

Bosch at bauma 2025

Powertrain solutions for more sustainable construction machinery

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- ▶ Powered by renewable synthetic fuels, construction machinery can already play a major role in reducing CO₂ emissions.
- ▶ The Digital Fuel Twin documents and certifies the use of renewable synthetic fuels.
- ▶ For hydrogen engines, around 80 percent of the technology can be transferred from combustion engines.
- ▶ Bosch Rexroth and Bosch Engineering offer a wide range of electrification solutions for mobile and stationary functions.

Stuttgart and Munich, Germany – Over one million new construction vehicles will be produced worldwide in 2025 alone. As different as their performance classes and tasks are, they almost all have one thing in common: a diesel engine. Its robustness and strength make it the ideal powertrain for a wide range of applications. At the bauma 2025 trade fair, Bosch will be showing how carbon emissions can be reduced even further in this vehicle segment. “Renewable synthetic fuels make operating both new and existing vehicles much more climate-friendly,” says Jan-Oliver Roehrl, executive vice president of the Bosch Power Solutions division and head of commercial vehicle activities at Bosch. “And in the future, hydrogen engines and electrification also stand to make construction machinery much more sustainable.”

Renewable synthetic fuels make combustion engines more climate-friendly

Construction vehicles are already subject to comprehensive exhaust-emission regulations, such as Stage V in Europe, Tier 4 in the U.S., and Phase IV in China. To date, however, their climate-relevant emissions have been regulated only to a limited extent, at least by law. One simple option for greatly reducing their carbon emissions that is already available today is to use renewable synthetic fuels such as HVO100. Because these fuels are based on residual and waste materials, they are much more climate-friendly than fossil fuels in terms of overall carbon emissions. They are also “drop-in” fuels, meaning they can be

mixed with normal diesel fuel as required. Since Bosch already takes compatibility with these fuels into account when developing its injection technology, they are suitable for use in its products.

According to Bosch forecasts, four out of five new construction vehicles worldwide with over 56 kilowatts will still have a diesel engine in 2035. That is why Bosch will continue to develop injection technology and urea dosing technology for exhaust-gas treatment in the future to suit the various segments of the construction machinery market.

The Digital Fuel Twin documents the use of renewable synthetic fuels

Renewable synthetic fuels can make construction machinery more climate-friendly: the more of it they use, the smaller the carbon footprint of each individual vehicle. Bosch makes this effect visible with a purely digital software solution called the Digital Fuel Twin. This documents the amounts of fuel distributed as well as the fuels' sustainability, from production and transportation all the way to the filling station. It provides the operators of construction machinery with certificates corresponding to how they have refueled their vehicles; these document the total amounts of fuel used and even the proportionate carbon footprint when using the vehicle.

Hydrogen engines build on tried-and-tested foundations

When it comes to hydrogen engines, German manufacturers and suppliers can draw on decades of expertise, particularly in the field of engine technology: some 80 to 90 percent of the technology involved can be transferred from conventional combustion engines. If the hydrogen fueling the engines is produced with renewable energy, their use could mark a big step forward for the climate. Often, construction machinery is stationary and operates under heavy loads. "This is precisely where hydrogen engines, with their high efficiency and robustness, can really excel," Roehrl says. "The first applications of hydrogen engines featuring Bosch injection technology will be launched this year." Bosch is working on both port- and direct-injection systems and is already involved in more than 100 development projects with customers worldwide. Moreover, the hydrogen engine is also a promising option for large engines, for example as the powertrain for dump trucks in mining. Here, too, robustness and reliability combined with a compact design are essential for economical operation.

Electrification solutions for construction machinery

In certain construction machinery applications, electrification is another efficient and climate-friendly option for mobile and stationary functions. With its eLION electrification portfolio, Bosch Rexroth already offers a wide range of motors, inverters, gearboxes, software, and accessories, including the appropriate hydraulics. This Bosch subsidiary is currently expanding its range to include components for 96-volt vehicle electrical systems; at the end of 2025, it will introduce a standardized software platform for all voltage classes. Bosch Engineering, meanwhile, is presenting a newly developed high-performance solution for battery voltages of up to 800 volts. This subsidiary's new electric powertrain system is compact and offers high power density as well as high efficiency. It is also suitable for construction machinery with high power requirements and limited installation space, such as wheel loaders.

Bosch, Bosch Rexroth, and Bosch Engineering will be showcasing these solutions at bauma, at booths A3/327 and A4/526.

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

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Mobility is the largest Bosch Group business sector. According to preliminary figures, it generated sales of 55.9 billion euros in 2024, and thus contributed around 62 percent of total sales. This makes the Bosch Group one of the leading mobility suppliers. Bosch Mobility pursues a vision of mobility that is safe, sustainable, and exciting. For its customers, the outcome is integrated mobility solutions. The business sector's main areas of activity are electrification, software and services, semiconductors and sensors, vehicle computers, advanced driver assistance systems, systems for vehicle dynamics control, repair-shop concepts, as well as 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 417,900 associates worldwide (as of December 31, 2024). According to preliminary figures, the company generated sales of 90.5 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 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. Bosch's innovative strength is key to the company's further development. At 136 locations across the globe, Bosch employs some 86,900 associates in research and development, of which nearly 48,000 are software engineers.

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