Thematic session on methane

9th Joint Session of the EMEP Steering Body and the Working Group on Effects
Geneva, September 11-15, 2023

Organisation of the session

1. Introduction (20 minutes)
   - Aims of the session
   - Readout from discussions at WGSR61
   - Input from the CCAC
2. Current and future impact of CH4 on O3 and benefits of emission reduction (20 minutes)
   - Synthesis of results from TFHTAP, CCAC, EC-JRC, TFMM, MSC-W, CIAM
3. Status of emissions reporting (20 minutes)
   - Presentation from TFEIP
4. What might CH4 control policies look like? (20 minutes)
   - Presentation from CIAM
5. Coffee break (15 minutes)
6. Review and close (40 minutes)
   - Do we have sufficient scientific understanding and assessment tools to support policymakers?
   - Which conclusions and recommendations can we already pass on to the EB for consideration?
   - What additional work on methane should be included in the 2024-2025 workplan?

Review and close

- Do we have sufficient scientific understanding and assessment tools to support policymakers?

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Discussion points (current and future impacts of CH4 on O3)

- Reductions in European NOx and NMVOC emissions remain the most important tool for reducing peak season ozone in Europe
- Projected global methane increases will (at least partially) offset the effects of these reductions in NOx and NMVOC
- Global reductions in methane emissions are needed to meet ozone-related air quality targets
- The potential UNECE contribution to the required reduction in global methane emissions is small compared to the reductions required from the rest of the world

- Requirements for future quantitative assessments of methane as an ozone precursor:
  - An ensemble of global and regional models, including the EMEP model
  - Consistent experimental setup and output metrics, including impacts

Ozone - impact of future emission policy

Action on methane would only be part of the solution; NOx/VOC emission reductions would still be very important to reduce surface O_3

- **Baseline**
  - Average ozone concentrations in Europe will **increase** by 2-5% between 2015 and 2050. Peak season MDA8 will be **reduced** around 5-10%. In both cases, CH_4 emission increase in the baseline scenario hampers the reductions expected from NOx/VOC declines

- **From 2015 baseline to 2050 LOW** (including global 50% CH_4 emission reduction) would:
  - **Reduce** average ozone concentrations by around 15% and peak season MDA8 by around 25%
  - About 20% of the annual mean ozone reduction is driven by reductions in CH_4, compared to only 12% for peak season MDA8
  - For ozone mean, transcontinental non-CH_4 sources dominate over European sources, whilst for peak season MDA8 European non-CH_4 sources dominate

- **The difference between the 2050 CLE and 2050 LOW** scenarios can be attributed to roughly ⅓ from reduction in global methane emissions, ⅓ from reduction in European precursor emissions and ⅓ from reduction of precursor emissions outside Europe, both for ozone mean and peak season MDA8

- CIAM estimates that methane emissions can be reduced (in the UNECE region) by almost 70% between 2015 and 2050, when **dietary change** and livestock reductions are included (2050 LOW scenario)

2050 LOW scenario - Ambitious global action on air pollution and methane, including non-technical measures

Based on TFHTAP/TFMM/MSC-W/CIAM work

Discussion points (CH4 emissions reporting)

- Is the emissions data (currently available from the UNFCCC) sufficient for the needs of the modelling teams?

- Irrespective of how the emissions data was obtained/provided to the modelling teams, resources would be needed to pre-process/check the data.

Discussion points (CH4 control policies)

- A scenario representing high ambition on NOx/NMVOC but low ambition on methane would be useful
- We might also like to consider scenarios with regionally differentiated ambition on NOx/NMVOC/CH4

- How can biodiversity/nature restoration targets support discussion about reduction of CH4 from agriculture?

Relevant items from the 2024-2025 draft workplan

1.1.1.7	On basis of recent evidence, long-term trends and uncertainty in future projections, provide insight into robustness of modelled long-term O_3 projections in relation to CH_4 mitigation	Synthesis of O_3 mitigation options	TFMM, MSC-W, TFHTAP	EMEP budget
1.1.2.1	Investigate practicalities and processes required for including CH_4 in annual emissions inventory reporting	Status report (2024)	TFEIP, CEIP	Additional resources required
1.1.3.1	Contribute to Gothenburg Protocol revision as mandated by Executive Body	Pending decision by Executive Body in December 2023	TFIAM, CIAM, TFMM, MSC-W, CCC, TFHTAP, CCE	EMEP budget and recommended contributions
1.1.3.2	Support policy process with scenario analyses	Calculation and analysis of scenarios	CIAM, MSC-W, TFHTAP, TFIAM	
1.1.3.4	Integrate knowledge from science bodies in integrated assessment framework and support policy process with scenario analyses	Specification of "optimized scenarios", "optimized and equity scenario", "ozone precursor scenarios", "health in cities scenarios"	CIAM, MSC-W, TFHTAP, TFIAM	Additional resources required
1.1.4.2	Organize new global and regional model simulations of historical trends and future scenarios for Gothenburg Protocol pollutants	Initial findings assessment (2025)	TFHTAP, TFMM	Parties' in-kind contributions
1.2.3	Regular coordination with task forces and expert groups on CH_4, O_3, N	Meeting notes	TFIAM, TFHTAP, TF-Health, TFRN, FICAP	

Draft conclusions

- It is possible to make broad quantitative conclusions about the effect of methane on ozone in the UNECE region
- On the basis of these conclusions, the EB should consider methane as an ozone precursor during any revision of the Gothenburg Protocol
- Further modelling work will be useful to increase the robustness of these conclusions
- The draft 2024-2025 workplan already sufficiently describes this work (with small modifications)
- All involved bodies should make sure to coordinate this work
- *Conclusion on methane emissions reporting(?)*
- An additional scenario representing high ambition on NOx/NMVOC but low ambition on methane should be produced