A Strong Partnership with Germany

Welcome to Bombardier Transportation in Germany

Railways have existed in Germany for more than 175 years. The first steam locomotive to travel in Germany was the ‘Adler’ (Eagle) - on the Nuremberg to Fürth line in 1835. While the Adler was supplied from England, the German rail industry was established soon after. Rail vehicles have been developed and built in Germany for more than 160 years. Some of the sites with the richest tradition in this industry are part of Bombardier.

Global rail technology leader Bombardier Transportation is continuing this proud tradition. Today, in the early 21st century, the rail industry in particular has the potential to promote social change. Growing urban centres and emerging markets demand mobility that is efficient and environmentally friendly. Rail transport provides the opportunity for sustainable transport solutions that can meet the challenge of congestion in overcrowded cities while delivering economic and environmental benefits.

Our German sites play an important role in the development of modern rail transportation technologies. Bombardier Transportation has the most comprehensive product portfolio in the rail industry. We manufacture and maintain vehicles not only for the domestic market, but also for customers around the world.

You can find out more about our commitment to Germany on the following pages.

**Bombardier Transportation Around the World**
- Bombardier Transportation is a global market leader, offering the most comprehensive product portfolio in the rail industry
- More than 100,000 vehicles in operation worldwide
- Products and services in over 60 countries
- 62 production and engineering sites
- Approximately 36,000 employees

**Bombardier Transportation in Deutschland**
- Global Headquarters: Berlin, with more than 560 employees
- Production sites: Aachen, Bautzen, Braunschweig, Frankfurt, Görlitz, Hennigsdorf, Kassel, Mannheim, Siegen
- Approximately 9,000 employees in Germany
- Products and services made in Germany: Trams and urban rail, underground, regional and intercity trains, locomotives, bogies, signalling technology, propulsion and control equipment, rail control solutions, maintenance and modernisation services, replacement component supply systems
Germany has one of the world’s richest railway traditions. Bombardier Transportation, along with its German production sites, plays a major role in shaping this progress. “Made in Germany” is an internationally recognised seal of quality – particularly with regard to the railway industry. Our German production sites have been setting quality standards for decades and continue to advance the full range of modern and innovative rail industry products for the future. The scope of our activities at our German sites ranges from the development, engineering and construction of mass transit, regional and mainline trains in Hennigsdorf, Aachen and Görlitz through to centres of expertise for trams in Bautzen and locomotives in Kassel as well as bogie development and production in Siegen.

Bombardier has recently added a Centre of Excellence for e-mobility at its site in Mannheim. In addition, we also provide a full range of services at our sites in Hennigsdorf, Mannheim and Kassel. Propulsion and control systems in Mannheim and the development of rail control solutions in Braunschweig round off our portfolio.

Delivering Excellence to the World
Our German sites provide high-tech engineering services and form the backbone of our production in Europe. They work closely with our international production sites in order to deliver excellence to customers on five continents. More than 60 per cent of their production is exported to customers around the world, often in close cooperation between German sites and plants in the customer’s country. The largest vehicle order in the history of the Swiss Federal Railways is currently being organised under the leadership of the Görlitz plant. The BOMBARDIER* TWINDEXX* double-deck train is a product of the close collaboration of sites in Germany, Sweden and Switzerland. Bombardier will produce 59 double-deck trains with an innovative tilting technology and excellent passenger comfort.

An example of international cooperation beyond Europe is China: The engineering department in Hennigsdorf is responsible for the BOMBARDIER* ZEFIRO* 380 very high speed train. A joint venture is producing the trains in the Chinese city of Qingdao.

You can find further information at: www.de.bombardier.com
Bombardier Transportation is supplying rail systems in many countries and cities around the globe.

We take special pride in managing our international business from Berlin. Our global headquarters have been situated in the German capital since 2002 – a city with a great industrial past, a fascinating present and a promising future. An urban centre of some 3.5 million people, Berlin looks back on an interesting railway history, as one of the great European railway hubs with advanced innovations in public mass transport in the late 19th and 20th centuries. Berlin has always been famous for its fast pace – and much of this is attributed to its highly efficient public transportation network.

From trams and metros to commuter and regional trains, many of these vehicles originated from Bombardier Transportation. It is against this unique historical background that we want to shape the future of mobility. We are building these products not only for Berlin, but for the world.

Number One

The headquarters of Bombardier Transportation are situated at No. 1, Schöneberger Ufer – an appropriate address for a global leader in rail technology. Since 1895, this now magnificently restored, neo-Renaissance building in the heart of the city has been a landmark in German rail history. Originally home to the Royal Prussian Railway Directorate, a body regulating Berlin’s rail traffic, the building later housed the Imperial Railway Directorate, also responsible for rail traffic in Berlin.

Following the Second World War, it served the Deutsche Reichsbahn and in the late 1950s, it became a clinic for railway employees. After the fall of the Berlin Wall, between 1991 and 2002, the striking, red-brick building served as the Deutsche Bahn Berlin headquarters. Finally, after thorough restoration, it re-opened in 2006 as the global headquarters of Bombardier Transportation.
Life in modern cities demands innovative mass transit solutions. Bombardier Transportation’s offers a diverse product range that meets the requirements of customers in Germany and beyond – from trams and light rail vehicles to metros and commuter trains.

With the global trend to keep private transport away from inner cities and at the same time to provide rapid access to city centres, trams have undergone a renaissance in recent years. Bombardier Transportation has been at the forefront of this development, with the innovative BOMBARDIER* FLEXITY* product range. These vehicles are perfectly suited to the needs of urban transport, ranging from 100 per cent and 70 per cent low-floor trams and high-floor light rail vehicles through to proven dual-system solutions. To date, more than 3,000 FLEXITY vehicles have been ordered, of which more than 2,000 are successfully operating in more than 20 countries around the world – including the German cities of Augsburg, Berlin, Dresden, Dortmund, Frankfurt am Main, Kassel, Krefeld and Leipzig. FLEXITY trams offer outstanding, reliable quality, attractive design and passenger comfort.

For Berlin, where the public transport network serves almost 3.5 million passengers daily, Bombardier Transportation has designed a FLEXITY solution in close co-operation with the Berlin Transport Authority (BVG). The new dynamic look and design of the FLEXITY Berlin was introduced in September 2008. It is inspired by the clear, functional lines of the Bauhaus design school, making it blend in well with the capital’s cityscape. The 100 per cent low-floor trams are air-conditioned, more easily accessible and quieter than their predecessors. The new vehicles have graced the streets of Berlin since 2011. The 142 FLEXITY Berlin trams ordered to date are giving mass transit in the capital a new and characteristic face.
Flexible Transport Solutions for Cityscapes

As urban centres continue to expand, fast, reliable and attractive means of transportation for millions of commuters is becoming increasingly important. Bombardier Transportation offers innovative solutions for modern commuter and regional transport.

In order to prevent traffic jams and gridlock due to personal transport in inner cities and on the surrounding road network, the rapid integration of cities’ commuter belt by rail is becoming increasingly important. A solution to this are commuter trains, which provide high capacity, rapid acceleration and high levels of reliability – such as the new Series 430 trains from Bombardier, for example, which are in use in the Stuttgart region and in the Frankfurt area. These modern four-car vehicles with their lightweight aluminium construction have large multi-purpose areas in the end rail cars, which allow easy access for people with bicycles.

In areas with high passenger volumes, BOMBARDIER* TWINDEXX* Vario double-deck trains are the ideal solution to meet growing demand. These vehicles are freely scalable in terms of their length. The top speed is 160 km/h, with the option of increasing it to 189 km/h. A range of equipment modules enable operators to select versions suited to their requirements, and combine these in almost any way. DB AG has already ordered 135 variable double-deck coaches of the newest generation Do2010 for mainline routes, as well as 18 intermediate coaches and 16 double-deck power cars for regional routes. The latter will be put into operation in northern Germany.

The TALENT 2 is the new all-round commuter train for regional transportation
With the *BOMBARDIER* TALENT* 2*, Bombardier offers a new generation of regional trains. Deutsche Bahn (DB) has so far ordered 295 of these electric multiple units (EMU), and they will form the future basis of the DB regional fleet. The trains are characterised by their variable interior designs and layout as well as their flexible configuration from two- to six-car units. TALENT 2 trains also set new standards in terms of comfort: equipment for example includes air-conditioning, advanced travel information displays, wide doors as well as toilets for disabled passengers.

The new commuter trains for the Stuttgart and Frankfurt regions

Double-deck trains for greater rail capacity
A Full-fledged Service Portfolio for Easy-flowing Operation

The reliability and service availability of operational trains are essential to the safe operation and profitability of a rail transport system.

Bombardier offers a worldwide service portfolio and thus provides operators with comprehensive support in the operation of their systems. These include fleet management, upgrading vehicles with the latest technology, maintenance and repair services as well as innovative replacement component supply systems. In Germany, for example, Bombardier Transportation has run the entire fleet management for Landesnahverkehrsgesellschaft Niedersachsen (LNVG) since 2003. The maintenance of the 40 BOMBARDIER* TRAXX* locomotives and 220 TWINDEXX Vario double-deck coaches provides high levels of reliability, safety and service availability – the fleet availability stands at 99 per cent.
Modern rail control solutions increase transport capacity

Train operators and passengers demand safe, efficient and cost-effective rail transportation across state borders.

Bombardier Transportation develops and installs systems for train control and signalling systems. In this area, we offer integrated control systems, electronic interlocking systems, automatic train protection and operation systems, radio-based train control and signalling systems as well as wayside equipment for local and long-distance transport. Modular electronic BOMBARDIER® EBI® Lock interlocking systems control and monitor trains of Deutsche Bahn and many other regional, commuter and industrial trains in Germany. The new technology contributes considerably to controlling operating procedures more flexibly, reducing maintenance costs, running at shorter intervals as well as significantly improving the operation of routes.

The EBI Lock interlocking systems are used worldwide and more than 800 systems have already been installed. Locomotives which are used across Europe in cross-border transport are equipped with the modern train protection system EBI Cab 2000 from Bombardier Transportation. The interoperable on-board technology enables an increase in transport capacity because it allows higher speeds and shorter train interval times. Meanwhile several routes on significant European freight corridors are equipped with ETCS, on which new or retrofitted locomotives operate with our EBI Cab 2000 system.
The Evolution of Mobility: sustainable passenger transport

Cities and their inhabitants require greener, more sustainable transport systems to cut congestion, lower emissions and reduce energy consumption.

Bombardier Transportation has long been developing pioneering products and services and providing highly innovative, sustainable and intelligent solutions. We are convinced that the climate is right for trains. Thanks to low energy consumption, low pollutant emissions, low noise and high transport capacities with less area wastage, modern rail vehicles offer real environmental advantages – for densely populated industrial countries like Germany, as well as for developing countries with their crowded conurbations.

With this in mind, Bombardier in 2008 launched the innovative BOMBARDIER* ECO4* product portfolio for the environmentally friendly and economical operation of rail vehicles. Many of these products are developed and manufactured in Germany. They combine the four cornerstones of energy, efficiency, economy and ecology, and enable general energy savings of up to 50 per cent as well as significant cost reductions. Success and demand have helped to grow the portfolio from an original eight solutions in 2008 to 15 different technologies today. Our production processes also go far beyond existing international requirements– from optimising energy efficiency to lowering noise levels or the use of harmless materials.

Bombardier Transportation’s long-standing “Design for Environment” programme contributes to the development of vehicles for sustainable mobility. This awareness of the environment allows our Centres of Excellence to devise product concepts that make some of our trains more than 95 per cent recyclable.

ECO4 application on German rails

One of the most fascinating technologies of the ECO4 product family, the BOMBARDIER* MITRAC* Energy Saver saves the energy released during braking and uses this during the next load operation. In trams, this system saves up to 30 percent energy; in diesel trains, this figure reaches as high as 35 percent. The MITRAC Energy Saver was tested for four years on the Rhein-Neckar-Verkehr GmbH (RNV) service in Mannheim. The operator is currently using 19 light rail vehicles equipped with this system in Heidelberg.

You can find further information at:
www.csr.bombardier.com
www.theclimateisrightfortrails.com
PRIMOVE Technology from Bombardier: A Milestone in Rail and Street E-Mobility.

The unique BOMBARDIER® PRIMOVE® system forms part of Bombardier’s ECO4 portfolio. Based on the principle of inductive power transfer, Bombardier’s innovative PRIMOVE technology allows electric vehicles such as trams, buses and cars to be recharged either in motion (dynamic charging) or at rest (static charging) without affecting driving habits or journey times. The energy transfer is highly efficient and does not sacrifice performance. In combination with on-board energy storage, energy consumption can be significantly reduced. By eliminating the overhead cables and other wires previously needed to power electric vehicles, mass transit networks can now blend in effortlessly with their surroundings. City landmarks, parks and heritage sites are left intact and the overall attractiveness of the city is thereby enhanced.

You can find further information at: www.primove.bombardier.com
The PRiMOVE Pilot Project in Augsburg
In September 2010, Bombardier Transportation, in cooperation with the Augsburg Transport Authority (Stadtwerke Augsburg Verkehrs-GmbH) and funded by the German Federal Ministry of Transport, Building and Urban Development, installed the contactless and catenary-free PRiMOVE system for trams on a section of the existing Line 3 to the city’s exhibition grounds. This pilot test successfully simulated normal operation in an urban environment.

In spring 2012, the first automotive prototype was equipped with PRiMOVE technology to undergo a series of performance tests on the Augsburg track as well as at Bombardier’s new Centre of Excellence for electric mobility technology in Mannheim, Germany.

The PRiMOVE Pilot Project in Braunschweig
As of June 2012, Bombardier is cooperating with the city of Braunschweig and local operator Braunschweiger Verkehrs-AG to turn a section of the bus network into an eco-friendly electric route. The project is funded by the German Federal Ministry of Transport, Building and Urban Development. As of early 2013, two buses are scheduled to operate with PRiMOVE technology on a 12 km route.

Centre of Excellence in Mannheim
Bombardier has opened a dedicated Centre of Excellence in Mannheim to support partnerships, projects and opportunities in the fast-moving e-mobility sector. The centre hosts a complete power test-lab set-up for all vehicle applications. Additionally, Bombardier has acquired several vehicles to conduct independent testing under real-life conditions.
Leading Transport Solutions for Cities and Airports

Our wide-ranging *BOMBARDIER*® *INNOVIA*® portfolio of completely automated and driverless technologies encompasses metro, monorail and people mover systems. These systems combine reliable performance and operational flexibility with highly efficient passenger capacity. They use less energy and less space – all critical factors for operators around the world.

Reliable *INNOVIA* APM systems from Bombardier are used in over 20 of the busiest airports, as well as in some of the most congested urban areas. In Germany too, airport operators rely on our flexible solutions: Frankfurt Airport has used an *INNOVIA* APM 100 type automatic people mover system since 1994. Its fleet, operating over a 1.9 km-long double-track system, currently consists of 18 vehicles. Bombardier not only provided the complete turnkey system, but also took on operation and maintenance services from the very beginning. Bombardier’s comprehensive system operation and maintenance program is carefully designed to optimise and ensure system performance. This enabled problems to be identified and eliminated before these could affect system availability.

In November 2011, Bombardier also won a contract to provide a driverless *INNOVIA* people mover system for Munich Airport. The airport’s new satellite terminal, almost 400 m away, is accessible from Terminal 2 in less than a minute via an underground *INNOVIA* APM 300 system. Smooth, flexible automatic operation with 12 vehicles is guaranteed by the leading-edge *BOMBARDIER*® *CITYFLO*® 650 communications-based train control system (CBTC). System completion and the start of operations are planned for 2014. A nine-year operations and maintenance period will then get underway.

**A Versatile System for Optimal Adaptability**
The *INNOVIA* APM 300 platform marks the latest generation APM technology from Bombardier. With its numerous customisable functions and flexible operating modes, it provides a variety of configurations and can thus fulfil the specific airport and train operator system requirements. The sleek, aerodynamic trains comprise lightweight yet solid and corrosion-resistant aluminium body shells. The operating system allows speeds of up to 80 km/h.
High speed trains are the future for sustainable mobility - especially as an alternative to short flights. Bombardier participates in approximately 95 per cent of all high speed projects in Europe and can look back on more than 20 years of experience in this sector.

Here Bombardier has proven its skills in the various consortia for important core elements - from car bodies, pantographs and power supply through to motors and gears as well as testing and homologation procedures. Examples of this include the ICE 3 used by Deutsche Bahn with a top speed of 330 km/h or the AVE S-102 high speed trains for the Spanish state railway (RENFE).

With the BOMBARDIER* ZEFIRO* product range, Bombardier Transportation is also introducing its own high speed technology. The ZEFIRO trains are designed for operating speeds between 250 km/h and 380 km/h and offer the highest level of travelling comfort at low operating costs, combined with application options for various countries and rail systems.

ZEFIRO technology was first used in China: Since 2009, ZEFIRO 250 trains have been in scheduled service there - so successfully that Bombardier, together with its joint venture, received an order for ZEFIRO 380 trains in the same year. This super-high speed train with a maximum operating speed of 380 km/h is being built in China and is set to significantly reduce travelling times when it enters service on the Chinese high speed network from 2013 onwards. Thanks to the energy-saving ECO4 technologies, the ZEFIRO 380 trains provide the best energy efficiency in this vehicle class.

Bombardier has developed the V300ZEFIRO for the European market, including the expansion of the Italian high speed network, in a consortium with Ansaldo Breda.
Interoperability: Setting a New Standard

**TRAXX locomotives help countries and continents to grow closer.**

The key to getting more passengers and freight onto rails lies in expanding Europe’s international rail corridors. TRAXX locomotives from Bombardier feature highly innovative technologies for cross-border operation: they are already prepared for stage 2 of the European Rail Traffic Management System (ERTMS). TRAXX locomotives are based on a standard platform, which includes both electric and diesel-electric locomotives. Their advantages lie in technical flexibility, reliability, in cost-efficient operation and maintenance.

Bombardier had these goals in mind when developing the latest innovations: The new TRAXX generation is setting new standards with the TRAXX AC with Last Mile Diesel Engine and the TRAXX Diesel Multi-Engine. Both locomotives were developed according to the customers’ requirements.

The success story of the TRAXX platform reflects the significance of international, cross-border traffic, mostly on the North-South freight corridors in Europe. To date, more than 1,550 TRAXX locomotives are in operation worldwide – assembled in Kassel with FLEXX Power bogies from Siegen and propulsion and controls.
from Mannheim and Hennigsdorf. In Germany, there are over 700 TRAXX locomotives in service, 600 of which are operated by Deutsche Bahn.

Bombardier’s leading locomotive site is Kassel – the plant can look back at more than 200 years of experience. The TRAXX Service Group also operates in Kassel, providing around-the-clock support to their customers as well as expert maintenance and service for their TRAXX locomotives.

ERTMS: Bringing Europe together

The European Rail Traffic Management System (ERTMS) technology is a supplier-independent rail signalling standard allowing trains to cross international borders safely without requiring a change in locomotive. At the core of the ERTMS, which will ultimately unify European railway traffic in the years to come, are the European Train Control System (ETCS) and the GSM-R, a new radio system for voice and data communication. ERTMS solutions use both onboard and wayside equipment to manage rail traffic more effectively – improving safety, maintaining high availability, providing shorter headways between high speed trains and reducing costs for rail operators.
Local Competence – Our Divisions

**Bombardier Transportation’s individual divisions cover the entire range of rail transport technologies.**

The Mainline and Metros division has its headquarters in Hennigsdorf. It is responsible for our mainline, underground and regional trains. These passenger trains are developed and manufactured in Aachen, Hennigsdorf, Görlitz and Bautzen. Innovative highlights include the new ZEFIRO high speed train, the TALENT 2 regional train, TWINDEXX latest-generation double-deck coaches, as well as vehicles for mass transit such as the ET 430.

Maintenance to protect the lifecycle of vehicles is an important factor for any operator: Our Services division based in Hennigsdorf, Mannheim and Kassel manages locomotives, diesel and electric multiple units, single and double-deck passenger coaches, as well as trams and metros. The spectrum of services ranges from the supply of replacement components through component repairs and vehicle upgrades to complete fleet management.

Our Locomotives, Light Rail Vehicles and Equipment division serves national and international demand for locomotives, trams and light rail vehicles as well as propulsion & control systems and bogies. Kassel is the Bombardier site at which Europe’s leading TRAXX locomotives are built, while the Bautzen plant is responsible for light rail vehicles and trams. Our experts in Siegen develop and produce bogies for all markets and rail vehicles.

With teams in Hennigsdorf and Mannheim, the Propulsion & Controls business unit is closely involved in developing the MITRAC system for cross-border traffic - a prerequisite for the future of European rail transportation.

The Systems division, based in Berlin, covers the development of complete transport systems. These include fully-automated rapid transit systems such as the NNOVIA systems, as well as operating and maintenance services for such systems. The division developed the innovative PRIMOVE system for all types of electric vehicles in cooperation with the Centre of Excellence for e-mobility in Mannheim.

The Rail Control Solutions division’s German base is in Braunschweig. Here and at the site in Mannheim Bombardier develops, tests and commissions train control systems and components for BOMBARDIER* INTERFLO* mainline and BOMBARDIER* CITYFLO* mass transit solutions as well as for the transnational European Rail Traffic Management System.

You can find further information at: www.de.bombardier.com
Braunschweig
Signaltechnik, Steuerungssysteme

Kassel
Lokomotiven und Services

Siegen
Drehgestelle

Aachen
Intercity-, Regional- und Doppelstockzüge

Frankfurt¹
People Mover und Services

Mannheim
Antriebs-, Signaltechnik und Services

Hennigsdorf
Intercity- und Regionaltriebzüge, U-Bahnen, Antriebstechnik, E-Komponenten, Services

Berlin
Konzernzentrale

Görlitz
Doppelstockzüge, Intercity- und Regionaltriebzüge

Bautzen
Stadt- und Straßenbahnen

¹Customer site with Bombardier employees
Bombardier Transportation has an active set of environmental print guidelines, for further details click onto:
www.transportation.bombardier.com

Learn more about our commitment to sustainable mobility on:
www.theclimateisrightfortrains.com

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