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Clean Air for Europe

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Existing policy

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- **AAQ framework and daughter directives**
- **National Emission Ceilings**
- **vehicle emission and fuel quality standards (Auto Oil programmes)**
- **stationary sources (LCP, solvents, IPPC,...)**



Development of CAFE

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- **Discussion paper circulated in 1998 on need for new, integrated framework for AQ policy covering all sources**
- **“Thematic strategy” concept developed in context of 6EAP**
- **CAFE Communication COM(2001)245 adopted May 2001**
- **6th EAP adopted July 2002**



Why CAFE?

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- **Continuing problems with air pollution, especially particulate matter and ozone**
- **Increasing evidence of adverse health effects**
- **Need to update and improve projections and modelling**
- **Difficulty in achieving limit values (especially NO₂ and particulate matter)**



Legal and Political Basis

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↻ 6th EAP requires:

- ↻ thematic strategy on air pollution to be adopted not later than July 2005
- ↻ requirement to follow a “knowledge-based approach”
- ↻ *level of AQ must not give rise to significant negative impact on environment and health*



Thematic Strategy

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- **not really defined in 6th EAP, but something like a White Paper**
- **will set goals and priorities for action, and be accompanied/followed by legislative proposals as appropriate**



Stakeholder consultation

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- **WG on Implementation**
- **WG on Particulate Matter**
review of Position Paper on PM
final draft available
- **WG on target setting and policy advice**
- **CAFE Steering Group**



Progress so far (1)

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- **WHO Systematic Review of Health Effects** first results received: **spring 2003**
second round of questions: **spring 2004**
- **Contractor (IIASA) chosen to undertake baseline scenario and integrated assessment modelling (RAINS): work well under way**
- **JRC model intercomparison “City Delta” to improve knowledge of urban background levels**



Progress so far (2)

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- **EEA study looking at street canyons (SEC)**
trying to deal with the local level
- **Transport Emission Modelling (TREMOVE)**
highly detailed transport modelling
- **Cost-Benefit Analysis (CBA)**
impacts, cost, benefits of cleaner air
- **RAINS peer review**



Timetable 2003 Q4

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- **report on dose-response from WHO**
- **stakeholder consultations on baseline**
- **RAINS peer review to begin**
- **TREMOVE model design and preliminary baseline**
- **PM workshop, major stakeholder consultation**
- **Contracts launched on ex-post evaluation of policies and short-term measures + emerging techniques**



Timetable 2004 H1

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- **final reports from WHO on health effects of air pollution**
- **Position Paper on PM finalised**
- **baseline projections of emissions and air quality to 2020**
- **targets for emissions, air quality and effects to be used as basis for integrated assessment modelling**



Timetable 2004 H2

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- **First set of integrated assessment model runs (policy option scenarios)**
- **Integration of City Delta results into RAINS**
- **first report from RAINS peer review**
- **discussion of scenarios in WG TSPA and WG PM**
- **interim reports on ex-post evaluation**
- **final report on emerging techniques**



Timetable 2004 H2

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- **SG discussion on policy options scenarios**
- **Completion of TREMOVE model development**
- **CBA phase 1 final report**
- **RAINS review final report**
- **reports on ex-post evaluation and emerging techniques**



2005 H1

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- **Further work on CBA and REMOVE**
- **drafting of CAFE integrated policy advice**
- **drafting and adoption of Thematic Strategy**
 - **Deadline for Thematic Strategy:
22. July 2005**



Conclusion

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- **Modelling and technical work in CAFE well underway**
- **Discussions starting on policy options (measures and instruments)**



Use of models in ambient AQ legislation; FWD Art. 6

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- **AAQ shall be assessed throughout the territory of the Member States**
- **measurements may be supplemented by models**
- **combination of measurement and modelling allowed below the UAT**



Use of models in ambient AQ legislation; e.g. 1. DD I

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- **Art. 7 in combination with Annex VII specifies:**
 - **minimum number of sampling points if fixed measurement is the sole source of data on concentrations**
 - **can be reduced by supplementary assessment such as modelling**



Use of models in ambient AQ legislation; e.g. 1. DD II

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- **Data Quality Objectives; uncertainty requirements**

- **for measurement:**

gases	15 %
PM10	25 %
- **for models:** **30-60 %**
depending on averaging period



Use of models in ambient AQ legislation; e.g. 1. DD III

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- **Definition of uncertainty**

- **for measurement:**

- expanded uncertainty**

- according to “Guide to the Expression of Uncertainty of Measurements”**



Use of models in ambient AQ legislation; e.g. 1. DD IV

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- **Definition of uncertainty**

- **for models:**

“maximum deviation of the measured and calculated concentration levels, over the period considered by the limit value, without taking into account the timing of the events”



Improving provisions

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- **Study launched to**

- **provide information on the current use of models in the context of the first DD**
- **reviewing uncertainties**
- **laying down minimum requirements**
- **defining algorithm for the determination of model uncertainties**



Current use of models I

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- **Questionnaire: 20 responses out of 25 MS**
- **11 use models**
 - **9 for compliance checking**
 - **7 for plans & programmes**
- **large variety,**
no two countries use the same model



Current use of models II

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- **most commonly modelled: NO₂ and PM₁₀ (30 and 33 models)**
- **Two main approaches**
 - “nested” set of models at different scales
 - individual models, rely on appropriate background data



Review uncertainties I

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- **Information provided**

- **on input data:** < 50 %
- **on output** ≈ 75 %

- **input data**

- **emission** 10 - 30 %
- **meteorology** 10 - 25 %
- **PM₁₀** ≈ 50 %



Review uncertainties II

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- **Output data:**

- **hourly LV** > 50 %
range 30 - 95 %
- **daily LV** > 40 %
range 20 - 60 %
- **annual LV** \approx 30 %
range 10 - 60 %



Review uncertainties III

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- **General observation**

**uncertainties for PM_{10}
(input and output data)
significantly larger than for other
pollutants**

(no surprise...)



Minimum requirements I

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- ***component***
sufficient input data (meteorological data, emission inventories, background conc.)
PM: attempt to account for the whole mass, including secondary particulates
- ***applicability***
temporal and spatial scale must be appropriate for the location and limit value for which the model is applied



Minimum requirements II

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- ***validation***

each model application should be validated, documented and peer reviewed. Coding and calculations should be checked as the quality of the input data

- ***verification***

checks the uncertainty of the model output. Where possible each model application should be compared with independent measurement data



Conclusions I

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- **No general algorithm for determination of model uncertainty yet defined**
- **good overview on the use of models, “fairly good” insight in the uncertainties**
- **indication of deficiencies in a number of key areas**





Deficiencies I

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- **uncertainties of input data not known in many cases. If reported: thoroughly assessed or based on expert judgement?**
- **uncertainties of modelled output unknown in many cases.**
- **model validation widespread though missing in a few cases**



Deficiencies II

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- **secondary PM not included in about 30 % of the models**
- **sources of coarse particles and resuspension are missing from some models**
- **Nitrogen chemistry (NO_2/NO_x) not defined in about 20 % of cases**



Further needs

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- **Further improvement of provisions on the use of models**
- **General algorithm for the determination of model uncertainties**
- **Harmonisation of models used in the context of EU ambient AQ legislation**



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Thank you for your attention

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