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**Economic Commission for Europe**

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**

**Seventh joint session**

Geneva, 13–16 September 2021

Item 3 of the provisional agenda

**Draft 2022–2023 workplan for the implementation of the Convention (science part)**

 Draft 2022–2023 workplan for the implementation
of the Convention (science part)

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| *Summary* |
|  The present document was compiled by the Chairs of the Working Group on Effects and the Steering Body to the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) based on the contributions submitted by the centres and task forces under the two scientific bodies of the Convention on Long-range Transboundary Air Pollution. The document contains the elements related to science of the draft 2022–2023 workplan for the implementation of the Convention. |
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 I. Introduction

1. The workplan for the implementation of the Convention on Long-range Transboundary Air Pollution translates the vision, objectives and strategic approaches set out in the Long-term strategy for the Convention on Long-range Transboundary Air Pollution for 2020−2030 and beyond (Executive Body decision 2018/5).[[1]](#footnote-2) The workplan structure builds on the primary needs of the Convention and its Parties, relating to five main areas: science; policy; compliance; capacity-building; and communication and outreach. For each area, a table presents the specific activities planned, deliverables, the lead body or bodies and resource requirements or funding source.

2. This approach to structuring the workplan allows Parties to better assess the work of the different subsidiary bodies and their deliverables in meeting the Convention’s needs and ensuring progress in realizing the vision set out in the long-term Strategy. The draft workplan includes activities that should be completed in the period 2022−2023. The proposed workplan for the two upcoming years also includes actions considered as priorities to support the Gothenburg Protocol review process. Long-term activities and related deliverables are set out in the mandates (terms of references) for the task forces and centres under the Convention.

 II. Science

3. Science project activities in the 2022–2023 period are presented in the table below.

**Science**

| *Workplanitem* | *Activity description/objective* | *Expected outcome/ deliverable* | *Lead body(ies)* | *Resource requirements and/or funding source* |
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| **1.1 Improving tools to assess air pollution and its effects in the United Nations Economic Commission for Europe region** |
| **1.1.1 Monitoring and modelling tools** |
| 1.1.1.1 | Contribute to the Gothenburg Protocol review by: (i) taking stock of long-term trend analysis and key messages for policy effectiveness; (ii) assessing the fitness for purpose of the monitoring and measurement tools to support policy (including recent developments on condensables, for instance) | Notes and contribution for the review of the Gothenburg Protocol (2022) | TFMM, MSC-W, CCC, MSC-E; Task Force on Health, ICPs | Covered by the EMEP budgetCovered by recommended contributions |
| 1.1.1.2 | Revising historical PM2.5 emissions from residential combustion to consistently include condensable organics and assessment of the implication for the review of the Gothenburg Protocol | Analysis of emission data sets including condensables for 2005–2018, EMEP MSC-W model calculation of PM trends and source-receptor matricesContribution of condensables to population exposure and health impacts review (spring 2022, review during the EMEP Task Force meetings and the eighth joint session of Steering Body to EMEP and WGE) | MSC-W in co-operation with CIAM, CCC, CEIP and TNO | Funding from Nordic Council of Ministers or other sources |
| 1.1.1.3 | Prepare and conduct an intensive measurement period focused on improved understanding of high ozone pollution episodes | New EMEP field campaign (spring–summer 2022) | TFMM, CCC | Covered by the EMEP budget and national contributions |
| 1.1.1.4 | Review of the use of in-situ VOC measurements (including high quality and potential complementary sensors or passive methods) for the revision and improvement of chemistry-transport models across a range of spatial scales: from local (industrial and urban) to regional background sites | EMEP report in 2022Potential implications to revise the profiles of VOC emission reporting (2023) | TFMM, CCC, MSC-WTFEIP | Covered by the EMEP budget |
| 1.1.1.5 | Perform a Eurodelta multi-model intercomparison exercise focusing on BaP  | First report in 2022Final report and publications in 2023Assessment of the relative importance of residential wood burning | TFMM, MSC-E, CCC | Covered by the EMEP budget and national contributions |
| 1.1.1.6 | Investigating monitoring of chemicals of emerging concern | Workshop on measurement and modelling of new contaminants (2023) | TFMM, CCC, MSC-E, TFHTAP | Covered by the EMEP budget |
| 1.1.1.7 | Preparation of data and model calculations that are necessary for “Multiscale GAINS”  | EMEP/MSC-W country to grid (0.3° x 0.2°) based on “brute force”, 5 years of meteorology, 5 source pollutants (PPM, SO2, NOx, NH3, VOC), extended EMEP domain including EECCA Local fraction tracking (sectoral) of PPM with EMEP model (0.1°) “Exposure Correction Factor” and “Exceedance distribution correction” per grid (sector) based on uEMEP (End 2022) | MSC-W | Covered by the EMEP budget |
| 1.1.1.8 | Analysis of changes in chemical regime for N-compounds**:** is the efficiency of NH3 measures changing? Impact on aerosol concentrations and depositions. Is the transport distance of reduced N changing?  | Analysis of source receptor calculations for the past and the future (EMEP report 2022) | MSC-W | Covered by the EMEP budget |
| 1.1.1.9 | Monitoring and assessment of the impact on the environment of corrosion and soiling effects on materials and their trends | Report of corrosion and soiling data from the exposure for trend analysis 2017–2021 (2022)Environmental data report (2023)Report of trends in corrosion, soiling and pollution 1987–2021 (2023) | ICP Materials | Covered by recommended contributions |
| 1.1.1.10 | Gathering information on policy-relevant user-friendly indicators to evaluate air pollution effects on materials by conducting case studies on UNESCO cultural heritage sites | Report on Call for Data –Part VI: Study on the relationship between the environment and the artefact on selected UNESCO sites (2022)Report on Call for Data –Part VII: Application of models with increased resolution on selected UNESCO sites (2023) | ICP Materials | Covered by recommended contributions |
| 1.1.1.11 | Biological recovery and responses to changing water chemistry | Thematic report (2022) | ICP Waters  | Covered by recommended contributions |
| 1.1.1.12 | Trends in base cations, potential drivers and implications for acidification status and biological recovery (to be discussed at the TF meeting). | Thematic report (2023) | ICP Waters  | Covered by recommended contributions |
| 1.1.1.13 | Call for data for moss survey 2020–2021(22) on heavy metals, N and POPs | Annual progress report (Final report 2024) | ICP Vegetation | In-kind contributions from participating countries |
| 1.1.1.14 | Ozone flux-based risk assessment for vegetation for air pollution scenarios relating to: (a) Implication on vegetation of scenarios focusing on the characterisation of the contribution of methane as an ozone precursor - post-hoc analysis (b) the application of ozone modified photosynthesis-based flux-response models(c) the effects of drought under present and future climatic conditions  | Maps and report (2023)Maps and report (2023)Maps and report (2023) | ICP Vegetation in collaboration with MSC-W, CIAM, TFMM and TFHTAP | United Kingdom and in-kind contributions from participating countries |
| 1.1.1.15 | Review of ozone pollution and climate change impacts on vegetation – focus on implications for calculation and application of flux-based Critical Levels and risk assessment | Report (2023) | ICP Vegetation | United Kingdom and in-kind contributions from participating countries |
| 1.1.1.16 | State-of-knowledge report on “genetics of crop resilience to ozone and potential for crop breeding” | Report (2023) | ICP Vegetation | United Kingdom and in-kind contributions from participating countries |
| 1.1.1.17 | N deposition and its effects on forest health, productivity, carbon sequestration and biodiversity | Report and scientific paper on status and trends of N levels in European forests (2022, 2023)Publication of the responses of European forest ecosystems to decreasing N deposition | ICP Forests | Covered by recommended contributions |
| 1.1.1.18 | Status and trends of heavy metals in forest ecosystems | Scientific paper on heavy metal concentrations in level I plots across Europe (2023) | ICP Forests | Covered by recommended contributions |
|  | Air pollution-related cause-effect relationships in forests in a changing climate | Impact of climate on foliar nutrition in European tree species (scientific paper in 2023)  | ICP Forests | Covered by recommended contributions |
|  | Effects of air pollution on forest health, productivity, carbon sequestration and biodiversity | Report on the effect of air pollution on forest health and productivity (2023)  | ICP Forests |  |
| 1.1.1.19 | Steady-state Critical Loads:(a) update of National Critical Loads by National Focal Centres;(b) establishment of European Background Database by CCE | Database (2020/2021)for Critical Loads for acidification and eutrophication; Report (2022) | CCE and ICP Modelling and Mapping | National Focal Centres and recommended contributions |
| 1.1.1.20 | Empirical Critical Loads: Review and revision of the CLemp N published in 2011 (continued) | Report on empirical Critical Loads in Europe (2022) | CCE and ICP Modelling and Mapping | Covered by CCE, CCE National Focal Centres and by recommended contributions |
| 1.1.1.21 | Update of the harmonized Convention receptor map | Harmonized receptor map for Europe (2023) | ICP Modelling and Mapping/CCE | CCE and Germany |
| 1.1.1.22 | Critical Levels of ammonia: literature review and empirical data provision supporting a workshop | Organization of an international workshop (2022) and workshop report (2023) | ICP Modelling and Mapping/CCE | CCE and Germany |
| 1.1.1.23 | Modelling interaction between air pollution and climate change: N and C | Expert workshop (2022) | ICP Modelling and Mapping/CDM | CDM and National Focal Centres experts |
| 1.1.1.24 | Modelling biodiversity change to set critical loads for N | Report on methodology development and proposal for call for data (2023) | ICP Modelling and Mapping/CDM/CCE | CDM, CCE, and National Focal Centres experts |
| 1.1.1.25 | Operationalizing and advertising “IM light” as an attractive monitoring protocol, aiming at adding more ecosystem types in the monitoring by ICP Integrated Monitoring  | An extension of the Integrated Monitoring methodology to include two additional levels of monitoring with fewer mandatory variables and an invitation to countries to join (2022)  | ICP Integrated Monitoring | Covered by recommended contributions |
| 1.1.1.26 | Modelling and assessment of biodiversity and ecosystem impacts | Scientific paper (2023) | ICP Integrated Monitoring and CDM | Covered by recommended contributions |
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| 1.1.1.27 | Consolidate existing evidence on health outcomes of exposure to air pollution | A report on methods for health risk/impact assessment of airpollution and cost-benefit analysis (update to HRAPIE project)An overview on air pollution and COVID-19 (optional, pending resources) | Task Force on Health in collaboration with other groups, for example, TFIAMTask Force on Health | Expected to be covered by recommended contribution; further funding needed  |

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| 1.1.1.28 | Further develop methodologies for assessment of direct and indirect impacts of long-range transboundary air pollution on human health | Update of tools forquantification of thehealth impacts of airpollution, including links to climate change mitigation Assessment of health co-benefits and trade-offs between climate change and clean air agendas (optional, pending resources) | Task Force on Health | Expected to be covered by recommended contribution and other potential donors; further funding needed |

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| **1.1.2 Emission and projection tools** |
| 1.1.2.1 | Planning and delivery of an updated EMEP/EEA Guidebook in 2023 | Guidebook delivered (2023)  | TFEIP, CEIP and national experts | Covered by national contributions |
| 1.1.2.2 | Review new guidance/methods for emissions from solvent and product use (Combustion and industry) | Contribution to the Guidebook (2023) | TFEIP and national experts | Covered by national contributions |
| 1.1.2.3 | Agriculture: further clarifying issues around proper accounting of emissions resulting from manure import/export and livestock allocations | Contribution to the Guidebook (2023) | TFEIP and national experts | Covered by national contributions |
| 1.1.2.4 | Proposal for an updated projection reporting template | Template adopted by the EMEP Steering Body (2022) | TFEIP and national experts | Covered by the EMEP budget |
| 1.1.2.5 | Detailed analysis of the status of inclusion of the condensable component in PM emissions reported by Parties based on the data provided by Parties in their Informative Inventory Reports and on direct communication with Parties for selected Nomenclature for Reporting categories (case studies) | Status reports (2022 and 2023) | CEIP and TFEIP in collaboration with MSC-W and TFMM  | Covered by the EMEP budget |
| 1.1.2.6 | Improving spatial distribution of emissions, assuring consistency across pollutants, especially for regions where incomplete gridded data is reported to CEIP. New data sources will be explored jointly with IIASA/CIAM CORINE Land Cover, population statistics) | Updated spatial distribution of emission inventories (2022)  | CEIP in cooperation with CIAM | Need to find complementary resources |
| 1.1.2.7 | Improvement of data for the modellers: comparison of EMEP gridded emissions with other sources (CAMS, Fairmode) | Updated EMEP gridded emissions (2022–2023) | CEIP in collaboration with MSC-W and CAMS, JRC, Fairmode | Covered by the EMEP budget |
| 1.1.2.8 | Gap-filling of 2020 and 2021 emission data sets (the special conditions in these years (COVID pandemic) will need refinement of the standard approaches) | Updated data sets and report (2022) | TFEIP  | Need to find complementary resources |
| 1.1.2.9 | Refinement of reporting and gap-filling of the shipping emissions to anticipate changes in modelling | Updated methodologies and emission data sets (2023) | TFEIP and CEIP | Need to find complementary resources |
| 1.1.2.10 | Complete refactoring of the WebDab database and the user interface for data queries to state-of-the-art technology, including integration of the gridding system to accelerate the gridding process and provide a more user-friendly access to gridded emissions | Updated WebDab interface (2023) | CEIP | Covered by the EMEP budget |
| **1.1.3 Integrated assessment tools** |
| 1.1.3.1 | Scenario assessment relevant for the Gothenburg Protocol review and potential revision using multiscale GAINS and EMEP/uEMEP and including an extension of the GAINS domain **(**EECCA/West Balkans/Turkey)  | Data and scenario analyses (2022−2023) | CIAM, TFIAM and MSC-W | Covered by the EMEP budget |
| 1.1.3.2 | Scenario development for the (potential) revision of the Gothenburg Protocol, including cost-effectiveness analysis of specific measures and assessment of the implication of improved modelling, among others, inclusion of condensables and marine deposition targets  | Scenario analyses (2023) | TFIAM and CIAM | Covered by the EMEP budget |
| 1.1.3.3 | Assessing observed trends in air pollution at the various scales Linkages between global and regional air pollution | Contribution to the review of the Gothenburg Protocol (2022) | TFMM, TFHTAP, TFIAM and MSC-W | Covered by the EMEP budget |
| 1.1.3.4 | Implementation for multiscale GAINS across the whole extended EMEP domain using data elaborated by MSC-W | Updated version of GAINS (early 2022) | CIAM | Covered by the EMEP budget |
| 1.1.3.5 | Impact of additional measures:Assess extent of recently implemented (by the Parties) additional measures, including best available technologies, and their respective contribution to meeting obligations  | Report (2022) | CIAM in collaboration with TFTEI, TFEIP, TFRN | Covered by the EMEP budget |
| 1.1.3.6 | Guidance document on non-technical measures and economic instruments | Guidance document (2023) | TFIAM | Need to find complementary resources |
| 1.1.3.7 | Perform an evaluation of the impact of potential methane mitigation measures on regional ozone | Report and workshop organized in 2023 | TFMM, TFHTAP, MSC-W, TFIAM and CIAM | Covered by the EMEP budget |
| **1.1.4 Linking the scales** |
| 1.1.4.1 | EPCAC activities | Activity report (2022)Two annual meetings of EPCAC (2022 and 2023) | TFIAM with nominated experts | Covered by in-kind contributions from participating countries |
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| 1.1.4.3 | Development and design of global emission scenarios with a regional and sectoral breakdown to explore the mitigation potential in comparison to the baseline with a data set for use in Convention modelling tools  | Report (2022–2023) | TFIAM and TFHTAP  |  |
| 1.1.4.4 | Complete the updated global emissions mosaic for traditional air pollutants (HTAPv3, 2000–2018)Incorporate emissions estimates for heavy metals and POPs, the actual work on this is unlikely to begin before 2023 | Updated data set (2023)Workshop to be organized in 2022 | TFHTAP in cooperation with CAMS, JRC, CIAM, TFEIPTFHTAP, MSC-E, TFEIP,CIAM | Covered by Parties’ in-kind contributions |
| 1.1.4.5 | Continue development of the openFASST tool for screening analysis of future scenarios and implications of global and regional model uncertainties | Tool updates (2022,2023) | TFHTAP | Covered by Parties’ in-kind contributions |
| 1.1.4.6 | Investigating the air-surface exchange rates of Hg | Report (2023) | TFHTAP and MSC-E | Covered by the EMEP budget and Parties’ in-kind contributions |
| 1.1.4.7 | Elaborating global source/receptor relationships of combustion-related POPs and PM | Report (2023) | TFHTAP, TFMM and MSC-E | Covered by the EMEP budget and Parties’ in-kind contributions |
| **1.2 Cooperation with Parties** |
| 1.2.1 | Country-scale assessment of heavy metal and POP pollution  | A case study of Hg pollution in Norway involving national measurement data and modelling (2022–2023)Continue the case study of PAH pollution and exceedances of air quality guidelines in Poland (2022–2023)  | MSC-E, TFMM, national experts | Covered by the EMEP budget and Norway and Poland |
| 1.2.2 | Focus on EECCA and West Balkan countries:Implementation of updated information about activities, costs of mitigation options, and improvement of spatial distribution of emissions; development of projections  | Application of the updated GAINS multiscale model/EMEP/uEMEP (2022 and 2023 for projections for the potential Gothenburg Protocol revision) | MSC-W and CIAM in collaboration with CEIP, TFTEI, MSC-E |  |
| 1.2.3 | Capacity-building for the health impact assessment of air pollution at regional and subregional levels  | Development and implementation of the capacity-building curriculum to address different needs | Task Force on Health | Expected to be covered by recommended contribution and other potential donors |
| **1.3 Cooperation with other projects and bodies (outreach activities)** |
| 1.3.1 | Cooperation with HELCOM and OSPAR; marine environment protection  | Evaluation of atmospheric load of heavy metals and POPs to the Baltic and North Seas Reports (2022-2023)Evaluation of the impact of air pollution on marine environmentEvaluation of the impact of chemicals of emerging concern in the Baltic Sea | MSC-E, WGE, MSC-W, TFIAM AMP (Ad hoc Group on Marine Protection including CCE and ICP Waters) | Covered by HELCOM and OSPAR fundingFurther funding needed  |
| 1.3.2 | Cooperation with Climate and Clean Air Coalition | Report to annual joint sessions of Steering Body to EMEP and WGE  | EMEP with support from TFEIP, TFHTAP, TFMM |  |
| 1.3.3 | Cooperation with Arctic Council and AMAP | Focus on BC in framework of a European Union contract  | CEIP, CIAM, MSC-W | Budget provided by AMAP (European Union contract) |
| 1.3.4 | Support Stockholm and Minamata Conventions in relation to atmospheric observations and data management within the ECE region | Report to annual joint sessions of Steering Body to EMEP and WGE  | MSC-E |  |
| 1.3.5 | Capacity-building on the health impact assessment of air pollution at the regional and subregional levels  | Development and implementation of capacity-building curriculum to address different needs  | Task Force on Health | Expected to be covered by recommended contribution and other potential donors |
| 1.3.6 | Promote health messages related to air pollution in Europe | Formulation of health messages in air pollution, including on personal-level interventions Workshop on risk communication, including for medical professionals, on health messages related to air pollution to the public and at individual level | Task Force on Health | Covered by the European Commission; further funding needed |
| 1.3.7  | Cooperation and support to the Task Force on International Cooperation on Air Pollution (TFICAP) | Participation in the TFICAP meetings (2022-2023) and sharing of current capacity building activities.Provision of scientific and technical input to TFICAP activities which:(a) Facilitate mutual learning and collaboration on air pollution.(b) Foster emissions reductions of air pollutants through exchange of information on best practices and policy approaches.(c) Facilitate the sharing of information technical capacity building | WGE and EMEP ICPs, task forces and centres | Expected to be covered by recommended contributions and other potential donors |
| **1.4 Improving the functioning of the WGE and EMEP and of their subsidiary bodies** |
| 1.4.1  | Restructuring the common WGE website (www.unece-wge.org) to highlight main areas of work conducted under the WGE | New version of the website launched (2022 and update in 2023) | WGE Bureau, CDM | Covered by recommended contributions |
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*Abbreviations*: AMAP, Arctic Monitoring and Assessment Programme; BaP, benzo[a]pyrene; BC, black carbon; C, carbon; CAMS, Copernicus Atmosphere Monitoring Service; CCC, Chemical Coordinating Centre; CCE, Coordination Centre for Effects; CEIP, Centre on Emission Inventories and Projections; CIAM, Centre for Integrated Assessment Modelling; CL, critical loads; CLemp, empirical critical loads; COVID-19, coronavirus disease; EECCA, Eastern Europe, the Caucasus and Central Asia; EDGAR, Emission Database for Global Atmospheric Research; EEA, European Environment Agency; Gothenburg Protocol, Protocol to Abate Acidification, Eutrophication and Ground-level Ozone; EMEP, Cooperative Programme for Monitoring and Evaluation of the
Long-range Transmission of Air Pollutants in Europe; EPCAC, Expert Panel on Clean Air in Cities; GAINS, Greenhouse Gas and Air Pollution Interactions and Synergies; Hg, mercury; HRAPIE, Health risks of pollution in Europe; ICP, International Cooperative Programme; ICP Forests, ICP on Assessment and Monitoring of Air Pollution Effects on Forests; ICP Integrated Monitoring, ICP on Integrated Monitoring of Air Pollution Effects on Ecosystems; ICP Materials, ICP on Effects of Air Pollution on Materials, including Historic and Cultural Monuments; ICP Modelling and Mapping, ICP on Modelling and Mapping of Critical Levels and Loads and Air Pollution Effects, Risks and Trends; ICP Vegetation, ICP on Effects of Air Pollution on Natural Vegetation and Crops; ICP Waters, ICP on Assessment and Monitoring of Acidification of Rivers and Lakes; IM, integrated monitoring; JRC, Joint Research Centre of the European Commission; Minamata Convention, Minamata Convention on Mercury; Modelling and Mapping Manual, Manual on Methodologies and Criteria for Modelling and Mapping Critical Loads and Levels and Air Pollution Effects, Risks and Trends; MSC‑E, Meteorological Synthesizing Centre-East; MSC-W, Meteorological Synthesizing Centre-West; N, nitrogen; NH3, ammonia; NOx, nitrogen oxides; OpenFASST, open-source FAst Scenario Screening Tool; PAH, polycyclic aromatic hydrocarbon; PM, particulate matter; PPM, primary particulate matter; POPs, persistent organic pollutants; S, sulfur; SO2, sulfur dioxide; Stockholm Convention, Stockholm Convention on Persistent Organic Pollutants; Task Force on Health, Joint Task Force on the Health Aspects of Air Pollution; TFEIP, Task Force on Emission Inventories and Projections; TFHTAP, Task Force on Hemispheric Transport of Air Pollution; TFIAM, Task Force on Integrated Assessment Modelling; TFMM, Task Force on Measurements and Modelling; TFRN, Task Force on Reactive Nitrogen; TFTEI, Task Force for Techno-economic Issues; TNO, Netherlands Organization for applied scientific research; uEMEP, urban EMEP; UNEP, United Nations Environment Programme; UNESCO, United Nations Educational, Scientific and Cultural Organization; VOC, volatile organic compound; WGE, Working Group on Effects; WGSR, Working Group on Strategies and Review; WMO, World Meteorological Organization.

1. All Executive Body decisions referred to in the present document are available at <https://unece.org/fr/node/4188>. [↑](#footnote-ref-2)