Outlook

Key technologies to fulfill possible post-Euro 6 requirements include advanced thermal management, further cold-start emissions reduction and further catalyst development.

Reference


Project

The aim of the project was to develop a diesel demonstrator car with consistently low NOx emissions.

Technologies

A combination of proven NOx emission control technologies was implemented together with a mild-hybrid system on a C-segment diesel passenger car.
Improvement in emissions of Nitrogen Oxides (NOx)

In the project we demonstrate that improvements below the Euro 6 limit of 80 mg/km can be achieved, including at low speed representative of urban driving and at high speed representative of motorway driving.

Vehicle

The base vehicle is a C-segment mild-hybrid car equipped with a pre-RDE diesel engine (Euro 6b) of 1.5l.

Overall deNOx performance

Particle Number (PN)

Level is between 10^9 and 10^{10} particles/km, orders of magnitude below the Euro 6 limit.

Emissions tests conducted

In addition to regulatory emissions tests (WLTC and RDE), different tests were conducted on the road and in the laboratory to cover urban (Berlin and Transport for London interpeak cycle), uphill (driving in the Harz area of Germany, up to 700 m) and motorway driving around Berlin (vehicle speeds up to 160 km/h).

Hybrid system

The 48V mild-hybrid system originally in the base vehicle, was also used for thermal management, enabling low urban emissions.

Exhaust aftertreatment system

How a combination of technologies can enlarge the overall system deNOx performance:

Urban emissions control

Motorway emissions control

Achieving high NOx conversion rates, while preventing NH3 slip was achieved via a model-based closed-loop control software.

Vehicle

Fahrzeugbeschriftung Ultra-Low NOx Renault Scenic Maßstab 1:10
Bitte am Fahrzeug einmessen!

Overall deNOx performance

91-95% deNOx
95-99% deNOx

Emissions tests conducted

48V Battery and Cooling System
48V Electric Machine (Mg, Phasing Pulley and Belt)

Hybrid system

LNT: Lean NOx Trap
ccSCR: close-coupled SCR
ufSCR: underfloor SCR
SDPF: SCR on Diesel Particulate Filter
ASC: Ammonia Slip Catalyst
RDE: Real Driving Emissions
WLTC: World harmonised Light vehicle Test Cycle