

the shift towards emission factors based on-road measurement data

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UPDATE VERSIT EMISSION FACTORS 2019

Air-quality data in the Netherlands | Norbert E. Ligterink

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DUTCH EMISSION FACTORS

- › **Annual update by 15 March**
 - › using TNO VERSIT+ approach: on-road testing and monitoring in normal Dutch conditions.
- › **Common source of emission factors for multiple purposes:**
 - › Used in Dutch air-quality models for environmental and health impact
 - › Used for emission inventories and international reporting obligations
 - › Used for Natura2000 obligations for nitrogen deposition (i.e. NO_x/NH₃)
- › **Generally based on multiple sources of research:**
 - › light-duty in-use compliance testing by TNO for the government
 - › heavy-duty in-use compliance testing by TNO for the government
 - › research and testing for the national health institute for emission inventories
 - › testing for Dutch stakeholders, like cities
 - › data from other ERMES institutes

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RELEVANT, RECENT PUBLICATIONS

- › TNO report 2019 R10193 Emissions of Euro-VI LNG truck
- › TNO report 2019 R10519 NO_x emissions of Euro-VI diesel trucks
- › TNO report 2018 R20313 NO_x emissions of refuse trucks
- › TNO report 2018 R11678 Heavy-duty driving behaviour
- › TNO report 2018 R11689 PM and EC emission factors
- › TNO report 2018 R11468 Light-duty DPF removal prevalence
- › TNO report 2018 R11114 Emissions of 12 older petrol cars
- › TNO report 2018 R11328 NO_x emissions of Euro-VI buses
- › TNO report 2018 R10919 Uptake of EV vehicles in the Netherlands
- › TNO report 2018 R10372 Real-world fuel consumption passenger cars
- › TNO report 2018 R10367 Fleet composition on the Dutch roads
- › TNO report 2018 R10465 Monitoring Non-Road Mobile Machinery
- › TNO report 2018 R10613 Effects of traffic measures on Dutch NO₂ hotspots
- › Magazine "LUCHT" (air) 2019: Measuring the growing NH₃ emissions
- › Magazine "LUCHT" 2018: Emissions of mopeds in the Netherlands

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MANY SETBACKS IN 2019

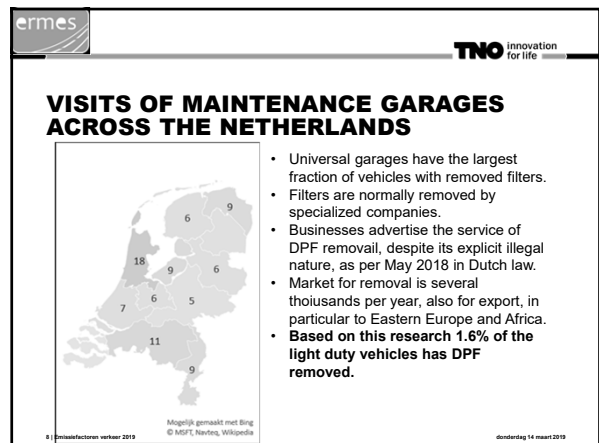
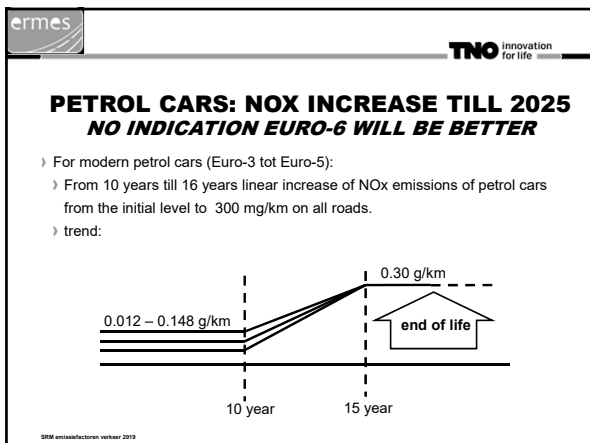
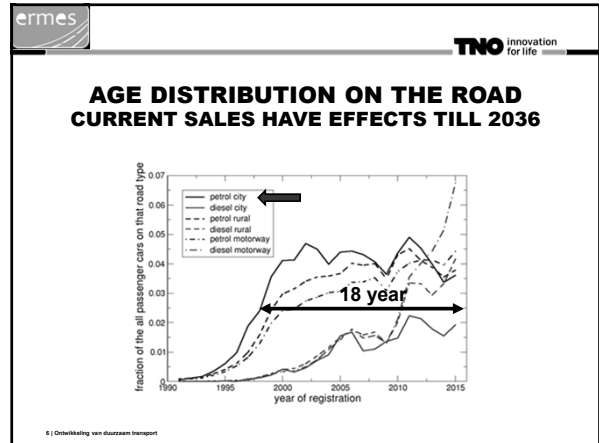
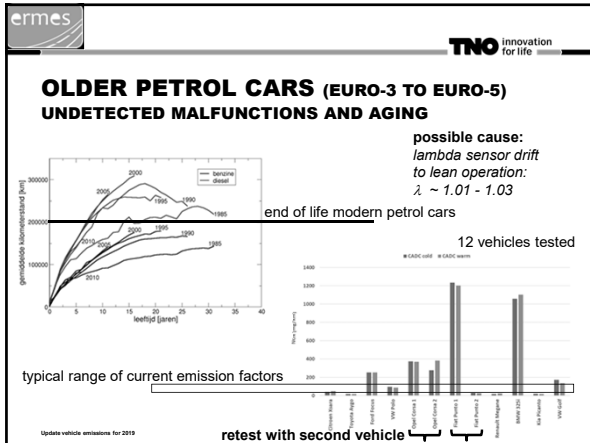
- › **Higher NO_x emissions of Euro-VI trucks in cities and in congestion:**
 - › under 20 km/h emissions increase substantially (outside ISC control)
- › **NH₃ emissions of Euro-VI trucks (random slip)**
 - › slip of NH₃ from SCR catalysts (was: 3 mg/km → now: 86 mg/km)
- › **High NO_x emissions of older petrol cars (1-in-6 have problems)**
 - › unnoted problems with three-way catalysts (average effect 300 mg/km)
- › **1.6% of the DPFs removed in light-duty diesel vehicles**
 - › with PM filtration efficiency of 99% the effect on PM and EC is substantial
- › **No longer brake wear emission differentiation for HEV and EV**
 - › high weight and power may compensate the effect by tyre and road wear
- › **More and older LCV's: 1 in 8 LD Dutch vehicles is a large van**
 - › negative effects of tax benefits for businesses on total NO_x emissions

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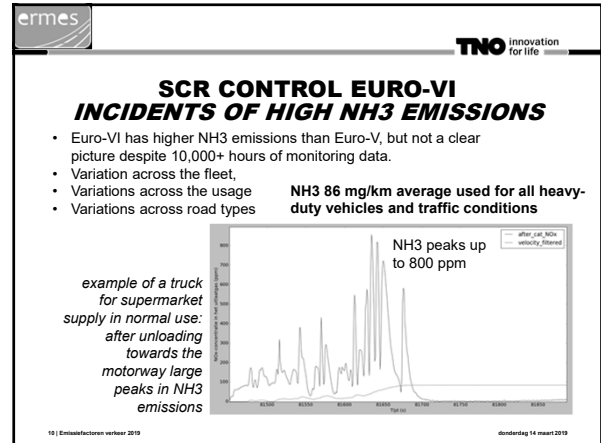
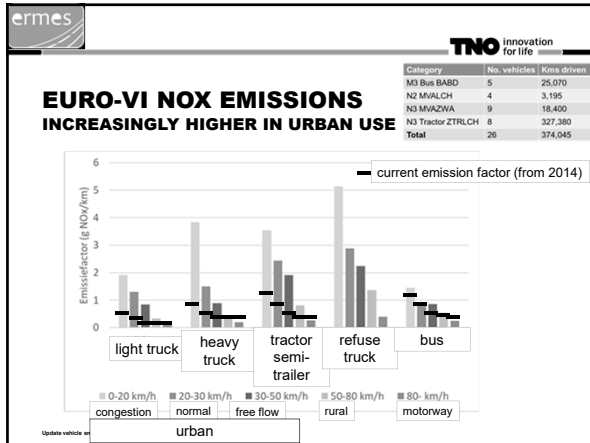
donnerdag 14 maart 2019

Norbert E. Ligterink

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SHIFT TOWARDS MONITORING MORE EMISSION DATA IN NORMAL USE

- › Remote data is coming in on TNO servers of ~20 vehicles continuously
- › Calibration issues under investigation (current accuracy ~5%, comparable with PEMS)
 - › new method for NH3 calibration, and NOx cross-sensitivity for NH3/N2O
 - › NOx for petrol and LNT (issues with rich operation)
- › New sensors under investigation (PM/PN/CO2/...)
- › Seasonal effects investigated (small for HD, larger for LD)
- › maintenance issues investigated (year and longer monitoring)
- › vehicle software updates investigated

› PEMS and chassis dynamometer is only used in follow-ups, new technologies and follow-ups. Simpler testing developed for screening more vehicles

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THANK YOU FOR YOUR ATTENTION

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