The Emissions Database for Global Atmospheric Research (EDGAR)

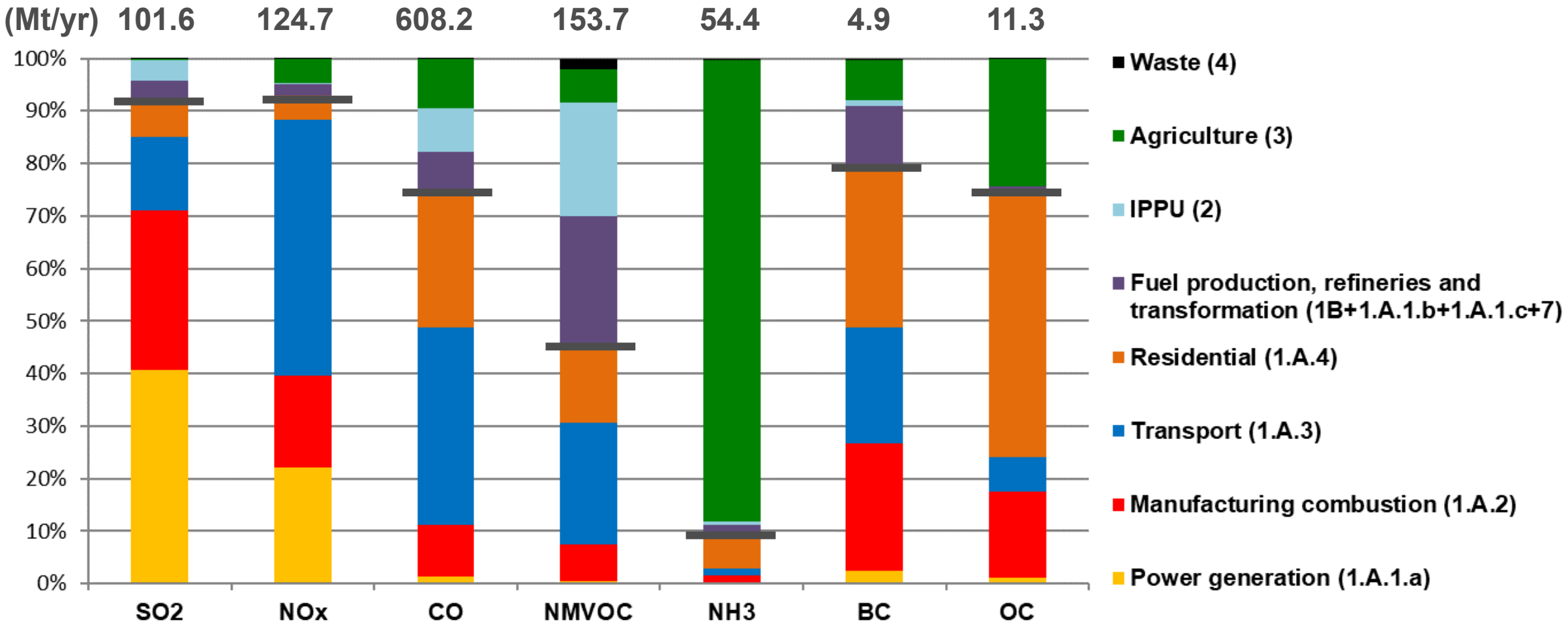
Joint 1st and 2nd IPCC Expert Meeting on Short-Lived Climate Forcers

11 – 22 October 2021, Virtual Meeting

Methodologies for Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry and Other Land Use (AFOLU) and Waste Sectors.

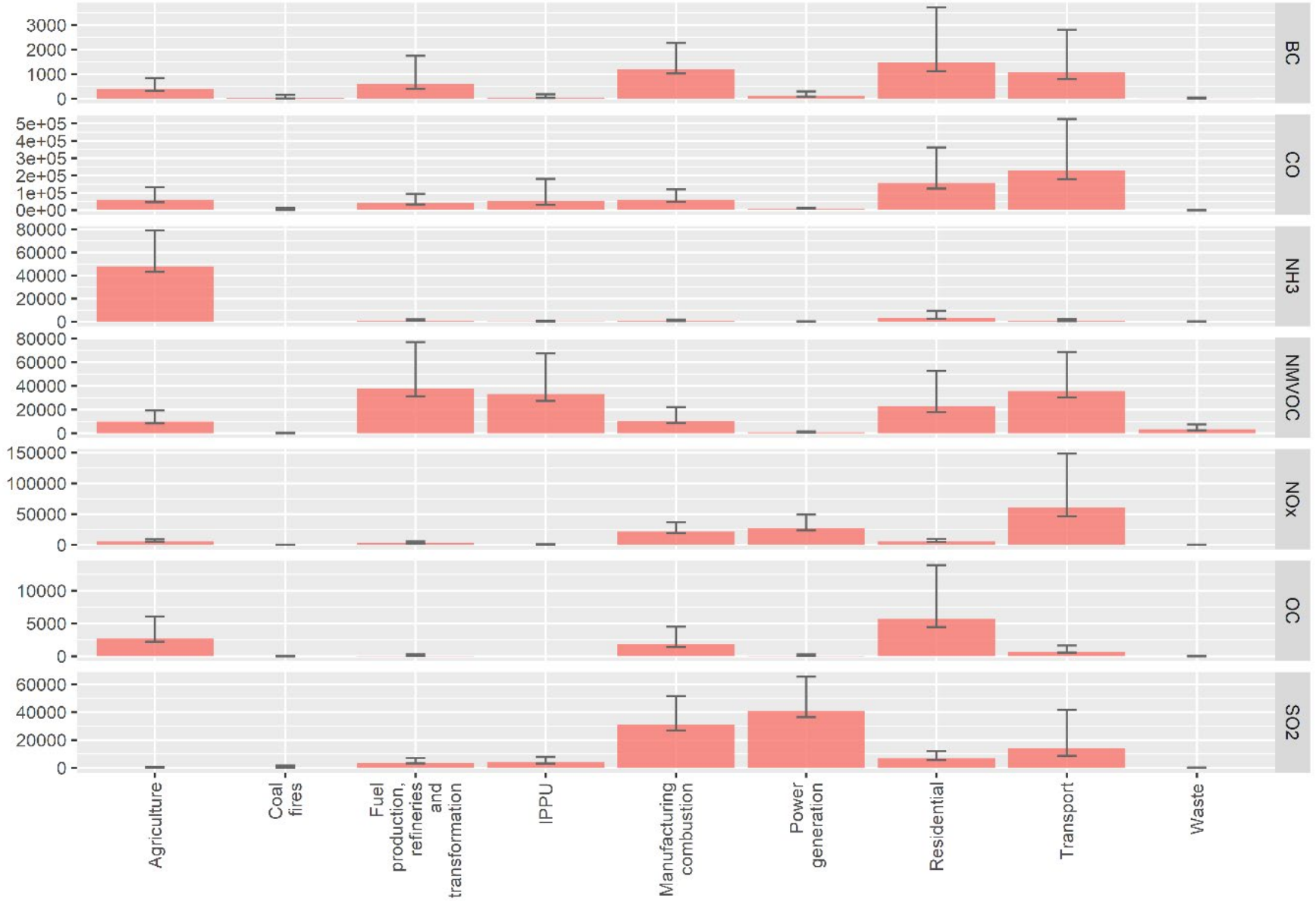
Monica Crippa, Efisio Solazzo, Diego Guizzardi, Manjola Banja, Marilena Muntean, Edwin Schaaf, Fabio Monforti-Ferrario, Jos Olivier

Global view: main sources of SLCF



Major emitting sources of Short Lived Climate Forcers (SLCF) in 2018 (EDGAR v6.0)

Uncertainty levels of SLCFs



95% CI of a lognormal distribution

	uncert_min	uncert_max
SO2	8.35%	42.20%
NOx	12.30%	73.50%
CO	10.80%	65.60%
NMVOC	7.55%	45.80%
NH3	8.82%	58.40%
BC	10.60%	66.80%
OC	12.50%	82.30%

Methodology from **Solazzo et al., 2021**: https://doi.org/10.5194/acp-21-5655-2021

EDGAR EMISSION DATABASE FOR GLOBAL ATMOSPHERIC RESEARCH

European Commission

EDGAR Methodology

EDGAR overview	Activity data	Emission factors	Methodology
Power generation (1.A.1.a)	IEA energy balances	EMEP/EEA guidebook 2019, AP-42	Tier 2
Manufacturing combustion (1.A.2)	IEA energy balances	EMEP/EEA guidebook 2019	Tier 1
Transport (1.A.3)	IEA energy balances	EMEP/EEA guidebook 2019	Tier 2
Residential (1.A.4)	IEA energy balances	EMEP/EEA Guidebook 2019	Tier 2
Fuel production, refineries and transformation (1B+1.A.1.b+1.A.1.c+7)	IEA energy balances	EMEP/EEA guidebook 2019, AP-42	Tier 1
IPPU (2)	USGS,WSA,Comtrade, FAOSTAT	EMEP/EEA Guidebook 2019	Tier 1
Agriculture (3)	FAOSTAT	EMEP/EEA Guidebook 2019	Tier 1 and Tier 2
Waste (4)	UN statistics, World Bank, FAO	EMEP/EEA Guidebook 2019	Tier 2

AgrEE tool (Agricultural Emission Estimation tool)

https://edgar.jrc.ec.europa.eu/agree_tool

Most critical sectors for data availability: solvents, chemicals, pipelines

EDGAR EMISSION DATABASE FOR GLOBAL ATMOSPHERIC RESEARCH

European Commission

Challenges of developing global emissions

- *Spatial proxies might be varying for the different SLCFs:*

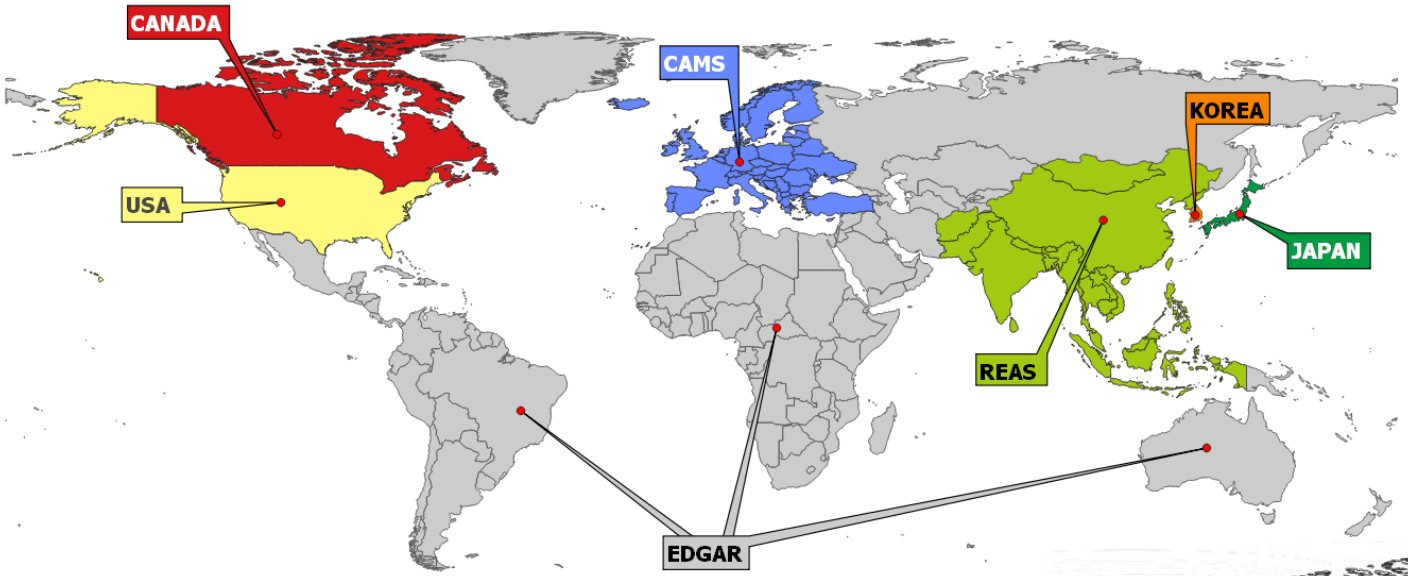
- SOx, NOx Emission Control Areas for shipping

- define substance-dependent weighting factors for certain proxies (based on S content for US power plants)

- *Point sources: lack of detailed data for some industrial activities and power plants (consistency)*
- *Spatial proxy need to be time dependant (lack of data)*

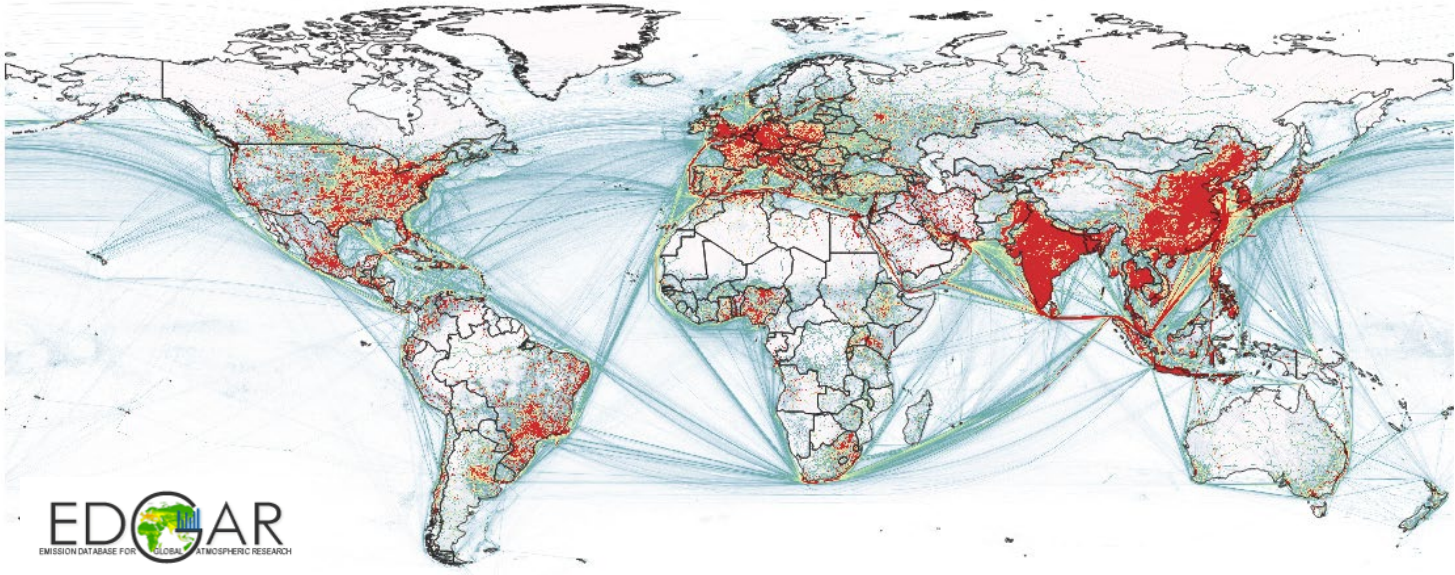
- ***Time resolution**: monthly data (seasonality of agriculture, residential, etc.), hourly to model haze events and hot spots (e.g. transport)*

Applications (1): Gapfilling the global view of officially reported inventories

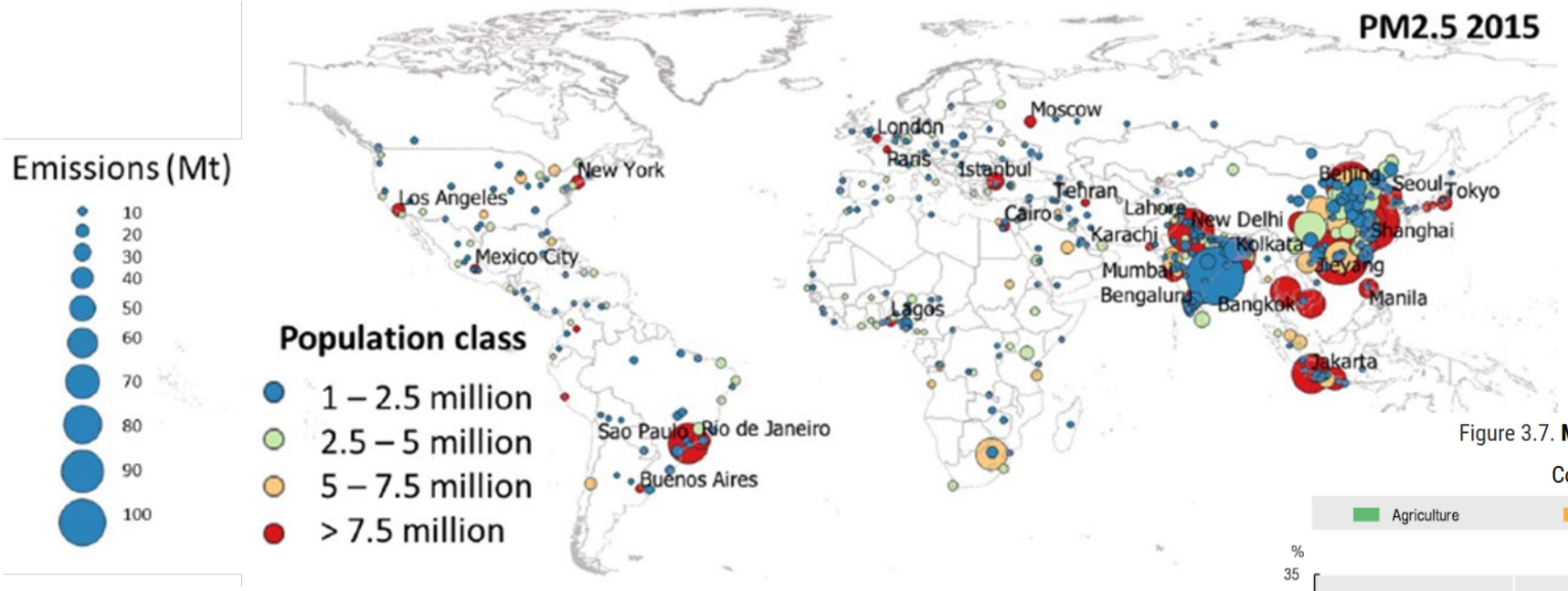


HTAPv3 mosaic

NOx emissions (2015)



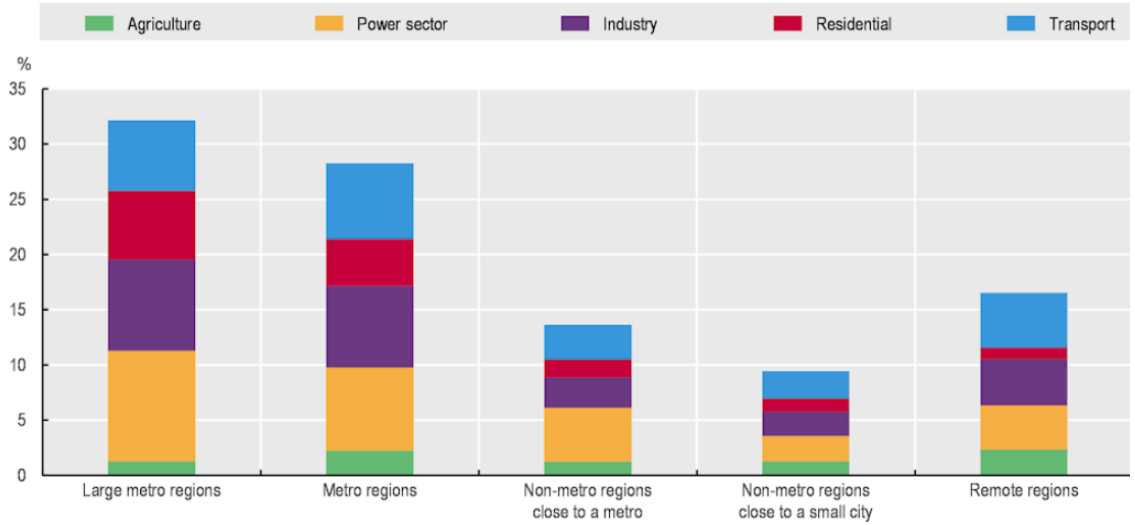
Applications (2): global emissions in urban areas



Crippa et al., 2021: https://iopscience.iop.org/article/10.1088/1748-9326/ac00e2

Figure 3.7. **Metropolitan regions emit the most greenhouse gas emissions**

Contribution to GHG emissions by type of region, 2018



Note: OECD countries, Bulgaria and Romania. GHG emissions excluding emissions from land use and land use change.

Source: OECD calculations based on EC (2020[84]), *EDGAR - Emissions Database for Global Atmospheric Research*, Joint Research Centre, European Commission.

OECD regional outlook, 2021: **3. Reaching net-zero greenhouse gas emissions: The role for regions and cities**

Challenges and Successes of EDGAR

- ***Challenges:***

- *move towards higher Tier methods to identify mitigation actions (lack of data)*
- *integrate near-real time data (e.g. satellite) to improve the spatial and temporal distribution of SLCFs (power plants, transport)*
- *Develop methodologies to estimate t-1 emissions (e.g. Fast-Track methods for SLCF, dynamic global inventory)*

- ***Successes:***

- *global consistency (countries, sectors, pollutants, methods) and historic time series -> trends monitoring and benchmarking*
- *wide use by modelers*
- *policy relevance (GHGs, AgrEE tool, HTAP, etc.)*

European Commission

Thanks for your attention!

European Commission