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of Integrated Strategies
At regional and Local scales

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1 Summary

This deliverable describes the first day of the two day conference “Tools for the design and implementation of air quality programmes in EU regions” which was dedicated to the first results of the APPRAISAL project and which was held at the Committee of the Regions in Brussels on 19 November, 2013.

1.1 Version History

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0.1	First Draft	26/11/2013	Peter Viaene, VITO
0.2	Revision	10/12/2013	Enrico Pisoni, JRC Giovanna Finzi, UNIBS Alberto Martilli, CIEMAT

1.2 Summary of Changes

Version	Section(s)	Synopsis of Change
0.1	All	Initial version
0.2	All	First revision

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3 Introduction

On November 19-20, 2013 a two days conference was held at the Committee of the Regions together with the LIFE+ project ATMOSYS titled “Tools for the design and implementation of air quality programmes in EU regions”. On the first day the results of the APPRAISAL project were presented together with the view of the European Commission, the member states and the cities. The first part of this document is dedicated to the main points addressed in these different presentations. At the end of the first day a round table discussion was held to discuss the gaps and challenges for integrated assessment methodologies between representatives for the different policy levels. The main conclusion from this discussion are gathered in the second part of the document.

For more details on the presentations the reader is referred to the APPRAISAL website (<http://www.appraisal-fp7.eu>) where copies of the presentations can be found.

4 Conference

4.1 Presentations

4.1.1 Welcome (A. Kudlinska, CoR)

On behalf of the CoR we were welcomed by A. Kudlinska. During the following presentations, it was acknowledged that the CoR is the appropriate venue for this conference, as the work presented is aimed at supporting the regions.

4.1.2 Research & innovation Partnership with EU regions and cities to meet the Air Quality challenge in Europe (A. Tilche, Climate change and natural hazards unit Head, EC DG-RTD)

In a first presentation by the Commission, the importance of the APPRAISAL project in the Air Quality Directive review process was highlighted and the different activities of the climate change and natural hazards unit at DG-RTD were presented. Special mention was also made of the upcoming Horizon2020 call and how this relates but also will differ to previous calls that were launched, with the aim to be a bridge between research and innovation.

4.1.3 APPRAISAL Project Integrated assessment for regional and local air quality policies (M. Volta, University of Brescia, Italy)

As Europe moves from a situation of widespread exceedances of the air quality limit values to a situation where there are rather “isolated islands of non-compliance” Integrated Assessment Modelling (IAM) tools for local air quality management will become more and more important to tackle the remaining problems in a cost efficient way. In APPRAISAL the current state of such tools is reviewed. The result of this review phase is a database of Air Quality and Health Integrated Assessment Systems in the EU. This can be used to identify the limitations of current IA systems and to obtain more insight on how to harmonize top-down and bottom-up approaches, as well as insight on AQ and health assessment methodologies Other outcomes of the project are a generic design framework for IAM tools and a guidance document. Last but not least, communication to key stakeholders and to policy-makers of the state-of-the-art scientific knowledge on air quality assessment and support to the review of the EU Air Policy are central to the APPRAISAL project.

4.1.4 Integrated assessment in the EU air policy (A. Zuber, DG-ENV)

This second presentation on the view of the Commission started out with sketching the current state of the air quality in the EU and the existing policy framework at the international and EU levels. EC4MACS was presented as an EU level framework for integrated assessment. A. Zuber then continued with what the future is expected to bring us, stressing the “zero impact” (that is no more exceedances) objective by 2010. For NO₂, compliance beyond 2015 will crucially depend on the level and timing of real-driving emissions from Euro 6 light duty diesel vehicles. Future objectives and options such as reinforced EU/national/local actions, or amendments to NEC as well as preferred pre-2020 options and the Air Implementation Pilot were discussed next. Lessons learned

from the Air Implementation Pilot were: 1) attention should be given to consistency among air quality plans from different member states; there is a need for a database of measures; 2) there is the need for capacity building at regional/local scale in relation to management practices; and 3) financial means to implement the plans that are developed. Finally, a number of expectations were listed. When asked what the main limitations are to current IAM practice, A. Zuber mentioned that a better quantification of the costs of measures is required.

4.1.5 Portugal Air Quality overview (N. Lacaste, President of the Portuguese Agency for Environment)

For Portugal, the current air quality situation as well as the experience of Portugal with both air quality assessment, air quality forecasting and the design of air quality plans was presented. In Portugal most of the population is living along the coast and is concentrated in and around cities. Air quality plans have been made for the Porto and the Lisbon area. During the presentation the effect of a low emission zone in Lisbon was shown. There is also the National Air Quality Strategy (ENAR) for 2014-2020 which will take into account the effects on both air quality and the climate, and consider the interactions between the different levels of decision making. N. Lacaste concluded by pointing out that modelling tools are essential for Air Quality Plans, and that are crucial for decision making. A question was raised from the audience on the higher impact of the Low Emission Zone on PM₁₀ (not on NO₂, as expected) shown in one of his slides. Lacaste answered that this is probably due to fleet changes or to the impact of the meteorology.

4.1.6 Needs for integrated assessment in air quality management at the regional scale (G.Bortone, Director General Environment and Land Protection Emilia-Romagna Region)

In Emilia Romagna there are air quality problems with PM, NO₂ and ozone. These are at least partially due to the specific orographic situation and low wind speeds that are characteristic of the Po Valley. The background PM levels are such that measures coordinated at all levels (national, interregional, regional and local) are needed. During the last 10 years Air Quality acts have been signed between the region and larger municipalities. In the new regional air quality plan (PAIR 2020), air quality and climate change objectives are integrated, and all processes generating pollutants are considered through a cross-sector approach. For PAIR a cost-effectiveness analysis using the RIAT IAM has been applied, to set the total emission reduction target at the regional level. Limit values have also been defined in PAIR for biomass plants. To obtain a better understanding for deriving air quality strategies, the region is currently involved in the *Supersite* research project. Asked how problems with long range transport of pollutants should be tackled, G. Bortone answered that, according to the agreements implemented in the Po Valley, measures are imposed at several levels (national, Po Valley and regional).

4.1.7 The case of a Metropolitan Area: the Barcelona Area Air Quality Plan (A. G. Lus,

Head of Air Quality Plans Technical Office)

Barcelona is a metropolitan area of 4 million inhabitants and 1.5 million cars. There are problems with NO₂ and PM. For PM the situation has improved over the last years but for NO₂ there is no clear trend. To tackle the problems two air quality plans have been put in place respectively for the periods 2007–2010 and 2011-2015. The plans used both measurements and modelling with the ADMS-Urban model. Source apportionment revealed that about half the NO₂ and PM concentrations could be attributed to traffic. There is a very high density of vehicles many of which are diesel vehicles. About half of this traffic is generated by vehicles coming from outside Barcelona. The air quality plans considered traffic measures such as the promotion of electric vehicles, bicycle infrastructure, urban and workplace mobility plans, measuring the outlet of diesel vehicles to promote drivers' awareness on the extend of pollution of their cars, efficient driving courses, an Eco label for the vehicle fleet, toll discount for clean vehicles, high occupancy vehicle lanes and an upgrade of the bus fleet. To improve air quality planning A.G. Lus mentioned a number of methodological difficulties such as the lack of data for modelling (emission factors for dust resuspension, social costs, efficiency of measures) and the problems facing implementation (harmonization in the EU and financial means for implementation).

4.1.8 Ten Years of PM Action Plans in Styria - A Review

(Andreas Schopper, Air Quality Control State Government of Styria)

In Styria the Alps inhibit ventilation, while the area is open to import pollution from Eastern Europe. Furthermore, low wind speeds and stable conditions often prevail. The PM₁₀ reduction plan involved a preliminary study with the characterization of emissions, analysis of the polluted situations, a receptor study which revealed an unusually high contribution from domestic combustion, dispersion modelling and the elaboration of AQ maps. Due to the fact that few measures would not be enough to solve the problems, all available measures were compiled and evaluated in terms of costs, effectiveness and societal/political acceptance. For different source groups the impact on PM₁₀ was evaluated. A reduction of 35% for NH₃ emissions only resulted in an improvement of a few percent in PM₁₀ concentration. Changes in the winter service on the other hand had a major impact. Switching out old heating appliances (coal, wood) which are mainly found in poorer communities requires financial support. The uncertainty on emissions (wood burning, real world traffic emissions), the estimation of health impacts for which an European tool would be nice and the lack of meteorological data from large scale and mesoscale models to force local area models were the main limitations that were experienced.

4.1.9 Results from the APPRAISAL Integrated Assessment Modelling Review

(A. Miranda, University of Aveiro, Portugal)

The aim of the review process in APPRAISAL is to analyse the assessment capabilities and modelling tools used in the EU Member States, to identify their limitations and determine the needs for future research. This was done through gathering information for five different topics, in a database. The considered topics are: synergies among scales

and emissions, air quality assessment, source apportionment, health impact and uncertainty and robustness. The main points brought up from the analysis of the database during the presentation were:

- source apportionment is mainly done to identify sources, define air quality plans or determine transboundary air pollution transport;
- emissions are in practice determined through a combined bottom-up and top-down methodology. Emission uncertainty is smallest for stationary large industrial sources and largest for natural sources;
- The models used at urban and regional scale for Air Quality modelling are essentially the same. Eulerian models are used most often. Air quality plans often include model evaluation but expert judgement and reuse of model performance analysis from previous studies is also reported;
- It is not a current practice to integrate health effects in air quality plans;
- Notwithstanding some local/urban scale integrated assessment optimization approaches exist, the current practice within air quality plans is mainly based on simpler approaches such as scenario analysis.

4.1.10 The IAM Decision Framework (G. Guariso, DEIB – Politecnico di Milano, Italy)

The DPSIR scheme can be used to describe the interaction between society and the environment: social and economic developments (DRIVERS) exert PRESSURE on the environment and, as a consequence, the STATE of the environment changes. This leads to IMPACTS on e.g. human health, ecosystems and materials that may elicit a societal RESPONSE that feeds back on the driving forces, on the pressures or on the state or impacts directly, through adaptation or curative action. The DPSIR scheme can be mapped to the different aspects of an integrated air quality assessment model. In a scenario analysis expert knowledge will be used to decide which abatement measures (responses) should be taken following a certain impact. An alternative is to use an optimisation procedure to determine the optimal set of abatement measures that should be taken. Each of the different blocks of the DPSIR scheme can be elaborated according to available data or to the requirements of the specific IAM system. As an example, the different levels for the emissions (pressure) block were presented where the level of detail can range from a coarse disaggregation in a number of macro sectors with little spatial and temporal detail, to a high resolution inventory and with sectorial detail required when considering all possible abatement measures. An additional dimension that is considered is the uncertainty. Actual air quality plans can be analysed according to this design framework.

4.1.11 Air quality in Brussels Current status, trends and action plans (A. Vanderpoorten – Air and climate policy advisor Cabinet of Minister Evelyne Huytebroeck – Environment, energy and urban renovation Brussels Capital Region)

Concerning air quality in Brussels progress has been made over recent years but there are still some problems with PM₁₀ and NO₂. In Brussels, the transport sector is the biggest emitter. Brussels has no control on transport fiscal policy that is currently favourable for diesel cars and company cars, or on Belgian and EU product standards. Policies for transport are also tricky and transboundary import is a problem. Besides traffic, building

heating is the second most important emitter. Actions that were taken in Brussels consider an integrated approach to air, climate and energy. Implemented transport policies are related to the improvement and further development of public transport, decreasing parking space by 16%, improving the vehicle fleet, plans for cycling and pedestrians, car and bike sharing, displacement plans for companies and mileage pricing. Building policies refer to the obligation of applying the passive standard for all new buildings and the low energy standard when renovating as well as subsidising measures that improve energy efficiency. Brussels is also involved in the *Exp'air* project, that focuses on the exposure to both indoor and outdoor pollution, the modelling of air pollution exposure and informing and raising awareness of the public.

4.1.12 Air quality management in Berlin & emerging wishes for regional IAM (M. Lutz Senate Department for Urban Development and Environment Berlin)

Considering all the aspects that need to be addressed in an air quality plan such as source identification and evaluating the impact of abatement measures, there is clearly a need for an integrated assessment tool. For Berlin an analysis of the situation for PM shows that also European and national levels actions are needed as the total urban contribution relevant for compliance is limited. The presentation then continued with some examples for Berlin of air quality assessment, source apportionment and scenario analysis, applying multi-scale modelling in which a chemical transport model is combined with a street canyon model (but also using techniques such as back trajectory analysis and a simplified receptor modelling approach). Scenario analysis was used to analyse the effect of traffic measures such as rerouting of traffic and the combination of a low emission zone with traffic planning (StEP), and to illustrate what is required from additional measures at the national and EU levels. Conclusions were that there are still uncertainties with respect to emissions (missing activity data and emission factors) and limited means to assess side benefits like the effect on noise and climate. For a regional IAM, the following issues are still missing according to M. Lutz: realistic quantification of the emission control potential and costs of measures that also account for health and monetary benefits; optimisation procedures to identify cost effective bundles of measures. His expectations from the APPRAISAL project is the production of a guidance on source apportionment (which method, model, input data...), on setting up consistent emission inventories across scales, on how to fill the gaps to set up a regional IAM framework and on better assessment of symbiotic actions with other policies, like climate change and noise.

4.1.13 Health Impact Assessment (C. Bouland, ULB, Belgium)

HIA is defined as a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population. In the context of an Integrated assessment tool the Impact is determined by two E's: effect and exposure.

Based on two examples C. Bouland illustrated how HIA can be included in an IAM. In a simple application the health impact of a population as a whole can be estimated

using mortality/morbidity information for the population and an appropriate exposure response function. An example of such an application can be found in the APHEKOM project where the gain in life expectancy for 25 different cities in Europe was calculated in such a way. This can be refined by distinguishing different subgroups in the population with differences in vulnerability, and taking into account the actual spatial distribution of the population with respect to major sources such as the distance to roads. Studies have shown that by not taking into account the distance to roads the health burden is underestimated. Another important point that was stressed is that there is currently not enough evidence to support the use of threshold values below which health effects are negligible; moreover there are still problems related to assessing health effects with respect to mixtures of pollutants.

4.1.14 Incorporating sociology in IAM (M.Maione, University of Urbino, Italy)

M. Maione presented the SEFIRA project (Socio Economic implications For Individual Responses to Air pollution policies in EU+27). In SEFIRA the intention is to extend the cost-benefit/cost-effectiveness analysis with assessing social acceptance of proposed abatement policies. In the project a large number of interviews will be conducted, in which the public will be asked to rate policies based on the perceived efficacy and acceptability. A key problem in fact seems to be how the policies are implemented and communicated. This should result in the integration of a discrete choice model (DCM) in GAINS. The latter is currently applied as an integrated assessment tool at the European level. DCM is based on consumer theory and is often applied to the transport sector. The technique estimates the probability that a person makes a particular choice. According to the work plan, SEFIRA will first determine the set of measures and attributes that have to be included in the questionnaire which will then be used in the survey. The latter will be automated using CATI (computer aided telephone interview). The data collected through the interviews will then be used to calculate an Indirect Public Acceptability (IPA) index for each measure. This could also be useful to include 'acceptability' of the measures in addition to the monetary cost in the optimisation in GAINS.

4.1.15 An example RIAT+: Regional Integrated Assessment Tool (G.Maffeis, Terraria)

The RIAT+ tool was developed in the OPERA (Operational Procedure for Emission Reduction Assessment) LIFE+ project; it is intended as an integrated assessment methodology and a tool to plan local cost-effective air quality policies harmonized with national and European actions, maximizing the environmental benefits while minimizing the costs. The software tool has a user friendly interface and features to process different types of input data. It can be used both for assessing scenarios, and for identifying the optimal set of measures (defined a particular air quality index to be improved) using an optimisation approach. RIAT+ can now be downloaded for testing from the OPERA website.

A question raised at the end was whether a tool such as RIAT+ could also take into account non-technical measures, as these are often the kind of measures that can be taken at the regional and local levels. These can be included to the extent that their

emission reduction potential and costs are known, but both with high level of uncertainty. The complication is often that non-technical measures impact not only air quality but also have an effect on other issues. An example is where a traffic measure also has an impact on the number of accidents or a decrease in congestion.

4.2 Research Gaps - a round table discussion

4.2.1 Introduction

To conclude the conference, a round table discussion was held, moderated by P. Thunis (JRC). The focus of the discussion was on the limiting factors in the current approaches to Integrated Air Quality planning methodologies. Besides P. Thunis, people representing the different decision making levels participated in the discussion, and in turn gave their opinion on this subject. After this the audience was invited to ask questions. The audience was also polled through a questionnaire. Finally, M. Volta presented some closing remarks.

4.2.2 City, local (*M.Lutz, Berlin*)

The main idea that was expressed by M. Lutz, is that data to properly quantify emissions from wood burning installations and construction machinery, such as activity data, are currently missing.

4.2.3 Region (*G. Bortone, Emilia-Romagna*)

In the Po Valley a better coordination is needed among the different levels, in the same way as this currently exists for the water basin. There is a further need for tools that can help us to identify the different policy options and compare their effectiveness taking into account also aspects such as sociology.

4.2.4 Europe (*A. Zuber, European Commission DG-ENV*)

Limiting factors are the policy coordination among decision makers taking into account the competence at the different levels, an ex-post evaluation to verify whether the measures are as efficient as predicted by the models, and the adoption of data assimilation techniques. He also pointed out that robustness of policies is extremely important, while, in his opinion, uncertainty is a more academic issue.

4.2.5 Country,/ research community (*C. Borrego, Portugal*)

We need tools that integrate physical planning with air quality, health, social aspects, .. and try to capture the whole picture. This also presumes good and reliable data. Social aspects are also not often addressed. There should be better communication of scientific results to the public in order to reach more awareness of people. This will also require initiatives to improve the knowledge of the general public (education). In reaction to this last point A. Zuber mentions the initiatives of the EC to improve capacity building including LIFE+, which has set aside 100 M€ to increase the capacity in the member states.

4.2.6 Europe (*J. Jimenez, European Commission DG-RTD*)

We should keep investing in models to improve their reliability, but we should also now move to deliver results, developing strategies that combine all the available models results, integrating the impacts (health, ecosystems, noise, ..) that should be considered.

4.2.7 Questions from the audience

Question: What about all these different approaches that exist today in Europe?

A. Zuber: The EU Directives (as the Air Quality Directive) cannot impose a particular approach. This is different in the USA, where there is a coherent plan across the country on how to proceed. US EPA can also step in, which is not the case in Europe. There should be more synchronization and there is a need for guidance, but overall this is not seen as a disadvantage.

J. Jimenez: It is stated that there is the need to use the already available tools and models (instead of creating new ones) to manage Air Quality at the different levels.

M. Lutz: Try to keep it simple! There is a need for guidance however the way it is done in the USA is too limiting. We should go for something in between

4.2.8 Results from the questionnaire

A questionnaire on research gaps in IAM was distributed to the audience with the following questions:

1. According to you what is the most (and least) limiting factor in the current approaches?
2. Are cross-scale issues a problem in your daily decisions (governance - approaches)? Any recommendations on how to solve the problem?
3. Is the multiplicity of the approaches positive or negative?

From the answers received the following can be concluded:

1. The most limiting factors mentioned are the poor knowledge on emissions and impacts (health,...) and the estimation of total costs accounting for all components including social behaviour. Besides these aspects related to the IAM methodology, also the need to explain integrated assessment modelling to the different political authorities and to the public in general is mentioned. Less limiting aspects according to the audience are climate change and air quality assessment.
2. Most respondents mention the need for better coordination and exchange of information among the political levels as a concern with respect to a cross-scale issues. Also the need for large scale boundary conditions to facilitate urban and local scale assessments is seen as a problem.
3. The multiplicity is seen as an advantage, as this triggers the competition and further improvements to the models. However there is a need for a minimal standard of quality for monitoring and modelling and also for the integration of models within the frame of an IAM.

5 Conclusions

At the first APPRAISAL review conference held at the Committee of the Regions, the different decision levels in Europe presented their experience and view on integrated air quality modelling. From these presentations it became clear that in Europe, modelling plays an essential role in today air quality planning. Recurring topics in the presentations and the discussions that followed were the need for 1) more reliable data to quantify emissions but also the costs and efficiency of abatement measures including the non-technical measures; 2) systems that take into account all impacts including health, noise and political and societal acceptance, over the different scales ranging from European to local; 3) the dissemination of knowledge on such systems to the different authorities and the general public; 4) the exchange of information among the decision levels to improve the synergies.

For APPRAISAL the first results from the review and design work packages of the project were presented. The review has resulted in an online database, that can be used to characterize the assessment capabilities and modelling tools used in the EU. The generic design that was adopted is based on the DPSIR scheme, and options to implement the decision process are *scenario analysis* or *optimisation*. Ways to include health impact and societal acceptance – aspects which are in practice not addressed in current air quality plans - were also explained. As an example of an existing regional integrated assessment, tool RIAT+ was demonstrated.

ANNEX: List of participants

Achard	Delphine	EUROCITIES
Adriaenssens	Sandy	Belgian Interregional Environment Agency
Andrews	Alan	ClientEarth
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Belis	Claudio A.	European Commission - JRC
Bianco	Lorenzo	Representative of Regione Piemonte Brussels
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Graff	Arno	Umweltbundesamt
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Martilli	Alberto	CIEMAT
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Micka	Lukas	Access EU! – EEIG (replaced by Brendl)
Miotto	Simone	Regione Veneto
Miranda	Ana Isabel	University of Aveiro
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Otero Riveiro	Denís	German Association of Cities

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Petracca	Michele	Regione Molise-Support and Liaison Office for Community Relations in Brussels
Piep	Henrik	Volkswagen AG
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Romeu	R.	/
Rosiers	Luc	AP
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Suppan	Claudia	Steiermark-Büro
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Trimpeneers	Elke	IRCEL
Van Espen	Luc	Antwerp Port Authority
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Vanderpoorten	A.	Advisor for Minister of Environment of Brus-Capital Region
Vanpoucke	Charlotte	VMM - IRCEL
Vercauteren	Jordy	VMM
Viaene	Peter	VITO
Vidic	Sonja	Meteorological and hydrological service
Vivani	Laura	atopica project
Vojta	Martin	Representation of South Moravian Region to EU
Volta	Ionita	Committee of the Regions
Volta	Marie-Louisa	DIMI - University of Brescia
Vranckx	Stijn	VITO
Walter(->Düring Fried)	Anne-Karin	Representation State of Hessen / Member of AIR-Network
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