Air Quality: Integrated Assessment Modelling
for the design and implementation of
Air quality plans in EU Regions
Brussels, 19 November 2012

Appraisal project
Air Pollution Policies
foR Assessment
of Integrated Strategies
At regional and Local scales

Results from the APPRAISAL Integrated Assessment Modelling Review

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Objectives

review

assessment capabilities and modelling tools used in the EU Member States to evaluate the effects of local and regional **air quality plans** regarding the **reduction of atmospheric pollutants and human health impacts**

Analysis of the limitations of the currently available assessment methods

Identification of key areas to be addressed by research and innovation

BRING TOGETHER ALL MAJOR ACTIVITIES ON AIR QUALITY AND HEALTH ASSESSMENT

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How?

- synergies among national, regional an… approaches, including emission abate…
- assessment capabilities to protect and efficiently reduce the impa… …on health (modelling approaches);
- source apportionment methodolog…
- …essment approaches;
- uncertainty and robustness, including Quality Assurance / Quality Control (QA/Q…

Topic 1

Topic 2

Topic 3

Topic 4

Topic 5

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How?

Database

- ***Stakeholders*** **(AQP), but also research activities (RP)**
- **63 contributions from 12 Member States**

Treatment and analysis of information

- Graphics automatically generated
- Bibliography review

http://www.appraisal-fp7.eu/site/

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How?

database + our own review

Source apportionment

Synergies among emission reduction measures at different scales

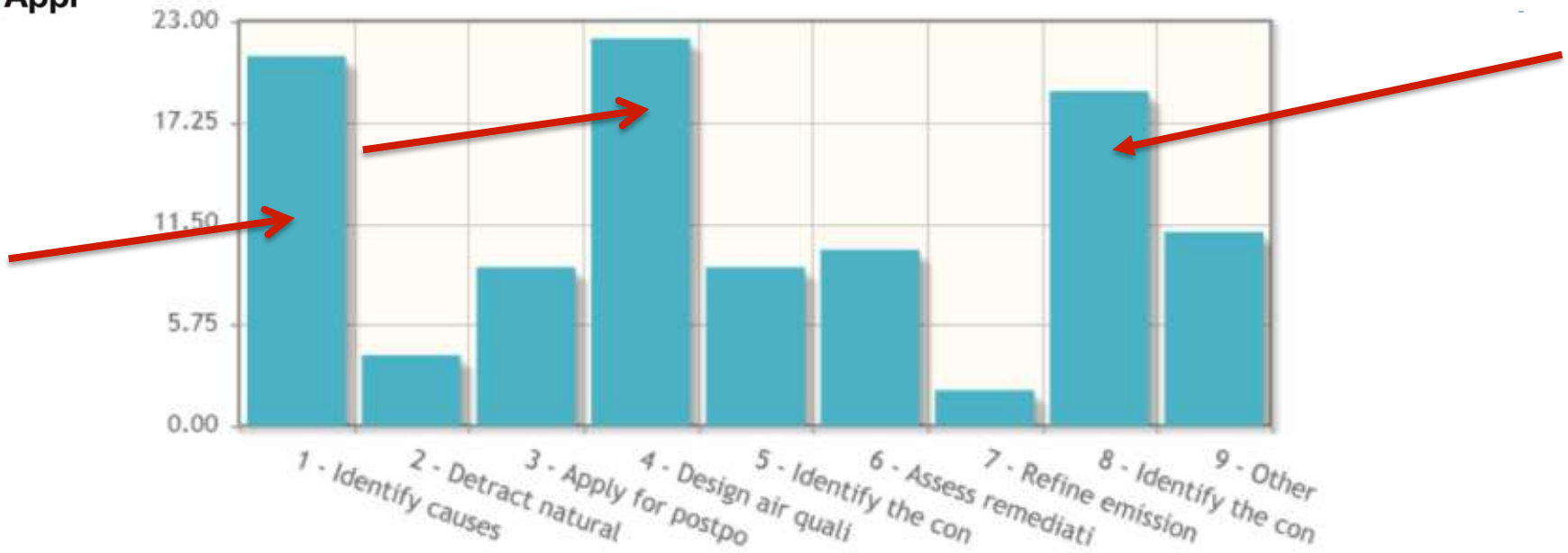
Modelling approaches

Health effects air pollution

Uncertainty

Appr

What was the purpose of the source apportionment study ?

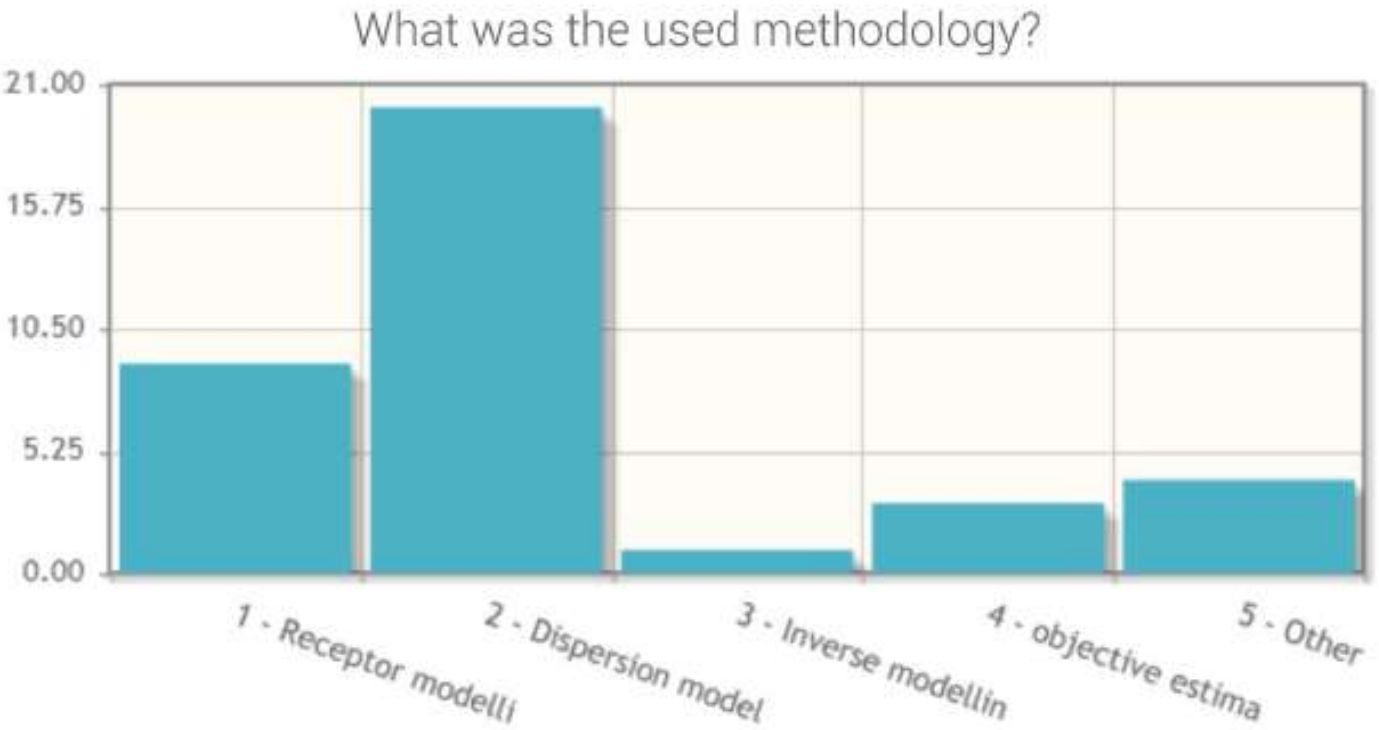


Legend

- 1 - Identify causes of exceedances
- 2 - Detract natural sources or road salting and sanding from PM (Dir. 2008/50/EC art. 21)
- 3 - Apply for postponement of attainment (Dir. 2008/50/EC art. 22)
- 4 - Design air quality plans/ action plans (Dir. 2008/50/EC arts. 23 and 24)
- 5 - Identify the contribution from different geographic areas within a country
- 6 - Assess remediation measures effectiveness
- 7 - Refine emission inventories
- 8 - Identify the contribution from other countries (transboundary pollution - Dir. 2008/50/EC art. 25
- 9 - Other

Info

- Total answers at this question: 107
- Total number of questionnaires: 49



As in every model, the **uncertainty in source apportionment** depends on the quality of the input data.

Info

- Total answers at this question: 37
- Total number of questionnaires: 49

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How?

database + our own review

Source apportionment

Synergies among emission reduction measures at different scales

Modelling approaches

Health effects air pollution

Uncertainty

Login

Selection

Topic: TOPIC 1: Synergies among national, regional and local ap

addressing with y

ssing with your air pollution mitigation measures ?

41.00

Current practice: combined approach using both a bottom-up and a top-down methodology.

Uncertainty

+

- anthropogenic stationary combustion installations (5% to 15%)
- mobile and small residential combustion sources
- biogenic and natural sources factor of 0.5 to 8)

251 answers

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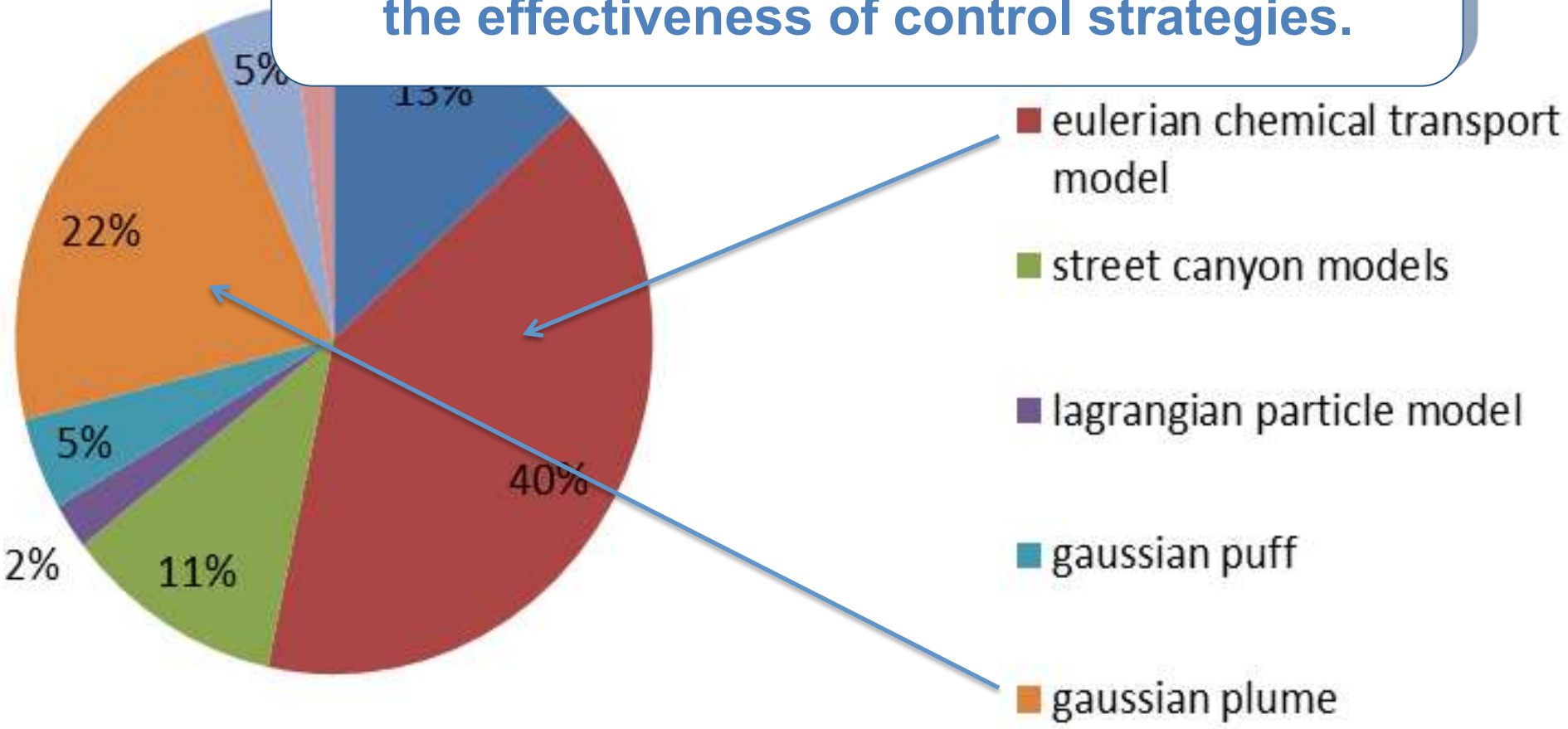
Air Quality modelling

AQP

Chemical transport (eulerian) and gaussian plume models are widely used for assessing the effectiveness of control strategies.



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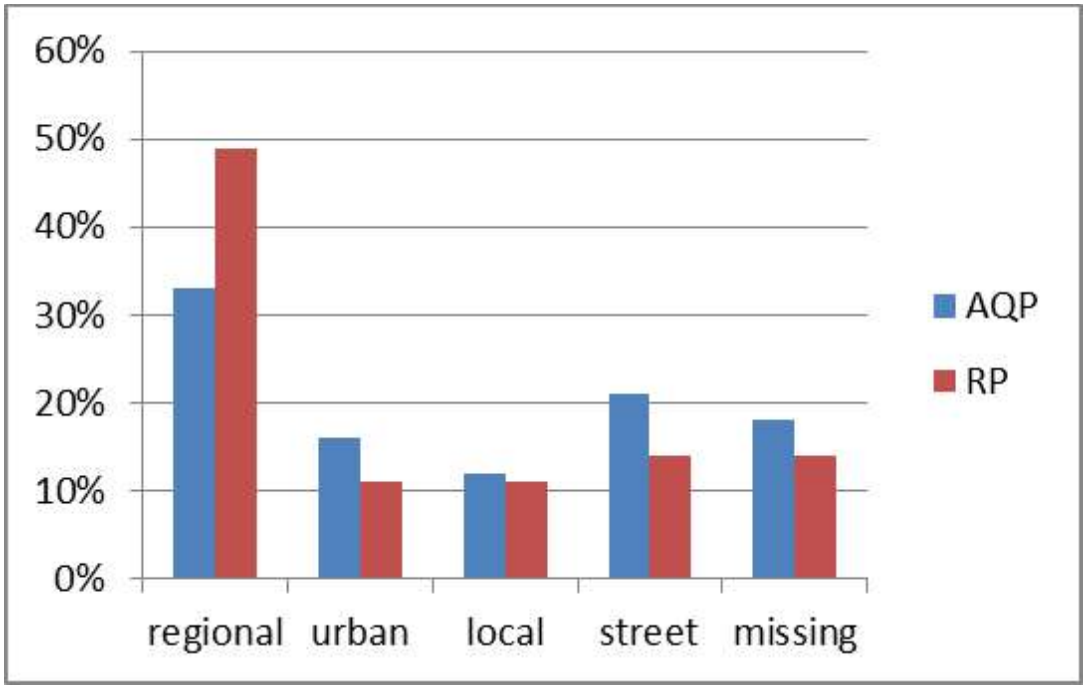
Air Quality modelling

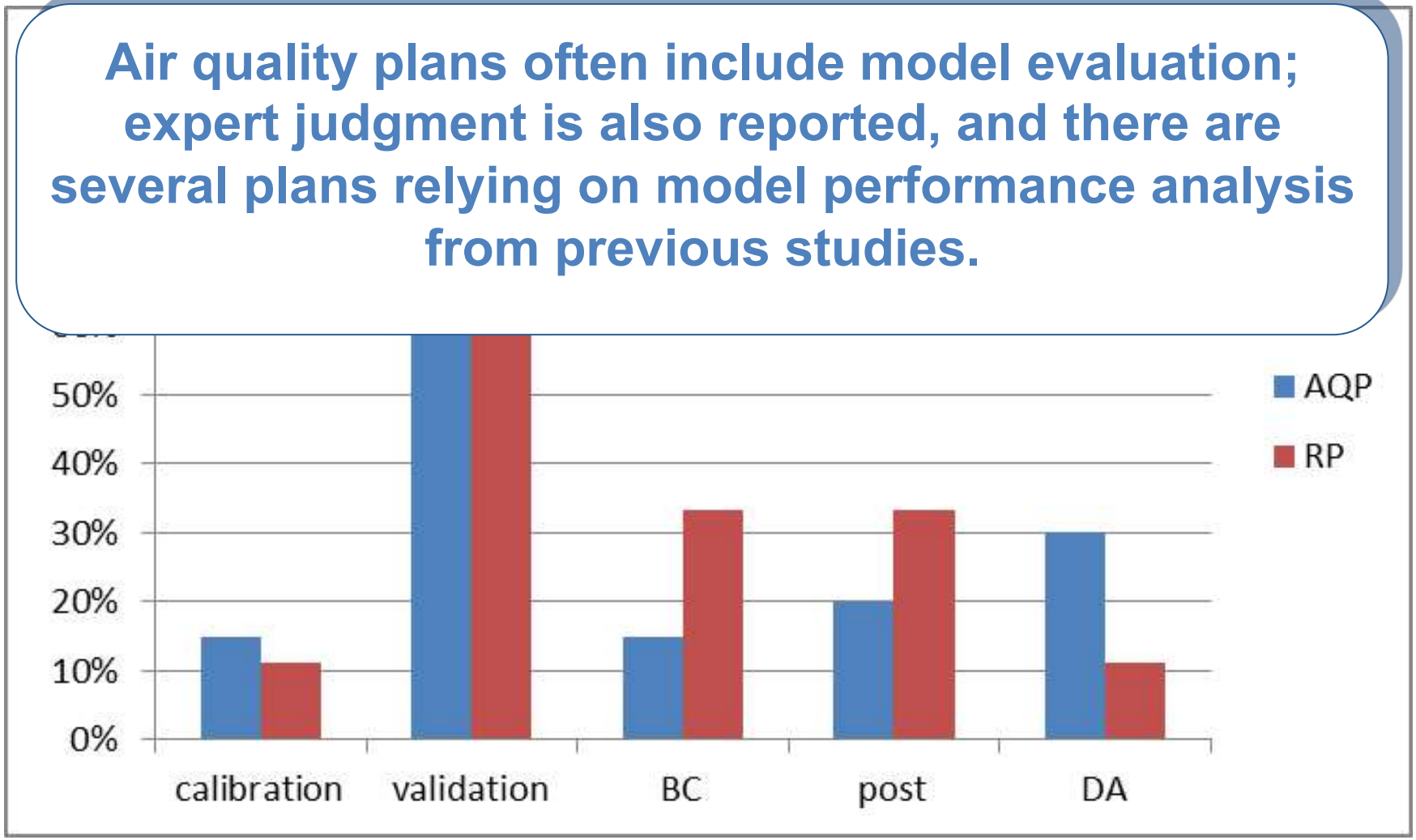
Scales of the modelling?



The models used at urban scale are essentially the same models as those used at regional scale.

Air Quality modelling (use of monitored data)

Air quality plans often include model evaluation; expert judgment is also reported, and there are several plans relying on model performance analysis from previous studies.



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Health assessment approaches

… indicators to express the change in population health due to exposure to air pollution:

- premature mortality (most used)
- morbidity
- life-expectancy
- disability-adjusted life years (more recently).

Air Quality Plans

It is not a current practice to integrate health effects

→ PM10, PM2.5, NOx, O_3

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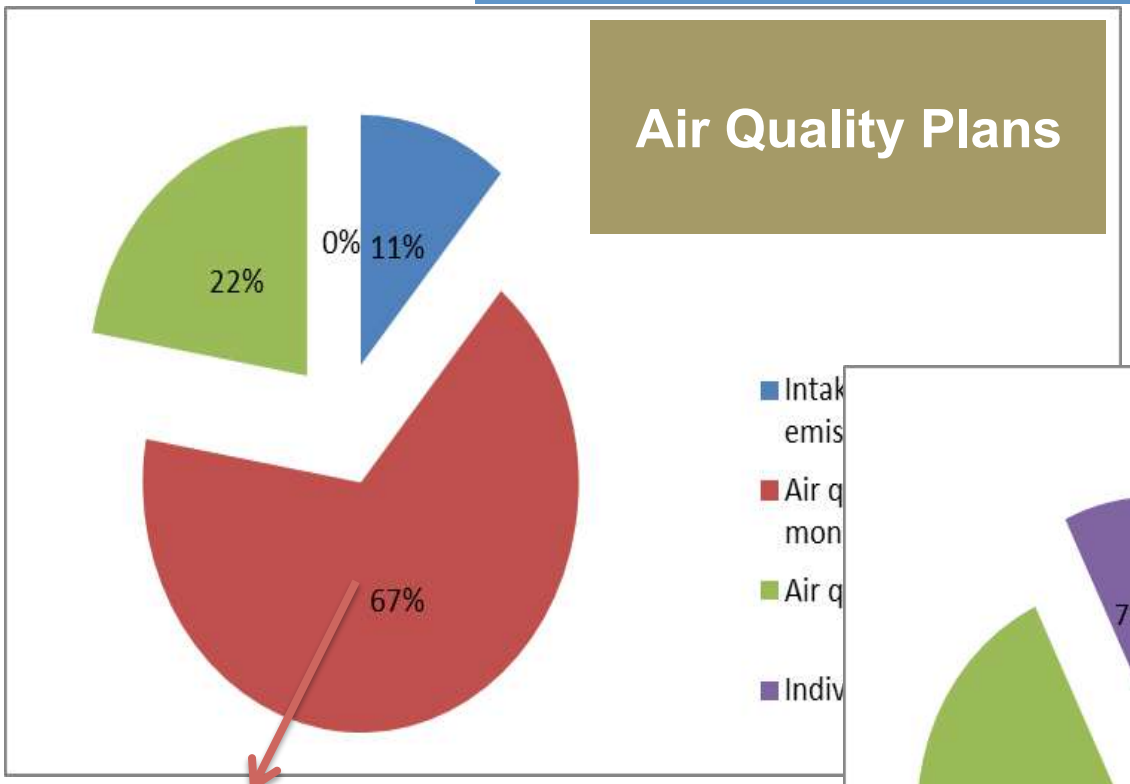
Health assessment approaches
exposure indicators based on...

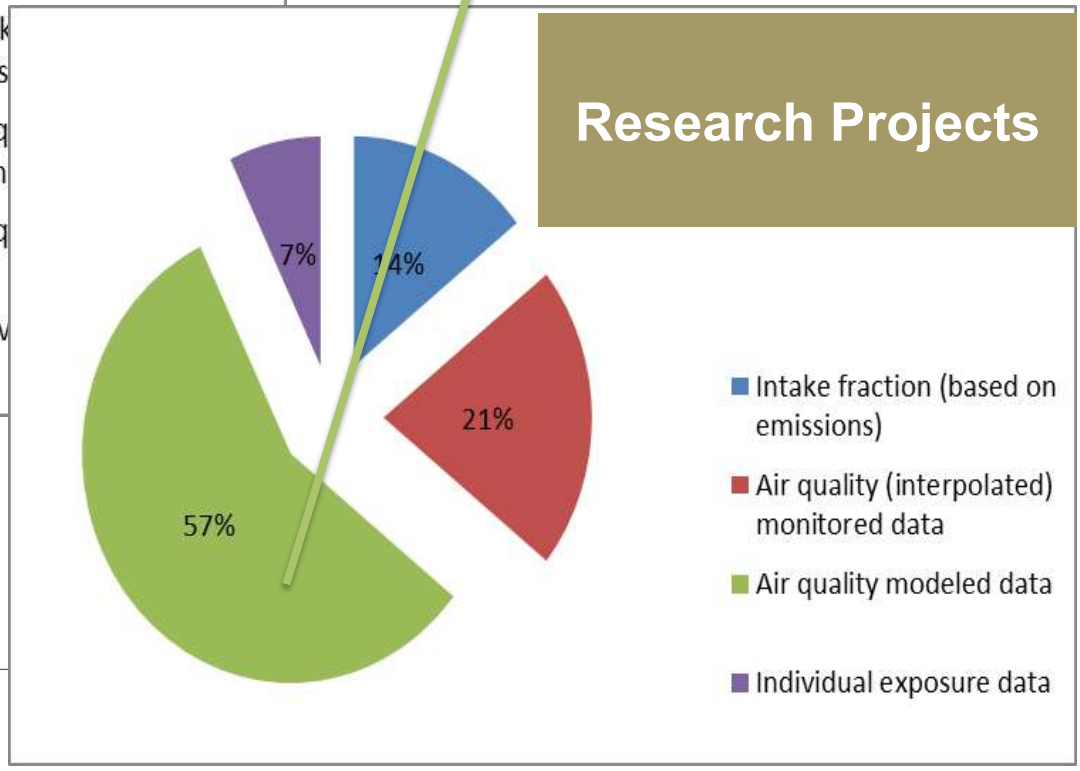
Air Quality Plans



Interpolated measured data

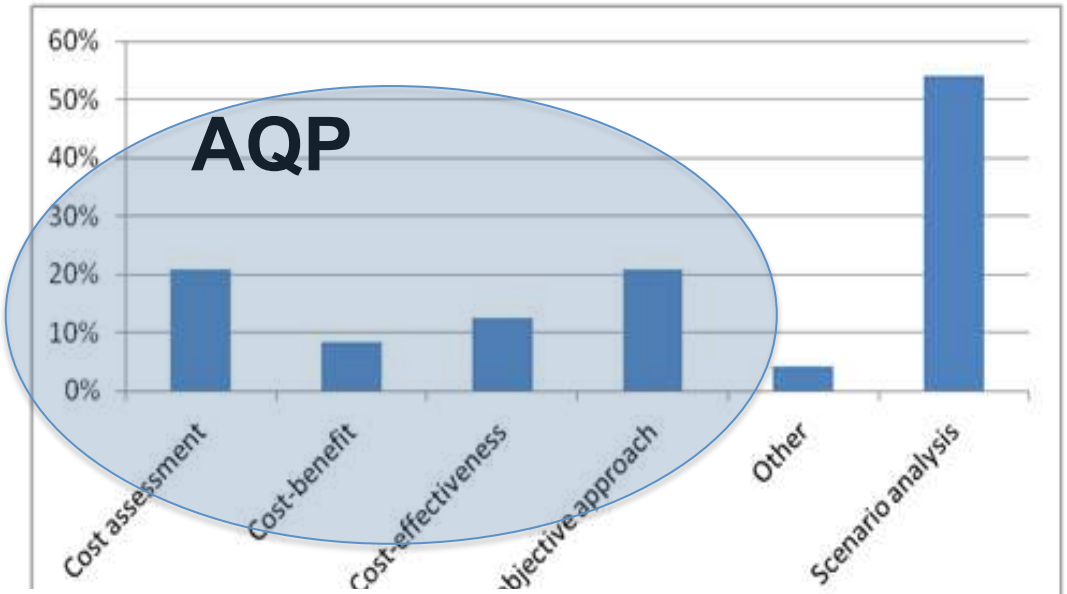
Air quality modelling results

Research Projects



16 answers

IA methodologies?



Optimization approach

Notwithstanding some already developed and applied local/urban scale integrated assessment optimization approaches (e.g RIAT+, LEAQ, UKIAM), the current practice within air quality plans developed by member states is mainly based on simpler approaches such as scenario analysis.

- uncertainties in model input data, particularly emissions (urban inventories and new technologies)
- missing or accounting in an incomplete way the synergies among abatement measures at different scales
- best practices in air quality modelling (e.g. higher resolution, longer periods, peer-reviewed)
- SA receptor models require measurements time series and chemical characterization
- uncertainty on health exposure-response function, mix of pollutants
- combining all IAM uncertainties to calculate a total uncertainty would require a great number of simulations
- absolute IAM “optimal” policy is not known and most of the times does not even exist (rethink accuracy concept)

Final comments

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the emergence of regional integrated assessment tools with their ability to identify cost-optimised local strategies is already opening the door to quantifying the cost-effective split between further European wide measures and regional/local measures.

IAM could/should support air quality authorities in selecting efficient mitigation strategies by providing tools for assessing and solving air quality planning problems at different spatial scales.

future research should study how to integrate these different scales and to build an IAM system able to connect different "scale-dependent" approaches, and to model policies from regional, to local, to street scale.

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On line data base

Plase, participate filling in!!!

http://www.appraisal-fp7.eu/site/

Final/updated document at the end of APPRAISAL

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Thank you!!!