



Air quality in Belgium

Road transport sector

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AIR QUALITY IN BELGIUM

Averaging time	1-hour		Max 8-hour		24-hour		Year	
	EU	WHO	EU	WHO	EU	WHO	EU	WHO
SO ₂	😊	😊			😊	😞		
NO ₂	😊						😞	😞
PM ₁₀					😊	😞	😊	😞
PM _{2.5}						😞	😊	😞
O ₃			😞	😞		😞		

- Most concentrations of air pollutants in Belgium are below EU limits.
- WHO targets are generally not met in Belgium.
- In a long-term perspective, the EU aims to respect air pollution standards set by the WHO.
 - > The concentrations of PM2.5 and NO2 in Belgium were respectively responsible for more than 8000 and more than 1800 premature deaths in Belgium in 2014 (EEA, 2017).
 - > The health costs of air pollution (i.a. the loss of 2.5 mio workdays/year) amount every year to 8 billion euro in Belgium (European Commission, 2017).

➔ Air quality has improved over the last decades, but concentrations of air pollutants still have a **significant health and economic impact** in Belgium.

Revised National Emission Ceilings Directive

2016/2284/EG (14/12/2016)

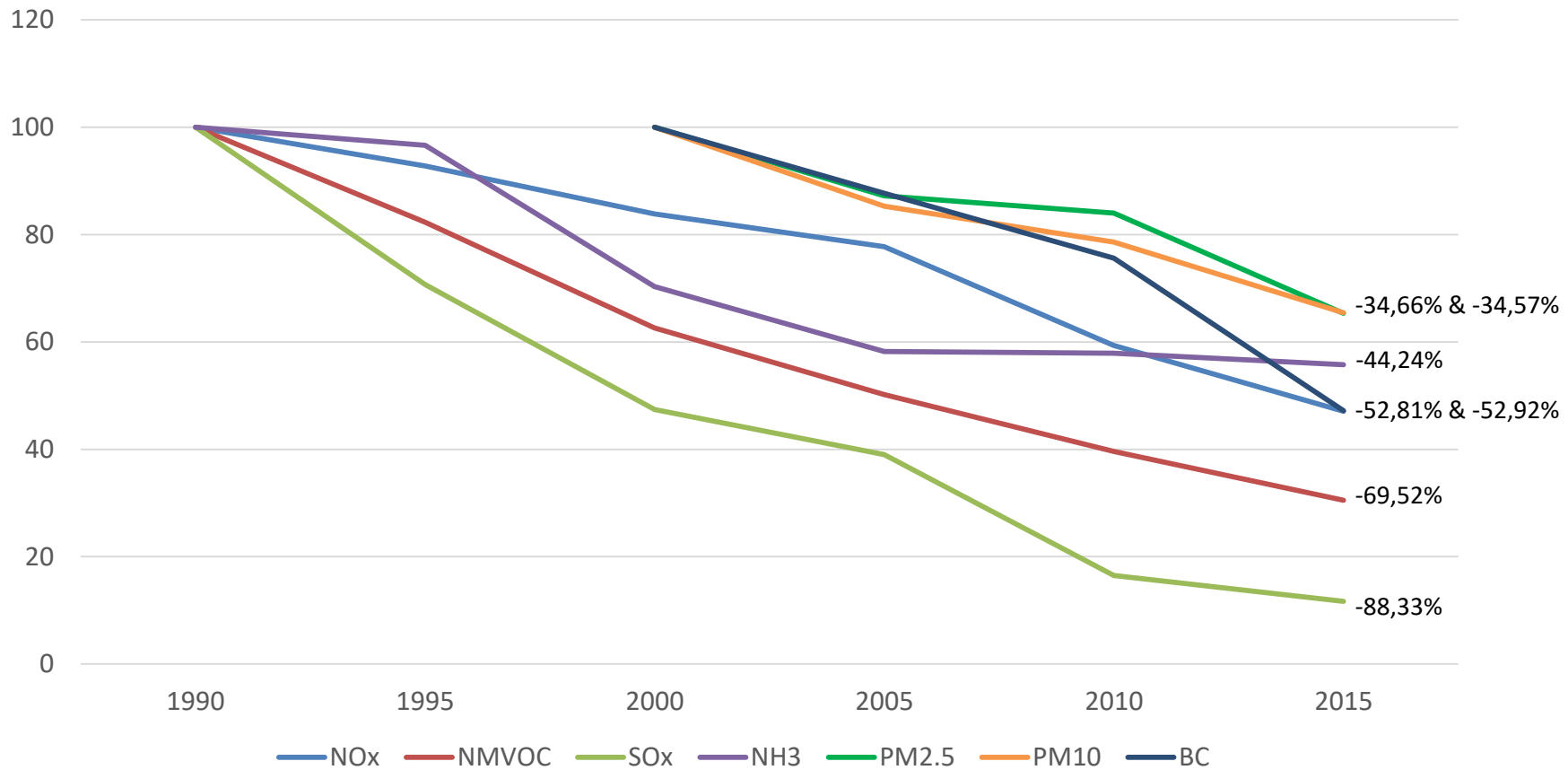
- Reduction targets Belgium 2020 and 2030
 - % to 2005
 - 2020: Göteborgprotocol
 - PM2,5 added
- 2025: trajectory 2020-2030

Emissions in kt/year

	2005	2010 NEC	2015	2020	2030
NOx	305	176	185 (-39%)	-41%	-59%
SO2	142	99	43 (-70%)	-43%	-66%
PM2,5	36		27 (-25%)	-20%	-39%
VOC	148	139	90 (-39%)	-21%	-35%
NH3	68	74	66 (-4%)	-2%	-13%

EMISSIONS IN BELGIUM

Evolution of the emissions of air pollutants in Belgium (from 1990, in % - Source: NEC 2017)



EMISSIONS vs. CONCENTRATIONS

Emissions = pollutants emitted to the air by different sources: industry, residential, traffic, agriculture, ...

Concentrations = pollutants measured in the ambient air

For most air pollutants, there is no linear relation between the emissions and concentrations, due to

- Transboundary air pollution
- Meteorological conditions
- Atmospheric reactions

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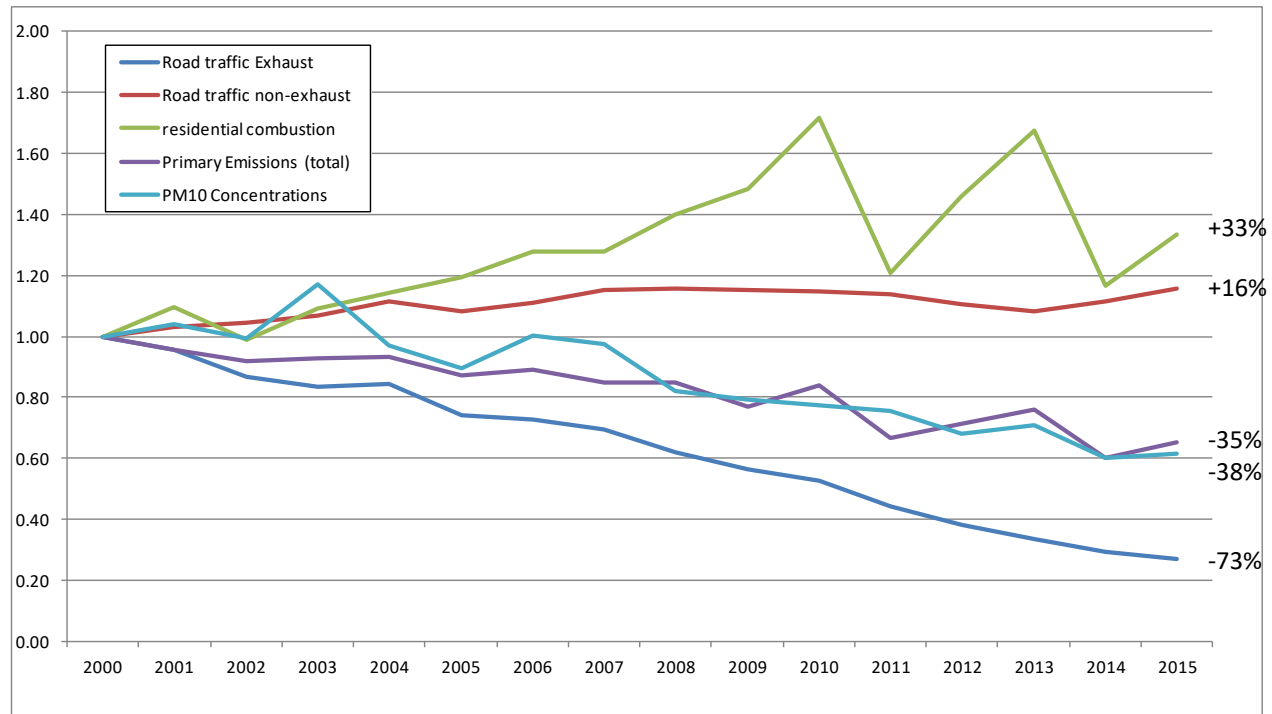
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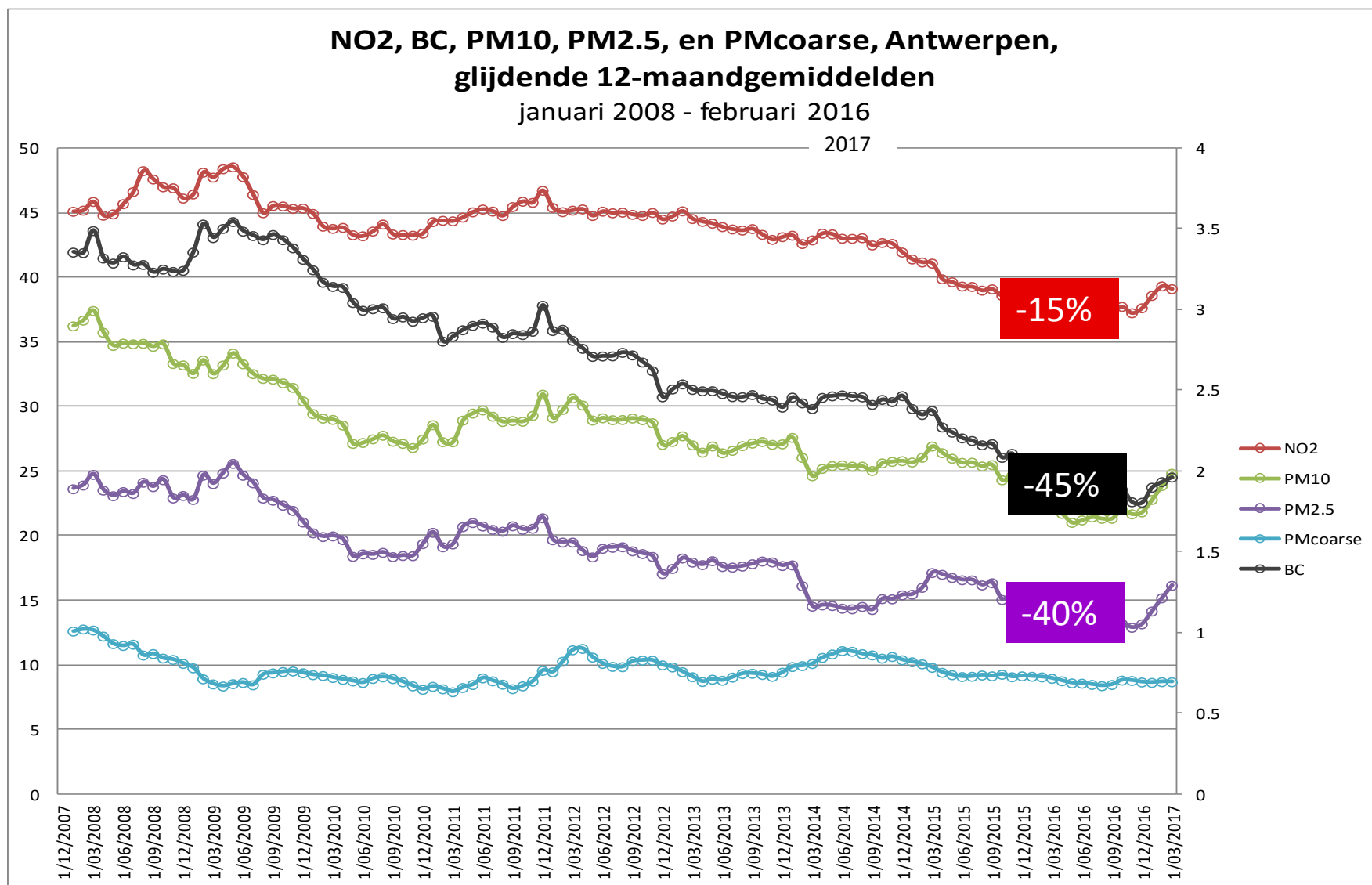
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PM10

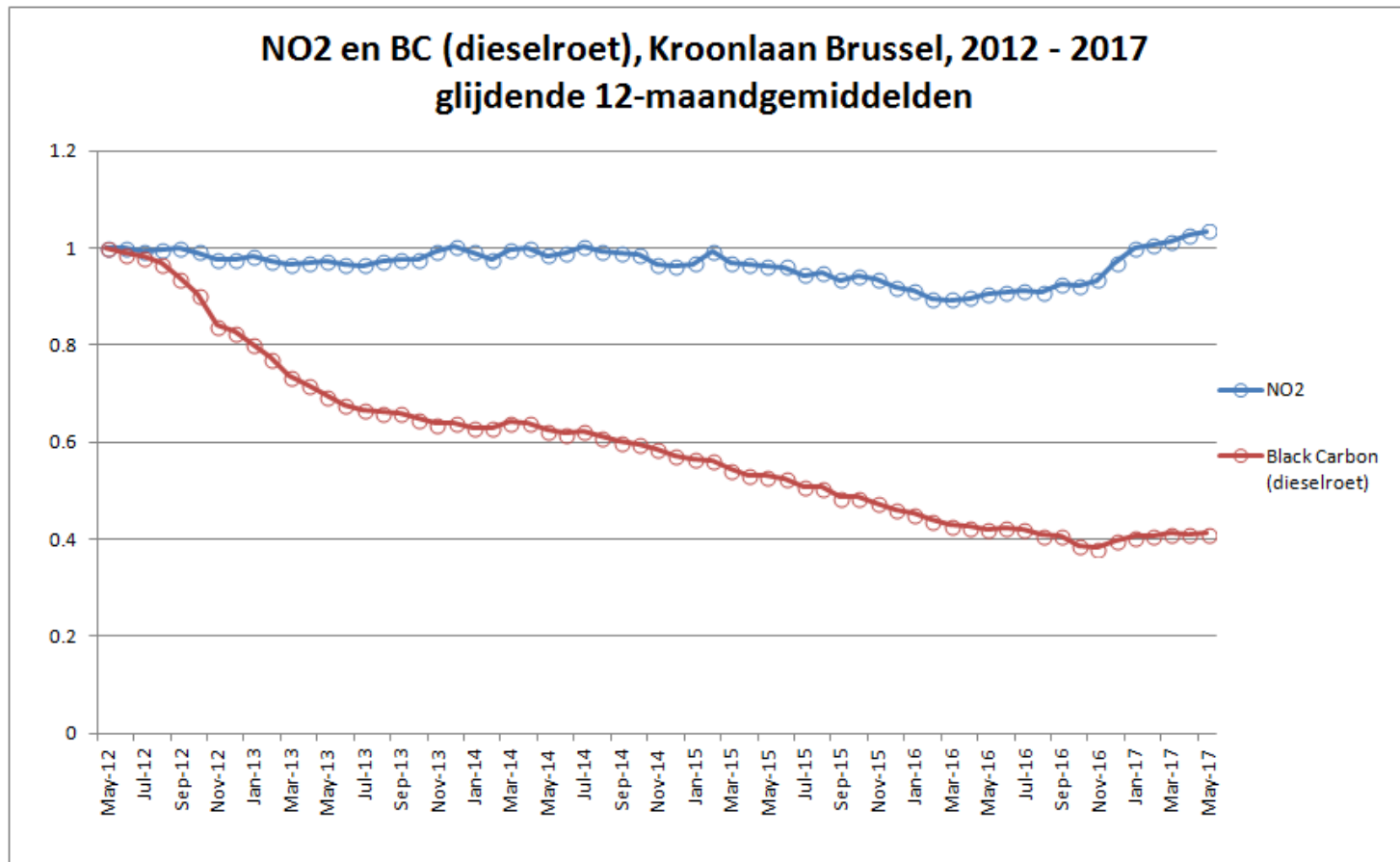
- **Primary PM**
- **Secondary PM**
- NO_x** (Transport)
- SO₂** (Industry)
- NH₃** (Agriculture)
- Secondary Inorganic Aerosols (SIA) ~ 40%



NO₂ decrease in urban (traffic)stations less than expected

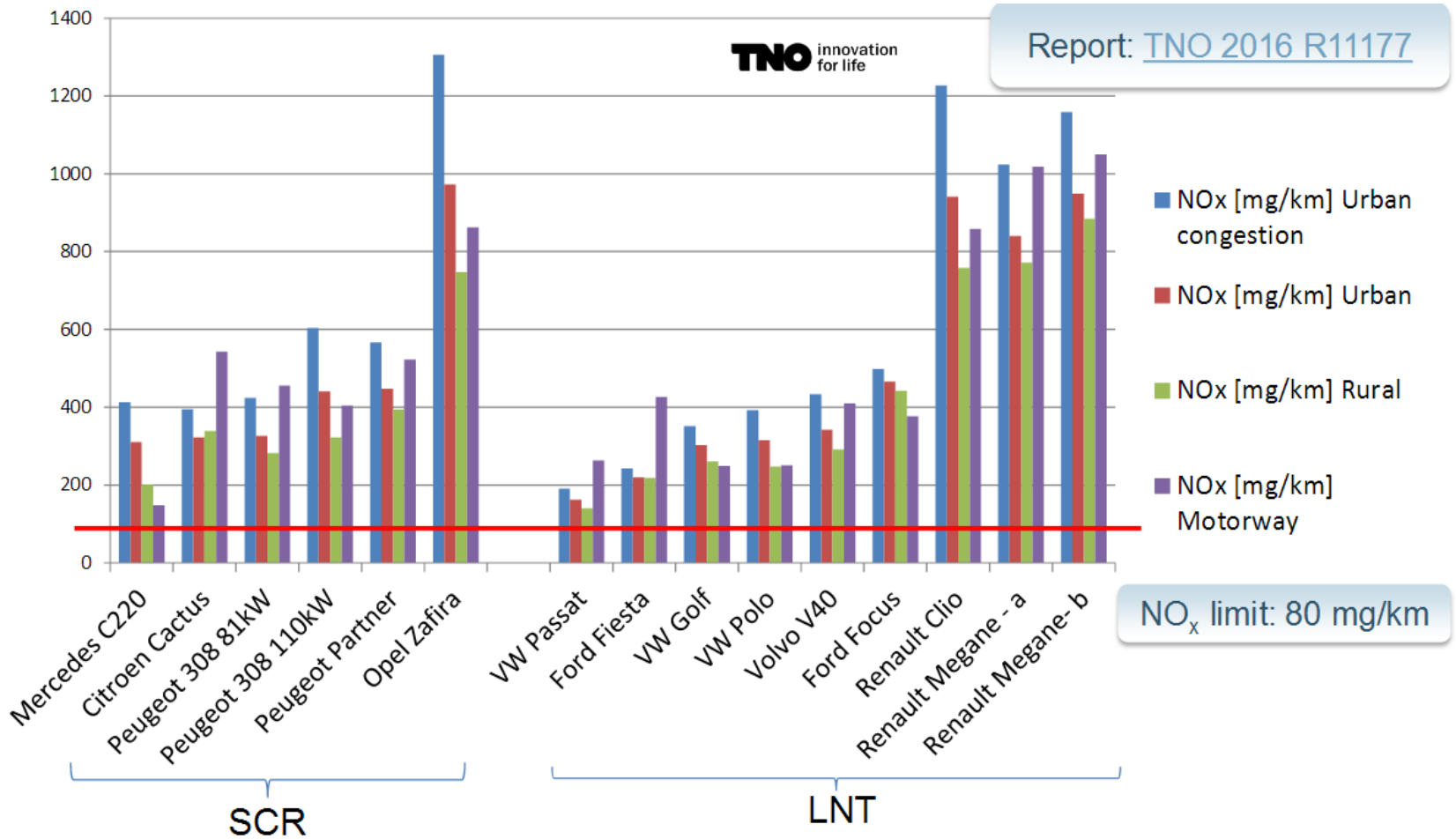


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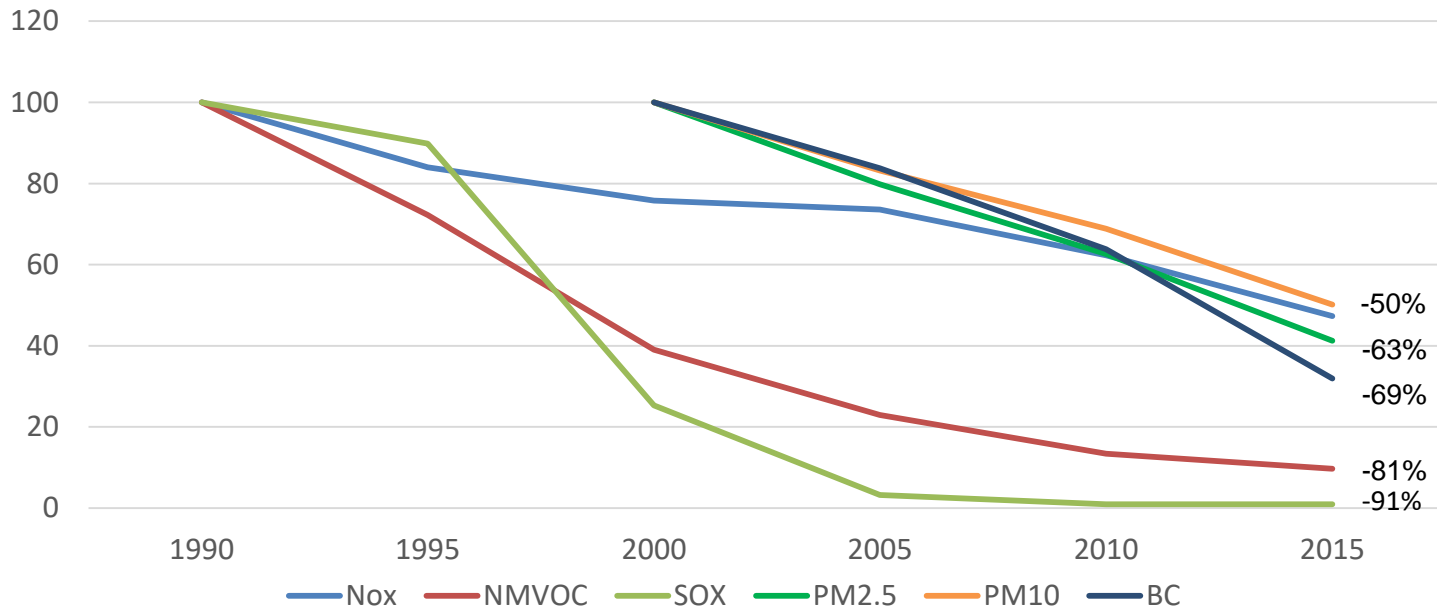
- There is no or little decrease in **NO₂** concentrations at traffic monitoring stations.
 - Insufficient decrease of the NO_x emissions by road transport (theoretic ↔ real emissions of Euro Standards) – Dieselgate
 - Increase of primary NO₂ (by use of oxidation catalysts and particulate filters in diesel cars)
- **Black Carbon** decreases thanks to the introduction of highly efficient diesel particulate filters (DPF)

Dieselgate: in 'Real Driving' too much NOx emissions



EMISSIONS IN BELGIUM

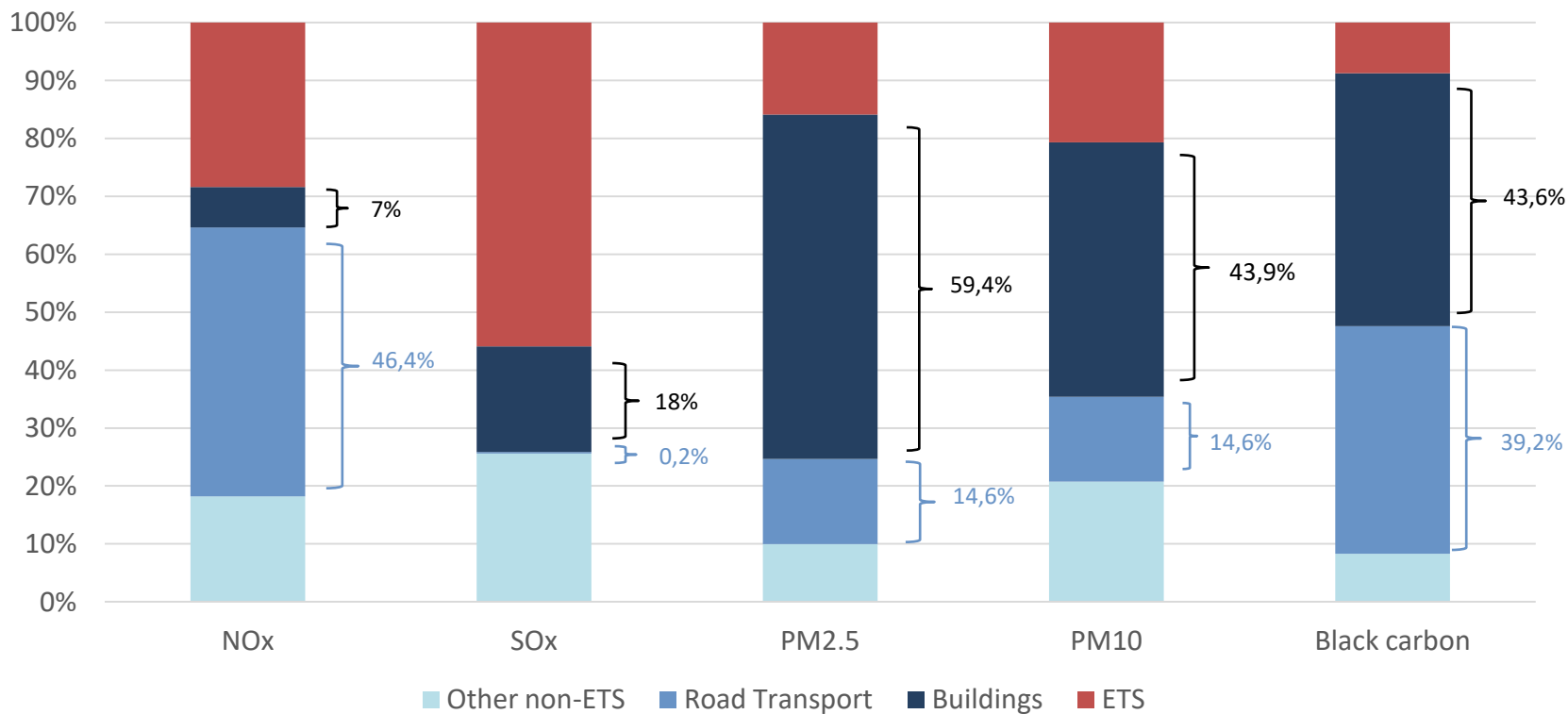
Evolution of the emissions from road transport (from 1990, in % - Source: NEC 2017)



- Since 1990, the emissions of most air pollutants has significantly decreased in the transport sector.
- Emission reduction thanks to implementation of new measures and technologies (fuels with low sulphur content, unleaded petrol, catalytic converters, particulate filters, Euro standards,...)
- Decrease of PM emissions are linked to the introduction of diesel particulate filters (since Euro 5/6), but the NOx emissions did not decrease as expected (dieselgate).

Share of ETS and non-ETS in air pollutant emissions

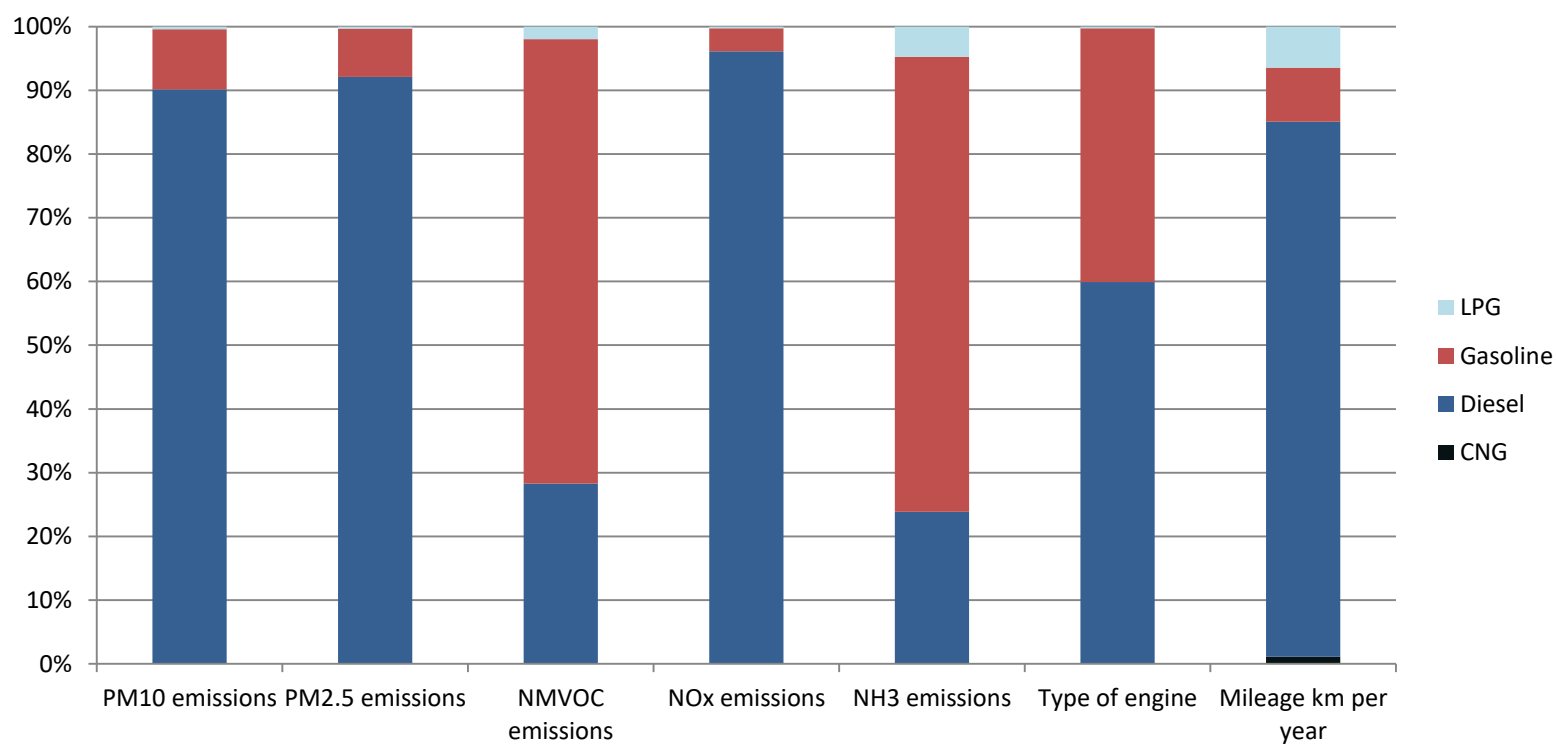
Origin of the Belgian emissions of air pollutants (Source: NEC 2017)



- In Belgium, the non-ETS sectors are significant contributors to the emissions of air pollutants.
- Except for SOx, the transport and the residential sectors are two major sources of air pollution (+ 50%).

Emissions of air pollutants in the transport sector

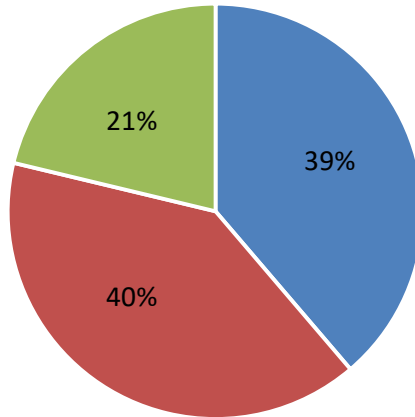
Share of fuels in road transport emissions in Belgium (Source: NEC 2017)



- While approximately 60% of the vehicles in Belgium are diesel-powered, this fuel technology is the source of more than 90% of particulate matter emissions and of 95% of NOx emissions in the road transport sector.
- This is linked both to the higher number of kilometers that these vehicles drive every year and to the technology itself.
- The electrification of the transport sector foreseen in a low-carbon scenario should have a positive impact on the emissions of air pollutants in Belgium.

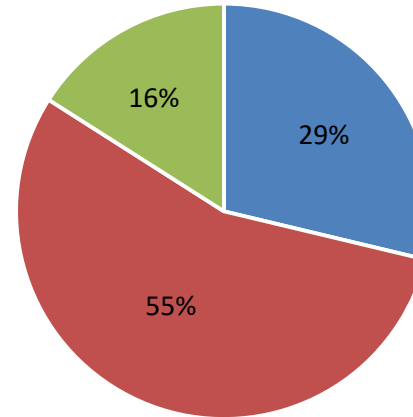
Emissions of air pollutants in the transport sector

PM10 Emissions in the transport sector



■ Tyre and brakes ■ Exhaust ■ Abrasion

PM2.5 Emissions in the transport sector



■ Tyre and brakes ■ Exhaust ■ Abrasion

- Emissions of particulate matter in the transport sector aren't only linked to the burning of fossil fuels. Non-exhaust emissions from tyres, brakes and road abrasion are also significant contributors.
- Technological changes such as switching to electric vehicles will therefore not completely solve the issue of particulate matter emissions in the transport sector. The only way to do this is by decreasing the traffic volume

KEY MESSAGES

- Even though air quality has improved over the past years, air pollution still has a significant health and economic impact in Belgium.
- A large share of the air pollutants emitted in Belgium originate from non-ETS sectors.
- Put together, transport and domestic heating represent more than half of the emissions for most air pollutants.
- An emission reduction of air pollutants in Belgium through a carbon tax will not have the same impact on the concentrations of all pollutants.
- There was an important decrease of particulate matter (and BC) emissions due to the introduction of highly efficient diesel particulate filters (since EURO-5/6), but NO_x emissions did not decrease as expected (dieselgate).
- For PM, the relative share of exhaust emissions decreases, the non-exhaust emission share increases
- The cleanest km, is the km not driven!