



## FVV Newsletter | October/November 2020

The planning groups are the engine room of the FVV: this is where the individual research projects are initiated, discussed and supported. This process, which has been established over decades, fortunately also works very well with digital technologies and creates new opportunities for the FVV as a "join-in association" to achieve an even larger, more international community. Nevertheless, we would have preferred to provide the outgoing / incoming Chairmen of the Scientific Advisory Committee, Dr Tobias Lösche-ter Horst and Dr Ekkehard Pott (both Volkswagen), with a "real" stage instead of the "virtual" one. And we would have liked to express our warmest thanks to two long-standing planning group heads - Prof Dr Uwe Gärtner (Daimler Truck) and Dr Bodo Durst (BMW) - for their commitment and personally wished their successors - Dr Volker Schmeißer (Daimler Truck) and Dr André Casal Kulzer (Porsche) - much success in the common tasks ahead of us. The talk with Dr David Bothe (Frontier Economics) in T format on the LCA orientation study, however, forms a bridge between face-to-face and digital events. The link to the video can be found in the brief review of the autumn conference, where we also inform you about the newly launched hydrogen research programme, which is intended to help accelerate the implementation of the German and European hydrogen strategy. The aim of the research association is to advance the defossilisation of the entire energy chain. However, the FVV prime movers network does not focus exclusively on hydrogen-powered energy converters, but also researches the operation of combustion engines with other renewable energy sources. Increasing the efficiency of IC engines, for example through hybrid powertrain concepts, also plays an important role in the research portfolio.

### CURRENT RESEARCH PROGRAMME



#### Looking back to the FVV 2020 Autumn Conference - A brief review

##### How to transform the energy and transport system in the long term while protecting the climate and environment effectively?

The transformation of global energy and transport systems in the direction of renewable energy sources requires a reliable scientific basis, accepted by all, for a complete «cradle-to-grave» assessment of all climate target compliant technologies. In doing so, the complete life-cycle balance of energy carriers, energy storage systems and energy converters must always be considered, and a holistic comparison of the energy efficiency of different powertrain alternatives along the entire value chain is also important. Because protecting both the climate as well as the environment requires a wide range of options. We have briefly summarised the conference highlights for you.

[Learn More](#)

#### Maximum pressure rise: FVV increases hydrogen research

The FVV significantly expands pre-competitive Industrial Collective Research (IGF) on hydrogen-powered combustion engines. The use of renewable 'green' hydrogen as an energy carrier is not limited to fuel cells. It can also be used directly in combustion engines and gas turbines. However, the chemical properties of hydrogen differ significantly from those that characterise fossil fuels. Therefore, technical adaptation or redesign of internal combustion engines, turbomachinery and the related combustion processes is necessary. Twelve newly initiated projects complement the research already underway and should thus accelerate the implementation of the German and European hydrogen strategy. The aim of the research association is to drive forward the defossilisation of the entire energy chain.

[Learn More](#)

#### Characteristic properties of materials under the influence of hydrogen

Projects for the use of hydrogen as an energy source are already represented in the FVV research portfolio. For example, the PGT «Turbomachinery» planning group together with Angelika Schubert (Robert Bosch) has already carried out extensive studies on **material embrittlement and fatigue strength under the influence of hydrogen** at the Materials Testing Institute of the University of Stuttgart. Currently, Ms Schubert is supervising a research project in PG4 «Strength & Tribology», in which the **influence of gaseous H2 inhibitors on the mechanical behaviour of steels** is to be investigated. Hydrogen can lead to a degradation of the mechanical properties of metals. Investigations on this are largely carried out with high-purity hydrogen, whereas the influence of gaseous impurities has so far received little attention. This should change. A more in-depth knowledge of fatigue behaviour contributes, among other things, to increasing the service life of hydrogen-carrying components and avoiding over-dimensioning.

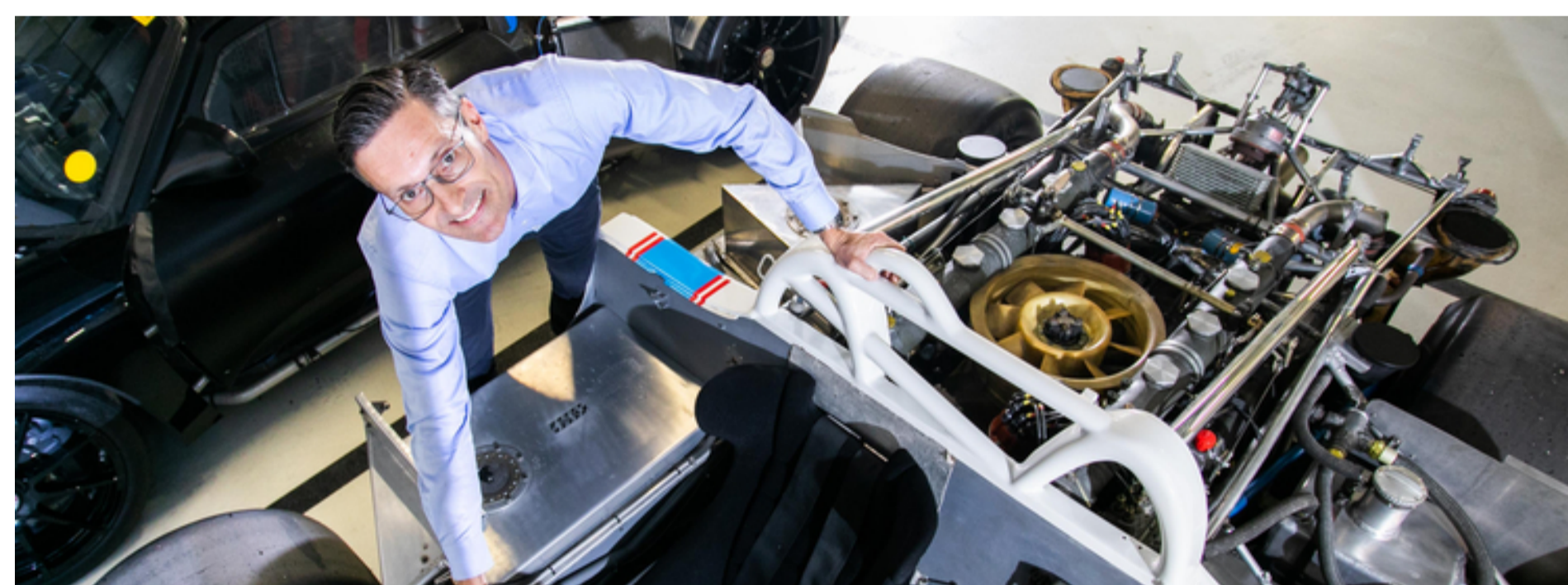
[Learn More](#)

#### A new mix in the gas network | A cooperation project with the DVGW

Hydrogen will play a decisive role in achieving the climate goals. A joint project initiated by the FVV with the German Association for Gas and Water (DVGW) investigates how the gas can be integrated into the existing natural gas infrastructure. From early 2020, researchers led by Dr Dietrich Gerstein (DVGW) and Dr Ulrich Kramer (Ford) have been investigating how a higher hydrogen concentration in gas affects both the mobility sector and stationary gas engines, such as those used in combined heat and power plants. **The starting point of the comprehensive technical and economic considerations was the question as to how the existing gas network would need to be adapted to allow hydrogen to be mixed in.** The project is planned to last two years and focusses on Germany. However, scenarios for Europe will also be considered. A glance at the rest of Europe reveals the potential they hold: in Italy, for example, ten times as many natural gas vehicles are registered as in Germany.

[Learn More](#)

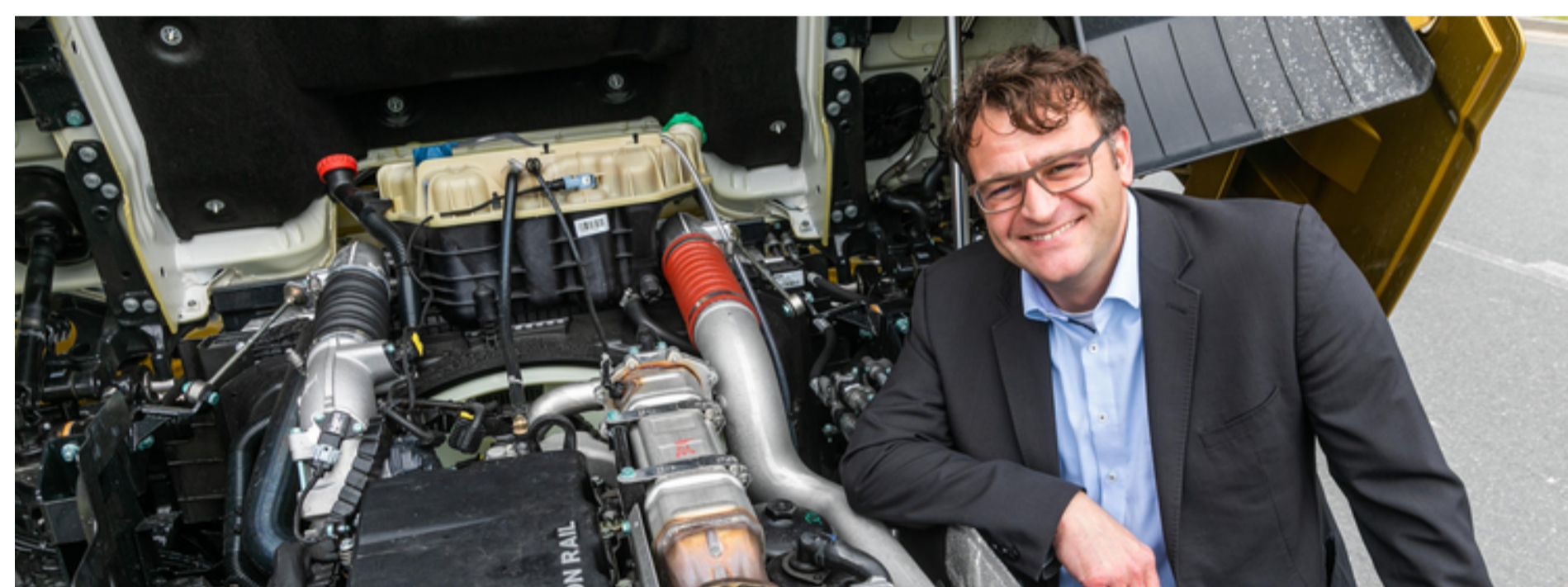
### THE PEOPLE BEHIND THE TECHNOLOGY



#### Pioneering spirit

**Names carry traces of the past //** Engine developer Dr André Casal Kulzer, new head of FVV's Planning Group 2 «Combustion SI», likes to break new ground and thus continues the tradition of his family. We met him in the Porsche Museum in Stuttgart-Zuffenhausen, alongside iconic vehicles such as the 356, 911 or 917 and many other small exhibits.

[Learn More](#)



#### Continuity

**Patently creating space for something new //** Since earning his doctorate with an FVV project, Dr Christian Weiskirch, head of FVV's Planning Group 3 «Combustion CI», has enjoyed a successful career. Today he coordinates the powertrain development of a large commercial vehicle group – and continues to work for the research association.

[Learn More](#)



#### THEMIS News

FVV Project List:  
[Overview of the current research programme](#)

FVV Planning Groups:  
[DKs/Workshops / PG Coordinators](#)

THEMIS calendar:  
[FVV meetings in November](#)

[Learn More](#)

### NEWS IN BRIEF FROM OUR NETWORK

#### ZOOM - AiF publishes the 2019/20 edition of its annual magazine



The German Federation of Industrial Research Associations (Arbeitsgemeinschaft industrieller Forschungsvereinigungen – AiF) has published its annual magazine ZOOM 2019/2020. The magazine features current and interesting information from the research network of the AiF and its member associations as well as the funding programmes managed by the federation. In addition, you will find an overview of the association's interest representation activities in Berlin "We are transfer!" and "Politics meet IGF" - two programmes in which the FVV is very pleased to participate.

[Learn More](#)

#### FVV is part of the new BMWi Hydrogen Research Network



The Hydrogen Research Network brings together experts from science and industry to exchange views on the production, storage, distribution and cross-sectoral use of hydrogen. As an element of the Federal Government's National Hydrogen Strategy, the research network, initiated by the Federal Ministry for Economic Affairs and Industry (BMWi) and organised by the Project Management Organisation Jülich (ptj), provides ideas for the entire value chain and application of hydrogen technologies along the entire value chain. The FVV is represented in the network by Martin Nitsche, Deputy Managing Director and expert in fuel cell research and hybrid powertrains.

[Learn More](#)

#### Future electricity-based fuels: research results enable the assessment and comparability of different technology pathways



The success of the energy transition depends in part on alternative concepts for sustainable mobility. Andreas Feicht, State Secretary in the Federal Ministry for Economic Affairs and Energy (BMWi), said: "It is essential that we make progress in all sectors in the use of renewable energies. A particular focus is on transport and mobility applications, as these currently account for almost one third of final energy consumption in Germany. We need to find innovative technological solutions here to further reduce greenhouse gas emissions. With its National Hydrogen Strategy, the German government has set the course for using hydrogen as a versatile energy carrier, e.g. as a basis for synthetic fuels. This is also the starting point for BMWi's Energy Transition Research and Innovation Platform. Industry and science are working together to develop efficient alternative powertrain technologies and climate-neutral fuels that can contribute to the decarbonisation of the transportation sector where the direct use of electricity does not make sense or is not yet technically feasible". First results were presented in an online conference in early November.

[Learn More](#)

#### Renewable Energy Directive: The Federal Environment Ministry's legislative proposal endangers the ramp-up of a hydrogen economy in Germany



The European Renewable Energy Directive (RED II) must be transposed into national German law by 30 June 2021. Implementation will determine, among other things, the future role of climate-neutral fuels and the available options for reducing emissions in the transportation sector. In the view of the German Hydrogen and Fuel Cell Association (DWH), the Petroleum Industry Association (MWV), the German Association of the Automotive Industry (VDA) and the German Engineering Federation (VDMA), however, the Federal Environment Ministry's (BMU) draft proposal neither creates the framework conditions for the market ramp-up of a German hydrogen economy nor does it lead to additional CO2 savings in transport, thus effectively ignoring the National Hydrogen Strategy, in which the German government sets ambitious targets within the framework of RED II implementation. The transportation sector would only be able to significantly contribute to the energy transition and the achievement of the EU climate targets by 2030 if national law shows more ambitions and includes synthetic fuels.

[Learn More](#)

### TECHNICAL MAGAZINES



#### Engine Research in International Cooperations

**MTZ worldwide 09/2020 |** The FVV has become significantly more international in recent years. Since 2015, it has been using the Collective Research Networking (CORNET) programme of the German Federal Ministry for Economic Affairs and Energy (BMWi) to promote international collaboration in pre-competitive Industrial Collective Research (IGF) on combustion engines. The potential is not only harbored by resource-efficient knowledge acquisition and transfer, but also in the training of the next generation of highly qualified scientists.

[Learn More](#)



#### Model-predictive Airpath Control for a Gasoline Engine

**MTZ worldwide 11/2020 |** The increasing complexity of modern powertrains requires innovative control concepts. In the scope of the FVV research project «Controls for High-Load Exhaust Gas Recirculation» (FVV No. 1265) conducted at the RWTH Aachen University, a model-predictive airpath control for a two-stage boosted gasoline engine with low-pressure exhaust gas recirculation was developed, integrated into a prototype vehicle and evaluated regarding the achievable control performance.

[Learn More](#)

For questions regarding your newsletter subscription, please contact Petra Tutsch or Stephanie Smieja at [newsletter@fvv-net.de](mailto:newsletter@fvv-net.de)