TASK FORCE ON INTEGRATED ASSESSMENT MODELLING (TFIAM)

42nd session, 22 - 23 April 2013
Copenhagen, Denmark

Draft Chairs report

I. INTRODUCTION

1. This report describes the results of the 42nd session of TFIAM, held from the 22nd to the 23rd of April 2013 in Copenhagen, Denmark. The presentations made during the meeting and the reports presented are available at:
http://www.iiasa.ac.at/web/home/research/researchPrograms/MitigationofAirPollutionandGreenhousegases/Integrated-Assessment.en.html

2. 43 experts attended, representing the following Parties to the Convention: Belarus, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Norway, Russian Federation, Spain, Sweden, Switzerland, Ukraine, United Kingdom of Great Britain and Northern Ireland. Also the Network of Experts on Benefits and Economic Instruments (NEBEI), 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 ICP Vegetation, the European Environment Bureau (EEB), and CONCAWE were represented. Representatives from WHO and EC-JRC participated via internet connection.

3. Mr. R. Maas (Netherlands) and Ms. A. Engleryd (Sweden) chaired the meeting.

II. OBJECTIVES OF THE MEETING

4. The local organiser Mr. S. Gyldenkaerne welcomed the Task Force to Copenhagen and Århus University.

5. Mr. Maas opened the meeting, presented the latest development of CLRTAP, and defined the purpose of the 42nd TFIAM meeting, which were to review recent changes in the GAINS-model and results of scenario analyses as well as the exchange national and international experiences with Integrated Assessment Modelling. Further information is available on:

http://www.unece.org/env/lrtap/welcome.html

http://www.unece.org/index.php?id=28153

III. RECENT DEVELOPMENTS OF THE GAINS MODEL

6. CIAM presented an overview of the recent changes in the GAINS model and specific aspects of these changes:

i. New source-receptor matrices (28km); VOC emissions contribute to PM2.5 concentrations (secondary organic aerosols)

ii. New Critical Loads

iii. New downscaling to 7km. This scale allows for capturing population exposure in cities. Measurements from AIRBASE stations are used to downscale exposure further and evaluate compliance with air quality limit values.

iv. Emissions of Black Carbon, Particle Numbers and Mercury

Further information on changes in GAINS is available at:
http://www.iiasa.ac.at/web/home/research/researchPrograms/MitigationofAirPollutionandGreenhousegases/Overview.en.html

7. Bilateral consultations with 15 EU member states had improved emission inventories and support for scenarios made with the GAINS model.

8. **Parties who have not yet submitted updated national projections to CIAM are encouraged to do so, in order to further improve the assessments. Parties are requested to deliver national projections up to 2030.**

9. The modelling of health impacts of long term exposure to PM2.5 had been updated on the basis of a European meta-analysis. No threshold had been assumed. Health impacts of short term exposure to ozone levels above 35 ppb had also been updated. In the future specific NO2-related health effects might be included.

10. For the new TSAP 2013 baseline emission scenario the following assumptions have been made on the basis of the latest PRIMES 2012 reference scenario:

- Strong economic growth to 2030, but in 2030 GDP will be still 7.5% lower than in the PRIMES 2010 scenario
- Implementation of EU energy, transport and climate policies

  Important are the assumed full implementation of the policy objectives for renewable fuels in transports and the rapid turnover of the capital stock in order to meet energy efficiency targets
- Fast penetration of Euro-6 vehicles and full effectiveness of the Euro-6 standards.

11. In general, 2030 fuel consumption for EU-28 is lower in PRIMES 2012 than in PRIMES 2010. Also livestock numbers in 2030 for EU-28 are lower in the 2012 assessment than in the 2010 (developed by the CAPRI model).

12. All in all, the TSAP 2013 contains - compared to the TSAP 2012baseline - similar emission reductions of SO2 (-70 % compared to 2005) and similar reductions of NOx emissions (-60 % compared to 2005). VOC emissions are lower in TSAP 2013 (-40%), due to more diesel engines in light duty vehicles. PM2.5 emissions are higher in TSAP baseline 2013, due to increased wood burning.

13. For environmental and health impacts, TSAP 2013 is slightly less optimistic than TSAP 2012, mainly due to the higher PM2.5 emissions, which offsets lower VOC and NOx emissions. PM2.5-related health risks are in 2030 higher than the TSAP targets. For ozone, the health effect targets set in TSAP will be met, a 25 % decline in premature deaths up to 2025, but there will still be 18 000 cases in the EU-28. Eutrophication damages, including damages on Natura 2000 areas, show that in 2025 62% of the Natura2000 areas and 420 000 km2 ecosystem areas are under threat of eutrophication, out of which 95 000 km2 can be saved with additional measures. In 2005, the corresponding area was 77 % of Natura2000 areas and 1 100 000 km2 ecosystem areas. The TSAP target will not be reached by 2020.

14. CIAM presented recent changes in modelling local concentrations of NO2 and PM in order to assess future compliance with air quality limit values. The analysis showed the importance of successful introduction of the new Euro 6 standards (starting in 2018) for compliance with NO2 air quality limit values. A Euro 6 failure would require a reduction in local traffic emissions with up to 50% to comply with the limit values.

15. In the TSAP 2013 baseline scenario, there is an increase in compliance with NO2 limit values in the EU-28. In 2010, less than 70 % of the 500 air quality management zones were likely to be in compliance. In 2030 more than 90% of the zones are projected to likely be in compliance. For PM10, improvement is projected up until 2020, but then levels off. Policies aiming at achieving PM10 AQ limit values need to pay more attention to solid fuel burning in the domestic sector e.g. in Poland, Slovak Republic, and Bulgaria.

16. **Parties are requested to develop and report to EMEP their fine scale emission data at 0.1*0.1 degree or less for use in the GAINS model.**

17. Long term scenario calculations emphasise that climate policies provide co-benefits for SO2 and NOx, but not for other pollutants. Current climate measures have much less impact on PM2.5-emissions than end-of-pipe control. NH3-emissions are not influenced by climate policy.

18. All in all, due to existing legislation and co-benefits of climate policy, emissions decline until 2030, but then the decline flattens out. Further policies targeted at air pollution would be needed after 2030.

19. **The Task Force took note of the GAINS-scenario analyses and stressed the need for further analysis of key uncertainties: the assumptions on the rapid turnover of capital stocks and the enforcement of Euro-6 emission standards for vehicles.**

20. The WHO representative presented via skype the latest conclusions from the WHO on air pollution impacts on human health. TFIAM noted that as no threshold can be identified for the health impacts of PM2.5. Health benefits would result from any reduction of concentrations, both when concentrations are above or below the air quality limit value. This is important for defining cost-effective strategies to reduce health risks.

21. TFIAM took note of the summary by the co-chair of TFHTAP of the workshop organised by TFHTAP and TFIAM in October 2012 in Laxenburg on harmonizing long term global emission scenarios for both air pollution and climate change. It was stressed that air pollution emissions will not simply be reduced as a consequence of economic development, but that explicit policy measures targeted at air pollution are needed.

22. The representative of the ICP vegetation showed that the ozone situation will improve between 2005 and 2030 according the analysed ozone scenario, which implies on average a 6 % decrease in surface maximum ozone concentration for Europe. CIAM has prepared the GAINS model for including the ozone flux approach, awaiting advice on the thresholds that should be considered in IAM.

IV. RECENT POLICY APPLICATIONS OF THE GAINS MODEL

23. CIAM presented recent policy applications with the new methodology GAINS model. Air pollution policy scenarios were explored where different ambition levels were analysed with respect to human health and environmental impacts as well as economic costs.

24. A scenario was derived where marginal costs would equal marginal benefits for PM-related mortality impacts. This would lead to additional expenditure on emission abatement of 0.04 % of EU-28 GDP (compared with current legislation) and provide health benefits corresponding to a 75% closure of the gap between current legislation and maximum feasible reduction, or a 50 % reduction of the years of life lost experienced in Europe in 2005. If the labour productivity improvement due to reduced absence from work would be included in the economic analysis, the macro-economic effects would be neutral.

25. The latest applications of the GAINS model are available at: http://www.iiasa.ac.at/web/home/research/researchPrograms/MitigationofAirPollutionandGreenhousegases/TSAP-review.en.html

26. NEBEI presented the cost benefit analysis of the EU commission ambition scenarios. Monetised economic benefits of air pollution abatement were used for human health, crop damages and damages to materials. The health impact assessment has been revised in line with the conclusions of the REVIHAAP/HRAPIE projects led by WHO-Europe for the European Commission. The most significant change so far concerns assessment of chronic exposure to ozone on mortality, an effect not previously considered. Damage to ecosystems could not be included yet but work continues in this area. A national damage assessment model (ALPHA-Riskpoll France) has been developed and similar work is planned for the UK. An accounting framework has been developed in the UK for thorough assessment of the externalities (co-benefits and trade-offs) of climate policies.

V. OTHER WORK RELATED TO GAINS

27. The chair presented the current level of knowledge regarding ecosystem effects from air pollution emissions. High nitrogen depositions play a key role in the loss of biodiversity in Natura2000 areas. One of the key messages from the ICP vegetation and the CCE is that in order to halt the loss of biodiversity restoration measures are needed awaiting further ammonia emission reduction measures. The protection of Natura2000 areas requires a balancing of actions on local, regional and EU level.

28. TFIAM noted the work needed for the assessment reports accompanying the revised Gothenburg protocol. A guidance document with quantified impacts for selected indicators for environmental and human health improvements envisaged for 2020 is being developed in cooperation with the Working Group on Effects. A draft will be presented in September 2013. A draft background document including the activity and emission projections used for the preparation of the revision of the Gothenburg Protocol will circulate among TFIAM-experts after the summer. This document is relevant for comparisons with actual outcomes in the future.

29. CIAM presented an innovative integrated assessment study for India with a wider economic, environmental and social context. The analysis showed that large investments in air pollution emission abatement (ranging from 0.15 to 0.5 % of GDP) contributed to health effects that would both increase human well being (measured by the Human Development Index) and national net savings that would stimulate economic growth. The net effect is an additional increase GDP with some 0.6 % (percentage points) by 2030, although per capita GDP would be 0.2% (percentage points) lower due to a larger population.

30. The Irish representative presented the key messages from the Air Science Policy Forum arranged in Dublin on 15th April 2013. The forum discussed 10 main areas of importance for air pollution abatement in the EU and its member states. Presentations are available on: http://www.epa.ie/newsandevents/events/airsciencepolicyforum.html

VI. EUROPEAN MODELLING EXPERIENCES

31. An expert from the UK presented findings form the LIAISE network. TFIAM noted the importance of effective communication between scientists and policy makers.

32. The French expert presented an INERIS-co-coordinated European scale air quality and health impact assessment taking into account long term European and global air pollution and climate change policies. The results showed that up to 2050 there will be co-benefits for air pollution and associated health impacts from a climate policy aimed at limiting temperature increase, but that air pollution mitigation policies were also a strong driver in the improvement of air quality.

33. TFIAM took note of the results from the CITEPA Annual conference on Black Carbon held on the 21st of March 2013. Reductions in population exposure to black carbon with measures to control tailpipe emissions might be undermined by increases in residential wood burning. The presentations from the conference are available at: http://download-citepa.tropicalex.net/yzw_jouet2013.

VII. NATIONAL MODELLING EXPERIENCES

34. The assessment of impacts of the latest Finnish Climate strategy showed that residential wood combustion is likely to become more and more important as a source of black Carbon emissions in the future.

35. Integrated Assessment modelling in the UK showed the potential impacts on air quality of climate and energy measures across different sectors up to 2030. Measures could have a substantial effect, but could also lead to more damage. E..g careful consideration is needed for measures that increase residential wood burning or the use of combined heat and power in densely populated areas.

36. Integrated Assessment Modelling in Belarus showed that additional policy measures will be needed if Belarus is to meet the NOx-commitments in the revised Gothenburg Protocol.

37. Integrated Assessment Modelling in Russia showed the challenges to meet the potential emission reduction obligations in the light of the projected increase in the use of coal in power generation.

VII. WORK PLAN

38. The proposed work plan for CIAM was adopted provided that sufficient means could be made available.

39. TFIAM will organise a workshop on the valuation of ecosystem services back to back with the ECLAIRE meeting in Zagreb, Croatia on the 24th – 25th October 2013.

40. The 43rd session of the TFIAM is planned for May 2014.