

31st International AVL Conference “Engine & Environment” 2019 “Competition of Energy Carriers – Impact on the Propulsion System”

If we are serious about reaching the goals of the Paris Climate Protection Agreement, then the transport sector will have to be practically climate-neutral by 2050. What does the path we need to take look like and which energy carrier is the most suitable, particularly if more than a tank-to-wheel energy consideration is made and energy production is also taken into account – or, even better, the entire life-cycle of the corresponding powertrain system from its manufacture to its recycling? And what are the impacts of the choice of the energy carrier for the propulsion system? These were the questions asked at this year’s international AVL conference “Engine & Environment” accompanied by beautiful springtime weather in Graz.

In his opening keynote, Professor Dr. Helmut List made a convincing plea for technology openness, the necessity of which for the reduction of CO₂ was confirmed over the course of the conference by almost all speakers. The forecasts given for which type of powertrain will have which share in the future were far apart from each other: ranging from almost 100 % BEV to still 80% for combustion engines. The latter is expected by two large Japanese manufacturers. This expectation was received with astonishment by the symposium participants and was the subject of many intensive discussions.

Many of the presentations focused on the different strategies employed by the international OEMs. While the Vice President of Geely Auto, Ulrich Schmalohr, explained his company’s strategy regarding the portfolio of electric vehicles in the face of the reduction in grants by the Chinese government, Volkswagen’s head of powertrain research, Dr. Tobias Lösche-ter Horst, defended his company’s concentration on electro-mobility that in his opinion excludes neither fuel cell technology nor the further development of combustion engines in electrified variants.

The importance of fuel cell technology for the Volkswagen Group was underlined by the fact that AUDI AG’s technical project manager Jörg Starr was voted as chairman of the Clean Energy Partnership. He very proudly presented the success of this consortium of 13 industrial partners in implementing hydrogen mobility to the conference participants. Dr. Jörg Wind, Daimler’s Manager for Energy Systems Analyses, presented the GLC F-CELL, a new fuel cell car with plug-in technology, and BMW’s Dr. Volker Formanski drew attention to the advantages of fuel cell vehicles that combine zero emissions with a long range and short filling-up times.

Dr. Tobias Brunner, CEO of Hynergy GmbH, considered the question of the optimum energy carrier from the perspective of the continuously growing share of renewable energy and the necessity for chemical storage of these intermittent energy sources. In his view, only hydrogen is suitable for this on a large scale, which already today provides CO₂-neutral mobility as a clean energy carrier. In such an energy system, fuel cell vehicles would be just as efficient as battery-powered electric vehicles whose energy carrier would have to at least partially feed electricity back.

But why not use the renewable energies that are particularly cheaply available in North African and Arabian countries to produce synthetic fuels? Dr. Alexander Tremel, Siemens AG, promoted these e-fuels, which can also provide an important contribution to CO₂ reduction for existing vehicles. Dr. Jürgen Rechberger, Skill Team Leader Fuel Cell at AVL List GmbH, presented an extremely efficient solution that uses a high temperature electrolyte SOEC and a synthetic process, whose thermal requirements match each other perfectly.

But who could build and operate the industrial plants that are needed to make e-fuels a viable contender amongst energy carriers? Dr. Hermann Pengg-Bührlen, Head of Project Management e-fuels at AUDI AG builds such systems for demonstration purposes. Wolfgang Langhoff, CEO at BP Europe promised the ability to deliver such plants on an industrial scale within 5 years, if the political framework for them were available. The chairman of the board at the Deutsche Shell Holding, Dr. Thomas Zengerly, was considerably more cautious.

All energy carriers were examined again carefully in the concluding panel discussion and also the audience was asked which energy carrier they saw as playing the greatest long-term role in the de-carbonization of mobility.- A neck-and-neck race developed between e-fuels and hydrogen, particularly after a lively discussion in which it became more and more evident that in order to reach the goals of clean and CO₂-neutral mobility, we will need all energy carriers and all powertrain systems: from the combustion engine with its spectrum of hybrid variants, via the purely battery-powered electric vehicle to fuel cell driven vehicles

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