OPUS REMOTE SENSING

Sensing and control of
real-world traffic emissions

www.opusrse.com

01

ABOUT US

Remote sensing experts

About us

OPUS - Global leader in the Vehicle Inspection and Intelligent Vehicle Support markets

OPUS

Nasdaq Stockholm

Vehicle inspection

- Opus Inspection
- Opus Remote Sensing
- Opus VTR

Intelligent Vehicle Support

- Opus IVS

About us

OPUS REMOTE SENSING

The world's only ISO-17025 accredited company for the remote measurement of real-driving vehicle emissions

Acreditación

ENAC
Entidad Nacional de Acreditación

Otorga la presente / Grants this

ACREDITACIÓN
1035/LE2117

a la entidad técnica / to the technical entity

OPUS REMOTE SENSING EUROPE, S.L.

Según criterios recogidos en la Norma UNE-EN ISO/IEC 17025, para la realización de Ensayos en el Sector Industrial definidos en el ANEXO TÉCNICO adjunto.
According to the criteria in UNE-EN ISO/IEC 17025 for the performance of Test in the Industrial Sector as defined in the attached Technical Annex.

Fecha de entrada en vigor / Coming into effect: 10/01/2014

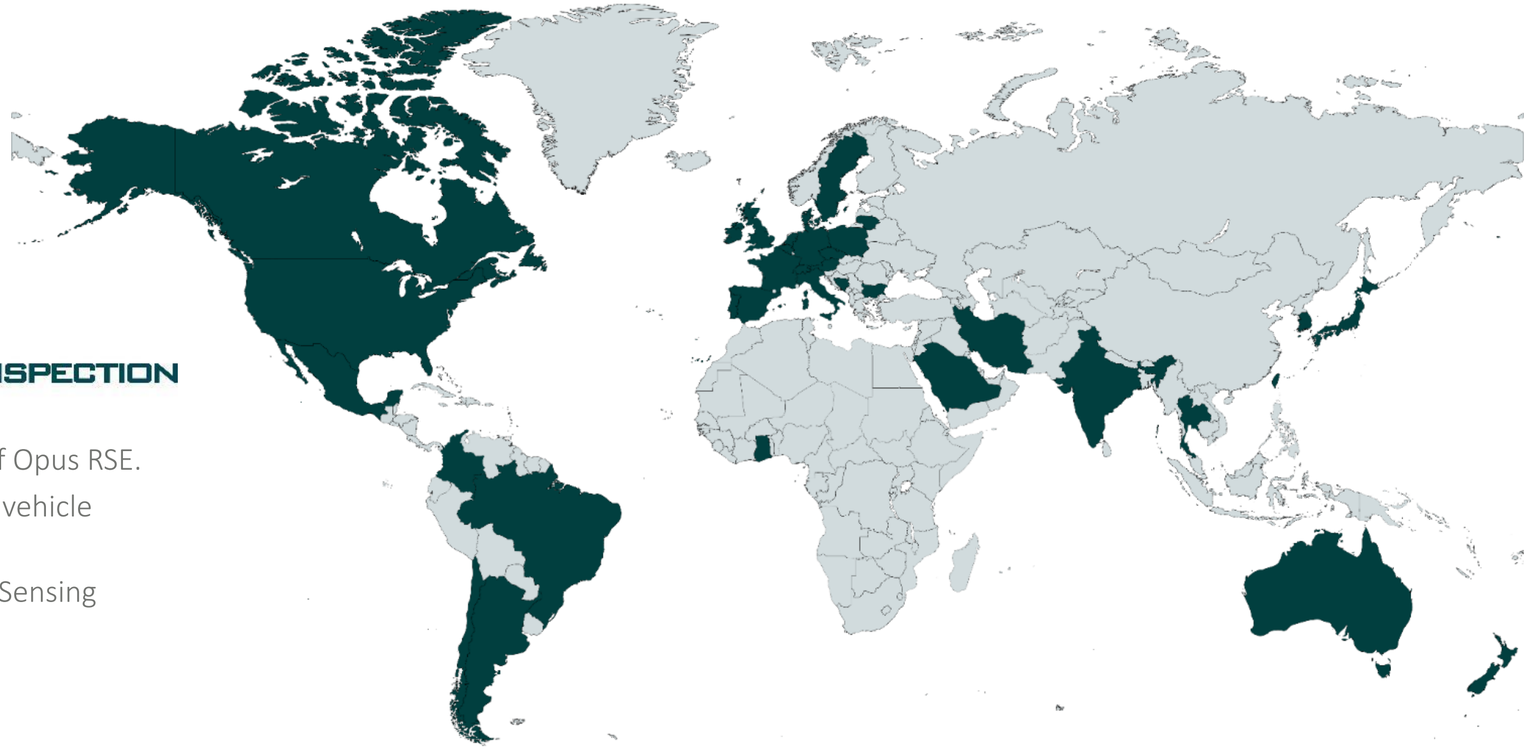
D. José Manuel Prieto Barrio
Presidente

Key value offering

- Provider of unique remote sensing **technology**
- Provider of **services** for the measurement & control of road traffic emissions
- Provider of **solutions**: consulting, research, traffic intelligent systems, smart city solutions, Low-Emission Zone technology…

About us

OPUS REMOTE SENSING



OPUS INSPECTION

- Major shareholder of Opus RSE.
- 85% market share in vehicle inspection in the US.
- Operator of Remote Sensing programs in the US.

OPUS | RSE

- Headquarters.
- ISO17025 laboratory.
- Production centre.
- Logistics centre.

Experience in the 5 continents. Millions of vehicles analyzed every year.

02

OPUS | RSE

TECHNOLOGY

Vehicle emissions remote sensing devices

Real-time analysis of each vehicle’s driving emissions

Emissions

Speed & acceleration

License plate

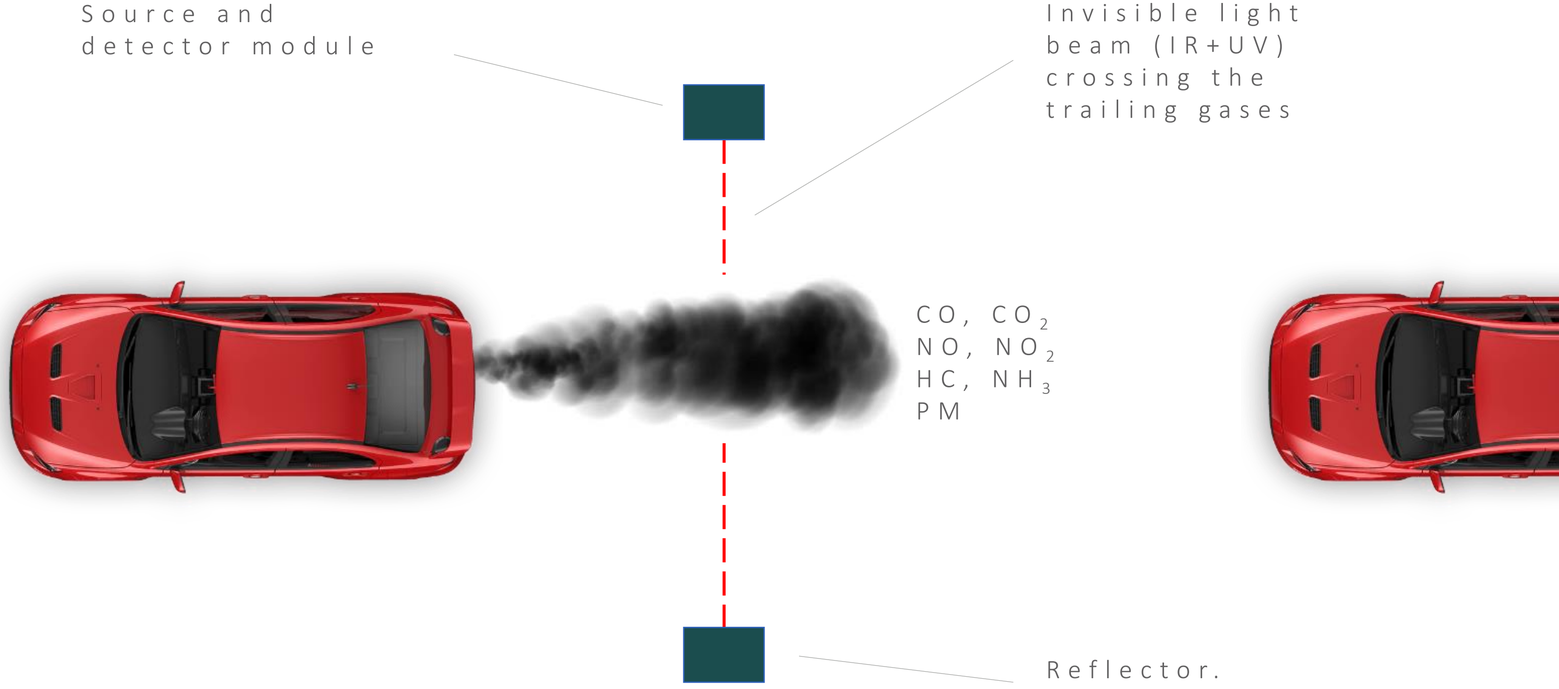
Ambient conditions

Real-time data transfer

TECHNOLOGY

OPUS REMOTE SENSING TECHNOLOGY

Automatic and remote analysis of each vehicle's emissions in free-flow circulation



TECHNOLOGY

PORTABLE

For flexible & itinerant monitoring.

It can monitor more than 1 lane.

- The most widely used remote sensing instrument in the world.
- No road modification. No preparation. No infrastructure. Quick & easy setup.
- Internal batteries for 20-hours continuous operation. 4G/5G data transfer.
- Deployed & calibrated in 20 minutes. A few devices can cover a whole territory.

TECHNOLOGY

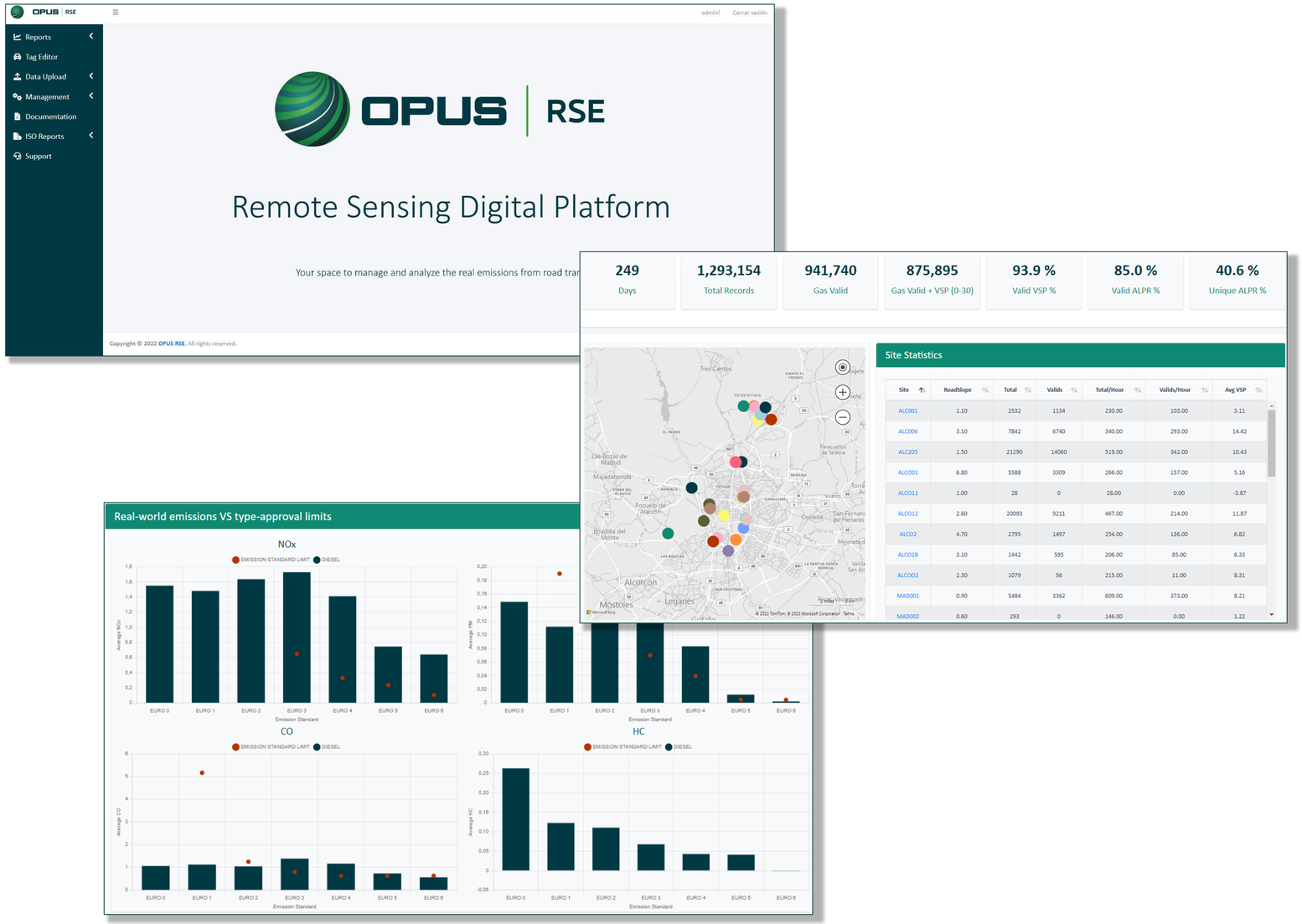
FIXED

For 24/7 monitoring at key locations.

Integration with other sensors and communication systems.

It can monitor more than 1 lane.

- Remote Sensing **cabinets** to measure in a fixed location. Fully autonomous.
- Especially appropriate to control access ramps into motorways or Low-Emission Zone access streets.
- Different options. The cabinets are customized.



TECHNOLOGY

REMOTE SENSING DIGITAL PLATFORM

A platform for the comprehensive processing and analysis of real-world traffic emissions.

It allows to analyze emissions globally, inside a city or a territory, and individually, looking into the individual detailed emissions of each vehicle.

Real Data. Valuable insights. Smart decisions.

03

SOLUTIONS

Real data, real solutions

REMOTE SENSING SOLUTIONS

1

Real-world emissions characterization

Real data, smart decisions

2

High & Clean screening

Identification and control of individual extremely polluting vehicles or rewarding the cleanest vehicles in the fleet

3

Roadside inspections

Real-time police enforcement on illegally manipulated vehicles

4

Fleet control

Monitoring of specific fleets

5

Urban access schemes

LEZ and smart tolling

6

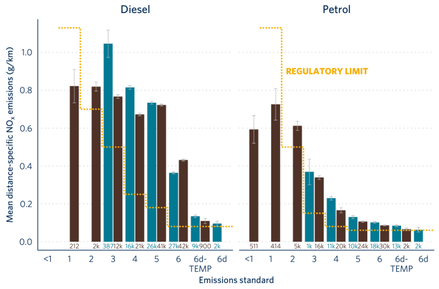
Smart City Solutions

Digitalization and connectivity

SOLUTION #1

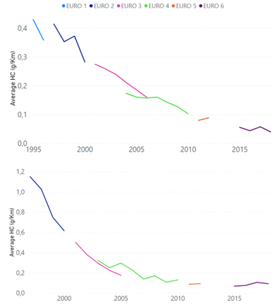
REAL-WORLD EMISSIONS CHARACTERIZATION

Measurement and analysis of actual traffic emissions in a territory to make better decisions

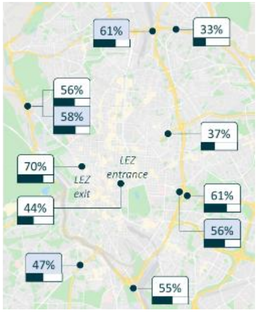


Market Surveillance

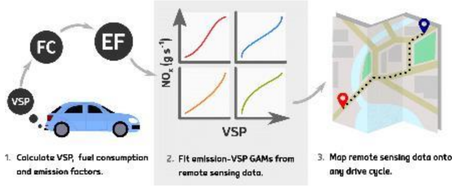
Vehicle groups studies



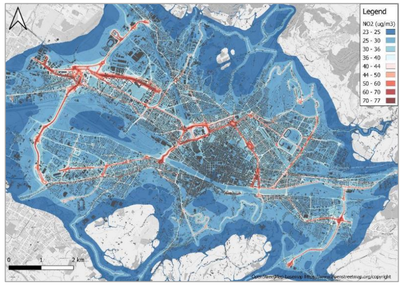
Deterioration & tampering



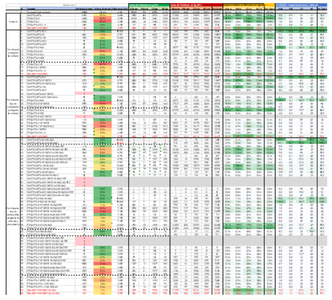
Hybrids performance



Update Em. Factors



Improve AQM

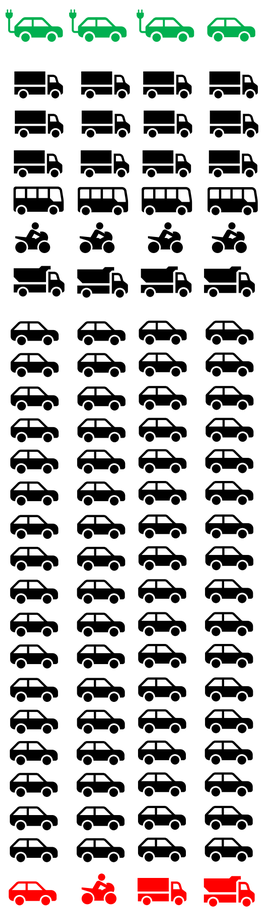


Simulate scenarios

Design new policies

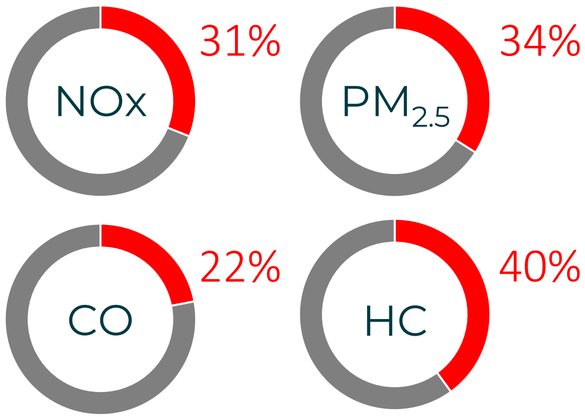
SOLUTION #2

HIGH & CLEAN SCREENING



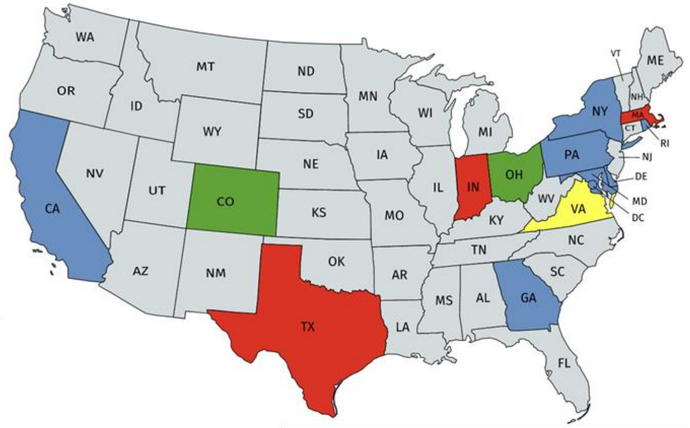
1 – 5 % of the vehicles are **very clean**

The typical **contribution** of these few vehicles to **total urban traffic emissions** is very large:



1 – 5 % of the vehicles are **extremely pollutant**

- High-Emitter identification programs
- Low-Emitter identification programs
- 'Total Screen': Identification of both the Cleanest and Dirtiest vehicles
- Different traffic and fleet monitoring programs

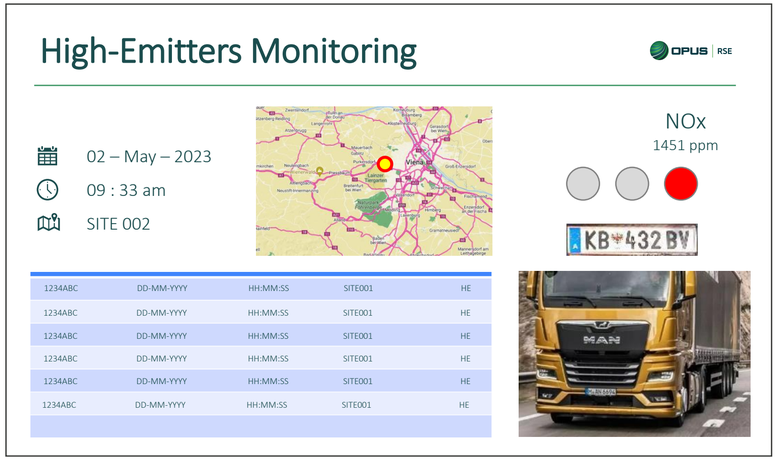


- ✓ Countries like China, Hong Kong, South Korea and USA include vehicle remote inspection.
- ✓ Different studies have shown the effectiveness of these programs.
- ✓ Recent cost-analysis studies have shown that the benefits of this programs outweigh the costs of the program and the costs of repairing the vehicles.

SOLUTION #3

ROADSIDE INSPECTIONS

Using the RSD as an alert system

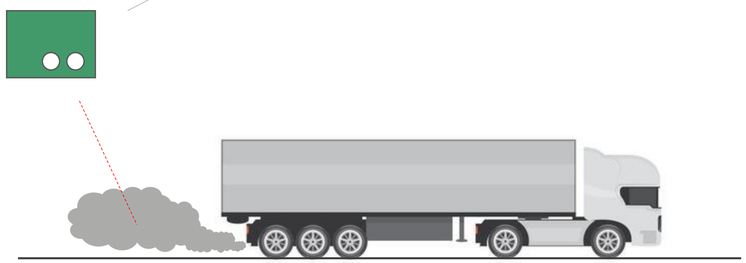


1 The RSD measures the vehicle's pollutant emissions

2 If it is identified as a potential tampered vehicle, an alert is emitted to the police

3 The truck picture and license plate is included in a monitoring system. This info is stored so that all high-emitting trucks can be controlled later

4 The police can pullover the truck, or intercept it, in any other place. ALPR cameras can be used to track the vehicle after its identification



SOLUTION #4

FLEET CONTROL

Continuous monitoring and predictive maintenance. Examples of some success stories

Employees' cars

GRUPOMASMOVIL

Employees and leased vehicles with high emissions were identified. Some were repaired and others were converted to electric. The reductions achieved by the company were quantified. This action helped the company to become a B-Corp and CO_2 neutral company.

More info

Trucks

MAHOU SANMIGUEL

The emissions of the heavy vehicle fleet are audited every 1 to 2 years in Spain's main logistics center. The company itself thus audits whether its fleet of vehicles is increasingly respectful of air quality. Individual high-emitting trucks are identified, and the company investigates the vehicle and the subcontractor.

Public buses

TRANSPORT SCOTLAND · RICARDO Ricardo Energy & Environment

The Scottish Government spent millions of pounds retrofitting older buses in the hope of reducing their emissions. Ricardo E&E used Opus RSDs to measure actual emissions, finding discrepancies against plan.

More info

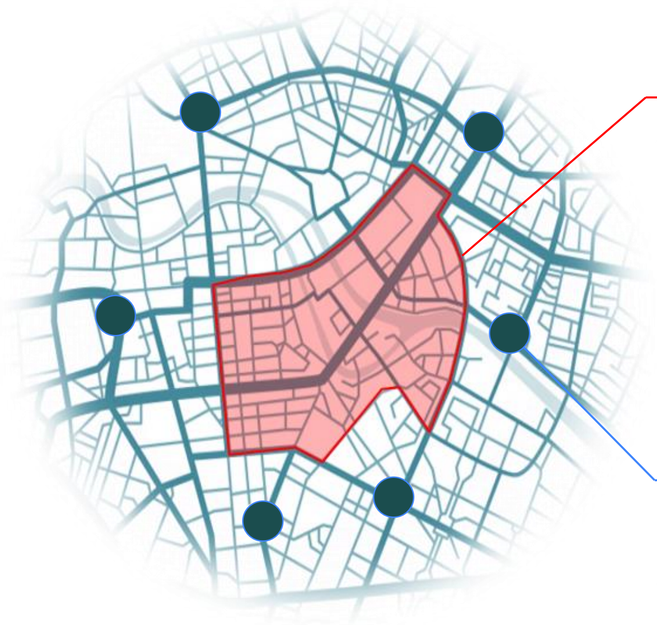
Urban delivery vans

MERCADONA · Dualfuel ECO SOLUTIONS

We evaluated the real-driving emissions of Mercadona delivery trucks in different configurations: original diesel engine, LPG-transformed and CNG-transformed. The company responsible of the retrofitting was DualFuel, who applied their propietary "Duel Fusion" modifications. The results showed reduced hydrocarbon and NOx emissions by a factor of up to 3.

SOLUTION #5

URBAN ACCESS SCHEMES



Low-Emission Zone

All entry points are controlled by license plate reading cameras.

Integrated platform for continuous enforcement

Remote Sensing Network

Fixed, portable and semi-fixed sensors monitor all road traffic on a metropolitan scale

High-Emitter

Restricting entry, parking or increasing access fees

Low-Emitter

Positive actions, such as allowing temporary access or reducing access or parking fees

Access restrictions

A) By vehicle type and age

If the vehicle is very old, it is considered to be too polluting, and its access to city center is restricted.

B) By real-driving emissions

Alternatively, and even complementary to the previous method, empirical measurement by the RSD can be used to fine-tune access policy: fairer and more effective restrictions.

Charging methods

An urban toll can also be implemented to charge the entrance to the city. The emission levels of each vehicle can be a factor in increasing or decreasing the fee.

SOLUTION #6

SMART CITY SOLUTIONS

Integration with other sensors

- Combined measurement of noise and emissions for each vehicle
- Combination with DAVAO: emissions per passenger
- Integration with ALPR camera network

VIDEO

Real-time information

- To check the status of each RSD and analyse the data in real time
- Personalised messages to the driver's smartphone or to vehicle’s OBU
- Variable message board signs within metres of the RSD

VIDEO

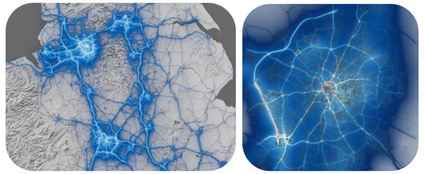
Integration with Traffic Modelling & Management

- Modelling and simulation of traffic emissions from real-world emissions data
- Integration with traffic centre or integrated management platforms

VIDEO

Integration with Air Quality Modelling

- Realistic and very detailed emission factors for each vehicle group
- RSD-enhanced dispersion models for better prediction and modelling of air quality



More info

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Real Measurements.
Efficient solutions.

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