



Economic and Social Council

Distr.: General
28 January 2022

Original: English

Economic Commission for Europe

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

Working Group on Strategies and Review

Sixtieth session

Geneva, 11–14 April 2022

Item 3 of the provisional agenda

Progress in the implementation of the 2022–2023 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 2022–2023 workplan for the implementation of the Convention (ECE/EB.AIR/148/Add.1, forthcoming) with respect to activities relevant to the Task Force, as well as on the outcomes of the seventh annual meeting of the Task Force (online, 29 October 2021).

* The present document is being issued without formal editing.



I. Introduction

1. The present document contains information on the outcomes of the seventh annual meeting of the Task Force on Techno-economic Issues (online, 29 October 2021) and on the progress made in the implementation of the 2022–2023 workplan for the implementation of the Convention (ECE/EB.AIR/148/Add.1), with respect to the activities relevant to the Task Force.

2. The seventh annual meeting of the Task Force, organized by Italy and France, was held via video conference back-to-back with the informal technical session (online, 28 October 2021) and focused on the work carried out by the Task Force on the review of the technical annexes to the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (the Gothenburg Protocol), as amended in 2012, and the associated guidance documents, the emissions of particulate matter and black carbon from wood burning residential heating systems and technical measures to control methane emissions from a number of relevant sectors.

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

A. Attendance

3. The meeting of the Task Force was attended remotely by 68 experts, including those from Austria, Belarus, Belgium, Canada, Denmark, the European Union, France, Germany, Italy, Kazakhstan, Norway, Poland, Sweden, the Russian Federation, Spain, Switzerland, and the United States of America.

4. Representatives of the French-German Institute for Environmental Research at the Karlsruhe Institute of Technology, the Inter-professional Technical Centre for Studies on Air Pollution, and the German Federal Ministry for the Environment, in their capacity of members of the techno-scientific board of the Task Force, attended the meeting. A representative of the United Nations Economic Commission for Europe (ECE) secretariat and representatives of scientific centres and other bodies under the Convention, including the Task Force for Integrated Assessment Modelling, the Task Force on Hemispheric Transport of Air Pollution, the EMEP¹ Meteorological Synthesizing Centre-West (MSC-W), the EMEP Meteorological Synthesizing Centre-East (MSC-E) and the Coordinating Group on the promotion of actions towards implementation of the Convention in Eastern Europe, the Caucasus and Central Asia (the Coordinating Group) participated in the meeting. Other participants included a representative of the Arctic Monitoring and Assessment Programme of the Arctic Council, experts from the European Association of Internal Combustion Engine Manufacturers, the European Solvents Industry Group, the European Federation of Clean Air and Environmental Protection Associations, and a number of experts from the private sector.

5. Simultaneous English-Russian interpretation was provided by France. All the presentations delivered, together with the detailed agenda of the meeting, are available on the website of the Task Force.²

B. Organization of work

6. Tiziano Pignatelli (Italy) and Jean-Guy Bartaire (France), Co-Chairs of the Task Force on Techno-economic Issues, chaired the seventh annual meeting of the Task Force.

7. The meeting was mainly focused on reporting on the progress in the implementation of the 2020–2021 workplan for the implementation of the Convention

¹ The cooperative programme for monitoring and evaluation of the long-rang transmission of air pollutants in Europe.

² See <http://tfei.citepa.org/>.

(ECE/EB.AIR/144/Add.2) and sharing information on the work carried out by the techno-scientific board of the Task Force, in cooperation with its expert members. The discussion evolved around the following main points, in line with the current mandate of the Task Force (decision 2018/7, annex):

- (a) Review of annexes IV, V, VI, VIII, X and XI to the Gothenburg Protocol, as amended in 2012, and the associated guidance documents;
- (b) Contribution of the Task Force to the work of the Gothenburg Protocol review group;
- (b) Outcomes of the joint workshop of the Task Force and the Coordinating Group (online, 26–27 April 2021);
- (c) Collaboration with other bodies under the Convention, in particular with the Task Force on Integrated Assessment Modelling and the Task Force on Reactive Nitrogen, on the implementation of the 2020–2021 workplan;
- (d) Overview of priority tasks for the Task Force in the 2022–2023 workplan for the implementation of the Convention.

C. Summary of the main discussion points

8. The representative of the ECE secretariat informed participants about recent developments under the Convention. She made an overview of the outcomes of the fortieth session of the Executive Body (Geneva, 18 December 2020), the fifty-ninth session of the Working Group on Strategies and Review (Geneva, 18–21 May 2021), in particular those directly related to the Task Force, and the seventh joint session of the EMEP Steering Body and the Working Group on Effects (Geneva, 13–16 September 2021). She also listed the main points in the agenda of the forty-first session of the Executive Body (Geneva, 6–8 December 2021). She noted that the draft guidance document on reduction of emissions from agricultural residue burning (ECE/EB.AIR/2021/5), and the draft document entitled “Prioritizing reductions of particulate matter from sources that are also significant sources of black carbon –analysis and guidance” (ECE/EB.AIR/2021/6) had been forwarded by the Working Group on Strategies and Review to the Executive Body for consideration at its forty-first session. The secretariat informed participants that the Code of good practice for wood-burning and small combustion installations, developed by the Task Force in collaboration with a large number of experts under the Convention, had been made available, as official ECE publication (ECE/EB.AIR/150)³.

9. The Task Force Co-Chairs made an overview of priority activities of the Task Force within the 2020–2021 and the 2022–2023 workplans for the implementation of the Convention. They noted that in 2021, the Task Force completed the review of technical annexes IV, V, VI, VIII, X, XI to the Gothenburg Protocol as amended and the associated Guidance documents on stationary and mobile sources. The Co-Chairs noted on-going contribution of the Task Force to the preparation of the draft report on the review of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, as amended in 2012 (ECE/EB.AIR/2021/4), by the Gothenburg Protocol review group. Among activities proposed for inclusion in the 2022–2023 workplan, that were not part of the mandate of the Task Force, the following were listed:

- (a) Drafting of new annexes IV, V, VI, VIII, X, XI to the Protocol depending on the outcomes of the review;
- (b) Development of draft new guidance documents on stationary and mobile sources;
- (c) Development of new draft guidance documents on control/mitigation technologies for methane and technologies for reduction of emissions from the shipping sector.

³ <https://unece.org/info/Environment-Policy/Air-Convention/pub/359346>.

10. The Co-Chairs noted that preliminary contacts had been made with the expected Co-Chair from the United Kingdom of Great Britain and Northern Ireland of the Task Force for International Cooperation on Air Pollution, establishment of which was foreseen, to explore possible ways of cooperation (for example, organization of webinars).

11. The Co-Chair of the Task Force on Integrated Assessment Modelling presented the main outcomes of the study, carried out in collaboration with the Task Force on Techno-economic Issues, which compared the costs of inaction, defined as the damage to health, ecosystems and economy, with the costs of abatement measures in different parts of the ECE region and presented the results to policymakers. The results of the analysis clearly demonstrated that, even in the most conservative case, the benefits were largely outweighing the costs of technological measures. As an illustration, a case study of the Apatity plant (the Russian Federation) was presented by the Co-Chair.

12. The Co-Chair of the Task Force on Techno-economic Issues from Italy presented the outcomes of the joint workshop of the Task Force and the Coordinating Group, which gathered 25-28 participants on each day of the workshop. The event had been organized by the ECE secretariat online providing English – Russian interpretation. During the first day of the workshop, experts from countries in Eastern Europe, the Caucasus and Central Asia presented information on their progress in the implementation of legislative instruments, permitting system and monitoring network, aimed at reducing pollutant emissions through the introduction of best available techniques (BAT). The Co-Chair noted that, despite considerable achievements in some countries, there was a significant difference in the level of progress among countries in Eastern Europe, the Caucasus and Central Asia. On the second day of the workshop, the Task Force Co-Chairs and experts provided information on the process of the review of the Gothenburg Protocol as amended, highlighting potential contribution to be made jointly with countries in Eastern Europe, the Caucasus and Central Asia. He noted that the members of the Coordinating Group welcomed sector analyses on aluminium and cement production made by the Task Force⁴. A short version of the paper on the flexibility mechanisms of the Gothenburg Protocol, developed by the Gothenburg Protocol review group, was circulated among members of the Coordinating Group before the workshop in English and Russian. The Coordinating Group confirmed its readiness to cooperate with the Task Force on issues related to the review of the Gothenburg Protocol.

13. The Co-Chair of the Task Force on Hemispheric Transport of Air Pollution provided information on cooperation with the Task Force on Techno-economic Issues. He noted relevance of the data provided by the Task Force on Techno-economic Issues for the work on global and regional model evaluation inter-comparison, and, in particular, on the intercontinental impact of marine shipping emissions. In addition to that, the data collected and assessed by the Task Force on Techno-economic Issues on methane mitigation in some relevant sectors, could find application in the Global Assessment Scenario analysis to estimate the ozone benefits of methane mitigation inside and outside the Convention, including the impacts on vegetation. He also provided detailed description of analyses, carried out by the Task Force, on trends of ozone with attribution to volatile organic compounds (VOCs) and nitrogen oxides (NO_x) emissions, along with an overview of the evolution of the analysis on shipping and methane.

14. The representative of the MSC-W presented information on issues related to condensable organics in emissions of particulate matter in the European part of the region, as well as the outcomes and follow-up to the dedicated workshop (Gothenburg, Sweden, 17-19 March 2020). He highlighted the main problems with respect to taking into account of the condensable part in emissions of particulate matter and implications for correct estimation of emissions of particulate matter and VOCs, for source apportionment and the impact on emission reduction commitments of Parties. The issue of condensables was deemed particularly relevant for the residential heating sector. The speaker noted that an ad hoc group had been established under the EMEP, which had its first meeting on 5 November 2021.

⁴ Available as informal documents for the fifty-eighth session of the Working Group on Strategies and Review: <https://unece.org/environmental-policy/events/working-group-strategies-and-review-fifty-eighth-session>.

15. A representative of the MSC-E presented an assessment of polycyclic aromatic hydrocarbons (PAHs) pollution levels in the EMEP area. He focused on long-term trends, key sources, and exceedances of air quality guidelines. He reminded participants of the relevance of the PAHs issue, and, as it was highlighted in the long-term strategy for the Convention for 2020-2030 and beyond (decision 2018/5), unintentional release of PAHs still raised concerns and there was a need to continue scientific research on the transport of persistent organic pollutants (POPs) and trends with a focus on PAHs. He added that residential sector was significantly contributing to the emissions of PAHs in the EMEP area, increasing the population's exposure to particulate matter and its toxic constituents. He noted different trends for benzo[a]pyrene (B(a)P) pollution throughout the EMEP area with a decreasing one in Western Europe (by 65 per cent between 1990-2019), small decrease/no changes in Central and Southern Europe after 2000, and an increase in the Caucasus and Central Asia. As for the population exposure to B(a)P, exceedances of air quality guidelines still existed in some countries (for example, in Central Europe), especially in urban areas. The speaker noted that a multi-model study of B(a)P pollution had been launched for 2017-2018.

16. A member of the techno-scientific board of the Task Force informed participants of the new technical instructions on air quality control in Germany. The First General Administrative Regulation on the Federal Emission Control Act introduced uniform national principles for the administrative procedure, decision making, assessment standards for installations requiring licensing and it was applied to ca. 50,000 installations. It mainly established conditions to be fulfilled prior to construction or operation of installations. In particular, the new regulation included the BAT conclusions of many European Union's BREFs, a number of new sectors or subsectors, including the farming sector. The speaker noted that stricter emission limit values (ELVs) for particulate matter for large installations, new ELVs for mercury and a new regulation for formaldehyde had been established. Also, a new regulation of minimum heights for chimneys using an online tool for calculation, had been introduced.

17. The President of the European Federation of Clean Air and Environmental Protection Associations informed participants of the outcomes of the Federation's session on emissions from shipping, held in conjunction with the Twelfth Croatian Scientific and Professional Conference (Medulin, Croatia, 15-17 September 2021). The issue of ultra-fine particles (UFP) emissions from shipping was addressed during the session. He provided some figures characterizing globally the shipping sector in terms of goods transported, fuel consumption, volume of traffic, CO₂, PM, NO_x and SO_x (precursors of UFP) emissions ratio in the sector with respect to global emissions, hemispherical distribution, comparison with emissions in other sectors. The session's conclusions included the following:

(a) The shipping emissions of sulfur dioxide (SO₂), NO_x, VOC, particulate matter and black carbon (PAHs) at global level were constantly rising, except for so called „emission control areas“;

(b) 85 per cent of all shipping pollution was emitted in the northern hemisphere, the geographical area of the ECE and the Convention;

(c) Port areas were particularly impacted;

(d) Sulphur Emission Control Areas (SECA) and Nitrogen Emission Control Areas (NECA) were very effective measures to reduce impacts on ecosystem from shipping.

18. He stressed that the ongoing review of the Gothenburg Protocol as amended should take into account emissions from the shipping sector.

19. The representative of a private company presented the state of performance of NO_x emission reduction equipments (DeNO_x) across the industry. He highlighted the role of secondary measures in pursuing the NO_x emission targets established, for instance, by the European Union directives. He pointed to three main secondary measures: adsorption and absorption of NO_x using solvents; DeNO_x with selective non catalytic reduction (SNCR) technology and DeNO_x with selective catalytic reduction (SCR) technology. In particular, the DeNO_x low temperature SCR technology was illustrated as an example of BAT.

20. An expert of the Swiss Federal Office for the Environment presented a case study on the use of electrostatic precipitators in domestic heating appliances. The municipality of Saas-Fee launched a subsidy program for installation of electrostatic precipitators in 2009 providing financial incentives covering about 50 per cent of the total costs of their installation. The standard measurement was not suitable for electrostatic precipitators, therefore a new dilution-independent emission measurement was developed. The electrostatic precipitator was found to be a very suitable retrofit solution for wood firing installations with an average separation efficiency of 70 +/-10 per cent registered in the 20 measured installations in Saas-Fee. The equipment required regular cleaning by the chimney sweep including maintenance of the electrostatic precipitators.

D. Progress in the implementation of the Task Force's activities

21. A member of the techno-scientific board of the Task Force informed participants of the progress in the review of annexes IV, V, X to the Gothenburg Protocol with regard to emissions of SO₂, NO_x and particulate matter from stationary sources in industrial processes. He made an overview of the processes concerned in the annexes and the methodology adopted for the review, based on the in-depth analysis of available documentation and comparison of data. The preliminary results, comparing existing data in the current annexes and available new data on potentially achievable new ELVs, demonstrated that further emission reductions were possible, owing to the evolution of technology during the last decade, after 2012, when the revision to the Gothenburg Protocol was adopted.

22. A member of the techno-scientific board of the Task Force presented the analysis of technologies for the abatement of particulate matter emissions in small (with a rated thermal input < 50 MWth) combustion installations burning wood, with respect to annex X. The analysis mainly referred to the development of low emission stoves for residential heating. Uncertainty remained with respect to the achievable levels of emissions; that related to the lack of a harmonized approach in taking into account of condensables in emissions of particulate matter and measuring methods throughout the ECE region. Nevertheless, a significant improvement in the performance of appliances was registered during the past decade.

23. A member of the techno-scientific board of the Task Force presented the results of the analysis of annexes IV, V and X to the Gothenburg Protocol with respect to emissions of SO₂, NO_x and particulate matter from large (with a rated thermal input higher than 50 MWth) combustion plants. The BAT associated emission levels showed that potential existed for the achievement of lower emission levels through the introduction of upgraded technologies (for example, flue gas desulfurization, electrostatic precipitators, scrubbers, ultra-low NO_x burners for natural gas plants). This conclusion was supported by the inclusion of lower ELVs for new plants in some regulations (for example, in the European Union and the United States of America).

24. A member of the techno-scientific board of the task force presented the results of the analysis of annex VIII to the Gothenburg Protocol. The analysis showed that upgraded technologies were available both for petrol and diesel light- and heavy-duty vehicles, including the EURO 7 emission scenarios and the control technologies for fine particles emitted from tires and brakes. The speaker noted the new European Union regulation for railways locomotives and railcars along with available technologies for inland waterways vessels. He further noted that an error in tables 7 and 8 of the existing annex VIII had been detected.

III. Progress in the implementation of the 2022 –2023 workplan

25. The present section summarizes the review of progress made in the implementation of activities outlined in the 2022–2023 workplan⁵, ordered by workplan item.

Item 2.1.2: Review of the sufficiency and effectiveness of the Gothenburg Protocol as amended

26. In the course of 2021, the Task Force reviewed the technical annexes to the Protocol and the associated guidance documents (see para 7, point (a) above). The present report includes the executive summary on the outcome of the review (see the annex), which responds to questions 1.6 (a)-(d) contained in annex I to the document entitled “Preparations for the review of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone as amended in 2012” (ECE/EB.AIR/2020/3-ECE/EB.AIR/WG.5/2020/3). The Task Force Co-Chairs regularly participated as advisors in monthly meetings of the Gothenburg Protocol review group.

Item 2.1.5: Report for policymakers that sets out the costs of control versus the costs of inaction

27. The Task Force on Integrated Assessment Modelling had a lead role in this work, and the Task Force on Techno-economic Issues cooperated providing data for the case study of the Apatity coal plant. The work resulted in an informal document presented to the Executive Body at its forty-first session. The revised document, incorporating comments by Parties, is submitted for consideration by the Working Group on Strategies and Review at its sixtieth session (ECE/EB.AIR/WG.5/2022/4) and is expected to be forwarded for adoption by the Executive Body at its forty-second session (Geneva, 12–16 December 2022, tentatively).

Item 2.2.3: Development of a Guidance document on non-technical and structural measures

28. The task was assigned to the Task Force on Integrated Assessment Modelling as a lead body. The Task Force on Techno-economic Issues contributes to the work providing inputs, where possible and appropriate, and revising the text.

Item 2.2.4: Promotion of guidance documents, including those recently adopted

29. The document entitled “Prioritizing reductions of particulate matter in its sources that are also significant sources of black carbon – analysis and guidance” (ECE/EB.AIR/2021/6) was prepared by the Task Force on Integrated Assessment Modelling, as a lead body, in cooperation with the Task Force on Techno-economic Issues. It is aimed to clarify in which sectors Parties to the Convention can implement fine particulate matter emission reduction measures that will enable reductions of black carbon. The Executive Body adopted the document at its forty-first session.

30. The Task Force, in collaboration with experts of the International Cryosphere Climate Initiative and the Task Force on Reactive Nitrogen, developed the Guidance Document on agricultural residue burning (ECE/EB.AIR/2021/5), which was adopted by the Executive Body at its forty-first session.

31. The Task Force Co-Chairs are in touch with other technical bodies of the Convention, including the new established Task Force on International Cooperation on Air Pollution, to disseminate and promote the most recently adopted guidance documents and other technical documents and tools.

⁵ This section contains information on the Task Force activities carried out mostly in 2021 with respect to the review of the Gothenburg Protocol and preparation of the report on the cost of inaction (correspond to items 2.1.2 and 2.1.5 in the 2022-2023 workplan and items 2.1.9 and 2.1.7 in the 2020-2021 workplan for the implementation of the Convention, respectively).

IV. Annual meetings of the Task Force

32. The eighth annual meeting of the Task Force is tentatively planned for the first week of October 2022 to be held in person or online, depending upon the evolution of the pandemic.

Annex

Executive Summary

Draft conclusions of the review of the technical annexes to the Gothenburg Protocol as amended and the associated guidance documents

1. The review of the technical Annexes to the Gothenburg Protocol as amended and the associated guidance documents, carried out by the Task Force in 2021, included the review of the following annexes:

- (a) Annex IV: limit values for emissions of sulphur from stationary sources;
- (b) Annex V: limit values for emissions of nitrogen oxides from stationary sources;
- (c) Annex VI: limit values for emissions of volatile organic compounds from stationary sources;
- (d) Annex VIII: limit values fuels and new mobile sources;
- (e) Annex X: limit values for emissions of particulate matter from stationary sources;
- (f) Annex XI: limit values for emissions of volatile organic compounds of products.

2. The main draft conclusion, from a technologic point of view is that potential new ELVs have been identified as technically feasible/consistent with the new/upgraded technologies now available, which would allow significant emission reductions in many of the sector/fuel (activity)/technology combinations.

Industrial processes and large combustion plants (> 50 MW)

3. In annexes IV, V, VI and X to the Protocol, the abatement techniques are rather the same with respect to techniques considered in the previous revision of the Protocol 12 years ago, but, in many cases, the performances have evolved, and the innovations introduced significantly improve the abatement efficiency of technologies and/or expand their domain of application. These technologies deliver lower emissions with respect to the levels achieved by the limit values in the existing technical annexes in many cases. As an example, higher efficient primary measures are now available for the reduction of NO_x emissions in combustion of liquid and gaseous fuels. The performances of the techniques are available as range values for the industrial processes and large combustion plants mentioned in the four annexes on stationary sources.

Small and medium size combustion installations (<50 MW)

4. Small and medium size combustion installations with a rated thermal input lower than 50 MWth, are covered in annex X for particulate matter emissions. Updated limit values technically achievable have been identified for the following:

- (a) Residential combustion installations with a thermal input lower than 500 kWth (mainly domestic small appliances using wood and coal in this category);
- (b) Non-residential combustion installations with a thermal input ranging between 100 kWth and 1 MWth;
- (c) Combustion installations with a thermal input ranging between 1 MWth to 50 MWth.

5. The new/updated technically achievable lower limit values for appliances in the residential combustion sector result from the technological progress made in the development

of small domestic appliances. New types of small high efficiency electrostatic precipitators are now available also for domestic appliances. Similar improvements are registered for new electrostatic precipitators used on boilers with a rated thermal output below 2 MW, characterized by lower costs than those of common electrostatic precipitators.

6. Particulate matter emissions from domestic sources are recognized to be one of the main sources responsible for high particulate matter and black carbon emissions, and, therefore, resulting also in high concentrations in ambient air, especially in urban areas. Throughout the ECE region, the document “Prioritizing reductions of particulate matter from sources that are also significant sources of black carbon - analysis and guidance”, developed by the Task Force on Integrated Assessment Modelling in collaboration with the Task Force on Techno-economic issues, classifies domestic wood burning and coal burning as the priority source to be addressed to reduce emissions of black carbon. The Code of good practice for wood-burning and small combustion installations (ECE/EB.AIR/2019/5) provides good practices for domestic wood burning heating installations and best available techniques to reduce PM_{2.5} emissions from domestic wood burning (and coal burning) boilers and stoves, which should be prioritized to also achieve reduction of black carbon emissions.

Mobile Sources

7. As result of the review, annex VIII is eligible to be updated to take into account new ELVs for the newest vehicle generation, as, for example, the recently adopted standards in the European Union for road vehicles, non-road mobiles machinery and other transport vehicles. As for the road traffic and other types of transport (for example, rail transport), dust emissions from abrasion of brakes, tyres and roads will become dominant compared to the combustion emissions in the near future. Reduction techniques have been developed and are now available to reduce this kind of non-exhaust particulate matter emissions.

Products containing VOCs

8. As a result of the review, no significant new information has been found yet, which would justify the proposal for possible updates in annex XI.

Analysis of sections in the annexes, which could be considered obsolete and therefore deleted

9. In general, sections in annexes which are eligible for deletion have not been identified, except for some tables in annex VIII on mobile sources, which are considered obsolete, and therefore an update is possible without them being deleted.

Analysis of sections in the annexes that could be simplified

10. For all the annexes related to stationary sources, the cross paragraphs on compliance checking of ELVs and measurement are rather complex. But, at the same time, they are necessary to ensure a good implementation of limit values and to make progress in emission reduction. Rather than simplification, some updates would be suggested on definition of *the mean value considered* (monthly, daily or other means). The Task Force would like to propose, in the future, consistently with other priority tasks, the development of a guidance document on pollutant measurements for SO₂, particulate matter and NO_x (similarly, in 2016, guidelines for estimation and measurement of emissions of volatile organic compounds were developed by the Task Force)⁶.

Analysis of possible gaps in the annexes

11. Annex V on limit values of NO_x, developed before 2012, is neither focussed on a large number of industrial sources, which are potentially responsible for high emissions of NO_x, nor on combustion installations lower than 50 MWth. Considering the new WHO air quality guideline for NO₂ in ambient air (10 µg/m³ as an annual average compared to the current value of 40 µg/m³), which is likely to be taken in consideration in the review of the

⁶ http://www.unece.org/fileadmin/DAM/env/documents/2016/AIR/WGSR/Docs_December/E_ECE_EBAIR_WG5_2016.

Gothenburg Protocol as amended, the introduction in annex V of a set of additional industrial processes and combustion plants with thermal power lower than 50 MWth is suggested. The related abatement technology is available.

Limit values for condensables and black carbon

12. In the conclusions of the related EMEP report⁷, it is noticed that condensables cannot be defined easily. Measurement techniques for condensables and black carbon exist but they do not have yet largely agreed standards applied across the ECE region. For condensables, different analytical protocols may give different concentrations. Standardised methods should then be developed to ensure a correct measurement of total particulate matter concentrations in flue gases for the purposes of identifying technically feasible limit values for particulate matter, including condensables and black carbon, which are mainly generated in small domestic wood burning appliances. There is also a lack a measurement of particulate matter emissions with condensables included. The limit values identified for filterable (or solid) particulate matter in this kind of appliances allow for significant emission reductions of black carbon and the condensable part of particulate matter.

Analysis of possible updates in the guidance documents

13. All the technical and descriptive information collected on the new/upgraded technologies, discussed above will be the main documentation, as update material, to be included in the guidance documents.

14. As for possible adaptation of the annexes to better address key sectors in South-Eastern Europe, Eastern Europe, the Caucasus and Central Asia and Turkey (question 1.6.b of annex I to the document entitled “Preparations for the review of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone as amended in 2012”), the Task Force believes it may find a better answer in the review of the flexibility mechanism of the Protocol.⁸

15. A more extensive and comprehensive informal document on the Task Force review of technical annexes and guidance documents with background information regarding BATs and related ELVs is under development and will be finalized by March 2022 and made available to the Working Group on Strategies and Review at its sixtieth session.

⁷ David Simpson and all, “*How should condensables be included in PM emission inventories reported to EMEP/CLRTAP?*” Report of the expert workshop on condensable organics organised by MSC-W, Gothenburg, 17-19th March 2020. ISSN 1504-6206, 2020.

⁸ Presentation by the Chair of the Coordinating Group at the forty-first session of the Executive Body, see <https://unece.org/sites/default/files/2021-12/Speaking%20points%20CG%202021.pdf>.