


The impact of future vehicles on pollutant emissions and air quality in Europe

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Widespread air quality problems in Europe

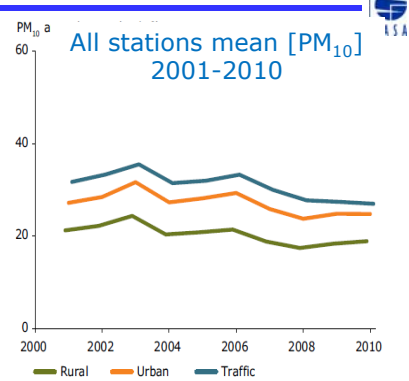
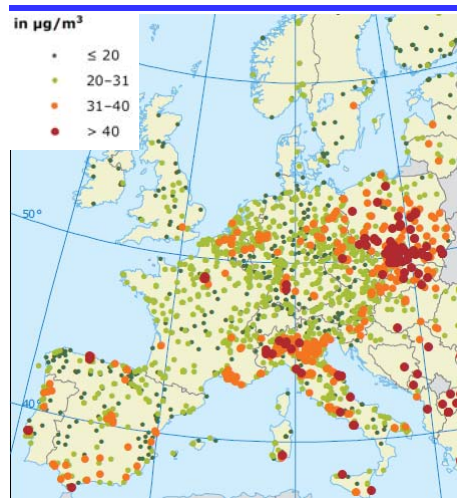
Pollutant	EU reference value	Exposure estimate (%)	WHO reference level	Exposure estimate (%)
PM _{2.5}	Year (20)	16-30	Year (10)	90-95
PM ₁₀	Day (50)	18-21	Year (20)	80-81
O ₃	8-hour (120)	15-17	8-hour (100)	> 97
NO ₂	Year (40)	6-12	Year (40)	6-12
BaP	Year (1 ng/m ³)	20-29	Year (0.12 ng/m ³)	93-94
SO ₂	Day (125)	< 1	Day (20)	58-61
CO	8-hour (10 mg/m ³)	0-2	8-hour (10 mg/m ³)	0-2
Pb	Year (0.5)	< 1	Year (0.5)	< 1
C ₆ H ₆	Year (5)	< 1	Year (1.7)	7-8



EEA 2012 – Air quality in Europe

- How big is contribution from road vehicles – now and in future?
- Possible improvement through alternative fuels or vehicles?

PM₁₀ and PM_{2.5} limits exceeded – not only at traffic sites

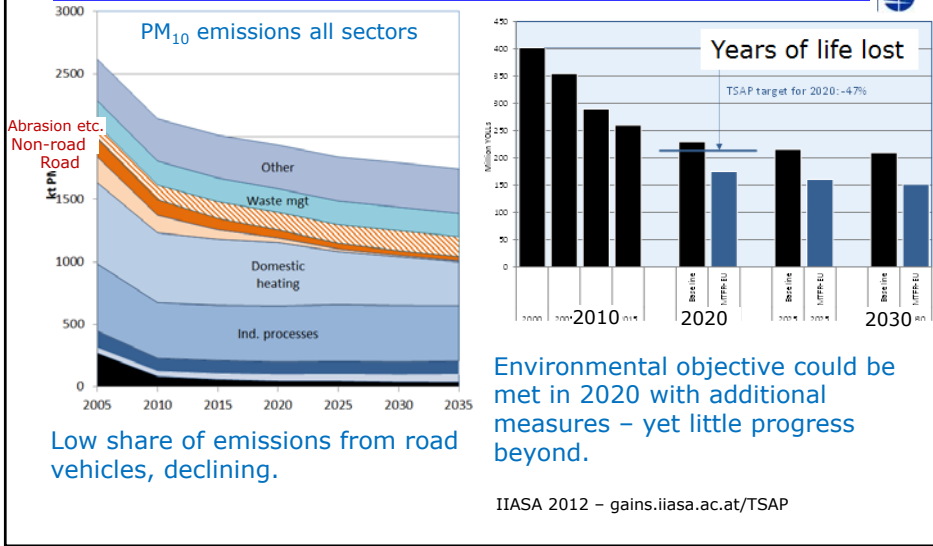


Limit value for protection of human health: 40 µm³ annual average, not to be exceeded .

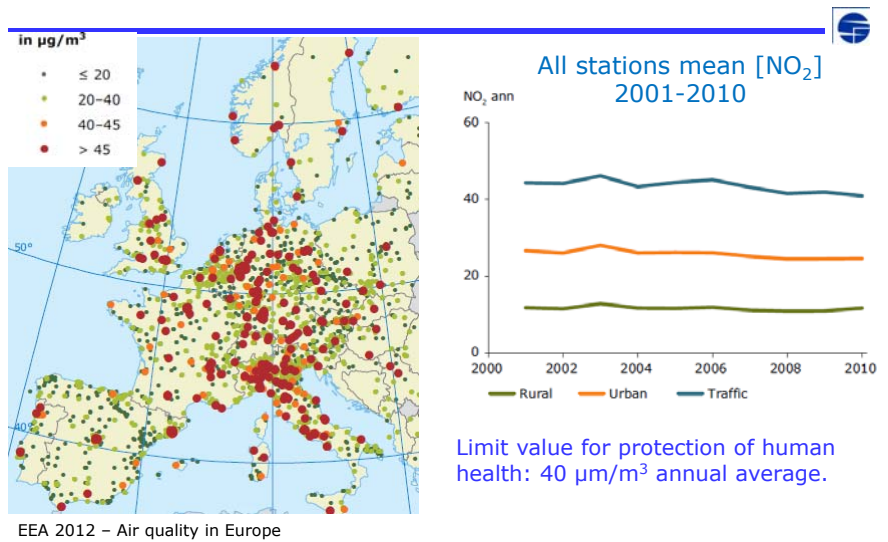
EEA 2012 – Air quality in Europe



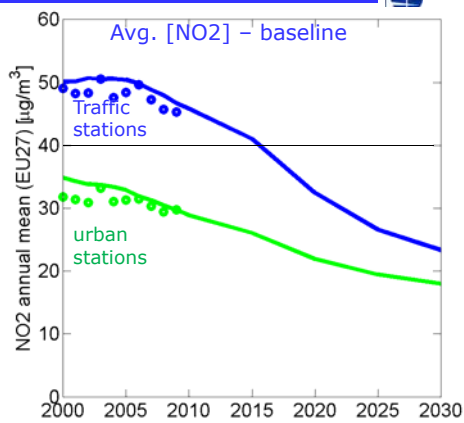
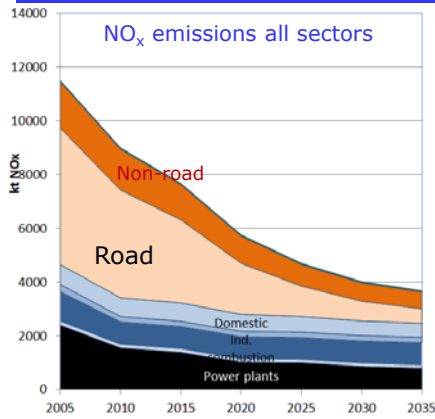
Trend development of PM₁₀ emissions and their health impact in EU27



NO₂ limit values exceeded – particularly at traffic sites



Trend development of NO_x emissions and exceedance of [NO₂] limit values in EU27

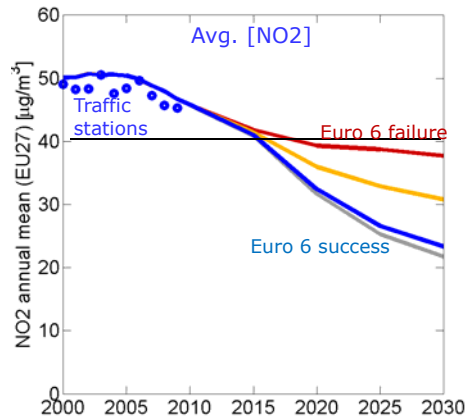
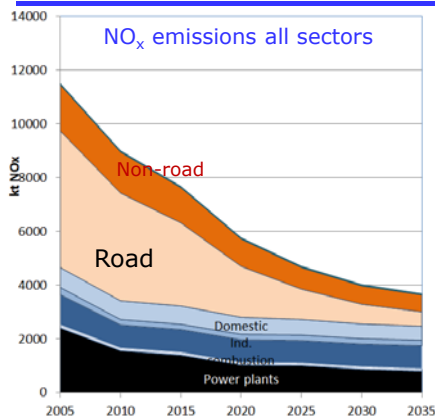


High share of traffic emissions, declining

Exceedance at traffic stations strongly declining....IF....

IIASA 2012 – gains.iiasa.ac.at/TSAP

Trend development of NO_x emissions and exceedance of [NO₂] limit values in EU27

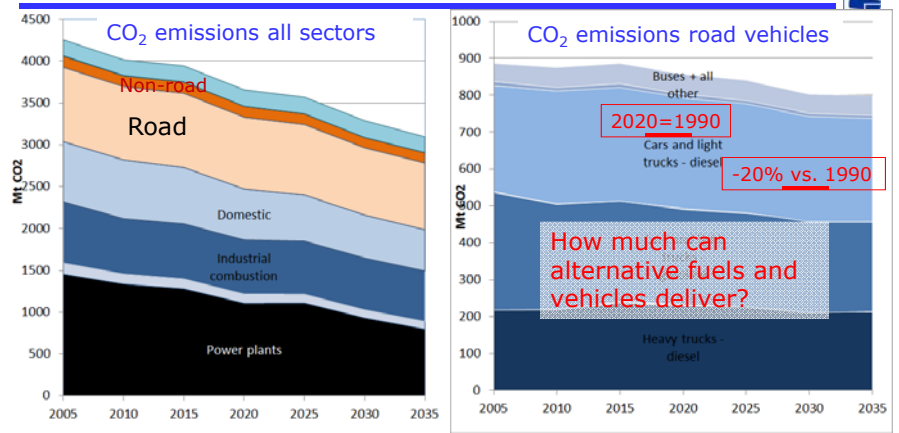


High share of traffic emissions, declining

Exceedance at traffic stations strongly declining....IF EURO 6 diesel cars have lower unit NO_x emissions.

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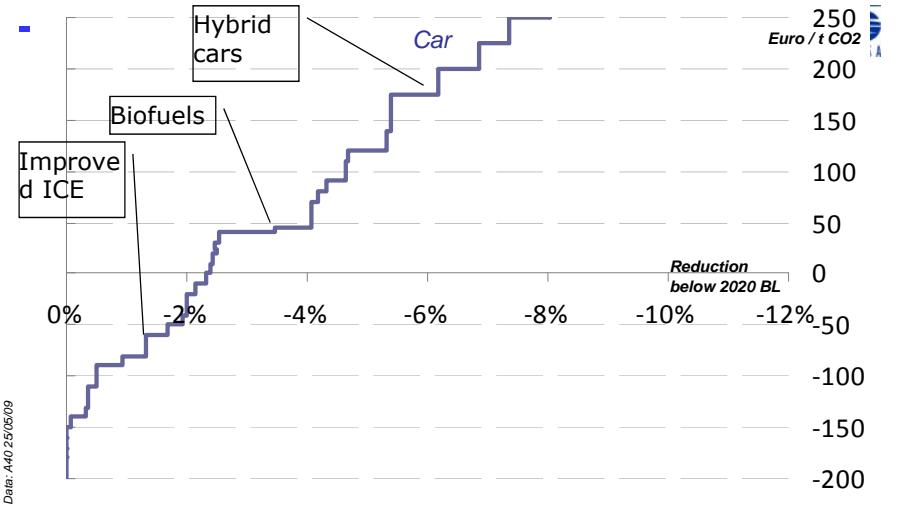
Trend development of CO₂ emissions in EU27

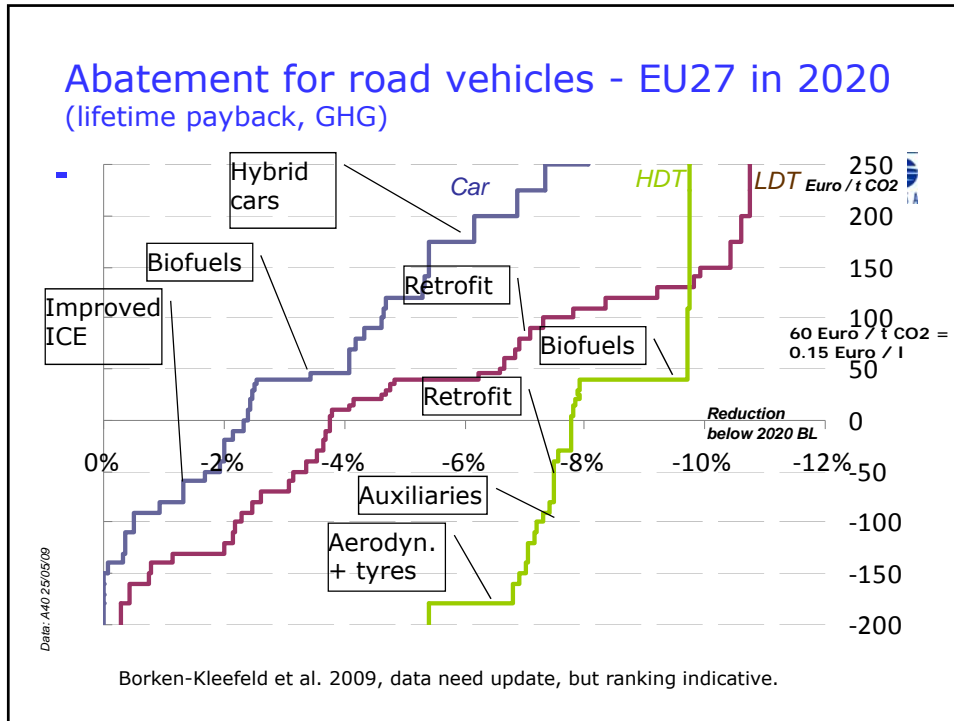


Official EC projection:
 Trend 2020: -14% vs. 2005
 Share road in total emissions: 22%

Trend 2030: -3% vs. 2005
 Share cars/trucks in total road : 55%/25%

Cost curve: By vehicle type - EU27 in 2020
 (lifetime payback, GHG)





Summary

Strongly declining pollutant emissions from national road transport, yet

- NO₂ compliance depends on effectiveness of EURO 6 for diesel cars.
- Local conditions might differ from national average.

Zero-emission vehicles might help in specific cases, also reducing traffic noise.

For CO₂ reduction intensified efforts needed:

- Much more efficient conventional and alternative vehicles **and**
- Sustainable low-C fuels **and**
- Adapted driving and purchase behaviour **and**
- Improved freight logistics **and**
- Modal shift **and**
- Adapted land use planning **and**
- Demand management **and...**

Not addressed:

Accidents, congestion, landscape fragmentation, resource infrastructure financing,...



Further reading

Reports and calculations on the
EU's Thematic Strategy on Air Pollution
gains.iiasa.ac.at/TSAP

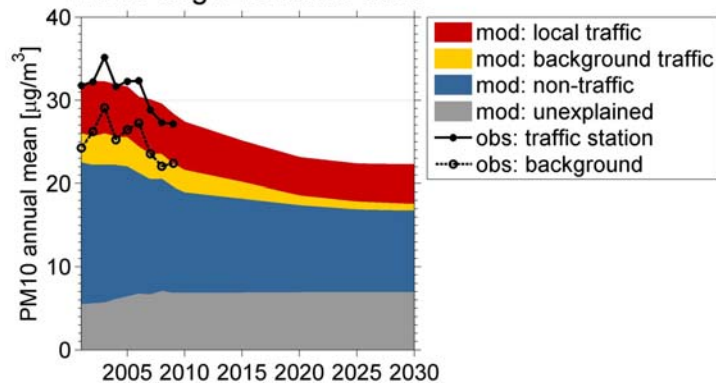


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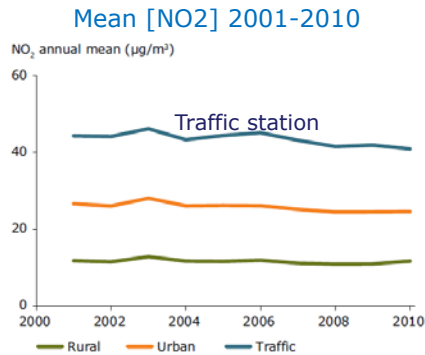
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Contribution of local & urban road traffic to [PM10]

PM10 avg: EU traffic sites

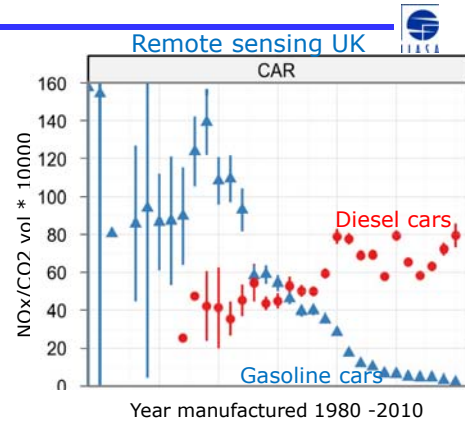


Problems linked to traffic & light duty diesel vehicles



NO₂ limit values exceeded almost only at traffic stations – persistent over the years

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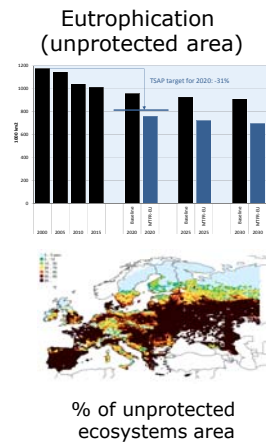


NO_x unit emissions from diesel cars increased in real driving

Carslaw et al. (AE 2011)

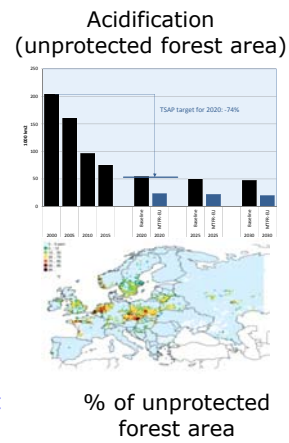
Ecosystems impacts

Results



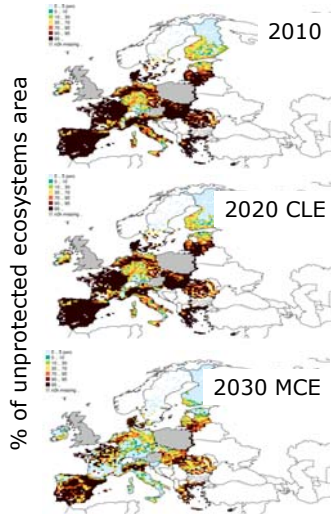
Baseline leaves biodiversity unprotected at 950,000 km² (55%) of all ecosystems area
MTFR measures could provide protection to another 200,000 km² after 2020

Soil acidification will remain a threat to 50,000 km² (~4%) of European forests.
MTFR measures could protect another 30,000 km²



Natura2000 areas

Threat to biodiversity from excess nitrogen input



- Nitrogen input will continue to threaten biodiversity at about two thirds (350,000 km²) of these nature protection zones in the baseline case.
- MTRF measures could provide protection to another 100,000 km² after 2020
- An incomplete assessment, as not all countries have reported critical load data for Natura2000 areas

Compliance with NO₂ AQ limit values

Methodology

