

Introduction to the LENS project

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LENS: L-vehicles Emissions and Noise mitigation Solutions

- Clean and competitive solutions for all transport modes (Topic ID: HORIZON-CL5-2021-D5-01-16)
- 5 M€ EU RI project
- 9.2022 – 11.2025



LENS ambition

Improve current understanding of LV **noise & pollutant emissions**

“L” category vehicles (LVs) are not just Motorcycles:

- Mopeds
- Enduro
- 3-wheelers
- Quads
- Mini-cars
- Buggies



Air pollution is improving but still of concern

EU standards

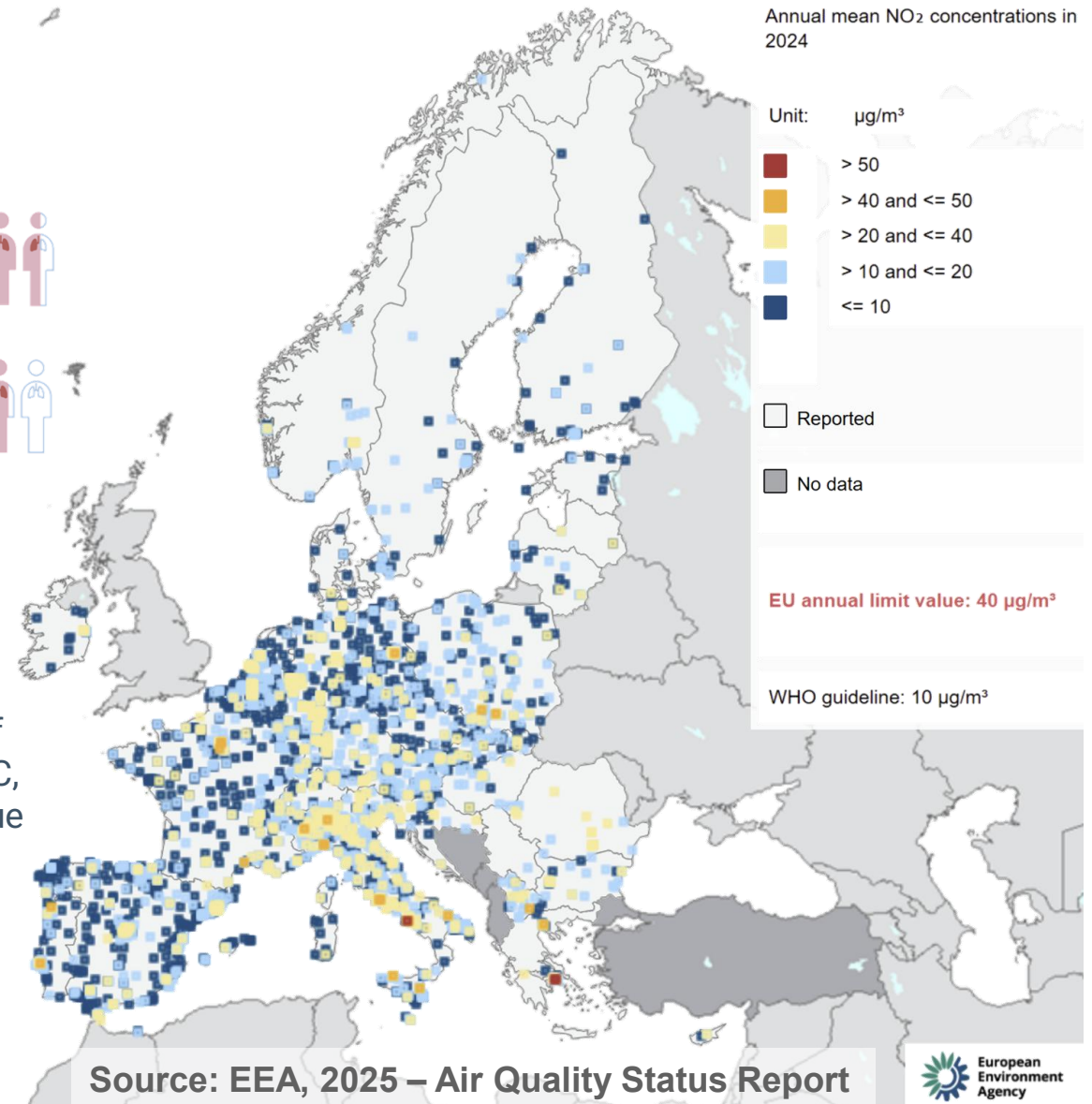


WHO guidelines

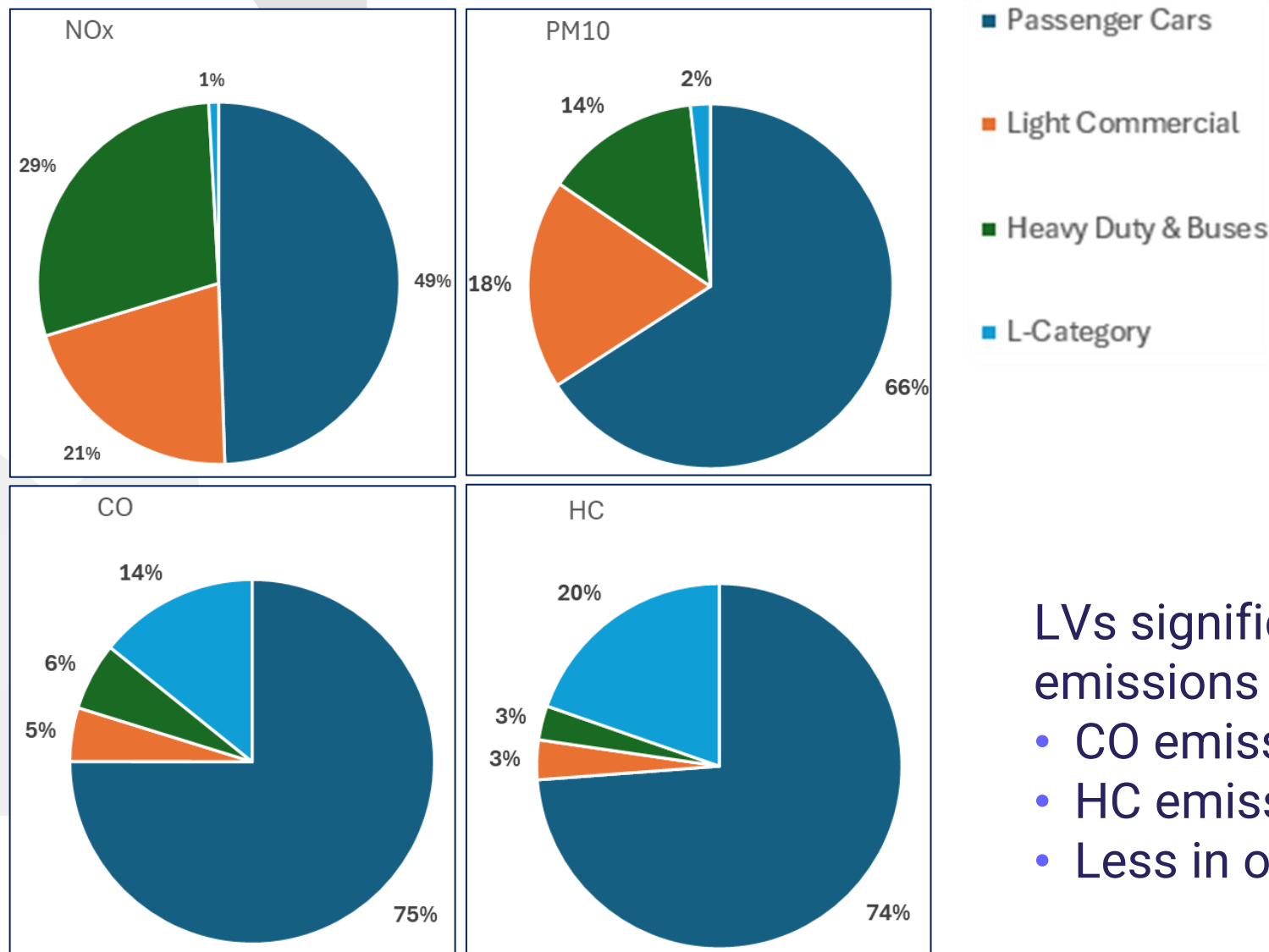


In the EU-27, transport was the largest emitter of **NO_x** in 2022, with a **share of 56.5%**. Transport was also responsible for **29.3% of PM₁₀** and PM_{2.5} in the EU-27 in 2022. Additionally, **26.3% of BC** emissions, 19.2% of SO_x emissions, 18.8% of CO emissions, 8.1% of the emissions of NMVOC, 5.75% of N₂O emissions and 1.4% of NH₃ emissions in the EU-27 were due to transport in 2022.

Source: European Environment Agency. Air Pollution. 2024



LVs contribution to urban air pollution



LVs significantly contribute to road transport emissions in urban areas

- CO emissions ~ 14%
- HC emissions ~ 20%
- Less in other pollutants

Source: COPERT EU road transport pollutant emissions. 2022

Beyond air pollutants: Noise

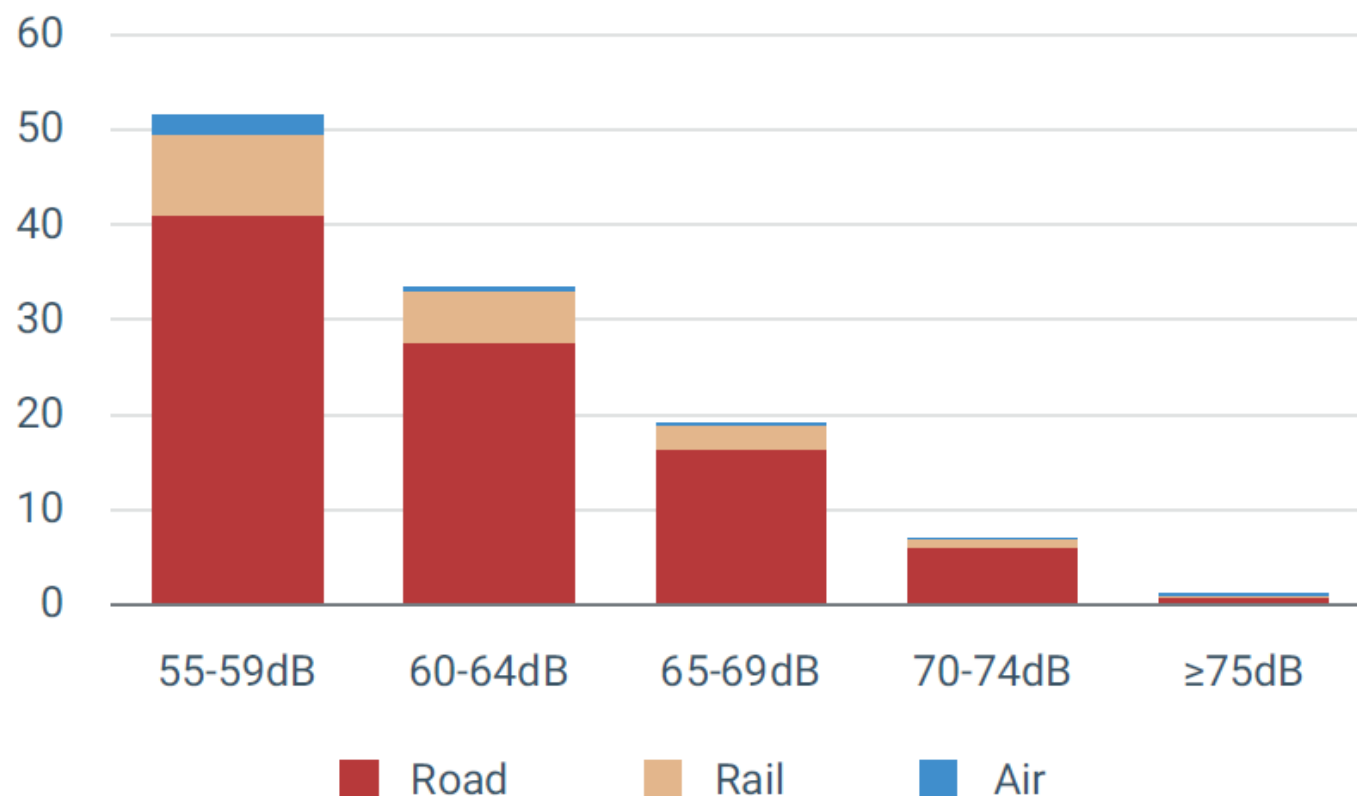
Long term average indicators (L_{den} and L_{night}) suggest:

- 92 M people exposed to harmful noise levels in the EU
- Road transport very important

Preliminary findings reveal that the majority of vehicles exceeding the noise threshold are motorised two-wheelers, accounting for approximately 70% of the offenders. Other noisy vehicles include cars and vans (17%) and heavy trucks and buses (13%) (Magnin and Thomson, 2024).

Distribution of the number of people exposed to noise from road, rail and air traffic in 5dB bands for the L_{den} period

Distribution of the number of people exposed to $L_{den} \geq 55$ dB

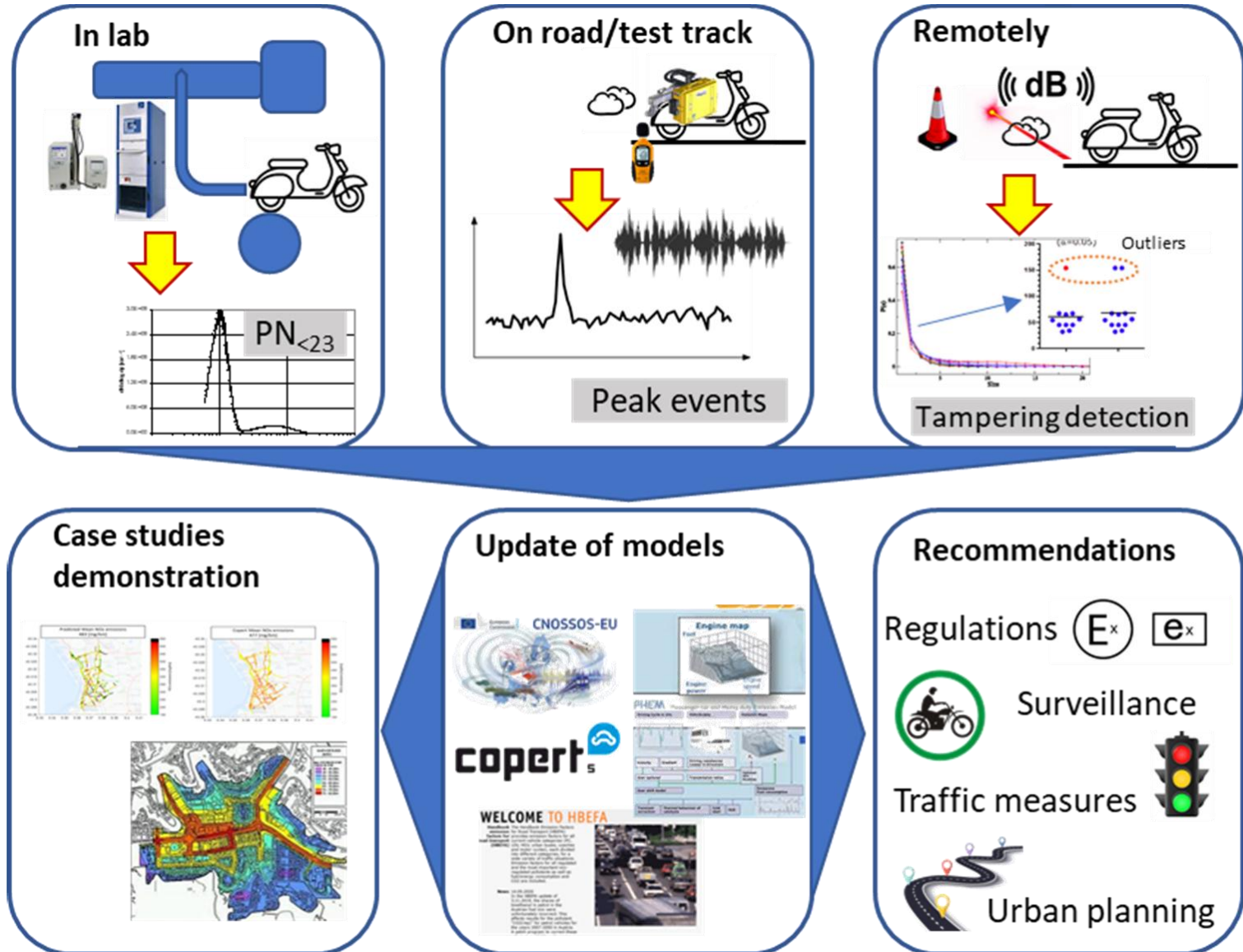


Source: European Environment Agency. Environmental noise in Europe. 2025

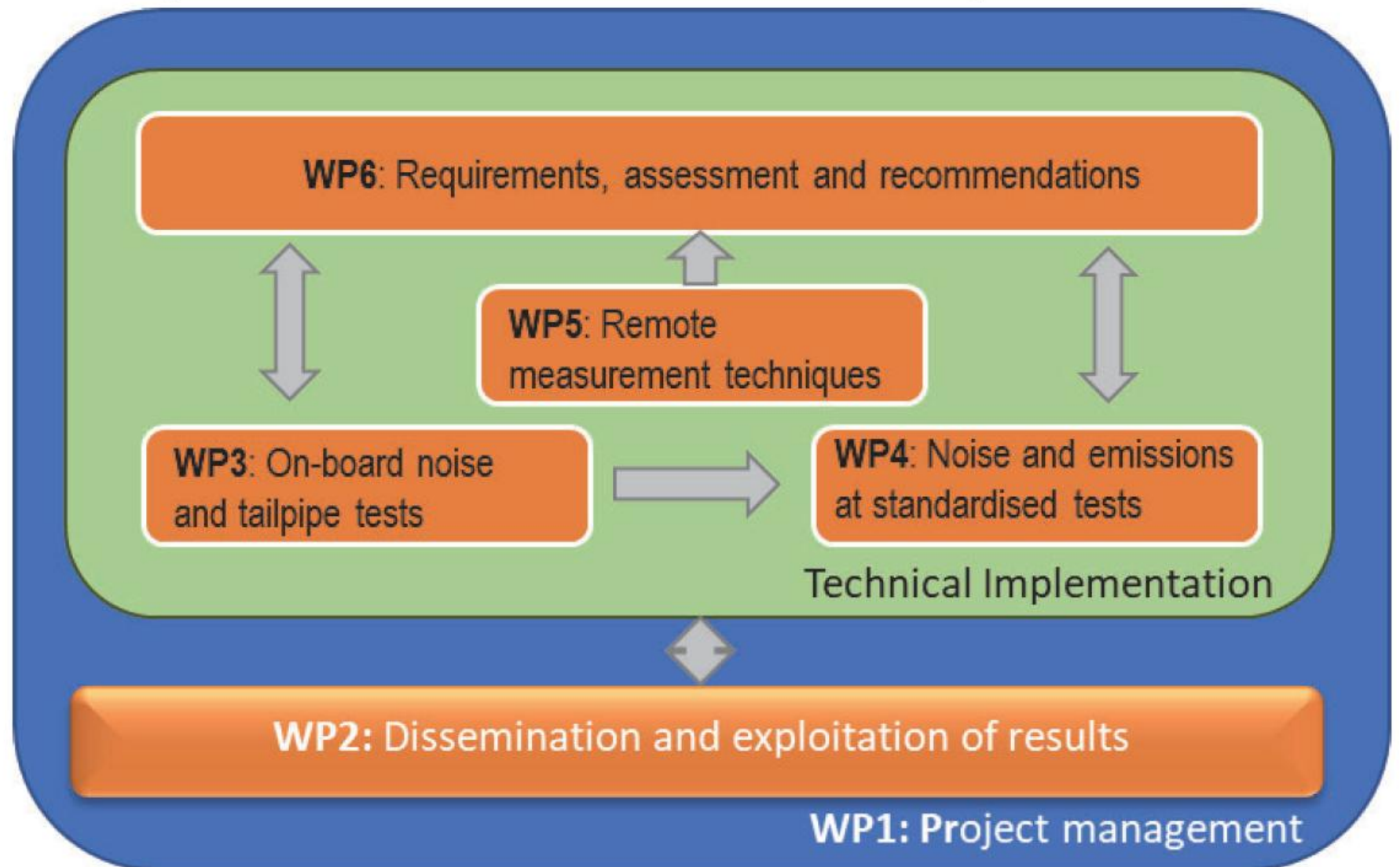
LENS (high-level) objectives

1	Develop LVs emission & noise techniques for on-road measurement
2	Characterize noise & pollutant emissions performance of real-world vehicles
3	In-field identification of tampered LVs
4	Provide recommendations for decreasing noise and pollutants from LVs, and expected impact

Overall technical approach and method



LENS implementation and structure



Thank you!

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