



Rolf Brück
Vice President Catalysts & Filters,
Vitesco Technologies

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An Integrated Approach

Life Cycle Assessments (LCAs) are becoming an increasingly important consideration for manufacturing industry and, in particular, for automotive companies. LCAs enable these firms to ensure that their products are environmentally sustainable by focusing on all the environmental influences throughout the entire life cycle of the product (raw materials, production, use, end of life), including infrastructure issues.

This integrated approach is often missing from discussions on the powertrains of the future, where frequently only the tank-to-wheel perspective is considered. This looks solely at the impact of the energy (fuel, electric power) that is converted into kinetic energy in vehicles.

A cradle-to-grave approach would make more sense if we genuinely want to protect the climate and the environment. This consists of a systematic analysis of the environmental impact of powertrains throughout their entire life and considers economic and environmental factors, as well as the existing infrastructure for vehicles with combustion engines and the infrastructure needed for battery electric vehicles.

The initial information on the Euro 7 emission limits, which was made public in November 2020, represents a move in the right direction. Euro 7 can best be described as “a comprehensive limit without conformity or correction factors.” However, the scenario that lies behind it includes

conditions that never occur in reality, only in theory, and that in statistical terms represent irrelevant extremes. No one disputes the fact that vehicles have to comply with the limits even during short journeys in the city and on the highway. But including conditions that are extremely unlikely to be encountered and have no relevant impact on the environment is not constructive and leads to excessively high costs. One example is acceleration under full load at -10 °C immediately after starting the engine. This type of worst case scenario is hardly practicable for vehicles with only a combustion engine or for hybrids.

However, combustion engines supported by electric motors can make a contribution to more climate-friendly mobility if an integrated approach is taken.

In highly dynamic operating states the vehicle is being powered not only by the combustion engine but also the electric motor. This opens up the opportunity for using the engine more often at highly efficient load levels and running the vehicle on the electric motor only in stop-and-go conditions and under light loads.

My conclusion is that during the transition to pure electric mobility, vehicles with hybrid drives will be essential. They not only make use of parts of existing value chains, but also help to protect the climate and reduce CO₂ emissions.