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Executive Body for the Convention on Long-range
Transboundary Air Pollution

**Steering Body to the Cooperative Programme for
Monitoring and Evaluation of the Long-range
Transmission of Air Pollutants in Europe**

Working Group on Effects

Fourth joint session

Geneva, 10-14 September 2018

Item 13 (a) of the provisional agenda

**Progress in activities of the Cooperative Programme for
Monitoring and Evaluation of the Long-range Transmission
of Air Pollutants in Europe in 2018 and future work:
integrated assessment modelling**

Integrated assessment modelling

Report by the Co-Chairs of the Task Force on Integrated Assessment Modelling

Summary

The present report describes the results of the forty-seventh meeting of the Task Force on Integrated Assessment Modelling under the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (Brescia, Italy, 8-9 May 2018). It includes the main findings from the meeting and recommendations for future work.

During the reporting period, the Task Force carried out the activities assigned to it in the 2018-2019 workplan for implementation of the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/140/Add.1, items 1.1.3.2-3, 1.1.4.3 and 2.3.9-10) and those set out in the informal document submitted to the Executive Body for the Convention at its thirty-seventh session, “Draft revised mandates for scientific task forces and centres under the Convention”. In accordance with the workplan, the Task Force is requested to present an annual report on its work to the EMEP Steering Body. The present

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report details the progress made by the Task Force since its previous report and provides an overview of upcoming activities through 2018.

I. Introduction

1. The present report describes the results of the forty-seventh meeting of the Task Force on Integrated Assessment Modelling under the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP), held in Brescia, Italy on 8 and 9 May 2018. It includes the main findings of the meeting and recommendations for the involvement of global and local networks in developing future air quality policies. The full report on the meeting and its presentations is available online.¹
2. The meeting was attended by 25 experts representing the following Parties to the Convention: Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Norway, Portugal, Sweden and the United Kingdom of Great Britain and Northern Ireland. Other bodies represented included AirClim, the EMEP Centre for Integrated Assessment Modelling (CIAM), the European Environment Bureau, the European Urban Partnership for Air Quality and the Oil Companies' European Association for Environment, Health and Safety in Refining and Distribution (CONCAWE).
3. Mr. Rob Maas (Netherlands) and Mr. Stefan Åström (Sweden) chaired the meeting.
4. Professor Marina Pizzi of Brescia University welcomed the Task Force and opened the meeting. Professor Rodolfo Faglia gave an overview of the University's Engineering School.

II. News from other bodies

5. Mr. Maas and Mr. Åström summarized the latest developments under the Convention and in other air pollution policy forums, the recommendations of the Saltsjöbaden VI workshop² and the purposes of the forty-seventh Task Force meeting.
6. The conclusions of the ad hoc policy response group on the 2016 scientific assessment of the Convention³ were accepted by the Executive Body in December 2017 and the group has begun the updating of the Long-term Strategy for the Convention. Furthermore, the participants in the meeting of the Bureaux of the EMEP Steering Body and the Working Group on Effects (Madrid, 19-21 February 2018) stressed the importance of continuing work on modelling urban scale pollution, increasing the knowledge base on the impact of air pollution on human health and identifying global and regional sectoral solutions. Future meetings will discuss the way forward on the Saltsjöbaden VI

¹ See http://www.iiasa.ac.at/web/home/research/researchPrograms/air/policy/past_meetings.html.

² See <http://saltsjobaden6.ivl.se/>.

³ See Rob Maas and Peringe Grennfelt, eds., *Towards Cleaner Air: Scientific Assessment Report 2016* (Oslo, 2016) and United States Environmental Protection Agency and Environment and Climate Change Canada, *Towards Cleaner Air: Scientific Assessment Report 2016 – North America* (online report, 2016).

recommendations, review the 2018-2019 workplan and discuss proposals for updating the Strategy in the hope that a decision can be taken by December 2018.

7. In the European Union, countries are following up on the recently amended National Emission Ceilings (NEC) Directive⁴ and national air quality plans are expected to be presented in 2019.

8. The Saltsjöbaden VI workshop, which was attended by some 180 participants from 35 countries and 20 international organizations, made eight main recommendations for action by air pollution scientists and policymakers:

(a) The Coordinating group on promotion of actions towards implementation of the Convention on Long-Range Transboundary Air Pollution (CLRTAP) in Eastern Europe, Caucasus and Central Asia (EECCA Coordinating Group) should explore possibilities for step-wise ratification of, among other things, the amended Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol).

(b) The Task Force should set up an expert panel to support local air policy development.

(c) Various Convention bodies should initiate efforts to harmonize global air pollution monitoring networks.

(d) The Executive Body should establish a global air pollution policy dialogue.

(e) The Working Group on Effects and other stakeholders should set up an expert group to coordinate monitoring of the impact of human activities on ecosystems.

(f) The establishment of maritime emission control areas in all seas should be encouraged and schemes for reducing emissions from existing ships should be developed.

(g) The Task Force on Techno-economic Issues (TFTEI) and other stakeholders should ensure that emissions and the health impacts of solid fuel burning are better addressed.

(h) The Task Force on Reactive Nitrogen (TFRN) and other stakeholders should develop criteria to link agricultural subsidies to emission reduction obligations.

9. Some of these recommendations, including the establishment of an expert panel, were particularly relevant to the Task Force's work. Participants also stated that local air pollution policies should be supported by national and international policies for ensuring efficiency and that continued efforts to identify cost-efficient policies leading to trade-offs and/or co-benefits in other environmental policy areas were needed. The importance of ozone flux modelling of air pollution for the quality and quantity of crop production might also be linked to integrated assessment modelling.

III. Objectives of the meeting

10. The 2018-2019 mandate of the Task Force is to guide and review the further development and application of integrated assessment models, facilitate the exchange of

⁴ Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC, 2016 O.J. (L 344), pp. 1-31.

experience among national integrated assessment modellers, produce the deliverables defined in the 2018-2019 workplan and suggest items for inclusion in the Long-Term Strategy of the Convention with a view to future support for the latter's objectives.

11. The Task Force requested the EMEP Steering Body to update the Task Force's mandate to include work on multi-scale, multi-objective integrated assessment modelling aimed at cost-effective policy strategies that combine international, national and local actions and include links between air quality policy and other policy processes, such as implementation of the United Nations Sustainable Development Goals.

12. Accordingly, the purposes of the meeting were to:

- (a) Assess the status of models
- (b) Assess the available scenarios
- (c) Learn from national, regional and sectoral analyses
- (d) Propose items for inclusion in the 2018-2019 workplan
- (e) Propose items for inclusion in the Long-term Strategy of the Convention.

IV. Updates on European scientific assessments

13. The Task Force took note of the CIAM presentation on the latest International Institute for Applied Systems Analysis research for the European Commission. It was confirmed that several (~10-25 per cent) European Union countries had changed their base year emission reporting by $>\pm 10$ per cent for the years 2005 and 2010 and that a few others by +200 per cent and -40 per cent, particularly for fine particulate matter (PM_{2.5}).

14. In light of recent policy developments (eco-design, non-road mobile machinery, transport and the European Union Climate and Energy framework), new reference and climate policy scenarios have been calculated. The outcome of the review shows that while little extra effort is needed from European Union countries in order to reach the NEC Directive targets for sulphur dioxide and nitrogen oxides (NO_x), many countries will require a far greater effort to reach the ammonia targets. Many countries will reach the PM_{2.5} targets by meeting the requirements set out in the Ecodesign Directive⁵ and through other co-control policies (such as reducing forest fires). The results also show that ambient air quality will be reduced to below the World Health Organization (WHO) guidelines for PM_{2.5} for ~90 per cent of the European Union population by 2030 with a similarly positive outlook for nitrogen dioxide. The annual cost of dedicated NEC Directive emission reduction is estimated at €1.05 – 1.9 per person.

15. On the other hand, the NEC Directive's targets fall below the biodiversity improvement levels envisaged in the European Commission's proposals of December 2013. Even if all of the proposed technical measures are implemented, depositions will exceed critical loads in about half of the European Union's Natura 2000 protected areas.

⁵ Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (of relevance to the European Environment Agency).

16. The Task Force took note of the presentation by the Joint Research Centre of the European Commission on the work of the European Union Forum for Air Quality Modelling in Europe (FAIRMODE). FAIRMODE is developing modelling tools to support implementation of the European Commission's Air Quality Directive with a focus on the spatial representativeness of measurements and modelling, composite mapping of air pollution and source appointment techniques. FAIRMODE recommendations for policymakers and scientists are under preparation.

17. The Task Force acknowledged the EMRC Corporation's update on benefit assessments,⁶ which showed that despite new knowledge regarding the health impacts of nitrogen dioxide exposure, there are still uncertainties that require attention.

18. New studies on the morbidity effects of air pollution have increased the damage cost estimates for asthma, chronic obstructive pulmonary disease, coronary heart disease, stroke, diabetes, lung cancer, low birth weight and dementia, as well as for work days lost owing to air pollution (productivity).

V. Discussion on the Task Force workplan items

A. Greenhouse Gas and Air Pollution Interactions and Synergies (GAINS) updates on model control costs and the costs of inaction

19. The Co-Chair of the TFTEI presented that Task Force's updated workplan for 2018-2019. TFTEI is planning to expand its work by establishing a clearing house for control technologies. For two workplan items, suggested by the ad hoc policy review group and adopted by the Working Group on Strategies and Review, TFTEI proposes to cooperate with the Task Force on Integrated Assessment Modelling and with CIAM if feasible in order to (i) analyse the costs of air pollution policy inaction and (ii) undertake a review of the control costs of air pollution in GAINS.

20. EMRC Corporation presented its experience in identifying the costs of inaction, drawing attention to the Organisation for Economic Co-operation and Development's Costs of Inaction and Resource scarcity: Consequences for Long-term Economic growth (CIRCLE) project.

21. Concerning opportunities to study the costs of inaction under the 2018-2019 workplan, the Task Force agreed that the request from the Working Group on Strategies and Review needed to be clarified by establishing a baseline (no policy or the current policy). Previous CIAM studies showing the benefits of action (and thus the costs of inaction) could be reused. An alternative approach would be to demonstrate the potential cost of damage associated with specific activities as is commonly done for project appraisals in countries such as Ireland, Finland, Netherlands and, to some extent, France, Italy and Sweden.

22. Regarding the proposed workplan item on updating the costs of air pollution control in GAINS, the priority is to update control costs for sources not yet controlled under existing legislation and to focus on regions that have yet to implement advanced controls, i.e., Eastern Europe. However, updating the GAINS cost data is dependent on ongoing research by specific Parties and its communication to CIAM.

⁶ See <http://www.mrcgroup-consulting.com/uk.php>.

B. Scientific assessment report on ammonia

23. Several parties and centres – including, among others, CIAM, the Meteorological Synthesizing Centre-West, the World Meteorological Organization, France and the Netherlands – expressed an interest in contributing to a thematic report on ammonia. In light of the previous work on the European Nitrogen Assessment, it is unclear whether a report would add to the existing body of knowledge on the subject. One possibility would be to address the cost of inaction in the case of additional ammonia measures and compare policy scenarios with and without such measures.

C. Global sectoral strategies

24. The Task Force took note of the CIAM presentation on the importance of global sectoral strategies based on a recent study on the Asia-Pacific region. A broader approach to air pollution control (considering more than end-of-pipe measures) would be needed in order to reach the WHO air quality targets. This also reconfirms the need for an integrated approach to air pollution, taking other environmental issues into account.

25. Currently, only a very limited number of Task Force experts would have the means to contribute to work on hemispheric issues.

D. Towards cleaner cities

26. The Task Force acknowledged the need for information-sharing with local experts. Air pollution in cities is still, to a large extent, affected by influx from sources located outside the cities and in other countries and it is not evident that the most cost-effective measures to improve air quality are local. Also, it is important that air pollution strategies are linked to policies on spatial planning, energy policy and agricultural policy at all levels of governance.

27. The Task Force welcomed the presentation by the Joint Research Centre of the European Commission on lessons learned from the Air Quality Atlas for Europe and the analysis of air pollution co-benefits from local climate and energy plans proposed under the Global Covenant of Mayors for Climate and Energy.

28. The Task Force concluded that its mandate should be updated to include multi-geographical scale management issues. This type of mandate would also promote research development. In addition to the FAIRMODE/Task Force workshop to be held in Tallinn on 28-29 June 2018, it was proposed that an additional Task Force workshop on local air quality management be held in the autumn of 2018 workshop with a view to a well-prepared, in-depth discussion of the purpose and added value of an expert panel on clean air in cities.

VI. Updates on national assessments

29. The Task Force took note of the presentation by a representative of the University of Brescia. Using a multi-objective, multi-scale tool, the GAINS scenarios for the Lombardy region of northern Italy were compared with cost-effective regional solutions. The analysis at the regional level shows that optimized European scenarios are inefficient and, in some cases, ineffective (as for ozone). This suggests that top-down decision-making is not the best approach to controlling secondary pollution in the area. The analysis also provided opportunities for understanding the positions taken during negotiations.

30. The Task Force welcomed the presentation by a representative from the United Kingdom of Great Britain and the Northern Ireland and, in particular, the explanation of the

country's new 25-year air quality plan and related policy initiatives, including traffic measures designed to meet air quality limit values for nitrogen dioxide, measures for reducing emissions from domestic wood burning and shipping, and agricultural measures aimed at reducing biodiversity risks in Natura 2000 areas.

31. The Task Force also took note of a Finnish expert's presentation of a project on damage costs from air pollution, which had produced online tools enabling rapid estimates of damage costs associated with emissions and emission reductions. However, there is still a need to update those estimates and give greater consideration to non-health-related costs.

32. The Task Force acknowledged a Swedish expert's presentation on ongoing emission inventory and integrated assessment modelling activities in Belarus and the Russian Federation, several of which are ongoing. In Belarus, black carbon emission inventories are being improved, emission reduction potentials for PM_{2.5} estimated and cost-benefit analysis of emission control conducted. In the Russian Federation, the GAINS Russia model, developed in 2010, has recently focused on regionalized emission inventories and on EMEP modelling.

33. The Task Force took note of the presentation by a representative of the Netherlands, which had seen significant improvement in both PM_{2.5} and nitrogen dioxide exposure. However, challenges remain; diesel vehicles and ammonia emissions in the Netherlands and surrounding countries will have to be targeted in order to meet the WHO guidelines for nitrogen dioxide and PM_{2.5}.

34. A representative of Sweden informed the Task Force that in developing a national air quality plan, his country was focusing on the reduction of NO_x emissions and that a co-benefit analysis had shown that a substantial portion of Sweden's NEC NO_x requirements could be met through climate measures.

35. The Task Force heard a presentation by a representative of France on his country's air quality plan for the period 2015-2017, the outcome of which had recently been published. The plan reflected both the NEC Directive and the European Union's air quality standards. Several wide-ranging measures and instruments had been investigated and were now being implemented in areas such as industry, transport, housing and individual behavioural change. France is also currently studying the potential impacts of a Sulphur Emission Control Area (SECA) and Nitrogen Emission Control Area (NECA) in the Mediterranean Sea.

36. The Task Force welcomed a representative of Germany's presentation on the development of his country's air quality plan; ongoing scenario development will include various ambition levels and options. The plan will include most of the traditional air pollution emission measures, including high-resolution spatial and sectoral analysis. The results are not yet complete, but the current understanding is that different ambitions might imply different spatial occurrence of emission intensities. The Task Force took note of the proposal to establish a dataset with gridded scenario emission data for the European Union countries. It also took note of the presentation by a University College London expert on energy storage and transmission in Europe as a response to variable electricity production. One of the key conclusions is that there is enough hydromass and biomass transmission storage capacity to balance the variability of solar and wind in a 100 per cent renewable energy system in Europe.

37. Lastly, a representative of Ireland gave a presentation on public consultations regarding the development of a clean air strategy in his country, emphasizing the stakeholders' interest in air pollution issues, the differences in their priorities and the range

of action encouraged in their submissions. There were many calls for enhanced communication strategies to support the future strategy.

VII. Update of the workplan and further work

38. Based on the discussion, some of the items proposed by the Executive Body will be added to the Task Force's workplan: Ammonia assessment (1.1.3.2); Global sectoral strategies (1.1.4.6); GAINS cost review / Costs of inaction (2.3.4, 2.3.9 and 2.3.10); and Towards clean cities (1.1.3.3).

39. The FAIRMODE/Task Force workshop on local versus regional measures will take place in Tallinn, Estonia on 28-29 June 2018.

40. The holding of an additional Task Force workshop (in autumn 2018) with a view to establishing an expert panel on clean cities has been proposed.

41. The next TFTEI meeting will take place in Brussels in October 2018.

42. The forty-eighth meeting of the Task Force will take place in Germany in early May 2019.
