

Updates on emissions reporting

Federico Antognazza

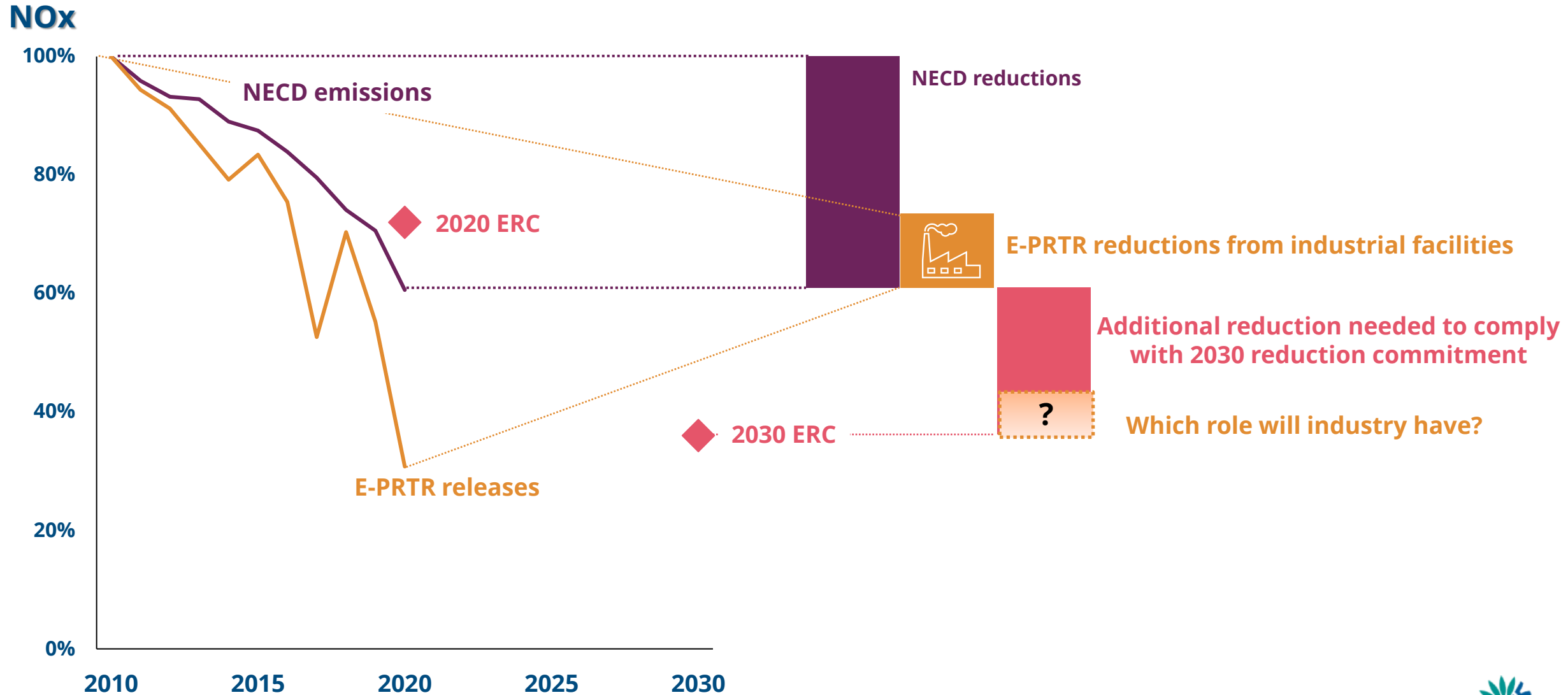
Content

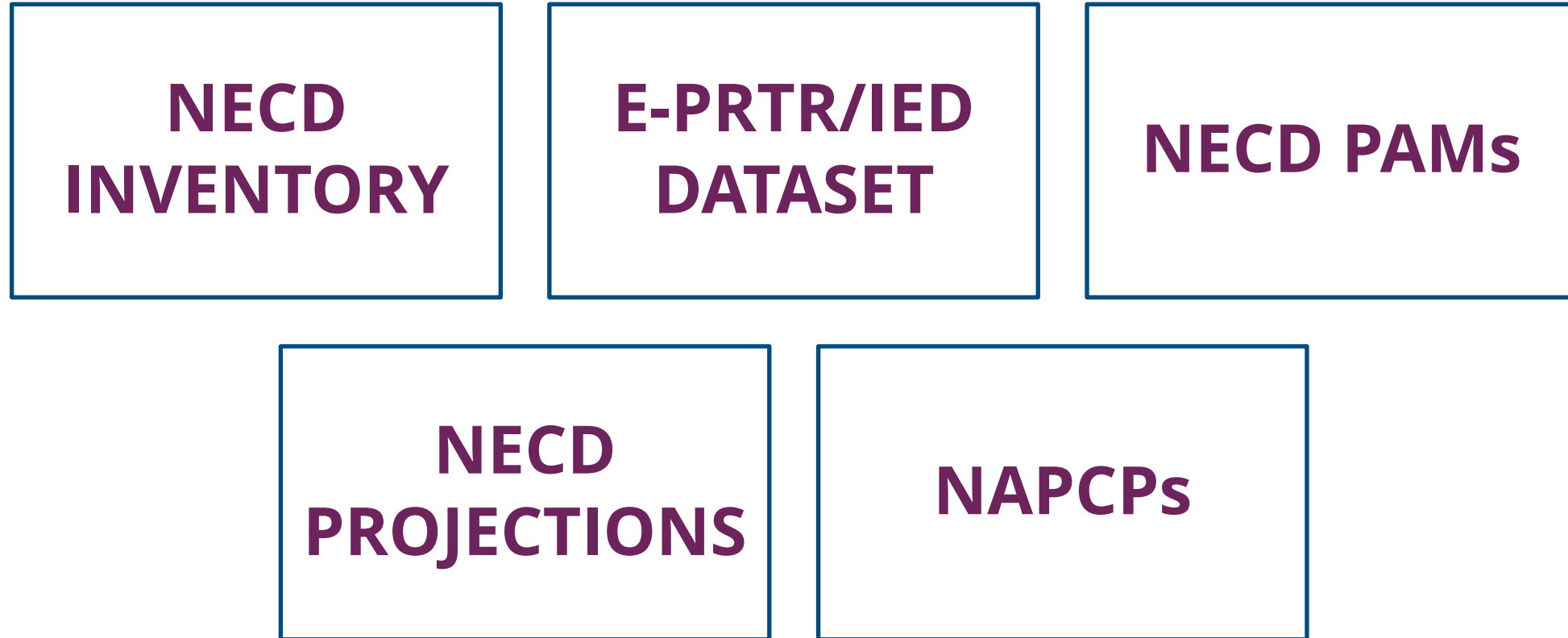
- **THE CONTRIBUTION OF THE INDUSTRIAL SECTOR TO THE 2020 EMISSION REDUCTION COMMITMENTS AND ITS ROLE IN THE LONG TERM**
- **USE OF COPERNICUS DATA TO ASSESS NO_x LCP EMISSIONS**

THE CONTRIBUTION OF THE INDUSTRIAL SECTOR TO THE 2020 EMISSIONS REDUCTION COMMITMENTS AND ITS ROLE IN THE LONG TERM

Work performed by ETC/HE partner (Aether): Lucy Garland and Katrina Young

Contribution of industrial sector in achieving emissions reduction commitments

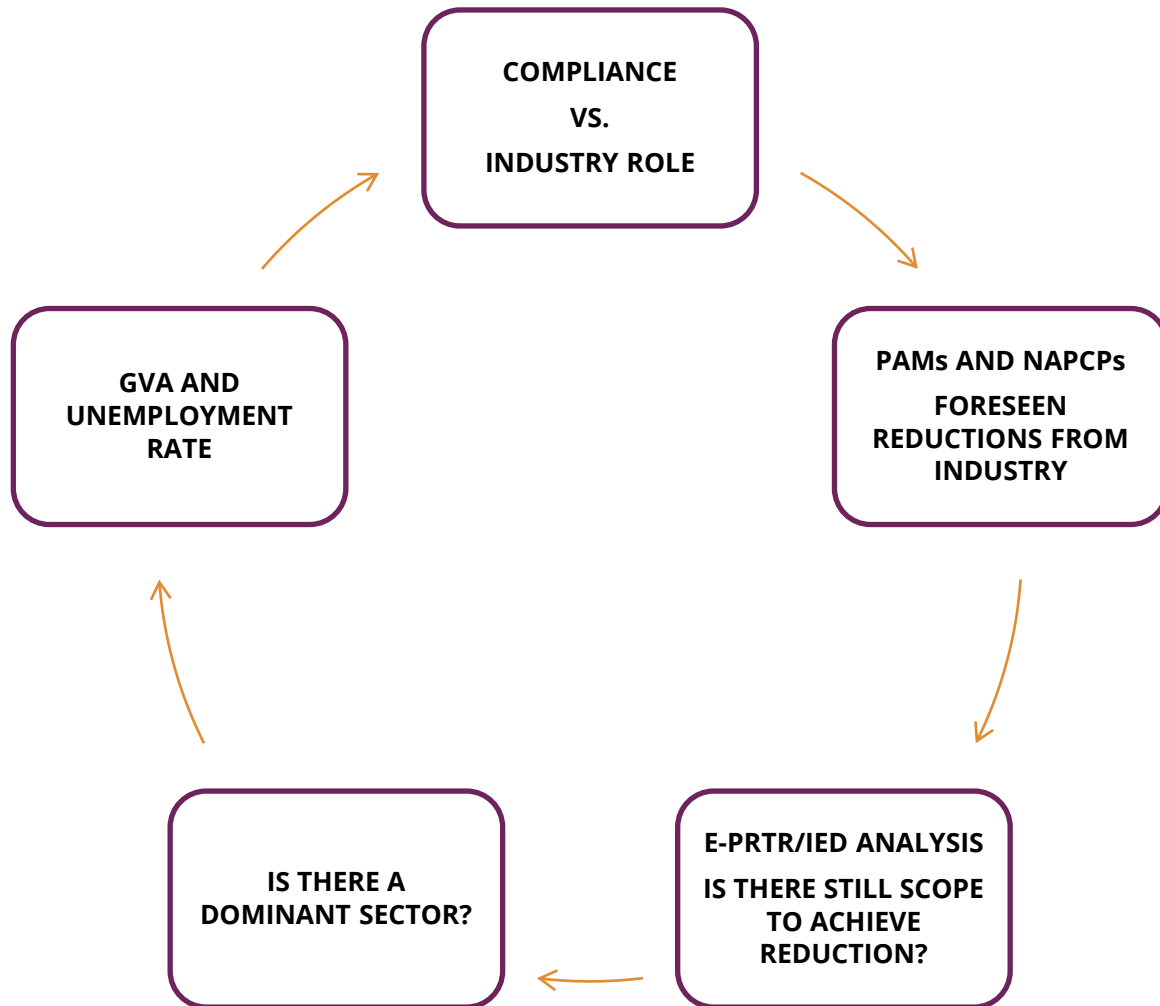




Awareness of data gaps in E-PRTR:

- DE and SK never reported under new E-PRTR/LCP (no data since 2017)
- IT and MT haven't reported 2020
- LT haven't reported 2019 and 2020

Main content



EIONET Report (Q3/Q4)



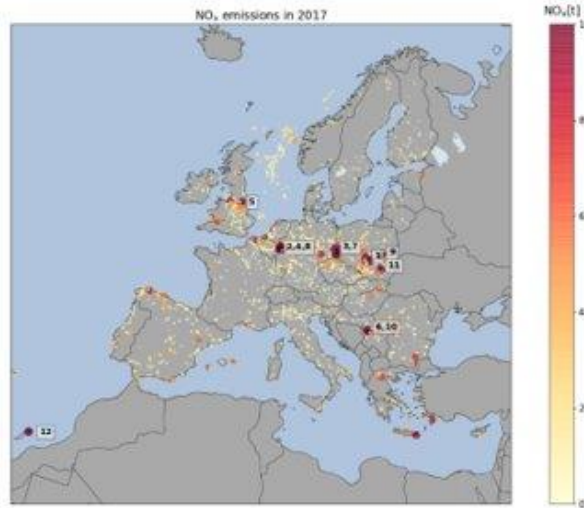
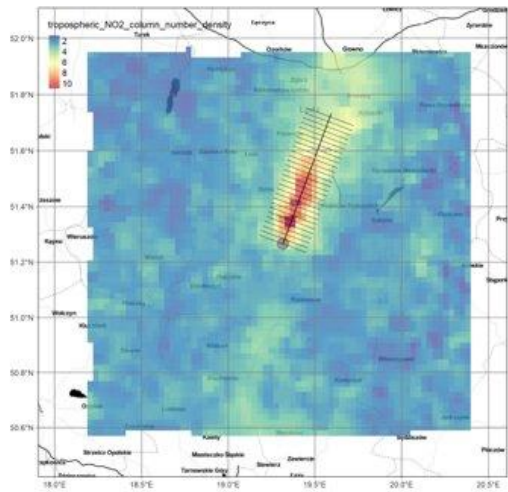
**EEA Briefing
Dataviewer
Q1 2023**

USING COPERNICUS DATA TO ASSESS LARGE COMBUSTION PLANTS (LCP) NO_x EMISSION LEVEL

Work performed by ETC/DI partner (NILU): Kerstin Stebel

NO₂ from TROPOMI on board Sentinel-5P

Scoping Study in 2021



#	Name of power plant	Country code	# TROPOMI overpasses total - selected for 2018 / 2019 / 2020	Top-down NO _x emissions [kg/s]			Reported NO _x emissions [kg/s]		Source
				2018	2019	2020	2018	2019	
01	Elektrownia Belchatów	PO	350 - 47 / 33 / 40	0.93	0.74	0.93	0.954	0.793	E-PRTR ³
02	Kraftwerk Neurath	GE	342 - 30 / 23 / 18	0.42	0.89	0.33	0.685		NECD ⁴
03	Kraftwerk Jämschwalde	GE	357 - 26 / 20 / 08	0.55	0.35	0.28	0.596		NECD
04	Kraftwerk Niederaußem	GE	overlapping plume with Kraftwerk Neurath				0.552		NECD
05	Drax Power Station	UK	244 - 10 / 03 / 15	N/A	N/A	N/A	0.387	0.259	E-PRTR
06	TPP Nikola Tesla B	CZ	551 - 42 / 61 / 42	0.51	0.42	0.62	0.381	0.358	E-PRTR
07	Kraftwerk Boxberg	GE	345 - 14 / 18 / 14	0.39	0.46	0.31	0.425		NECD
08	Kraftwerk Weisweiler	GE	310 - 19 / 08 / 01	N/A	N/A	N/A	0.365		NECD
09	Elektrownia Koźienice	PO	373 - 16 / 22 / 11	in final report			0.306	0.339	E-PRTR
10	TPP Nikola Tesla A	CZ	overlapping plume with TENT B				0.419	0.444	E-PRTR
11	Elektrownia Połaniec	PO	398 - 04 / 06 / 01	in final report			0.246	0.205	E-PRTR
12	Central Diesel Punta Grande	ES	618 - 32 / 53 / 45	0.26	0.26	0.29	0.355	0.346	E-PRTR

- Impact of background emissions
- Proximity

Data and pre-processing steps

Satellite data

TROPOMI tropospheric NO₂ vertical column density (Level 2, processor version 1)

Meteorological data and ozone

ECMWF ERA5 data for the time period January 2018 – December 2020.

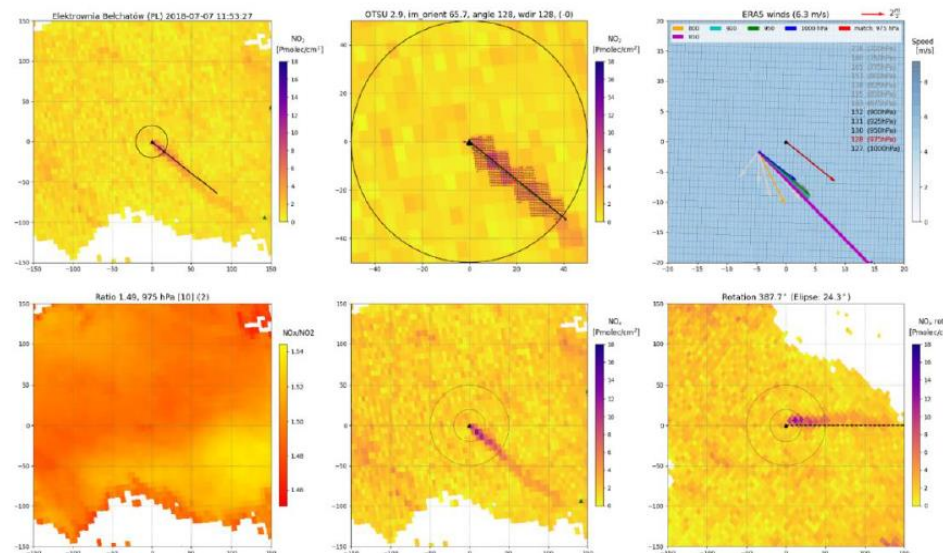
Satellite instruments can only observe tropospheric NO₂

NO_x / NO₂ conversion factor for the photochemical steady state

$$\frac{[NO_x]}{[NO_2]} = 1 + \frac{[NO]}{[NO_2]} = 1 + \frac{J_{NO_2}}{k_{NO+O_3} * n_{O_3}}$$

Photolysis rate of NO₂ (J_{NO_2})

Rate constant for the reaction of NO with ozone (O₃) (k_{NO+O_3})



Rotation of all plumes to increase SNR

Choice of pressure level to be used for ERA5 winds and O₃



... fit based emission estimates (III)

TROPOMI NO₂ line density (S)

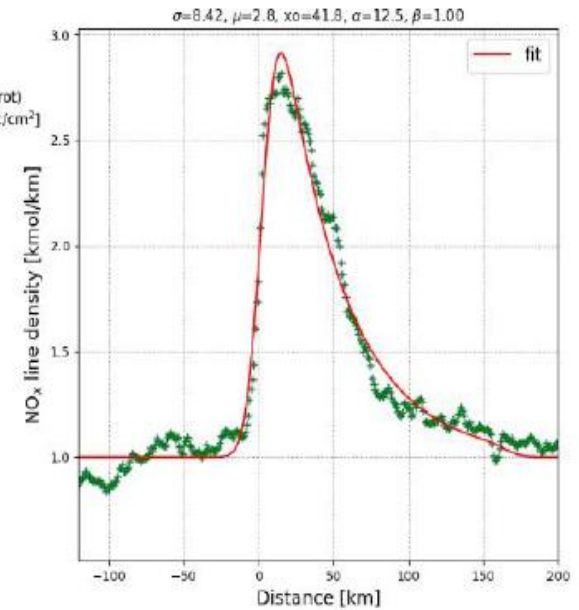
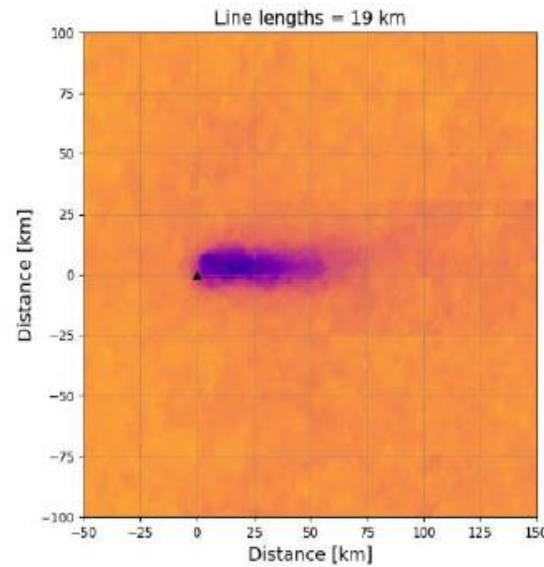
$$S = \int_{y_l}^{y_h} NO_x * dy$$

$$\tau = x_0 w$$

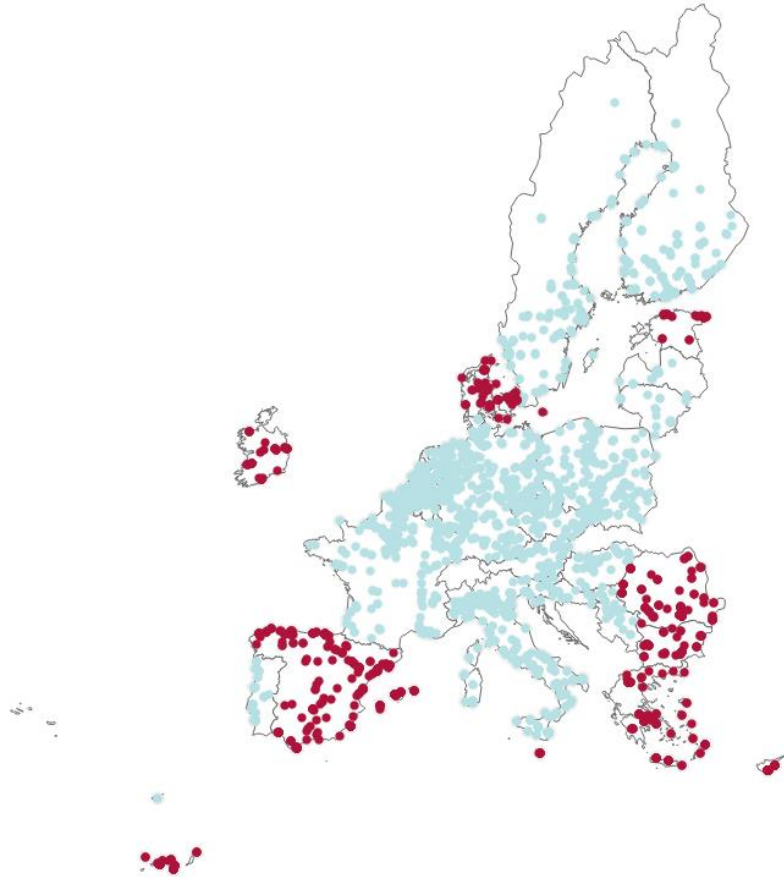
effective lifetime

$$E = \alpha / \tau$$

NO_x emission rate



Focus of 2022 work



Bulgaria, Cyprus, Denmark, Estonia,
Greece, Ireland, Malta Romania, Spain

