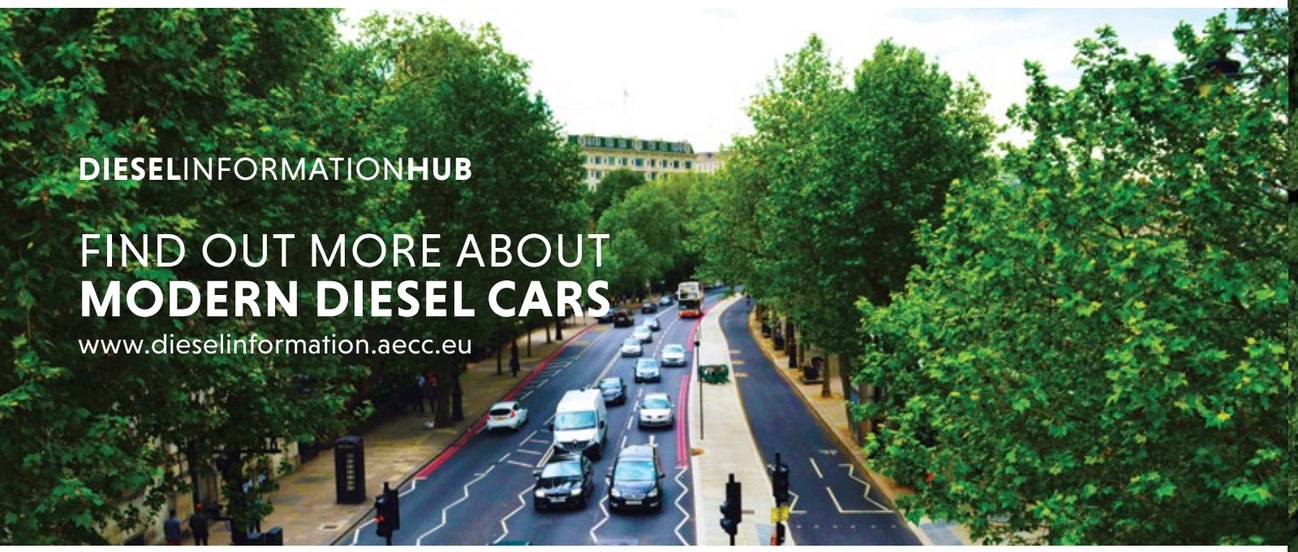
ASSOCIATION FOR EMISSIONS CONTROL BY CATALYST

Outlook

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

Reference

"Integrated Diesel System Achieving Ultra-Low Urban and Motorway NOx Emissions on the Road", J. Demuynck, et al.; 40th International Vienna Motor Symposium, 15-17 May 2019



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MODERN DIESEL CARS
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Ultra-Clean Diesel

Ultra-low NOx mild-hybrid

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.

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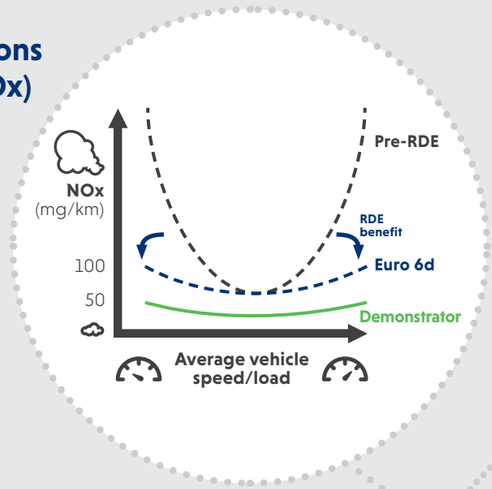
Improvement in emissions of Nitrogen Oxides (NOx)

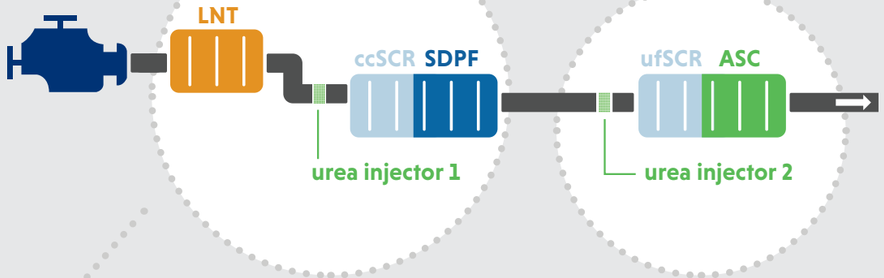
In the project we demonstrate that improvements **below the Euro 6 limit of 80 mg/km** can be achieved, including at low speed representative of urban driving and at high speed representative of motorway driving.



Vehicle

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

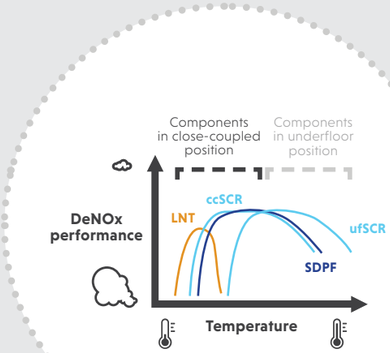
Exhaust aftertreatment system



Urban emissions control

Motorway emissions control

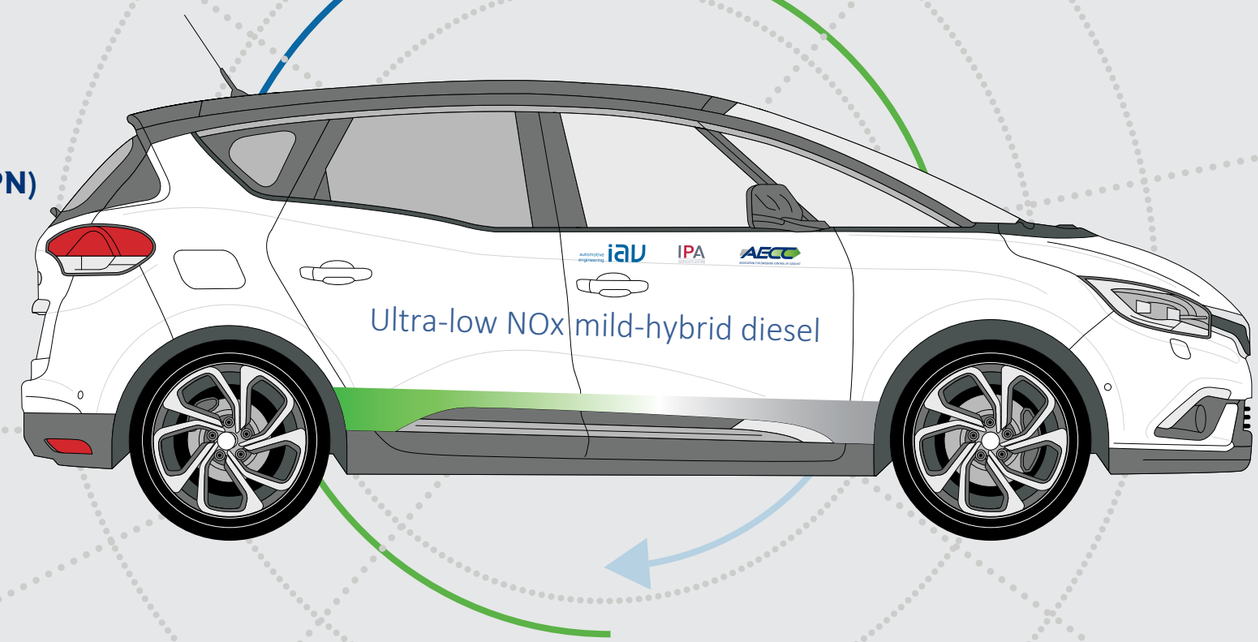
How a combination of technologies can enlarge the overall system deNOx performance:



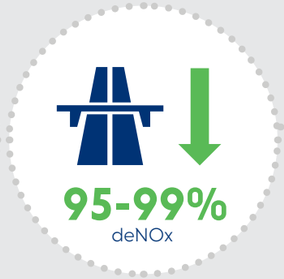
Achieving high NOx conversion rates, while preventing NH_3 slip was achieved via a model-based closed-loop control software.

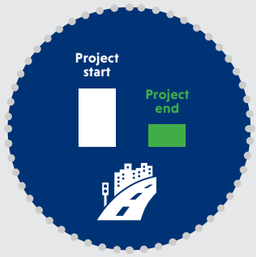
Particle Number (PN)

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



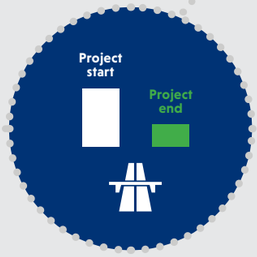
Overall deNOx performance





Urban

Hilly



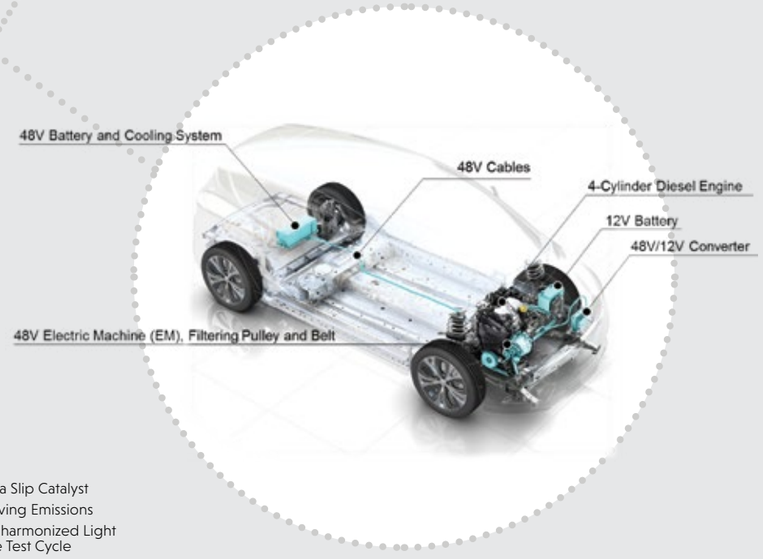
Motorway

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.



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