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»Networked action for zero emissions«

*Prof. Dr. Peter Gutzmer, President of FVV,
on the value of networks in an era of transformation*

Dear FVV members,
dear readers,

Five years ago, almost exactly to the day, FVV celebrated its 60th anniversary. If you were to pick up the book that was published to mark this occasion, you'd notice two things: unlike in preceding technology-focussed anniversary publications, people were at the heart of our book that year. People who work with us, particularly engineers in industry and researchers at universities. People who work with passion and commitment to develop the technology we need to move society forward. By putting people front and centre, we turned the spotlight on the core value of FVV: the networking of bright minds. We also looked at the shift that was already well under way by 2016. One of the subheadings in an interview I gave for the book was: »There are enormous changes on the horizon.« Now, in 2021, this shift is still not complete. In fact, the pace of change has picked up. It has become so all-encompassing that the word »transformation« – which is usually used to refer to societal systems – has established itself in the free economy. Like many other concepts, transformation is open to interpretation. So I want to explain how we experience transformation in FVV – both in terms of the work we do and how we organise it.

»Systematic research that involves many different energy sources and energy converters demands a large, collective network.«

For many years, the pre-competitive, collective research coordinated by FVV was focussed on highly detailed research questions: how does the geometry of a piston head affect the efficiency of a direct-injection combustion engine? Or how can we accurately predict the exact lifespan of an innovative, highly temperature-resistant material for an aircraft turbine? What is the perfect reduction agent for nitrogen oxide exhaust gas aftertreatment? Within the frameworks of such projects, people at FVV have been able to drive technological progress, develop more efficient machines and reduce emissions – and they continue to do so today. Without this research, there would be higher levels of hazardous substances in the air we breathe and higher concentrations of environmentally harmful emissions in our atmosphere. And our industrial sector would not have access to such highly qualified, skilled engineers.

However, we are also acutely aware that we cannot pave the way for a climate-neutral world by fine-tuning details. It is no longer enough to hone in on the machines we use for energy conversion when we actually need to restructure our entire world to use only renewable sources of energy. We need to optimise our entire system, beyond the traditional sector boundaries of energy and transport. With this in mind, the Board and the Scientific Advisory Committee of FVV have spent the last few years pushing for research into alternative energy sources. The fuel studies have been, and continue to be, an important source of new knowledge and information. The recently published fourth study shows that it will be virtually impossible to keep to the greenhouse gas budget set

out in the Paris Agreement if we focus exclusively on ensuring that all new vehicles produce no emissions, without coming up with sustainable alternatives for the vehicles already in circulation around the world [[→ page 16](#)]. It is also important for me to say that these kinds of meta-studies are designed not only as a kind of roadmap for our cross-sector value creation network, but also to highlight new directions for our research.

This signposting function is all the more evident in the research programmes that the FVV Board initiates and drives forward, in some cases dedicating significant internal resources to do so. In these programmes, our goal is to identify the most important innovation issues for digitalisation and climate neutrality and to develop projects to provide the answers we need. The enthusiastic response to our latest research initiatives on hybrid powertrains and energy converters in hydrogen systems [[→ page 28](#)] is very encouraging. Fuel cell research now accounts for a large part of our work. Alongside combustion engines and turbomachinery, we are turning our attention to this third energy converter – one that could be hugely important in a world that runs on renewable energy sources.

Our fuel cell projects – both the ones we have already put into action and those in the pipeline for the future – also demonstrate that efficient energy conversion will be a key area of research in the future. However, the manufacture of chemical energy carriers from renewable sources will remain more costly than recovering and processing fossil energy feedstock for the foreseeable future, and at the very least until regulations are introduced to make the

latter option significantly more expensive. But, in a practice-oriented network like FVV, efficiency in energy conversion processes can be taken to new levels, which in turn will significantly boost the market acceptance of new technologies. And so, we see that the long-established benefits of collective research are just as important today as they have always been. In fact, they might even be more important: systematic research that involves many different energy sources and energy converters demands a large, collective network.

We have strong links with international partners such as the Japanese research association AICE [[→ page 50](#)] and the major maritime technology organisation CIMAC [[→ page 52](#)]. We also collaborate closely with the Research Association for Drive Technology (FVA) on our electrified powertrain projects. Although FVV is an independent research organisation, it has its headquarters at the VDMA, the largest industrial association in Europe. This means that we can consistently coordinate the political work of the association with the scientific expertise of FVV [[→ page 38](#)].

Will all this be enough given the scale of the transformation taking place? We have undoubtedly achieved a great deal already, and we've set the ball rolling for even more progress in the future. However, the future of FVV will be decided not only by its members or even by its Board – but by society's acceptance of certain technologies. There are two aspects to consider here: firstly, the generation and use of renewable energy sources requires further research, followed by the relatively rapid construction of the relevant infrastructure. Without public funds and international cooperation facilitated at government level, this will be difficult to achieve. Secondly, Germany will only be able to defend its leading position in many of the key techno-



Photo: Uwe Nölke

logical fields – from electrolysis to aircraft turbines – if there is a steady supply of qualified new talent with an academic background. We need to present a convincing package not only to the government and wider society, but also to young people.

Over the past few years, we have consistently renewed our image and the profile we present to the world to communicate the fact that FVV is researching for the future; this magazine is part of that strategy. In the future, we want our image to reflect the transformation of our research programme towards digitalisation and climate neutrality. At the time of writing, no final decisions have been made. But I am sure that the outcome of this process will be a huge step forward for us. And that won't be the end of the changes, either. That's not what this is all about: our task is to keep the future open!

Let's continue to work together and build on our global network to pave the way for a zero-emissions future in energy conversion. //

A handwritten signature in blue ink, appearing to read 'Peter Gutzmer', written over a white background.

PROF. DR. PETER GUTZMER
President