IPCC TFI Work on Short-lived Climate Forcers: Background and Scope

Third IPCC Expert Meeting on Short-lived Climate Forcers

11-15 April 2022

Virtual Meeting

IPCC TFI TSU

Expert meeting in 2018

- At the 45th Session of the IPCC (March 2017, in Guadalajara, Mexico) some governments proposed the work on development of methodologies for estimation of emissions of Short-lived Climate Forcers (SLCFs)

- At its 46th Session (September 2017, in Montreal, Canada) the IPCC decided (Decision IPCC/XLVI-6) to hold an expert meeting on SLCFs to discuss issues on estimation of emissions and climate effects

- The expert meeting was held jointly by TFI and WGI on 28-31 May 2018 in Geneva, Switzerland

- The following SLCF species were considered at the meeting: BC, OC, [PM2.5], NOx, CO, NMVOC (including BVOC), SO_2 and NH_3. Methane and halogenated species (e.g., hydrofluorocarbons) are not discussed at the meeting as they are already well covered by the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* and its *2019 Refinement*

Expert meeting in 2018

- The meeting concluded, among others:
  - Improved emission inventories of SLCFs are necessary to enhance scientific understanding and assessment of their role in climate change as well as to inform climate policy at national and international levels
  - Internationally-agreed, globally applicable methodologies and emission factors for SLCF emission inventories are necessary, and the IPCC TFI is in a good position to do that work
  - All SLCF species discussed at this expert meeting are considered important and should be prioritized in the future work to develop inventory methodology
  - SLCF emissions should not be converted to CO_2 equivalent units in the same way as in the inventory reporting under the UNFCCC. The meeting agreed that the issue of metrics and how they can be used may be further considered based on new scientific literature for coordination across WG reports (particularly WGI & WGIII)

- The meeting report is published at the TFI website https://www.ipcc-nggip.iges.or.jp/public/mtdocs/1805_Geneva.html

Further work on SLCFs

- Taking the conclusions and recommendations of the expert meeting held in 2018 into consideration, the IPCC decided (Decision IPCC-XLIX-7) at its 49th Session (May 2019, in Kyoto, Japan) to **develop a Methodology Report on SLCFs** during the IPCC 7th Assessment Report (AR7) cycle

- The **preparatory work** for the Methodology Report to be completed as soon as possible, **starting in the AR6 cycle**
  - Technical analysis work by TFI TSU with other experts
  - 3-4 Expert meetings
  - Scoping meeting
  - Approval of outline by the Panel

- Expert meetings will produce a series of supporting materials after each expert meeting and will be used to inform the scoping of methodological work for SLCFs

Work on SLCFs in 2020-2022

- TFI Technical Support Unit (TSU) conducted technical analysis of the main methodological frameworks on SLCF emissions (*EMEP/EEA Air Pollutant Emission Inventory Guidebook 2019; AP-42: Compilation of Air Pollutant Emissions Factors, USEPA; and Atmospheric Brown Clouds (ABC) Emission Inventory Manual, UNEP*) and prepared a number of background documents to support the work at expert meetings

- Kick-off Session for the IPCC TFI Expert Meetings on SLCFs was held on 9 and 11 March 2021 (virtual meeting)

- Joint 1st and 2nd IPCC Expert Meeting on SLCFs was held on 11-22 October 2021 (virtual meeting)

- 3rd IPCC Expert Meeting on SLCFs on 11-15 April 2022 (virtual meeting)

Impact of COVID19 pandemic on the work plan

- No meetings in 2020

- IPCC at its 53(bis) Session (March 2021) agreed that Scoping meeting planned in 2022 should be postponed to AR7 cycle together with the IPCC Session for outline approval

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Outcome of the Joint 1ˢᵗ and 2ⁿᵈ IPCC Expert Meeting on SLCFs (Joint Meeting)

- Working on the background documents, the Joint Meeting successfully achieved its goals:

    1. Complete list of SLCF source categories and associated SLCF species for all sectors – Energy, IPPU, AFOLU and Waste *(the main goal)*

    2. List of knowledge gaps *(the secondary goal)*

- **All outcomes** *(category list, gaps' list, BOGs' discussion and conclusions, presentations and tables for each sector)* are part of the **meeting report** published in the TFI website *(https://www.ipcc-nggip.iges.or.jp/public/mtdocs/2110_SLCF.html)*

- The category list and other materials will help to inform the future Scoping meeting with the aim to develop the outline of a new Methodology report on SLCFs

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The 3rd IPCC Expert Meeting on SLCFs

- The scope of the 3rd Expert Meeting is to consider:

  ✓ SLCF species definitions and their relevance for a climate-related inventory (BOG1)

  ✓ Applicability of general inventory guidance provided in Volume 1 of the 2006 IPCC Guidelines and the 2019 Refinement to the inventories of SLCFs, including, but not limited to, key category analysis, uncertainty analysis, verification, etc. (BOG2)

  ✓ Gaps that need to be addressed in the future work for a new Methodology Report on SLCFs (BOG3)

Materials for the 3rd Expert Meeting

BOG1

- ✓ Note on BOG1 including participants' feedback to the questionnaire
- ✓ Outcomes of the IPCC WGI and WGIII contributions to AR6

BOG2

- ✓ Note on BOG2 including participants' feedback to the questionnaire
- ✓ Note on Key Category analysis
- ✓ Technical consolidation of Volume 1 of the 2006 IPCC Guidelines and Volume 1 of the 2019 Refinement (informal material prepared by TSU)

BOG3

- ✓ Note on BOG3 including participants' feedback to the questionnaire
- ✓ Gaps list from the Joint Meeting and Geneva Meeting
- ✓ Category list from the Joint Meeting
- ✓ Allocation issues from the Joint Meeting

Questionnaire	Definitions of SLCFs	General Inventory Issues	Lists of Gaps and Categories
Experts' feedback	10	9	6

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Expected discussion and outcome
of the 3rd Expert Meeting – BOG1

2018 Geneva Expert Meeting concluded that SLCF species to focus on in a national emission inventory are:

- Aerosols:
  - Black Carbon (BC, also as fraction of PM2.5)
  - Organic Carbon (OC, also as fraction of PM2.5)
- Precursors (ozone precursors and aerosol precursors):
  - NOx
  - CO
  - NMVOC (including BVOC)
  - SO2
  - NH3

BOG1 experts are expected to discuss the following:

1. *With reference to the above list of SLCF species, could experts confirm its validity?*

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Expected discussion and outcome
of the 3rd Expert Meeting – BOG1

2. Is there a common metric applicable across all GHGs and SLCFs to assess the relative importance in terms of climate impacts of each GHG/SLCF source and CO2 sinks within national emissions totals?

3. For each SLCF species provide a prioritization in an emission inventory considering the relevance in terms of climate impact?

4. Could experts assess if for any of the SLCF species listed above constrains in instruments/monitoring-systems availability and operativity may prevent countries' capacity to prepare national emission estimate unless a disproportionate amount of resources is to be applied?

Expected discussion and outcome
of the 3rd Expert Meeting – BOG2

BOG2 experts are expected to discuss the following:

- Key category analysis

  - How <u>quantitative</u> approaches should be applied for SLCFs (see KCA note)?

  - Should <u>qualitative</u> criteria for SLCFS be applied as provided for GHGs in the KCA note or should be revised or new to be added?

- Approaches to data collection and time series consistency

  - How to address finer temporal and spatial distribution of SLCFs?

  - What are the implications in terms of good practice for SLCFs data collection?

  - What are implications on time series consistency for SLCFs?

- Verification.

  - Given SLCF emissions have large spatial and temporal variability, should verification with atmospheric observation data be further promoted?

  - Is there any regional/global independent monitoring system/dataset to be suggested for verification of SLCF emissions?

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Expected discussion and outcome of the 3rd Expert Meeting – BOG3

BOG3 experts are expected to:

1. *Refine the list of data gaps and, where needed, to refine the list of SLCF categories as well*

2. *Prioritize the gaps for future research according to the significance of the sources, for which methods gaps and/or data gaps are identified*

3. *Review the list of allocation issues (cross-sectoral/cross-category), where a further work or clarification is needed and to refine the list, if needed*

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https://www.ipcc-nggip.iges.or.jp/meeting/meeting.html

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