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## Economic Commission for Europe

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

### Working Group on Strategies and Review

#### Fifty-eighth session

Geneva, 26–29 May 2020

Item 3 of the provisional agenda

#### Progress in the implementation of the 2020–2021 workplan

## Report of the Task Force on Techno-economic Issues

### *Summary*

At its thirty-third session (Geneva, 8–11 December 2014), the Executive Body for the Convention on Long-range Transboundary Air Pollution established the Task Force on Techno-economic Issues (ECE/EB.AIR/127/Add.1, decision 2014/2). In accordance with its revised mandate set out in the annex to decision 2018/7, the Task Force is required to report on progress in its work to the Working Group on Strategies and Review.

The report by the Task Force on Techno-economic Issues contained in the present document presents information on progress in the implementation of the 2020–2021 workplan for the implementation of the Convention (ECE/EB.AIR/144/Add.2, forthcoming) with respect to activities relevant to the Task Force, as well as on the outcomes of the fifth annual meeting of the Task Force (Ottawa, 22 and 23 October 2019).



## I. Introduction

1. The fifth annual meeting of the Task Force on Techno-economic Issues (Ottawa, 22 and 23 October 2019), organized by Italy and France and hosted by Canada, was held back-to-back with the workshop on open agricultural burning (Ottawa, 24 October 2019), co-organized with the International Cryosphere Climate Initiative.
2. The present document contains information on the outcomes of the fifth annual meeting and on the progress made in the implementation of the 2020–2021 workplan for the Convention (ECE/EB.AIR/144/Add.2, forthcoming) with respect to the activities relevant to the Task Force.

## II. Fifth annual meeting of the Task Force on Techno-economic Issues

### A. Attendance

3. The Task Force meeting gathered 65 experts,<sup>1</sup> including experts from Austria, Canada, Croatia, France, Germany, Italy, Poland, Sweden, the United Kingdom of Great Britain and Northern Ireland, the United States of America and Ukraine.
4. Representatives of the French-German Institute for Environmental Research at the Karlsruhe Institute of Technology (Germany), the German Federal Environment Agency and the Interprofessional Technical Centre for Studies on Atmospheric Pollution (France), in their capacity as members of the technical secretariat of the Task Force, attended the meeting. A representative of the United Nations Economic Commission for Europe (ECE) secretariat attended the meeting remotely. Also present at the meeting were representatives of scientific centres and other bodies under the Convention, international programmes, academia, the private sector and industrial associations, including: the Centre for Integrated Assessment Modelling, the Task Force on Hemispheric Transport of Air Pollutants, the Arctic Monitoring and Assessment Programme, the International Cryosphere Climate Initiative, Carleton University (Canada), University of Minnesota (United States of America), the European Cement Association, the Chemistry Industry Association of Canada, the Canadian Association of Petroleum Producers and the Methane Emissions Leadership Alliance.
5. All the presentations delivered, together with the detailed agenda of the meeting, are available on the Task Force website.<sup>2</sup>

### B. Organization of work

6. Mr. Tiziano Pignatelli (Italy) and Mr. Jean-Guy Bartaire (France), Co-Chairs of the Task Force on Techno-economic Issues, chaired the fifth annual meeting of the Task Force.
7. The meeting mainly focused on reporting on progress in the implementation of the activities included in the mandate of the Task Force (decision 2018/7, annex) and the workplan for the implementation of the Convention, with the latter being given priority in view of the upcoming review of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol). Issues addressed included the following:
  - (a) Black carbon (BC) emissions, related guidance documents on best available techniques, BC in the Arctic region, different perspectives from other bodies of the Convention and other studies;
  - (b) Methane emissions, with a focus on specific sectors;

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<sup>1</sup> Eighteen of the sixty-five participants were connected remotely to the meeting, through the Web-Ex Conference System, for all or part of the meeting.

<sup>2</sup> See <http://tfei.citepa.org/en/5th-tfei-meeting>.

- (c) Shipping emissions;
- (d) New technical documents on best available techniques in the aluminium and cement production sectors;
- (e) Agricultural residue burning (open burning).

8. During the first day of the meeting, the Chair of the Working Group on Strategies and Review and the Co-Chairs of the Task Force provided a summary of the history of the Convention, an overview of the key outputs of the work of the Task Force since the establishment of the Expert Group on Techno-economic Issues and the updated mandate of the Task Force. The second day of the meeting was devoted to discussion of the key priorities in the work of the Task Force in 2020–2021 and progress in the implementation of activities assigned to it by the Executive Body. The two-day meeting was followed by a technical workshop on open agricultural burning chaired by the Director of the International Cryosphere Climate Initiative.

### C. Summary of the main discussion points

9. The following paragraphs capture the main issues presented and discussed at the fifth annual meeting of the Task Force. Information on progress in the implementation of the 2020–2021 workplan for the Convention is presented in section III of the present document.

10. A representative of a Norwegian private oil industry company presented a technical report entitled “Best available techniques economically achievable to address black carbon from gas flaring” under the European Union Action on Black Carbon in the Arctic initiative. The report was mainly intended to:

- (a) Provide technical guidance on possible BC abatement measures where associated gas was flared during oil extraction activities;
- (b) Update and complete the overview of existing options, addressed both to national administrations and businesses;
- (c) Assist national administrators contemplating enhanced environmental legislation regarding BC emission reductions from flaring, including other stakeholders involved in or affected by oil and gas operations in the Arctic.

11. Intended users of the report included oil and gas field operators and owners, investors and other decision makers. The report characterized and quantified the flaring sources in the Arctic region and identified seven categories of the best abatement measures, accompanying each category with a technology summary, information on applicability to the Arctic, effects on emissions, benefits, infrastructure requirements and technical and economic considerations. The Task Force suggested including the document in its Clearing House of Control Technologies.<sup>3</sup>

12. A Co-Chair of the Task Force on Hemispheric Transport of Air Pollution under the Convention presented the results of an analysis of the response in air quality in other regions to a 20 per cent reduction in anthropogenic emissions in one source region. Source-receptor regions had been analysed in the Northern hemisphere for BC, organic aerosol and sulphur dioxide (SO<sub>2</sub>). The results of the study demonstrated that, in most cases, the local influence was predominant. However, emission reductions in South and East Asia had substantial impacts on the radiative budget of all investigated receptor regions, especially for BC. For North America, BC emission controls at sources in East Asia had a greater impact than domestic mitigation. Thus, emission reductions from the major source regions in Asia would reduce the BC burden in the Northern hemisphere. The Co-Chair subsequently presented the results of another study focused on the intercontinental transport of ozone, which had found that intercontinental transport of ozone dominated over intercontinental transport of particulate matter (PM) and that background ozone was very sensitive to methane concentration.

<sup>3</sup> See <http://tfei.citepa.org/en/clearing-house-home>.

13. A representative of the European Union Action on Black Carbon in the Arctic initiative/the secretariat of the Arctic Monitoring and Assessment Programme provided information on the main objectives, content, stakeholders and deliverables of the initiative. The main goal of the initiative was to contribute to the development of collective responses to reduce BC emissions in the Arctic and enhance international cooperation to protect the Arctic environment. A number of technical reports had been prepared in 2019. One of the studies highlighted that three quarters of the global anthropogenic emissions of BC could be eliminated by 2030, and the potential of the Arctic global warming reduction, corresponding to the maximum technically feasible emission reductions measures, was estimated at  $-0.25^{\circ}\text{C}$  by 2050. Future actions envisaged under the initiative included: the finalization and distribution of key knowledge-based and associated communication products; and the development of a road map for enhanced international cooperation.

14. An expert from the United States Environmental Protection Agency informed participants of the results of an analysis of global non-CO<sub>2</sub> greenhouse gas emission projections and mitigation potential for 2015–2050.<sup>4</sup> The speaker highlighted that:

(a) Non-CO<sub>2</sub> greenhouse gas emissions had comprised 25 per cent of all greenhouse gas emissions in 2015;

(b) CO<sub>2</sub> accounted for a large portion of annual greenhouse gas emissions, but non-CO<sub>2</sub> greenhouse gases would play a significant role in future emissions scenarios;

(c) Methane emissions from agriculture, energy and waste accounted for two thirds of non-CO<sub>2</sub> greenhouse gas emissions;

(d) The maximum technical potential reduction in 2030 was nearly 34 per cent of the projected non-CO<sub>2</sub> greenhouse gas emissions for that year;

(e) The waste sector was the largest source of mitigation potential in 2030.

15. The main conclusions of the analysis were that:

(a) A greater understanding of non-CO<sub>2</sub> mitigation potential and associated costs was important for understanding policy trade-offs, designing efficient and plausible climate mitigation strategies, targeting future mitigation technology development and deployment, understanding the limits of mitigation technologies and targeting areas for behavioural change;

(b) The inclusion of technical change resulted in more mitigation overall and a greater abated emission potential available at lower costs;

(c) Non-CO<sub>2</sub> greenhouse gas emissions could be held roughly constant by deploying available mitigation technologies;

(d) Achieving long-term reductions of non-CO<sub>2</sub> greenhouse gas emissions below the 2015 level would require the deployment of new or more effective mitigation technologies.

16. Experts from private operators and associations of private companies active in the field of oil and natural gas production, processing and transmission in Canada informed participants of their activities, strategies and technological solutions aimed at reducing emissions, in particular those of BC and methane.

17. The Director of the International Cryosphere Climate Initiative and an expert in agroforestry fires from Miami University (United States of America) introduced the issue of open burning in agriculture and the forestry sector – the topic of the workshop that followed the Task Force meeting. The speakers noted increased focus on the issue over the past years due to significant amounts of emissions having been released into the atmosphere, including those of carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), PM, including BC (open agricultural burning being the largest single source of BC globally (36 per cent)) and methane, with a related negative impact on human health and climate change, as well as on agriculture by lowering crop yields and increasing the use of fertilizers. The presenters demonstrated that

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<sup>4</sup> See [www.epa.gov/global-mitigation-non-co2-greenhouse-gases](http://www.epa.gov/global-mitigation-non-co2-greenhouse-gases).

low-cost alternatives to open burning existed and their increased application implied, among other things, awareness-raising among farmers and the introduction of financial incentives, including microfinancing.

18. The Co-Chairs of the Task Force on Techno-economic Issues expressed their appreciation to Canada for hosting the meeting, noting that it provided an opportunity to strengthen contacts with experts and stakeholders in Canada and the United States of America. They also noted that the information shared at the meeting and related discussions would provide an important input to the work of the Task Force. In particular, the new activities of the Task Force on methane, BC, reduction and mitigation technologies for shipping emissions and open burning would benefit from the input of experts from Canada and the United States of America. Further studies and work of the Task Force on methane, BC and shipping emissions conducted in collaboration with other technical bodies of the Convention – such as the Task Force on Hemispheric Transport of Air Pollution, the Task Force on Integrated Assessment Modelling, the Task Force on Reactive Nitrogen, the Meteorological Synthesizing Centre-East and the Meteorological Synthesizing Centre-West – and related deliverables were expected to provide a scientific basis for the review of the Gothenburg Protocol.

### III. Progress in the implementation of the 2020–2021 workplan

19. The present section summarizes the review of progress made in the activities outlined in the 2020–2021 workplan, ordered by workplan item.<sup>5</sup>

#### **Item 2.1.6: Review of control costs currently used and update**

20. The present activity, carried out in collaboration with the Task Force on Integrated Assessment Modelling, consisted of two parts. The first part was institutional for the Task Force on Techno-economic Issues as it included the regular update of the cost parameters related to abatement technology implementation, made available for use in the modelling analyses carried out by the Centre for Integrated Assessment Modelling. The new data were regularly made available through technical reports published on the Clearing House of Control Technologies and the Task Force website<sup>6</sup> and shared with the community of concerned experts. The second part of the activity implied the comparison of cost estimates from different national models and studies in order to improve the cost-benefit analyses done with the Greenhouse gas – Air pollution Interactions and Synergies model. No additional funding was currently available for that part of the activity. Progress would depend on comparisons done by national experts and presented at the meetings of the Task Force on Techno-economic Issues and/or the Task Force on Integrated Assessment Modelling.

#### **Item 2.1.7: Report for policymakers that sets out the costs of control versus the costs of inaction**

21. The present activity, assigned to the Task Force on Integrated Assessment Modelling and the Task Force on Techno-economic Issues, had remained at the stage of analysis of existing studies for a certain period. As Norway had recently expressed its readiness to provide financial resources to support the implementation of the activity, the Centre for Integrated Assessment Modelling would conduct further modelling analysis, including a cost-benefit analysis of controls versus inaction. The Task Force on Techno-economic Issues had provided its contribution with an analysis at the plant level: namely a retrofit analysis applied to an existing plant calculating the avoided emissions. Subsequently, the cost-benefit analysis approach had been applied to the avoided emissions from the plant, in comparison with the emissions prior to the retrofit. The report was included in the list of the official documents under the Convention in 2021. The draft version would be presented to the Working Group on Strategies and Review at its fifty-eighth session as an informal document.

<sup>5</sup> In several cases, the titles abbreviate or summarize much longer workplan items. For the full text of each item, see ECE/EB.AIR/144/Add.2, forthcoming.

<sup>6</sup> See <http://tfei.citepa.org/en>.

**Item 2.1.8: Carry out other tasks specified in the mandate**

22. As per its mandate, the Task Force on Techno-economic Issues continued its work on identification and characterization of best available techniques in specific sectors, in particular, in the sectors of aluminium and cement production. A document that described the production process of primary aluminium and the best available techniques abatement technologies with related specifications had been concluded in 2019 and was currently being revised by experts of the Task Force. Updates and possible extensions were planned for the future.

23. A new document concerning cement production had been finalized by the technical secretariat of the Task Force at the end of 2019. It provided an update of the existing document on the subject dated 2005, with the aim of making the updated information available for the review of the Gothenburg Protocol. The best available techniques for nitrogen oxide (NO<sub>x</sub>), sulphur oxide (SO<sub>x</sub>) and PM emission abatement were considered, including the update of cost parameters.

24. In accordance with the 2018–2019 workplan for the implementation of the Convention (ECE/EB.AIR/2017/1), the Task Force had organized a workshop to promote the ratification of the Protocols to the Convention with focus on countries in the Eastern Europe, the Caucasus and Central Asia region (Berlin, 14–16 May 2019). The workshop had been financed by Germany, Switzerland and ECE. Fifty-nine participants from 19 countries had attended the workshop, including 29 experts from Eastern Europe, the Caucasus and Central Asia and the Russian Federation. Representatives of the European Commission, the European Investment Bank, the Organization for Economic Cooperation and Development, the United Nations Environment Programme (secretariat of the Minamata Convention on Mercury), non-governmental organizations and other bodies under the Convention had participated in the workshop. The event had been divided into five main sessions. The workshop had highlighted the priority needs of countries in Eastern Europe, the Caucasus and Central Asia to overcome the barriers and facilitate their ratification of the three most recent Protocols to the Convention. The final report of the workshop was available on the web page of the event.<sup>7</sup>

25. One of the needs expressed by countries in Eastern Europe, the Caucasus and Central Asia at the above-mentioned workshop had been the need for technical assistance and guidance on estimation and measurement of emissions of volatile organic compounds (VOCs), as well as on compiling solvent management and reduction schemes in line with annex VI to the Gothenburg Protocol. A workshop on assessment and measurement of emissions of VOCs had been held as a follow-up to that request (Minsk, 11 and 12 November 2019) by the Task Force, with support provided by Germany and ECE. Thirty experts from Belarus, Georgia, the Republic of Moldova and Ukraine had participated in the event, along with an expert of the technical secretariat of the Task Force. The sessions of the workshop had focused on: annex VI to the Gothenburg Protocol; monitoring techniques; the principles of solvent management and reduction plans; and reducing VOC emissions from storage of fuels and at petrol stations. Examples of plants with different emission reduction schemes had been provided in line with the specific needs of the participating countries and with a focus on the most current types of installation. The presentations delivered at, and the agenda of, the workshop were available on the Task Force website.<sup>8</sup>

26. The Task Force, through its technical secretariat, had initiated work on mitigation measures for methane emissions in selected sectors. The expert from the Karlsruhe Institute of Technology (Germany) presented at the fifth annual meeting of the Task Force the approach adopted for a relevant study, starting with the analysis of two specific sectors, the transport system of natural gas and emissions in Europe and waste storage and landfills, along with an overview of the most significant methane emission sources in Europe. A number of abatement and mitigation technologies were also presented for both sectors. The technical report would be prepared and made available for review in 2020.

27. In line with its mandate, in 2019, the Task Force had initiated work to assess information on emission abatement technologies for the reduction of air pollutant shipping

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<sup>7</sup> See [www.unece.org/index.php?id=51388](http://www.unece.org/index.php?id=51388).

<sup>8</sup> See <https://tfei.citepa.org/en/cooperation-with-eccca>.

emissions. An expert from the Interprofessional Technical Centre for Studies on Atmospheric Pollution introduced the work, beginning with the existing *Guidance Document on Emission Control Techniques for Mobile Sources under the Convention on Long-range Transboundary Air Pollution*,<sup>9</sup> which covered diesel vessels for inland waterways and seagoing ships. A study would deliver an assessment for those two types of vessels and an update of the reduction technologies for SO<sub>2</sub>, nitrogen oxide (NO<sub>x</sub>), PM and BC. An overview of maritime traffic volumes in Europe was presented, followed by examples of available abatement technologies, including the cost data. Control techniques at berth (electricity infrastructures) would be also considered. A reference was made to annex VI – on SO<sub>2</sub> and NO<sub>x</sub> – to the International Convention for the Prevention of Pollution from Ships. A technical document had been made available for expert review at the end of 2019 and the final version would be delivered in 2020.

28. The Code of good practice for wood-burning and small combustion installations (ECE/EB.AIR/2019/5), prepared by the Task Force, had been adopted by the Executive Body at its thirty-ninth session (ECE/EB.AIR/144/Add.1, decision 2019/3).

#### **Item 2.1.9: Input provided to support the review of the Gothenburg Protocol**

29. The Task Force was expected to be mandated by the Executive Body and the Working Group on Strategies and Review to revise the technical annexes to the Gothenburg Protocol, except for the annex on ammonia. In line with article 10 (3) of the Protocol, BC emissions and related mitigation technologies would also be considered in the review. In that regard, there were a number of studies on BC currently under evaluation. Contact had been established with relevant experts, including during the fifth annual meeting of the Task Force.

#### **Item 2.2.1: Guidance in relation to prioritizing reductions of particulate matter in its sources that are also significant sources of black carbon**

30. The work in question was carried out in collaboration with the Task Force on Integrated Assessment Modelling. The study *Air pollution in Asia and the Pacific: Science-based Solutions*<sup>10</sup> provided a ranking of the most important sources of fine PM emissions. Many renowned experts in the subject had contributed to that study, including those from the Centre for Integrated Assessment Modelling and the Climate and Clean Air Coalition. Although that study focused on Asia and the Pacific, it nevertheless represented a landmark in that field, which would serve as the basis for developing a specific report corresponding to the workplan item. The Task Force on Techno-economic Issues would contribute by examining the list of sources from the perspective of the ECE region and comparing it with the information the Task Force already had. The informal document would be available for consideration by the Working Group on Strategies and Review at its fifty-eighth session.

#### **Item 2.2.2: Guidance on reduction of emissions from agricultural residue burning**

31. The fifth annual meeting of the Task Force had provided an opportunity to involve experts of the International Cryosphere Climate Initiative, who had gained notable experience with mitigation projects, material and studies on agricultural burning over the past years. The workshop organized back-to-back with the fifth annual meeting had considered the issue of agricultural burning, along with measures and costs of mitigation (best available technologies and practices) and had identified gaps and further needs in improving analysis of the sources. The Task Force and the International Cryosphere Climate Initiative had agreed that the Initiative's experts would develop a draft of the guidance document on reduction of emissions from the use of fire in agriculture. The discussion of the first draft would be initiated by the Working Group on Strategies and Review at its fifty-eighth session and the draft would be then circulated for further review within the entire network of experts involved, followed by a discussion at the sixth annual meeting of the Task Force. The final version would be

<sup>9</sup> United Nations publication, ECE/EB.AIR/138.

<sup>10</sup> United Nations Environment Programme (Bangkok, 2019). Available at <https://ccacoalition.org/en/resources/air-pollution-asia-and-pacific-science-based-solutions-summary-full-report>.

submitted to the Working Group on Strategies and Review for consideration at its fifty-ninth session (Geneva, 17–20 May 2021, tentatively).

#### **IV. Annual meetings of the Task Force**

32. The sixth annual meeting of the Task Force would be hosted by Poland in Warsaw, on 22 and 23 October 2020.

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