Understanding real-world driving emissions

Outdoor air pollutants, such as nitrogen dioxide and particulate matter, continue to exceed air quality standards in many towns and cities. Globally, nearly 4 million people die as a result of exposure to outdoor air pollution every year. In the UK, air pollution is linked to 40,000 early deaths annually.

Vehicle emissions are the primary cause of air quality standard exceedances in the majority of UK Air Quality Management Areas. Increasing pressure to reduce the impact of pollution from vehicles has led to growing interest in the implementation of strict 'Clean Air' and 'Low Emission Zones'. However, such mitigation measures are expensive to design and implement, and are often politically unpalatable due to difficulties in garnering public support.

To aid transparency and maximise the cost-effectiveness of low-emission policy development, it is critical that decisions are underpinned by high-quality, location-specific, and up-to-date information.
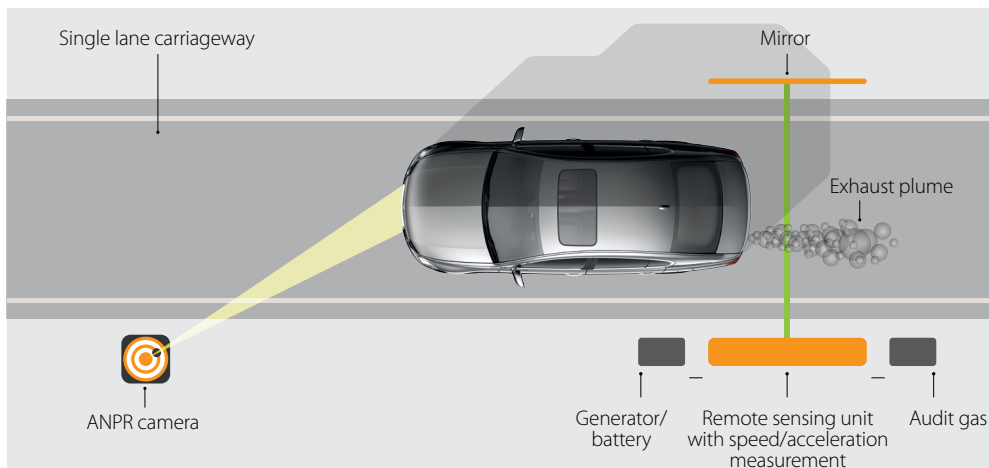
Ricardo Energy & Environment and its technology partner OPUS Inspection, use state-of-the-art vehicle emission measurement technology to ensure that policy focuses on only the most polluting sectors of the vehicle fleet. By accurately measuring real-world driving emissions, we deliver the local insight necessary to inform the cost-effective design of low-emission policy.

Understanding real-world driving emissions

Vehicles driven under real-world conditions produce much higher emissions than under traditional laboratory-based test procedures. In particular, diesel vehicles produce significantly higher emissions of nitrogen oxides under real-world conditions. Such discrepancies have resulted in pollution reduction policies failing to deliver the benefits originally anticipated and uncertainty over how to develop optimum mitigation measures.

To address this problem, and to ensure that the development of future low-emission policy is effective, accurate measurements of real-world driving emissions are needed.

Single lane carriageway

Mirror

Exhaust plume

ANPR camera

Generator/
battery

Remote sensing unit
with speed/acceleration
measurement

Audit gas

Remote sensing technology

Our remote sensing equipment accurately measures real-world driving emissions from thousands of vehicles, under actual driving conditions, in a short space of time and without interfering with the vehicle whose emissions are being measured.

Our systems are configured to measure real-world driving emissions of nitric oxide, nitrogen dioxide, particulate matter, hydrocarbons, carbon monoxide and ammonia. Bespoke measurement campaigns are designed to explore real-world driving emissions at locations selected to maximise the benefit to the design of low-emission policies.

Why Ricardo Energy & Environment?

For many decades, our specialists have been helping clients to address the challenges of air pollution. Moreover, Ricardo has world-leading expertise in vehicle emissions measurement including an advanced Vehicle Emissions Research Centre and extensive expertise in the use of Portable Emissions Measurement Systems. Our deep understanding of and expertise in vehicle emissions, air pollution in general and vehicle emissions remote sensing supports:

• The design and development of cost effective, evidence-based, Clean Air and Low Emission Zone strategy and pollution mitigation schemes through:
  - Real-world driving emissions measurements that accurately characterise the vehicle fleet mix, identifying the most polluting vehicle types (i.e. buses, heavy goods vehicles, vans and cars) and their respective contributions to emissions.
  - Quantified and highly disaggregated emissions data to underpin robust mitigation measures.
  - Assessing abatement technology performance over time.
  - Measurement data to support compliance management within Clean Air and Low Emission Zones.
• The improvement of local air quality emissions inventories and modelling through:
  - The provision of vehicle-emissions data that are consistent with existing vehicle classes used in emission factor and emission inventory development.
  - Accurate road traffic counts and detailed vehicle information via automatic number plate recognition (ANPR).
  - The delivery of insights such as the fraction of primary nitrogen dioxide emissions and the potential for ammonia emissions from modern selective catalytic reduction technologies.
  - Significantly reduced modelling uncertainty for baseline and mitigation scenarios by removing assumptions and replacing them with evidence-based, real-world driving emissions information.
  - High-volume sample sizes, at multiple locations, ensuring the evidence base is representative of the fleet in the area of interest.
  - Optimisation of model performance at key road links.

To understand how we can support your low emissions policy development, and improve your inventory and modelling tools, adding confidence to your local decision-making, please contact one of our experts at
enquiry-ee@ricardo.com or +44 (0) 1235 753000