



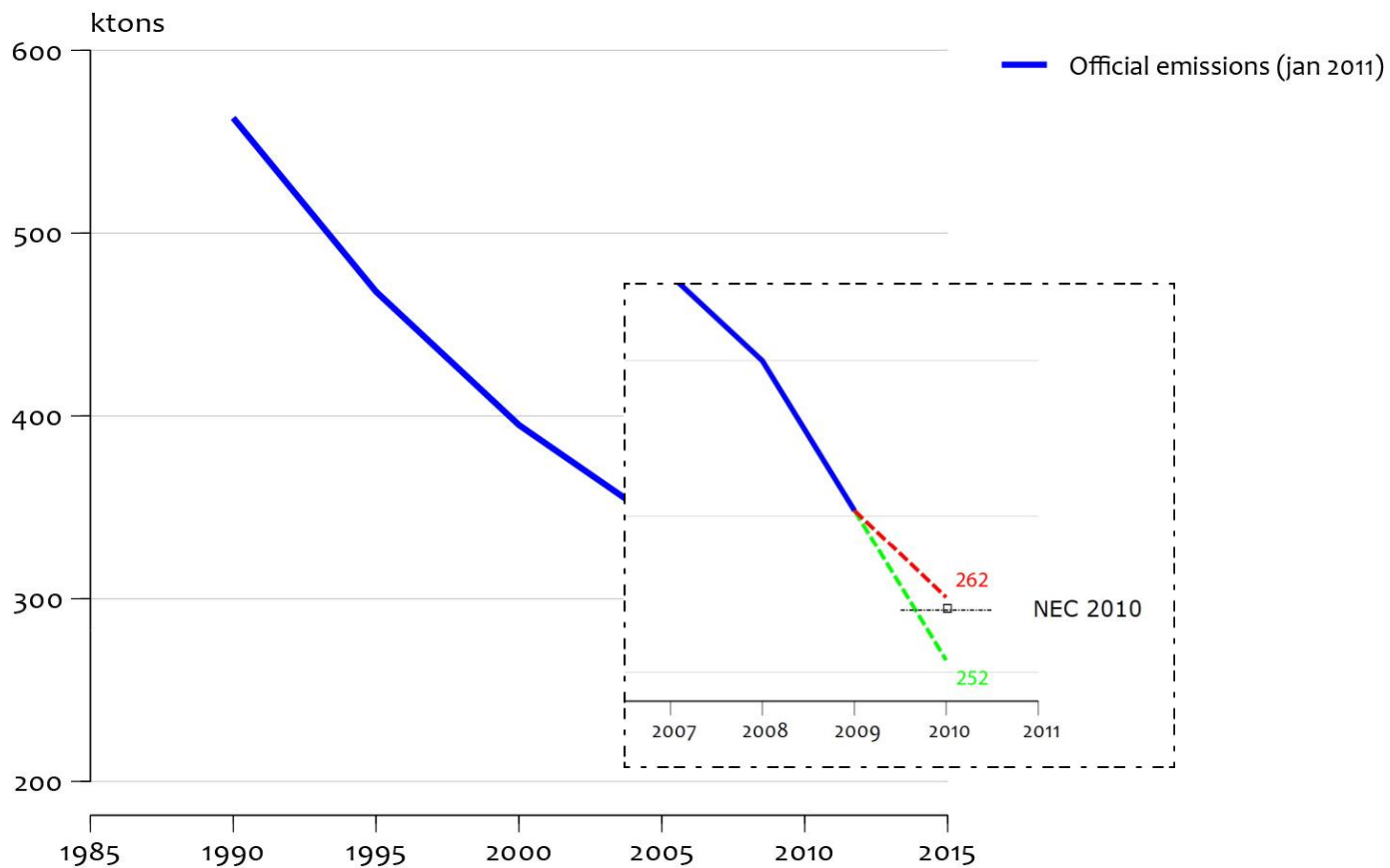
National Institute for Public Health  
and the Environment  
*Ministry of Health, Welfare and Sport*

## Attainment of NO<sub>x</sub> emission ceiling and NO<sub>2</sub> limit value in The Netherlands

Influence of new insights in the  
emission factor for high duty  
vehicles

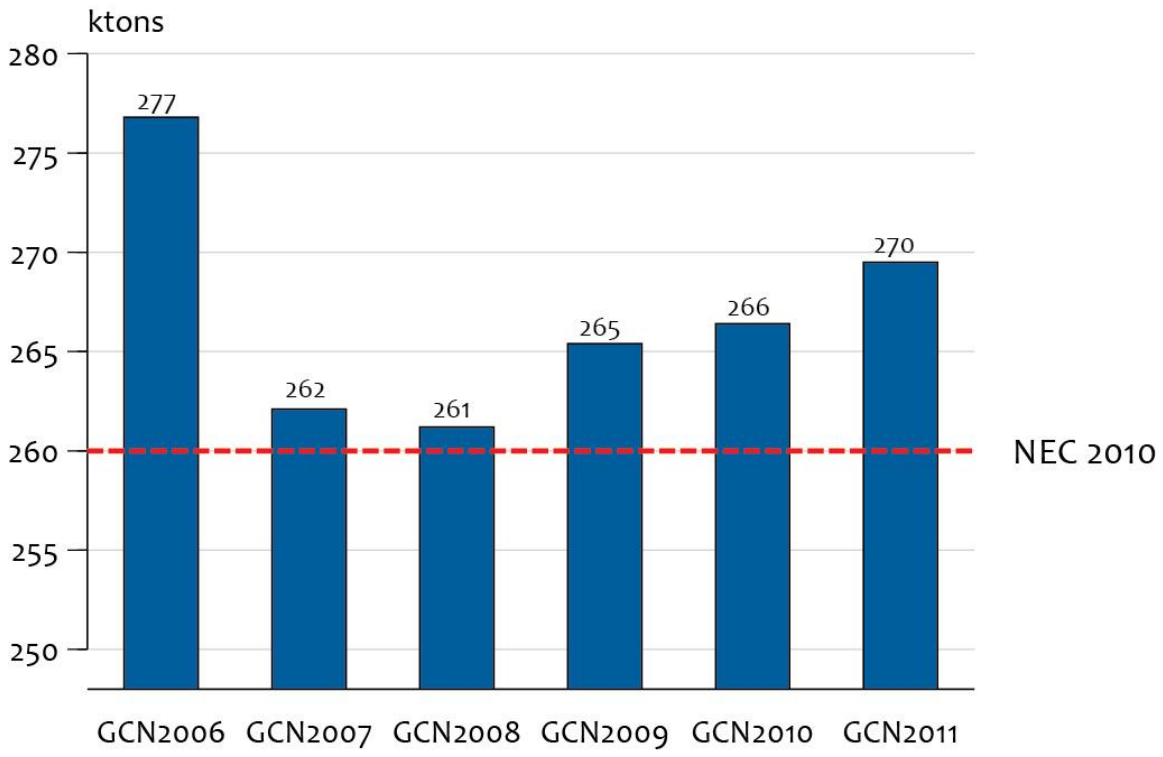


# Attainment of NO<sub>x</sub> emission ceiling



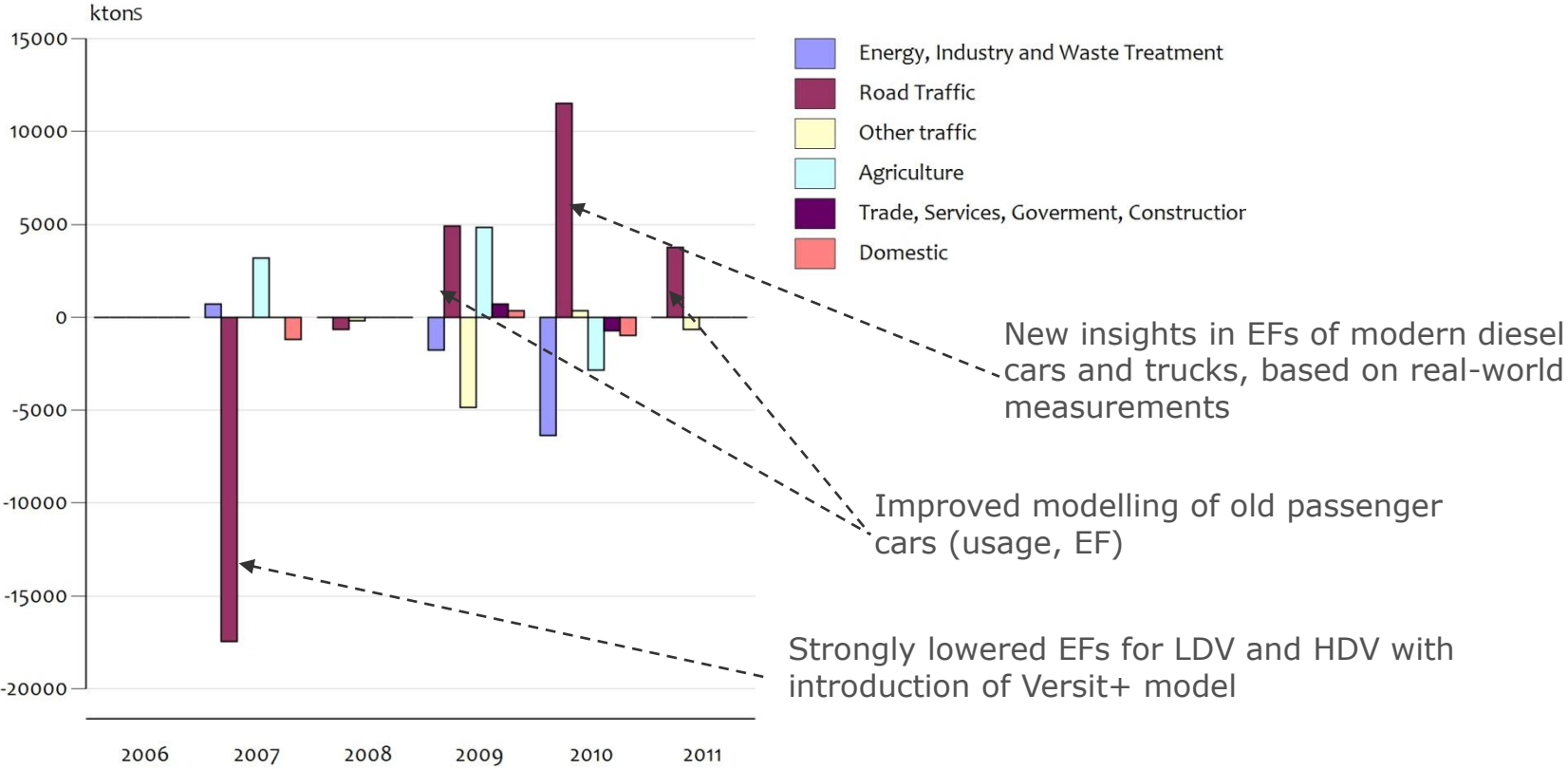


# Forecasts of 2010 emission – Current policies





# Change compared to previous forecast





## Calculation procedure for road traffic emissions

- $\text{Emission}[i] = \text{EF}[i] * \text{Volume}[i]$
- This product is determined for each relevant combination [i] of vehicle type, weight class, fuel type, EURO standard, road type and driving cycle and summed over all combinations
- The volumes are estimated from volumes realized in the past (Statistics Office) and the growth rate of the scenario
- The EFs are determined by TNO
  - Derived from laboratory measurements with Versit+ model
  - Based on real-world measurements with a Portable Emission Measurement System (PEMS)

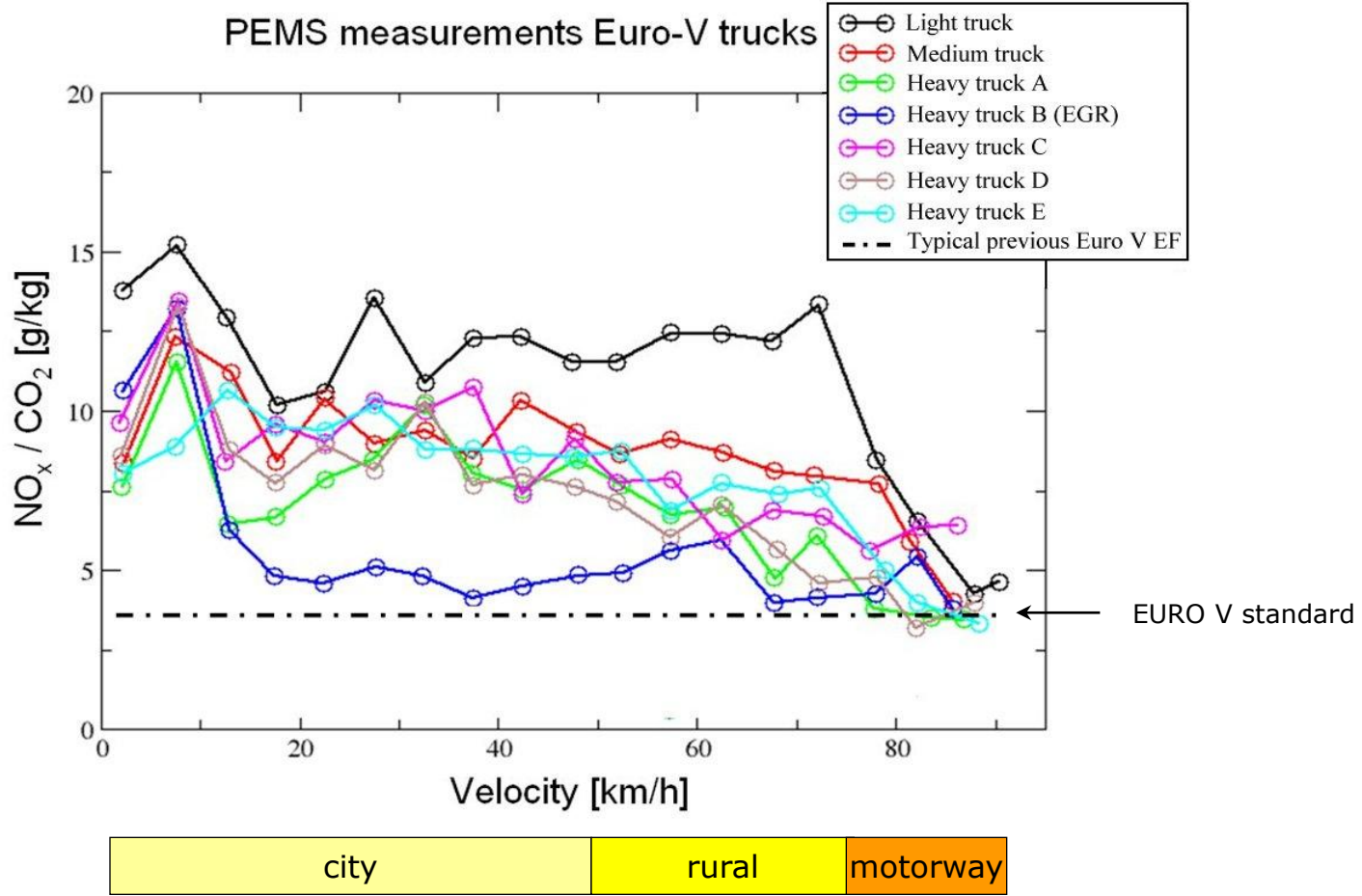


## Real world emission measurements of HDV

- The emission of seven distribution and long haul trucks meeting EURO-V standard was measured
- Equipped with an SCR (6 trucks) or EGR (1 truck) system
- Trips of ~60 km covering all major road types (motorways, rural roads, sub-urban, urban, city center)
- Each truck was tested with different loading on several days
- Trucks tested along the same route and under similar circumstances



# Real world EURO-V emission

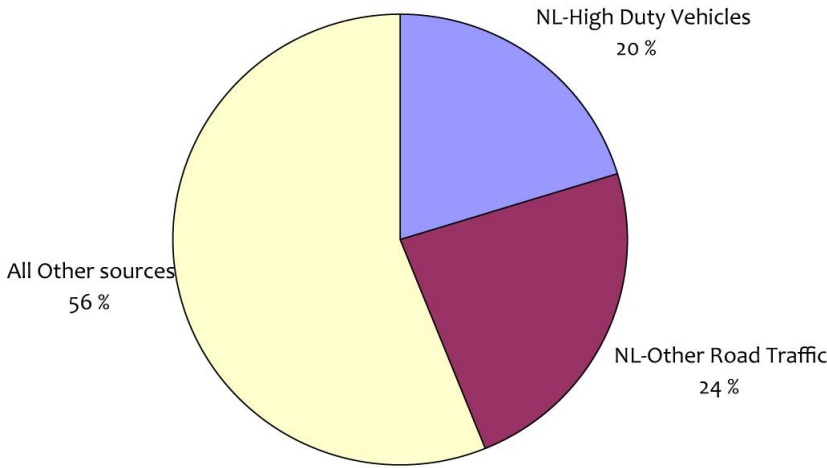
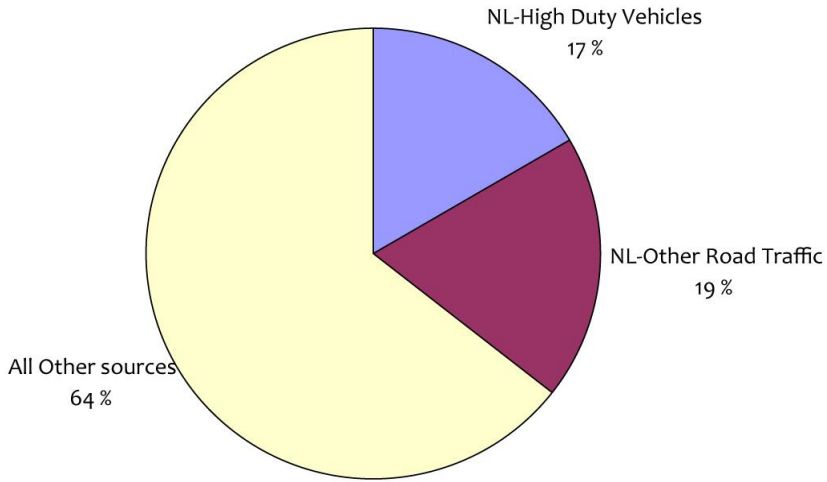




# Contribution of HDV to urban NO<sub>2</sub> concentration

Utrecht

Rotterdam



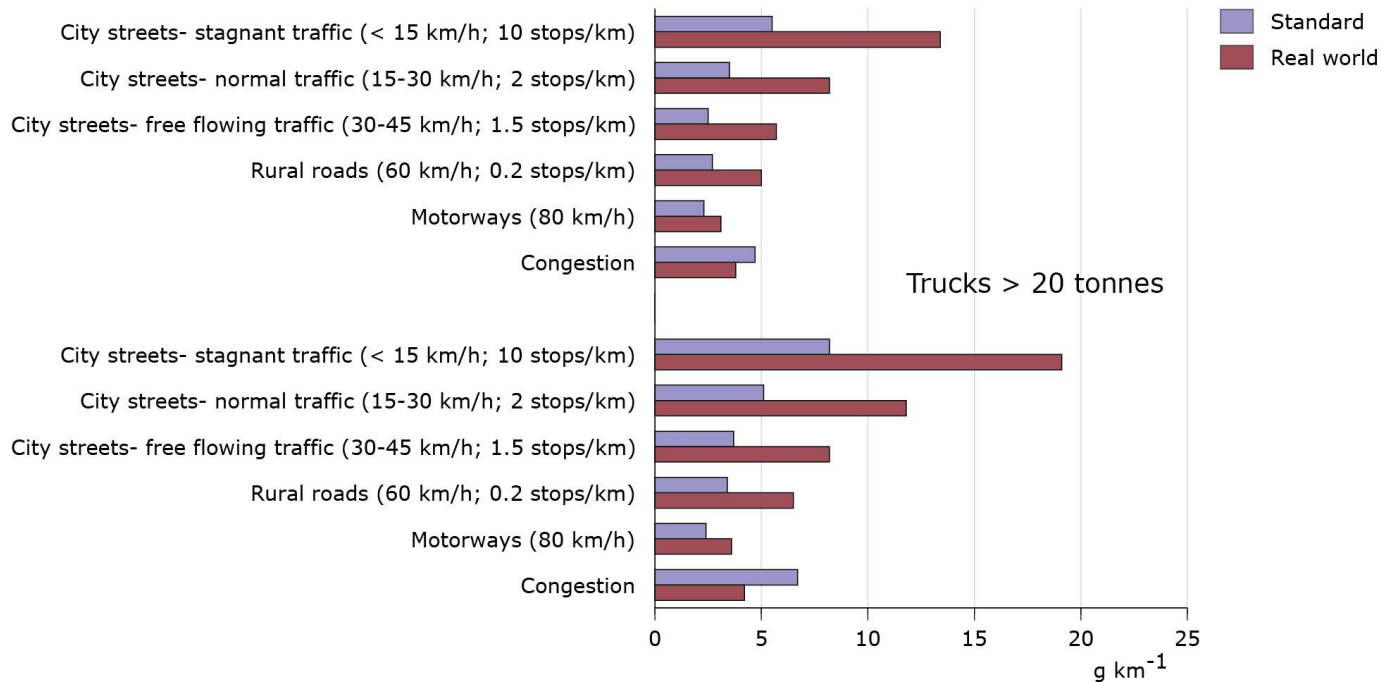
Share of EURO standards in HDV traffic volume in 2015						
EURO-0	EURO-I	EURO-II	EURO-III	EURO-IV	EURO-V	EURO-VI
0.7%	0.4%	2.2%	8.3%	9.6%	55.8%	23.0%





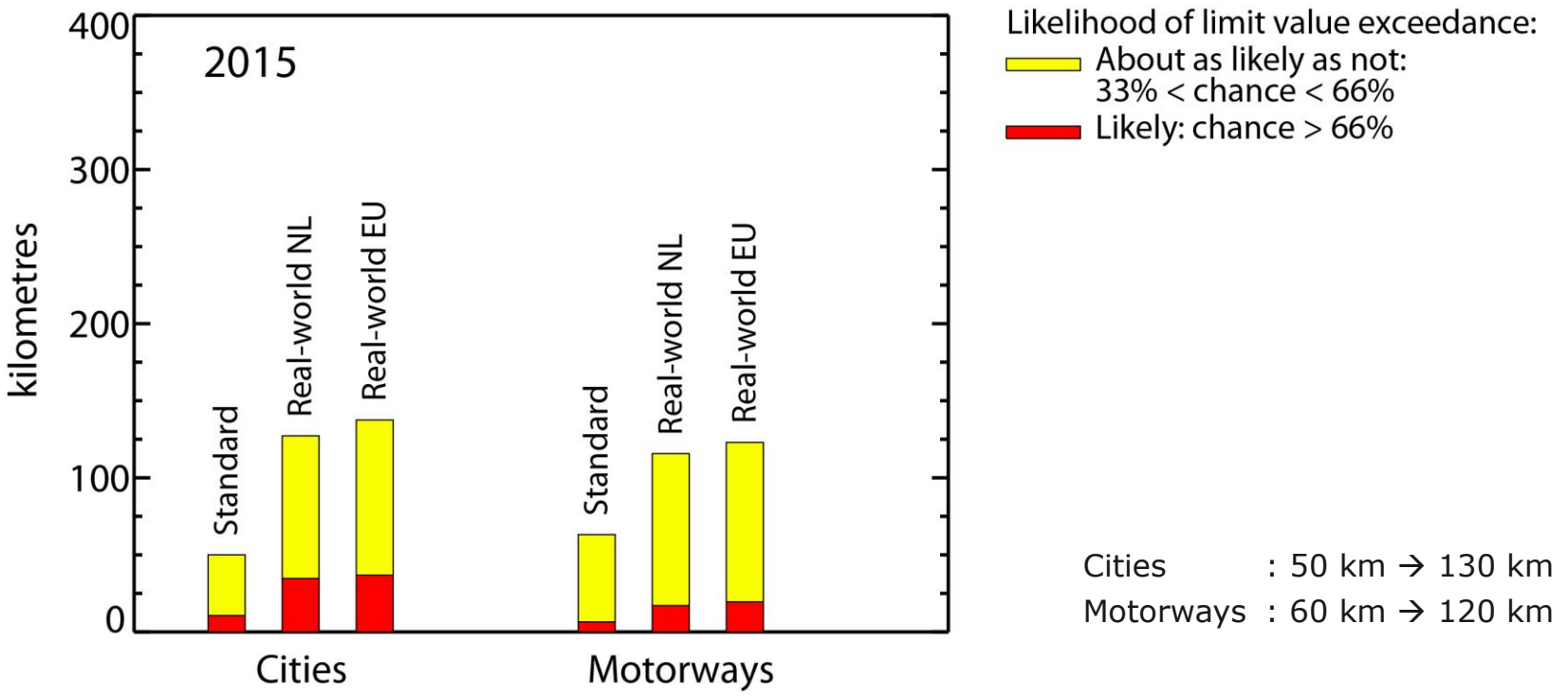
# Average HDV emission factors for 2015

Trucks < 20 tonnes





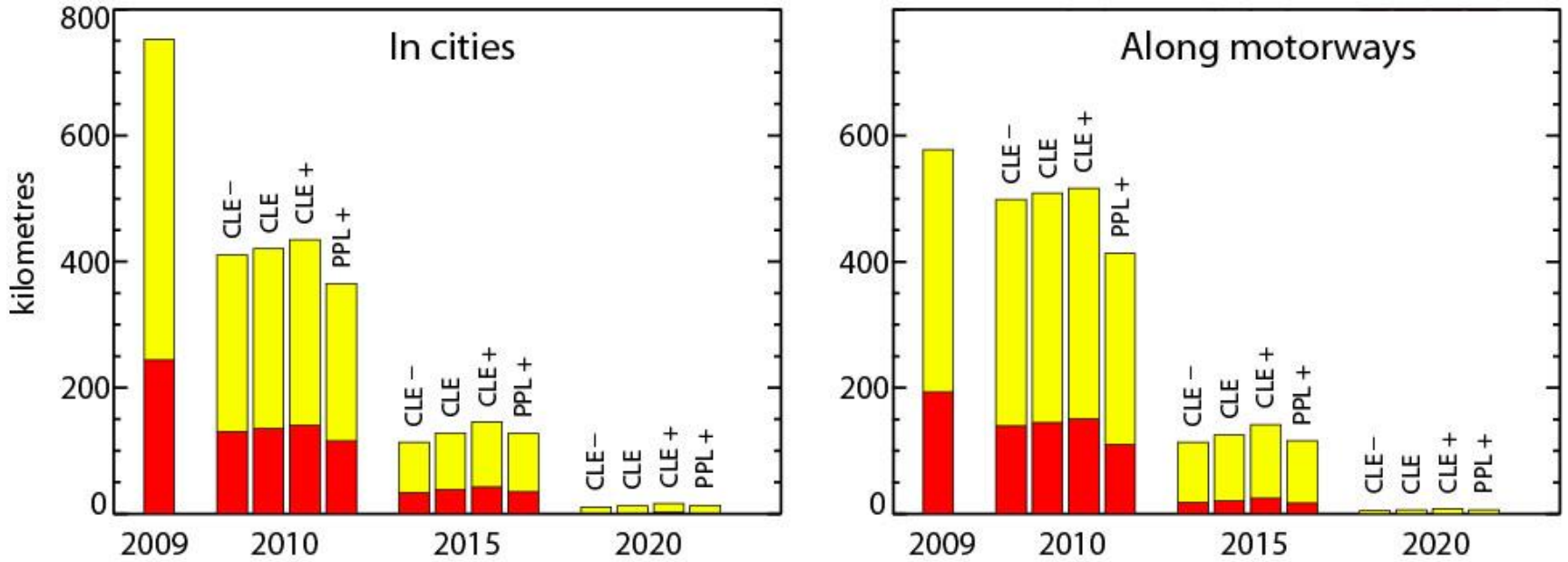
# Exceedance of NO<sub>2</sub> limit value in 2015



Current and proposed policies; 2.5% growth rate; no local measures



# Exceedance of NO<sub>2</sub> limit value in perspective



Likelihood of limit value exceedance:  
About as likely as not  
33% < chance < 66%  
Likely: chance > 66%



## Summary

- Attainment of the NEC 2010 for  $\text{NO}_x$  is about as likely as not. However if it is exceeded, the exceedance will be moderate and the ceiling will presumably be attained shortly after 2010.
- The higher than expected emission of trucks has a relevant effect on the exceedance of the  $\text{NO}_2$  air quality limit in 2015. If EURO-VI works as it should work the exceedances will nearly be disappeared in 2020 even without local policies.



# References

## Paper

G.J.M. Velders (RIVM), G.P. Geilenkirchen (PBL) & R. De Lange (TNO)

Higher than expected NO<sub>x</sub> emissions from trucks may affect attainability of NO<sub>2</sub> limit values in the Netherlands

Accepted for publication in Atmospheric Environment

URL: <http://dx.doi.org/10.1016/j.atmosenv.2011.03.023>

## TNO-Reports

- [www.tno.nl/downloads/Real\\_world\\_NOx\\_emissions\\_of\\_Euro\\_V\\_vehicles.pdf](http://www.tno.nl/downloads/Real_world_NOx_emissions_of_Euro_V_vehicles.pdf)
- [www.airclim.org/news/documents/TNO\\_Report.pdf](http://www.airclim.org/news/documents/TNO_Report.pdf)



Thank you for your attention