CARES project - City demonstration remotesensing measurement campaigns

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REMOTE SENSING IS A WELL-SUITED TECHNOLOGY FOR UNOBTRUSIVELY MEASURING REAL-WORLD EMISSIONS

 Open-path techniques

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ICCT

Point sampling

Plume chasing



Utilized for:

- Fleet monitoring
- Emissions factors development
- Market surveillance
- Enhance periodical inspection
- Individual vehicle tampering
- Individual high emitter
- Etc.



SELECT RECENT & PLANNED MEASUREMENTS



OVERVIEW AND PRELIMINARY RESULTS OF THE REMOTE-SENSING CAMPAIGN IN MILAN, FALL 2021



Figure 3b: Schematic setup of a stationary air sampling system.





CARES website: https://cares-project.eu/cares-milan-res-complete/

TESTING LOCATION: VIA MADRE CABRINI

Air quality vs vehicle emissions monitoring (EDAR)

Airborne concentrations & weather measurements (Reference instruments and advanced sensors)

Vehicle emissions measurements (EDAR and Point Sampling)







REMOTE SENSING GIVEN AN OVERVIEW OF THE MILAN'S FLEET COMPOSITION



- Majority of passenger cars
- A significant share of LPGpowered vehicles (bi-fuel) relative to other cities

REMOTE SENSING GIVEN AN OVERVIEW OF THE MILAN'S PASSENGER CARS COMPOSITION BY EURO STANDARD AND FUEL TYPE



REMOTE SENSING INFORMS THE CITY ABOUT REAL-WORLD NOX EMISSIONS FROM PASSENGER CARS WITHIN THE LEZ



- A diesel Euro 6 (2014-2016) emits about as much as a petrol Euro 2 (1996-2000)
- Significantly higher NO_X emissions from diesel vehicles than petrol counterparts up to 6d-TEMP
- Steady improvement in emission performance of petrol vehicles with new standards but little improvement with diesel until 6d-TEMP

LPG, AND CNG EMISSIONS ARE NO BETTER THAN PETROL EQUIVALENT



- Higher NO_x emissions from CNG and LPG vehicles across all emission standards
- Significantly elevated CO emissions from LPG vehicles
- High methane emissions from CNG (powerful greenhouse gas)
- The current LEZ in Milan excludes LPG and CNG from vehicle restrictions

REMOTE SENSING AS A POTENTIAL SOLUTION FOR ZERO-EMISSION ZONE ENFORCEMENT



- Pure electric vehicles (PEVs) records are invalid due to the absence of CO₂ (as expected)
- Plug-in hybrids (OVC-HEV) are using their internal combustion engines in 64% of measurement, not significantly less often than conventional hybrids

ON-GOING DATA ANALYSIS AND CAMPAIGN PREPARATION IN KRAKOW AND PRAGUE



https://cares-project.eu/cares-remote-emission-sensing-campaign-krakow-completed/

The Prague campaign will combine all measurements techniques

THE uCARe PROJECT



Ambition

To reduce the **overall pollutant emissions** of the **existing vehicle fleet** by providing **vehicle users** with **simple, insightful, and effective tools** to decrease their individual emissions *and* to support **stakeholders** with an interest in local air quality in selecting feasible **intervention strategies** that lead to the desired user behaviour.

Objectives

- To identify user-influenced vehicle emission aspects (i.e. driving behaviour).
- To determine the **emission reduction potential** of each vehicle emission aspect with help of the uCARe model.
- To develop a **toolbox** with intervention strategies.
- To test and evaluate **intervention strategies** in a set of pilots with various target groups.
- To perform an **impact assessment** for the intervention strategies' effectiveness.
- To support policy makers and other stakeholders in identifying intervention strategies that translate the measures into the desired behaviour of the user.





Smart and Sustainable Mobility for all.



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