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Convention on Long-Range Transboundary Air Pollution (CLRTAP)
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Draft guidance on methane from landfills and the natural gas grid and biogas facilities

Comments by the EU and its Member States

The EU and its Member States thank the Task Force on Techno-economic Issues for preparing this document.

To facilitate discussions during the 61st session of the WGSR, we provide the following advance comments. Text suggestions are provided with new text in **bold** and deleted text in ~~strikethrough.~~

We reserve the right to provide additional comments in the next steps.

- A link/cross-reference should be made between this guidance and the draft guidance on co-mitigation for CH4 and NH3 regarding the CH4 from biogas aspects.
- Editorial correction in paragraph 3 (proposed deletion marked with strike-through):

  3. Due to the diversity in CH4 emissions from various sources and industry sectors, measures to reduce CH4 emissions are manifold and cannot be reduced to a simplified collection of technical measures. In many cases, for example, the reduction of emissions from the natural gas grid and management aspects such as maintenance procedures and early leakage detection are ~~the~~ among the most important reduction measures. However, leakage detection can also be supported by modern mobile sensor technologies, as described in section III.B below.

- We assume that the editors will in a later stage ensure the correct and consistent use of abbreviations (e.g. avoiding unnecessary abbreviations, make sure that abbreviations are only explained once). E.g. “LFG” should rather be spelled out, for consistency across the text and for clarity.
- Paragraphs 5-6: as this is a guidance under the Air Convention, it should be made clear that air pollution impacts are the main concern. The subchapter should be restructured to start with methane as an ozone precursor (current paragraph 6) as this is the primary interest for the Air Convention and the reason this guidance document is within the Convention scope.
- Paragraph 9: it is not clear why actions in the EU are singled out in this paragraph as the only example. More general information or facts from several parts of UNECE

would be more appropriate here, or else to explain that the EU is used as an example in this paragraph (the guidance is UNECE-wide, not EU-specific).

- Paragraph 10:
  - please clarify if the reference is to ton or tonne (metric ton). It would be more convenient to use International System units.
  - The references to percentages are not always clear (e.g. (emphasis added*): "In the European Union, landfilled waste has continuously decreased in recent years and is currently* ***at around 15 per cent****"; "In Eastern Europe, the Caucasus and Central Asia, landfill rates in the past were* ***up to 100 per cent****"*) – this assumedly refers to "per cent of total waste", can this be clarified?
  - Examples are included from EU and EECCA. Would it be possible to add references also to North America land fill rates?
- Paragraphs 10-11: when referring to "waste" in these paragraphs, should it always be understood as municipal solid waste?
- Paragraph 14: the purpose of this paragraph is unclear. The source of natural gas used in the EU is not relevant as background to the cause of emissions from the natural gas grid. It is also not clear why information about the EU is singled out here. We propose to delete the entire paragraph to focus on information of direct relevance for the guidance.
- Paragraph 16: while these details are interesting, it is not quite clear how this should be understood in terms of emissions and emission reductions. Some of this information is also repeated below. The paragraph could perhaps be shortened or else the information be linked more clearly to the emission risks/mitigation options.
- Should not current sections II. C and II. D be sub-sections under current section II. B, at the same level as the subheading "landfill gases" (paragraphs 10-13)? They all describe major non-agricultural sources. Section II. D is also content-wise different from sections II. B and II. C: it has less information about the source/cause of emissions and instead focuses on reporting/inventory challenges.
- Paragraph 18: this paragraph and its purpose is unclear and needs clarification and/or restructuring.
  - Does "the German emission inventory" refer to the GHG or air pollution inventory? If this refers to the air pollution emission inventory it does not seem very surprising that it is not suitable for calculating the GHG efficiency.
  - Why does this guidance comment on means for calculating the GHG efficiency – that seems to be beyond the scope for this document?
  - Why is the emission inventory issue the main aspect in presenting the background to emissions from biogas facilities? Should emission inventory issues perhaps be a separate section?
  - "Due to an extensive subsidy policy, the number of biogas units has greatly increased in some European Union member States, such as Germany" – it is not clear why Germany is again singled out as the only example. It should be made

clear why the EU is quoted, if as an example of a trend or as standing out as somehow different from other UNECE Parties because of these subsidies.

- "Biogas plant emissions cannot be accounted directly to classical agricultural emissions, but they may have a technological origin and, therefore, are also briefly considered in this report" – unclear sentence, consider deleting or rephrasing.

- Paragraph 19: is the leakage rate estimated for the German emission inventory representative and useful also for other Parties or why is this example included, how should it be interpreted?
- Paragraph 22: the first sentence seems like repetition from the background chapter.
- Paragraph 23: it should be made clear that the EU legislation is used here as an example of successful mitigation policy (guidance document has UNECE-wide relevance).
- Paragraph 24: the paragraph should be rephrased to avoid the impression of focusing on GHG mitigation instead of air pollution reduction; in the Air Convention context, the rationale is primarily reducing methane as an ozone precursor, with GHG reduction as a welcome co-benefit.
- Overall: the guidance has very little information about costs, cost-efficiency and implementability of the listed measures. Would it be possible to add more information on this (cf the draft guidance on shipping emissions)?
- Paragraph 26.c.i: proposed rephrasing of the first sentences (additions in bold, deletions in strikethrough) for more general relevance:

  (i) Gas collection. ~~According to the Landfill Directive,~~ ***Requirements can be set that*** *energy has to be recovered from the collected landfill gas.* ***For example, the EU Landfill Directive sets out that, i~~I~~****f the operator considers the landfill gas unusable at the landfill, then it has to be demonstrated to the competent authority that, at that individual landfill, there are site-specific reasons why utilization is unfeasible.*

- Paragraph 26: the structure is very complicated with subpoints in four levels. Please reconsider to help the reader navigate. For example, sublevel 3 (page 10) could be removed in the following way:

  *(ii) Gas utilization****~~. Depending on site-specific circumstances, different utilization options exist for landfill gases. The most relevant are listed below:~~***

  ~~(a)~~ *~~F~~laring. Collecting and flaring landfill gas is part of the normal operation of the landfill, independently of additional heat or power generation systems. The landfill gas generation rate will decline over time, producing lower volumes of gas, with a low CH4 content.* ***For example, a~~A~~****ccording to the European Union guidance on landfill gas control, operators should follow the following hierarchy of treatment techniques over the landfill's lifetime, to ensure that the maximum amount of landfill gas is oxidized over the whole lifecycle of the landfill: (a) high-temperature flaring; (b) low calorific flaring; and (c) other techniques for*

oxidation of CH4. There are generally two types of flares: (a) open flares (candlestick flares); and, (b) enclosed flares (ground flares), which, when properly engineered and operated, may achieve removal efficiencies of 99 per cent or more. Higher combustion temperatures and residence times result in the destruction of unwanted constituents, such as unburnt hydrocarbons. However, a significant drawback to this type of flare system is that installation and operation are more expensive compared to open flares;

~~(b)~~ ***(ii) Gas utilization:*** *Electricity generation. Landfill gas collected at the waste disposal site can be used for electricity generation. After pumping out, the gas usually has to undergo pretreatment, to remove liquids, sulfur and siloxanes. If the cleaned landfill gas is to be upgraded to bioCH4, CO2 also has to be removed. Reciprocating engines for co-generation of electricity and heat are able to operate even when the landfill gas contains up to 40 per cent of CO2, by volume. Energy production also requires temporary gas storage, or a flare station to burn the CH4 production in excess. Typical technologies for electricity generation from landfill gas ~~(LFG)~~ are listed below:*

- Paragraphs 36-38: these paragraphs seem not to present many mitigation measures but read more as general background on the cause of emissions. What guidance on emission reduction techniques could be proposed here?
- Paragraph 40:
  - The first three sentences ("CH4 emissions from waste landfills… -> CH4 is formed through anaerobic digestion of hydrocarbon waste.") is a repetition of the background and could be removed here.
  - How about reduced production of e.g. product packaging as a measure; and awareness raising among consumers to help avoid waste generation?
- Paragraph 41: The first sentence is a repetition from the background and could be removed here. As with the comment on paragraph 14, the source of natural gas used in the EU is not relevant as background to the cause of emissions from the natural gas grid. It is considered that the text in brackets can be removed.
- Paragraph 42: should this be read as a general criticism against the concept of biogas plants? Who envisages further research and development, and by whom?