



Wissenschaftliche Gesellschaft für Kraftfahrzeug- und Motorentechnik e.V. (WKM)

WKM e.V. is an association of professors from German, Austrian and Swiss universities who as heads of institutes, heads of departments, or holders of chairs are, or have been, active in the domains of automotive engineering and/or engine technology.

WKM aims to promote science and research, academic teaching, academic studies, and new talent in the fields of automotive engineering and engine technology.

Inspired by the ongoing intense debate on diesel engine and gasoline engine emission issues, WKM e.V. has drawn up the position paper "The Future of the Combustion Engine / Assessment of the Diesel Engine Situation" to provide the interested public based on scientific findings with a review of the current situation.

The Future of the Combustion Engine / Assessment of the Diesel Engine Situation

Last year's fierce debate, with its massive and to some extent justified criticism of diesel engines, has since gained momentum and has even sparked a wider discussion about a potential ban on combustion engines in automobiles.

Wissenschaftliche Gesellschaft für Kraftfahrzeug- und Motorentechnik e.V. (WKM) has viewed these developments with great concern and considers it particularly alarming that biased and rather emotional reporting seems to be replacing matter-of-fact pragmatic information.

Based on the current scientific knowledge, WKM has formulated three key messages related to these issues and to the future of the combustion engine. Additional facts and details are given below.

- a. Combustion engines have been and continue to be the driving force behind mobility, freight transport, and mobile machinery. This role can be complemented, but not replaced, by electrical drives. The technological advancement of drive systems is a prerequisite for a successful climate policy in a prospering society. Bans have the opposite effect. [see Facts and Details 1 and 2]

- b. Due to very low emissions from internal combustion engines the issue of emissions and pollution concentration in-air will be in future no argument against the diesel or the gasoline engine. Even the current state of technology already ensures that pollution limits can be met without exception. Weak points detected in retrospect are no longer relevant to the future. Thanks to intense research environmentally fully neutral combustion engine drivetrains are completely viable. [see Facts and Details 3 to 7]

- c. The particular advantage offered by combustion engines is the efficient and flexible use of fuels with high energy density and excellent storage and distribution options. This basic property has enabled the combustion engine to reinvent itself again and again, and considering the integrated system this enables lower CO₂ emissions in comparison to alternative technologies. The potential to flexibly use non-fossil and hence CO₂-neutral fuels, is another guarantee for a long-term and sustainable technology of the future. [see Facts and Details 7 to 10]

Additional Facts and Details

- 1.) WKM condemns all forms of technical manipulation, for example the use of cycle recognition software, to adjust, without physical necessity, special emission reduction measures that are not active under real operating conditions.
- 2.) WKM strongly supports introduction of the new Real Driving Emission (RDE) regulations in Europe. From September 2017, these regulations will provide clearly defined legal standards in the form of EURO6_{d_{temp}} for recertifications. The RDE Regulations are a great opportunity to help restore lost confidence.
- 3.) For decades, diesel engine development went hand in hand with finding solutions to the nitrogen oxide problem. Hundreds of research projects have aimed to understand in detail the formation of nitrogen oxides (NO_x) and have sought to reduce emissions, and the NO_x emission problem can now be considered as technically solved.
- 4.) The development of automotive passenger car diesel engines focused on the fulfillment of regulations relevant to the NEDC (New European Driving Cycle) certification cycle. The resulting discrepancy between certification limits and real emissions has been publicly known and documented for two decades and will disappear as the RDE regulations are applied.
- 5.) NO_x exhaust gas treatment devices positioned close to the engine is a decisive technological prerequisite in the latest automobile generation, which today already meets the RDE regulations. Numerous measurements on automobiles confirm low NO_x levels.
- 6.) In terms of mean annual air pollution release rates, the emissions contribution from the most modern diesel automobiles, meeting the new RDE standards, is perceptible, if at all, only on heavily trafficked roads and the Diesel engine's contribution is ensured to amount to only a few percent of the NO₂ pollution limit.
- 7.) WKM is critical that public reports have repeatedly contained unreasonably judgmental or even false statements. Diesel engines, for example, are not the only source of particulate matter and contribute only a few percent to dust pollution, with the trend pointing downward. Also the contribution of gasoline engines is very low, and will be reduced even further with the introduction of the RDE regulations and the implementation of particulate filters. NO₂ pollution is decreasing already for more than a decade throughout Germany.
- 8.) WKM is extremely concerned about the trend of discussing a ban on the combustion engine. A ban on combustion engines e.g. from 2030, would have negative effects on fighting climate change. WKM pleads for a holistic and straightforward honest consideration of CO₂ emissions in terms of the supply of energy, and production and disposal of drivetrain systems.
- 9.) Alternative synthetic and biogenic fuels need to be important elements of further CO₂ reduction. Sustainability ensured through the use of renewable electrical energy is decisive for a successful implementation of the energy turnaround. Combustion engines are ideally suited for supporting this development.
- 10.) WKM pleads for competition between drivetrain concepts with the aim of reducing emissions to the limit predetermined by the pollution of the intake air (pragmatically zero). According to all predictions, there will be more combustion engines worldwide in 2030 than today. Continued intense research and development and the preservation and holding of technology leadership are appropriate. WKM predicts a long-lasting need for combustion engines and, in particular, also for diesel engines.

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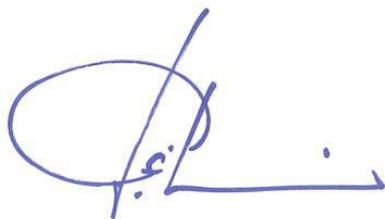
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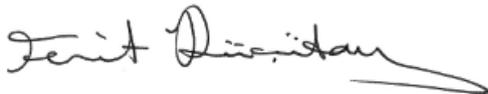
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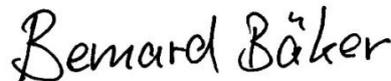
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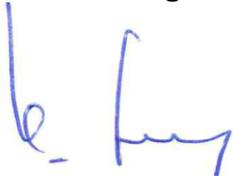
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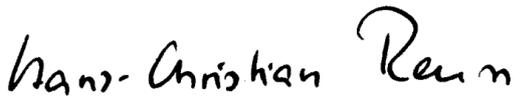
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