

Press information
29 April 2022

BMW iFACTORY. LEAN. GREEN. DIGITAL. – Master plan for production of the future.

+++ Highly flexible, efficient, sustainable and digital:

BMW iFACTORY sets new standards and defines future of automotive manufacturing for the production network of the BMW Group

+++ Board Member for Production Nedeljković: "New Debrecen plant will be first CO2-free vehicle plant." +++

Munich. It's the master plan for the automotive production of tomorrow: The BMW iFACTORY production strategy defines the future orientation of plants and production technologies at the BMW Group and meets the challenges of the transformation to e-mobility. "Automotive manufacturing of the future requires a new, holistic way of thinking. With our BMW iFACTORY, we are leading the way and setting new standards in flexibility, efficiency, sustainability and digitalisation," said Milan Nedeljković, Member of the Board of Management of BMW AG, responsible for Production.

Over the last few decades, the BMW Group has considered itself the benchmark for innovative, flexible and efficient production technologies in vehicle manufacturing. And it is from this level that the company is now redefining operational excellence. The strategic vision of the global production network is the BMW iFACTORY. LEAN. GREEN. DIGITAL., with its integrative, global approach. "The BMW iFACTORY is not a one-off showpiece but an approach we will implement at all our plants in the future – from our 100-year-old home plant in Munich to our forthcoming plant in Debrecen, Hungary," said Milan Nedeljković.

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The mission: LEAN. GREEN. DIGITAL.

The BMW iFACTORY focuses the BMW Group's production expertise on three key topic areas: LEAN, which stands for efficiency, precision and extreme flexibility, GREEN, for sustainability, resource-efficiency and circularity, and DIGITAL, for the active use of digitalisation in data science, artificial intelligence (AI) and virtualisation. As always at the BMW Group, the holistic approach of the BMW iFACTORY is underpinned by the consistently high standard of flexibility, launch expertise and integration capability in the company's production system.

LEAN: Based on highly flexible, efficient production

The BMW Group's production network is on the cusp of a fundamental transformation: the Neue Klasse, due for production launch in 2025, is based on a completely new vehicle architecture. With its clear focus on the all-electric drive, it sets the conditions for future vehicle generations to be manufactured efficiently and in line with the company's profitability and quality goals. The BMW iFACTORY is now set to strengthen the proven success factors of the global production network. Board Member for Production Milan Nedeljković: "Our production network has three key strengths: maximum flexibility, excellent processes and outstanding integration capabilities. We are the absolute benchmark in all three. And they are the focal points of our BMW iFACTORY." The key topic of LEAN is about highly flexible, efficient production through streamlined processes in competitive structures.

Flexibility remains the key competitive advantage of BMW Group production, now and in the future – and in several respects: The company's production structures are so flexible that a single production line can produce different drive types and vehicle models. They also set the standard in terms of rapid responsiveness and adaptability, absorbing supply bottlenecks and shortages comparatively spontaneously and reacting quickly to fluctuations in demand.

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And for customers, this flexibility means they can change certain elements of their vehicle configuration up to six days before the production date.

The aim of the BMW iFACTORY is to use even more meaningful real-time data from throughout the production process to control global manufacturing more closely and transparently achieve the fastest possible response times. This will enhance not only volume and market planning but also supply chain and inventory management and support targeted work on quality as well.

GREEN: Sustainability along the entire value chain

Avoiding consumption, saving resources and using state-of-the-art technologies: With the BMW iFACTORY, the focus on sustainable production is stronger than ever, reaffirming the BMW Group's position as the most sustainable manufacturer of premium automobiles. "Environmental, economic and social responsibility are inseparable, and we strive to achieve all three not only in the product itself but along the entire value chain. By 2030 we aim to reduce CO2 emissions from production by 80 percent compared to 2019," explained Board Member for Production Milan Nedeljković.

Plant Debrecen: The first completely fossil fuel-free plant

With its new plant in Debrecen, Hungary – where production of the all-electric Neue Klasse will launch in 2025 – the BMW Group is entering a new era in sustainable automotive production. "Our plans are for Plant Debrecen to be the first automotive plant in the world to dispense completely with fossil energy sources in its production processes," said Nedeljković. "Debrecen will be our first CO2-free vehicle plant and puts us clearly at the vanguard of developments in this regard."

A significant share of the plant's electricity will be generated directly on site. The remainder will be covered by 100 percent renewables, the vast majority of which will come from regional sources. Nedeljković: "Our contribution to

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the energy transition makes not only environmental but also business sense because our approach ensures stable prices and secure supplies.”

Another element of sustainable production is consistent circularity. Wherever possible, production materials and resources will be reused. Metal offcuts and filings from milling, for example, will be recycled and reused, while waste heat from cooling will be fed into a circuit to heat indoor spaces and water.

Saving resources significantly benefits the company economically – but smart, effective solutions also make production at the BMW Group unique in terms of environmental credentials. Examples of the technologies realising our commitment include the resource-saving wet-in-wet painting process (IPP) and the use of direct current in car body construction for the very first time.

The energy that powers the BMW Group’s plants around the world is sourced purely from renewables. As Plant Leipzig develops into a centre of excellence for hydrogen, the company’s facilities worldwide are becoming increasingly independent of third-party energy suppliers or other external influences. This is enabled by a combination of self-generated and stored energy with flexible load profiles throughout production. Here, the latest digital methods and comprehensive systems ensure maximum transparency and support the consistent reduction of energy consumption as well as the needs-based use of renewables on the basis of accurate forecasts.

A further key issue in the field of climate protection is biodiversity. The variety of flora and fauna at BMW Group sites worldwide is being promoted through targeted, region-specific measures, from beehives and falcons to meadow orchards.

Meanwhile, to support GREEN logistics both within and outside the plants, the BMW iFACTORY adopts an open-minded approach to technologies, focusing on environmentally sustainable concepts. Within the next few years, for example, increased use of rail transport and electric trucks will mean zero local emissions from transport logistics at Plant Munich.

DIGITAL: From innovations to effective use cases

Customised premium vehicles, delighted customers, excellent quality and on-time delivery have always been the goal of digitalisation at the BMW Group. "The BMW iFACTORY is advancing digitalisation by taking data consistency to a completely new level along the entire value chain and across every one of our process chains. We use digital innovations to create effective use cases in production – because for us, innovation and efficiency go hand in hand," emphasised Milan Nedeljković.

Production at the BMW Group uses the latest technologies to link all the relevant product, process, quality and cost data between development, planning and production processes. The main focus here is on applications from the fields of virtualisation, data science and artificial intelligence.

Virtualisation plays an important role within the BMW iFACTORY strategy model. In a first step, every detail of all the BMW Group's production sites is being recorded in a 3D scan. In this way, planning work can be carried out virtually at any time and from anywhere. In the next logical step, a virtual representation – or digital twin – is created of each factory in its entirety. This can then be used by planning specialists in real-time collaborations across different locations and time zones. This approach takes the planning of all structures, production plants and even individual processes to a completely new level. It allows virtual products to be integrated into the factory early on, for example, and significantly reduces planning work further down the line. It also

allows investments to be optimised and enhances process efficiency and the stability of product launches.

In partnerships like the one with NVIDIA, the BMW Group combines its pioneering spirit and process expertise with cutting-edge technologies. Applications and augmented and virtual reality support employee training for future processes and technologies, and digital production system planning allows global partners to be integrated into the value chain early on.

Meanwhile, data science provides the foundations for fact-, figure- and (real-time) data-based decision-making. Consistent, transparent data allows the root causes to be identified quickly and proactively so that processes can be optimised. BMW Group production is already an industry pioneer in the effective use of AI and currently uses more than 200 AI-based applications. The technology allows various logistics and production processes to be automated for better quality assurance. In addition, standardised platforms and self-services mean solutions can be scaled rapidly for application across all technologies and locations.

Employees: Fit for the BMW iFACTORY

At the heart of the BMW iFACTORY are the people who create it. Future-focused and highly qualified, the BMW Group's workforce is ensuring a competitive and successful transformation. The Production division is investing heavily and with foresight in upskilling staff for quality, logistics, maintenance, e/e, e-mobility and digital planning. Thanks to state-of-the-art instruction methods, employees benefit from electronic training programmes that leave them

free to train independently and on their own initiative. Extensive additional development options are also available to help them maintain and enhance their skills. More than 50,000 BMW Group employees have already undergone the training they need to work in electromobility.

The reason: Customers' wishes and our responsibility

The key factors behind the transformation of BMW Group production are the developments in the automotive market and specifications around climate change. The BMW Group is already doubling its production of electric vehicles in 2022, having delivered more than 35,000 fully electric cars to customers in the first quarter alone. At the same time, the latest technical innovations are supporting the company as it contributes significantly to climate protection and sustainability. Milan Nedeljkovic: "The BMW iFACTORY delivers not only on the increasing customer demand for electric vehicles but also on our desire, as a member of society, to support climate protection and sustainability. We are using digitalisation to make this happen – while remaining absolutely competitive."

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The BMW Group production network

For decades, the BMW Group has seen itself as a benchmark in terms of production technology and operational excellence in vehicle construction. BMW iFACTORY. LEAN. GREEN. DIGITAL. stands for the strategic target image of the worldwide production network. It provides the answers to the challenges of the transformation towards e-mobility and pursues a global approach.

Lean stands for efficiency, precision, maximum flexibility and outstanding integration capability. Green involves the use of state-of-the-art technologies to establish production with the least use of resources. The aim is to reduce CO2 emissions in production per vehicle by 80% by 2030 compared to 2019. Digital focuses on data science, artificial intelligence as well as virtual planning and development. The BMW Group's production thus makes a decisive contribution to the company's profitability.

Die BMW Group

With its brands BMW, MINI, Rolls-Royce and BMW Motorrad, the BMW Group is the world's leading premium manufacturer of automobiles and motorcycles and a provider of premium financial and mobility services. The BMW Group production network comprises 31 production and assembly sites in 15 countries; the company has a global sales network with representatives in over 140 countries.

In 2021, the BMW Group achieved worldwide sales of more than 2.5 million automobiles and over 194,000 motorcycles. Profit from taxes in the 2021 financial year amounted to €16.1 billion and sales to €111.2 billion. As of December 31, 2021, the company employed 118 people worldwide. 909 employees.

Long-term thinking and responsible action have always been the basis of the BMW Group's economic success. The company set the course for the future at an early stage and consistently places sustainability and resource conservation at the center of its orientation, from the supply chain to production to the end of the use phase of all products.

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