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EXECUTIVE BODY FOR THE CONVENTION ON LONG-RANGE TRANSBOUNDARY AIR POLLUTION

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PROGRESS IN CORE ACTIVITIES

DRAFT STRATEGY FOR EMEP FOR 2010–2019

Revised draft prepared by the Bureau of the Steering Body[1]

I. INTRODUCTION

A. Mandate

1. The Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) was initiated in 1977 as a special programme under the United Nations Economic Commission for Europe (UNECE). It has operated under the Convention on Long-range Transboundary Air Pollution since the Convention entered into force.

[1] This document presents the draft Strategy for EMEP for 2010–2019, as it was adopted by the Steering Body to EMEP at its thirty-third session in September 2009 and forwarded to the Executive Body for approval at its twenty-seventh session.

2. In 1999, the Executive Body for the Convention decided that the main objective of EMEP was "to provide sound scientific support for the Convention, in particular in the areas of: (a) Atmospheric monitoring and modelling; (b) Emission inventories and emission projections; and (c) Integrated assessment" (ECE/EB.AIR/68, appendix III, decision 1999/2).

3. Interpretation of the mandate. The EMEP Steering Body, in collaboration with the Working Group on Effects, represents the main scientific and technical subsidiary bodies that provide the Convention with a technical support on how to achieve environmental goals in a cost-effective way.

B. Definitions[2]

4. For the purposes of the Convention, the following definitions apply:

(a) Air pollution. The introduction by man, directly or indirectly, of substances or energy into the air resulting in deleterious effects of such a nature as to endanger human health, harm living resources and ecosystems and material property, and impair or interfere with amenities and other legitimate uses of the environment, and "air pollutants" shall be construed accordingly;

(b) Long-range transboundary air pollution. Air pollution whose physical origin is situated wholly or in part within the area under the national jurisdiction of one State and which has adverse effects in the area under the jurisdiction of another State at such a distance that it is not generally possible to distinguish the contribution of individual emission sources or groups of sources.

C. Background

5. EMEP has during its over 30 years of existence taken an international leadership role in supporting air pollution policy development and its implementation within its domain and also globally. It has developed a unique and specific capacity to quantify long-range transport of air pollution including source-receptor relationships for calculation of transboundary fluxes as well as a widely accepted system for quality assurance of methods and results. The Convention is using these science-based results to support the identification and design of policy responses. Through extended peer review of methods and technical results, EMEP has developed strong links with the scientific community and relevant stakeholders. Through implementing the vision

[2] As set out in the article 1 of the Convention.

that guides and motivates its work, it continuously strives to improve and develop itself in directions that support Convention's goals.

6. The EMEP Strategy for the period 2010–2019 builds on the results and progress achieved to date and pursues work on the core activities while developing further partnerships, with a view to linking atmospheric science to environmental policy developments in Europe, both nationally and globally. The Strategy addresses air pollution issues caused by atmospheric compounds contributing to acidification, the reactive nitrogen cycle, ozone formation, transport and deposition of particulate matter, heavy metals and persistent organic pollutants, as seen in the light of the impacts. The impacts include effects of air pollution on human health, eutrophication, acidification, ecosystem change and climate change.

7. The following paragraphs summarize the main driving forces, political issues and concerns that are of importance to the Convention during the strategic period 2010–2019. Political issues and driving forces that influence the work of the Convention also influence the work of EMEP. They are changing over time as a consequence of improved knowledge, new evidence and results achieved in other areas and forums that share similar or common goals in preserving, promoting and improving the quality of life and the environment. Examples of Conventions and initiatives that EMEP cooperates with encompass the United Nations' Framework Convention on Climate Change (UNFCCC); regional air pollution initiatives such as the Acid Deposition Monitoring Network in East Asia (EANET) and the Malé Declaration on Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia; and the regional marine conventions, the Stockholm Convention on Persistent Organic Pollutants and the Arctic Monitoring and Assessment Programme (AMAP). They offer opportunities to EMEP to further extend its work in support of policy developments.

8. Current policy developments under the Convention of relevance to EMEP include those that relate to:

(a) The 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol), the status of its implementation and the needs for its revision;

(b) Particulate matter (PM) and the related health effects as a major environmental policy concern;

(c) Revision of the Protocol on Persistent Organic Pollutants (POPs), inclusion of new POPs into the Protocol (taking into account the European Commission's Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) activities) and the Stockholm

Convention on POPs.

9. Relevant policy developments in the European Union and elsewhere that influence the work of EMEP include:

(a) The revision of the EU Thematic Strategy for Air Pollution (including the Air Quality Directive and National Emission Ceiling Directive; ~~The Clean Air for Europe Directive ("CAFE Directive") on ambient air quality and cleaner air for Europe~~[3];

(b) The European Union (EU) Climate and Energy Package, which has the goal of reducing EU greenhouse gas emissions to at least 20 per cent below 1990 levels by 2020, and with a specific ambition to reduce emissions within sectors like transportation by 10 per cent [4];

~~(c) The revision and implementation of the EU National Emission Ceilings (NEC) Directive;~~

~~(d)~~(c) The EU REACH Regulation, which can be a driving force in efforts to combat persistent toxic substances;

(d) The common agricultural policy (CAP) in Europe, which is due for revision, and has implications for the European reactive nitrogen cycle, land use patterns and compliance with the Convention on Biological Diversity[5];

(e) Activities related to Short Lived Climate Forcers (SLCF), in particular Black Carbon (BC) and tropospheric ozone, where activities are organised under the Arctic Council/Arctic Monitoring and Assessment Programme and the UNEP.

10. Climate change and UNFCCC represent driving forces for EMEP, as climate variability and change have consequences for atmospheric composition. Moreover, the adaptation of societies to climate change has consequences for atmospheric composition, for instance through changes in emissions from energy consumption as the energy production system moves towards a more extensive use of renewable energies, including biofuels.

11. Processes related to regionalization and globalization additionally influence the development of EMEP, as follows:

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[3] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:152:0001:0044:EN:PDF.
[4] http://ec.europa.eu/environment/climat/climate_action.htm.
[5] http://www.cbd.int/.

(a) Air quality is governed by topographical features and the geographical distribution of the population and other activities such as agriculture, rather than by national boundaries. A regional focus is of special importance, for example on the intensive agriculture in north-western Europe, and on the pollution climate along the Mediterranean coast of Europe;

(b) Trends in urbanization must be noted and taken into account;

(c) The deposition of POPs in the Arctic environment at levels far in excess of any local emissions is another example of a regional pollution problem;

(d) The United Nations Environment Programme (UNEP) has increasing activities related to the Global Convention on POPs, which involve more than 150 countries, in particular for the development of the Global POP Monitoring Programme, and related to mercury, lead and cadmium.

12. The pollutant emissions in Europe have gradually decreased over the last decade or two, whereas emissions over the Northern Hemisphere and globally have remained unchanged. As a consequence, the air pollution situation in Europe today is more than before influenced by pollutants emitted globally. This phenomenon can be called “the globalization of European air pollution”, which more specifically involves, inter alia:

(a) Emissions growth in the Far East;

(b) The globalization of the economy and its consequences for intercontinental transport of air pollution;

(c) Aircraft emissions;

(d) Shipping emissions;

(e) Changes in biomass burning and forest fire frequency and extent.

13. There is a need for an increasing emphasis on the intercontinental transport of air pollution and its contribution to the pollution levels in various regions (e.g. Europe, the Arctic, marginal seas). In this regard, EMEP should benefit from, as well as contribute to the work of international organizations such as International Civil Aviation Organization (ICAO) and International Maritime Organization (IMO).

14. The EMEP domain has been extended to areas covered by former Soviet republics in Eastern-Europe, Caucasus and Central Asia, (EECCA) following the accessions of Kazakhstan and Kyrgyzstan to the Convention in 2000 and 2001 respectively, as well as following the interest expressed by other countries from this region to accede to the Convention and its protocols. Currently, there are 51 Parties to the Convention, including the European Community, out of which 23 have ratified the Gothenburg Protocol.

15. The activities of EMEP and of the Convention in general should be carried out in an transparent and open manner to promote the participation of representatives of other regions, such as the Middle and Far East, Central Asia and North Africa, in them.

16. EMEP, the World Meteorological Organization (WMO) and the EU Global Earth Observation System of Systems (GEOSS) show commonalities in their goals. According to the WMO Executive Council, it is currently particularly challenging for WMO to develop a common understanding of and approach to issues related to air pollution, its long range transmission and the interaction with climate change. The Convention, the Intergovernmental Panel on Climate Change (IPCC), the Reactive Nitrogen Initiative, GEOSS and its European component Global Monitoring for Environment and Security (GMES), EANET and the Malé Declaration can all benefit from the common approach that WMO will contribute to.

17. EMEP will work with WMO and GEOSS/GMES to develop knowledge and services that address transboundary air pollution and its global and national dimensions. GEOSS and GMES will provide information for process assessments; day-by-day analysis and forecasting of the atmosphere at various space/time scales. They may also provide sustained monitoring of greenhouse gases, aerosols and reactive gases such as tropospheric ozone, as well as services derived from these observations.

18. Openness and the availability of data and information are underlying principles of the Convention. Open data policy has also been a governing principle of EMEP for more than 25 years, with respect to the measurement data and information on emissions collected as well as the results calculated by means of atmospheric models. This information is available to all parties and individuals interested in air quality issues and environmental protection.

19. International regulations and EU legislation, that share and support the vision of openness on the part of EMEP include in particular the following:

(a) The 1998 UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention), according to which in a democracy, people have the right to gain access to information,

including environmental information and government has the responsibility of supporting the public interest by making it easy to access that information;

(b) The EU Directive on Infrastructure for Spatial Information in Europe (INSPIRE), which aims to make harmonized and good quality geographic information publicly available and free of charge, to support the development, implementation, monitoring and evaluation of European Community policies.

II. STRATEGY FOR THE COOPERATIVE PROGRAMME FOR MONITORING AND EVALUATION OF THE LONG-RANGE TRANSMISSION OF AIR POLLUTANTS IN EUROPE FOR 2010–2019

A. Mission

20. The Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) will continue to represent the main science-based and policy-driven instrument for international cooperation in atmospheric monitoring and modelling, emission inventories and projections, and integrated assessment to help solve transboundary air pollution problems in Europe.

B. Vision

21. In order to achieve its mission, EMEP builds on and seeks to develop, maintain and implement methods and tools that support the achievement of goals in the following areas:

(a) Science: EMEP establishes sound scientific evidence and provides guidance to underpin, develop and evaluate environmental policies;

(b) Partnership: EMEP fosters international partnership to find solutions to environmental problems;

(c) Openness: EMEP encourages the open use of intellectual resources and products;

(d) Sharing: EMEP is transparent and shares information and expertise with research programmes, expert institutions, national and international organizations, and environmental agreements;

(e) Organization: EMEP is organized to integrate information on emissions, environmental quality, effects and abatement options, and to provide the basis for solutions;

(f) Leadership: EMEP supports the Convention in providing leadership in environmental policymaking at the European level, as well as nationally and globally.

1. Science – transboundary air pollution constitutes an overall science goal of the Cooperative Programme

22. Significant progress has been achieved in scientific issues identified in the EMEP Strategy for 2000–2009. In some cases, the ambition level of the 2000–2009 Strategy has been surpassed, while in others, additional efforts will be necessary. EMEP will further strengthen its leadership in developing a sound scientific basis for international air pollution policies.

23. The Strategy for 2010–2019 identifies several new issues as well as the development of new methodologies and tools. Issues of particular importance include: (a) the relation to climate change and climate change policies; (b) the development of tools for integrated assessment of reactive nitrogen; (c) the inclusion of radiative forcing from particles and ozone in regional models; and (d) the population exposure to air pollution, in particular PM.

24. The overall science goal of EMEP is related to transboundary air pollution of substances contributing to acidification and eutrophication, ozone and its precursors, fine PM, heavy metals and POPs.

25. The scientific goals of EMEP can be summarized as follows:

(a) To provide observational and modelling data on pollutant concentrations, exposures, deposition, emissions and transboundary fluxes on the regional and hemispheric scales and identify their trends in time;

(b) To identify the sources of the pollution concentrations, exposures and depositions and to assess the effects of changes in emissions;

(c) To improve our understanding of chemical and physical processes in the ambient environment, relevant for assessing collaboratively the effects of air pollutants on ecosystems and human health in order to develop cost-effective abatement strategies;

(d) To provide models and source-receptor data that can be used for policy development, taking into account economic developments, costs, impacts, climate change and climate change policies in collaboration with the relevant bodies under the Convention;

(e) To continue the identification of new POPs and analysis of their environmental cycles and impacts (in collaboration with the Working Group on Effects). The biogeochemical cycle of nitrogen and mercury in the environment, and in particular its chemical transformations in the atmosphere, remain poorly known and need more work.

26. To reach its overall science goal, EMEP should undertake the following activities:

(a) Determine the state, source-receptor relationships and trends of air pollutants for policy development under the Convention;

(b) Determine concentrations of elemental carbon (as a chemical component of PM) and black carbon[6] (as a light absorbing component of PM ~~as a component of particulate matter~~) and tropospheric ozone precursors including methane and carbon monoxide, quantify the impact of these substances, and identify measures to facilitate further air quality improvements, significant public health benefits, and regional climate benefits that could be achieved by protecting the Arctic and glaciated mountainous regions from melting;

(c) Determine and verify emissions and their trends;

~~(a)~~(d) Quantify and minimize emission uncertainty for HCB, PAH and PCDD/Fs, and in the longer term for new POP-like substances;

~~(b)~~(e) Investigate, in cooperation with the Working Group on Effects and the World Health Organization (WHO), air quality impacts and ecosystem improvements (recovery);

~~(c)~~(f) Investigate abatement strategies, including economic benefits from emission reductions through integrated assessment modelling, sector specific reductions, flat-rate reduction assumptions etc. In optimizing abatement, combine options for reducing several air pollutants simultaneously, including the radiative forcing agents.

27. In addressing the science goals, EMEP should take into account a number of emerging issues and concerns. These include:

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[6] At the moment there is no clear definition accepted by scientific community. Operationally, BC is defined as aerosol species based on measurements at light absorption and chemical reactivity and/or thermal stability. The measurement methods for BC observations will be addressed by Scientific Advisory Group on aerosol of the GAW Programme and will be made available to the scientific community.

(a) Air pollution changes with global (climate) change. EMEP needs to take into account that over the next decades (2010–2050), the air quality development can have an impact on and be influenced by, climate variability and change. In this regard, specific issues to be considered include the following:

(i) Concerns about whether climate change will generate a need for additional emission controls to achieve air quality targets in Europe;

(ii) Air pollution incidents in the Eastern Mediterranean countries in summer 2007 and droughts and high ozone levels recorded in Mediterranean countries demonstrated a need for a strengthened regional focus in EMEP. Changes in the geographical distribution of the population and how that modifies the air pollution situation, for instance in populated regions such as Greater London, the Low Countries, the Po Valley and Istanbul, must also be noted;

(iii) Concerns related to the consequences of climate adaptation for transboundary air pollution as the energy production system moves towards extensive inclusion of renewable energies including biofuels;

(iv) Determination of source-receptor relationships with respect to radiative forcing of species, such as aerosols and ozone, for which transboundary transport and regional gradients are important for their distribution;

(b) Air quality and its effect on the population. The coupling of hemispheric, regional and local air pollution needs further investigation to determine the extent to which population exposure to air pollution is of transboundary origin as well as to identify sets of measures to control population exposure. The coupling of geographical scales also determines the concentration of PM. Further physical and chemical characterization of PM is important for the calculation of dispersion and population exposure. The effects of exposure on human health must be assessed in consultation with the Joint Task Force on the Health Aspects of Air Pollution between WHO and the Executive Body, operating under the Working Group on Effects, and other competent bodies;

(c) Atmospheric physical and biological processes. The quality of the scientific results in EMEP is determined by the insight into the processes that determine atmospheric composition and fluxes. In this regard, further improvement is needed, in particular in the description of:

(i) Fluxes of trace chemical species between terrestrial ecosystems and the atmosphere, and between the oceans and the atmosphere (with a focus on fluxes rather than concentrations). This work should be pursued in collaboration with Working Group on Effects;

(ii) The interaction between the hydrological cycle and biogeochemical cycles;

(iii) The role of meso-scale meteorological cycles in and around the Mediterranean sea for the air pollution load along the Mediterranean coast;

(d) The reactive nitrogen cycle. EMEP, in collaboration with the Working Group on Effects and the Task Force on Reactive Nitrogen, should investigate and quantify the atmospheric component of the biogeochemical cycle of reactive nitrogen, including its relation to the sequestration of carbon in ecosystems;

(e) Air pollution and the carbon cycle. There are feedbacks between the biosphere and the atmosphere. For example, biomass growth (i.e. the rate of carbon dioxide uptake by vegetation) is affected by the ozone concentration. Changes in temperature and precipitation on the one hand and changes in biomass growth and emissions of biogenic volatile organic compounds and nitrogen oxides on the other are interdependent. Understanding these processes is important to establishing how air pollution changes when the climate changes. Work on this field should be carried out in collaboration with the Working Group on Effects;

(f) Atmospheric pollutants as short lived climate forcers (SLCFs). Calculation of the climate forcing impact of inorganic and organic components in aerosols, b~~B~~lack c~~C~~arbon (BC) and tropospheric ozone precursors including methane and carbon monoxide both for the EMEP domain and the global scale. There is a growing interest in the role of short lived climate forcers and the option for short term climate change mitigation they offer. EMEP has the tools to assess the importance of these compounds and their mitigation options as part of general air pollution strategies.

2. Addressing the science questions

28. In addressing the scientific questions EMEP will continue to follow its vision and achieve its goals in terms of partnership, openness, sharing, organization and leadership.

29. The main elements of the methodological approach to be followed for addressing the science goals include:

(a) Numerical models of the chemistry, physics and dynamics of the atmospheric system. This includes the cycling of anthropogenic pollutants as well as biogeochemical tracers between the soil, the atmosphere and the oceans. Model resolution and domain need to be adequate for the coupling of the local, transboundary and global spatial scales;

(b) For forecasting and reanalysis purposes, data assimilation techniques combining the use of remote sensing observations (from satellites) and in situ observations need to be used when they result in a significant improvement in the accuracy of the technical basis for the policy discussion;

(c) Emission inventories are required both for anthropogenic surface sources and biogenic sources, including emissions from biomass burning and forest fires, aircraft and shipping emissions. Improvement is needed in the quantification of PM emissions both in terms of size distribution and chemical composition. The uncertainty in the reported emissions of all substances, but in particular heavy metals and POPs, needs to be reduced;

(d) The observations/monitoring in EMEP should allow for a better understanding of processes and links between local, regional, intercontinental and global issues. EMEP monitoring should constitute the core infrastructure for the observation of atmospheric composition, also with respect to local air pollution, links between air pollution and climate variability and change, and taking into account other relevant conventions and regulations. EMEP monitoring must remain up to date and further develop the quality control/quality assurance and reference methods. Interoperability with other networks and data users (applications) should be encouraged (e.g. air quality forecasting, reanalysis);

(i) The acquisition and processing of space and in situ observations should provide the users with the information as fast as the technology allows (near real-time, historic and ancillary);

(ii) Further development of methodologies for monitoring of POPs in air, precipitation as well as other compartments, simultaneous measurements in different compartments, including congener composition of mixtures and gaseous and particulate phases of POPs, is needed;

(iii) The recommendations of the EMEP monitoring strategy and measurement programme 2010–2019 (ECE/EB.AIR/GE.1/2009/15) reflect the evolving technological capabilities and specific science questions to be addressed;

(e) As a specific task, the impact of the global financial crisis from its onset in 2007/2008 on emissions and air pollution loads, as well as on the level of compliance by Parties

with current air pollution legislation, should be examined;

(f) Integrated assessment modelling should be further developed to calculate and assess the most efficient emission reductions taking into account costs and technology developments as well as various abatement options. Other approaches in the field of integrated assessment should also be explored and tested, for instance sector specific reductions or flat-rate emission cuts.

30. In all its communication, dissemination and outreach activities, EMEP will pursue an open, transparent and free data policy. Due to existing as well as rapidly developing measurement and analytical techniques, it can be expected that the time gap between data collection and reporting will be considerably reduced, for instance to not more than six months in the case of data assessments and to near real-time when online instrumentation is used alone or in conjunction with forecast models.

31. EMEP holds reference methods for how measurements are carried out, for quality control and quality assurance, emission inventories and projections, atmospheric (or earth system) numerical models and integrated assessment models. These methods will become increasingly transparent and available to the scientific community.

3. Partnership and leadership

(a) Partnership within the Cooperative Programme and the Convention's subsidiary bodies

~~31. EMEP and the Working Group on Effects provide technical support to the Working Group on Strategies and Review on how to achieve environmental targets in a cost-effective way. This is well explained by the relationship max ($\partial E/\partial \$$) that is used to maximize the benefit for environment and/or human health by minimizing costs:~~

$$\frac{\partial E}{\partial \$} = \frac{\partial E}{\partial c} \cdot \frac{\partial c}{\partial Q} \cdot \frac{\partial Q}{\partial \$}$$

32. EMEP in collaboration with WGE provides technical support to WGSR on how to achieve environmental targets in a cost effective way (denoted as "max (∂Effect / ∂€) " below).

$$\max\left[\frac{\partial \mathbf{E}_{\mathbf{ffect}}}{\partial €}\right]_{\text{CIAM}} = \max\left\{\left[\frac{\partial\ \mathbf{E}_{\mathbf{ffect}}}{\partial\left(\begin{smallmatrix}\text{DEPOSITION}\\ \text{CONCENTRATION}\\ \text{RAD. FORCING}\end{smallmatrix}\right)}\right]_{\text{WGE}} \times \left[\frac{\partial\left(\begin{smallmatrix}\text{DEPOSITION}\\ \text{CONCENTRATION}\\ \text{RAD. FORCING}\end{smallmatrix}\right)}{\partial \mathbf{E}_{\mathbf{missions}}}\right]_{\begin{smallmatrix}\text{MSCE, CCC}\\ \text{MSCW, CEIP}\end{smallmatrix}} \times \left[\frac{\partial \mathbf{E}_{\mathbf{missions}}}{\partial €}\right]_{\text{CIAM}}\right\}$$

~~32. In the above formula **E** denotes the effects in the environment or on human health, **c** the concentration or deposition of air pollutants, **Q** – emissions, and **$** – the cost of an impact or of an emission reduction. The Working Group on Effects addresses the term ∂E/∂c, the EMEP centres (Meteorological Synthesizing Centre-East (MSC-E), Meteorological Synthesizing Centre-West (MSC-W), Chemical Coordinating Centre (CCC) and CEIP) address the term ∂c/∂Q, and the Centre for Integrated Modelling Assessment (CIAM) addresses ∂Q/∂$ and carries out the optimization (max(∂E/∂$)).~~

33. EMEP shall contribute to the implementation of the long term strategies of the Convention and of the Working Group on Effects, through enhancing the capacities of the Convention to address efficiently: (a) the interlinkages between climate change and air quality; (b) the relationship between deposition of sulphur, reactive nitrogen, ozone and other chemical compounds for the sequestration of carbon; (c) the relationship between air quality and the related health impacts; (d) the biogeochemical cycling of reactive nitrogen and its control by manmade activities, and (e) the distribution of POPs and their effects, including the exploration for new POPs in the environment.

(b) Partnership between the Cooperative Programme and the national programmes of the Parties to the Convention

34. ~~EMEP will support the implementation of the EU Clean Air for Europe Directive ("CAFE Directive") on ambient air quality and cleaner air for Europe by developing and offering monitoring practices, quality-assurance systems and high-resolution models for the use in EU Member countries.~~Interactions with EU policy and research programmes remain of high importance and of mutual benefit. EMEP, for example, benefits from EC research projects and from well established co-operation with EEA and JRC. In addition, revision, development and implementation of EU air legislation is supported by the knowledge and tools developed in EMEP.

~~34.~~35. Both Canada and the United States are Parties to the Convention and to a number of its protocols, including the 1984 Geneva Protocol on Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP Protocol). There is a long tradition of cooperation between EMEP and North American scientists. Much of the work related to POPs and heavy metals, including the transport of these pollutants to Arctic regions, has been conducted jointly. The cooperation needs to be developed to further cover the hemispheric and global issues facing EMEP.

(c) Partnership between the Cooperative Programme and initiatives outside the Convention

~~35.~~36. The Convention and EMEP need to develop a common understanding of how the issues related to air pollution and its long-range transmission are of relevance to other initiatives, such as IPCC; the Convention on Biological Diversity[7]; GEOSS and GMES; the Stockholm Convention on POPs; and UNEP activities on mercury, cadmium and lead. It is important to show how the focus and the capacity built within EMEP can be beneficial in dealing with these political issues and driving forces at the Convention level.

~~36.~~37. EMEP should liaise with and develop joint work with the relevant initiatives. In particular, it should consider how best:

(a) To continue supporting the development of both working level and formal links between the Convention and the Malé Declaration and EANET;

(b) To further develop emission inventory capacities through interaction with the Global Emissions Inventory Activity (GEIA) and the Emissions Database for Global Atmospheric Research (EDGAR) of the European Union Joint Research Centre (JRC);

(c) Establish links to the ecosystem (terrestrial as well as marine) – atmosphere communities, e.g. AMAP, OSPAR[8], the Baltic Marine Environment Protection Commission (HELCOM), and within the International Geosphere-Biosphere Programme (IGBP), the Integrated Land Ecosystem-Atmosphere Processes Study (ILEAPS) and the Surface Ocean-Lower Atmosphere Study (SOLAS);

(d) To create linkages to the International Nitrogen Initiative[9] and European initiatives on reactive nitrogen in order to increase the scientific understanding of the use and release of reactive nitrogen and of measures to improve its management (e.g. the European Science Foundation (ESF) projects Nitrogen in Europe (NinE) and COST 729, as well as EU research projects);

(e) To carry out the work with WMO - Global Atmosphere Watch in its implementation of a common approach to issues related to air pollution, its long-range transmission and the interaction with climate change.

(d) Supporting the Convention's leadership in environmental policymaking

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[7] http://www.cbd.int/.
[8] OSPAR is a mechanism by which 15 Governments of the western coasts and catchments of Europe, together with the European Community, cooperate to protect the marine environment of the North-East Atlantic.
[9] http://www.iniforum.org/.

~~37.~~38. The support of EMEP with respect to the Convention's leadership in environmental policymaking should involve:

(a) Capacity-building within the Convention in the fields of sharing of reference methods for measurements, quality control and quality assurance, emission inventories and projections, atmospheric and earth system numerical models, and integrated assessment models. EMEP will contribute to making these methods increasingly transparent and available to the scientific community;

(b) Ensuring that the air quality relevant work in GEOSS and GMES take advantage of the methods and capabilities within EMEP to avoid redundancies and double work;

(c) Fostering interoperability between networks of regional air pollution (e.g. EANET and the Malé Declaration); Linking to the Global Atmospheric Pollution Forum on relevant issues;

(d) Linking with the climate change community (e.g. UNFCCC/IPCC) and considering the 2010–2050 time frame, which is not the focus of IPCC, and proposing to the Executive Body an agreed sharing of tasks between the Convention/EMEP and UNFCCC/IPCC.

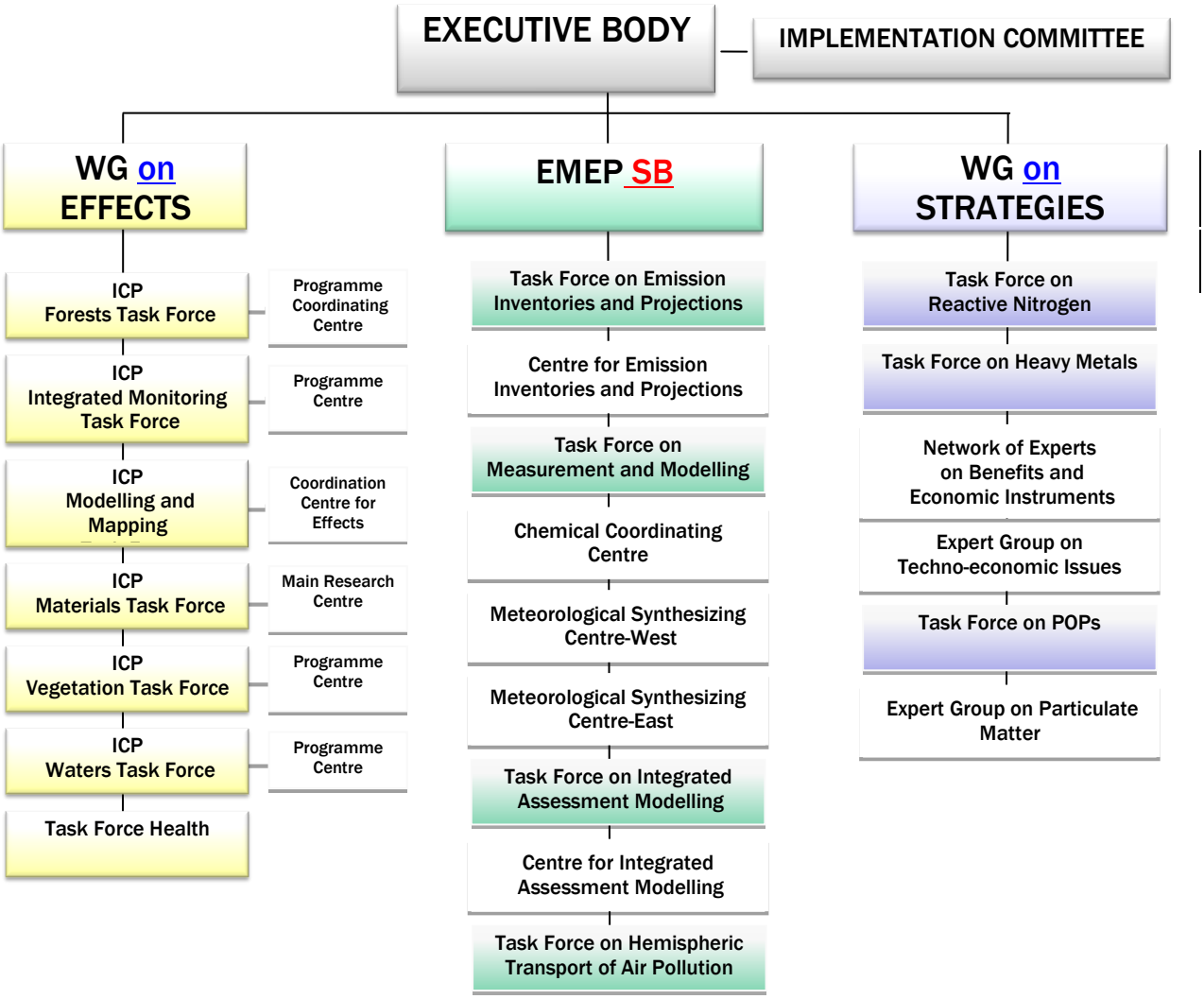
4. Sharing

~~38.~~39. The dissemination of information within EMEP as well as from EMEP should be transparent, two-way and easily accessible by everybody. It is particularly important to develop the EMEP website further, and to make sure that the special information needs of, for example, the Working Group on Strategies and Review and the Implementation Committee are met.

~~39.~~40. The work carried out within EMEP should be transparent, interact with and enjoy the confidence of all the stakeholders, including individual citizens, local authorities, industry, non-governmental organizations, expert institutions, countries and other bodies.

5. Organization

~~40.~~41. The organization of the work under the Convention is shown in the figure below. Strengthening overall cooperation within EMEP, and in particular cooperation involving better and broader use of EMEP products at the national level, will facilitate a wider acceptance of the protocols to the Convention and help their ratification.



Notes: ICP – International Cooperative Programme; WG – Working Group.

~~41.~~42. National research and monitoring activities constitute an indispensable part of a well-functioning EMEP and Convention. The national representatives to the Executive Body of the Convention should take the responsibility for facilitating such activities in their countries. The EMEP Steering Body, its Bureau and the centres should all actively contribute towards establishing scientific cooperation with the national activities.

43. The role of EMEP, the Working Group on Effects and the policymaking segment of the Convention represented by the Working Group on Strategies and Review should be interpreted to ensure that EMEP, in collaboration with the Working Group on Effects, provides technical support to the Working Group on Strategies and Review with respect to how to achieve environmental targets in a cost-effective way (~~denoted as "max Δeffect / Δ$" in the text under 3. Partnership and leadership, see above). The environmental targets are interpreted to mean the issues as outlined in 1. Science – transboundary air pollution constitutes an overall science goal of the Cooperative Programme, see above.~~

~~* At the moment there is no clear definition accepted by scientific community. Operationall, BC is defined as aerosol species based on measurements at light absorption and chemical reactivit and/or thermal stability.~~
~~The measurement methods for BC observations will be addressed by Scientific Advisor Group on aerosol of the GAW Programme and will be made available to the scientific community.~~

6. Long-term financing, geographical coverage and monitoring costs

~~42.~~44. Long-term financing of EMEP centres must remain secure through the effective implementation of the EMEP Protocol. There are significant differences with respect to the commitment to implement the EMEP monitoring programme in the participating countries. Small countries are often more committed than large ones to providing measurement data, but the costs of measurements relative to the gross domestic products (GDPs) of the different countries also show that national priorities vary. A lack of resources prevents high-quality measurements in many countries, although these measurements are needed to resolve uncertainties in present model estimates and emission inventories.

~~43.~~45. The measurements should continue to be under national jurisdiction. The measurement network and information about ambient concentration levels and deposition rates can be improved in several ways. One way to obtain a set of measurement data of uniform quality for components such as POPs and mercury is to carry out a common pilot measurement programme of limited duration with the collection of samples at previously identified sites and the analysis of these samples in one laboratory only.

~~44.~~46. Attention has repeatedly been drawn to the poor geographical coverage of the EMEP measurement network in EECCA and South-Eastern Europe. This is clearly linked with the lack of resources in some countries. In order to remedy this situation:

(a) Bilateral or multilateral cooperation should be further developed between countries;

(b) Cooperating organizations or networks should be involved, to the extent that they have common goals with EMEP;

(c) CCC should provide sampling equipment and chemical analyses, for a limited period of time, at sites identified by the Steering Body. The adoption of the EMEP reference measurement methods in all participating countries should be accompanied by an active support of their implementation.
