TFIAM-FAIRMODE Workshop on local measures to improve air quality and health
Tallinn, 28-29 June 2018 – workshop report

1. On 28 June and 29 June the Task Force on Integrated Assessment Modelling (TFIAM) together with the Forum on Air Quality Modelling in Europe (FAIRMODE) organized a joint workshop to address the question what the most cost-effective measures are to reduce health risk from air pollution in cities. 36 participants from Belgium, Croatia, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, United Kingdom of Great Britain and Northern Ireland were present. Also experts from the Task Force on Measurement and Modelling, the Meteorological Synthesizing Centre-West, the Joint Research Centre of the European Commission, the European Environment Agency and CONCAWE participated.
2. The chair of the meeting, Mr. Rob Maas, opened the meeting and described as purpose of the workshop to exchange experiences in modelling of the effectiveness of local and regional policy measures to reduce health risks from air pollution in cities. He informed the participants about the recommendation of the Saltsjöbaden-6 workshop to form an expert panel on clean air in cities under the Task Force on Integrated Assessment Modelling. A kick-off meeting for this group will be organized in October 2018 in Brussels.

Multi-scale air quality modelling

3. Mr. Enrico Pisoni of the Joint Research Centre of the European Commission presented scenario results with the SHERPA-tool. In case countries would prioritize measures in urban areas when implementing national emission reduction obligations, more exposure reduction could be achieved. The most efficient scenario at the national level may not deliver the best results at the local scale.
4. Mr. Michael Gauss of the Norwegian Meteorological Institute presented progress in uEMEP (urban EMEP), on behalf of Mr. Bruce Denby and co-workers. uEMEP is a computationally efficient downscaling method based on the EMEP MSC-W model coupled with a Gaussian dispersion model. Output from the EMEP MSC-W model can be downscaled to 50 meters resolution, and local contributions/imported contributions to air pollution can be calculated for multiple species and emission sectors for each model grid cell. The tool will enter operational services for Norway on 1 November 2018, but can be applied also at other regions in Europe and the world, provided the necessary proxy data are available. uEMEP does not yet provide estimates for secondary components at this scale.
5. Mr. Rob Maas described the methodology used in GAINS to evaluate the contribution of long-range air pollution to urban concentrations, based on a presentation by Mr. Gregor Kiesewetter for the Task Force on Measurements and Modelling. The EMEP 28*28 km grid is downscaled with the 7*7 km CHIMERE model. Differences between observed and modelled concentrations at 1900 measurement stations were attributed to regional and local increments on the basis of a detailed analysis of measurements at twin stations. Further work on twin site analysis is ongoing under the Task Force on Measurement and Modelling.

Guidance for local air quality planning

6. Mrs. Evrim Ozturk (European Environment Agency) presented findings of the updated Air Implementation Pilot. Successful examples of measures to reduce emissions for traffic or domestic heating were identified in Madrid, Prague, Antwerp, Milano, Vienna, Berlin and Paris. A questionnaire identified legal issues, lack of funding, and lack of public support as the most relevant challenges for implementation of air policies. Better cooperation between local, regional, national and international authorities would be needed to overcome legal and financial issues. Better information to the public and engagement of citizens in air quality issues would be required to gain public support.

Practical experiences

7. Mr. Joost Wesseling (Netherlands) presented an assessment of measures to reduce the average exposure of the population in the various neighborhoods of the city of Utrecht. Several vehicle types, shipping, industry and domestic heating were distinguished. Air quality calculations were done at 250*250 meter grids for PM2.5, NO2 and elemental carbon (EC). About 50% of the NO2 and EC concentrations was caused by local sources, but for PM2.5 this is only 10%. Measures could affect several pollutants simultaneously. Reduction of car traffic and speed limits would also give co-benefits, such as reduction of traffic accidents and less noise. Replacing diesel cars by electric vehicles in the city would be more effective than banning the oldest diesel cars in a limited low-emission-zone.
8. Mr. Rob Maas (Netherlands) added estimates for the health benefits of these local measures. Even with a low relative risk factor for direct NO2-exposure, Utrecht would be able to gain more NO2-related health benefits than it could achieve with reducing local PM2.5-emissions. The health benefits of a low emission zone depended on the size of the zone. Assumptions on cut-off levels and the interrelation of NO2 and PM2.5 impacts remain uncertain. Sensitivity analysis was recommended.
9. Mrs. MariaLuisa Volta (Italy) presented results of a multidimensional model showing that active mobility (walking and cycling) would give significant direct health benefits for the participating commuters, even in polluted areas, and would indirectly contribute to the health of others due to less traffic emissions. It would also reduce the total costs of air pollution policy measures and give benefits due to fuel saving. The benefits of active mobility measures exceed its costs.
10. Mr. Fabio Monforti-Ferrario (Joint Research Centre of the European Commission) showed the positive air quality and health impacts of local energy saving measures, based on the analysis of energy saving measures contained in the action plans of 146 European cities participating in the Covenant of Mayors climate and energy initiative and using the SHERPA-tool. The analysis has shown that for the same climate benefit, energy saving measures involving traffic lead to higher PM2.5 and NO2 benefits than energy saving measures for buildings. All the about 2700 measures analyzed together would give a reduction of 18.242 Mton CO2-eq and save 68.476 life years. JRC is planning to analyze the health impacts of other measures included in the local plans, including measures aimed at increasing the use of biomass and biofuels in a next step.
11. Mr. Chris Boocock (AERIS-Europe) presented a comparison commissioned by CONCAWE, of the air quality impacts of strict implementation of Euro-6 standards and zero-emission vehicles. For PM2.5 the impacts are not much different, as non-exhaust emissions dominate. For NOx, with strict Euro-6 standards diesel car emissions would be reduced by around 80% (compared to almost 100% in an all-electric case). However for compliance with the NO2 air quality limit values the difference between the two approaches is small. Health impacts assessments are uncertain due to variability in personal exposure and the ongoing debate on the (independent) effects of long term NO2 exposure. These uncertainties are much greater than the uncertainties in air quality modelling and differences between scenarios.
12. Mr. Michel Vedrenne (United Kingdom) presented a streamlined pollution concentration mapping tool developed for the UK-Department for Environment, Food & Rural Affairs that enables a fast assessment of the improvement of local concentrations with national or local traffic emissions measures. This screening tool is publicly available its approach could also be used by other countries, if properly adapted.
13. Mr. Fernando Martín (Spain) presented the outcomes the EU-RESPIRA-project that looked at the effectiveness of measures, such as planting trees or hedges, application of photocatalytic paint or rearranging traffic flows. Modelling estimates show that the net health impacts of such measures are negligible except in the cases of the restricted traffic in a district with very low significant traffic divertion around such district. Experiments and simulations show that trees would increase concentrations under the canopy in streets with traffic due to reduction of ventilation. However, trees and hedgerows can efficiently separate pedestrians and cyclists from the air pollution due to traffic. Air quality strategies

should not be based on removing trees from streets. Reducing traffic in cities is more effective. Photocatalytic paint and pavements are not effective in reducing air pollution.

14. Mr. Andreas Eisold (Germany) gave an update on the development of the German National Air Pollution Control Programme. National measures are effective to reduce local PM2.5 concentrations, as a large part of these concentrations consist of secondary particles (resulting from agricultural ammonia emissions). National measures are not sufficient to comply with NO2-limit values at all local traffic stations. Reduction of ozone levels is depending on compliance with the NEC-directive in all member states and global reduction of precursor emissions. Conservative health impact estimates of reduced NO2 concentrations show that there is a positive effect.

Closing session

15. Mr. Rob Maas closed the session and informed the participants about an upcoming kick-off meeting in autumn to set up an expert panel on clean air in cities, with links to existing networks.