

Into the hydrogen age: Bosch starts volume production of its fuel-cell power module Sales of 5 billion euros with H₂ technologies by 2030

July 13, 2023

PI 11678 BBM joe/af

- ▶ Bosch operates along the entire hydrogen value chain.
- ▶ Bosch chairman Stefan Hartung: “Bosch knows its way around hydrogen, and Bosch is growing with hydrogen.”
- ▶ Bosch to invest nearly 2.5 bn euros in H₂ technology from 2021 to 2026.
- ▶ Bosch employs more than 3,000 people in hydrogen technology.
- ▶ Bosch automotive expertise in demand in the hydrogen economy.

Stuttgart, Germany – Bosch is entering the hydrogen age of mobility. At its Stuttgart-Feuerbach location, the supplier of technology and services has now begun volume production of its fuel-cell power module. Nikola Corporation, based in the United States, will serve as the pilot customer with its Class 8 hydrogen fuel cell electric truck, which is scheduled to enter the North American market in the third quarter of 2023. “Here in Stuttgart-Feuerbach, in the plant whose history goes back further than any other Bosch plant, the hydrogen future is about to happen,” said Dr. Stefan Hartung, the chairman of the board of management of Robert Bosch GmbH, at the Bosch Tech Day 2023. “Bosch knows its way around hydrogen, and Bosch is growing with hydrogen.” The company operates along the entire hydrogen value chain, developing technology for its production and application. By 2030, Bosch plans to generate sales of roughly 5 billion euros with hydrogen technology.

In its solutions for the hydrogen economy as well, Bosch is relying on a global manufacturing network and the prowess of its German locations. For example, the Bosch plant in Bamberg, Germany, will supply the Feuerbach factory with the fuel-cell stack. And important system components such as the electric air compressor and the recirculation blower come from the Bosch plant in Homburg, Germany. “Bosch is one of the very few companies that are capable of mass producing technology as complex as fuel-cell stacks. We don’t just have the required systems expertise, but also the capability of quickly scaling up new

developments to mass production,” said Markus Heyn, member of the Bosch board of management and chairman of Bosch Mobility. Production of the fuel-cell power module is not only starting in Feuerbach, but also in Chongqing, China. The components it requires will come from the Wuxi plant. “Bosch is the first company to produce these systems in both China and Germany,” Hartung said. In addition, Bosch is also planning to manufacture stacks for mobile applications in its U.S. plant in Anderson, South Carolina. Worldwide, the company expects that, by 2030, one in five new trucks weighing six tons or more will feature a fuel-cell powertrain.

Bosch is helping to shape the hydrogen economy, and sees obligations on the part of policymakers

Only with hydrogen can there be a climate-neutral world. For Bosch, that is crystal-clear. The company therefore strongly advocates the establishment of a hydrogen economy, and is stepping up its investments in hydrogen. Between 2021 and 2026, Bosch will have invested a total of nearly 2.5 billion euros in the development and manufacturing of its H₂ technologies. That is another billion euros more than was earmarked in the investment plan for 2021 to 2024. The business opportunities for Bosch are huge, as is the effect on jobs. Even now, there are more than 3,000 people at Bosch working on hydrogen technologies, more than half of them in Europe. Most of the vacancies can be filled from within the company, and especially with people who have so far worked in the Bosch powertrain business. However, the further prospects for the hydrogen business depend on the political environment. Hartung especially believes that Europe must do much more to create a counterweight to the rapid pace of developments in other regions of the world, such as the United States. More specifically, the Bosch chairman has four demands of German and European policymakers: “First, we have to step up the pace of hydrogen production in the EU. Second, global supply chains have to be set up, and third, hydrogen has to be used in all sectors of the economy.” As a fourth point, he stressed the importance of quickly setting up infrastructure for distributing hydrogen in Europe.

Bosch technology starts with electrolysis and ends with the hydrogen engine

At all events, Bosch is ready, and applying automotive experience to the hydrogen economy like no other company. This is why the company is also in demand in H₂ production. At the start of 2023, Bosch started constructing prototypes for electrolysis using proton exchange membranes – in other words, the reverse of the energy conversion method used in mobile fuel cells. Starting in the fall, the company intends to make 1.25-megawatt prototypes available for pilot applications, and is on track to start volume production in 2025. Bosch is exploring several options for the use of hydrogen. Stationary solid-oxide fuel

cells can be used for the distributed supply of power and heat. In a pilot project at the hospital in Erkelenz, near Cologne in Germany, Bosch wants to use this technology to achieve overall efficiency of 90 percent. The micropower plant there will initially run on natural gas, but can be converted to green hydrogen. Apart from the fuel-cell powertrain, Bosch is also working on the hydrogen engine, developing systems for both port and direct injection of hydrogen. This solution is particularly suitable for heavy vehicles on long hauls with especially heavy loads. "A hydrogen engine can do everything a diesel engine does, but on top of that, it is carbon neutral. It also allows a fast and cost-effective entry into hydrogen-based mobility," Heyn said. One major advantage is that more than 90 percent of the development and manufacturing technologies needed for it already exist. The H₂ engine is expected to be launched starting in 2024. Even now, Bosch has four orders for production projects from all the major economic regions, and expects six-figure unit volumes by 2030. In this field as well, Bosch is dynamically taking the hydrogen economy forward.

Press photos: #9e10e7bf, #d00f7b3b, #96445cbc, #64e1a62d, #13d77b42, #9057f835, #db6f7da0

Contact person for press inquiries:

Jörn Ebberg

Phone: +49 +711 811-26223

Twitter: @joernebberg

Mobility is the largest Bosch Group business sector. It generated sales of 52.6 billion euros in 2022, and thus contributed almost 60 percent of total sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility business sector pursues a vision of mobility that is safe, sustainable, and exciting, and combines the group's expertise in the domains of personalization, automation, electrification, and connectivity. For its customers, the outcome is integrated mobility solutions. The business sector's main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP anti-skid system, and common-rail diesel technology.

The Bosch Group is a leading global supplier of technology and services. It employs roughly 421,000 associates worldwide (as of December 31, 2022). The company generated sales of 88.2 billion euros in 2022. Its operations are divided into four business sectors: Mobility, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT provider, Bosch offers innovative solutions for smart homes, Industry 4.0, and connected mobility. Bosch is pursuing a vision of mobility that is sustainable, safe, and exciting. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to facilitate connected living with products and solutions that either contain artificial intelligence (AI) or have been developed or manufactured with its help. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is "Invented for life." The Bosch Group comprises Robert Bosch GmbH and its roughly 470 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. With its more than 400 locations worldwide, the Bosch Group has been carbon neutral since the first quarter of 2020. The basis for the company's future growth is its innovative strength. At 136 locations across the globe, Bosch employs some 85,500 associates in research and development, of which nearly 44,000 are software engineers.

Additional information is available online at www.bosch.com, www.iot.bosch.com, www.bosch-press.com, www.twitter.com/BoschPress