Partnership IFPEN Transports Energie Carnot Institute - Capelec

REAL-e is a smart, on-board connected system for measuring pollutant emissions in real traffic conditions

REAL-e is the result of synergies unlocked between Capelec's gas analysis expertise and pollutant emission models developed by Carnot IFPEN Transports Energie. It makes it much easier to produce exhaustive and reliable mass measurements of car pollutant emissions that are independent of the figures produced by carmakers.

Supporting Innovation

Roadworthiness testing of passenger cars in France uses exhaust gas analysers that measure a tiny part of the gas emissions of a stationary vehicle. These systems are incapable of measuring pollutant emissions based on traffic conditions, driving style or type of journey. REAL-e is no bigger than a suitcase but it contains an exhaust gas analyser (CO, CO2, NOx, PN, NH3) connected to an EOBD dongle which reads the vehicle's settings and geolocalises and collates the data before sending it to the cloud. These measurements are then merged with digital emissions models and the resulting data is enriched, contextualized and compared to the emissions of the vehicle's "nominal digital twin". The tested vehicle may then be either "passed" or sent back for additional testing. REAL-e provides a cost-effective solution for measuring vehicle emissions under real conditions, for vehicle development, market surveillance or "in-service conformity" pursuant to RDE regulations (Real Driving Emissions). REAL-e measurements can be usefully positioned between a "pollutant radar" (i.e., quick and simple but one-off and not very accurate) and the measurements used for accreditation purposes (PEMS: Portable Emissions Measurement System).
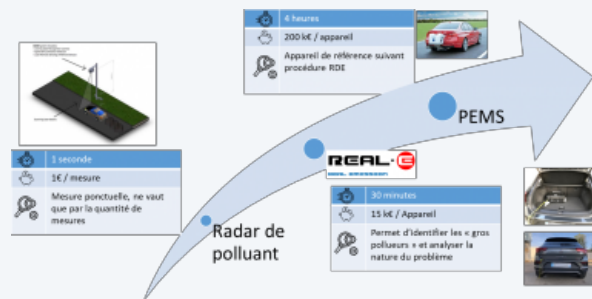
The client needs

Capelec has been supplying vehicle test centres with measuring instruments and test benches since 1989. This SME is renowned for the quality of its exhaust gas analysers and it has now began to focus on measuring pollutant emissions in real situations as required under the most recent regulations. Raw data needs to be re-contextualized and rounded out so that it can be compared to benchmark data. This digital step has been made possible by Carnot IFPEN Transports Energie algorithms for calculating pollutant emissions with GPS trace, which may be used to determine whether or not a vehicle is compliant. At the end of the test – which doesn't last long and is unconstrained by having to follow a pre-defined circuit – the equipment may easily be removed from one vehicle and attached to the next. Big polluters or non-compliant vehicles are identified very quickly. REAL-e came away with the Grand Prix at the Auto Equipment Innovation awards.

Partnership

Carnot IFPEN Transports Energie has been partnering the sustainable mobility challenges of big and small operators since 2006. It markets Geco Air, the free smartphone app developed by the French Agency for the Environment and Energy Management (ADEME) which allows motorists to visualise the pollutant footprint of their different journeys. Using vehicle specifications and journey parameters, Geco Air's mathematical models provide an estimate of gas and particulate emissions and fuel consumption. The app delivers a "mobility score" out of 100, complete with tips on how to reduce the driver's environmental footprint. This anonymised data is also used to improve infrastructure and traffic regulations. In this partnership, the Geco Air algorithms and Capelec analyser have been adapted and used to co-develop REAL-e. This is a simpler, cheaper and faster system than those currently being used and is a first step in identifying vehicles that are big polluters under real conditions. REAL-e gives this Montpellier-based SME a clear edge over the competition in the emerging market of "in-service conformity" and market surveillance together with very attractive growth prospects.