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Options for revising the Gothenburg Protocol

Options for revising the 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone

Note by the secretariat

Summary

This document presents the options for revising the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol) to the Convention on Long-range Transboundary Air Pollution discussed by the Working Group on Strategies and Review at its sessions in 2009, 2010 and 2011. It has been prepared on the basis of document ECE/EB.AIR/WG.5/2011/1 as revised at the Working Group's forty-eighthth session in April 2011.

The document indicates proposed changes to the current text of the Protocol. Proposed new text is in bold. Text in square brackets that is not marked for deletion has not been provisionally agreed by the Working Group.

In line with the relevant decisions by the Executive Body to the Convention at its twenty-eighth session in 2010, the Working Group is invited to continue negotiations with a view to concluding the revision of the Gothenburg Protocol and presenting proposed amendments for adoption by the Parties to the Protocol meeting at the twenty-ninth session of the Executive Body in 2011.

Protocol to the 1979 Convention on Long-range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground-Level Ozone¹

The Parties,

Determined to implement the Convention on Long-range Transboundary Air Pollution,

Aware that nitrogen oxides, sulphur, volatile organic compounds, [and – ~~delete~~] reduced nitrogen compounds **and particulate matter** have been associated with adverse effects on human health, [and – ~~delete~~] the environment **and the climate**,

Concerned that critical loads of acidification, critical loads of nutrient nitrogen and critical levels of ozone **and particulate matter** for human health and vegetation are still exceeded in many areas of the United Nations Economic Commission for Europe's region,

Concerned also that emitted nitrogen oxides, sulphur, [and – ~~delete~~] volatile organic compounds, **ammonia and directly emitted particulate matter**, as well as [secondary – ~~delete~~] **secondarily formed** pollutants such as ozone, **particulate matter** and the reaction products of ammonia, are transported in the atmosphere over long distances and may have adverse transboundary effects,

Concerned furthermore that **black carbon and ground-level ozone are negatively impacting the climate, particularly in the Arctic and in the Alpine regions**,

Recognizing that emissions from Parties within the United Nations Economic Commission for Europe's region contribute to air pollution on the hemispheric and global scales, and recognizing the potential for transport between continents and the need for further study with regard to that potential,

Recognizing also that Canada and the United States of America are bilaterally negotiating reductions of emissions of nitrogen oxides [and volatile organic compounds – ~~delete~~], **sulphur dioxide and particulate matter** to address the transboundary [ozone effect – ~~delete~~] **impacts of particulate matter**,

Recognizing furthermore that Canada [will undertake further reductions of sulphur by 2010 through the implementation of the Canada-wide Acid Rain Strategy for Post-2000 – ~~delete~~] **[is committed to achieving reductions of sulphur dioxide, nitrogen oxides, volatile organic compounds and particulate matter to meet the national standards for ozone and particulate matter and the national objective to reduce acidification]**, and that the United States is committed to the implementation of [a nitrogen oxides reduction programme in the eastern United States and to the reduction in emissions necessary to meet its national ambient air quality standards for particulate matter – ~~delete~~] **programmes to reduce emissions of nitrogen oxides, sulphur dioxide, volatile organic compounds and particulate matter necessary to meet national ambient air quality standards for ozone and particulate matter, to make continued progress in reducing acidification and eutrophication effects and to improve visibility in national parks and urban areas alike**,

Resolved to apply a multi-effect, multi-pollutant approach to preventing or minimizing the exceedances of critical loads and levels,

¹ The name of the Protocol does not include "particulate matter".

[*Taking into account* the emissions from certain existing activities and installations responsible for present air pollution levels and the development of future activities and installations,

Aware that techniques and management practices are available to reduce emissions of these substances, – ~~delete~~]

***Taking into account* the scientific knowledge about the hemispheric transport of air pollution, the influence of the nitrogen cycle and the potential synergies with and trade-offs between air pollution and climate change,**

***Also taking into account* the advances in scientific knowledge by international organizations, such as the United Nations Environment Programme and the Arctic Council, about the climate co-benefits of reducing primary particulate matter and ground-level ozone;**

***Aware* that emissions from shipping and aviation contribute significantly to adverse effects on health and the environment and are important issues under consideration by the International Maritime Organization and the International Civil Aviation Organization,**

Resolved to take measures to anticipate, prevent or minimize emissions of these substances, taking into account the application of the precautionary approach as set forth in principle 15 of the Rio Declaration on Environment and Development,

Reaffirming that States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction,

Conscious of the need for a cost-effective regional approach to combating air pollution that takes account of the variations in effects and abatement costs between countries,

Noting the important contribution of the private and non-governmental sectors to knowledge of the effects associated with these substances and available abatement techniques, and their role in assisting in the reduction of emissions to the atmosphere,

Bearing in mind that measures taken to reduce emissions of sulphur, nitrogen oxides, ammonia, [and – ~~delete~~] volatile organic compounds **and particulate matter** should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international competition and trade,

Taking into consideration best available scientific and technical knowledge and data on emissions, atmospheric processes and effects on human health and the environment of these substances, as well as on abatement costs, and acknowledging the need to improve this knowledge and to continue scientific and technical cooperation to further understanding of these issues,

Noting that under the Protocol concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes, adopted at Sofia on 31 October 1988, and the Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes, adopted at Geneva on 18 November 1991, there is already provision to control emissions of nitrogen oxides and volatile organic compounds, and that the technical annexes to both those Protocols already contain technical guidance for reducing these emissions,

Noting also that under the Protocol on Further Reduction of Sulphur Emissions, adopted at Oslo on 14 June 1994, there is already provision to reduce sulphur emissions in order to contribute to the abatement of acid deposition by diminishing the exceedances of critical sulphur depositions, which have been derived from critical loads of acidity according to the contribution of oxidized sulphur compounds to the total acid deposition in 1990,

Noting furthermore that this Protocol is the first agreement under the Convention to deal specifically with reduced nitrogen compounds **and particulate matter, including black carbon,**

[Bearing in mind that reducing the emissions of these substances may provide additional benefits for the control of other pollutants, including in particular transboundary secondary particulate aerosols, which contribute to human health effects associated with exposure to airborne particulates – ~~delete~~]

[Bearing in mind the need to avoid, in so far as possible, taking measures for the achievement of the objectives of this Protocol that aggravate other health and environment-related problems],

Noting that measures taken to reduce the emissions of nitrogen oxides and reduced nitrogen compounds should involve consideration of the full biogeochemical nitrogen cycle and, so far as possible, not increase emissions of reactive nitrogen including nitrous oxide [**and not increase nitrate levels**] which could aggravate other nitrogen-related problems,

Aware that methane and carbon monoxide emitted by human activities contribute, in the presence of nitrogen oxides and volatile organic compounds, to the formation of [tropospheric – ~~delete~~] **ground-level** ozone, and

[Recognizing that measures to reduce emissions of black carbon (a component of particulate matter) will improve public health and also have climate co-benefits by reducing warming in the near term, particularly in the Arctic and Alpine regions],

Aware also of the commitments that Parties have assumed under the United Nations Framework Convention on Climate Change,

Have agreed as follows:

Article 1

Definitions

For the purposes of the present Protocol,

1. “Convention” means the Convention on Long-range Transboundary Air Pollution, adopted at Geneva on 13 November 1979;
2. “EMEP” means the Cooperative Programme for Monitoring and Evaluation of Long-range Transmission of Air Pollutants in Europe;
3. “Executive Body” means the Executive Body for the Convention constituted under article 10, paragraph 1, of the Convention;
4. “Commission” means the United Nations Economic Commission for Europe;
5. “Parties” means, unless the context otherwise requires, the Parties to the present Protocol;
6. “Geographical scope of EMEP” means the area defined in article 1, paragraph 4, of the Protocol to the 1979 Convention on Long-range Transboundary Air Pollution on Long-

term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP), adopted at Geneva on 28 September 1984;

7. “Emission” means the release of a substance from a point or diffuse source into the atmosphere;

8. “Nitrogen oxides” means nitric oxide and nitrogen dioxide expressed as nitrogen dioxide (NO₂);

9. “Reduced nitrogen compounds” means ammonia and its reaction products, **expressed as ammonia (NH₃);**²

10. “Sulphur” means [all sulphur compounds – ~~delete~~] **the sum of sulphur dioxide (SO₂) and sulphur trioxide (SO₃),** expressed as SO₂;

11. “Volatile organic compounds”, or “VOCs”, means, unless otherwise specified, all organic compounds of an anthropogenic nature, other than methane, that are capable of producing photochemical oxidants by reaction with nitrogen oxides in the presence of sunlight;

[12. “Particulate matter” or “PM” is an air pollutant consisting of a mixture of solid and liquid particles suspended in the air. These particles differ in their physical properties (such as size) and chemical composition. PM can either be directly emitted into the air (primary PM) or be formed secondarily in the atmosphere from gaseous precursors (mainly sulphur dioxide, nitrogen oxides, ammonia and non-methane volatile organic compounds). Particle size (or aerodynamic diameter) is often used to characterize PM, since it is associated with the origin of the particles, their transport in the atmosphere and their ability to be inhaled into the respiratory system;³

13. “PM_{2.5}” means the mass of particulate matter with an aerodynamic diameter equal to or less than 2.5 µm;

14. “PM₁₀” means the mass of particulate matter with an aerodynamic diameter equal to or less than 10 µm;

15. “TSP” or “dust” means the mass of particles, of any shape, structure or density, dispersed in the gas phase at the sampling point conditions which may be collected by filtration under specified conditions after representative sampling of the gas to be analysed, and which remain upstream of the filter and on the filter after drying under specified conditions.]⁴

[16.] “Particulate matter” or “PM” unless otherwise stated refers to both PM_{2.5} and PM₁₀;

[17. “Particulate matter components” means individual chemical species or classes or components with specific physiochemical properties constituting particulate matter, including black carbon, elemental carbon, organic carbon, inorganic components, soluble, non-soluble and crustal material;]

[18.] “Black carbon” means carbonaceous particulate matter that absorbs light;

² This definition may need to be further specified, e.g., to allow Parties to report in line with article 7.

³ See the joint WHO/Convention Task Force on the Health Aspects of Air Pollution report, *Health risks of particulate matter from long-range transboundary air pollution* (European Centre for Environment and Health Bonn Office, 2006), p. ix.

⁴ The definition is consistent with that proposed for the Heavy Metals Protocol.

[19.] **“Ozone precursors” means nitrogen oxides, volatile organic compounds, including methane, and carbon monoxide;**

[20.] [12. – ~~delete~~] “Critical load” means a quantitative estimate of an exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur, according to present knowledge;

[21.] [13. – ~~delete~~] “Critical levels” means concentrations of pollutants in the atmosphere **or fluxes to receptors** above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur, according to present knowledge;

[22.] [14. – ~~delete~~] “Pollutant emissions management area”, or “PEMA”, means an area designated in annex III under the conditions laid down in article 3, paragraph 9;

[23.] [15. – ~~delete~~] “Stationary source” means any fixed building, structure, facility, installation or equipment that emits or may emit sulphur, nitrogen oxides, **ammonia**, volatile organic compounds or [ammonia – ~~delete~~] **particulate matter** directly or indirectly into the atmosphere;

[24.] [16. – ~~delete~~] [“New stationary source” means any stationary source of which the construction or substantial modification is commenced after the expiry of one year from the date of entry into force **for a Party of: (a) the present Protocol; or (b) an amendment to the present Protocol that, with respect to that stationary source, introduces new limit values in annexes IV to VI or X.** It shall be a matter for the competent national authorities to decide whether a modification is substantial or not, taking into account such factors as the environmental benefits of the modification].⁵

25. “Countries with economies in transition” are countries as listed in Executive Body decision 2006/13 or, if the Executive Body modifies the list in a subsequent decision, the latest such decision.

Article 2

Objective

1. The objective of the present Protocol is to control and reduce emissions of sulphur, nitrogen oxides, ammonia, [and – ~~delete~~] volatile organic compounds **and particulate matter** that are caused by anthropogenic activities and are likely to cause adverse effects on human health [**and the environment**], natural ecosystems, materials, [and – ~~delete~~] crops [**and the climate**] due to acidification, eutrophication **and particulate matter** or ground-level ozone as a result of long-range transboundary atmospheric transport, and to ensure, as far as possible, that in the long term and in a stepwise approach, taking into account advances in scientific knowledge, atmospheric depositions or concentrations do not exceed [**levels which would exacerbate near term climate change**] [**and considering co-benefits on near term climate change**]:

(a) For Parties within the geographical scope of EMEP and Canada, the critical loads of acidity, as described in annex I [**and that allow for/ that allow**] [**and achieve**] **ecosystem recovery as described in [guidance document V]**;

(b) For Parties within the geographical scope of EMEP, the critical loads of nutrient nitrogen, as described in annex I [**and that allow for/ that allow**] [**and achieve**] **ecosystem recovery as described in [guidance document V]**; [and – ~~delete~~]

⁵ The proposed definition is in line with the definition in the amended Protocol on Persistent Organic Pollutants.

- (c) For particulate matter:
- (i) For Parties within the geographical scope of EMEP, the critical levels of particulate matter, as given in annex I;
 - (ii) For Canada, the national standard for particulate matter; and
 - (iii) For the United States of America, the National Ambient Air Quality Standards for particulate matter; and
- (d) For ozone:
- (i) For Parties within the geographical scope of EMEP, the critical levels of ozone, as given in annex I;
 - (ii) For Canada, the [Canada-wide Standard – ~~delete~~] national standard for ozone; and
 - (iii) For the United States of America, the National Ambient Air Quality Standards for ozone.

[2. In implementing measures to achieve their national targets for particulate matter, Parties should, to the extent possible, give priority to emission reduction measures which also significantly reduce black carbon in order to help avoid the exacerbation of near-term climate change.]⁶

[3. The emission ceilings for 2020 as listed in annex II should result in environmental and health improvements as presented in [guidance document V.]⁷

Article 3

Basic obligations

1. Each Party having an emission ceiling in any table in annex II shall reduce and maintain the reduction in its annual emissions in accordance with that ceiling and the timescales specified in that annex. Each Party shall, as a minimum, control its annual emissions of polluting compounds in accordance with the obligations in annex II. **[To meet the ceiling for particulate matter, each Party should seek reductions from those source categories known to emit high amounts of black carbon, to the extent possible.⁸ [Guidance document V] describes the environmental benefits of attaining the emission ceilings as listed in annex II by comparing exceedances of effects thresholds listed in annex I in the target year to those in the base year.]⁹ Each party shall apply best available techniques for reducing black carbon emissions as listed in the Guidance Document adopted by the Executive Body at its [xxth] session and any amendments thereto. The Parties shall, no later than two years after the date of entry into force of the present Protocol, evaluate mitigation measures for black carbon with a view to amending annexes X and VIII, as well as the Guidance Document.**

[1 bis. A Party having an annual emission that exceeds the corresponding emission ceiling set in annex II still fulfils the obligations of paragraph 1 if:

⁶ This text could be moved to article 6.

⁷ This text could be moved to article 5.

⁸ This text could be moved to article 6

⁹ The text referring to the Guidance document could be better moved elsewhere, e.g., to article 5, 7 or 8.

(a) The average of the annual emissions for the year itself, the previous year and the year after does not exceed that emission ceiling; or

(b) The exceedance is caused by:

(i) New source categories found after the adoption of the Protocol and approved by the EMEP Steering Body; or

(ii) Significant differences between the emission factors and the way emissions of a source are calculated, the setting of the emission ceilings and the updated emission factors and the way emissions are calculated in assessing emission inventories as approved by the EMEP Steering Body;

under the provision that:

(c) The Party also fulfils the obligations of paragraphs 2 to 7 with regard to the pollutant for which the ceiling is exceeded.

1 ter. Any Party intending to make use of one or more of these provisions shall document the underlying data in its Informative Inventory Report, as referred to in article 7, paragraph 1.]¹⁰

2. Each Party shall apply the limit values specified in annexes IV, V, [and – ~~delete~~] VI **and X** to each new stationary source within a stationary source category as identified in those annexes, no later than the timescales specified in annex VII. As an alternative, a Party may apply different emission reduction strategies that achieve equivalent overall emission levels for all source categories together.

3. Each Party shall, insofar as it is technically and economically feasible, and taking into consideration the costs and advantages, apply the limit values specified in annexes IV, V, [and – ~~delete~~] VI **and X** to each existing stationary source within a stationary source category as identified in those annexes, no later than the timescales specified in annex VII. As an alternative, a Party may apply different emission reduction strategies that achieve equivalent overall emission levels for all source categories together or, for Parties outside the geographical scope of EMEP, that are necessary to achieve national or regional goals for acidification abatement and to meet national air quality standards.

[4. Limit values for new and existing boilers and process heaters with a rated thermal input exceeding 50 MW_{th} and new heavy duty vehicles shall be evaluated by the Parties at a session of the Executive Body with a view to amending annexes IV, V, and VIII no later than two years after the date of entry into force of the present Protocol. – ~~delete~~]

4. [5. – ~~delete~~] Each Party shall apply the limit values for the fuels and new mobile sources identified in annex VIII, no later than the timescales specified in annex VII .

5. [6. – ~~delete~~] Each Party should apply best available techniques to mobile sources and to each new or existing stationary source, taking into account guidance documents I [to V – ~~delete~~] **[and II]** adopted by the Executive Body at its [seventeenth – ~~delete~~] **[xxth]** session (decision [1999/1 – ~~delete~~] **[201x/x]**) and any amendments thereto.

6. [7. Each Party shall take appropriate measures based, inter alia, on scientific and economic criteria to reduce emissions of volatile organic compounds associated with the use of products not included in annex VI or VIII. The Parties shall, no later than at the second session of the Executive Body after the entry into force of the present Protocol, consider with a view to adopting an annex on products, including criteria for the selection of such products, limit values for the volatile organic compound content of products not

¹⁰ The proposed new paragraphs 1 bis and 1 ter might be better placed elsewhere (e.g., in art. 9).

included in annex VI or VIII, as well timescales for the application of the limit values. – ~~delete~~. [Each Party shall, insofar as it is technically and economically feasible, and taking into consideration the costs and benefits, apply the limit values for VOC contents of products as defined in annex XI.]

7. [8. – ~~delete~~] Each Party shall, subject to paragraph 9 [10 – ~~delete~~]:

(a) Apply, as a minimum, the ammonia control measures specified in **part A of annex IX**; and

(b) Apply, where it considers it appropriate, **the control measures specified in part B of annex IX and** best available techniques for preventing and reducing ammonia emissions, as listed in guidance document [V – ~~delete~~] **III** adopted by the Executive Body at its [seventeenth – ~~delete~~][~~xxth~~] session (decision [1999/1 – ~~delete~~] [20xx/x]) and any amendments thereto.

[7. Each Party shall, subject to paragraph 9, apply the ammonia control measures specified in annex IX. [As an alternative, a Party may apply different emission reduction strategies that achieve equivalent overall emission levels for all source categories together.]¹¹

[7. Each Party shall, subject to paragraph 9, apply[, as a minimum, – ~~delete~~] the ammonia control measures specified in annex IX. As an alternative, a Party may apply different emission reduction measures, on the basis of best available techniques for preventing and reducing ammonia emissions listed in the guidance document [V – ~~delete~~] **III** adopted by the Executive Body at its [seventeenth – ~~delete~~] session (decision [1999/1 – ~~delete~~] [xxth] [20xx/x]) and any amendments thereto, that achieve equivalent overall emission reductions.]¹²

8. [9. – ~~delete~~] Paragraph 9 [10 – ~~delete~~] shall apply to any Party:

(a) Whose total land area is greater than 2 million square kilometres;

(b) Whose annual emissions of sulphur, nitrogen oxides, ammonia, [and/or – ~~delete~~] volatile organic compounds [**and/or particulate matter**] contributing to acidification, eutrophication, [or – ~~delete~~] ozone formation [**or increased levels of particulate matter**] in areas under the jurisdiction of one or more other Parties originate predominantly from within an area under its jurisdiction that is listed as a PEMA in annex III, and which has presented documentation in accordance with subparagraph (c) to this effect;

(c) Which has submitted upon signature, ratification, acceptance or approval of, or accession to, the present Protocol a description of the geographical scope of one or more PEMAs for one or more pollutants, with supporting documentation, for inclusion in annex III; and

(d) Which has specified upon signature, ratification, acceptance or approval of, or accession to, the present Protocol its intention to act in accordance with this paragraph.

9. [10. – ~~delete~~] A Party to which this paragraph applies shall:

(a) If within the geographical scope of EMEP, be required to comply with the provisions of this article and annex II only within the relevant PEMA for each pollutant for which a PEMA within its jurisdiction is included in annex III; or

¹¹ Proposal by Norway.

¹² Proposal by Switzerland.

(b) If not within the geographical scope of EMEP, be required to comply with the provisions of paragraphs [1, 2, 3, 5, 6 and 7 – ~~delete~~] **1 to 6** and annex II, only within the relevant PEMA for each pollutant (nitrogen oxides, sulphur [and/or –~~delete~~], volatile organic compounds [**and particulate matter**] for which a PEMA within its jurisdiction is included in annex III, and shall not be required to comply with paragraph 7 [8 – ~~delete~~] anywhere within its jurisdiction.

10. [11. – ~~delete~~] Canada and the United States of America shall, upon their ratification, acceptance or approval of, or accession to, the present Protocol, submit to the Executive Body their respective emission reduction commitments with respect to sulphur, nitrogen oxides, [and – ~~delete~~] volatile organic compounds [**and particulate matter**] for automatic incorporation into annex II.

11. Canada may also upon ratification, acceptance or approval of, or accession to the present Protocol, submit to the Executive Body additional relevant limit values for automatic incorporation into annexes IV, V, VI, VIII, X and XI.

[12. Each Party shall develop and maintain inventories and projections for the emissions of sulphur dioxide, nitrogen oxides, ammonia, volatile organic compounds, and particulate matter. Each Party should also develop and maintain inventories and projections for emissions of black carbon.¹³ Parties within the geographic scope of EMEP shall use the methodologies specified in guidelines prepared by the Steering Body of EMEP and adopted by the Parties at a session of the Executive Body. Parties in areas outside the geographic scope of EMEP shall use as guidance the methodologies developed through the workplan of the Executive Body.]¹⁴

13. Each Party should actively participate in programmes under the Convention on the effects of air pollution on human health and the environment.¹⁵

[14.] [12. – ~~delete~~] The Parties shall, subject to the outcome of the first review provided for under article 10, paragraph 2, and no later than one year after completion of that review, commence negotiations on further obligations to reduce emissions.

Article 4

Exchange of information and technology

1. Each Party shall, in a manner consistent with its laws, regulations and practices and in accordance with its obligations in the present Protocol, create favourable conditions to facilitate the exchange of information, technologies and techniques, with the aim of reducing emissions of sulphur, nitrogen oxides, ammonia, [and – ~~delete~~] volatile organic compounds **and particulate matter, including black carbon** by promoting, inter alia:

(a) The development and updating of databases on best available techniques, including those that increase energy efficiency, low-emission burners, [and – ~~delete~~] good

¹³ This text could be better placed under article 6.2.

¹⁴ This paragraph, consistent with the relevant proposal in the 1998 Protocol on Heavy Metals, aims to invite Parties to develop and maintain emission inventories in line with the Guidelines for reporting emission data under the Convention on Long-range Transboundary Air Pollution (ECE/EB.AIR/97). As the use of the Guidelines is mandatory for emission inventories (enabling clause), its name and/or content may need to be reconsidered.

¹⁵ The new paragraph is intended to increase the level of participation in the effects-oriented activities under the Convention. It is an enabling clause for the Parties to this Protocol. Other Parties to the Convention are invited to participate in the effects-oriented work by the decision of the Executive Body (2008/1). Note that this paragraph is a voluntary obligation.

environmental practice in agriculture **and measures that are known to mitigate emissions of black carbon as a component of particulate matter;**

- (b) The exchange of information and experience in the development of less polluting transport systems;
- (c) Direct industrial contacts and cooperation, including joint ventures; and
- (d) The provision of technical assistance.

2. In promoting the activities specified in paragraph 1, each Party shall create favourable conditions for the facilitation of contacts and cooperation among appropriate organizations and individuals in the private and public sectors that are capable of providing technology, design and engineering services, equipment or finance.

Article 5

Public awareness

1. Each Party shall, in a manner consistent with its laws, regulations and practices, promote the provision of information to the general public, including information on:

(a) National annual emissions of sulphur, nitrogen oxides, ammonia, [~~and - delete~~] volatile organic compounds **and particulate matter, including black carbon** and progress towards compliance with the national emission ceilings or other obligations referred to in article 3;

(b) Depositions and concentrations of the relevant pollutants and, where applicable, these depositions and concentrations in relation to critical loads and levels referred to in article 2;

(c) Levels of [~~tropospheric - delete~~] **ground-level ozone**; [~~and - delete~~]

(d) Strategies and measures applied or to be applied to reduce air pollution problems dealt with in the present Protocol and set out in article 6; **and**

(e) **The environmental and health improvements associated with attaining emission ceilings for 2020 as listed in annex II, as presented in [guidance document No. V].**

2. Furthermore, each Party may make information widely available to the public with a view to minimizing emissions, including information on:

(a) Less polluting fuels, renewable energy and energy efficiency, including their use in transport;

(b) Volatile organic compounds in products, including labelling;

(c) Management options for wastes containing volatile organic compounds that are generated by the public;

(d) Good agricultural practices to reduce emissions of ammonia;

(e) Health, [~~and - delete~~] environmental **and climate** effects associated with **reducing of** the pollutants covered by the present Protocol; and

(f) Steps which individuals and industries may take to help reduce emissions of the pollutants covered by the present Protocol.

Article 6

Strategies, policies, programmes, measures and information

1. Each Party shall, as necessary and on the basis of sound scientific and economic criteria, in order to facilitate the implementation of its obligations under article 3:

(a) Adopt supporting strategies, policies and programmes without undue delay after the present Protocol enters into force for it;

(b) Apply measures to control and reduce its emissions of sulphur, nitrogen oxides, ammonia, [~~and – delete~~] volatile organic compounds **and particulate matter**. **[To the extent possible,] each Party should seek reductions from source categories known to emit high amounts of black carbon;**

(c) Apply measures to encourage the increase of energy efficiency and the use of renewable energy;

(d) Apply measures to decrease the use of polluting fuels;

(e) Develop and introduce less polluting transport systems and promote traffic management systems to reduce overall emissions from road traffic;

(f) Apply measures to encourage the development and introduction of low-polluting processes and products, taking into account guidance documents I to [V – ~~delete~~] **III** adopted by the Executive Body at its [seventeenth – ~~delete~~] [~~xxth~~] session (decision [1999/1 – ~~delete~~] [~~201x/x~~]) and any amendments thereto;

(g) Encourage the implementation of management programmes to reduce emissions, including voluntary programmes, and the use of economic instruments, taking into account guidance document [VI – ~~delete~~] **IV** adopted by the Executive Body at its [~~xxth~~] session (decision [1999/1 – ~~delete~~] [~~201x/x~~]) and any amendments thereto;

(h) Implement and further elaborate policies and measures in accordance with its national circumstances, such as the progressive reduction or phasing-out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all sectors that emit sulphur, nitrogen oxides, ammonia, [~~and – delete~~] volatile organic compounds [~~and particulate matter~~] which run counter to the objective of the Protocol, and apply market instruments; and

(i) Apply measures, where cost-effective, to reduce emissions from waste products containing volatile organic compounds.

2. Each Party shall collect and maintain information on[: (a) Actual levels of emissions – ~~delete~~] [~~ambient concentrations and depositions~~] of sulphur, nitrogen compounds, volatile organic compounds, [~~and – delete~~] ozone [~~and particulate matter~~] [taking into account, for those Parties within the geographical scope of EMEP, the work plan of EMEP; and (b) The effects of ambient concentrations and of the deposition of sulphur, nitrogen compounds, volatile organic compounds and ozone – ~~delete~~] [~~and their~~] effects on human health, terrestrial and aquatic ecosystems, [~~and – delete~~] materials [~~and the climate~~]. **[Parties within the geographic scope of EMEP should use guidelines adopted by the Parties at a session of the Executive Body. Parties outside the geographic scope of EMEP should use as guidance the methodologies developed through the workplan of the Executive Body.]**

3. Any Party may take more stringent measures than those required by the present Protocol. **[To the extent possible, to reduce potentially significant climate impacts, such as those currently under way in the Arctic and Alpine regions, [as well as the known**

human health impacts,] Parties are encouraged to swiftly and effectively begin implementing black carbon emission reductions.]

Article 7 Reporting

1. Subject to its laws and regulations and in accordance with its obligations under the present Protocol:

(a) Each Party shall report, through the Executive Secretary of the Commission, to the Executive Body, on a periodic basis as determined by the Parties at a session of the Executive Body, information on the measures that it has taken to implement the present Protocol. Moreover:

(i) Where a Party applies different emission reduction strategies under article 3, paragraphs 2 and 3, it shall document the strategies applied and its compliance with the requirements of those paragraphs;

(ii) Where a Party judges certain limit values, as specified in accordance with article 3, paragraph 3, not to be technically and economically feasible, taking into consideration the costs and advantages, it shall report and justify this;

(b) Each Party within the geographical scope of EMEP shall [report, through the Executive Secretary of the Commission, to EMEP, on a periodic basis to be determined by the Steering Body of EMEP and approved by the Parties at a session of the Executive Body, the following information: (i) Levels of – ~~delete~~], **for the emissions of sulphur dioxide, nitrogen oxides, ammonia, [and – ~~delete~~] volatile organic compounds and particulate matter** [using as a minimum, the methodologies and the temporal and spatial resolution specified by the Steering Body of EMEP– ~~delete~~], **on the basis of guidelines as prepared by the Steering Body of EMEP and adopted by the Parties at a session of the Executive Body, report the following information to EMEP through the Executive Secretary of the Commission:**

(i) Levels of emissions [of sulphur, nitrogen oxides, ammonia and volatile organic compounds – ~~delete~~] using, as a minimum, the methodologies and the temporal and spatial resolution specified by the Steering Body of EMEP;

(ii) Levels of emissions [of each substance – ~~delete~~] in the reference year [(1990) – ~~delete~~] [(2000)] using the same methodologies and temporal and spatial resolution;

(iii) Data on projected emissions [and current reduction plans; and – ~~delete~~];

(iv) [Where it deems it appropriate, any exceptional circumstances justifying emissions that are temporarily higher than the ceilings established for it for one or more pollutants; and – ~~delete~~] [**An Informative Inventory Report containing detailed information on reported emission inventories and emission projections, including specification of the effect of new sources and new emission factors found after the adoption of the Protocol.**]

[Each Party should also develop emission inventories and projections for emissions of particulate matter, including on black carbon;]

(c) Each Party within the geographical scope of EMEP should report available information to the Executive Body, through the Executive Secretary of the Commission, on air pollution effects programmes on human health and the environment and atmospheric monitoring and modelling programmes under the

Convention, using guidelines adopted by the Parties at a session of the Executive Body;

[(d)] [(c) – delete] Parties in areas outside the geographical scope of EMEP shall make available information similar to that specified in subparagraph (b), if requested to do so by the Executive Body. **Parties in areas outside the geographical scope of EMEP should make available information similar to that specified in subparagraph (c), if requested to do so by the Executive Body.**

2. The information to be reported in accordance with paragraph 1 (a) shall be in conformity with a decision regarding format and content to be adopted by the Parties at a session of the Executive Body. The terms of this decision shall be reviewed as necessary to identify any additional elements regarding the format or the content of the information that is to be included in the reports.

3. In good time before each annual session [of the – delete], the Executive Body [EMEP shall provide – delete] **shall receive from its subsidiary bodies** information on:

(a) Ambient concentrations and depositions of sulphur and nitrogen compounds as well as, where available, ambient concentrations of **particulate matter and its components**, volatile organic compounds and ozone;

(b) Calculations of sulphur and oxidized and reduced nitrogen budgets and relevant information on the long-range transport of [**particulate matter**,] ozone and [its – delete] **their precursors; [and]**

[(c) Adverse effects on human health, natural ecosystems, materials, and crops including interactions with climate change and the environment related to the substances in this Protocol, and progress in achieving health and environmental improvements as described in [guidance document V]].

[4.] Parties in areas outside the geographical scope of EMEP shall make available [similar – delete] information **similar to that specified in paragraph 3**, if requested to do so by the Executive Body.

[5.] [4. – delete] The Executive Body shall, in accordance with article 10, paragraph 2 (b), of the Convention, arrange for the preparation of information on the effects of depositions of sulphur and nitrogen compounds and concentrations of ozone **and particulate matter**.

[6.] [5. – delete] The Parties shall, at sessions of the Executive Body, arrange for the preparation, at regular intervals, of revised information on calculated and internationally optimized allocations of emission reductions for the States within the geographical scope of EMEP, using integrated assessment models, including atmospheric transport models, with a view to reducing further, for the purposes of article 3, paragraph 1, the difference between actual depositions of sulphur and nitrogen compounds and critical load values as well as the difference between actual ozone **and particulate matter** concentrations and the critical levels of ozone **and particulate matter** specified in annex I, or such alternative assessment methods as approved by the Parties at a session of the Executive Body.

[7. **A Party that is a country with economy in transition may [request to] report emissions limited to large point sources, for a period of up to five years after the date of entry into force of the Protocol for the Party in question.**]

Article 8

Research, development and monitoring

The Parties shall encourage research, development, monitoring and cooperation related to:

(a) The international harmonization of methods for the calculation and assessment of the adverse effects associated with the substances addressed by the present Protocol for use in establishing critical loads and critical levels and, as appropriate, the elaboration of procedures for such harmonization;

(b) The improvement of emission databases, in particular those on **particulate matter, and particulate matter components, including black carbon**, ammonia and volatile organic compounds;

(c) The improvement of monitoring techniques and systems and of the modelling of transport, concentrations and depositions of sulphur, nitrogen compounds, [~~and – delete~~] volatile organic compounds **and particulate matter and particulate matter components, including black carbon**, as well as of the formation of ozone [~~and secondary particulate matter~~];

(d) The improvement of the scientific understanding of:

[(i)] The long-term fate of emissions and their impact on the hemispheric background concentrations of sulphur, nitrogen, volatile organic compounds, ozone and particulate matter, focusing, in particular, on the chemistry of the free troposphere and the potential for intercontinental flow of pollutants; [~~and~~

(ii) **The potential co-benefits for climate change mitigation associated with potential reduction scenarios for air pollutants (such as black carbon, methane, and carbon monoxide) which have near-term radiative forcing and other climate effects**];

(e) The further elaboration of an overall strategy to reduce the adverse effects of acidification, eutrophication, [~~and – delete~~] photochemical pollution [~~and particulate matter~~], including synergisms and combined effects;

(f) Strategies for the further reduction of emissions of sulphur, nitrogen oxides, ammonia, [~~and – delete~~] volatile organic compounds **and [other ozone precursors] [and particulate matter] [and particulate matter components]** based on critical loads and critical levels as well as on technical developments, and the improvement of integrated assessment modelling to calculate internationally optimized allocations of emission reductions taking into account the need to avoid excessive costs for any Party. Special emphasis should be given to emissions from agriculture and transport;

(g) The identification of trends over time and the scientific understanding of the wider effects of sulphur, nitrogen, [~~and – delete~~] volatile organic compounds, [**particulate matter**] and photochemical pollution on human health, [~~including their contribution to concentrations of particulate matter – delete~~] the environment, in particular acidification and eutrophication, and materials, especially historic and cultural monuments, taking into account the relationship between sulphur oxides, nitrogen oxides, ammonia, volatile organic compounds, **particulate matter [and particulate matter components]** and [~~tropospheric – delete~~] **ground-level ozone**;

(h) Emission abatement technologies, and technologies and techniques to improve energy efficiency, energy conservation and the use of renewable energy;

(i) The efficacy of ammonia control techniques for farms and their impact on local and regional deposition;

(j) The management of transport demand and the development and promotion of less polluting modes of transport;

(k) The quantification and, where possible, economic evaluation of benefits for the environment, [and – ~~delete~~] human health **and the climate** resulting from the reduction of emissions of sulphur, nitrogen oxides, ammonia, [and – ~~delete~~] volatile organic compounds [**and particulate matter**]; and

(l) The development of tools for making the methods and results of this work widely applicable and available.

Article 9 Compliance

No changes proposed.

Article 10 Reviews by the Parties at sessions of the Executive Body

1. The Parties shall, at sessions of the Executive Body, pursuant to article 10, paragraph 2 (a), of the Convention, review the information supplied by the Parties, EMEP and subsidiary bodies of the Executive Body, the data on the effects of concentrations and depositions of sulphur, [and – ~~delete~~] nitrogen compounds, **particulate matter** and of photochemical pollution, as well as the reports of the Implementation Committee referred to in article 9 above.

2. (a) The Parties shall, at sessions of the Executive Body, keep under review the obligations set out in the present Protocol, including:

(i) Their obligations in relation to their calculated and internationally optimized allocations of emission reductions referred to in article 7, paragraph [5 – ~~delete~~] 6, above; and

(ii) The adequacy of the obligations and the progress made towards the achievement of the objective of the present Protocol;

(b) Reviews shall take into account the best available scientific information on the effects of acidification, eutrophication and photochemical pollution, including assessments of all relevant health effects, [**climate co-benefits,**] critical levels and loads, the development and refinement of integrated assessment models, technological developments, changing economic conditions, progress made on the databases on emissions and abatement techniques, especially related to **particulate matter**, ammonia and volatile organic compounds, and the fulfilment of the obligations on emission levels;

(c) The procedures, methods and timing for such reviews shall be specified by the Parties at a session of the Executive Body. The first such review shall commence no later than one year after the present Protocol enters into force.

Article 11 Settlement of disputes

No changes proposed.

Article 12 Annexes

No changes proposed.

Article 13 Amendments and adjustments

1. Any Party may propose amendments to the present Protocol. Any Party to the Convention may propose an adjustment to annex II to the present Protocol to add to it its name, together with emission levels, emission ceilings and percentage emission reductions. **[Any Party may propose an adjustment of the emission levels, the base year and the emission ceiling for particulate matter. These adjustments need to be detailed in the Informative Inventory Report of that Party.]**

2. Proposed amendments and adjustments shall be submitted in writing to the Executive Secretary of the Commission, who shall communicate them to all Parties. The Parties shall discuss the proposed amendments and adjustments at the next session of the Executive Body, provided that those proposals have been circulated by the Executive Secretary to the Parties at least ninety days in advance.

3. Amendments to the present Protocol **[and, subject to paragraphs 6 and 7 below,]** [including amendments – ~~delete~~] to annexes II [to IX – ~~delete~~] **and IV to XI** shall be adopted by consensus of the Parties present at a session of the Executive Body, and shall enter into force for the Parties which have accepted them on the ninetieth day after the date on which two thirds of [the – ~~delete~~] **[those that were]** Parties **[at the time of their adoption]** have deposited with the Depositary their instruments of acceptance thereof. Amendments shall enter into force for any other Party on the ninetieth day after the date on which that Party has deposited its instrument of acceptance thereof.

4. Amendments to the annexes **[I and III]** to the present Protocol [, other than to the annexes referred to in paragraph 3, – ~~delete~~] shall be adopted by consensus of the Parties present at a session of the Executive Body. On the expiry of [ninety – ~~delete~~] **[one hundred and eighty]** days from the date of its communication to all Parties by the Executive Secretary of the Commission, an amendment to any such annex shall become effective for those Parties which have not submitted to the Depositary a notification in accordance with the provisions of paragraph 5, provided that at least sixteen Parties have not submitted such a notification.

5. Any Party that is unable to approve an amendment to [an annex – ~~delete~~] **[annexes I and III]** [, other than to an annex referred to in paragraph 3, – ~~delete~~] shall so notify the Depositary in writing within ninety days from the date of the communication of its adoption. The Depositary shall without delay notify all Parties of any such notification received. A Party may at any time substitute an acceptance for its previous notification and, upon deposit of an instrument of acceptance with the Depositary, the amendment to such an annex shall become effective for that Party.

[6. Amendments to annexes II and IV to XI shall be adopted by consensus of the Parties present at a session of the Executive Body. On the expiry of one year from the date of its communication to all Parties by the Executive Secretary of the Commission, an amendment to any such annex shall become effective for those Parties which have not submitted to the Depositary a notification in accordance with the provisions of subparagraph (a) below.

(a) Any Party that is unable to approve an amendment to annexes II and IV to XI shall so notify the Depositary in writing within one year from the date of the communication of its adoption. The Depositary shall without delay notify all Parties of any such notification received. A Party may at any time substitute an acceptance for its previous notification and, upon deposit of an instrument of acceptance with the Depositary, the amendment to such an annex shall become effective for that Party;

(b) Any amendment to annexes II and IV to XI shall not enter into force if an aggregate number of sixteen or more Parties have either:

(i) Submitted a notification in accordance with the provisions of subparagraph (a) above; or

(ii) Not accepted the procedure set out in this paragraph and not yet deposited an instrument of acceptance in accordance with the provisions of paragraph 3 above.

7. For those Parties having accepted it, the procedure set out in paragraph 6 above supersedes the procedure set out in paragraph 3 above in respect of amendments to annexes II and IV to X.]

[8.] [6. – delete] Adjustments to annex[es] II [and III] shall be adopted by consensus of the Parties present at a session of the Executive Body and shall become effective for all Parties to the present Protocol on the ninetieth day following the date on which the Executive Secretary of the Commission notifies those Parties in writing of the adoption of the adjustment.

Article 14

Signature

No changes proposed.

Article 15

Ratification, acceptance, approval and accession

1. The present Protocol shall be subject to ratification, acceptance or approval by Signatories.

2. The present Protocol shall be open for accession as from 31 May 2000 by the States and organizations that meet the requirements of article 14, paragraph 1.

3. The instruments of ratification, acceptance, approval or accession shall be deposited with the Depositary.

[4. Any Party that was not already a Party on [xxx date]¹⁶ shall declare in its instrument of ratification, acceptance, approval or accession if it does not intend to be bound by the procedure set out in article 13, paragraph 6, as regards the amendment of annexes II and IV to XI.]

¹⁶ Insert date of adoption of amendment to article 13.

Article 16
Depositary

No changes proposed.

Article 17
Entry into force

No changes proposed.

Article 18
Withdrawal

No changes proposed.

Article 19
Authentic texts

No changes proposed.

Annexes

- Annex I: Critical loads and levels
- Annex II: Emission ceilings
Emissions: 1980 (only sulphur), 1990[, **2000**]; Ceilings: 2010 [(**not for particulate matter**), **2020**; **Aspirational ceilings: 2050**]
- Annex III: Designated pollutant emissions management area (PEMA)
- Annex IV: Limit values for emissions of sulphur from stationary sources
- Annex V: Limit values for emissions of nitrogen oxides from stationary sources
- Annex VI: Limit values for emissions of volatile organic compounds from stationary sources
- Annex VII: Timescales under article 3
- Annex VIII: Limit values for fuels and new mobile sources
- Annex IX: Measures for the control of emissions of ammonia from agricultural sources
- Annex X: Limit values for emissions of [total suspended particulates] [dust] from stationary sources**
- Annex XI: Limit values for volatile organic compounds content of products**

Guidance documents

- I. Guidance document on control techniques for emissions of sulphur, nitrogen oxides, non-methane volatile organic compounds and particulate matter from stationary sources.**
 - II. Guidance document on control techniques for selected mobile sources.**
 - III. Guidance document on control techniques for preventing and abating emissions of ammonia.**
 - IV. Guidance document on economic instruments to reduce emissions of sulphur, nitrogen oxides, non-methane volatile organic compounds, ammonia and particulate matter.**
 - [V. Guidance document on recovery of ecosystems and environmental and health improvements.]**
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