



Background and objectives of SLCF Scoping Meeting

IPCC Scoping Meeting

Methodology Report on Short-lived Climate Forcers (SLCFs): 2027 Supplement to the 2006 IPCC Guidelines

Brisbane, Australia, 26-28 February 2024

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INTERGOVERNMENTAL PANEL ON **climate change**

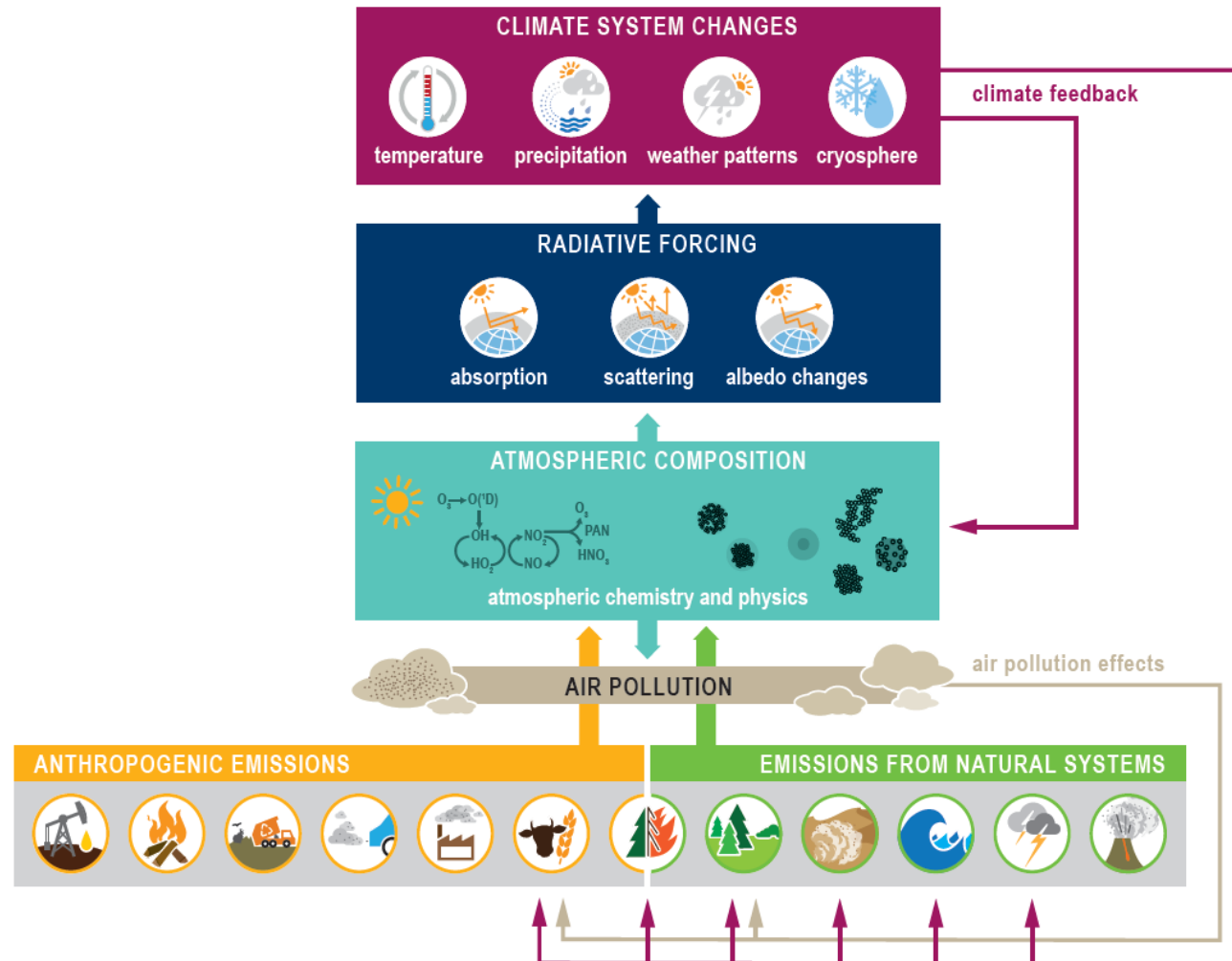


SLCFs

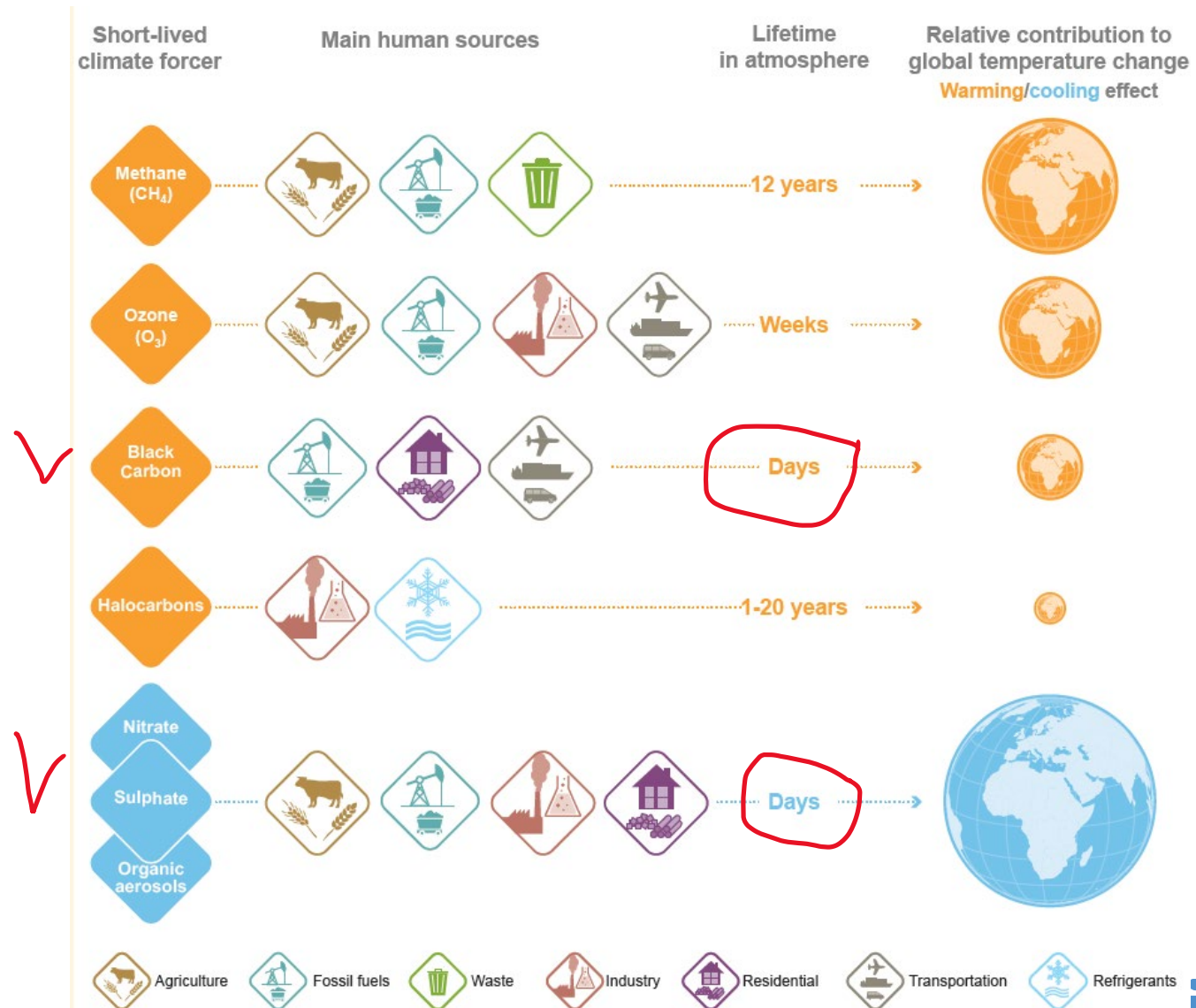
- Short-lived Climate Forcers (SLCFs) affect climate and are, in most cases, also air pollutants; as aerosols (including *carbonaceous aerosols*), which are also called particulate matter (PM), and chemically reactive gases (*methane, ozone, some halogenated compounds, nitrogen oxides, carbon monoxide, non-methane volatile organic compounds, sulphur dioxide and ammonia*).
- Multiple impacts on climate:
 - Direct when in the atmosphere:
 - ✓ Cooling given solar radiation scattering
 - ✓ Warming given solar radiation and earth's infrared absorption
 - Indirect:
 - ✓ when in the atmosphere, oxidation to CO₂, CO reduction to CH₄, Ozone formation, Cloud formation, secondary aerosols
 - ✓ on the ground, reduction of albedo

SLCFs sources and impacts (WGI Report AR6 Ch6)

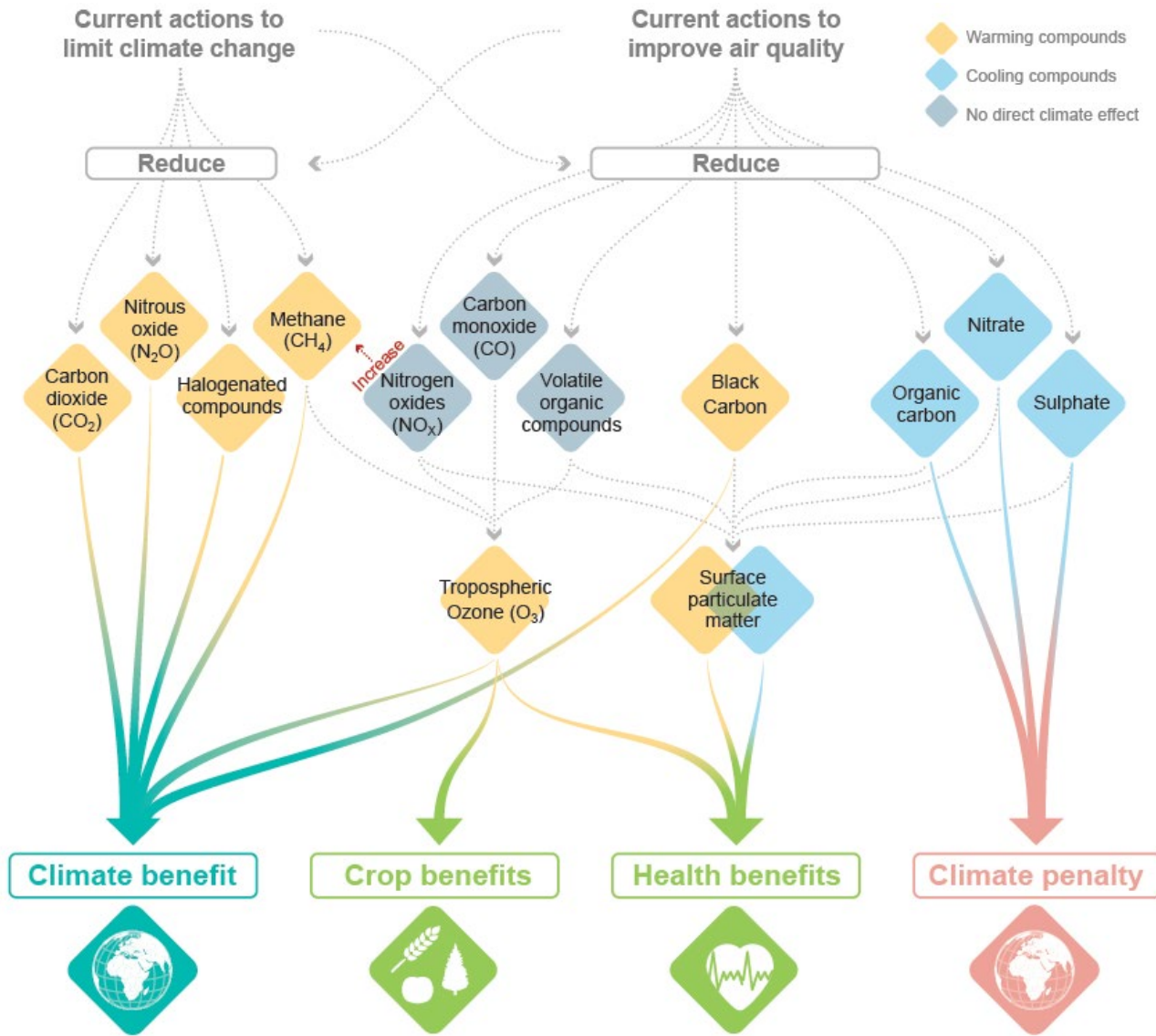
Sources and processes contributing to SLCFs and their effects on the climate system



SLCFs lifetime in atmosphere (WGI Report AR6 Ch6)

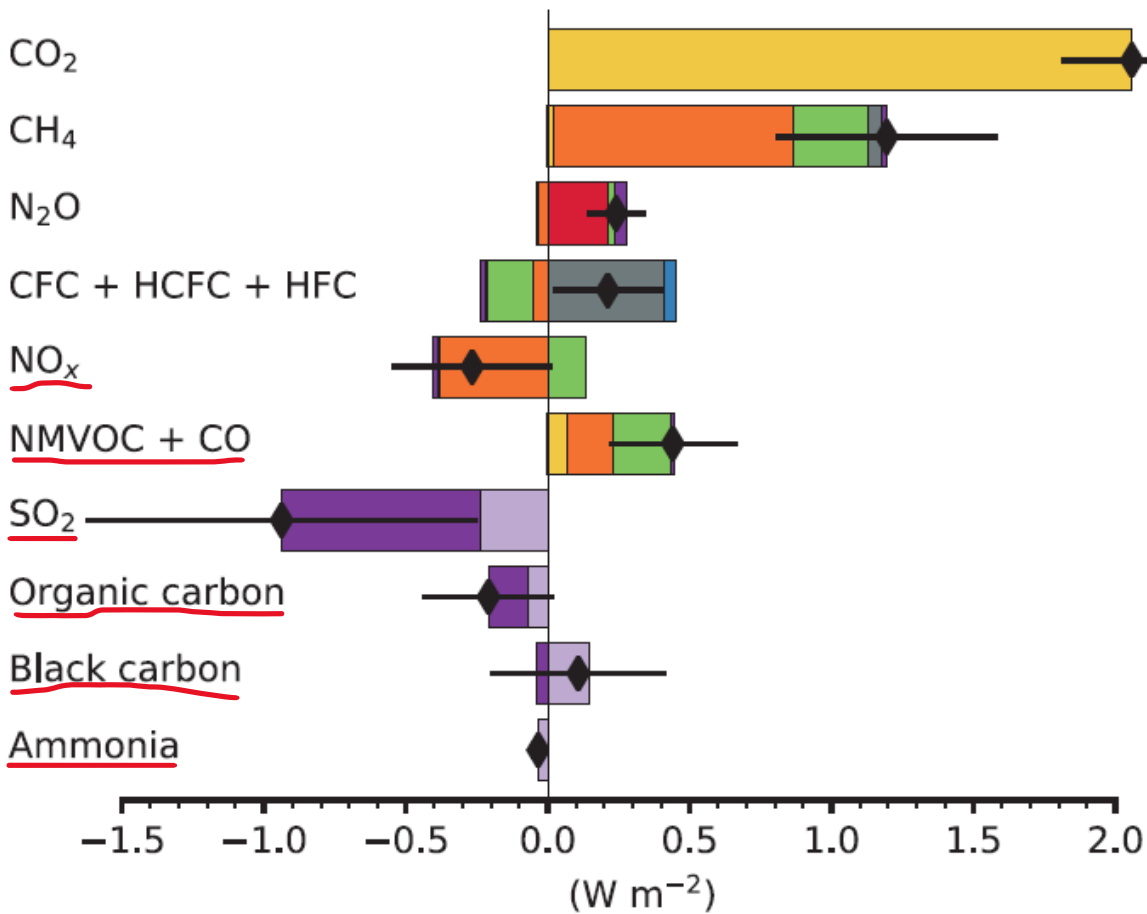


SLCFs Climate and Air quality links (WGI Report AR6 Ch6)

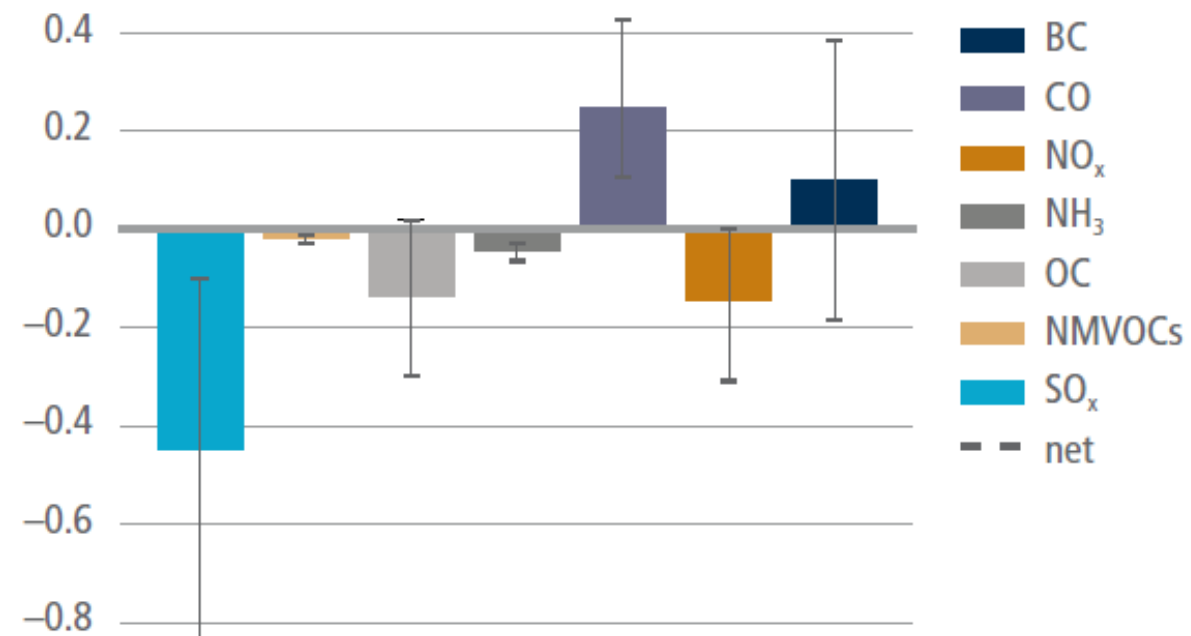


SLCFs Radiative Forcing & Warming (WGI Report AR6 Ch6 - WGIII Report AR6 Ch6)

(a) Effective radiative forcing, 1750 to 2019



(d) SLCF contributions to 1750–2018 warming



SLCFs Inventories

- Many countries are already annually producing national and regional inventories of air pollutants (including SLCFs)
- Thus, operational methods, datasets, guidance and guidebooks for SLCFs inventory estimates are available, e.g.
 - ✓ EMEP/EEA air pollutant emission inventory guidebook 2023
 - ✓ Chinese Technical Guide on emissions inventory
 - ✓ US AP-42 and NEI guidance
 - ✓ Other country-specific methods for some sources/species
- Given the significance of SLCF emissions and the availability of robust science and techniques to estimate such emissions IPCC has decided to
 - ✓ (IPCC/XLVI-6) *discuss estimation of emissions and associated climate effects, and then*
 - ✓ (IPCC/XLIX-7) *develop a Methodology Report on SLCF emissions inventories*

SLCFs mitigation

- Nationally determined contributions under the Paris Agreement - Synthesis report by the UNFCCC secretariat (FCCC/PA/CMA/2023/12) Para 72:
 - ✓ “...Eleven per cent of Parties included additional gases or emissions, including short-lived climate pollutants, such as *black carbon*, *sulfur dioxide* and NMVOCs.
- Further, climate synergy/tradeoff of air quality policies (e.g. von Salzen, K., Whaley, C.H., Anenberg, S.C. et al. [Clean air policies are key for successfully mitigating Arctic warming](https://doi.org/10.1038/s43247-022-00555-x). *Commun Earth Environ* 3, 222 (2022). <https://doi.org/10.1038/s43247-022-00555-x>)

Meeting's Objectives

- Based on desirability of consistency with 2006 IPCC Guidelines, and on the availability of robust science and data as well as on significance of species and sources, define the scope of methodological guidance for SLCF emissions inventories:
 - ✓ Title and Format [Plenary]
 - ✓ Species, and methods to measure those (ToR) [BOG1]
 - ✓ Definitions and Cross-cutting methodological issues (ToR/ToC-vol1) [BOG1]
 - ✓ Sources, of significant emissions and for which robust methods and data are available (ToC) [BOG2]
- Based on the need to ensure efficient use of resources available to inventory compilers and to facilitate the use of SLCF estimates, provide instructions to authors on
 - ✓ Approach to define methods and associated needed information and data (ToR/Instructions) [BOG3]
 - ✓ Approach to ensure reproducibility of guidance drafted by authors *-as data sources, data and methods-* [BOG3]
- Provide feedback on the Workplan draft [BOG 3]



Thank you

<https://www.ipcc-nggip.iges.or.jp/index.html>

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

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An SLCF with indirect impacts only: H₂

- Hydrogen is expected to play a key role in the global energy transition to net zero emissions
- **Fugitive emissions of H₂** into the atmosphere –*associated to its production*, storage, distribution and use*– impact the atmospheric chemistry and thus the greenhouse effect
- The increase in atmospheric [H₂] causes increases in atmospheric concentration of
 - ✓ CH₄
 - ✓ tropospheric O₃
 - ✓ stratospheric H₂O vapourresulting in a positive radiative forcing (a paper in 2023 [*Warwick et al, 2023***] estimated **GWP₁₀₀** to be **12±6**)

* grey/blue hydrogen, green hydrogen, white hydrogen

** <https://doi.org/10.5194/acp-2023-29>