

## Quick Facts about BMW Manufacturing

- Since 1992, the BMW Group has invested nearly **\$12.4 Billion** (through December 31, 2022), and the Spartanburg plant has gone through six major expansions. The seventh major expansion was announced on October 19, 2022 – a \$1.7 billion investment to prepare the plant for the production of electric vehicles and to build a high-voltage battery assembly plant in Woodruff, SC. (see page 2)
- There are more than **11,000 jobs onsite**.
- More than 40 direct Tier 1 suppliers are located in South Carolina and more than 300 suppliers are in the United States.
- Currently, the physical size of BMW Plant Spartanburg is about **8.0 million square feet** with two body shops, two paint shops, two assembly halls, and several logistics centers.
- The plant produces more than **1,500 vehicles each day**.
- Approximately 70% of the steel and aluminum used in manufacturing BMWs in the U.S. is produced in the U.S.
- From 2010 – 2020, about **two-thirds of Spartanburg's production was exported** to more than 120 world markets.
- According to the U.S. Department of Commerce, **the BMW Group is the largest automotive exporter by value from the U.S.** with a total export value of nearly **\$9.6 Billion** in 2022. The number of BMWs exported totaled 227,029. This makes nine consecutive years that BMW has led the nation in this category.
- **Production in 2022 totaled 416,301 units – second-highest production total in the history of the plant.**
  - Total X3: 97,737    Total X3 M: 3,586
  - Total X4: 53,705    Total X4 M: 2,507
  - Total X5: 154,486    Total X5 M: 4,658
  - Total X6: 38,915    Total X6 M: 3,594
  - Total X7: 56,826
  - Total XM: 287
- The Spartanburg plant also has its own **battery assembly facility** onsite which produces lithium-ion battery modules for three plug-in hybrid electric vehicle (PHEV) models: the BMW X3 xDrive30e, the BMW X5 xDrive50e, and the BMW XM. In 2022, 69,200 “electrified” BMWs were produced.  
BMW X3 PHEV – 22,967      BMW XM – 287  
BMW X5 PHEV – 45,946

## **BMW Plant Spartanburg is Preparing for the Future.**

- **The BMW Group is investing about \$1.7 billion in its U.S. operations**, including \$1 billion to prepare for the **production of electric vehicles** at Plant Spartanburg and \$700 million to build a new high-voltage battery assembly facility in nearby Woodruff, SC. The \$1.7 billion investment is the largest single investment for this site.
- By 2030, the BMW Group will build at least six fully electric models in the U.S.
- **The BMW Group has chosen Envision AESC as its battery cell partner.** Envision will build a new battery cell factory in South Carolina to supply Plant Spartanburg. They will produce newly developed round lithium-ion battery cells, which were specifically designed for the sixth generation of BMW eDrive technology and will be used in the next generation of electric vehicles. The annual capacity of the battery cell factory will be up to 30 GWh.
- **New BMW Technical Training Center opened in October 2022.** Plant Spartanburg will use this new training center to promote creative learning, foster innovation, and advance technical skills of its workforce. Inside the \$20 million, 68,000 square foot building will be areas for hands-on vocational training as well as advanced training in robotics and controls, mechatronics, automotive technology, and electrification.
- **New BMW Logistics Center for X Models opened in September 2022.** This new facility is nearly one million square feet in size and provides a more efficient, sustainable, and digital operation.
- **New Press Shop Construction Underway:** BMW Group is investing more than \$200 million to construct a 219,000-square-foot press shop on the plant site. The investment, announced March 2, 2022, includes more than 200 new jobs. The new press shop, which will start production in the summer of 2024, will take raw coils of steel, cut them into blanks, and stamp sheet metal parts for future BMW models.

### **Why did BMW locate in South Carolina?**

- Statewide technical education system
- Skilled workforce
- Close proximity to key transportation facilities (rail, international airport, interstate)
- Deep-water Port of Charleston
- Pro-business policies and attitude of state and local officials

### **History of BMW Manufacturing Co., LLC**

- **1992:** BMW Group announced on June 23, 1992, that it would build its first full manufacturing facility outside of Germany in Spartanburg County, South Carolina. At that time, the company pledged to invest \$600 million, to employ 2,000 associates by the year 2000, and attract at least nine suppliers to the state.
- **BMW models produced since 1994:**
  - BMW 318i (1994-96)
  - BMW Z3 Roadster and variants (1995 – 2002)
  - BMW X5 (1999 – current)
  - BMW Z4 Roadster and variants (2002 – 2008)
  - BMW X6 (2007 – current)
  - BMW X3 (2010 – current)
  - BMW X4 (2014 – current)
  - BMW X7 (2018 – current)
  - BMW XM (2022 – current)

### **Current models built at BMW Manufacturing:**

- BMW X3 Sports Activity Vehicle (Third Generation)
- BMW X4 Sports Activity Coupé (Second Generation)
- BMW X5 Sports Activity Vehicle (Fourth Generation)
- BMW X6 Sports Activity Coupé (Third Generation)
- BMW X7 Sports Activity Vehicle (First Generation)
- BMW XM (First Generation)
- Five Motorsport models: BMW X3 M, BMW X4 M, BMW X5 M, BMW X6 M, and BMW XM.
- Three plug-in hybrid electric vehicle models: the BMW X3 xDrive30e, BMW X5 xDrive50e, and BMW XM.

**The plant's largest production year in history occurred in 2021 when 433,810 vehicles were produced.**

- The plant has produced **more than 6 million vehicles** since the first car was built in September 1994. Here are some key production milestones.
  - **September 8, 1994:** The first BMW, a 318i, was produced.
  - **February 28, 2006:** The one millionth BMW, a Z4 M Roadster, was produced.
  - **January 12, 2012:** The two millionth BMW, an X3 xDrive35i, was produced.
  - **March 24, 2015:** The three millionth BMW, an X5 M, was produced.
  - **September 8, 2017:** The four millionth BMW, an X3 xDrive M40i, was produced.
  - **June 4, 2020:** The five millionth BMW, an X5 M Competition, was produced.
  - **September 2, 2022:** The six millionth BMW, an X6 M, was produced.
- **On September 2, 2022, BMW produced its six millionth vehicle**, a Java Green Metallic BMW X6 M equipped with a 600-horsepower 4.4-liter BMW M TwinPower Turbo V-8 engine, Silverstone Full Merino Leather interior, and 21/22-inch M Star-spoke bi-color wheels. Due to its historic significance, this X6 M will remain at the factory and become part of the BMW historic collection.
- According to the U.S. Department of Commerce, **the BMW Group is the largest automotive exporter by value from the U.S.** with a total export value of nearly **\$9.6 Billion** in 2022. This marks the ninth consecutive year that BMW Manufacturing has led the nation as a vehicle exporter. The number of BMWs exported in 2022 totaled 227,029.
- In March 2021, the South Carolina Ports Authority announced that it exported the three millionth BMW manufactured in South Carolina through its port in Charleston.
- BMW Manufacturing **receives over 15,000 sea containers** on an annualized basis, most of which reach the plant via the highly efficient and successful Inland Port Greer.
- BMW is also a supplier of parts to other BMW manufacturing plants, with **outbound containers totalling 25,000** projected for 2017. A majority of these containers depart the plant via the Inland Port.

### **BMW's Economic Impact on South Carolina**

- BMW Manufacturing remains a high-performance economic engine for South Carolina through the company's continued investment and job creation. A 2022 study by the Darla Moore School of Business at the University of South Carolina showed that BMW Manufacturing has an annual economic impact of \$26.7 billion in the state, which reflects all goods and services produced directly and indirectly.
- The same study showed that Plant Spartanburg supports, both directly and indirectly, 42,935 jobs across the state along with \$3.1 billion in wages and salaries. The plant's direct employment base also accounts for 4.8 percent of all manufacturing jobs across South Carolina.
- The 2022 study said that BMW Manufacturing regularly uses more than 500 South Carolina suppliers, 90 percent of which are in the Upstate. With the large in-state supplier base, BMW has a uniquely high employment multiplier of 3.5. This means that for every 10 jobs created at Plant Spartanburg, another 25 are created elsewhere in the state, for a total of 35 jobs.

**BMW Manufacturing has its own health facility.** The Associate Family Health Center officially opened in January 2013. The Center is a first-class facility, employing highly trained professionals and offering the latest in healthcare technology. Use of the facility is available to all BMW Associates, eligible retirees, and their dependents.

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## **Sustainability in Production**

**Landfill Gas-to-Energy Project** – BMW Manufacturing's original Landfill Gas-to-Energy project was implemented in 2003 in conjunction with partners Ameresco and Waste Management. Infrastructure was installed at the Palmetto Landfill to collect, clean, and compress the methane gas. The gas is then transported through a 9.5-mile pipeline to the BMW plant. The methane gas coming from the landfill is used to cogenerate electrical power and heat water more efficiently.

In 2009, BMW replaced the original 4 turbines with 2 new highly efficient turbines. Currently, about 20 percent of the plant's total energy needs is provided by methane gas. Implementation of the landfill gas program reduces CO<sub>2</sub> emissions by 9,200 tons per year. Based on calculations provided by the EPA, the reduction of 9,200 tons per year of carbon dioxide emissions is equivalent to the benefit of planting over 2,300 acres of trees annually or 3 times the size of New York's Central Park.

**Use of Hydrogen Fuel Cells in Logistics Equipment** – BMW Manufacturing has more than 800 pieces of material handling equipment (forklifts, tuggers) powered by hydrogen fuel cell technology to deliver parts to the production line. This makes BMW one of the largest hydrogen fuel-cell fleets in the world on a single site. Operators can refill their equipment with hydrogen in minutes at one of dozens of refueling stations around the plant site.

**Integrated Paint Process (IPP) technology** – In the Paint Shop, the plant's IPP technology integrates the primer coat process into the topcoat process which eliminates three process steps: primer, primer oven and primer finish. This more efficient method, combined with the latest in robot application equipment and new ventilation technology, results in an ultra-high-performance paint shop that reduces the plant's energy consumption by 30 percent. It also reduces the total amount of process time per vehicle by 80 minutes, a 40 percent productivity increase.

**Use of CO<sub>2</sub>-Reduced Steel for Global Production:** For the Americas region, agreements have already been reached with domestic steel producers Steel Dynamics (SDI) and Big River Steel, a U. S. Steel facility, to use renewable energy sources in their local steel production. In the US and Mexico, about half of the BMW Group's flat steel requirements are supplied by the electric arc furnace (EAF) steelmaking process, which relies on electrical energy to melt down iron and steel scrap. This manufacturing process has significant potential for CO<sub>2</sub> savings, compared to coal-based steel production in a blast furnace. The CO<sub>2</sub>-reduced steel is then used at BMW Group Plants Spartanburg and San Luis Potosí to create car bodies for BMW vehicles. Due to its material properties, steel from electric arc

furnaces is particularly suitable for use in structural components such as the underbody.

**Use of Reverse Osmosis** – Plant Spartanburg uses high-pressure reverse osmosis to remove impurities from the water that is used. This allows the water to be reused in production processes, reducing wastewater and water consumption.

**Energy-Efficient Smart Motor System** – Working with BMW iVentures partner Turntide Motors, Plant Spartanburg has installed more than 300 energy-efficient smart motor systems in air handling units across the site. This system has already reduced plant HVAC energy use by 40 percent.

**Reducing Carbon Footprint with Carbon Capture Pilot Program** – BMW is rethinking how we build facilities, all the way down to the foundation. In a pilot program with BMW iVentures partner Carbon Cure, recycled CO<sub>2</sub> was injected into fresh concrete during mixing. Once injected, the CO<sub>2</sub> undergoes a chemical reaction where it transforms into a mineral, which makes the concrete stronger. What was once CO<sub>2</sub> is now eliminated. Some of this concrete was used during the building of our new Logistics Center for X Models.

From 2006 to 2022, per vehicle shipped, BMW Manufacturing has decreased:

- Water consumption by 57 percent
- Energy consumption by 67 percent
- Waste disposed of in a landfill by 84 percent
- Industrial wastewater by 55 percent

The amount of waste reused, recycled, or recovered totaled 96 percent in 2022. Only 4 percent of waste was sent to a landfill. (Note: BMW Manufacturing achieved “zero waste-to-landfill” status for all non-regulated waste streams in 2012.)

From 2015 to 2021, BMW:

- Saved over 810 million gallons of water through overall recycling efforts – enough daily water for 10 million people.
- Saved over 670 million kilowatt hours of electricity through overall recycling efforts – enough energy to power 17,700 homes for one year.
- Saved over 55 million gallons of oil – enough to heat/cool over 250,000 homes for one year.
- Recycled enough paper, cardboard, and wood to save over six (6) billion mature trees.

## Innovations

**Automated Stud Correction** – In the Body Shop, between 300 and 400 studs are welded to each car body. Stud placement is extremely important in ensuring excellent quality for the precise fit and finish that our customers expect from a BMW. To achieve our volume targets, many of these studs are applied in parallel stations. This creates over 12,000 unique attributes that must be controlled.

Over time, there can be a natural drift of position in the stud placement. The final position of the stud placement is essential to ensure quality to downstream manufacturing partners and end customers for operational excellence. The stud position is captured in 12 different measurement stations by using laser radar technology.

**By using artificial intelligence**, we can now create a closed loop system between the stud installation through the welding robots and the laser radar measurement stations. The AI detects when the stud positions are off, and it automatically gives feedback to the welding robots to adjust its positioning. The benefit of using AI has resulted in a 95% efficiency improvement. No jobs are lost by using AI. The associates who previously performed the tedious manual adjustments are now working on more complex problem solving and contributing to value-added improvements that push our business even further forward.

**Vision Quality System** – When it comes to AI, the BMW Group has proven its pioneering credentials with its AIQX (Artificial Intelligence Quality Next) project, which uses sensors and AI to automate quality processes.

Smart camera systems and sensors embedded in the production lines record data for backend evaluation in real-time using algorithms and AI. Today, we can already automate many quality inspections with artificial intelligence (AI). Examples are color verification, detection of parts and type verification, surface scratches, gap detection, and measurements. For every vehicle, 20 images are taken and analyzed with 26 different use cases (e.g., to check for defects or anomalies, etc.). This project was created at Plant Spartanburg and has since launched throughout the BMW Group.

**Smart Transport Robots (STR)** – STRs demonstrate a unique example of parts delivery inside the 1.2 million square foot body shop. These flat, autonomous mobile robots can transport parts weighing as much as one ton to their destination. STRs are equipped with high-performance technology and special artificial intelligence modules. Enhancements to the navigation system allow STRs to identify obstacles such as forklifts, tugger trains, and people faster and more clearly. This makes it possible for the STR to calculate alternative



routes in a matter of milliseconds. The AI-based technology enables the STR to learn and apply different responses to people and objects.

**3D Printing** – The Body Shop Central Maintenance department is using **3D printing (additive manufacturing)** to create spare parts for robots. The team has successfully printed a wheelhouse gripper and is using it on the production line. The parts are made from reinforced carbon fiber, which is stronger and much lighter than metal. Plant Spartanburg is the first BMW plant to use 3D printing in an automotive production environment.

**Robots That Install Plugs** – The Paint Shop has incorporated **special plug robots** that can plug holes in the body of a vehicle. There are dozens of holes on the underbody of every X model. The holes allow the e-coat and phosphate paint fluids to escape during the e-coat/phosphate bath. Not all these holes are needed in the assembly process, so the unnecessary holes are plugged before entering assembly. In the past, associates installed snap plugs by hand as the vehicle passed overhead. Now, new ABB robots perform much of this process, improving ergonomics in the paint shop.

**Scanner Glove** – In the Assembly department, BMW has developed a **scanner glove** with German startup company ProGlove. The smart glove has a bar code scanner that is comfortably attached to the back of the hand. The device is being used in areas of assembly and logistics. Associates wrap the scanner glove around their hand and press a button in their palm to activate the scanner. This allows the workflow to be more natural and intuitive. Because the associate now has both hands free, the process will be more ergonomic.

## Training & Recruitment

The rapid pace of digitalization, electrification, artificial intelligence, and autonomous driving is transforming the automotive industry. Advancing the skills of our workforce is a priority for BMW Manufacturing. Our task is to put together a toolbox that will help associates to prepare for their career. We are involved with several recruiting partnerships that deliver two-year, four-year, and graduate school employment candidates.

**BMW Scholars Apprenticeship Program** – BMW offers an apprenticeship program for students enrolled in several two-year career paths related to manufacturing technology – **the BMW Scholars program**. BMW Scholars offers the workplace benefits of a traditional apprentice program found in Germany with the additional advantage of tuition and book assistance. This is a great example of how collaboration between the educational and manufacturing sector can lead to employment and far better outcomes and opportunities for the next generation.

BMW Manufacturing first announced the Scholars program in 2011; in 2018, it expanded the number of apprentices in the program to 200 Scholars. BMW currently partners with four area technical colleges: Spartanburg Community College, Greenville Technical College, Tri-County Technical College and Piedmont Technical College. In the program, students attend class full-time and work at the BMW plant for 20 – 25 hours per week. BMW covers the cost of tuition and books, provides healthcare benefits and pays students for their work at BMW. Since the Scholars program began, there have been 12 graduating classes and nearly 400 BMW Scholar graduates.

In 2021, BMW expanded the popular Scholars program to include two additional opportunities: BMW Rising Scholars and BMW Fast Track.

**BMW Rising Scholars:** The BMW Rising Scholars Program allows high school seniors to work part-time at BMW Manufacturing while attending high school and a participating Career and Technical Education (CATE) center. These students will work primarily at the BMW Training and Development Center 15 hours per week. The first class of Rising Scholars started in August 2021. Just like the BMW Scholars Program, Rising Scholars is registered as an Apprenticeship Program with U.S. Department of Labor.

**BMW Fast Track:** In the BMW Fast Track Program, BMW will hire recent graduates or experienced individuals who already have an associate degree in a technical field such as

mechatronics or automotive technology. They will enter an aggressive training program using the well-established BMW Scholars curriculum. These candidates will train 40 hours a week instead of the normal 20 hours.

**PACE Program** – Other successful programs at the plant include the **PACE** program (**P**rofessional **A**ccelerated **C**ross-functional **E**xperience). This program, which began in July 2008, was formulated in conjunction with several four-year universities to develop a pipeline to recruit the best and brightest engineering, supply chain, finance, and business graduates from around the nation. The goal is to establish a pool of broadly skilled specialists beyond their specific field of study. Currently, 30 candidates are in the **PACE** program. Since July 2008, more than 210 associates have been hired by BMW through this program.

**Gen>NEXT Program** – To support the professional recruitment, BMW makes **domestic and international intern and co-op positions** available through its **Gen>NEXT** program. This program is available to highly skilled students who have demonstrated an interest in international careers in automotive manufacturing. The objective is to build a channel to find engineering and management prospects that can gain valuable knowledge by working along the side of existing, tenured employees.

## Community Involvement

**BMW is committed to being a responsible corporate citizen.** The company believes its role in the community is to use its funds, facilities, and image to initiate inventive partnerships among existing organizations; to be a catalyst for innovation in education, social service programs and cultural activities; and to promote volunteerism. Over the last two decades, the company has given over \$40 million to local educational, cultural, and civic programs throughout South Carolina.

Each contribution reflects our principles and commitment to responsible action. For this reason, we like to support programs that have a long-term, sustainable impact on our community. Programs typically align with one of the following four categories: STEM education, Sustainability, Road Safety and Cultural Engagement.

Arts and other cultural activities are engines for economic growth, and **BMW is actively involved in arts and cultural partnerships throughout South Carolina.**

- BMW donated \$1.25 million to restore and preserve eight acres of wetlands at Unity Park west of downtown Greenville, SC. The donation will also support the construction of a series of low-impact boardwalks and overlooks through the wetlands, which occupy the northern portion of 60-acre Unity Park.
- A \$1 million gift to the Spartanburg Center for Arts, Science and History ensures the advancement of cultural arts in the Upstate. BMW is a major supporter of the internationally renowned Spoleto Festival, which is held each spring in the coastal city of Charleston, South Carolina.
- In 2018, BMW invested \$1 million in the International African American Museum (IAAM) located in Charleston, SC. BMW's \$1 million investment is recognized in the Orientation Theater, where guests will begin their exploration of the IAAM. Here, visitors will watch videos that provide essential historical context to the museum's location at the former site of Gadsden's Wharf.

"BMW values community partnerships," said Dr. Robert Engelhorn, president and CEO of BMW Manufacturing. "For this reason, we are committed to supporting the historic and cultural fabric of the International African American Museum. Preserving and maintaining history and culture of a people strengthens the community through

preservation, education, and technology."

- **Education is a major focus for the company.** By concentrating on this area, BMW can improve the overall quality of life in South Carolina while ensuring a future quality workforce pool.
  - **BMW is the premier sponsor for the annual South Carolina Teacher of the Year**, which supports teachers across the state. In addition to monetary support, BMW donates a vehicle to the Teacher of the Year. The teacher drives the BMW during his/her year-long sabbatical from the classroom as the state's public education ambassador.
  - **BMW Manufacturing donated \$300,000 to fund the dynamic programs of Project Lead the Way** for a three-year period at four Cherokee County middle schools: Gaffney, Blacksburg, Granard, and John E. Ewing. Project Lead the Way is a national non-profit that offers STEM (science, technology, engineering, mathematics) learning experiences for K-12 students and teachers that include hands-on activities, projects, and complex problem solving.
  - **BMW is involved in educational initiatives**, such as the state's Governor's School for the Arts and Humanities and Governor's School for Science and Math. South Carolina's technical colleges and universities also receive BMW support to fund fellowships.
  - New libraries in Greer, the Middle Tyger area and Spartanburg County were supported by BMW, and associates work with elementary and secondary schools, vocational schools, colleges and universities to use the plant as a learning tool for students.
- In 2001, the company launched the **BMW Charity Pro-Am golf tournament**. This local event was created to showcase the beauty of Upstate South Carolina and the hospitality of its citizens to the world; to bring the Upstate a fun and entertaining week centered around professional athletes and world-renowned celebrities; and to raise money and awareness for South Carolina charities. Since 2001, the tournament has distributed \$14.3 million to charities in the Upstate, part of the PGA TOUR's \$3 billion raised for charity.

## Diversity Initiatives

BMW Manufacturing believes diversity among its suppliers adds value throughout the organization. As a leader in the global automotive industry and one of the leading manufacturers of premium automobiles, BMW Manufacturing works toward a goal of inclusiveness that enables the company to attract and retain a talented workforce, develop a diversified supplier network, and have a positive impact through extensive community involvement. This strategy is designed to ensure the company's commitment to sustainable manufacturing success.

- Since 2012, BMW Manufacturing has hosted the **Tier 1 Supplier Diversity Matchmaker Conference** in Greenville, SC. The conference, one of the largest diversity events in the nation, is an opportunity for women-, minority- and veteran-owned businesses to participate in a day of professional development and networking with BMW's Tier 1 suppliers. The event allows participants to meet many of BMW's suppliers and showcase their capabilities. Many of these businesses have been awarded national and global contracts with BMW Tier 1 suppliers. The 2022 conference drew more than 2,500 participants and 232 Tier 1 suppliers. Since 2012, BMW and its suppliers have increased spending with women-, minority- and veteran-owned companies by nearly 400 percent.