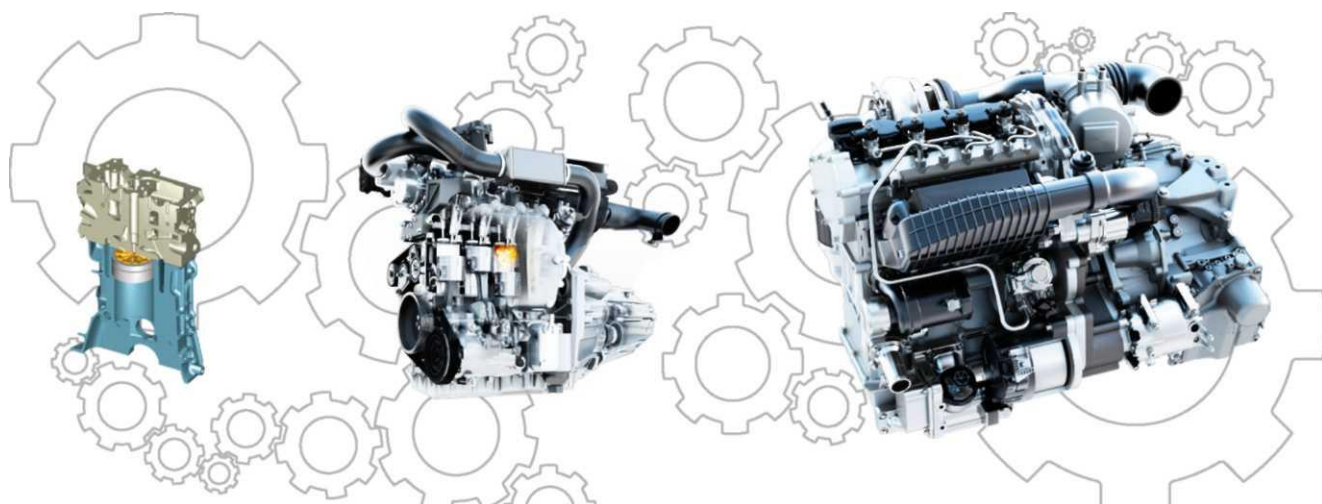




Get the most out of diesel: optimal fuel efficiency and lowest emission levels

FROM COMBUSTION CONCEPT TO FULLY INTEGRATED SOLUTION

Having the system-based advantage of greater fuel efficiency, diesel-powered engine drive systems remain integral to meeting future fleet CO₂ emission targets in a cost-efficient manner. Even if a cost-benefit analysis poses a challenge in smaller vehicle segments, the persistent trend toward SUVs and cross-over models does highlight the necessity of a cost-efficient drive unit based on higher-efficiency diesel combustion.

SYSTEM SIMULATION DELIVERS KEY BENEFITS IN TERMS OF QUALITY AND TIME

Early on in development, the use of CFD-assisted simulation allows the evaluation of different combustion concepts. Common parameters, such as swirl number, number of holes, nozzle projection or the shape of the bowl or injection patterns, can so be assessed and pre-selected well before the testbed phase. This ensures consumption and emission-optimized combustion definition within a shorter period of time and in enhanced

quality. Apart from dealing with emission optimization, testbed development also focuses centrally on the temperature management systems needed to create the best possible conditions for downstream exhaust gas aftertreatment. This guarantees the perfect trade-off between raw emission reduction, combustion efficiency and tailpipe emissions. The phase is accompanied by model-based simulations, ensuring that the selected system is ideally adjusted to suit a maximum range of driving conditions and climate-related boundary conditions.

SYSTEM INTEGRATION: COMPONENT AND CUSTOMER BENEFIT OPTIMIZATION

Once the engine hardware as well as the aftertreatment components are available, the focus turns to system integration, also in view of customer-relevant attributes such as drivability or NVH. Here, too, AVL's own tool chain provides invaluable services when it comes to performing an objective assessment of drivability and

noise aspects at an early stage. Added electrification not only supports the diesel where consumption and driving pleasure are concerned. It is also fundamental to lowering emissions further. So, particularly where electrified diesel drive systems are concerned, it is crucial to develop the required operating strategies optimally at an early stage.

Only by ensuring early simulation-assisted system definition and continued system optimization will it be possible to overcome the ever-increasing complexity of future development tasks efficiently. At a very early development stage, the real-world driving environment is transferred to the testbed, i.e. the model-based development environment.

Without neglecting the optimization of details, this integral approach will enable the continued development of diesel-powered engines, which make a significant contribution toward cost-efficient fleet CO₂ emission reduction combined with minimal emissions also under real-world conditions. □

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