Press release

Bosch fuel cell power module team nominated for the Deutscher Zukunftspreis 2025

Powering long-distance trucks with hydrogen for zero-carbon operation

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- Bosch chairman Stefan Hartung: “This nomination is outstanding recognition for Bosch.”
- FCPM is the most complex system in Bosch’s almost 140-year history.
- Individual parts of the powertrain module are optimized for interaction in the system.
- FCPM trucks are not inferior to diesel trucks in terms of refueling time and range.

Munich, Germany – A three-person development team from Bosch is in the running for the Deutscher Zukunftspreis 2025. Christoffer Uhr, Kai Weeber, and Pierre Andrieu have been nominated for the federal president’s prestigious award thanks to their work on the fuel cell power module (FCPM). The FCPM converts hydrogen and oxygen into electricity. This means that trucks worldwide can also run on electricity over long distances; if they use green hydrogen, their operation will be zero-carbon. This is an important step in the fight against climate change. After all, in the EU alone heavy commercial vehicles account for more than one-fourth of greenhouse gas emissions from road traffic – but it is impossible to imagine freight transport without them. “This nomination for the Deutscher Zukunftspreis 2025 is an outstanding recognition for the Bosch team and everyone involved with the fuel cell power module. It’s also confirmation that we’re on the right track: hydrogen is indispensable for a climate-neutral world and is also a strategic business field for Bosch,” says Dr. Stefan Hartung, chairman of the board of management of Robert Bosch GmbH. “We offer scalable solutions along the entire hydrogen value chain – from production to transportation and application.” The Deutscher Zukunftspreis 2025 will be awarded in Berlin on November 19.

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Bosch manufactures the stack and all key system components itself

With more than a thousand individual parts and weighing around 500 kilograms, the FCPM is the most complex system Bosch has ever developed in its nearly 140-year history. In addition to its centerpiece, the fuel cell stack, among the most important individual components are a hydrogen metering valve, a hydrogen recirculation pump, and an electric air compressor – everything needed to effectively transport water and atmospheric oxygen into the fuel cells for conversion into electricity. Bosch has designed each individual part to work together optimally in the overall system. Volume production of the system launched in Stuttgart-Feuerbach in mid-2023 and a little later in Chongqing, China. One thing to note is that, unlike batteries, for example, building the FCPM requires hardly any critical raw materials. Bosch can draw on decades of appropriate manufacturing expertise, such as high-speed laser welding, which is used to make the 1.2 kilometers of weld seams in each system watertight. Another major advantage is that the module is designed to fit into the space that in over 95 percent of all trucks was previously occupied by the combustion engine. For freight forwarders and logistics companies, using a truck with the Bosch FCPM is no different than with the diesel technology they are used to: with high robustness for the vehicle's entire service life, short hydrogen refueling times, and a long range of up to 1,000 kilometers per tank. Moreover, the powertrain module enables almost whisper-quiet operation without vibrations.

Bosch is committed to building a hydrogen economy

Several thousand trucks with the Bosch FCPM are already on the road worldwide. In Europe and North America in particular, the further ramp-up depends on the course that politicians set. "We urgently need to start building a hydrogen economy along with the corresponding infrastructure for the production, storage, and use of hydrogen. China and India are showing us how this can be done. As an industry, we stand ready with technical solutions – the FCPM is a first building block," Hartung says. Meanwhile, the powertrain modules already in use by customers are collecting data for further development. Each FCPM has a double existence: one in reality and one as a digital twin in virtual space. Bosch uses this to collect specific information on things like temperature, pressure profile, and wear, drawing key findings that have already been incorporated into the development of the second generation. But not just that. Bosch also uses some of the technology developed for the FCPM for other solutions. One of these involves reversing the principle of the fuel cell: instead of generating electricity from water and oxygen, the company also offers technology for electrolyzers that produce hydrogen from water and renewable electricity – in a climate-friendly way. In addition, the FCPM can power ships or, say, provide data centers with zero-carbon electricity.

Bosch has already received the Deutscher Zukunftspreis three times

Germany's federal president has awarded the "Deutscher Zukunftspreis for technology and innovation" since 1997. These innovations reflect the wide range of research and development in Germany. Endowed with 250,000 euros, the prize honors outstanding research and development projects. The key factors in the jury's decision are the degree of innovation as well as the potential to turn this achievement into sustainable jobs and create added value for society. The innovations range from medical technology, novel material development, and robotics to mechanical engineering and aerospace technology. Between 1998 and 2013, Bosch was nominated five times for the Deutscher Zukunftspreis. To date, three teams from Bosch or with Bosch involvement have received the award: in 2005 for piezo injectors, in 2008 for smart sensors, and in 2013 for ultrashort pulse lasers. Is this track record about to be extended?

Press photos and infocharts are available on the Bosch Media Service at www.bosch-press.com.

Related link: www.deutscher-zukunftspreis.de

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The Bosch Group is a leading global supplier of technology and services. It employs roughly 418,000 associates worldwide (as of December 31, 2024). The company generated sales of 90.3 billion euros in 2024. Its operations are divided into four business sectors: Mobility, Industrial Technology, Consumer Goods, and Energy and Building Technology. With its business activities, the company aims to use technology to help shape universal trends such as automation, electrification, digitalization, connectivity, and an orientation to sustainability. In this context, Bosch's broad diversification across regions and industries strengthens its innovativeness and robustness. Bosch uses its proven expertise in sensor technology, software, and services to offer customers cross-domain solutions from a single source. It also applies its expertise in connectivity and artificial intelligence in order to develop and manufacture user-friendly, sustainable products. With technology that is "Invented for life," Bosch wants to help improve quality of life and conserve natural resources. The Bosch Group comprises Robert Bosch GmbH and its roughly 490 subsidiary and regional companies in over 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. Bosch's innovative strength is key to the company's further development. At 136 locations across the globe, Bosch employs some 87,000 associates in research and development.

The company was set up in Stuttgart in 1886 by Robert Bosch (1861–1942) as "Workshop for Precision Mechanics and Electrical Engineering." The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant upfront investments in the safeguarding of its future. Ninety-four percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a limited liability company with a charitable purpose. The remaining shares are held by Robert Bosch GmbH and by a company owned by the Bosch family. The majority of voting rights are held by Robert Bosch Industrietreuhand KG. It is entrusted with the task of safeguarding the company's long-term existence and in particular its financial independence – in line with the mission handed down in the will of the company's founder, Robert Bosch.

Additional information is available online at www.bosch.com, www.bosch-press.com.