TASK FORCE ON INTEGRATED ASSESSMENT MODELLING (TFIAM)

43r[rd] session, 6 - 7 May 2014
Helsinki, Finland

Chairs report

I. INTRODUCTION

1. This report describes the results of the 43[rd] session of TFIAM, held from the 6[th] to the 7[th] of May 2014 in Helsinki, Finland. The presentations made during the meeting and the reports presented are available at: http://gains.iiasa.ac.at/index.php/tfiam/past-tfiam-meetings.

2. 36 experts attended, representing the following Parties to the Convention: Belarus, Belgium, Croatia (via web-cast), Denmark, Finland, France, Germany, Ireland, Italy, Norway, Portugal, Spain (via web-cast), Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland. Also the Co-operative Programme for monitoring and evaluation of the long-range transmissions of air pollutants in Europe (EMEP), the EMEP Centre for Integrated Assessment Modelling (CIAM), the European Environment Bureau (EEB), CONCAWE and the European Commission were represented.

3. Mr. R. Maas (Netherlands) and Mr. S. Åström (Sweden) chaired the meeting.

II. OBJECTIVES OF THE MEETING

4. The director-general of SYKE Mrs. Lea Kauppi welcomed the Task Force to Helsinki.

5. Mr. Maas opened the meeting, presented the latest developments within the CLRTAP, and defined the purpose of the 43[rd] TFIAM meeting, which were to learn about progress of international projects, to learn about national experiences, and to contribute to an effective role of integrated assessment modellers in policy formulation (WGSR, bilateral consultation, linkage with scientists in other groups).

6. The EU commission representative presented the Clean Air Policy Programme presented by the European Commission on the 18[th] of December 2013. This includes a proposal for a revised NEC directive, a proposal for a directive on controlling emissions from Medium sized Combustion Plants, and a proposal for ratifying the Gothenburg Protocol. The main policy objective of the proposal is to reduce health impacts from air pollution by half in 2030. The analysis showed that in 2030 there are substantial co-benefits between climate and air pollution policy. A reduction of EU

greenhouse gas emissions by 40% would reduce air pollution control costs from €3.3 billion to €2.5 billion annually.

7. After adoption of the proposal by the commission, the council is now analysing the proposal for the NEC directive. Bilateral meetings with experts from EU member states on input data of the GAINS model are ongoing. Clarifications on specific topics (marine offsets) are being produced. In June, the Council will have an orientation debate on the NEC. The Parliament work will start after the new Parliament is in office. There is already a rapporteur nominated. Supplementary analysis might be needed via the parliament Impact Assessment service.

8. In parallel, other policy initiatives are being pursued: the Ecodesign implementing acts; the non-road mobile machinery directive revision (including inland shipping), and the implementation of the Euro 6. For the 2030 C&E framework there has been a council conclusion on the 20-21st of March. Now member states implications are analysed. A final decision on the C&E framework is expected by October 2014.

III. RECENT POLICY ANALYSIS

9. CIAM presented an overview of the GAINS scenarios produced for the European Commission. The target of the scenarios was to reduce health effects of air pollution, based on a comprehensive source allocation of population exposure to particulate matter (PM).

10. For the AIRBASE monitoring stations, the GAINS model enables apportionment of observed $PM_{2.5}$ concentrations to natural sources, transboundary contributions, sources within the same city, and from within the street canyon. In addition, the various economic sectors that contribute to these categories can be quantified.

11. This allocation, which provides the basis for the subsequent cost-effectiveness analysis, differs greatly over Europe, depending on emissions in neighbouring countries and topographic conditions.

12. The ambition level of the original proposal by DG Environment was based on the equilibrium between marginal costs and monetized marginal health benefits of emission abatement. The final Commission proposal deviated from this theoretically optimum point, in order to consider additional aspects.

13. At the EU-level, a number of key measures would achieve a large part of the proposed reduction (on top of baseline).

- Industry and heating plants.
    i. The new Medium sized Combustion Plants directive

ii. Reducing emissions from some industrial sources to the lower range provided in the 'Best Available Techniques' Reference documents (BREF)

iii. Anaerobic digestion of industrial food waste (CH_4)

- Households
  i. The new Ecodesign directive (pellets for new boilers in single family houses)
- Non Road Mobile Machinery
  i. Stage V for inland waterways (SCR) and construction machinery
- Agriculture (measures mainly affects large farms (>300 animals)
  i. Improved storage of manure + anaerobic digestion at large farms
  ii. Improved application of manure on soil on large farms (NH_3)
  iii. Improved application of urea fertilizer or substitution by ammonium nitrate

A new report on agricultural measures will soon be delivered by IIASA.

14. Total costs of the suggested air pollution controls range between 2.5 and 3.3 billion Euro/yr, depending on the future climate policy. Cost savings from the proposed CH_4 measures would balance (part of) these costs, so that net costs range between 0.9 billion Euro/yr and savings of 1.5 billion Euro/yr.

15. The analysis clearly demonstrates that effective solutions to the PM problem in Europe require international cooperation, due to the strong transboundary transport of particulate matter and its precursor emissions.

IV. DEVELOPMENTS IN MODELLING

16. TFIAM noted with interest the CONCAWE efforts to develop the assessment tool SMARTER. SMARTER uses the GAINS model cost curves and economic values on environmental and health impacts and enables a fast sensitivity analysis e.g. for different ambition levels, the inclusion of climate impacts in the optimization, or different weights for the toxicity of PM-components.

17. TFIAM noted the tool developed by EGTEI to quantify the implications of emission limit values specified in national legislation on total national emissions and to import them into the GAINS database, especially for EECCA countries. The tool highlights that implementing the technical annexes of the revised Gothenburg Protocol would significantly reduce emissions in EECCA countries.

18. TFIAM noted the developments of the FAIRMODE project. The project aims at harmonizing and promoting the use of models in support of national air pollution policy development. One striking finding is that currently air quality models used for national policy support often are not validated against measurements.

19. JRC presented recent developments of the APPRAISAL project. APPRAISAL has amongst other things identified that analysis of source appointment of emissions was important for local air quality management. Also, in local policy making, the air quality models used are often poorly validated against measurements.

20. Some of the final conclusions from the recently ended LIAISE project were that knowledge for policy support was often under-utilized. This is partly due to a lack of understanding of experts for the needs of policy makers and insufficient involvement of experts in the final stages of policy making. CLRTAP is seen as a positive example, where trust building between scientists and policy makers was characteristic.

21. TFIAM took note of the work in SEFIRA, which aims at integrating social sciences in integrated assessment of air quality policy. In SEFIRA, discrete choice experiments are used to identify key aspects determining the policy acceptability and probability for behavioural change, highlighting also the relevance of socio-economic differences. The challenge addressed by the project is to use the policy acceptability weights in the GAINS optimization process in order to rank air quality measures on the basis of acceptability criteria.

22. EMEP-MSC-w estimated the potential for further reductions of ambient $PM_{2.5}$ concentrations through further reduction of ammonia emissions. It was found that additional efforts on NH_3 beyond the Gothenburg obligations would lead to significant further reductions of PM concentrations and subsequently health impacts, although their impact varies over Europe. The cost-effectiveness of ammonia emission reductions for reducing PM-exposure however would also differ between regions.

23. Mr. Maas presented the current developments within ICP Vegetation. The TFIAM requested ICP Vegetation to further assess the response of ozone fluxes towards further emission reductions in Europe and compare them with declines in hemispheric background ozone.

V. BENEFITS

24. TFIAM noted recent developments on valuing the damage to Ecosystem Services within the ECLAIRE project, as presented by Rob Maas. Preliminary results for the EU as a whole suggest that monetised ozone impacts on ecosystem services can be substantial compared to monetized ozone impacts to health, crops and materials. For nitrogen, the ecosystem services approach, by focussing on the positive (short-term) impacts on forest growth and carbon sequestration, will capture negative impacts of

excess nitrogen (e.g., on biodiversity) only to a limited extent. Different options have been explored to quantify the (stated or revealed) willingness to pay for biodiversity protection. Preliminary outcomes show a substantial lower willingness to pay for nature than for health protection.

25. Mr. Holland presented country specific results of the ECLAIRE work with country specific results. Ozone leads to high damage to forest growth in central Europe and even in Scandinavia. For extrapolating the findings from a UK-study on the willingness to pay for biodiversity improvement to the European scale additional assumptions have to be made on the income-dependency of the values and the impact of the relative abundance of the available nature in a country. The sensitivity for alternative assumptions has to be assessed.

26. The latest updates on health benefits of reduced emission levels have been minor in terms of impact on the cost-benefit analysis performed on EU air pollution policy. Additions suggested in the HRAPIE study included impacts on bronchitis in children. But most significantly in HRAPIE is the effect on mortality and morbidity from exposure to NO_2-concentration, which is not included in the current update of health impact calculations performed for the commission, inter alia because of the risk of double counting with the impacts of PM.

27. TFIAM noted the CIAM analysis on sustainable long-term levels of emissions. CIAM explored the lowest level of emissions that could result from the maximum control efforts of measures that are currently considered in GAINS, including a stringent GHG reduction, healthy diets, ongoing concentration processes in the agricultural sector, and full application of all currently available emission control techniques. It was found that, in general, residual health and ecosystems impacts of these emission levels, computed with the current GAINS parameterization, are below the confidence range of current impact assessment methodologies, especially when limitations from current model resolution are considered. Neither current policy trends, nor the emission levels of revised Gothenburg Protocol, will be sufficient to meet these emission levels.

VI. NATIONAL EXPERIENCES IN INTEGRATED ASSESSMENT MODELLING AND COMPARISONS WITH GAINS

28. TFIAM took note of the work with Integrated Assessment Modelling in Belarus, and the current focus on supporting modelling with emission trend analysis. National data is now available for an update of CIAM estimates on use of emission control in the transport sector of Belarus. The share of vehicles with recent Euro-standards will be higher than currently assumed in GAINS. Cost effective measures have been identified that would enable Belarus to achieve its ambition level in the revised Gothenburg Protocol.

29. Spain has recently developed the Iberian integrated assessment model AERIS. The Spanish expert presented the features of the model and cross model comparisons

of environmental and health impacts calculated. One feature of the model is that it includes ecosystem damages for five types of forests and nine different crops.

30. In Finland much of the current work on integrated assessment modelling is focussed on Black Carbon. This has resulted in a voluntary submission of a black carbon emission inventory to CEIP in February 2014. It is expected that the Arctic Council will recommend to start reporting emissions of black carbon and to define actions. A number of important reference reports have been produced for different international bodies clarifying the current state of knowledge.

31. The Norwegian Environment Agency has proposed an action plan for Norwegian emissions of short-lived climate forcers: http://www.miljodirektoratet.no/no/Publikasjoner/2014/Mars-20141/Summary-of-proposed-action-plan-for-Norwegian-emissions-of-shortlived-climate-forcers/

32. The expert from Portugal presented the method used in Portugal for developing the latest air pollution emission projection. The baseline shows higher NMVOC and $PM_{2.5}$ emissions than in the GAINS baseline. Differences are mainly caused by differences in the vehicle fleet composition in the base year, the application of Nitrogen fertilizer, domestic biomass burning, and the inclusion of the Azores and Madeira in the PRIMES/GAINS-data.

33. The Swedish expert gave an overview of the current integrated assessment modelling activities in Sweden, which is currently focussed on policy support and research on synergies and conflicts between air pollution and climate change. Experiences from the bilateral consultation with IIASA showed that the main discrepancies found were the NMVOC and NO_x emissions in 2005 from the transport sector.

34. In the Netherlands, the NEC directive proposal is being reviewed in a process to inform the parliament. In comparison, the major differences with the EU NEC Directive proposal are in road transport (more diesel in GAINS, more kilometres driven with old cars in 2005) and inland shipping (increased energy intensity not taken into account). According to the Dutch assessment NO_x abatement would be much more costly and the VOC-emission reduction target is technically infeasible.

35. Integrated assessment modelling in the UK is being expanded to cover ozone and black carbon, and to encompass cost-benefit analysis. Developments include improvement of urban modelling to reflect traffic characteristics in relation to limit values, and more detailed work on $PM_{2.5}$ source apportionment including new estimates of secondary organic aerosol. Particular attention is being paid to uncertainties and robustness for policy application. Comparison of national assessments with EC proposed scenarios modelled by GAINS raises issues of achievement of emission standards for Euro 6 and beyond, and demonstrates advantages of more detailed national analysis of ecosystem protection in indicating benefits for designated sites. Investigation of revised health benefits from HRAPIE needs to be followed up, including direct effects of NO_2.

36. France presented approaches to scenario development with GAINS-France and ongoing analyses for the revision of the NEC Directive, as well as examples of results. Analyses involve comparison of GAINS-EU scenarios with national projections and with GAINS-FR scenarios. As first results, they show that in the NEC scenarios for France (Baseline and Commission Proposal) certain activities are missing, and that historic emission levels for several pollutants, as well as NO_x transport emissions for the whole period (2005-2030), are below those of the national projections. Also, the cost-effectiveness of GAINS mitigation measures for fertilizers needs verification. A health impact assessment for France confirms benefits from international cooperation in air pollution policy making.

37. CIAM presented that one of the major challenges in aligning data in GAINS with national emission inventories for 2005 is that the national submissions have had the tendency to significantly change over time dependent on the year of submission. The current bilateral consultation will be finalised by the end of May 2014. The findings from these consultations will be reported to the European Commission in June 2014. If commission finds it important, further sensitivity analysis might follow.

VII. FURTHER WORK

38. TFIAM WORK PLAN

- Update the GAINS model with new information on emissions, emerging technologies, health & ecosystem impacts, ozone fluxes. Downscale ammonia deposition to protected areas; report results.
- Interact with Parties (meetings, consultations, workshops) on input data to the GAINS model.
- Analyse implications of EU policy proposals on air quality in the ECE region.
- Analyse effectiveness of hemispheric control strategies. Joint workshop on linking geographical scales.
- Increase scientific cooperation on linkages with global-scale scenarios and issues, including climate and nitrogen.
- Increase linkages with local-scale air pollution and cost-effective local measures, including co-benefits (congestion, healthy lifestyles, and reduced heat stress).
- Provide support to Parties, in particular countries in Eastern Europe, the Caucasus and Central Asia.
- Communicate and disseminate scientific developments, model and methodology improvements, data and products through the Task Force on Integrated Assessment Modelling website.
- Exchange information on national and international integrated assessment activities at annual Task Force meetings.

39. Most work plan elements are on schedule. Capacity building for EECCA countries would require special capacity building sessions during the next meetings of the Task Force.

40. TFHTAP and TFIAM will organize a workshop/webinar on Global Scale Assessments on 13-15 October 2014 in Laxenburg, Austria.

The 44th session of the Task Force will be mid May 2015 in Edinburgh.

VII. ANY OTHER BUSINESS

41. The TFIAM discussed the format and issues to be covered in the CLRTAP Scientific Assessment Report.

    a. Several experts stressed that the target group should be beyond the Executive Body of the CLRTAP.

    b. More emphasis should be on remaining challenges and in what way the CLRTAP convention and its research network can play a role in the future.

    c. More emphasis should be on what is needed to reach the long term objectives of the CLRTAP.

    d. Co-benefits of achieving the long term objectives of the CLRTAP should be highlighted.

    e. The report should not be a self-congratulating document.

    f. Analysis of where Europe would have been without air pollution policy could be interesting, as well as showing the economic effects. More attention is needed to future implementation of air pollution policies in EECCA countries.

    g. The assessment report should be complemented by policy briefs highlighting the potentials for using international air pollution policy to achieve policy targets. Examples on country level decisions could be used as examples. The assessment report could be complemented with country fact sheets.

    h. Shipping NO_x emissions are continuing to increase. This should also be covered in the assessment report.

    i. The chair invites the TFIAM experts to contribute to the report.