouse gasses. Again this seems obvious from the sender's point of view, but it is confusing for the receiver: NO<sub>2</sub>, NO<sub>x</sub>, N<sub>2</sub>O, CO, CO<sub>2</sub>, etc. they all sound scary, are harmful to a certain extent in one way or another, and they are all emitted into the air. Why some of them on one website and the rest on another? And when it comes to health impacts of air pollution, indoor air pollution is often worse than the outdoor air pollution. Unless there is a severe incident, people should not decide to stop ventilating their house because of elevated outdoor concentrations! Furthermore, communication theory shows that people tend to be more apprehensive of a message if it concerns something they can control, such as their indoor environment. From a communication point of view it is therefore a missed opportunity not to raise the subject of indoor air pollution.

-The websites that belong to monitoring networks tend to focus on the core business of the organisation: providing concentration data for regulated and monitored pollutants. As such they do meet the accessibility of information requirements. Several sites contain behavioural advice in case of pollution episodes. What is often hard or impossible to judge for the lay public is what the presented data actually mean. To what extent are the monitoring stations representative for public exposure? What does a certain hourly concentration mean for the current situation, for their long-term exposure, should they be concerned or relaxed? How does the current measurement relate to the year averages reported? Etc.

- In the CITEAIR review it appears that local government websites, without a history in monitoring or modelling, do a better job in providing integrated information on all aspects of chemical substances being emitted into the air and the impacts they might have on the public. In addition

these websites not only tend to suggest what to do in case of pollution but also what citizens can do themselves to improve the situation. Communication experience shows that “complete” messages tend to have a higher impact.

#### *Different perspectives on air quality indices*

Air quality indices are meant to translate individual concentration measurements of a complex mixture of pollutants into a single figure indicating the relative quality of the ambient air. This can be done in numerous ways and many different indices exist. An index, is often thought of as a communication tool: an essential simplification of complex information. Though this sounds convincing, this hypothesis has never been tested as far as we know. Shooter and Brimblecombe (2005), in a review article on air quality indices, mention (citing Burden and Ellis, 1996) that in Australia, public confidence in reporting on air pollution fell following the introduction of an index. Apparently, making complex information simpler does not necessarily improve the communicative powers of the information. Other issues, as discussed in the previous section, probably play a role as well. (For other reviews of indices see for example Garcia and Colosio, 2002 and Elshout and Léger, 2006).

The type of air quality index Shooter and Brimblecombe advocate has a strong base in science and is mainly directed at communicating short-term changes in pollution in view of making health recommendations. Hence they advocate forecasted concentrations (yesterday's, or today's concentrations are still the most common presentation form on the internet) and stress the need for a correct translation of the public health effects of the pollutants into an index. The latter is a particularly complicated question, new information on health effects of pollutants and pollutant mixtures is published regularly and the relative importance of each pollutant in a pollutant mixture remains inconclusive. Most indices take a pragmatic approach: calculating sub-indices for each pollutant and the worst sub-index determines the overall index.

Shooter and Brimblecombe argue that with timely delivered information (forecasting) and scientifically correct assessment of health impacts the public has the opportunity to adapt its behaviour in appropriate response to changing air quality. However, they also cite a study by Johnson (2003) that observed that different versions of the USA's index did not particularly well at increasing public knowledge or changing people's behaviour in case of episodes. Though this could mean that air quality indices (and their delivery) still have to be improved, it could also mean that the general public is not overly concerned about air quality and does not feel a need to change their habits. As was mentioned before: in large parts of Europe and the US, pollution episodes are increasingly rare so alerting the general public (sensitive target groups is a different issue) by means of a website and an index might not be the only, or the most relevant objective of having an air quality index.

An important disadvantage of indices based on health impacts is that they tend to trail at the good end of the scale as short-term exposure to air pollution (particulate matter probably being an exception) is seldom a problem. For the general public this implies that the index hardly changes and seems to convey the message that air quality is good. At the same time annual limit values are exceeded, action plans have to be made, infrastructure development is blocked, etc. This way, an air quality index confuses rather than informs the public. Feedback of this nature was received both in Rotterdam and in the UK (Fuller p.c.), where the index is firmly rooted in health-based recommendations. This paradox between short and long-term exposure is hard to solve on a website.

The CITEAIR project developed a new set of common air quality indices - CAQI (Elshout and Léger, 2006). The CAQI was primarily developed for comparing cities in different countries through a common website ([www.airqualitynow.eu](http://www.airqualitynow.eu)). The CITEAIR partners felt that being able to compare air quality in different cities in different countries, at a glance, is an interesting feature that could be used in raising awareness on air quality. The new indices are not meant to replace existing local indices and are not meant for warning the public. The CAQI resembles a number of existing European indices and the scale is purely relative but inspired by the EU air quality directives. In addition to an hourly and daily index, a year average index was developed to address (at least partly) the short-term – long-term paradox. Though sound science was not disregarded, the CAQI was primarily designed with communication with the public in mind. The table illustrates how this affects some the decisions on the way the index is developed.

Table 1. Different perspectives and their impact on the presentation of an air quality index.

Science perspective	Public communication perspective
Health advice is the main objective. There is no other objective basis for qualifying ambient concentrations.	Though a health-based index is on the one hand easy to communicate, it is not used for reasons discussed in the text. The index hardly changes and indicates that air quality is mainly good whereas from long-term exposure point of view this is often not the case. Without a health basis the chosen grid is to some extent arbitrary and a purely relative quality indicator.
For long-term exposure there is a fair consensus on the health impacts. The year average index can be health based.	Long-term exposure generally deals with loss of life expectancy, a fairly abstract parameter to communicate. Besides there are no safe concentrations. The year average CAQI is based on the European limit values and allows people to see how well their city does compared to other cities in terms of meeting the EU's air quality requirements.
Given the measurement uncertainty and the difficulty of translating the impacts of pollutants the index scale should be limited to a few levels (e.g. 1 to 5).	<ul style="list-style-type: none"> <li>- The CAQI scale from 1 to 100 suggests an unrealistically precise knowledge of the parameter (scientifically speaking). However a detailed scale makes it possible to notice even small changes. Frequent changes are necessary to make a website dynamic and attractive, and to entice repeated visits.</li> <li>- The index also has to be dynamic to make it credible: from a communication point of view, the public should be able to identify real life events, such as the rush hours, on an air quality website. In particular if communicating the role of traffic is an objective.</li> </ul>
Time resolution should be in line with legal limits (in Europe), e.g. 8-hour averages for ozone, 24-hour averages for particulate matter.	The CAQI provides an hourly grid and the website is hourly updated (for those cities providing hourly measurements). Moving averages obscure the relation between an event (rush-hour, a fire, new year celebrations). Direct response improves the credibility of an index and the website and reinforces the knowledge of the public on the causes of air pollution.

#### 4. Summary

Air quality information is abundantly available on the internet and as such the public has access to information on the quality of their environment. Most information is also supplied with the intention of warning the public in case of adverse conditions and/or to raise awareness on environmental issues. This paper argues that if this second set of objectives is to be met, the development of a carefully designed communication strategy and the integration of knowledge in a way that is attractive and relevant for the public are needed.

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## A.12 CLAIRE website

### 1 Screenshot home page



### 2 Sample description of Air pollutants

Basic properties of the major (outdoor) air pollutants

#### Nitrogen dioxide (NO<sub>2</sub>)

Nitrogen Dioxide is one of a group of gases called nitrogen oxides (NO<sub>x</sub>) which is formed during the combustion of fossil fuels. NO<sub>2</sub> is a reddish-brown gas with a pungent and irritating odour. It reacts in the air with water vapour to form nitrous and nitric acid and then toxic organic nitrates. This contributes to the production of acid rain that can kill trees, fish and animal life

The majority of nitrogen oxides emitted from a vehicle exhaust are in the form of nitric oxide (NO), which is not directly considered harmful to health. However, this gas can react with other gases present both in the exhaust and the atmosphere, to form nitrogen dioxide. Nitrogen dioxide is harmful to health and is also an important component of ground level ozone formation.

Whenever anything is burnt in air, nitrogen oxides are formed. This is because the air we breathe is mostly

made up of nitrogen (78%) and oxygen (21%) and these combine when energy (from burning material) is available.

### **Particulate Matter (PM10)**

Particulate matter in the atmosphere can be from a whole range of sources, both natural, such as sand or sea spray, and man made, such as construction dust or soot. The smaller a particle, the longer it can remain suspended in the atmosphere. Very fine particles made up of carbon from combustion and chemical compounds (sulphates and nitrates) can remain in the atmosphere for weeks. Particulate matter is also usually the pollution that you get to see, as it is often visible as 'dark dust' when it collects on surfaces.

The amount of particulate matter in the air has decreased rapidly over the last 30 years. This is due to a decrease in coal burning, heavy industry and improved industrial pollution control measures.

Attention is currently focused on finer particles known as PM10. These fine particles can be breathed more deeply into the lungs and are more likely to have a toxic effect than larger particles. Even smaller particulates known as PM2.5 are also being studied, however these are not measured in many locations in the UK. This however, may change in the next couple of years.

As particulate matter is composed of such a large range of chemicals and materials from a variety of sources, the control of pollution levels is very difficult.

### **Carbon Monoxide (CO)**

Carbon Monoxide (CO) is a colourless, odourless poisonous gas produced by incomplete, or inefficient, combustion of fuel including 'cold' or badly tuned engines.

Badly ventilated domestic fuel appliances (gas, oil or solid fuel) can cause high levels indoors, as can smoking.

As traffic is a major source of carbon monoxide, ambient concentrations will generally be highest close to busy roads. Monitoring data suggests that annual average CO levels have been decreasing over the last few years. This is probably due to improved vehicle engine efficiency and the introduction of catalytic converters. The effect of technological improvements has been cancelled out to some degree by an increase in traffic levels.

### **Carbon Dioxide (CO2)**

As opposed to carbon monoxide, carbon dioxide (CO<sub>2</sub>) is produced by 'complete' fossil fuel combustion.

While ambient levels do not have any direct health effects, it is an important 'greenhouse gas' which is believed to contribute to global warming.

Its major anthropogenic (man-made) sources are road transport, power stations and other industrial combustion processes and domestic heating.

### **Sulphur Dioxide (SO2)**

Sulphur dioxide (SO<sub>2</sub>) is produced when a material, or fuel, containing sulphur is burned. SO<sub>2</sub> is a colourless gas. It can be oxidised to sulphur trioxide, which in the presence of water vapour is readily transformed to sulphuric acid.

Globally, much of the sulphur dioxide in the atmosphere comes from natural sources, but in the UK the major contributors are power stations (65% of the total emissions). Sulphur dioxide levels in this country have dropped considerably over recent years due to cleaner power stations and a decreased use of coal. Also reduced levels of sulphur in vehicle fuels have helped bring about a lower level from transport emissions.

### **VOC's (Including Benzene and 1,3 Butadiene)**

The term 'hydrocarbons' is often used when discussing traffic pollution. This refers to a group of chemicals of which volatile organic compounds (VOCs) are a subgroup.

Volatile Organic Compounds (VOCs) comprise of a range of chemical compounds, all of which contribute, to varying degrees, to the formation of ground level ozone. Both Benzene and 1,3 Butadiene are part of the 'VOC' group.

Current attention is focused on 1,3 butadiene, primarily because one of its sources are from vehicle exhausts, and benzene.

Benzene in the atmosphere either comes from the combustion or evaporation of petrol. Levels are therefore highest close to busy roads or in the vicinity of petrol filling stations. As only very small concentrations of VOC's are typically found in the atmosphere, the monitoring process is very complicated and expensive. As monitoring has only been carried out for the last few years, it is impossible to identify any upward or downward trend in levels. Monitoring of Benzene has taken place in the Chiltern District in the past and results are available in the monitoring & results section.

### Lead

The main source of lead in the atmosphere has historically been from the combustion of petrol in vehicles. Since the phasing out of leaded petrol, air-borne lead levels have fallen dramatically and lead is no longer the major problem it once was.

### Low Level Ozone (O3)

Ozone is an unstable gas with a characteristic fresh, penetrating odour. The smell is noticeable after thunderstorms, where the energy from the flashes of lightning has created short-lived ozone from the oxygen in the atmosphere.

While naturally occurring, ozone in the upper atmosphere, 'the ozone layer', protects the Earth, ground level ozone (O3) is harmful to health.

Ozone is not emitted directly from any man made source in significant quantities, but is formed by a complex set of reactions involving nitrogen oxides and hydrocarbons in the presence of light from the sun.

Once formed, ozone can remain in the atmosphere for many days and is often transported over long distances. It is for this reason that a real reduction in ozone levels can only be achieved through global action by everyone. Ozone is therefore not a pollutant currently in the Air Quality Regulations. It is however still considered when looking at air quality.

Nitric oxides destroy ozone; therefore ozone concentrations are actually lower next to busy roads. For the same reason, ozone levels are usually higher in rural locations than in urban areas.

It is also a strong oxidising agent. Ozone is therefore a pollutant that can damage your health, farm crops, vegetation and materials such as rubber.

## 3 Kids and teaching information (screenshots)

Interesting material both on the website and available for downloads.

The left screenshot shows the 'bucksairquality.net' website. At the top, it displays the date 'Friday, July 27th' and the 'Nitrogen Dioxide Air Pollution is: Low' with a 'Particulate Level is: Low'. The main content area is titled 'Learning Zone' and features 'The Learning Zone' logo. Below the logo, it states: 'Information within the Learning Zone is provided by a number of organisations and include DEFRA, ARIC, the EPA and the Understanding Energy Group. Some information is supplied in pdf format. Some file sizes are up to 2MB so please be patient.' A table lists resources for download:

Key Stage 4 Schools/Teachers information	<a href="#">View Content</a>
Key Stage 3 Schools/Teachers information	<a href="#">View Content</a>
Teachers Packs - Key Stage 2 and 3	<a href="#">Download Now</a>
Teachers Packs - Key Stage 1	<a href="#">Download Now</a>
Happy Earth Colouring Book (US Version)	<a href="#">Download Now</a>
Energy Efficiency & Environment pack	<a href="#">Download Now</a>

The right screenshot shows the 'CLAIRE' website. The main content area is titled 'Meet the Noxious Nine' and 'Perilous Particulate'. It includes a section 'All you need to know about? Perilous Particulate' with text: 'Solid matter that is suspended in the air. To remain in the air, particles are usually less than 0.1 mm wide and can be as small as 0.00005 mm (Very small). Sources: Particulate matter can be divided into two types - coarse particles and fine particles. Coarse particles are bigger than 0.002 mm and are formed from sources like road dust, sea spray, and construction. Fine particles are smaller than 0.002 mm and are formed when fuel is burned in automobiles and power plants. Effects: Particulate matter that is small enough can enter the lungs and cause health problems. Some of these problems include more frequent asthma attacks, respiratory problems, and premature death.'