

Fuel Consumption Potential for Passenger Car Diesel Engines beyond EURO 6

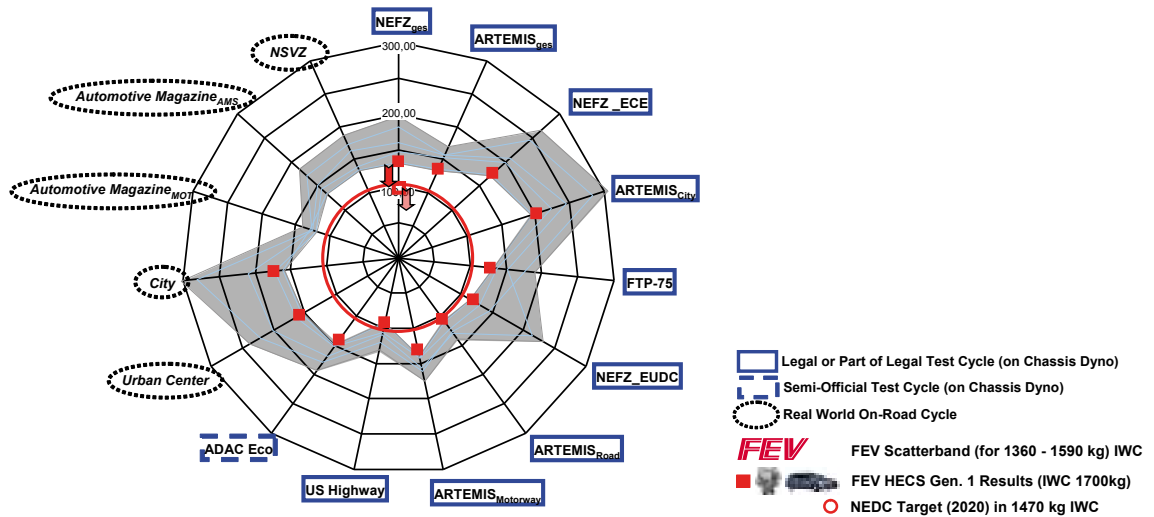


Fig. 1: Overview about the Fuel Saving Potential of a Comprehensive Diesel Engine Concept with Integrated Hybrid Functionalities

Today, the modern passenger car Diesel engine provides a vehicle propulsion system that affords the highest efficiency and lowest CO₂ emissions for passenger vehicles and offers an advantageous basis to achieve future stringent legislation requirements.

The key element in a successful strategy to simultaneously meet challenging CO₂ targets and increasingly strict emission limits is an intense focus within the relevant operational area towards manageable and beneficial operating points. Regarding the combustion process, the essential aspects for realizing this parallel strategy are load point shifting (e.g. by downsizing and downspeeding) and the implementation of electric propulsion assistance. Optimized fuel consumption and emission performance of the base engine, requires combined optimization steps in engine mechanics and thermodynamics, together with targeted integrated thermal management to reduce the losses during the warm-up phase.

Additionally, an optimized layout and arrangement of the exhaust aftertreatment components is mandatory to improve the actual real-life fuel consumption. This avoids costly heating measures to improve the conversion efficiency. Regarding the additional hybridization, a prior fine-tuning of the operational strategies, which considers the engine emission characteristics is inevitable. This includes the utilization of modern development tools and is based on detailed knowledge and experience with existing engine concepts and aftertreatment systems (Fig. 2).

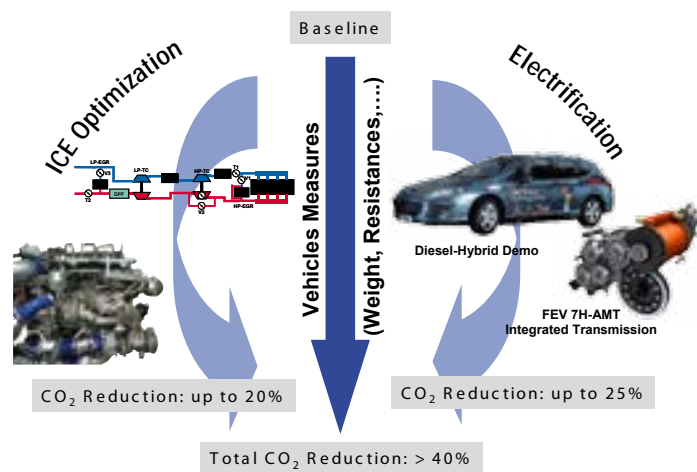


Fig. 2: Combined Strategy for Realization of Challenging CO₂-Targets

The potential of such integrated hybrid diesel engine concepts has been investigated by FEV for current and potential future drive cycles. FEV's HECS (Highly Efficient Combustion System) diesel engine concept already accomplishes very competitive emission levels for a vehicle in the 1700 kg IWC (Inertia Weight Class), with 95 g/km CO₂. This undercuts representative CO₂ emissions for vehicles in the 1360 to 1590 kg IWC and provides the potential to meet 2020 CO₂ emission limits with the appropriate technology upgrades (Fig. 1).

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