I. Overview of relationship between Gothenburg Protocol Review conclusion themes and policy approaches described in document ECE/EB.AIR/WG.5/2023/2.

	Approach 1 *no revision of AGP*	**Approach 2a** *targeted revision of AGP*	**Approach 2b** *comprehensive revision of AGP*	**Approach 3a** *non-binding new instrument*	**Approach 3b** *binding new instrument*	**Approach 4a/b/c/d** cross-cutting
Theme 1 Emission reduction commitments (ERC) or equivalent action on current pollutant set (NO_X, SO_2, $PM_{2.5}$, VOCs and NH_3)	Focus would remain on further ratification and implementation. New ratifications would result in further emission reductions. For current non-Parties (EECCA, WB countries) ERCs would need to be set when ratifying. For existing Parties no new ERCs beyond 2020 possible in case of no revision.	Focus would be on updating the technical annexes; ERCs would not be directly addressed.	Allows for updated commitments on current pollutants, as well as new commitments for new pollutants. It also allows for alternative base years for current non-Parties.	A non-binding instrument could enable voluntary ERCs (at national or regional level), likely with risk of having less impact.	A new treaty would be an opportunity to consider new or different types of targets, although this can also be achieved via a revision process. A new treaty could potentially be useful to enlarge the scope.	Further capacity building would allow further improvement of emission inventories of current non-parties, which is a prerequisite for proposing meaningful ERCs.
Theme 2 Technical Annexes (TA) / Guidance documents (GD) (updating/other action)	The 'no revision' option would not allow an update of the currently outdated TA, or other amendments to the TA. Existing GD can be updated and new GD can be developed.	Focus would be on updating the TA. This approach would allow targeted amendments to the TA, potentially prioritizing key sectors and/or large reduction potentials in EECCA/WB countries.	Allows for a full update of the TA including changing their scope and focus, introducing new solutions or removing them all together. An update of the TA should be accompanied by corresponding updates of existing or developments of new GD.	Would allow the use of non-mandatory TA / GD.	A new treaty could contain new and different ways to house technical information to aid countries to reduce emissions and/or to achieve other objectives. This could be via TA or another modality (e.g., via enabling secondary legislation). This could also be achieved through a revision process.	Further capacity building would increase knowledge of the TA and contribute to the further development of roadmaps and national action plans / reduction strategies for the implementation of the TA.

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Theme 3 Ammonia (NH_3) (action on Annex IX/other)	Focus would remain on further ratification and implementation., including of current Annex IX. Focus also on updating the GD on NH_3. The 'no revision' option would not allow an update of the outdated Annex IX.	Can be addressed through an update to Annex IX.	Could be further addressed with stronger and broader commitments (from a geographic scope) to take action on these pollutants/sector beyond only the measures identified in annex IX (extend scope to e.g. cattle).	This could include a new instrument targeting i.a. new voluntary measures on NH_3.	A new treaty could deal with singular pollutants or sectors.	Important for building long-term, sustained awareness and increasing knowledge base of key issues (e.g. NH_3). Cooperation with other international organizations (e.g., UNEP) is important.
Theme 4 Black carbon (BC) (action on BC as component of PM/other)	Focus would remain on further ratification and implementation., including of current Annex X on particulate matter (PM). Focus would also be on further guidance on how to give priority to reduction of BC in reducing PM.	Can continue to be indirectly addressed, as component of PM, through an update of Annex X.	Could include the option to taking further action on BC including mandatory reporting, emission reduction commitments, extension of Annex IX to BC from agricultural residue burning and/or a separate annex on BC.	This could include a new instrument targeting i.a. new voluntary measures on BC.	A new treaty could contain more specific actions regarding BC (separate BC or new broader protocol cove (ring also e.g. CH_4). However it is difficult to differentiate BC from wider action on PM (covered by the Gothenburg Protocol).	Important for building long-term, sustained awareness and increasing knowledge base of key issues (e.g. BC). Cooperation with other international organizations (e.g., UNEP) is important.
Theme 5 Methane (CH_4) (action on CH_4 as ozone precursor)	The current Gothenburg Protocol does not address CH_4. The 'no revision' option would not further reduce emissions of CH_4. Focus would be on improving CH_4 emissions and impact information and development of guidance.	Separate commitments on CH_4 are not possible under this option.	Could include the option to extend the protocol scope and include CH_4 as a new pollutant, with similar requirements as for current pollutant set. Potentially including a synergetic approach to methane and ammonia.	This could include a new instrument targeting i.a. new voluntary measures on CH_4 (e.g. non-binding targets).	A new treaty or instrument could treat specific (CH_4) or multiple ozone precursors.	Important for building long-term, sustained awareness and increasing knowledge base of key issues (e.g. CH_4). Cooperation with other international organizations (e.g., UNEP) is important.

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Theme 6 Removing protocol related barriers (flexibilities/other action)	Protocol barriers will largely remain (inadequate. flexibilities, emission inventories insufficient as basis for ERCs, …). This option only allows minor improvements to current flexibility provisions.	Addressed somewhat through simplified TAs, but they would still remain mandatory. This option would also allow amendments to Annex VII on timescales.	Allows for changes to be made to the TA and the Protocol text itself, and addressing both in combination would allow more barriers to be addressed, including by adding new/different flexibilities.	This option would avoid protocol related barriers, as it would not require ratification.	A new treaty would contain new provisions and could be designed differently, with due consideration of barriers, to achieve higher ratification. This could also be achieved via a revision process.	Some potential to address ratification and implementation barriers; this is one of the main focuses of approach 4.
Theme 7 Removing other barriers (political, financial, institutional, regulatory, capacity)	Would not specifically be addressed.	Would not specifically be addressed.	Potential to address some of the other barriers (e.g. financial barriers via avoiding expensive retrofitting; regulatory barriers via simplifying legal requirements).	May remove some of the barriers as it concerns a non-binding instrument (e.g. regulatory barriers), but simultaneously also increase others (e.g. lower political will).	A new binding financial mechanism could address financial barriers and support implementation of abatement measures.	Some potential to address other barriers, like political barriers via awareness raising, financial barriers via fundraising efforts, etc.
Theme 8 Improving emission inventories of current non-Parties in particular (for setting ERCs and assessing policies).	Would not specifically be addressed. The regular updates of the EI Guidebook will improve guidance, but not address the lack of capacity or statistical data to improve EI of EECCA/WB countries.	Would not specifically be addressed.	Allows for changes to the current provisions on developing and reporting inventories, including extension to new pollutants.	Would not specifically be addressed.	Similar as for a revision of the Gothenburg Protocol.	Significant potential to address lack of capacity for preparing and improving inventories.
Theme 9 Addressing other issues (synergies, non-technical measures, action outside ECE)	'No revision' would not allow to further address synergies or non-technical measures (also needed to achieve LT objective). Focus on new GD.	Would not specifically be addressed.	Could be addressed.	Could be addressed.	Could be addressed. A new treaty is a way to house new provisions and repeal other protocols or brought under new framework, with consideration of i.a. synergies.	Beneficial for extension of activities beyond the UNECE region.

II. Qualitative comparison of policy approaches described in document ECE/EB.AIR/WG.5/2023/2 on the basis of a set of criteria.

This section will present a qualitative comparison of the policy approaches in addressing the themes/problems as listed in the summary table in part I of this informal document, using the following criteria (which are considered important in evaluating these approaches):

(a) Level of ambition and political/technical feasibility to implement: extent to which a particular approach could achieve meaningful further progress towards the long-term objectives of the Gothenburg Protocol (effectiveness);

(b) Level of effort: extent to which negotiations would be needed and level of effort required to pursue and develop a particular approach;

(c) Expected timeline: time required to (ratify and) implement a particular approach (short/medium/long term);

(d) Costs and resources: extent to which an intended level of ambition could be achieved in a cost-efficient way, and according to the ability of different Parties;

(e) Level of complexity: extent to which a particular approach would increase legal complexity;

(f) Multi-pollutant / multi-effect approach: ability to apply a multi-pollutant/multi-effect approach in analysing and identifying (cost-effective) control strategies and measures to reduce air pollution

(g) Level playing field: ability of a particular approach to maintain a basic level playing field (general standards) to avoid distortion of competition between countries and sectors; extent to which diverging obligations between current Parties and non-Parties could be avoided;

(h) Potential to encourage ratification and/or implementation: ability of a particular approach to address ratification and/or implementation barriers;

(i) Future-proof: potential to remain relevant in the future; agile requirements that could easily be updated; ability to take into account non-technical measures and synergies (maintaining coherence with long-term climate neutrality and key objectives in other policy areas).

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Effectiveness (level of ambition / implementability	Insufficient to achieve long-term objectives, even in combination with enhanced capacity building and/or voluntary actions. The effectiveness of the present GP can be increased by further increasing its ratification and implementation, but it will not allow to make the necessary progress in emission reductions and to address all conclusions of the GP review.	Insufficient to achieve long-term objectives, but significant progress possible with appropriate amendments to and restructuring of the TA, to allow, i.a., addressing the large emission reduction potentials of current non-Parties.	Has the potential to address all conclusions of the GP review, as it allows (i) the inclusion of more ambitious emission reduction commitments, (ii) updates of the TA, (iii) additional action on NH_3 and BC and (iv) extending the scope to CH_4. Effectiveness can be negatively affected if insufficient attention is given to barriers to ratification and implementation.	Non-binding / voluntary action can also be set at an ambitious level, but its end result is unclear at the outset. The effectiveness of this option depends heavily on its implementation, which cannot be enforced.	Similar potential as with a comprehensive revision of the GP. Option to replace or complement the present GP. An additional (separate) new instrument for CH_4 could be more effective than including CH_4 in the GP, as requirements for this pollutant could be a barrier to ratify. The effectiveness of a complete novel instrument (e.g. framework protocol) is difficult to predict.	Further capacity building and similar action will be essential to increase the effectiveness of the current Protocol, a revised Protocol or a new instrument, as this will help remove barriers to their ratification and implementation. Capacity building actions however are very resource intensive: the effectiveness of these actions themselves is difficult to assess.
Level of effort	Little (additional) effort required, as the actions envisaged under this approach (improving emission inventories, flexibility guidance and technical guidance) do not require lengthy negotiations and development of a revised protocol or new instrument.	Effort required under this approach is limited, as focus can be set on amending the TA, with the aim of optimizing / maximizing their impact. It will require less effort and negotiation time than a complete revision of the GP or development of a new Protocol.	Negotiations could require considerable efforts, especially when introducing new approaches (like a phased commitment approach), expanding the scope (e.g. to CH_4), incl. additional measures for NH_3 etc. Achieving an optimal balance between the level of ambition and the accompanying flexibility provisions could also require considerable negotiation time.	Developing and negotiating non-binding action will likely require less time than developing and negotiating a revision of the GP or a new binding instrument.	Similar as for a revision of the GP, negotiating a new instrument (replacing GP), could require considerable effort. Developing and negotiating a new instrument would not necessarily save time: the outcome of negotiating a new Protocol may even be harder to predict than the outcome of negotiating a revision of the present GP. Perhaps less so in case of a framework protocol.	Capacity building, awareness raising and cooperation actions are essential, but nevertheless require considerable efforts to pursue, especially in case of frequent turnover of technical staff. The results of these efforts depend heavily on stable and sustainable employment of air quality experts within Party concerned.

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Expected timeline	Responses from current non-Parties to the 2022 questionnaire on barriers indicated that ratification of the present GP is earliest by 2025 (1), by 2035-2040 (2) and not a priority (1). Key driver for several current non-Parties are the association agreements with the EU.	This is a fast route, as amendments to Technical Annexes IV–XI may become effective within one year of adoption for those Parties that have accepted the expedited amendment procedure, allowing EECCA and Western Balkan countries to accede more rapidly.	The expected timeline for ratification and implementation of a revised protocol will depend on the agreed amendments and new requirements / approaches being introduced. The entry into force of the last three amended protocols took between 7 and 14 years. The adoption of a new revised GP is likely to take several years, with its entry into force to be expected to take place sometime between 2030 and 2035. A revised text should be carefully negotiated to avoid certain new obligations / approaches / modalities further delaying ratification. Entry into force may take long time with no guarantee of success to attract more Parties.	Voluntary actions or programs can kick off immediately as soon as they are set up.	Similar concerns as for a revision of the GP. Specifically, the expected timeline for ratification and implementation of a framework protocol will likely be different. It could ensure more ratifications from the outset and faster entry into force, but deciding on implementing measures will also take the necessary time.	Progress of capacity building and similar measures is slow and also depends on the availability of stable financial and human resources.
Costs and resources	The high and often disproportionate costs of retrofitting existing emission sources (implementing BAT)	Allows to move / remove parts of the technical annexes on emission limit values (to non-mandatory	A comprehensive revision could focus on the most-cost-effective measures (rather than on	Costs and resources for non-mandatory actions are likely to be lower than for mandatory actions.	Similar as for a revision of the GP. Also to be noted here that a new single pollutant protocol	Capacity building and cooperation are very resource intensive. Enhancing these actions will possibly

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	is regarded by several current non-Parties as a major barrier to ratification. A 'no revision' cannot address this barrier. Abatement costs as a percentage of GDP to meet comparable levels of ambition (protocol requirements) are higher in EECCA and Western Balkan countries than in EU or CA/US.	guidance documents) and to focus first on emission limit values for new installations (to avoid expensive retrofitting of existing installations in poorer economies) and/or focus on key categories or most cost-effective solutions in the technical annexes.	expensive retrofitting). It would also allow to properly take into account the share of costs of additional policy measures in GDP (equity). It should be noted that uniform percentage reduction commitments and/or uniform technical requirements may be less cost-effective.	However, non-mandatory actions are also less likely to attract political attention and generate the necessary financial resources.	(e.g. on CH_4) will (likely) be less cost-effective than an integrated multi-pollutant/multi-effect protocol.	require significant additional financial and human resources from different partners (Parties, Secretariat, Task Forces, …) or may come at the expense of current tasks carried out within the Convention. The efficiency of these actions is rather low. Outreach to large financial institutions to attract additional funding could help.
Level of complexity	It is unlikely that a large number of additional Convention Parties will ratify the amended Protocol due to its current complexity. A 'no revision' cannot address this barrier.	Targeted amendments to the technical annexes can reduce the complexity and number of requirements of these annexes.	A new revision may potentially further increase the complexity of the Protocol and its technical annexes in particular, i.a. in case of introducing new and stricter uniform limit values for all, extending the scope, introducing new pollutants, introducing new approaches (e.g. staged ratification) that could lead to additional legal and procedural complexity etc.	Not applicable	A new (complementary) protocol would add another protocol to the exceedingly complex situation with numerous Protocols under LRTAP and also yet another instrument, increasing the complex situation of International Environmental Law in general.	Not applicable (at least less complex)

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Multi-pollutant/multi-effect approach	The Gothenburg Protocol is a multi-pollutant, multi-effect instrument regulating emissions of five pollutants in an integrated way. Emission reduction commitments were not already set for all Parties due to lack of qualitative emissions inventories. This had an impact on the cost-effectiveness calculations.	A sector-by-sector approach is less likely to apply a multi-pollutant, multi-effect approach	Negotiation of new emission reduction commitments could be based on modelled scenarios (multi-pollutant, multi-effect) showing how agreed targets aimed at protecting human health and the environment could be met in an integrated and cost-effective way, possibly also addressing new pollutants and effects. Further improvements to statistical and emission data sets could further improve identification of most cost-effective measures.	A non-binding instrument may also apply a multi-pollutant, multi-effect approach.	Negotiations of new binding instruments could apply a multi-pollutant, multi-effect approach also addressing new pollutants and new effects in an integrated and cost-effective way.	Capacity building in integrated assessment modelling could raise awareness of the importance of applying a multi-pollutant, multi-effect approach.
Level playing field	The technology-based requirements set in the technical annexes serve to achieve the Annex II emission reduction commitments, but also to ensure a level playing field to avoid distortion of competition between Parties and sectors.	Removing emission requirements from the technical annexes (or differentiating them between Parties) could reduce the current level playing field.	Targeted approaches, different sets of flexibilities and/or different levels of ambition for the different subregions within the UNECE region can put undue pressure on the level playing field.	Voluntary action is less able to ensure a level playing field.	Similar concerns as for a revision of the GP.	Capacity building and related actions are unlikely to make the playing field less level than it currently is for Parties and non-Parties to the Protocol.
Potential to encourage	Potential is limited, as only some (operational)	Potential is considerable: part of the protocol related	Potential is high if due account is given to all	Voluntary action can be a route to further implement abatement	Potential is high if due account is given to all	Potential is high to address the non-related protocol

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ratification and/or implementation	improvements to flexibility guidance and emission inventories would allow to further encourage ratification.	barriers could be addressed through properly amending the technical annexes.	protocol related barriers.	measures (on the short term, in parallel with mandatory action).	protocol related barriers.	barriers (political, financial, regulatory, capacity, …).
Future relevance	The relevance of the present GP will gradually diminish further over time as it is unable to adequately address the remaining / future challenges. 'No revision' does not allow updating the outdated TA or introduce new ERCs, and/or to non-technical measures into account.	Potential for future relevance is limited as this approach only allows targeted amendments to the TA.	Potential for future relevance is high if a revision particularly focuses on pollutants / sectors insufficiently addressed by climate and energy policies, like NH_3 (agriculture), PM and BC (biomass combustion, …), focuses on synergies and remaining challenges best addressed at Convention level.	Similar to approach 4	A completely novel protocol (e.g. framework) protocol) could be the most appropriate instrument to enable the integration of agile requirements that could easily be updated / extended.	These actions can always be adjusted to remain relevant.