

# Air4EU

**Air Quality Assessment for Europe: from local to continental scale**



6th Framework Programme- Policy oriented Research  
Priority 8.1 Topic 1.5 Task 2

## **Mid Term Assessment Report**

|                      |                              |
|----------------------|------------------------------|
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### LIST OF AIR4EU PARTNERS

| <b>Partic. no.</b> | <b>Participant name</b>                           | <b>Participant short name</b> | <b>Country</b> |
|--------------------|---|-------------------------------|----------------|
| 1                  | Netherlands Research Organisation                 | TNO                           | NL             |
| 2                  | Norsk Institut for Luftforskning                  | NILU                          | NO             |
| 3                  | Aristotle University Thessaloniki                 | AUT                           | GR             |
| 4                  | University of Stuttgart                           | IER                           | DE             |
| 5                  | University of Hertfordshire                       | UH                            | UK             |
| 6                  | Universidade de Aveiro                            | UAVR                          | PT             |
| 7                  | AIRPARIF  | AIRPARIF                      | FR             |
| 8                  | Servizi per la Mobilità del Comune di Roma S.p.A. | STA                           | IT             |
| 9                  | Environment Agency                                | EA                            | UK             |
| 10                 | City Development Authority of Prague              | URM                           | CZ             |
| 11                 | Enveco  | ENVECO                        | GR             |
| 12                 | Gemeentewerken Rotterdam                          | GW                            | NL             |
| 13                 | Milieudienst Rijnmond                             | DCMR                          | NL             |
| 14                 | City of Oslo, Public Health Authority             | OPHA                          | NO             |

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# **1 Project Objectives and mayor achievements**

## **1.1 Overall aims**

The following overall aims of the project AIR4EU have been defined:

1. To formulate a guidance document on best practices for the combined use of monitoring methods and models to assess AQ in Europe from hotspot/street level to continental level for various users on local, regional, national and European level and for various purposes.
2. To prepare maps of air quality in Europe based on the available European wide data sets and best technique of assessment.

In order to achieve these overall aims, a set of operational measurable objectives have been specified, each linked to one or more of the work packages and contributing to one or more of the project products and deliverables. These measurable objectives and the progress towards their achievement in the period from March 2004 to September 2005 period are described in the following section.

## **1.2 Operational objectives and achievements**

The AIR4EU project is divided into eight workpackages. For each of these workpackages one or more operational objectives are defined. The thematic work packages 3-5 deal with specific thematic challenges on tools and methods for AQ assessment addressing the different spatial and temporal scales: hotspot/local (WP3), urban/agglomerate (WP4) and regional/European (WP5). The same set of objectives has been defined for these workpackages. Five cross-cutting issues, which are common to these work packages, namely: CC1) Emission & Data needs, CC2) Uncertainty of Models & Monitoring, CC3) Representativeness of Models & Monitoring, CC4) Scale Interactions and CC5) Data Assimilation with operational objectives for these cross-cutting issues have been defined.

The following Table 1 gives an overview of these objectives and describes the progress to their achievement reached between the operational start of AIR4EU in March 2004 until October 2005.

**Table 1: Objectives and achievements**

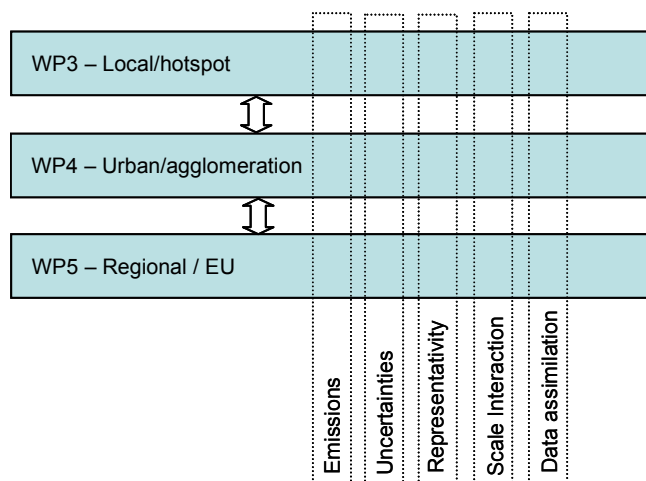
| WP  | No. | Objective  | Progress towards achievement   |
|-----|-----|--|--|
| 1   | a   | Co-ordination of the overall project   | In progress  |
| 2   | a   | To set the policy framework and identify user needs  | Policy framework and user needs have been defined in D1.2  |
| 2   | b   | To establish and implement the consultation with the high-level Expert group, policy makers, authorities, practitioners and other stakeholders | A workshop with the application group comprising practitioners from European Cities has been conducted in June 2005. High-level Expert group has been consulted. |
| 3-5 | a   | To review and examine the benefits and drawbacks of monitoring and modelling air quality assessment methods                                    | The reviews have been carried out. D3.1, D4.1, D5.1 have been finalised in October 2005.   |
| 3-5 | b   | To review and assess the procedures for quantifying the main natural and anthropogenic sources   | The review has been carried out and is described in D 3.1, D 4.1, D 5.1  |
| 3-5 | cc1 | To provide a comprehensive methodology to generate emission inventories  | Work is in progress, Milestone report 6.4 is under preparation   |
| 3-5 | cc2 | To provide uncertainty estimates.  | Work is in progress, Milestone report 6.5 is under preparation   |
| 3-5 | cc3 | To provide a better concept of representativeness  | Work is in progress, Milestone report 6.6 is under preparation   |
| 3-5 | cc4 | To provide a review of the current modelling methods regarding scale interaction   | Work is in progress, Milestone report 6.7 is under preparation   |
| 3-5 | cc5 | To identify adequate data assimilation methods   | Work is in progress, Milestone report 6.8 is under preparation   |
| 6   | a   | To synthesise and harmonise the benefits and drawbacks of AQ assessment methods  | Close co-operation with WP3-5 has been established to ensure that their output can be used in an efficient way.  |
| 6   | b   | To prepare draft recommendations on best techniques for assessment of air quality  | A draft structure for preparing D6.2 has been prepared and agreed.   |
| 6   | c   | To specify the criteria and develop the protocols for case studies: objectives, contents and types of results.                                 | A conceptual framework and a workplan of setting up the case studies has been prepared and discussed with the application cities.                                |
| 7   | a   | To prepare, implement and evaluate case studies  | Consultations with cities to define the case studies are in progress.  |
| 7   | b   | To formulate final recommendations   | No progress in reporting period  |
| 7   | c   | To develop a GIS-based mapping framework   | No progress in reporting period  |
| 7   | d   | To prepare maps of air quality   | No progress in reporting period  |
| 8   | a&b | To disseminate and exploit the projects interim and final results and awareness raising  | Project dissemination webpage is in operation and is regularly updated. The 1 <sup>st</sup> and 2 <sup>nd</sup> Project newsletter has been prepared.            |

### 1.3 Problems and corrective actions

Because the kick-off meeting could only be held after the Consortium Agreement was signed by all partners, the meeting took place at the end of February 2004, which caused a delay of 2 months right at the start of the project.

Progress was good initially, and the reviews to be performed in WP 3-5 were on schedule and the project was prepared to catch up the delay.

The assessment of methodologies at the spatial scales Local/hotspot, Urban/agglomeration and Regional/EU embedded in WP 3-5 forms the horizontal structure in AIR4EU. These work packages are working jointly on the five cross-cutting issues (CC) Emissions, Uncertainties, Representativity, Scale Interaction and Dataassimilation which form the vertical structure in the project. Figure 1 illustrates the interrelation of the spatial scales and the cross-cutting issues.



**Figure 1: Assessment of methodologies & uncertainties**

This matrix structure indicates that the different cross cutting issues, like for example emissions, play a role in all three spatial scales. It is obvious that a close co-operation between the WPs and the CC's is of major importance to avoid duplication of work and to create synergies. To cover the CCs appropriately it was ensured that the same partner is responsible for an issue in all three WPs.

In practice it worked out that the interrelations between the spatial scales addressed and the themes covered by the CC's were more complex than initially expected. For example, it was not always easy to decide in which deliverable (D3.1, 4.1 and 5.1) certain topics mainly covered by one issue should be placed, or what the exact differences of a CC between the spatial scales are. An example is the description of air quality monitoring at different spatial scales, and their representativeness

The result was that considerably more iterations and interactions between WP- and CC-level were needed than was originally anticipated. Instead of having a first, second and final draft

of a WP –Deliverable, up to 6 versions appeared. The positive effect of this is that a consistent and well established result was obtained, the drawback was the delay in time of about 8 months in completing Deliverables D3.1, D4.1 and D5.1 and a delay of about 6 month in completing the deliverables D3.2, D4.2 and D5.2.

The way the project management handled the situation was the adoption of a more flexible approach. The work has been reorganised in a more parallel fashion. The cornerstones of this reorganisation are:

- Reviews (D3.1, D4.1 and D5.1) were written in combination with the first set of recommendations (D3.2; D4.2 and D5.2).
- Cross-cutting issue mile stone reports (M6.4 – M6.8) will be finalised before the city case studies will be in progress.
- Case Studies are being set up (D6.1) in accordance with the original plans taking the intermediate draft deliverables D3.2, D4.2 and D5.2 into account
- Structure of the final recommendations (D6.2) was set up at an early stage to ensure smooth transition from first- to final recommendations

In this way the delays will be reduced, and from spring 2006 the project will be on schedule again.

## 2 Project deliverables

This section gives an overview about the contractual deliverables, their status of completion and provides an overview about the structure and content of the main technical deliverables.

### 2.1 List of deliverables and degree of completion

The following table shows all deliverables and their contractual and real delivery dates. For deliverables which are delayed the degree of completion is specified.

Table1: Deliverables and degree of completion

| Del. No. | Del. Name   | WP No. | Date due (Month) | Delivery date (Month) | Degree of completion |
|----------|---|--------|------------------|-----------------------|----------------------|
| D 1.1    | Inception report  | 1      | 3                | 5                     | Completed            |
| D 1.2    | Mid Term Assessment Report  | 1      | 18               | 23                    | Completed            |
| D 1.3    | Final Report  | 1      | 36               | -                     |                      |
| D 2.1    | Policy framework and requirement analysis report  | 2      | 5                | 7                     | Completed            |
| D 3.1    | Report on review of monitoring and modelling methods to hotspot/local scales identifying benefits, drawbacks variability and uncertainties of current methods | 3      | 13               | 22                    | Completed            |
| D 3.2    | Report on first recommendations for best methods and techniques for conducting air quality assessment at hotspot/local scale                                  | 3      | 17               | -                     | 75% Completed        |

|       |  |   |    |    |               |
|-------|--|---|----|----|---------------|
| D 4.1 | Report on review of monitoring and modelling methods to urban/agglomeration scales identifying benefits, drawbacks variability and uncertainties of current methods  | 4 | 13 | 22 | Completed     |
| D 4.2 | Report on first recommendations for best methods and techniques for conducting air quality assessment at urban/agglomeration scale                                   | 4 | 17 | -  | 75% Completed |
| D 5.1 | Report on review of monitoring and modelling methods to regional/continental scales identifying benefits, drawbacks variability and uncertainties of current methods | 5 | 13 | 22 | Completed     |
| D 5.2 | Report on first recommendations for best methods and techniques for conducting air quality assessment at regional/continental scale                                  | 5 | 17 | -  | 75% Completed |
| D 6.1 | Protocols for implementation of case studies   | 6 | 18 | -  | 75% Completed |
| D 6.2 | Recommendations of best techniques for AQ assessment related to spatial and temporal scales  | 6 | 33 | -  |               |
| D 7.1 | Report from individual case studies  | 7 | 33 | -  |               |
| D 7.2 | Summary report of case study findings and recommendations  | 7 | 33 | -  |               |
| D 7.3 | Description of mapping framework   | 7 | 24 | -  |               |
| D 7.4 | Maps of air quality in Europe  | 7 | 33 | -  |               |
| D 8.1 | Project website  | 8 | 5  | 4  | Completed     |
| D 8.2 | Good practice database   | 8 | 35 | -  |               |

## 2.2 Policy framework and requirements

Deliverable D2.1 represents an analysis report on requirements and user needs for AQ assessment by European, national and local authorities including the identification of the 'features' (e.g. accuracy, representiveness, quality control) of AQ data for different policy purposes.

The requirements for AQ assessment depend first of all on the specific type of AQ assessment such as monitoring, modelling or combinations of both. Beyond that, requirements are related to the objective target of the assessment, the user, the (spatial and temporal) scale and the pollutants which are taken into account. For a synthesis of both types, the different user groups and the different requirements (needs), a review of currently available information about the various policy needs following official directives like the Council Directive 96/62/EC on ambient air quality assessment and management, their daughter directives, the CAFE programme and others was conducted.

## 2.3 Reviews of modelling and monitoring approaches

Starting point for the development of sound recommendations on best techniques for the integrated assessment of air quality at different spatial scales was the review and examination of the benefits and drawbacks of state-of-the-art monitoring and modelling approaches.

Due to the structure and the workplan of AIR4EU this work was split across three workpackages reflecting the spatial scales Local/hotspot (WP3), Urban/agglomeration (WP4) and Regional/EU. These work packages worked jointly on the five cross-cutting themes Emissions & data needs, Uncertainty of models & monitoring, Representativeness of models and monitoring, Scale interactions and Data assimilation. In order to implement this matrix structure (see also Figure 1) in the most efficient way the WPs and the cross-cutting themes performed their work according to a joint workplan avoiding overlaps and create synergies to the largest extent possible. It worked out that the complexity of topics addressed and their close interaction across the spatial scales required substantially more iterations than originally planned. The efforts undertaken resulted in a homogenous structure of the review reports (D3.1; D4.1; D5.1) ensuring that all relevant topics are covered and emphasis is given to these aspects which are specific to a certain spatial scale.

Each report starts with an introduction and follows in the subsequent chapters the same structure as described below.

Chapter 2 includes discussion of current, existing approaches, both for modelling and for monitoring air quality as well as the combined use of monitoring and modelling.

Chapter 3 provides information on the application of these approaches, showing a number of examples.

Chapter 4 addresses the use of emission data, both from anthropogenic and natural sources.

Chapter 5 refers to other input data required for modelling such as meteorology, land use and land cover data and topography.

Chapter 6, 7 and 8 respectively cover the important issues of scale interactions, representativity and uncertainty; all three aspects which need to be considered in a joint way for a proper air quality assessment.

In Chapter 9 data assimilation is proposed as a method for combining monitoring and modelling in a coherent way.

Chapter 10 closes the reports with conclusions and a summary of needs for an improved air quality assessment.

All reports are enriched with a good number of references guiding the reader to the relevant sources for obtaining more detailed information on certain aspects of the air quality assessment if required.

The common structure supports substantially the creation of the first recommendations for each spatial scale in a coherent way.

## 2.4 First recommendations

The next step in the development process is the preparation of a set of first recommendations for best methods and techniques for conducting air quality assessment on the three different scales addressed by AIR4EU. This work is, as the reviews described above, part of the workpackages 3, 4 and 5 and are therefore specific for the spatial scales as far as possible. The Deliverable 3.2 addressed the local/hotspot scale, D4.2 gives recommendations for the urban/agglomeration scale and D5.2 focuses on the regional/continental scale. These reports are based on the reports D3.1, D4.1 and D5.1.

Continuing the joint workplan for the WPs 3, 4, 5 and the cross-cutting issues the first recommendations were again following a common structure to present the first recommendations. Besides an introduction and a brief reflection on the respective reviews undertaken the following key questions related to the assessment of air quality mainly focussed on the EU directives are addressed:

Chapter 3 gives first recommendations on appropriate monitoring approaches to be employed.

Chapter 4 gives first recommendations on modelling approaches for each spatial scale.

Chapter 5 deals with questions how input data like emissions, meteorology, land use and other data should be treated.

Chapter 6 addresses the approach to combine monitoring and modelling in air quality assessment.

Chapter 7 deals with recommendations for other assessment purposes than the EU-Directives.

Chapter 8 closes the reports with conclusions.

These reports are available in matured draft versions and are currently scrutinized in order to identify gaps and to enhance homogeneity. These reports also contain the essential information from the Cross Cutting issues from their respective draft milestone reports.

## 2.5 Final recommendations

Following the “logical workstream” in AIR4EU starting from the reviews and first recommendations (part of WP3-5) and the formulation of one of the key products, namely D6.2: “Final Recommendations of best techniques for AQ assessment related to spatial and temporal scales” the project is going to develop in the frame of WP6 it is essential that the structure of D6.2 is defined as soon as possible. The obvious reason is that D6.2 will receive substantial input from WP3-5 and its reports. Consequently the project developed this structure at a fairly early stage in parallel to the work undertaken in WP3, 4 and 5. This underpins the concept of a more flexible approach as reported earlier in section 2.3. of this report.

As of today the overview of the structure of D6.2 can be described as follows:

### a) Main level of recommendations: the objective and scale of the assessment

- objective: The main objective of the project: Spatial assessment of air quality (mapping, concentrations, exceedances).

- scales: regional, urban, local (hot-spot).

This combination of objective and scale is termed the 'topic' of the recommendation. There are additional, less central, but still important objectives (see section c below)

**b) Substructure within each of these recommendations:**

Recommendations are to be given on:

- 6 areas of methods: monitoring, emissions, modelling, contributions from larger scales, uncertainty, combinations of monitoring and modelling.
- compounds: PM, Ozone, NO<sub>2</sub>, SO<sub>2</sub>, etc.

and according to:

- level of quality: according to DQOs in the Directives, or better, or less accurate.

**c) Additional objectives**

Additional objectives we have defined/touched upon, are assessment of source contributions, trend analysis, population exposure, information to the public, and probably some more. Additional recommendations will be developed for each of these objectives. Some, but not all of them, will be scale specific (in such a case: one recommendation per scale). If a recommendation is true for all scales, we could place in the urban scale and refer to it from the other scales. All of them will have the sub-structure of compound and quality level within them.

**d) Additional topics for recommendations**

The cities have indicated some specific areas where recommendations are needed (PM resuspension and how to deal with it; 2-wheelers in emission inventories, etc., as we have listed in D2.1). Each of these will be a separate recommendation.

**e) Number of recommendations**

There will thus be a number of main recommendations: the main objective and the 3 scales, and under each scale it is probably necessary to write recommendations separately for various scale-related applications (such as, for regional scale: separate recommendations for European scale, country scale, the scale of a 'zone', and for urban scale: for mega-cities, for typical agglomerations, for smaller polluted cities, etc.). Then there will be recommendations for the additional objectives, and for the additional topics, maybe 10 more. Each recommendation will treat compound, level of quality and the 6 'aspects' (monitoring, modelling, etc.).

This overall structure is currently under discussion, especially in the light of the outcomes of the first recommendations and in the context of the case studies which are currently under preparation.

## **2.6 Case studies**

The case studies are intended to test and demonstrate the recommendations laid out in WP3-5 that describe the best methods for combining modelling and monitoring data in air quality assessment. Case studies will be used not just as validations but also as test cases for feedback into the final recommendations (D6.2). Case studies can be either activities carried out during, and for, the Air4EU project or reports of studies already carried out that

are relevant to the recommendations made by AIR4EU. Each city involved in AIR4EU has a research partner that is responsible for defining, in direct consultation with the city partner, the case studies to be carried out. The decision on which case studies to implement, and how to implement them, will be determined by the city and their respective research partner. Input will also come from the other research partners in the Air4EU consortium to help define the best approaches in implementing the case studies.

The cities and their respective research partners are listed below:

| <b>City</b> | <b>Research Partner</b> |
|-------------|-------------------------|
| Oslo        | NILU                    |
| Prague      | NILU                    |
| London      | UH                      |
| Paris       | TNO                     |
| Rotterdam   | TNO                     |
| Rome        | TNO                     |
| Athens      | AUT                     |

The main milestones for the case studies are:

- August – September 2005: Initial bilateral meetings between cities and their research partner to plan the case studies
- October 2005: Case study workplans established
- October – March 2006: Implementation of case studies
- April 2006: Preparation of preliminary case study report

The following table gives an overview about the case studies AIR4EU envisages to conduct.

| <b>Case study</b> | <b>Nature</b>  | <b>Spatial scale</b>                  |
|-------------------|--|---------------------------------------|
| London I          | Traffic management impact  | Local/hotspot                         |
| London II         | Impact of stack emissions  | Urban/Regional                        |
| Rotterdam         | Trend analysis of pollutants from 1995-2005  | Urban/regional                        |
| Rome              | Review of AQ assessment, improvement of 24-h modelling and test of data assimilation | Urban/hotspot and regional background |
| Paris             | Review of AQ assessment and introduction of data assimilation                        | Regional/Urban                        |
| Oslo I            | Data assimilation on the urban scale   | Urban                                 |
| Oslo II           | Data assimilation on line source   | Hotspot/street                        |
| Oslo III          | Source apportionment in Oslo   | Urban                                 |
| Prague I          | Data assimilation on the urban scale   | Urban                                 |
| Prague II         | Combining monitoring and modelling on the urban scale                                | Urban                                 |
| Athens            | Assessment of PM levels  | Urban/regional                        |
| Europe I          | Assessment of regional background of PM10  | Regional/continental                  |
| Europe II         | Regional scale interpolation using monitoring and model data                         | Regional/continental                  |

The detailed content of these planned case studies and the workplans for implementing them are currently under discussion with the local teams. Deliverable 6.1 Case Study Protocols will provide the full overview about the case studies which will be undertaken in 2006.

### **3 Consultations with Users and Expert group**

AIR4EU aims to develop solutions and products which meet the needs and requirements of potential users and are therefore widely applicable in Europe. In order to meet this objective to the largest extent possible consultation with potential users, especially in European Cities and the close interaction with experts from key-organisations is essential. The aim is to get at an early stage feedback and input to the intermediate and final results and therefore to improve the quality of the products developed by AIR4EU.

Through the involvement of the European Cities Paris, Rome, London, Rotterdam, Athens, Prague, and Oslo as project partners in AIR4EU the needs of cities are taken into account in the best possible way and a continuous feedback process is guaranteed. Nonetheless, the project planned to receive further feedback from other cities, especially through the planned Workshop and the final conference.

The involvement of European experts became operational through the creation of a high-level expert group. This group of recognised experts on the field of air quality assessment is consulted on a regular basis, especially when key deliverables are available in draft. This process will ensure the quality of the products.

#### **3.1 Project workshop, June 2005**

The main aim of the 1<sup>st</sup> Project workshop held on 29<sup>th</sup> June 2005 in Athens was to present the first set of practical recommendations on integrated air quality assessment to European stakeholders and to enter into discussion with these stakeholders to get feedback and additional input to improve the products of AIR4EU. The workshop was very well attended by 49 participants from 16 European countries. Beyond the notably spatial coverage of Europe the participants were delegates from city authorities, research institutes and universities reflecting the views of practitioners as well as the views of the European research community. The topics presented at the workshop led to live and interactive discussion between the project team and the participants. A full report on the workshop comprising the programme, the topics presented and a summary of the discussions is available for download from the News-section on the project webpage [www.air4eu.nl](http://www.air4eu.nl)

#### **3.2 Consultation of High-Level Expert Group**

Right at the beginning of the project the team started to create the high level expert group. The following researchers agreed in 2004 to join the group:

|                 |                             |
|-----------------|-----------------------------|
| Andre Zuber:    | DG Environment              |
| Jaroslav Fiala: | European Environment Agency |
| Kees Cuvelier:  | Joint research Centre       |

Frank de Leeuw: Topic Centre Air Quality and Climate Change  
David Simpson: EMEP

In the course of the 1<sup>st</sup> Project workshop held on 29<sup>th</sup> June 2005 in Athens the expert group was extended by the two new members:

Martin Lutz: Municipality of Berlin  
Axel Welge Council of European Municipalities and Regions

During the 1<sup>st</sup> half of the project lifetime the expert group has been regularly informed about the progress of the project and have received the matured draft deliverables for comments.

Fortunately, most experts were able to join the 1<sup>st</sup> Project Workshop, and were actively engaged in the discussions during the workshop. A questionnaire was send to the experts who could not attend the workshop.

### **3.3 Results from the workshop**

The discussions during the workshop and the interaction with the expert group gave relevant information to the AIR4EU-project.

In general, it was concluded that the AIR4EU project was on the right track and developing in the right direction. The opinion was that the project might well achieve its ambitious goals and in this way contribute to improved and advanced air quality assessment methods.

The following remarks were made:

- The project should-if possible- take into account the new focus on PM 2.5, and the exposure index
- The project should-if possible- not only consider health aspects, but also give attention to acidification and eutrophication. In this respect, attention should be given to NH<sub>3</sub>, also because of its role in PM.
- Although spatial air quality assessment in view of the EU-directives and exceedances of limit values are the central focus of AIR4EU, the assessment of source contributions ( vital for emission control policy) should also be taken into account.
- AIR4EU should take the relevant information from related projects into account. Reference was made to CITAIR, to CLEAR, to OSCAR, to APMEIS ( a project on health impact), to the IUTA siting project, to the project by ENTEC on the development of a methodology to assess population exposure due to high levels of noise and air pollution close to roads, to the project by AEAT on the use of modelling for air quality assessment .
- Reliable emissions were regularly mentioned as central to reliable AQ-assessment. In that context the suggestion for the set up of a European Centre where emission data and modelling data could be obtained was made.

- The importance to take uncertainty into account in all aspects of AQ-assessment was stressed, including the education of/ advice to policy makers how to handle uncertainty in their decision process.
- Of importance is the formulation-if possible- of criteria to be set for models and measurements to be allowed to be used in AQ-assessment. This holds especially for their combined use, in which the risk of compensating errors should be avoided.
- Involvement of stakeholders in AIR4EU is well established with the cities, and also reasonable well for international organisations as DG-Environment and UNECE. Involvement of national ministries of environment is weak. This is not special for AIR4EU, but a general phenomenon in similar projects.

## 4 Revised workplan

The delays the project has seen in it's 1<sup>st</sup> half of project lifetime have lead to a slightly revised workplan which takes account of the problems encountered. The corrective action agreed upon resulted in revised deadlines of some deliverables. The following table and the revised Gantt-chart in section 4.1 show the original and revised deadlines and the new workplan.

Table 2: Contractual and revised dates for deliverables

| Del. No. | Del. Name   | WP No. | Contractual Date (Month) | Forecast Delivery date (Month) |
|----------|---|--------|--------------------------|--------------------------------|
| D 1.3    | Final Report  | 1      | 36                       | 36                             |
| D 3.2    | Report on first recommendations for best methods and techniques for conducting air quality assessment at hotspot/local scale        | 3      | 17                       | 24                             |
| D 4.2    | Report on first recommendations for best methods and techniques for conducting air quality assessment at urban/agglomeration scale  | 4      | 17                       | 24                             |
| D 5.2    | Report on first recommendations for best methods and techniques for conducting air quality assessment at regional/continental scale | 5      | 17                       | 24                             |
| D 6.1    | Protocols for implementation of case studies  | 6      | 18                       | 24                             |
| D 6.2    | Recommendations of best techniques for AQ assessment related to spatial and temporal scales   | 6      | 33                       | 33                             |
| D 7.1    | Report from individual case studies   | 7      | 33                       | 33                             |
| D 7.2    | Summary report of case study findings and recommendations   | 7      | 33                       | 33                             |
| D 7.3    | Description of mapping framework  | 7      | 24                       | 28                             |
| D 7.4    | Maps of air quality in Europe   | 7      | 33                       | 33                             |
| D 8.2    | Good practice database  | 8      | 35                       | 36                             |

## 4.1 Revised gantt-chart

| Workpackage / Task                                | 1st year |     |     |     |     |   |   |   |   |    |     |    | 2nd year |    |     |    |     |    |     |    |    |    |     |     | 2nd year |    |     |    |    |    |     |     |    |    |    |    |     |     |
|---|----------|-----|-----|-----|-----|---|---|---|---|----|-----|----|----------|----|-----|----|-----|----|-----|----|----|----|-----|-----|----------|----|-----|----|----|----|-----|-----|----|----|----|----|-----|-----|
|   | 1        | 2   | 3   | 4   | 5   | 6 | 7 | 8 | 9 | 10 | 11  | 12 | 13       | 14 | 15  | 16 | 17  | 18 | 19  | 20 | 21 | 22 | 23  | 24  | 25       | 26 | 27  | 28 | 29 | 30 | 31  | 32  | 33 | 34 | 35 | 36 |     |     |
| <b>1. Management</b>                              |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 1.1 Overall co-ordination and management     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 1.2 Contractual and financial management     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| M 1.1 - M 1.7                                     | 1.1      |     |     |     | 1.2 |   |   |   |   |    |     |    |          |    | 1.3 |    |     |    | 1.4 |    |    |    |     |     |          |    | 1.5 |    |    |    | 1.6 |     |    |    |    |    | 1.7 |     |
| D1.1 - D1.3                                       |          | 1.1 |     |     |     |   |   |   |   |    |     |    |          |    |     |    | 1.2 |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     | 1.3 |
| <b>2. Policy framework &amp; requirements</b>     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Tasks 2.1 - 2.4                                   |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| M 2.1 - M 2.3                                     |          |     | 2.1 | 2.2 | 2.3 |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| D 2.1   |          |     |     |     | 2.1 |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| <b>3. Local &amp; hotspot scale</b>               |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 3.1 Selection of models & methods for review |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 3.2 Conduct review                           |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| M 3.1 - M 3.3                                     |          |     |     |     | 3.1 |   |   |   |   |    | 3.2 |    |          |    | 3.3 |    |     |    |     |    |    |    | 3.1 | 3.2 |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| D 3.1 - D 3.2                                     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| <b>4. Urban/agglomeration scale</b>               |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 4.1 Selection of models & methods for review |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 4.2 Conduct review                           |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| M 4.1 - M 4.3                                     |          |     |     |     | 4.1 |   |   |   |   |    | 4.2 |    |          |    | 4.3 |    |     |    |     |    |    |    |     | 4.1 | 4.2      |    |     |    |    |    |     |     |    |    |    |    |     |     |
| D 4.1 - D 4.2                                     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| <b>5. Regional/EU scale</b>                       |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 5.1 Selection of models & methods for review |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 5.2 Conduct review                           |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| M 5.1 - M 5.3                                     |          |     |     |     | 5.1 |   |   |   |   |    | 5.2 |    |          |    | 5.3 |    |     |    |     |    |    |    |     | 5.1 | 5.2      |    |     |    |    |    |     |     |    |    |    |    |     |     |
| D 5.1 - D 5.2                                     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| <b>6. Synthesis</b>                               |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 6.1 Synthesis                                |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 6.2 Case studies protocol                    |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| M 6.1 - M 6.3                                     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    | 6.1 |    | 6.2 |    |    |    |     |     |          |    |     |    |    |    |     | 6.3 |    |    |    |    |     |     |
| M 6.4 - M 6.8                                     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| D 6.1 - D 6.2                                     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     | 6.2 |
| <b>7. Case studies &amp; mapping</b>              |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 7.1 Case studies                             |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 7.2 Mapping                                  |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| M 7.1 - M 7.4                                     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| D 7.1 - D 7.4                                     |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| <b>8. Dissemination &amp; Exploitation</b>        |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 8.1 Website                                  |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| Task 8.2 Good practice database                   |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     |     |
| M 8.1   |          |     |     |     |     |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    | 8.2 |     |
| D 8.1 - D 8.2                                     |          |     |     |     | 8.1 |   |   |   |   |    |     |    |          |    |     |    |     |    |     |    |    |    |     |     |          |    |     |    |    |    |     |     |    |    |    |    |     | 8.2 |

## **5 Conclusions**

Although the project has gathered some delays in preparing deliverables, especially D3.1, D4.1 and D5.1, the corrective actions taken and described in this report justify the statement that these delays will have no adverse impact on the content and on the quality of the products AIR4EU is going to. The proposed revised workplan and the new deadlines for deliverables will ensure that AIR4EU will meet its objectives and all contractual obligations.