

UPDATE DUTCH EMISSION FACTORS 2021
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› SUMMARY

ANNUAL DUTCH ADAPTION ON 15 MARCH

- › Enforcement of SCR manipulation, initially proposed by the government but not specific
- › Estimates beyond 2030, but not yet including Euro-7
- › CO₂ emission factors (MILE21 updates) from real-world fuel consumption data
- › Measurement programs for NRMM, multiple projects and approaches

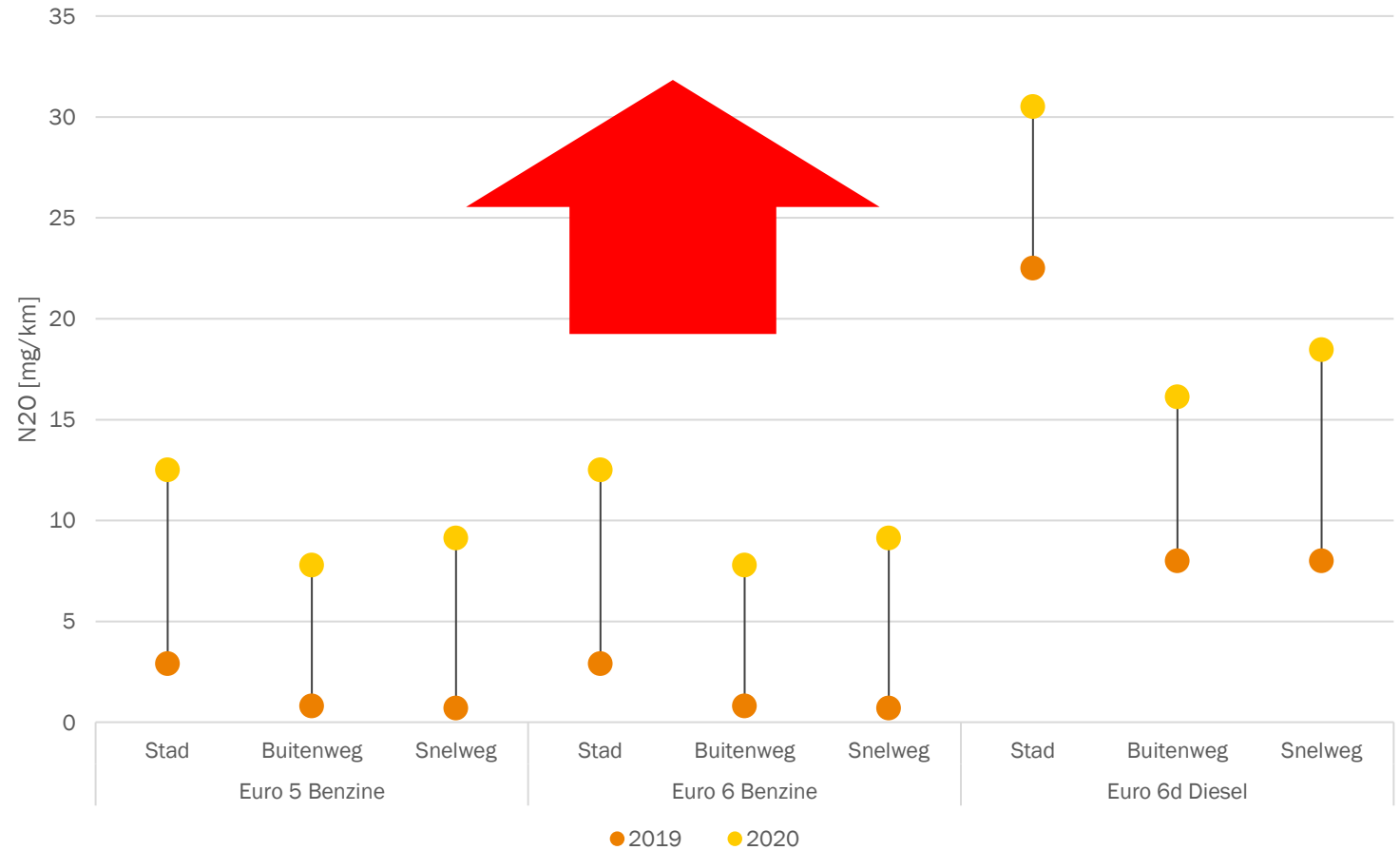
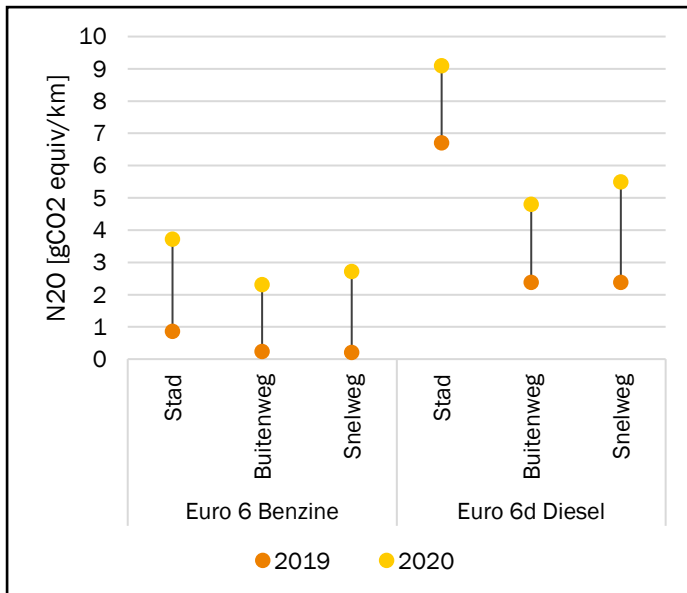
Slides:

- › N₂O emission factors update for petrol and diesel
- › NH₃ and NO_x emission factors update for diesel Euro-6d-temp/final
- › Measurement of 50 older petrol vehicles (increased NO_x and NH₃)
- › Non-road mobile machinery, large variation
- › Dutch national fleet emission monitoring (bottom-up)
- › Other updates

N₂O LATEST PETROL AND DIESEL PASSENGER CARS

INCREASE IN N₂O WITH SCR SYSTEMS IN EURO-6D-TEMP/FINAL

- › N₂O measurements on-road and in the laboratory across Europe
- › Increase of N₂O emission factors for petrol and diesel.
- › Equivalent of 8 g CO₂ extra per km urban for diesel (CO_{2-eq} = 265)



› NH₃ EN NO_x LATEST DIESEL (6D-TEMP)

- › New measurement and monitoring of Euro 6d-Temp vehicles 2019 - 2020
- › Improvements over earlier generation of Euro-6d-temp
- › Reduced NH₃ and NO_x emission factors

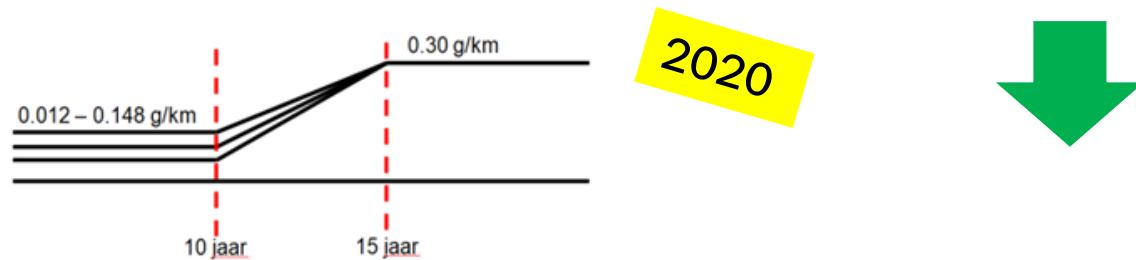


OLD PETROL CARS: DETERIORATION MAJOR CONTRIBUTION TO NOX TOWARDS 2030

UK remote sensing

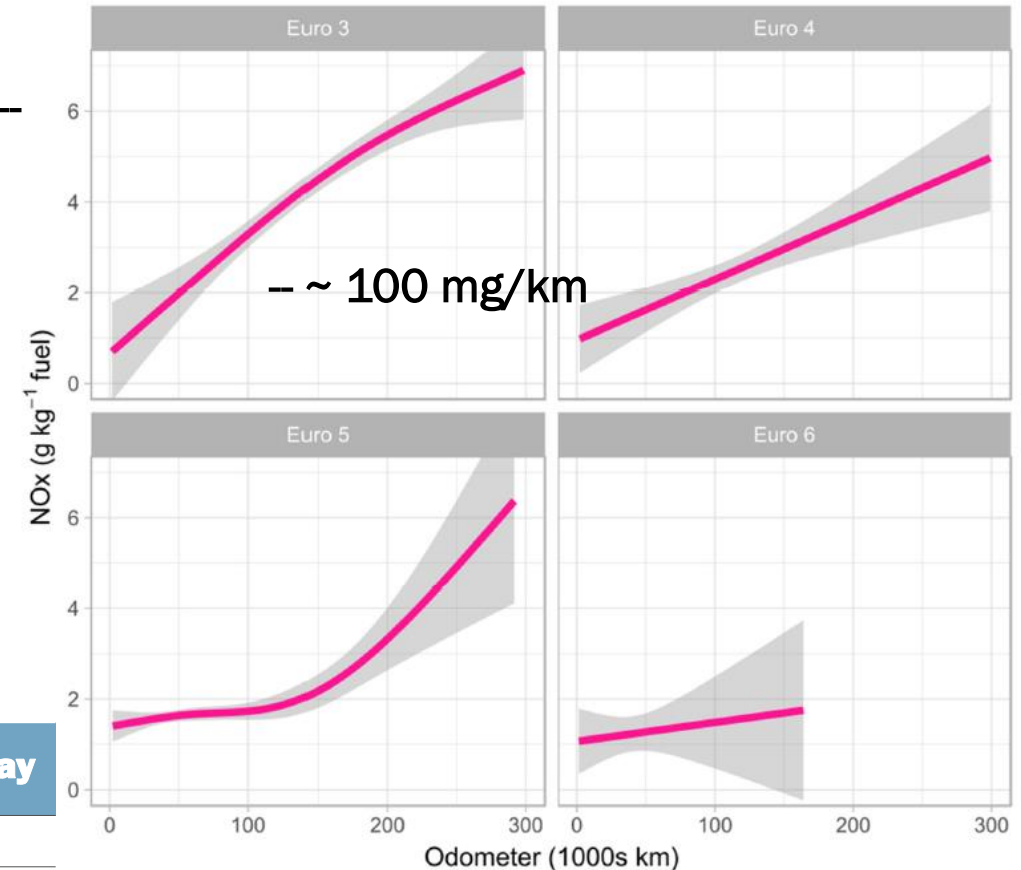
- › 38 petrol cars measured (private owners)
- › > 154 800 km, 3 - 22 year

2019 update NOx Euro-3 tot Euro-5:



2019-2020 meetprogramma komt lager uit:

	Number vehicles	Total		Urban	Rural	Motorway
		cold	warm	Warm	warm	warm
		[mg/km]				
2018	12	299	305	383	177	379
2020	38	-	166	206	119	155
Total	50	-	200	248	133	209



No reason to assume Euro-6 does not have to same problems

NEW METHODOLOGY FOR DETERIORATION EFFECTS

STATISTICS NETHERLANDS HAS MILEAGES OF ALL VEHICLES

- › Statistics Netherlands has mileages of all vehicles:
 - › Deterioration based on actual mileages of individual vehicles
 - › Annual mileages in prognoses, yet to be resolved

› Voor 2021:

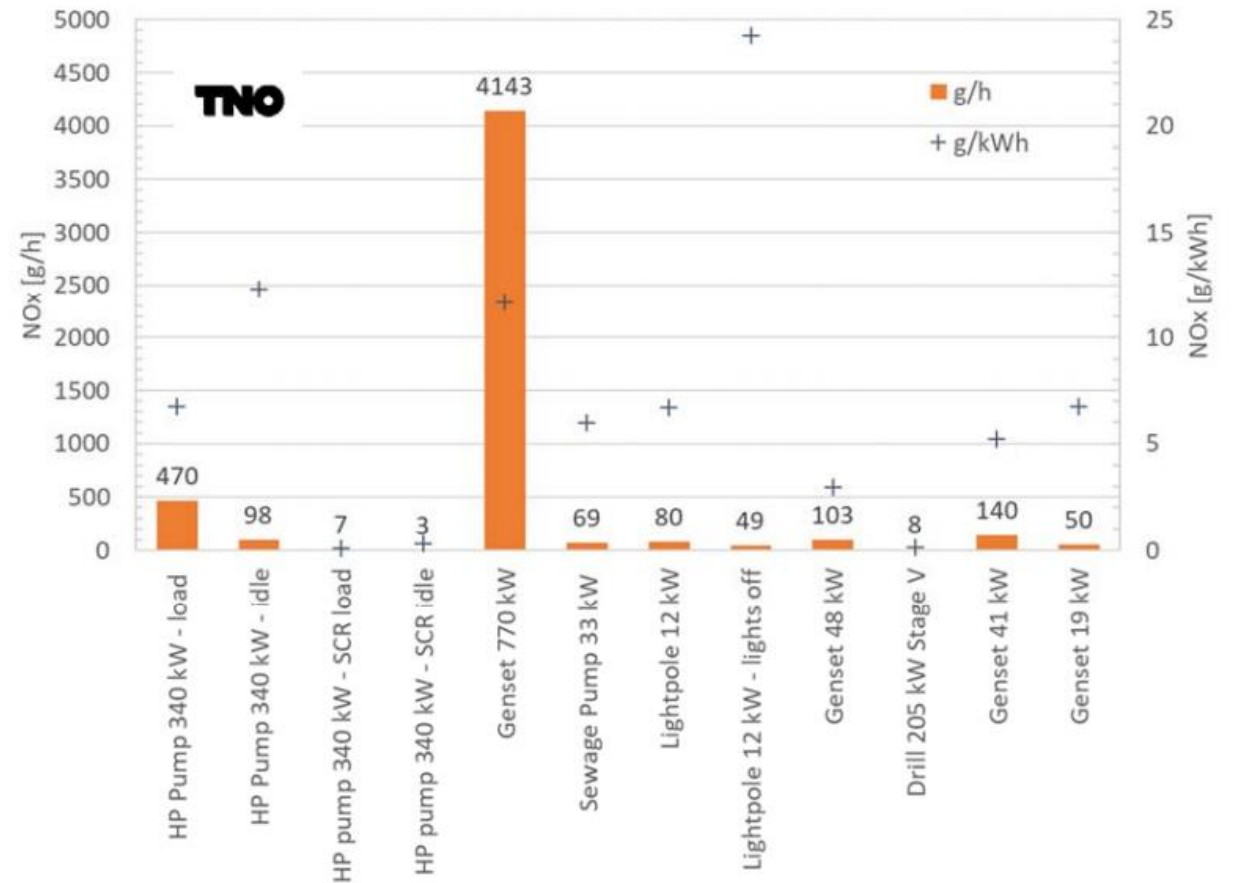
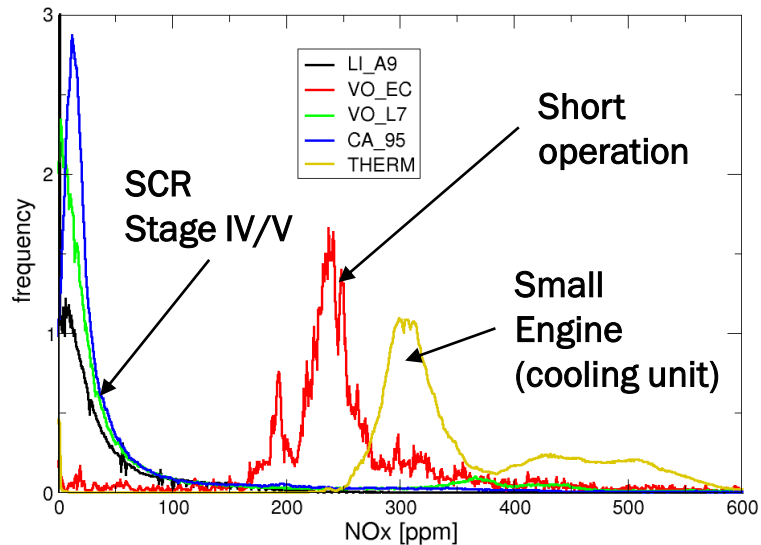
- › Final stage deterioration adapted downward: NOx ~ 200-250 mg/km (was 300 mg/km)
- › Also applied for Euro-6, no reason to assume a change
- › Road type distinction introduced
- › Adaption of NH3 emission factors (urban: slightly up, otherwise down)

NH3 [g/km]	stad	buitenweg	snelweg
Euro-1	0.070	0.132	0.074
Euro-2	0.085	0.149	0.084
Euro-3	0.058	0.030	0.065
Euro-4	0.038	0.029	0.065
Euro-5	0.018	0.029	0.065
Euro-6	0.009	0.029	0.065

NH3	Number	Total	Total	Urban	Rural	Motorway
	of	cold	warm	warm	warm	warm
	Vehicles	[mg/km]	[mg/km]	[mg/km]	[mg/km]	[mg/km]
2020	38	-	32.1	49.0	22.2	20.6

NON-ROAD MOBILE MACHINES MONITORING, MEASUREMENTS AND SCREENINGS

- › Stage IIIB, IV, and V
- › Wide variation in results
- › Many new machine types identified and included
- › Risks of tampering real: 10% tampering assumed on SCR and DPF systems
- › Mobile cooling units: high emissions and many hours of operation (no stop-start systems). They are a new and substantial source of NOx and PM emissions.



› OTHER TOPICS

AFFECTING TOTAL EMISSIONS AND ATTRIBUTIONS

- › Separate emission factors and fleet numbers for (urban) “utility vehicles” like refuse trucks, mobile cranes, drainage vehicles, with low velocity, PTU use, and urban use.
- › Non-exhaust emission factors based on vehicle weight, to compensate brake wear with tyre wear for current (heavy) BEVs
- › L-cat: mopeds, motorcycles, tricycles, and quads: emission factors and fleet numbers included. Mileages under investigation.

Lcat classes in VERSIT+ based on Dutch vehicle registration:

LBFBEURO, LBFBEUR1, LBFBEUR22TK, LBFBEUR24TK, LBFBEUR3, LBFBEUR4, LBFBEUR5,
LBFEZEEV, LMFBEURO, LMFBEUROLCH, LMFBEUROMED, LMFBEUROZWA, LMFBEUR1,
LMFBEUR1LCH, LMFBEUR1MED, LMFBEUR1ZWA, LMFBEUR2LCH, LMFBEUR2MED,
LMFBEUR2ZWA, LMFBEUR3LCH, LMFBEUR3MED, LMFBEUR3ZWA, LMFBEUR4LCH,
LMFBEUR4MED, LMFBEUR4ZWA, LMFBEUR5LCH, LMFBEUR5MED, LMFBEUR5ZWA, LMFEZEEV,
LQ6BEURO, LQ6BEUR1, LQ6BEUR22TK, LQ6BEUR24TK, LQ6BEUR3, LQ6BEUR4, LQ6BEUR5,
LQ6DEURO, LQ6DEUR1, LQ6DEUR22TK, LQ6DEUR24TK, LQ6DEUR3, LQ6DEUR4, LQ6DEUR5,
LQ6EZEEV, LQ7BEURO, LQ7BEUR1, LQ7BEUR2, LQ7BEUR3, LQ7BEUR4, LQ7BEUR5, LQ7EZEEV,
LT2BEURO, LT2BEUR1, LT2BEUR22TK, LT2BEUR24TK, LT2BEUR3, LT2BEUR4, LT2BEUR5,
LT2EZEEV, LT5BEURO, LT5BEUR1, LT5BEUR2, LT5BEUR3, LT5BEUR4, LT5BEUR5, LT5EZEEV

› FLEET MONITORING (~12 MILJOEN REGISTRATIONS)

BOTTOM-UP APPROACH

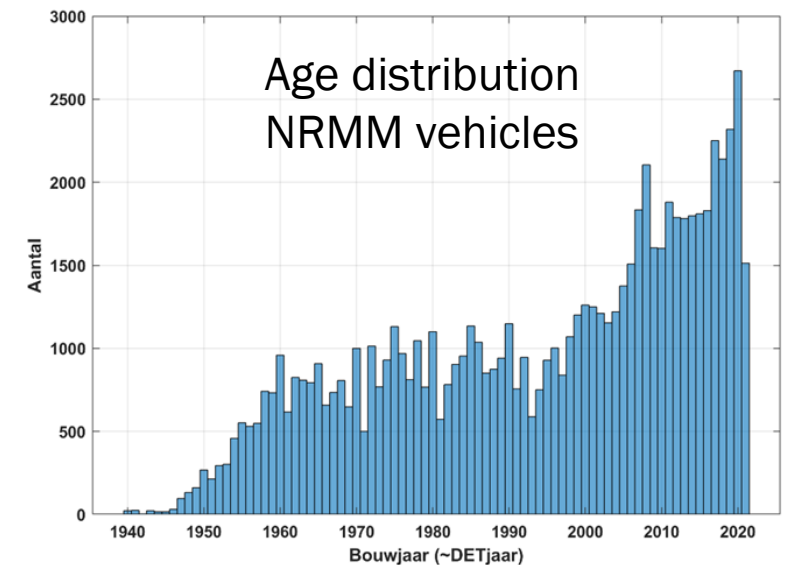
- › Distinction between different types of dual fuel: estimate of actual fuel mix.
- › Distinction between rigid and articulated busses (50% higher fuel consumption)
- › Details in the vehicle registrations:
 - › Better criteria to single out true PHEVs in the data
 - › Medium (two-axle) trucks GVW (Gross Vehicle Weight) from 19 to 19.5 ton
 - › Light tractors (new and growing category) better classified
- › Emission factors for tricycles, quads and other L-cat vehicles
- › Mobile machinery which are allowed on the road (i.e. 45 km/h limit) require registration. Monitoring started.



TNO, 02-Apr-2021

NL Non-road Mobile Machine bouwjaar verdeling (TNO RDW OD 1/4/2021)

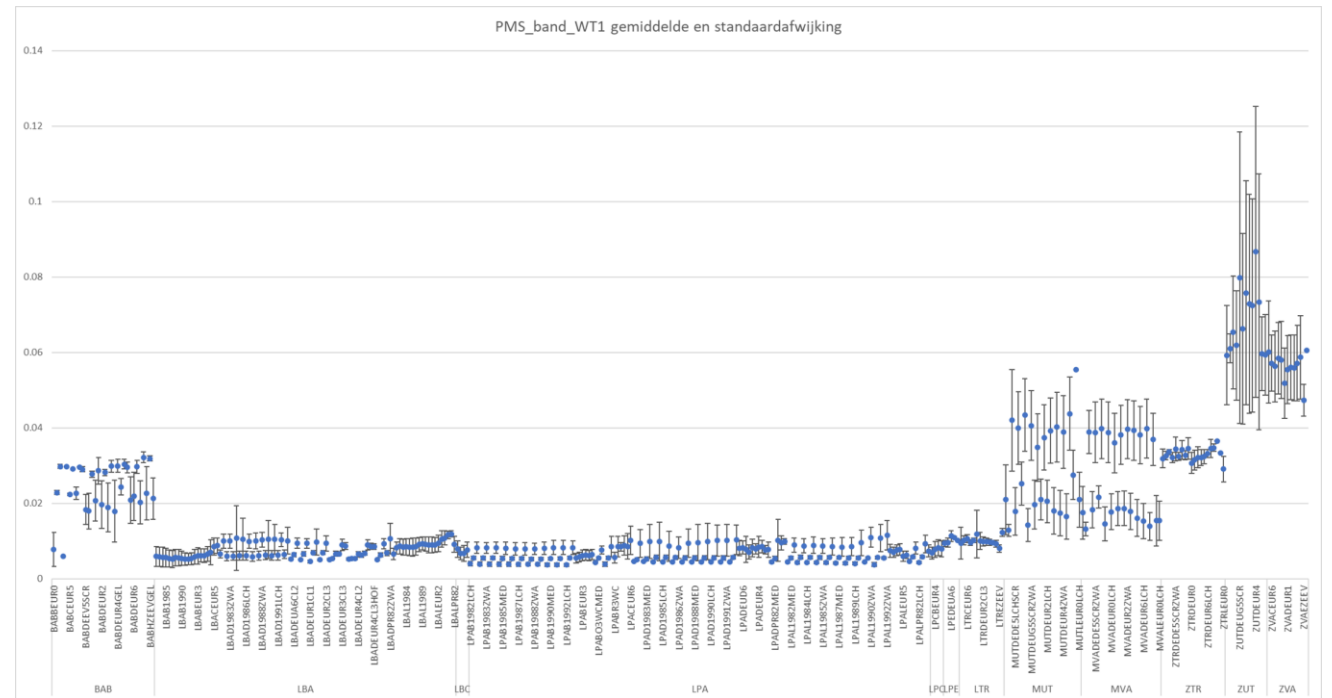
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› BOTTOM-UP UPDATES

STRUCTURAL CHANGES, LINKING DATA SOURCES

- › Non-exhaust emissions based on vehicle weight
- › Aging factors with components, Euroclass, and actual mileage.
- › Update EUR6 en EUD6 factoren (NH_3 ↓ en N_2O ↑)
- › In progress:
 - › Deterioration factors should vary with road type, partly related to cold start and initial levels.
 - › Separate aging factors for CH_4 , now equal to HC
 - › Improving non-exhaust emissions (away from linearity with weight)



THANK YOU FOR YOUR ATTENTION

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