

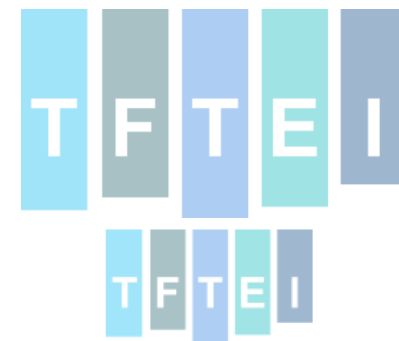
TFTEI

Under the Convention on Long Range Transboundary Air Pollution

# TFTEI informal background document on reduction techniques for mobile sources and the review of annex VIII of the Gothenburg Protocol

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# Introduction



## Context and objectives

- In the scope of the review of the AGP from 2021 to 2023 and its work plan, TFTEI carried out an extensive review of Technical Annexes both for stationary and mobile sources
- For mobile sources, the technical annex VIII “Limit values for fuels and new mobile sources” and the associated guidance document were assessed

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# Information provided

## Current vehicles or fuels addressed in technical annex VIII

1. Limit values for passenger cars and light-duty vehicles
2. Limit values for heavy-duty vehicles steady-state cycle load-response tests
3. Limit values for heavy-duty vehicles – transient cycle tests
4. Limit values for diesel engines for non-road mobile machines, agricultural and forestry tractors (stage IIIB)
5. Limit values for diesel engines for non-road mobile machines, agricultural and forestry tractors (stage IV)
6. Limit values for spark-ignition engines for non-road mobile machines
7. Limit values for engines used for propulsion of locomotives
8. Limit values for engines used for propulsion of railcars
9. Limit values for engines for propulsion of inland waterways vessels
10. Limit values for engines in recreational crafts
11. Limit values for motorcycles ( $> 50 \text{ cm}^3$ )
12. Limit values for mopeds ( $< 50 \text{ cm}^3$ )
13. Environmental specifications for marketed fuels to be used for vehicles equipped with positive-ignition engines
14. Environmental specifications for marketed fuels to be used for vehicles equipped with compression-ignition engines

TFTEI examined each category of road and off-road vehicles and provided the latest developments in limit values (based on Euro Standards or other regulations adopted before 2023 (date of the delivery of the report))

The rationale for potential updates was provided

The available techniques for achieving these limit values are described

# Examples of passenger and light duty vehicles



## Current limit values in table 1 of Annex VIII

Based on EU regulation 459/2012 implementing Euro 6

- The limit values in Table 1 for passenger cars and light duty vehicles were established using New European Driving Cycle (NEDC) test cycle specified in UNECE R101.

## Evolution

- Since then, **a new cycle for light vehicles testing has been set-up: the Worldwide harmonized Light vehicles Test Cycle (WLTC)** in the framework of the Worldwide harmonized Light vehicles Test Procedure (WLTP).
- The new cycle is supposed to be more representative of the real-world emissions and has been set-up to answer to numerous studies showing that real on-road emissions and fuel consumption could be substantially higher than those reported during NEDC test.

# Example of passenger and light duty vehicles



## Current limit values in table 1 of Annex VIII

Based on EU regulation 459/2012 implementing Euro 6

## Evolution

**A new table 1 developed with limit values of Euro 6 c and d**



With advanced techniques, the gap between pollutant emissions measured in the laboratory and on the road, under real-world conditions has significantly decreased

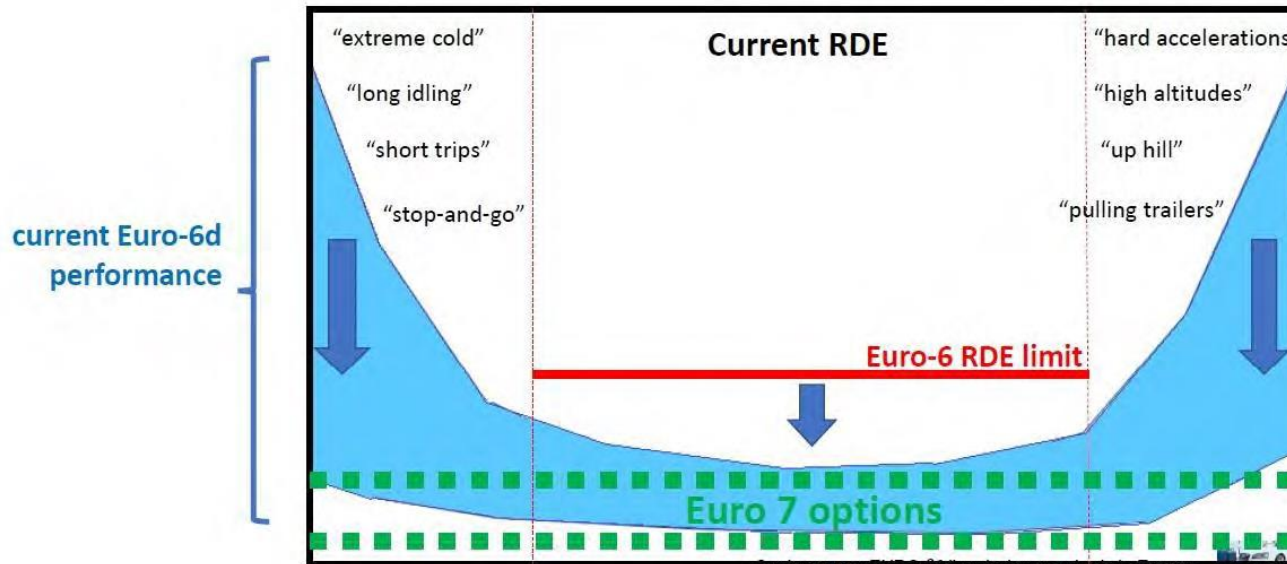
# Example of passenger and light duty vehicles

## Current limit values in table 1 of Annex VIII

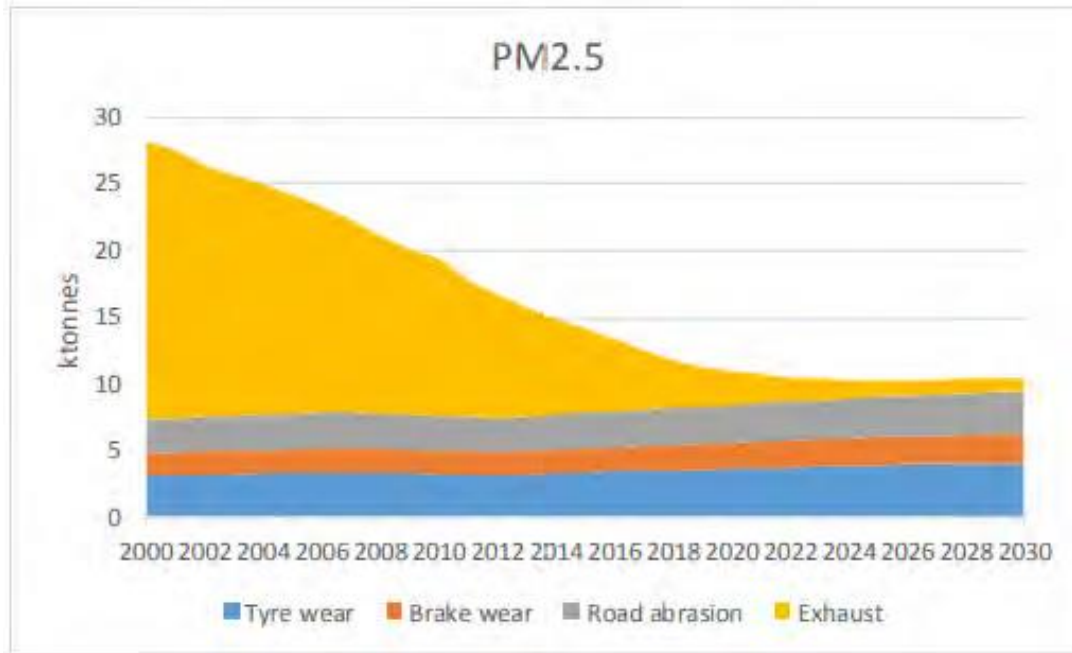
Based on EU regulation 459/2012 implementing Euro 6

### Evolution

However, since then, Euro 7 was published. This will have to be considered in 2025 in the revision of the guidance document for mobile sources



## Example of Non-Exhaust Emissions (NEE)



NEE PM particles emitted from abrasion of brake, road and tyres are taking greater importance compared to total PM emissions

To reduce the impact of NEE, several technical options are available:

- Reducing formation of particles
- Trapping particles at the source after formation
- Removing particles from the environment.

## Example of Non-Exhaust Emissions (NEE)



System developed to capture the tyre particles at the source (the tyre collective project)

System developed to capture PM emissions from brakes

Reduce PM emissions by up to 85% when braking a vehicle or a train, whether individual or collective, light or heavy, thermal or electric. Protected by a portfolio of patents, filed in many countries around the world, TAMIC®





# Conclusions and work plan for 2025



## **Main results:**

- 14 tables of Annex VIII proposed to be updated
- Improved engine or end of pipe techniques described

## **Work plan for 2025:**

- In 2025, according to the updated work plan, the guidance document on mobile sources must be revised (for discussion at the first WGSR meeting of 2026).
- The informal document developed in 2023 will facilitate the work, but in two years other development will have to be considered

Thank you very much  
Questions?