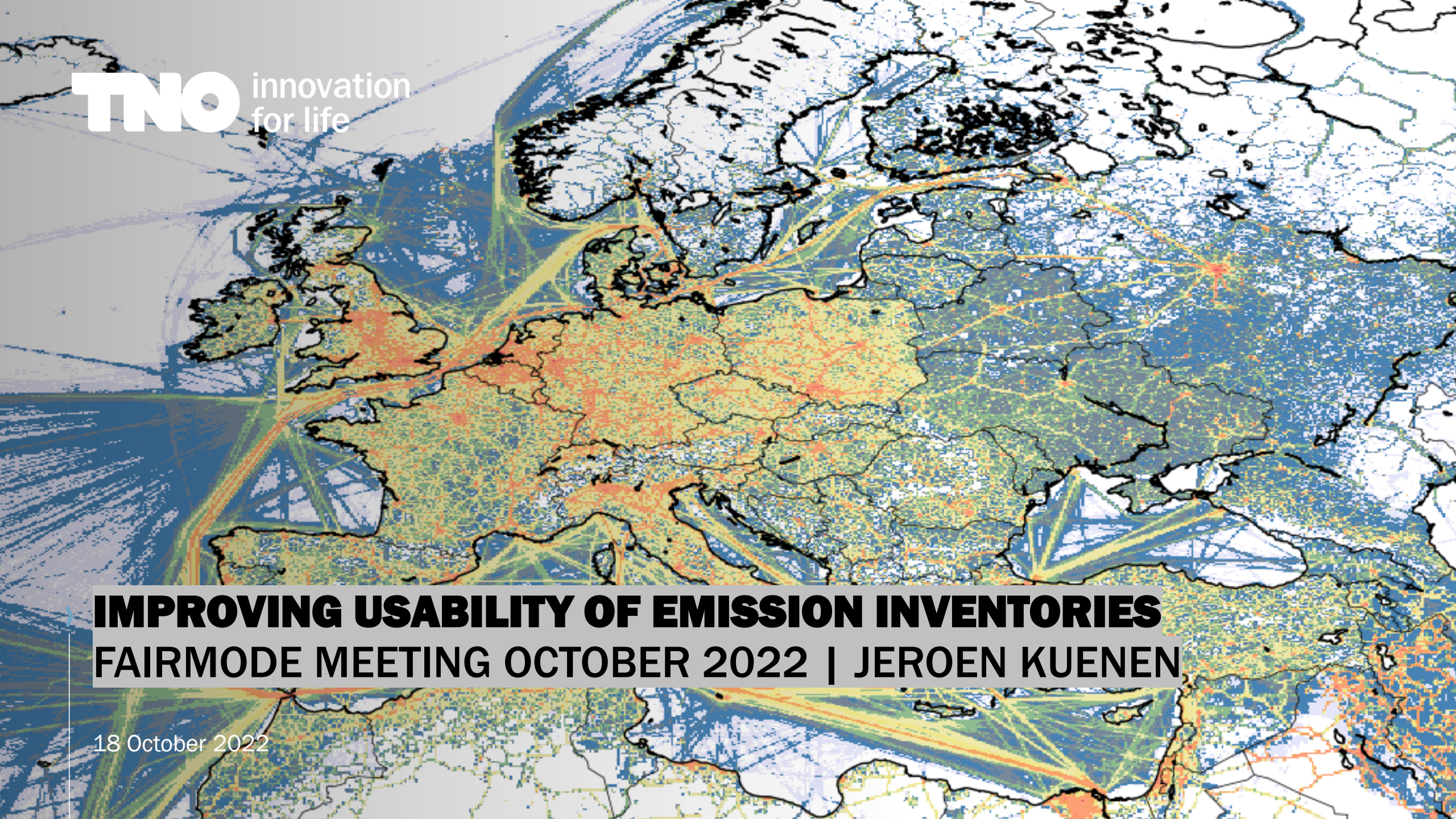


IMPROVING USABILITY OF EMISSION INVENTORIES

FAIRMODE MEETING OCTOBER 2022 | JEROEN KUENEN

18 October 2022

BACKGROUND

ANNEX 1: National sector emissions: Main pollutants, particulate matte

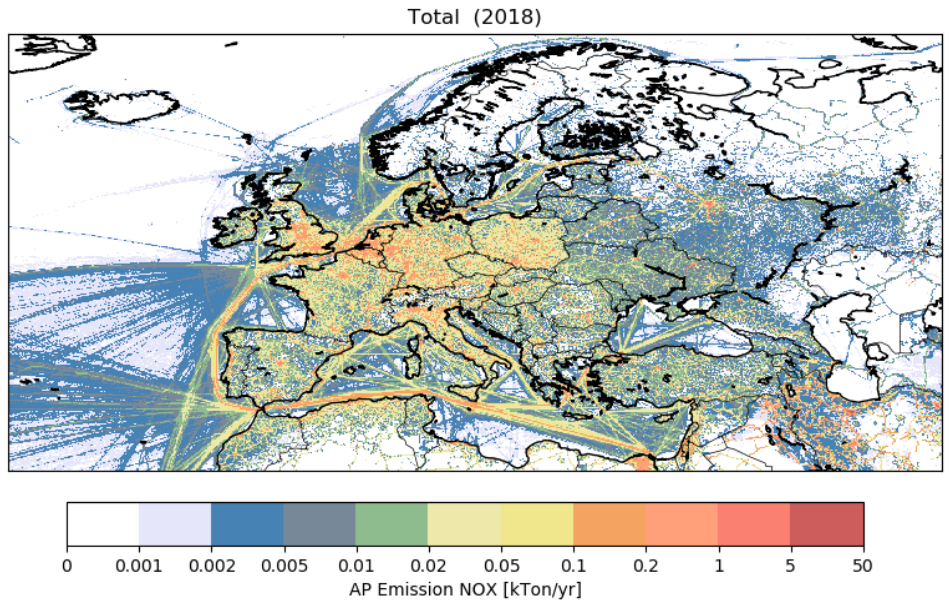
NFR 2019-1

COUNTRY:	XX	(as ISO2 code)
DATE:	05.02.2023	(as DD.MM.YYYY)
YEAR:	2005	(as YYYY, year of emissions and activity data)
Version:	v1.0	(as v1.0 for the initial submission)

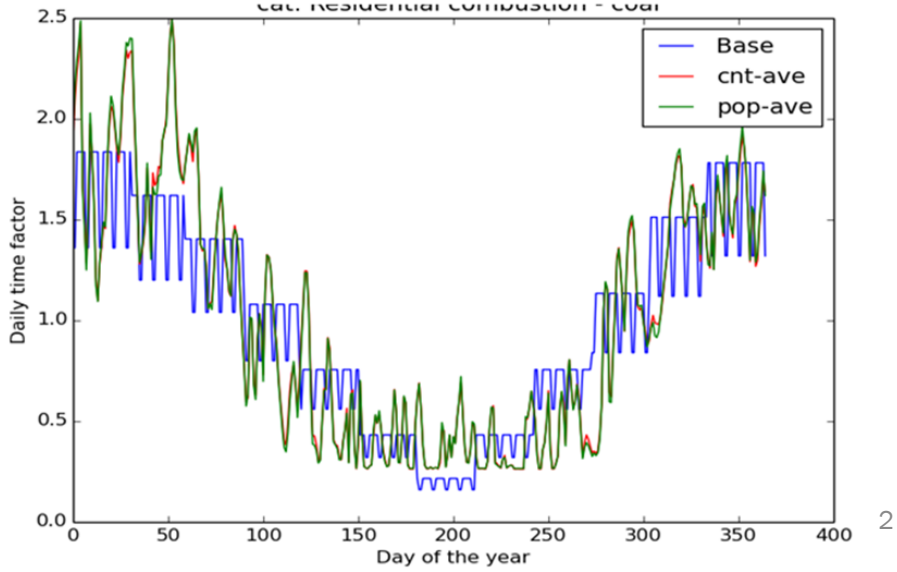
XX: 05.02.2023: 2005	NFR sectors to be reported			Main Pollutants (from 1990)				Particulate Matter (from 2000)				Other (from 1990)	Priority Heavy Metals (from 1990)		
				NOx (as NO_2)	NMVOC	SOx (as SO_2)	NH_3	$PM_{2.5}$	PM_{10}	TSP	BC	CO	Pb	Cd	Hg
NFR Aggregation for Gridding and LPS (GNFR)	NFR Code	Long name	Notes	kt	kt	kt	kt	kt	kt	kt	kt	kt	t	t	t
A_PublicPower	1A1a	Public electricity and heat production													
B_Industry	1A1b	Petroleum refining													
B_Industry	1A1c	Manufacture of solid fuels and other energy industries													
B_Industry	1A2a	Stationary combustion in manufacturing industries and construction: Iron and steel													
B_Industry	1A2b	Stationary combustion in manufacturing industries and construction: Non-ferrous metals													
B_Industry	1A2c	Stationary combustion in manufacturing industries and construction: Chemicals													
B_Industry	1A2d	Stationary combustion in manufacturing industries and construction: Pulp, Paper and Print													
B_Industry	1A2e	Stationary combustion in manufacturing industries and construction: Food processing, beverages and tobacco													
B_Industry	1A2f	Stationary combustion in manufacturing industries and construction: Non-metallic minerals													

Table 3-2 Tier 1 emission factors for source category 1.A.1.a using hard coal

Tier 1 default emission factors					
	Code	Name			
NFR Source Category	1.A.1.a	Public electricity and heat production			
Fuel	Hard Coal				
Not applicable					
Not estimated	NH3				
Pollutant	Value	Unit	95% confidence interval		Reference
			Lower	Upper	
NOx	209	g/GJ	200	350	US EPA (1998), chapter 1.1
CO	8.7	g/GJ	6.15	15	US EPA (1998), chapter 1.1
NMVOC	1.0	g/GJ	0.6	2.4	US EPA (1998), chapter 1.1
SOx	820	g/GJ	330	6000	See Note
TSP	11.4	g/GJ	3	300	US EPA (1998), chapter 1.1
PM_{10}	7.7	g/GJ	2	200	US EPA (1998), chapter 1.1
$PM_{2.5}$	3.4	g/GJ	0.9	90	US EPA (1998), chapter 1.1

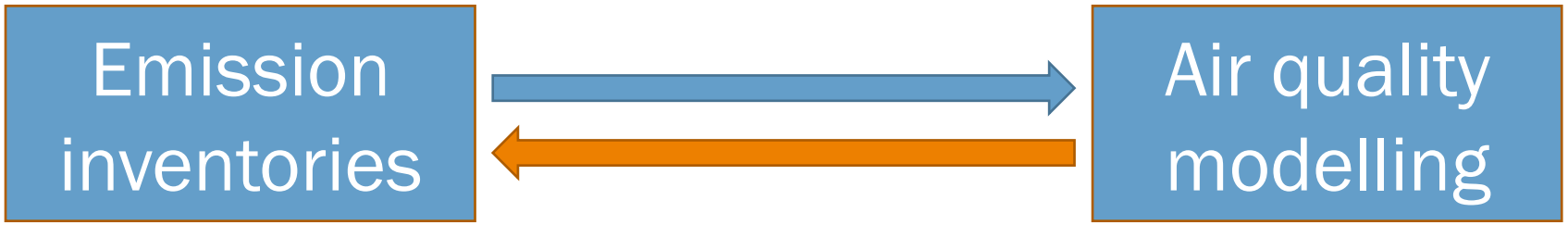


Meteo dependent emission modelling



WHY THIS EFFORT?

- Reported data primarily developed in relation to emission policies and reporting
- Standardized methodologies, focus on total emissions by country & sector
- Only once every 4 years spatially explicit emission data reporting
- One-way exchange of information, no interaction



- Interaction on emissions & modelled results
  - Modelled results can be compared to measured data (in-situ & satellite) which may trigger feedback to emission community
  - Valuable alternative approach / type of validation to emission inventories

- Modellers need in addition:
  - Spatially explicit emission data for each relevant year
  - Temporal disaggregation
  - Profiles for lumped pollutants (e.g. PM, NMVOC, NOX, SOX)
  - Emissions for non-reported sectors (e.g. (semi)natural)

CURRENT STATUS & DEVELOPMENTS IN TFEIP

- Earlier discussions took place – for instance between TFEIP and TFMM (2013 “wish list”) – but not much happened because of other priorities
- An important aspect is the policy framework in which inventories are regulated
  - Difficult to change the structure and setup of current emission inventories
  - But we can suggest new elements that we see possibly fit

- Why now?
  - Change of role Jeroen within TFEIP
  - Take stock of ongoing projects and initiatives at EU level (e.g. CAMS, FAIRMODE)
  - Increasing user requirements with to better represent emissions in space, time and composition

TWO LINES: (1) SPATIAL DISTRIBUTION

- Reporting requirements in place; EMEP/EEA Guidebook chapter online
  - Chapter to be updated as part of the EMEP/EEA 2023 Guidebook update
- Improve the quality of spatially distributed emission inventories by improving the guidance on this topic
  - Reporting every 4 years under NECD/LRTAP - take into account lessons learned during the NECD inventory reviews 2020/2021
  - Review & update Guidebook chapter (general)
  - Review & update list of proxies suggested with different Tiers

- NECD inventory reviews 2020/2021 focussed on gridded & LPS data
  - Large variety in quality of gridded emissions across EU27/28 (from very good to very poor)
  - Issues with coordinates, extent of countries, basis for reporting (fuel sold/used) and documentation
  - LPS data found to have multiple issues and not always consistent with gridded data (often related to consistency issues between national inventories and E-PRTR)

TABLE WITH SUGGESTED METHODS/PROXIES

- Detailed table (18 pages) by (G)NFR in current Guidebook chapter
- Contribution from FAIRMODE to review this table
- Needs definition of Tier 1-2-3 => improve inventories but don't make reporting overly demanding!!!

				Best quality---------→----------→----------Approximate estimate			
NFR sector	**NFR sector name**	**GNFR sector**	**Cat.**	**Tier 3**	**Tier 2**	**Tier 1**	**Notes**
1.A.1 Energy industries	1.A.1.a Public Electricity and Heat Production	A_PublicPower	A	Reported point source data or national totals disaggregated using plant-specific capacity or other activity statistics	Employment data e.g. for 1.A.1.c: number of employees by economic activities (EUROSTAT Employment statistics - Manufacture of coke oven products) See also section 3.3.5 for an example	Industrial Land cover	A combination of tiered approaches might be needed depending on the availability of a complete dataset of point sources. Where only partial datasets are available for point sources use proxy data most relevant to sub-sectors to map diffuse remainder.
	1.A.1.b Petroleum Refining	B_Industry	A				
	1.A.1.c Manufacture of Solid Fuels and Other Energy Industries	B_Industry	B				
	1.A.2.a Stationary Combustion in Manufacturing Industries and Construction: Iron and Steel	B_Industry	B		Employment data		A combination of tiered approaches might be needed depending on the

STATUS & HOW TO GO FROM HERE

- Next steps
  - Jeroen to suggest first draft of Guidebook chapter update, then all to comment
  - If you have any suggestions for improving the chapter please send them to me in the next weeks

- Timeline
  - Guidebook chapter editing, start now
  - First draft update by early November
  - Comments/input from the group until early December
  - Finalise draft chapter until end of December (deadline for 2023 GB updates)

(2) SUPPLEMENTARY GUIDANCE FOR MODELLERS

- Idea: provide users (AQ modellers) with a guidance document with information which will help them implement the emissions provided by the emission inventory community by providing information and data related to:
  - Temporal distribution of emissions => *work in CAMS e.g. CAMS-TEMPO and more simplified profiles*
  - Vertical emission distribution => *some defaults available from CAMS*
  - Speciation profiles (e.g. PM, NMVOC but also NOX, SOX) => *provided by CAMS for European domain*
  - Accounting for semi-volatiles (that do not fit PM nor NMVOC definitions) => *research phase, for later*
  - "Non-inventoried" emissions (biogenics, resuspension, forest fires, …) => *provide links to available data sources e.g. from CAMS – models have many different approaches to these*
- Not part of EMEP/EEA Guidebook (no reporting requirement) => stand-alone document linking to/from GB
  - Allows for flexible timeline
  - First version ready before approval/publication of updated GB (scheduled for May 2023)
  - Improve guidance in the following years

PRACTICALLY

- Updated GB chapter on spatial mapping to be finished mid-November
  - Comments from group by early December
  - Final draft by end of December

- Additional guidance for modellers to be draft early 2023
  - Building on guidance already available from CAMS, supplemented by other sources
  - Goal to have a first version of this guidance by end of March

- Please let me know if you are interested to contribute
  - Jeroen.Kuenen@tno.nl

COMMENTS

- The additional guidance is not only for AQ modellers but also for emission modellers