LIFE16 ENV/ES/00082

LIFE GySTRA

MAŁOPOLSKA W ZDROWEJ ATMOSFERZE

Global system for Sustainable TRAffic emissions management

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CENTRO TECNOLÓGICO CARTIF · OPUS RSE · sofia development association · Ciemat Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas · DGT Dirección General de Tráfico

The LIFE GySTRA project

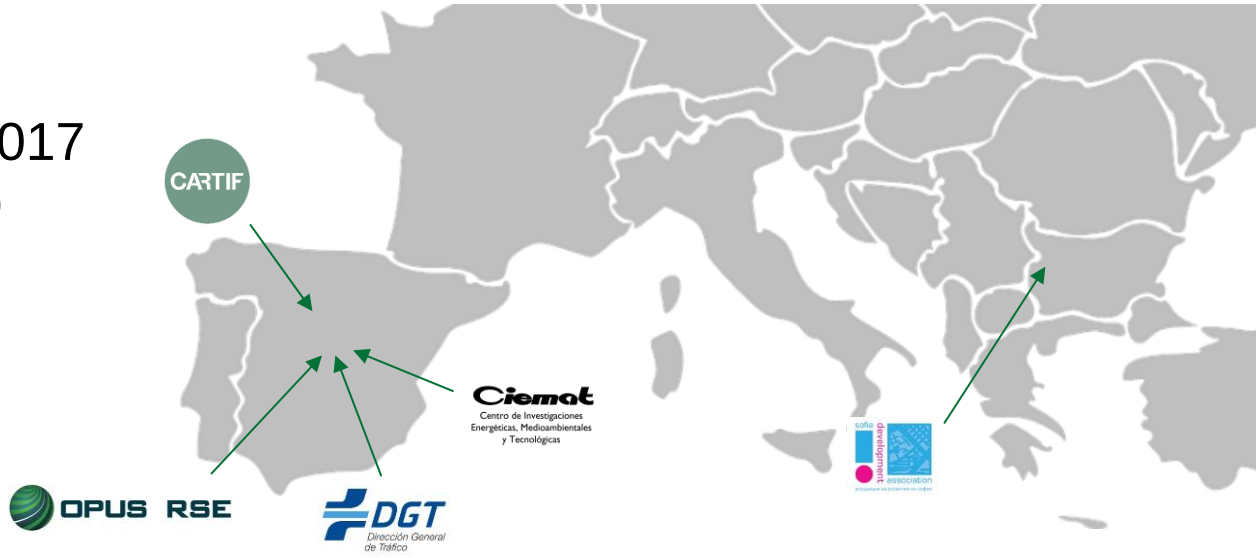
https://www.lifegystra.eu/

Duration

- From Sept 2017
- To Nov 2020

Budget

- 1,567,625.00



Objectives

1. Implementation of a new and solid **sustainable mobility policy based on empirical** information related to traffic emissions.

2. Development of a new tool based on the remote sensing technology, the RSD+. It will measure real driving emissions, including NO_2, at fixed locations

3. To **reduce up to 20% traffic emissions** and **5% of fuel consumption** through the identification of high emitters

The environmental problem

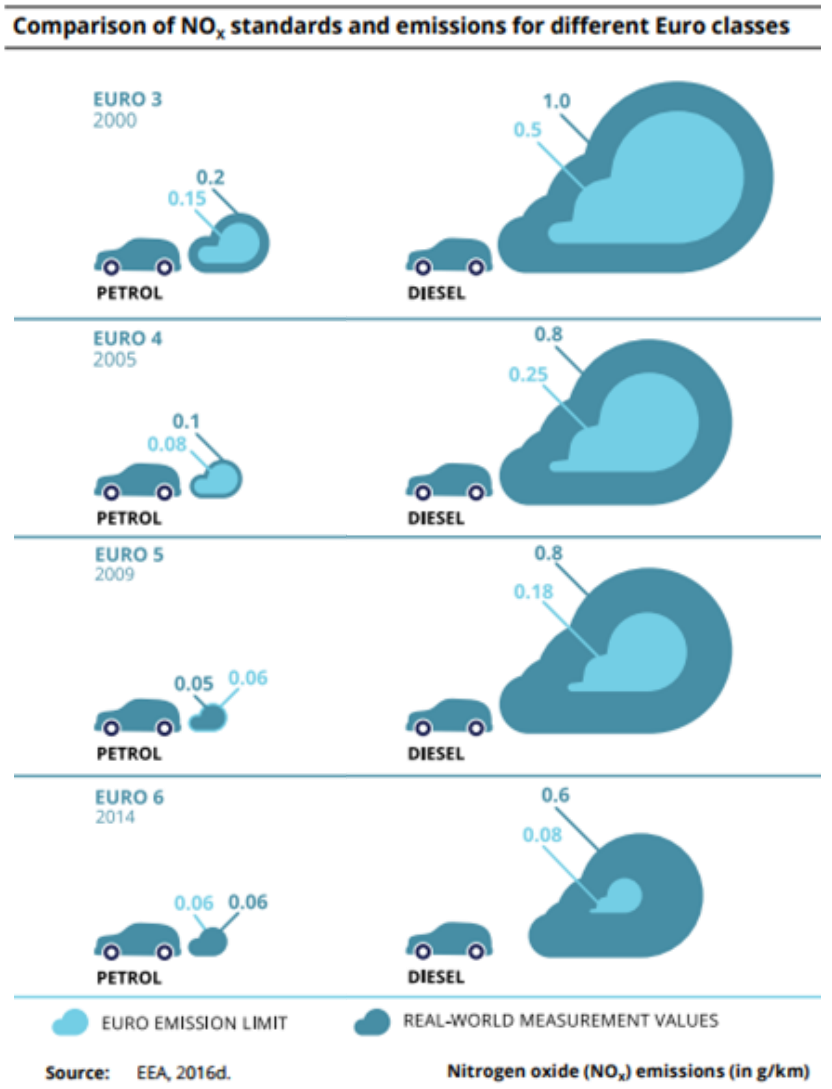
1. Traffic is responsible for up to **60%** of the total emissions in major urban areas, (CO, NO_x and PM).

2. Tests for vehicle emissions are not conducted under real driving conditions (new RDE tests are closer).

3. Engine malfunctioning, bad maintenance, deterioration, driving-style or intentional tampering are the main causes of these differences.

4. Vehicle age is not the only factor.

5. A small portion of the fleet contributes a lot in total emissions.



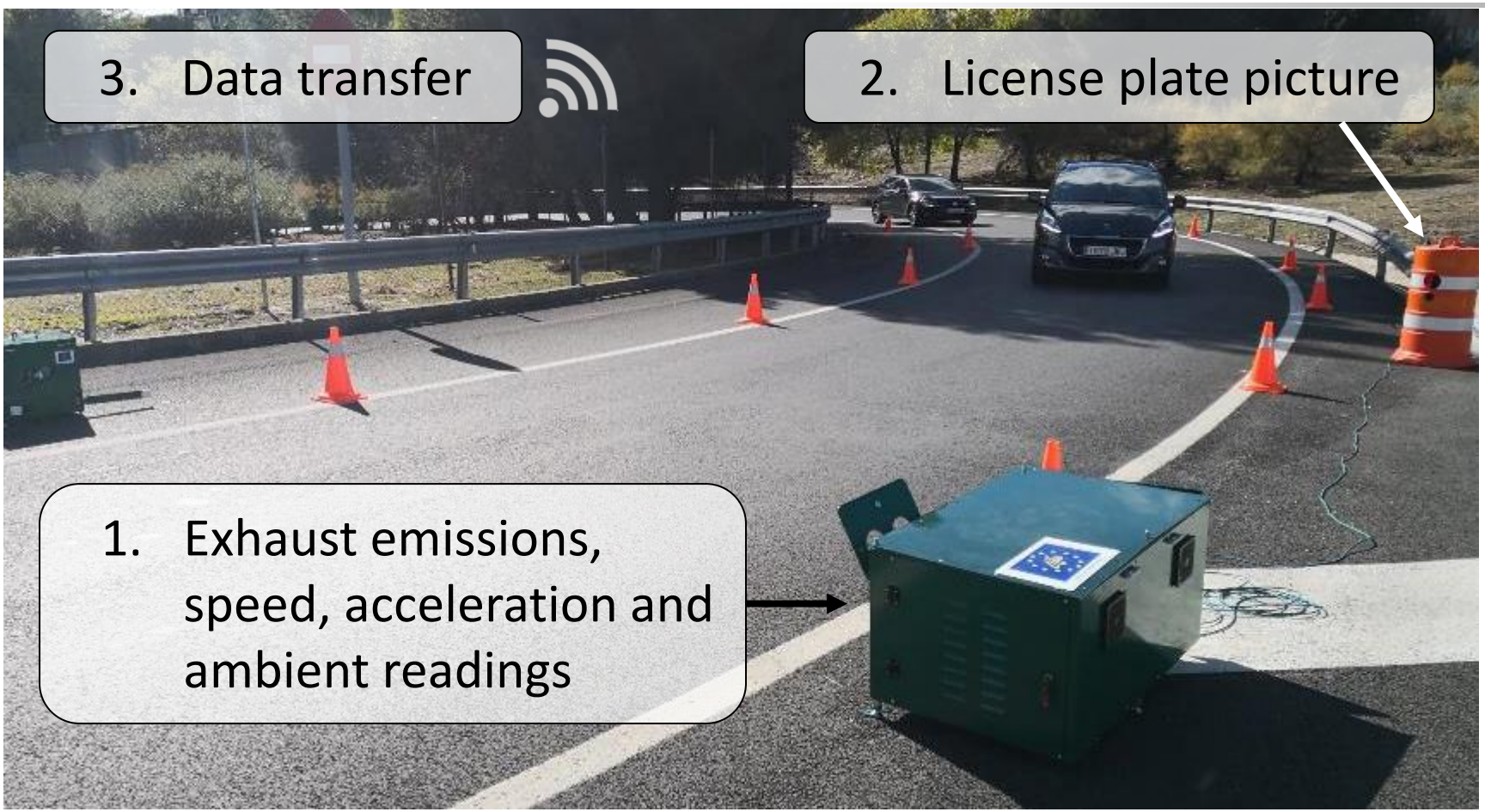
RSD+ Device

- Remote operation and real-time data transfer and visualization.

- +16 hours continuous autonomous operation.
- No road modification.
  No need of any site preparation.

- Emitted NO, NO_2, CO, PM and HC.
  Speed, acceleration.
  License plate picture.
  Ambient readings.
- Multilane capability.
- Connection with traffic database.

RSD+ Device



CO HC NH_3 NO NO_2 $PM2.5$

100 measurements of the plume in 0.5 seconds

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RSD+ Device - Video

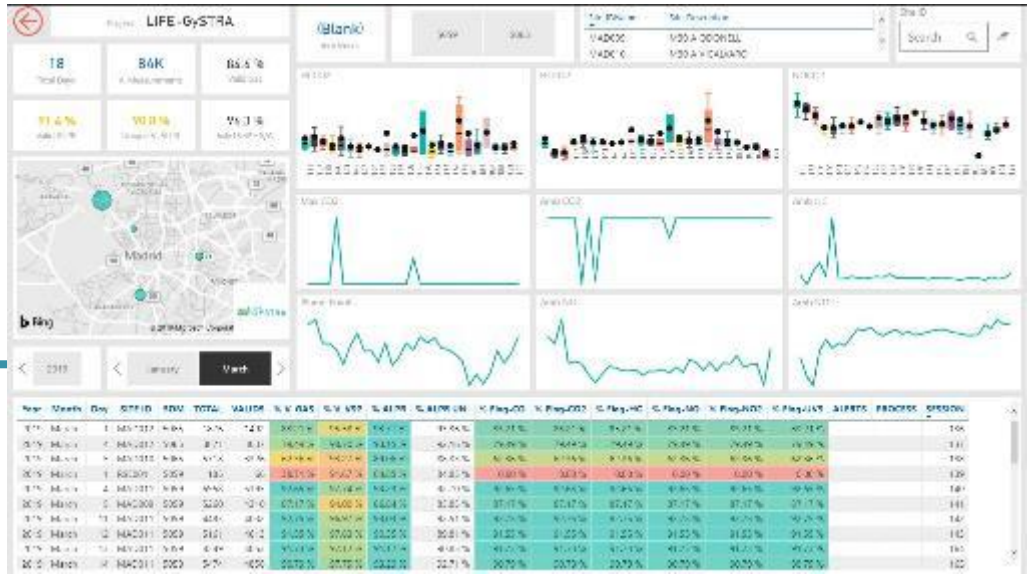
https://www.youtube.com/watch?v=-eK6fWonJxo

RSD+ Device

https://www.lifegystra.eu/

Global traffic emissions analytics

i.e. calculate how much pollution is produced by different vehicles or at different points in the city.



Individual vehicles' analysis

i.e. quickly analyse individual measurements of a single vehicle

Madrid City Model

The RSD+ is placed at **different roads of the city** to measure vehicles in different traffic conditions and to measure most of the car fleet

The RSD+ remotely measures the **emissions of each vehicle** passing in front of the device

We **identify the most polluting vehicles** and qualify them as High-Emitters

We contribute to define new environmental policies based on real emissions

The actual emissions of each vehicle are analyzed and on a Big-Data platform

We calculate the **real contribution of road traffic** to the city's emissions

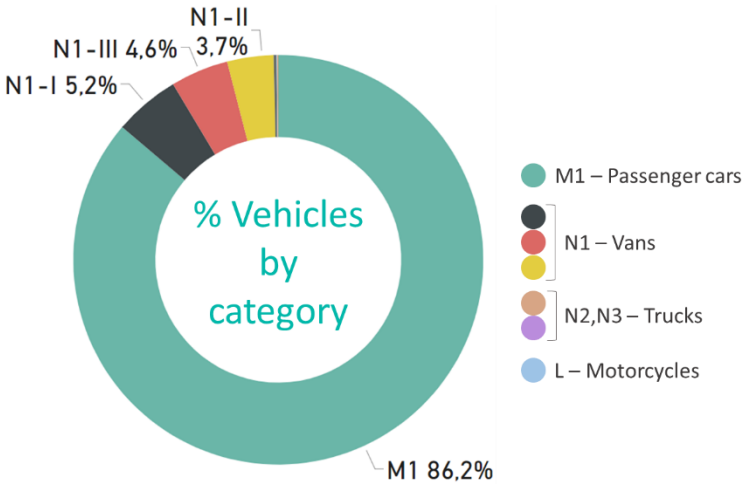
Madrid traffic emissions monitoring program

https://www.lifegystra.eu/

- ✓ First continuous remote sensing program in Europe.
- ✓ From Oct **2018** to Oct **2020**.

800,000 records …

22 different locations



Madrid traffic emissions monitoring program

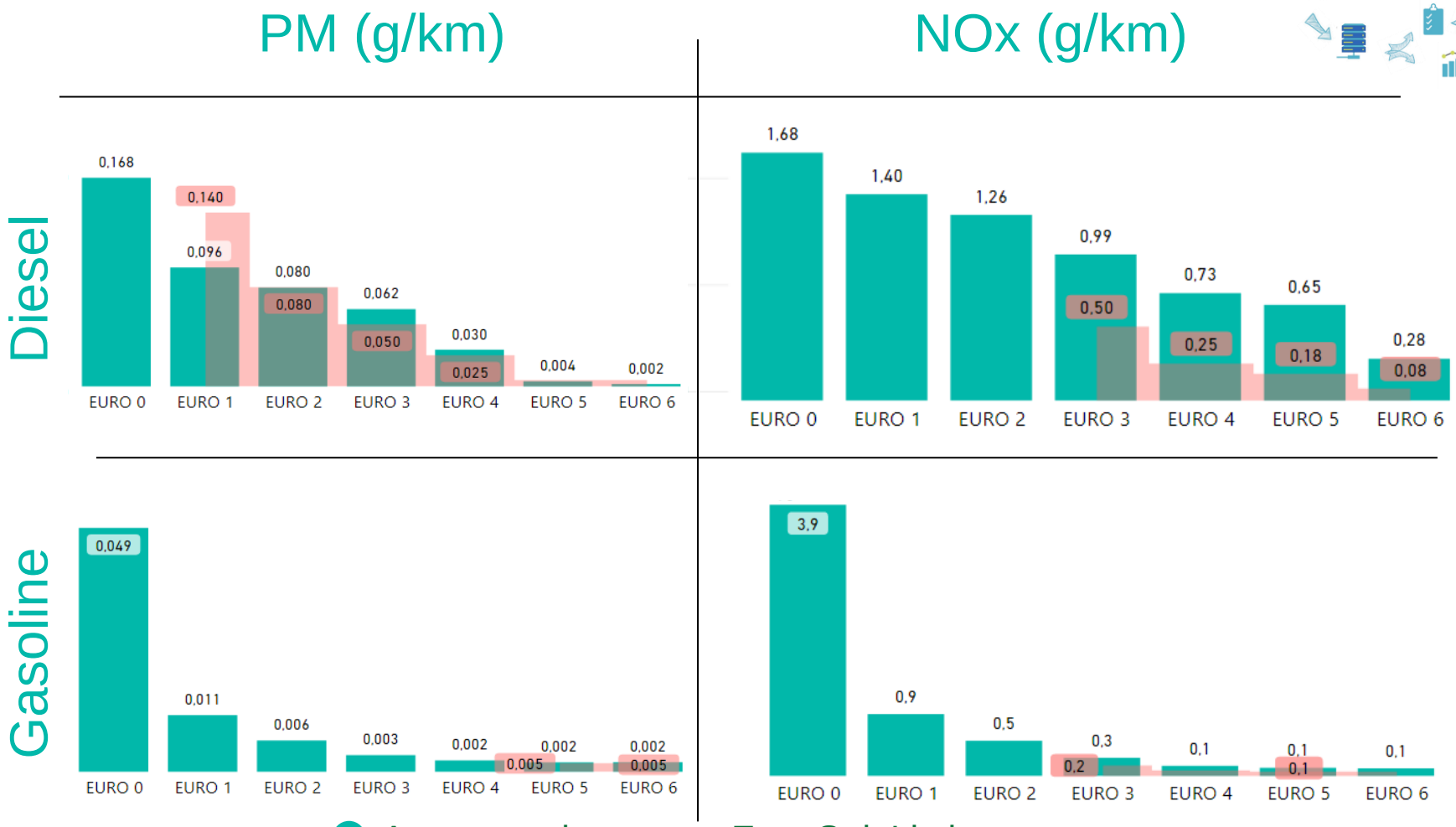
National news – Prime time

https://www.youtube.com/watch?v=LUfcSxqVk1Y

Madrid City Model - First results

https://www.lifegystra.eu/

Average emissions of all passenger cars



Madrid City Model - First results

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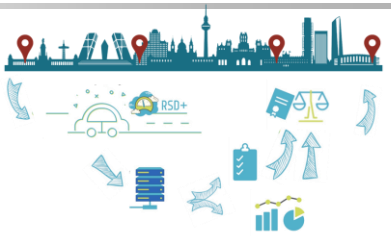
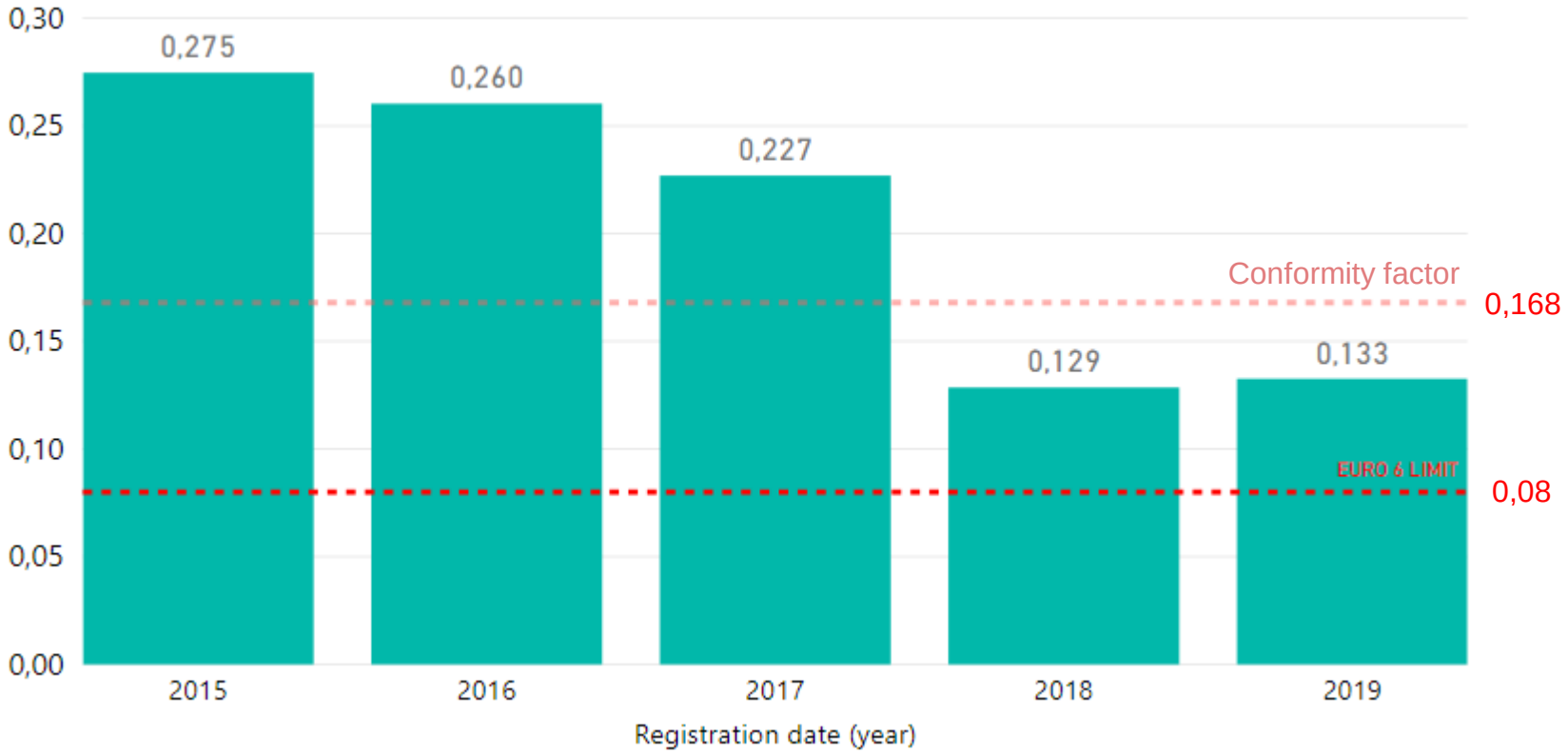
Average emissions of most modern diesel passenger cars (Euro 6)



NOx (g/km)



Average value — Euro Std. Limit

Madrid City Model - First results

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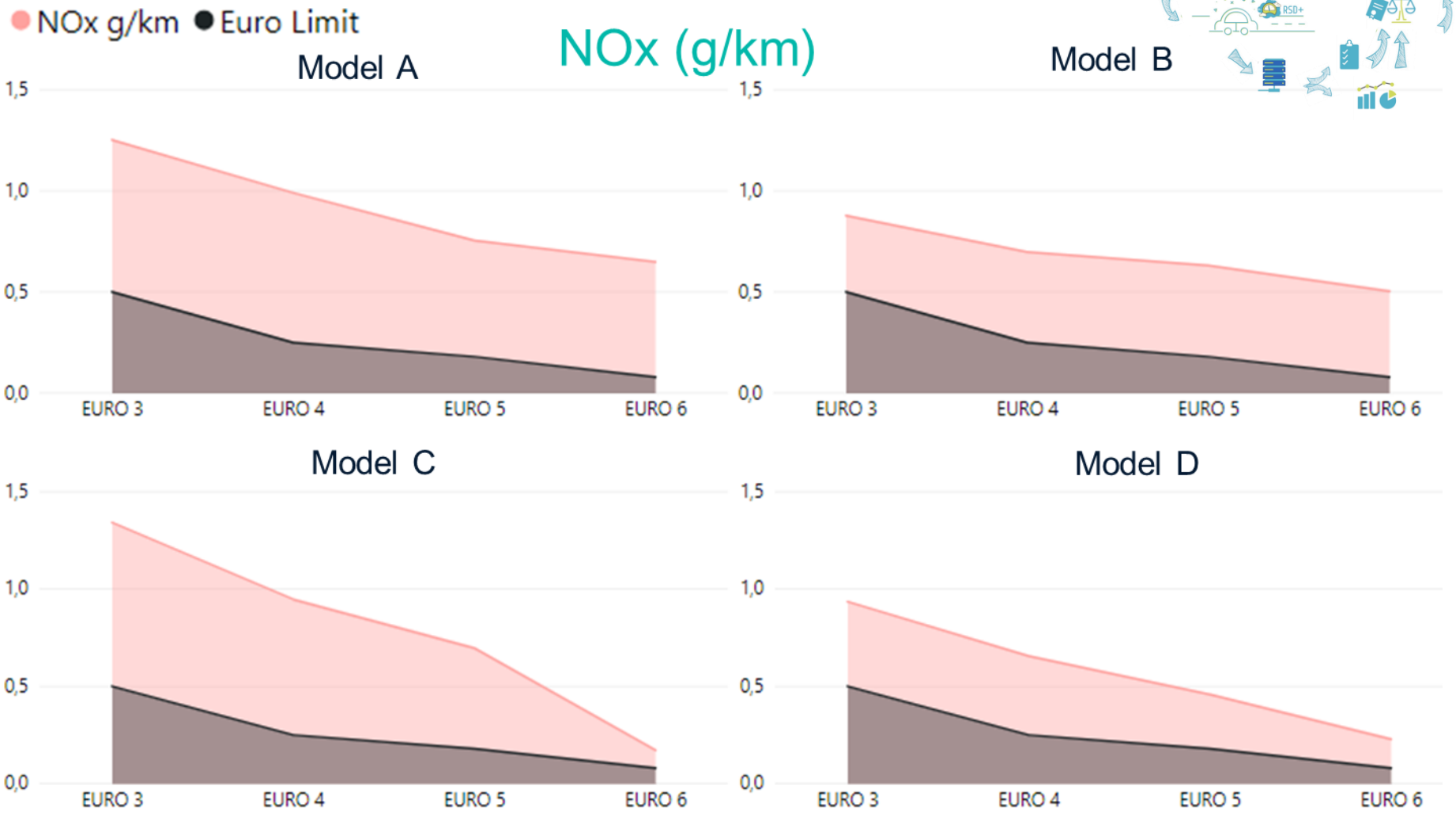
NOx by vehicle model



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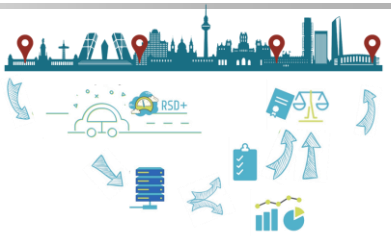
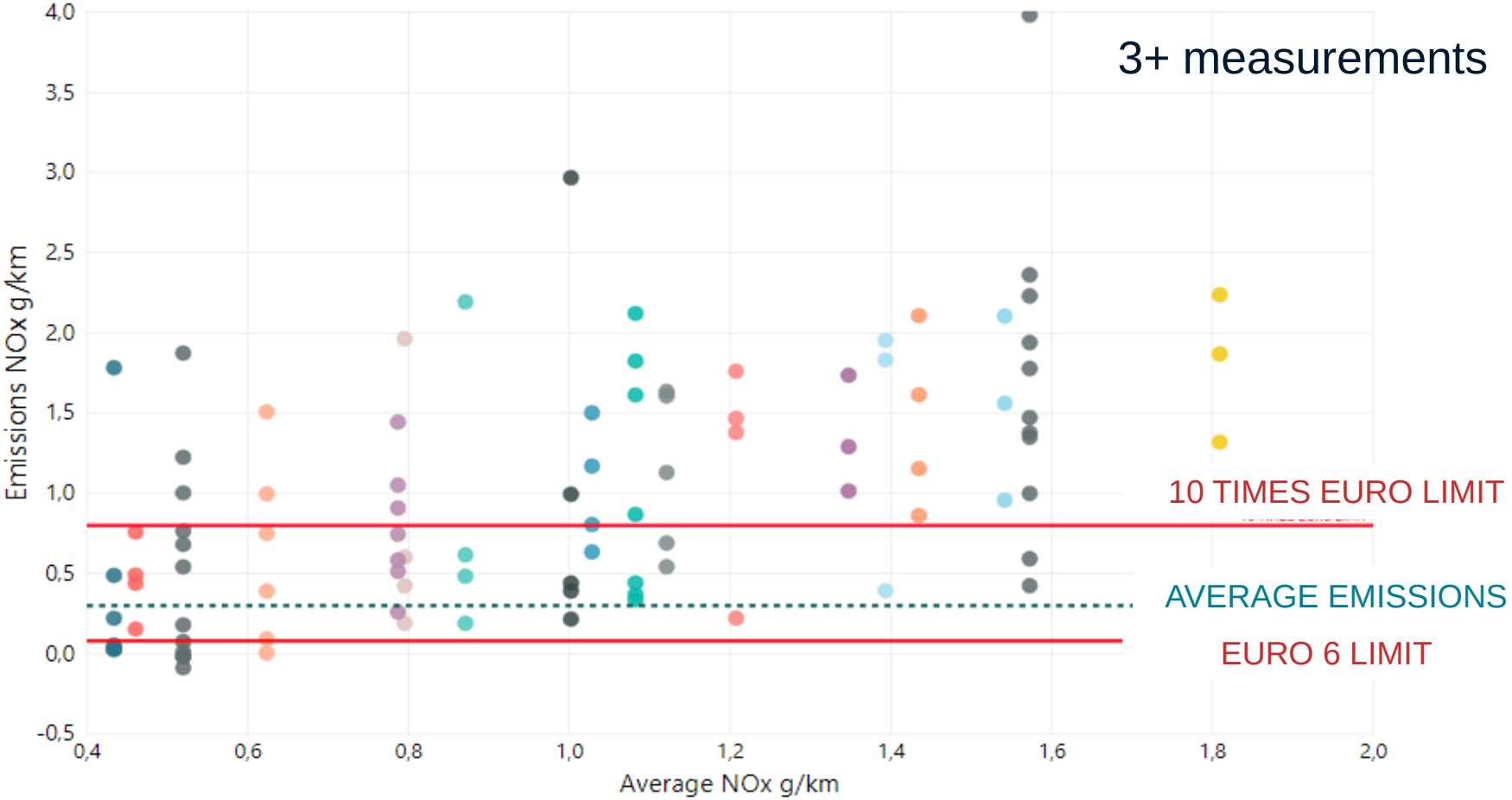
Identifying high-emitting vehicles

Some examples of high-emitting Passenger Cars, Diesel, Euro 6





Madrid City Model - First results

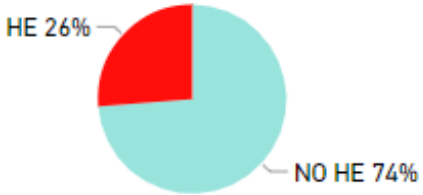
https://www.lifegystra.eu/

Identifying high-emitting vehicles

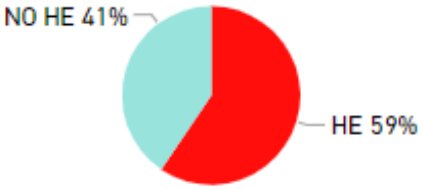
A small portion of the fleet contribute to a large amount of total emissions…

Total contribution of CO HE

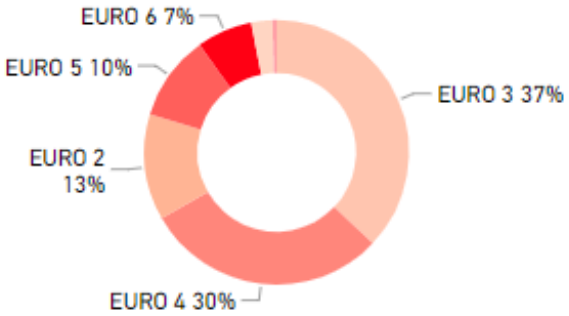
Total contribution of NOx HE



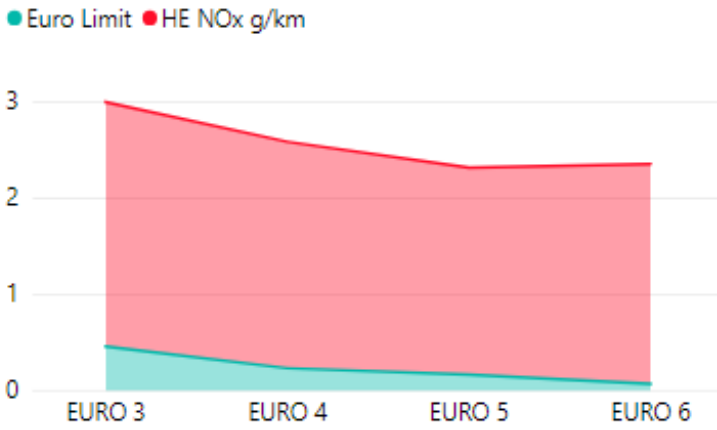
Total contribution of PM HE



HE NOx by Euro Standard



Average of HE NOx g/km emissions



Madrid City Model - First results

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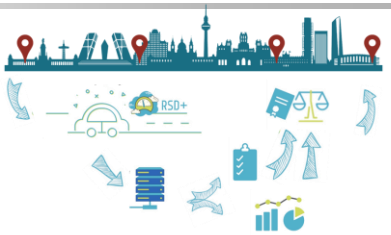
Awarding the population



OCU (part of Euroconsumers) has already Manifested its interest in the LIFE GySTRA Project

Jointly we are developing an online platform to inform Spanish drivers on their Real Driving Emissions

Madrid City Model - First results

Biker concentration – Pingüinos2020

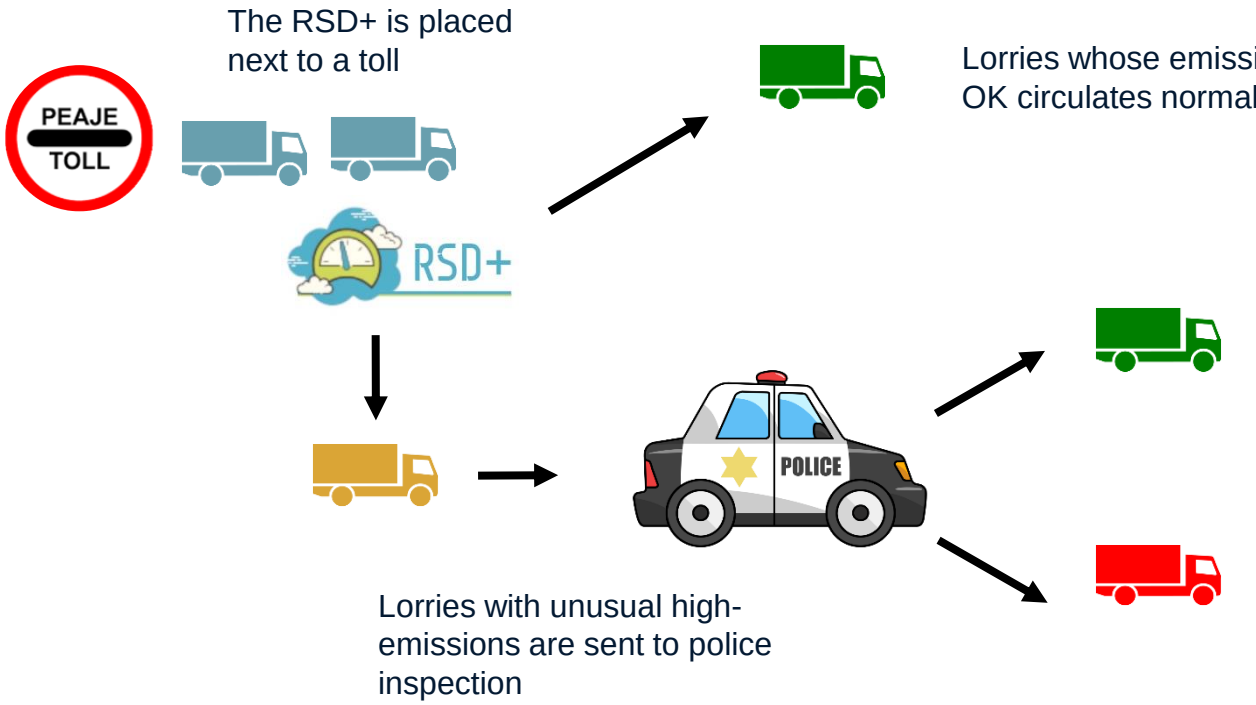
- ✓ Largest motorcycle Remote sensing emissions monitoring campaign in Europe
- ✓ 3 days
- ✓ +34,000 motorcycles
- ✓ With the support of Valladolid City Council

Madrid City Model - First results

https://www.lifegystra.eu/

Biker concentration – Pingüinos2020

Madrid - Collaboration with Spanish Guardia Civil



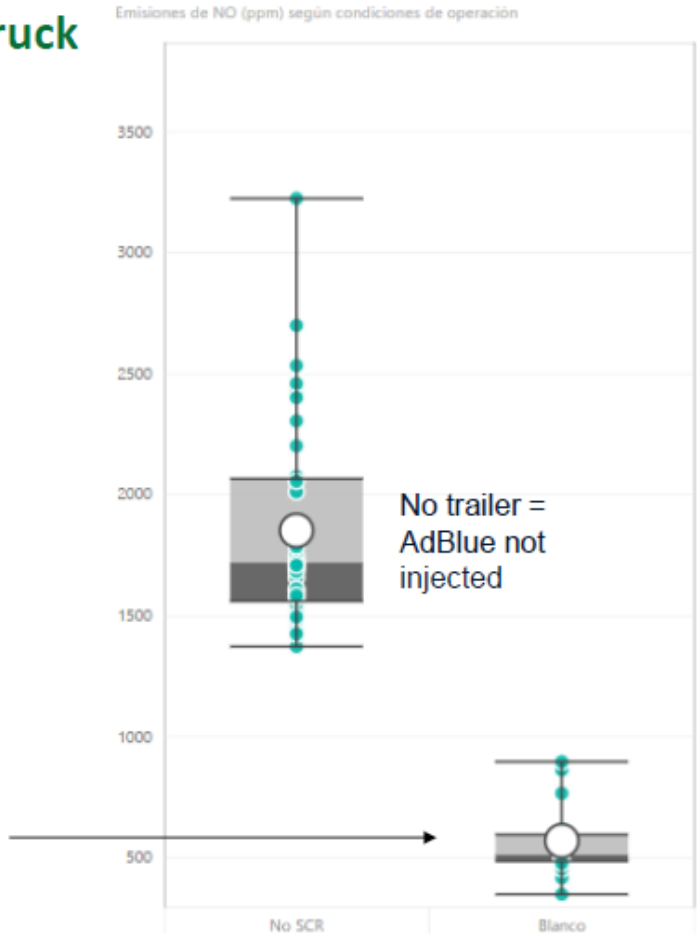
Madrid - Collaboration with Spanish Guardia Civil

https://www.lifegystra.eu/

How Bad is this practice?

A non-manipulated Euro V truck with and without AdBlue

	Average NO (ppm)
SCR ON	570
SCR OFF	1744



EUROPOL

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Madrid - Collaboration with Spanish Guardia Civil

We have quantified the impact of cheating SCR:

+ 1 Tons NOx per year

If all Euro V cheating trucks were corrected:

Reduction of 20% of total NOx from road transport!

Calculations:

1	Ton / year and / truck
3.200.000	Trucks in Spain
480.000	Euro V trucks in Spain
48.000	Trucks may be manipulated
48,000	**Tons per year saved**

820,000	Tons of NOx in Spain per year
246.000	Tons of NOx in Spain per year caused by road transport

20% reduction
of road transport
NOx emissions

Madrid - Collaboration with Spanish Guardia Civil

https://www.lifegystra.eu/

Identifying high-emitting vehicles

52 Lorries fined
4 People arrested

EUROPOL · 20 YEARS

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Automated translation | Seleccionar idioma

HAULIER IN SPAIN CAUGHT CHEATING EMISSION REGULATIONS DESIGNED TO PREVENT AIR POLLUTION

THIS NEWS/PRESS RELEASE IS ABOUT
ENVIRONMENTAL CRIME
View all crime areas ›

27 March 2019
Press Release

A road haulage company based in Madrid is under investigation by the Spanish Guardia Civil (Civil Guard), and four people have been arrested, after roadside checks uncovered high levels of use of cheat devices which disable pollution control system on lorries. 30 diesel vehicles from that company were caught with such cheat devices – called emulators.

Adblue is an additive which converts harmful nitrogen oxide from a diesel vehicle exhaust into harmless nitrogen and water steam. This process considerably reduces the emission of nitrogen oxide, which is a major source of air pollution.

The emulators work by tricking the lorry's electronic system into "thinking" that the selective catalytic reduction (SCR) control system is functioning correctly, when in reality it is not functioning at all.

Operators using these devices do not have to bear the cost of purchasing Adblue fluid or maintaining the complex SCR system on their vehicles. These emulators however allows the lorries to produce unregulated

Madrid - Collaboration with Spanish Guardia Civil

https://www.lifegystra.eu/

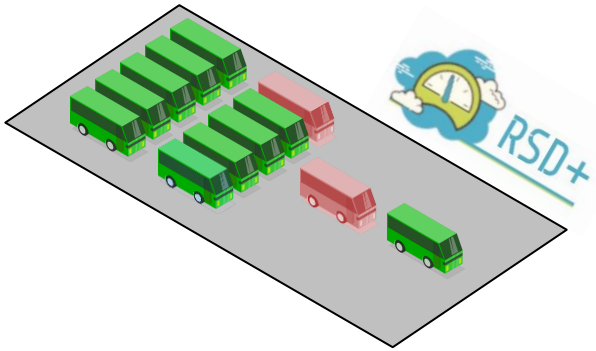
Video

https://twitter.com/guardiacivil/status/1110897862743859202

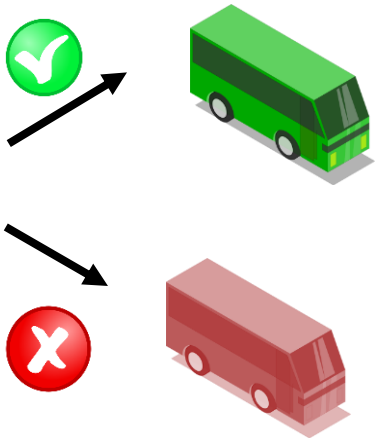
Sofia Controlled Fleet Model

https://www.lifegystra.eu/

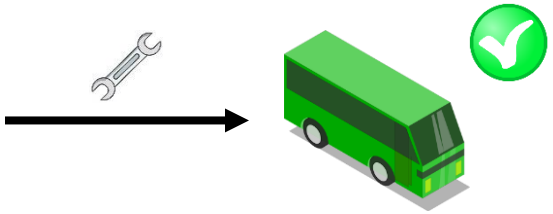
The RSD+ is placed at the entrance of the bus station



The device monitors the whole fleet



OK buses operates normally



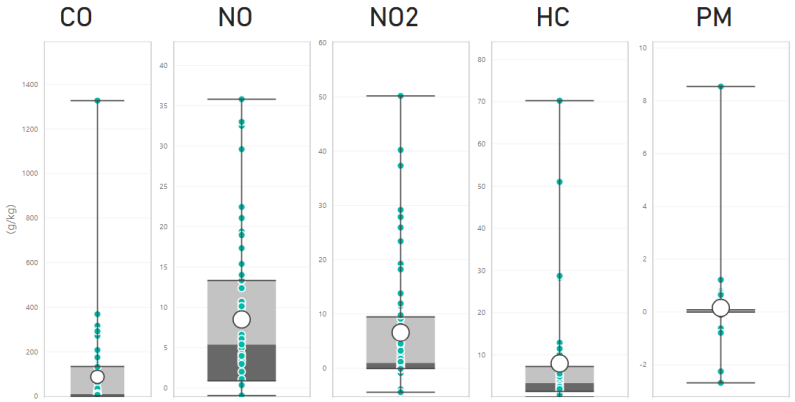
High-Emmitting buses are repaired before they can circulate again

Sofia Controlled Fleet Model

High emissions → Combustion is not fine.

Looking for technical problems:

NOx → SCR
CO and HC → fuel consumption
PM → DPF
and other combinations...



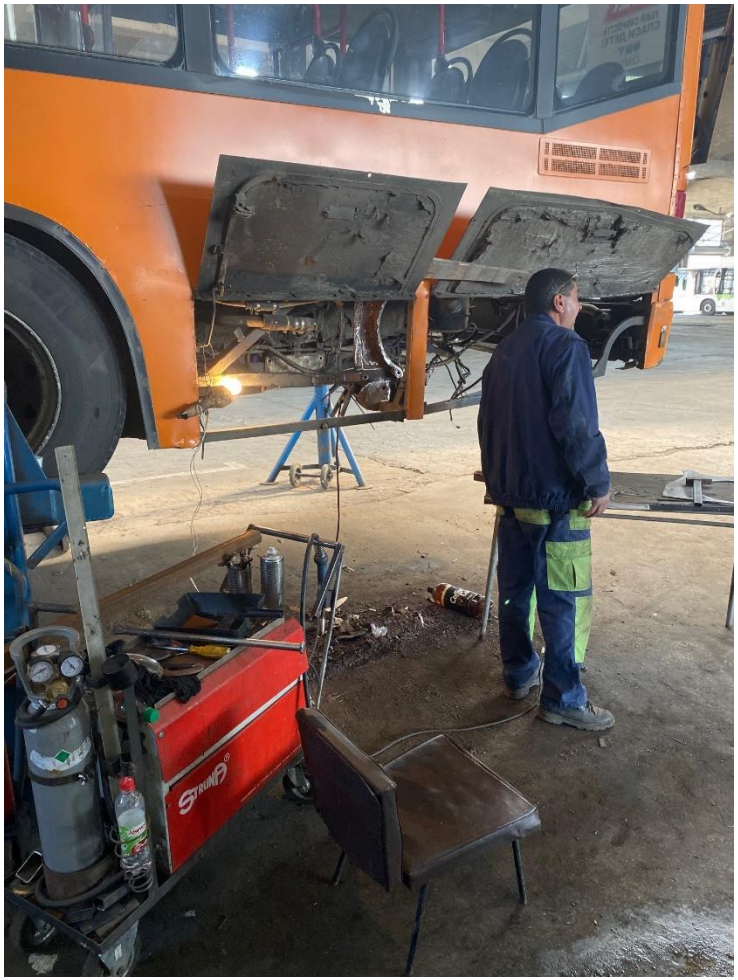
2 buses are currently at the repair garage.

1 of them will probably be retrofitted.

Sofia Controlled Fleet Model

https://www.lifegystra.eu/

Some photos



Future lifelong compliance

Integrating Remote Sensing in periodical inspections

- Current PTIs in Europe
  - ↑ Safety of the vehicles
  - ↓ Emissions of the vehicles
- Current Regulation: Control Real-Driving Emissions

Why use Remote Sensing to improve vehicle emission inspection?

1. It rescues the importance of the PTI in environmental protection
2. It aligns with what the European Union asks (and CITA recommends)
3. Opus RSD is the only ISO-17025 accredited system worldwide
4. Cheap and fast technology to measure exhaust emissions

Future lifelong compliance

From periodical inspections to continuous inspections

RDE monitoring

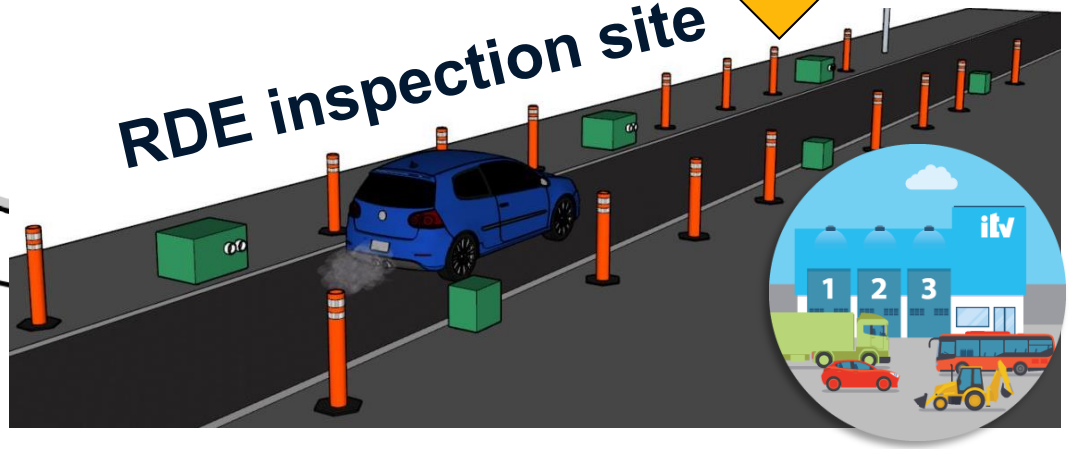
ISO-17025 portable laboratory

Ok

High-Emitter identification

Notification letter

RDE inspection site



High-Emitter

Repair!!

Krakow and Remote Sensing

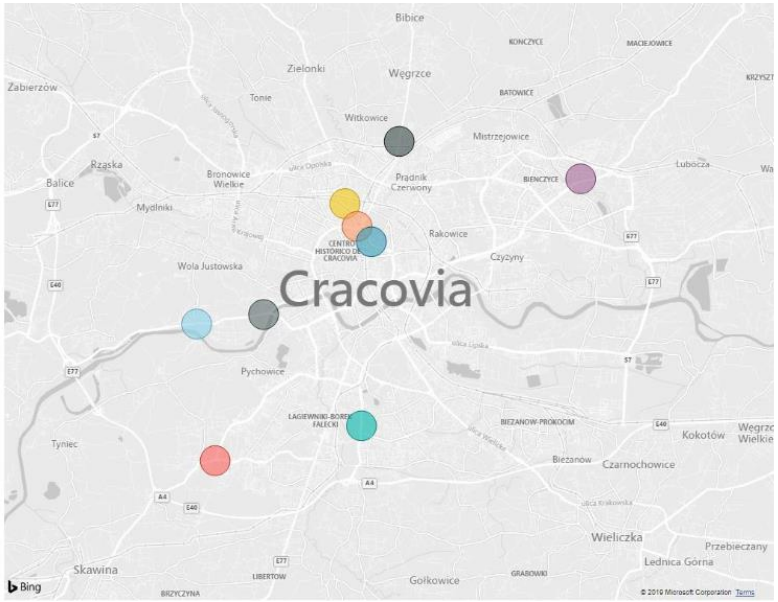
https://www.lifegystra.eu/

Available in this link

http://mobilnykrakow.pl/wp-content/uploads/2019/12/Badania-spalin-Krakow_final.pdf

Site Description
- CALLE JERZEGO TUROWICZA 13
- CALLE 29 LISTOPADA
- DOKTORA JOSEFA BABINSKIEGO, 30-393
- DOKTORA TWARDEGO
- KSIECIA JOSEFA 65,30-206 KRAKOW, POLON
- KSIECIA JOZEFA/JODLOWA
- PAWIA STREET
- VIA DE TRANVIA CALLE KOCMYRZOWSKA
- WITA STWOSZA BUS STATION

Lokalizacje punktów pomiarowych



Krakow and Remote Sensing

https://www.lifegystra.eu/

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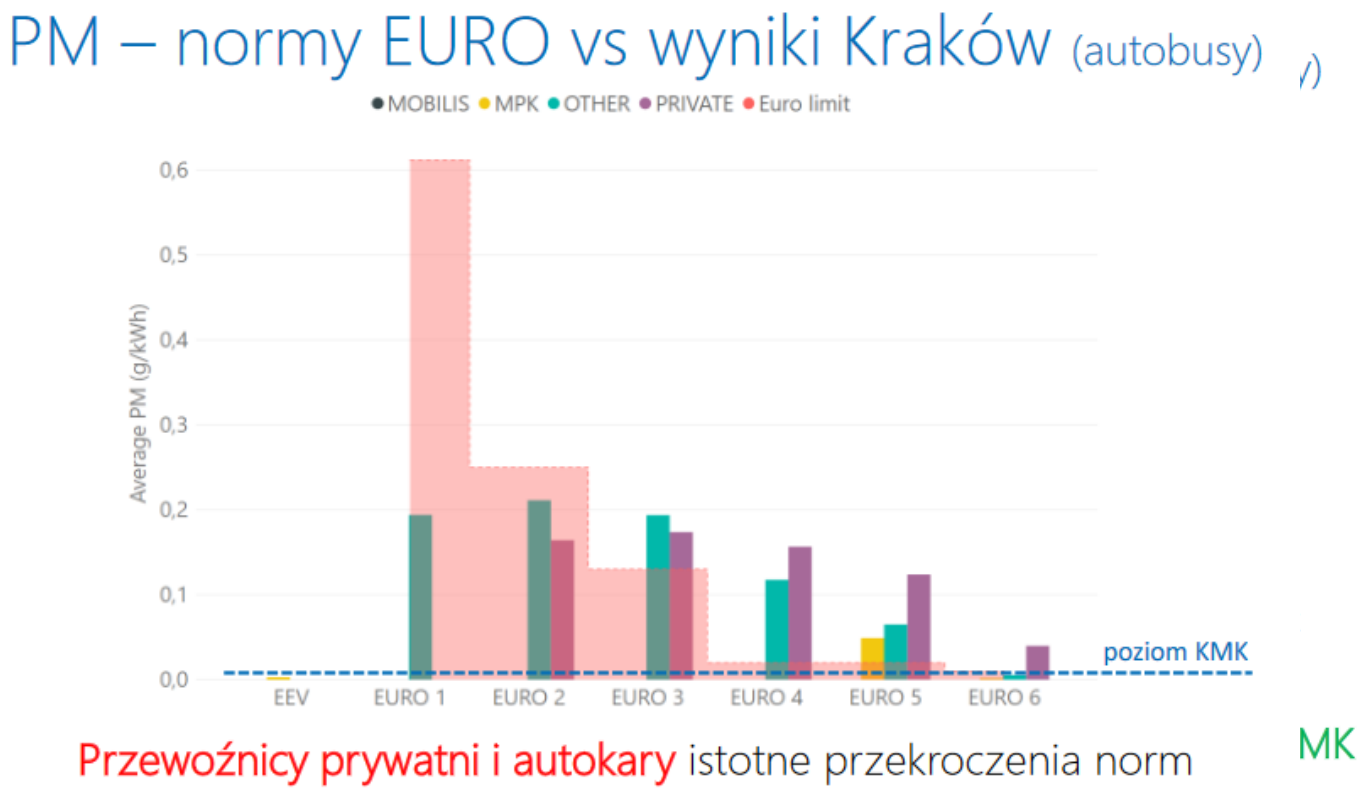

Key Notes

1. The RSD+ can **massively measure and analyze** real-world traffic emissions

2. Cities **can use the RSD+** to identify **High-Emitters** and send then for extraordinary **PTIs**

3. The RSD+ is a tool for authorities to **identify tampered vehicles**.
   In the case of trucks, identifying tampering might save up to
   1 Ton / year and / truck

4. The RSD+, applied to **control public fleets**, can help to reduce up to 20% exhaust **emissions** and 5% the **fuel consumption**

5. The RSD+ can reinforce PTIs by **screening** Real Driving Emissions in a **wide urban area** in a **cost-effective** way

Thank you for your attention

For general issues:

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