

Report from the Head of Environment of Deutsche Bahn

**Facts and figures on
environmental protection
in 2016**

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Standing out with environmental protection

Deutsche Bahn wants to continuously improve in the field of environmental protection, and is assessed regularly to achieve this goal. Participating in ratings and rankings provides DB with an outside view and important tips on where it can improve even further. DB has set itself the goal of being the leader in environmental protection.



Foreword



Dear Reader,

For many people, environmental and climate protection are key challenges our country is currently facing, and we at DB couldn't agree more.

That's why, along with being economically successful and becoming a top employer, environmental protection forms one of the three fundamental pillars of Deutsche Bahn's corporate strategy. Environmental protection is in our DNA.

We see environmental protection to be an all-encompassing task, including areas from climate protection, the expansion of renewable energy and improved noise control to increased protection of birds on overhead lines and the use of recycled paper. By the end of 2016, we launched a total of over 8,600 individual measures aimed at nature and wildlife conservation.

I would like to highlight three milestones we reached in 2016:

- As part of our contribution to climate protection, we have already cut our specific CO₂e emissions by 27.5% compared with 2006, and increased the share of green energy in the traction current mix to 42%.
- Together with the German Federal Government, Deutsche Bahn has carried out noise remediation work on some 1,600 kilometers of line since 1999. Some 57,000 apartments and houses have been equipped with noise-control measures. And over half of all of DB Cargo's freight cars (over 32,000) were equipped with whisper brakes by the end of 2016 and now run much more quietly.
- We also opened the second carbon-neutral station in Lutherstadt Wittenberg in December 2016. The use of geothermics, photovoltaics, roof greening, rain water management, and LED lighting allow the station to be operated without emitting any CO₂.

We strengthen our commitment to environmental protection every year because we know that rail will only succeed in the future if it is environmentally friendly. And that is what I am committed to achieving.

A handwritten signature in blue ink, which appears to read 'Andreas Gehlhaar'. The signature is fluid and cursive, with a horizontal line underneath.

Andreas Gehlhaar

Strategy and goals

Deutsche Bahn's DB2020+ strategy brings three dimensions – economic, social and environmental – into harmony with each other. To implement this strategy, we at DB have set ourselves ambitious targets: we want to be a profitable quality leader, a top employer and an eco-pioneer by 2020.

Dimension of sustainability



Economic dimension
Profitable quality leader



Social dimension
Top employer



Environmental dimension
Eco-pioneer

On our way to becoming an **eco-pioneer**, we are concentrating on five environmental areas: In climate protection we want to reduce CO_{2e} emissions through high energy efficiency and the use of renewable energy. The measures we carry out on our infrastructure and rolling stock will ensure quieter operation and also improve noise reduction. Recycling and reduced consumption will improve resource efficiency. DB is contributing to air quality control with the use of modern, low-pollutant rolling stock. When designing and operating railway installations and property, we are mindful of nature conservation and work to preserve the habitats of plants and animals.

Organizing environmental protection

At the DB Group, some 300 employees are responsible for organizing environmental protection work. They are actively involved in consolidating our position as an eco-pioneer. The central department responsible for organizing environmental protection measures at the Group is called DB Environment. Employees develop environmental targets and measures together with the business units and offer environmental services.

The Group Committee on the Environment pools the environmental measures. Environmental units and on-site environmental coordinators are responsible for implementation in the business units, maintenance depots, and sites. DB's international companies are responsible for consolidating our commitment to environmental protection worldwide.

As of 2016

Target for 2020

Specific CO₂e emissions compared with 2006

-27.5%



-30%

Renewable energy in the traction current mix

42%

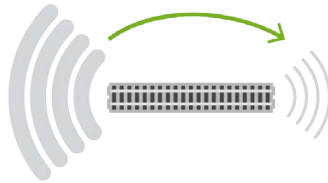


45%¹⁾

1) relating to DB companies

Track kilometres noise remediated

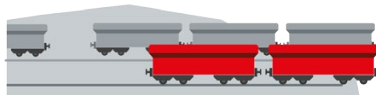
1,600 km



2,000 km

Quiet freight cars (new and refitted)

32,400



64,000

Recycling rate

97.3%



95%

Absolute particulate emissions from diesel vehicles compared with 2010

-42.2%

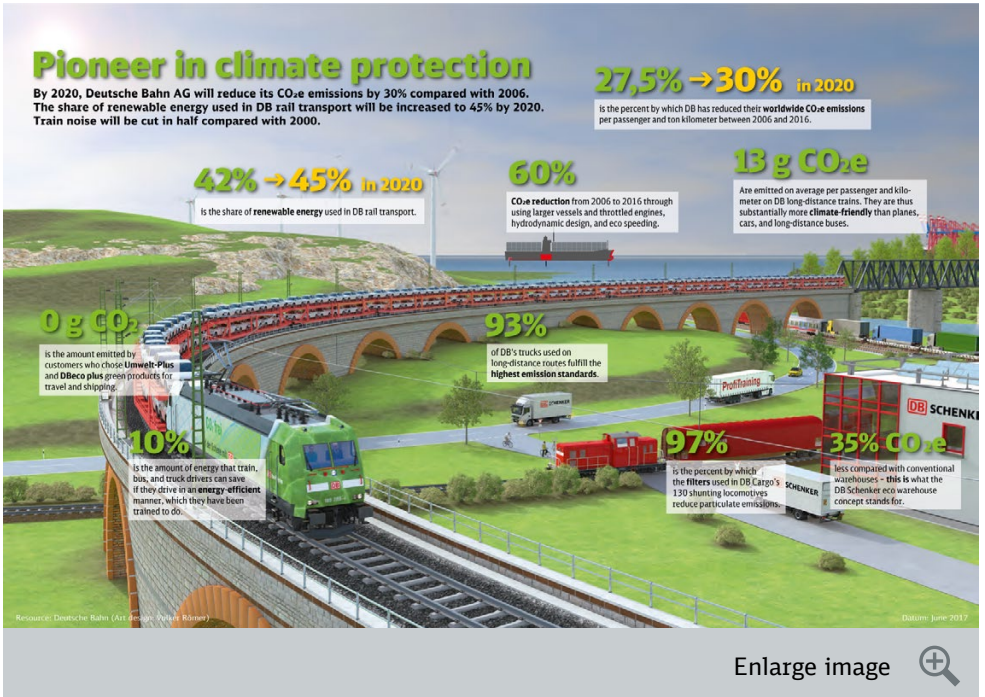


-55%

Climate protection

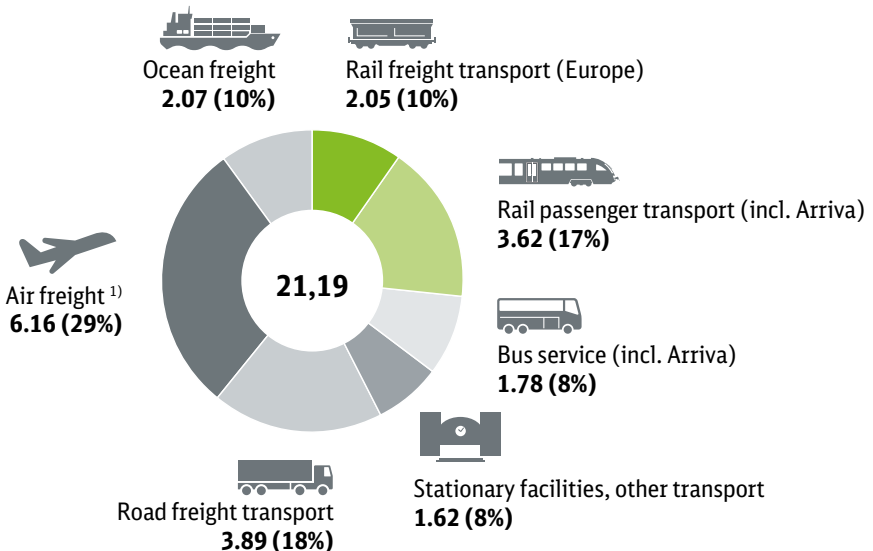
In 2015 the internationally recognized rating organization CDP recognized DB as the world's most climate-friendly rail company for its record in climate protection.

However, DB wants to continue to improve and raised its climate protection goal in 2016. By 2020, DB will reduce the specific CO₂e emissions, i.e. greenhouse gas emissions per person and metric ton kilometer, of its worldwide transport by 30% in comparison with 2006. It's previous goal was 20%.



i **CO₂e:** The greenhouse gas effect of gases such as methane or nitrous oxide (laughing gas) is converted into CO₂ and added to total emissions.

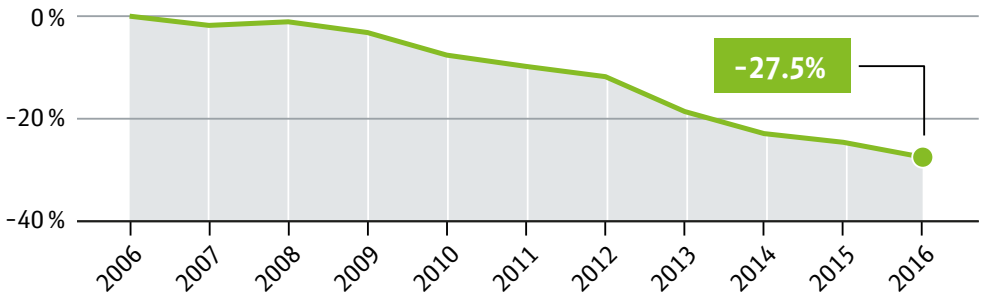
Absolute CO₂e emissions of the DB Group by type of transport in millions of metric tons



1) incl. pre and onward carriage

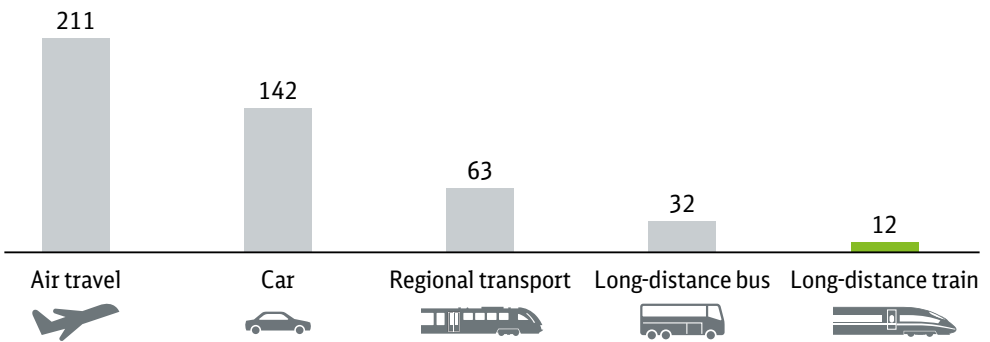
Development of DB's target for specific CO₂e emissions

adjusted to 2006 values, change in comparison with 2006 in %

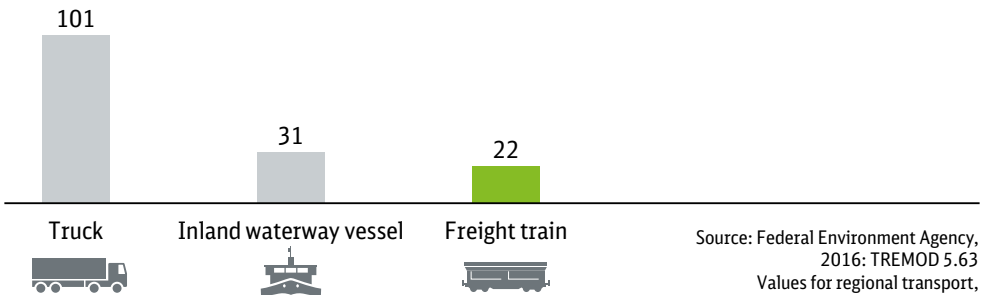


CO₂e emissions by mode of transport

Passenger transport in grams per person and kilometer (g/pkm)



Freight transport in grams per metric ton and kilometer (g/tkm)



Source: Federal Environment Agency, 2016: TREMOD 5.63
 Values for regional transport, long-distance trains and freight trains: DB AG (reference year 2014)

Crafting the mobility chain

This comparison of modes of transport shows that DB long-distance trains and freight trains are the most climate-friendly forms of transport. Smart integration of transport modes creates forward-looking and environmentally friendly solutions for mobility and logistics in both DB's passenger and freight transport segments. Moreover, DB's carsharing service, the use of around **600 electric vehicles**, and **13,000 Call-a-Bike rental bikes** reduce harmful emissions as compared with other mobility products.

CO₂-free stations and maintenance depots

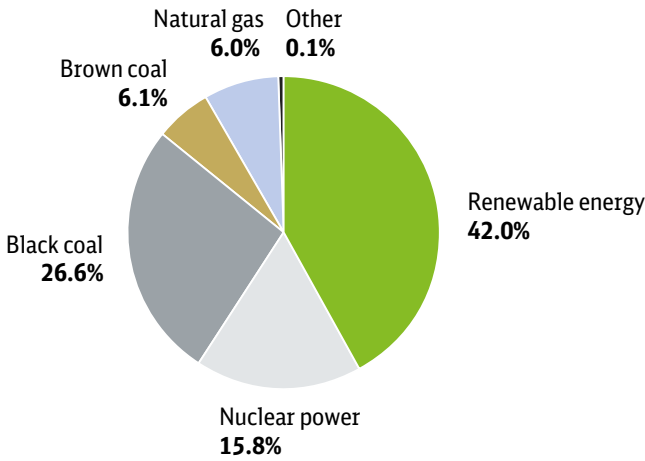
After Kerpen-Horrem, DB has opened the second carbon-neutral station in Lutherstadt Wittenberg. The use of geothermics, photovoltaics, roof greening, rain water management, and LED lighting allows the station to be operated without emitting any CO₂. And the first carbon-neutral ICE maintenance depot is being built in Cologne. In addition, construction of a climate-friendly maintenance depot for DB Regio has begun in Munich-Pasing.

Renewable energy and energy efficiency

DB is focusing on three areas to reduce greenhouse gas emissions: using energy efficiently, consuming as little as possible and further increasing the share of the renewable energy it utilizes. Our goal is to increase the share of renewable energy in the DB traction current mix in Germany to 45% by 2020. The share of renewable energy has already reached 42% in rail passenger transport, a level that no other mobility company in Germany can reach. DB also provides investors property and rooftops where they can install photovoltaic systems. DB is increasing the energy efficiency of its rolling stock, for example by recovering braking energy.

DB Energy's traction current mix

in %



Braking energy recovery

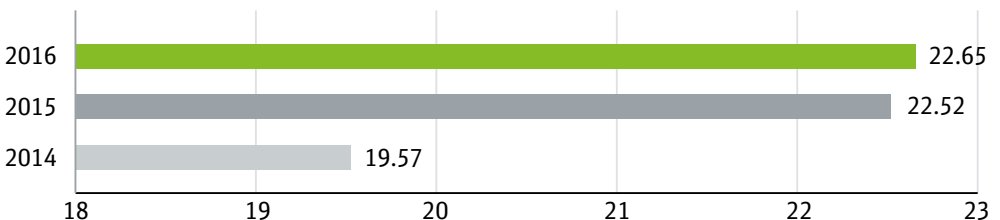
in gigawatt hours (GWh)

	2016	2015	2014
Regional rail passenger transport	800	781	697
Share of total electricity procurement in %	19	18	16
Long-distance rail passenger transport	304	278	280
Share of total electricity procurement in %	11	11	11
Rail freight transport	153	160	153
Share of total electricity procurement in %	7	7	6
Total	1,257	1,219	1,130

Germany, tank-to-wheel (TTW)

Installed capacity of photovoltaic systems

in megawatt peak (MWp)



Noise reduction

Noise from rail freight transport has become a burden for many people. That's why Deutsche Bahn is consistently implementing a two pillar strategy to make rail transport quieter. First of all, we are working to ensure that noise does not occur in the first place. To do so, we are gradually equipping DB freight cars with whisper brakes and plan to have all of them outfitted by 2020. More than half of DB freight cars already have been equipped with modern brakes. Secondly, the German Federal Government and DB have already invested more than a billion euros in noise control measures along rail lines, including sound barriers and soundproof windows.

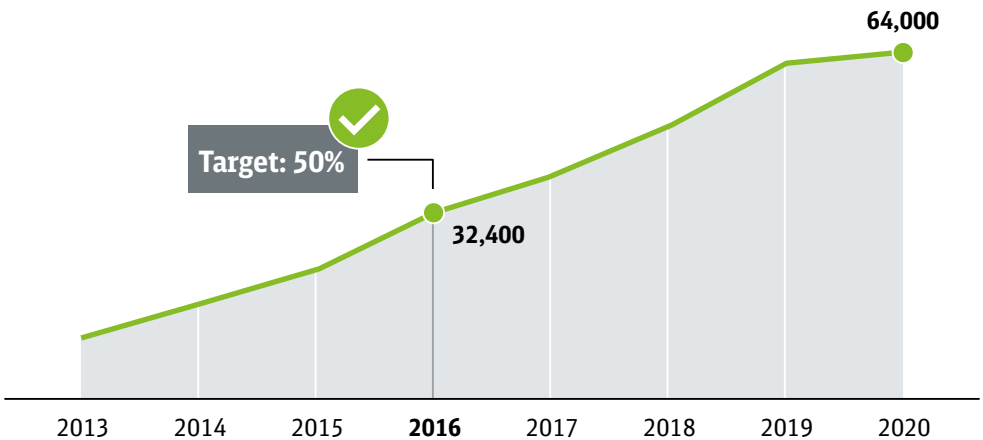
The aim is to reduce rail noise by half by 2020 (based on levels from 2000) and thus provide lasting relief to residents near railway lines.

Noise reduction and freight car refitting in Germany

	2016	2015	2014
Track kilometres noise remediated	1,600 ¹⁾	1,500	1,400
Quiet freight cars	32,396	20,460	14,334

1) Preliminary value

Path to achieving the noise reduction target in refitted freight cars



Test routes for new noise protection technologies

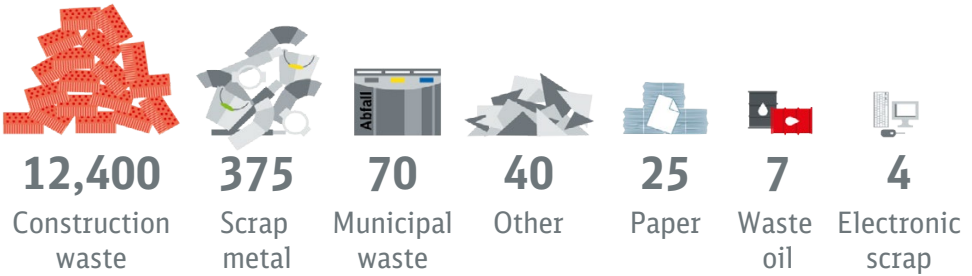
In cooperation with DB, the Federal Ministry of Transport and Digital Infrastructure (BMVI) has started an initiative for new and application-oriented noise control testing (I-LENA). From April 2016 until the end of 2020, this initiative will give developers and manufacturers of noise reduction technologies the opportunity to field test their innovations on DB routes. The BMVI is providing around six million euros for the initiative. Nearly 50 proposals for innovative measures for soundproofing and vibration protection were submitted during the year under review.

Resource efficiency

To conserve natural resources, DB has set itself the target of achieving a recycling rate of 95% by 2020. It exceeded this target with 97% in 2016. DB is increasing its use of recycled materials and is extending the service life of its products.

Volume of waste according to type

in thousand metric tons



Volume of waste by disposal type

in thousand metric tons

	2016	2015	2014
Total waste	12,921	11,814	6,381
Recycling rate in %	97.3	97.2	95.6
Share of thermal recovery in %	1.4	1.6	2.7
Share of disposal in %	1.4	1.2	1.7
Share of hazardous waste of the total ¹⁾ in %	5.1	6.3	15.7

Excluding DB Arriva. The data for 2016 are projections and are based on the information and estimates available as of December 2016.

1) According to Waste Catalogue Ordinance (Abfallverzeichnisverordnung), for example waste oil



Redesign for an extended service life: We regularly modernize our trains. This saves up to **80%** of material compared with buying new trains, and also extends the service life of our vehicles. The redesign of the ICE3 and the overhaul of the Rhein-Neckar and Hamburg S-Bahn trains began in 2016.

Recycled ballast and ties:

In 2016, some **17%** of the ballast used and some **9%** of the concrete railroad ties used were recycled.

Use of recycled paper:

We use only recycled printing and copy paper in our offices – that is a total of roughly **600 million** sheets every year. Our marketing departments also use recycled paper for their printed material. Using recycled paper cuts energy consumption by up to 70%, water consumption by up to 60% and wood consumption by up to 100% compared with virgin fiber paper.

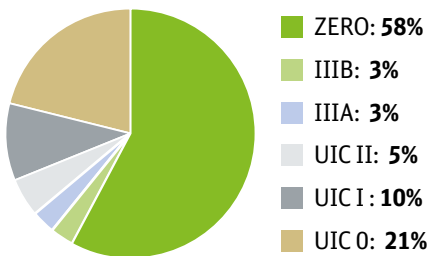
Air quality control

Clean air is a core issue for Deutsche Bahn, and we work continuously to reduce output of harmful emissions. Our goal is to reduce the emission of particulate matter by DB's rolling stock in Germany by 55% by 2020, as compared with 2010-levels. DB will achieve this goal largely through modernizing both their road and rail vehicle fleet. A reduction of 42.2% compared with 2010 has already been reached.

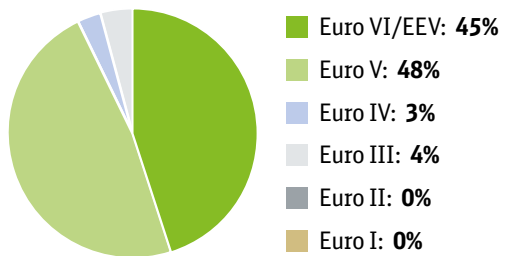
Distribution of the DB vehicle fleet by emissions standard

in %

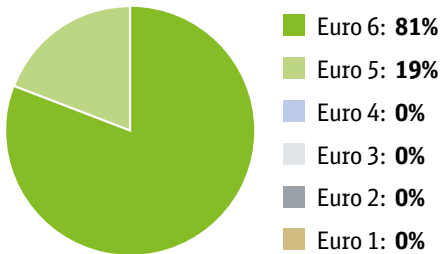
DB rail vehicles



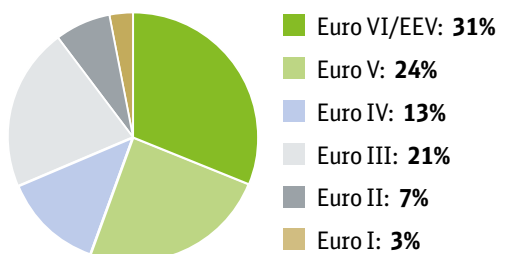
DB long-range trucks



DB cars ¹⁾



DB buses



1) Excluding electrical vehicles

EEV: Enhanced Environmentally Friendly Vehicle

Absolute airborne pollutants from journeys and transport

in metric tons

	2016	2015	2014
Particulate matter	7,246	8,158	9,075
Hydrocarbon	10,931	11,602	12,014
Sulfur dioxide	55,214	60,722	66,247
Nitrogen oxide	136,269	143,948	152,573

Combustion-related, well-to-wheel (WTW), scope 1-3

i Effect of particulate, hydrocarbon, sulfur dioxide, and nitrogen oxide emissions

Along with nitrogen oxides, particulate emissions can also damage health by causing respiratory diseases. Nitrogen oxides are also responsible for "summer smog". Sulfur dioxide causes acid rain, and hydrocarbons can lead to allergies and other impairments.

Nature conservation

When building or operating railway installations, DB makes sure to treat nature with the utmost possible care, starting in the planning phase. If this is not possible, targeted nature conservation measures are implemented in order to ensure that the habitats of rare types of plants and animals are preserved. More than **8,600 individual measures for nature and wildlife conservation** were already launched in Germany from 2010 to 2016. This included creating protected areas for rare birds such as cranes, a reservoir for wild horses, and new habitats for bees.

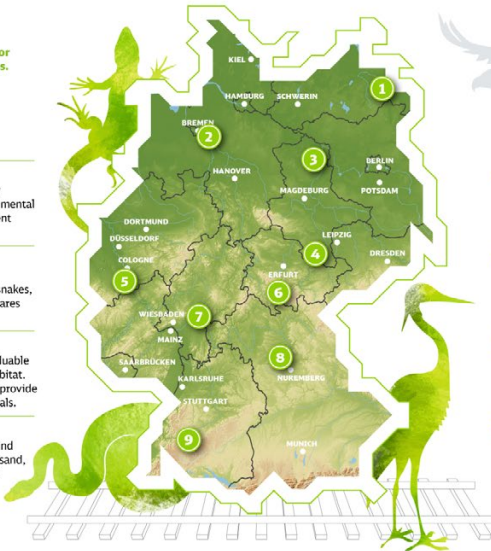
DB goes far beyond what is required under legal regulations and has set many additional priorities. For example, we have improved protections for birds on DB overhead lines to keep them from being killed by short circuits.

DB's wildlife

Cranes, wild horses, lizards – DB's wildlife and nature conservation

DB tries to avoid disturbing the environment when building or operating railway installations. If this is not possible, it offsets this or creates new habits at other locations.

- 1 Bats in Ducherow**
Bat hotel in the old brickyard – for barbastelle bats, which are protected by law.
- 2 Kestrels in Weyhe (Bremen)**
The German Nature and Biodiversity Conservation Union (NABU) environmental association and DB install replacement nesting boxes on a rail bridge.
- 3 Cranes near Stendal**
New breeding and feedings areas have been created for cranes, grass snakes, and great crested grebes on 6.5 hectares of agricultural land.
- 4 Sheep in Unstruttal**
600 sheep owned by DB graze on valuable orchid meadows, maintaining the habitat. Small bodies of water and grassland provide new habitats for other types of animals.
- 5 Sand lizards in Cologne**
Around 150 protected sand lizards find a new home in ramparts made from sand, clay, and brushwood on a 17,000 m² area in Cologne-Zollstock.



- 6 Peregrine falcons on DB bridges**
The Regional Society for Protection of Birds (Landesbund für Vogelschutz) and DB install nesting boxes on bridge pillars for strictly protected peregrine falcons.
- 7 Wild horses in Hesse**
Rare Przewalski horses are given valuable pasture land. The project in Hanau was given an award by the UN Decade on Biodiversity.
- 8 Sand lizards, smooth snakes, and grasshoppers near Nuremberg**
A 10,000 m² unused area of railway embankment is the new habitat for sand lizards, smooth snakes, and grasshoppers.
- 9 Wood grouse in the Black Forest**
By transforming the forest structure, DB is connecting valuable habitats, thus creating a migratory corridor for wood grouse.

Deutsche Bahn, June 2017

Enlarge image

Fahrtziel Natur (Destination Nature)

DB promotes sustainable tourism in collaboration with three environmental associations – the BUND, NABU, and VCD. Together we campaign for environmentally-friendly mobility along the entire travel chain in **22 natural sites** in Germany, Switzerland, and Austria.



Further information

For further information on environmental protection, contact:

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<http://www.deutschebahn.com/environment>

<http://www.dbschenker.com/environment>

www.deutschebahn.com/trainsimulator

www.bahn.com/environmentalmobilitycheck

www.ecotransit.org

www.flinkster.de (German)

www.call-a-bike.de (German)

www.fahrtziel-natur.de (German)

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Pioneer in climate protection

By 2020, Deutsche Bahn AG will reduce its CO₂e emissions by 30% compared with 2006. The share of renewable energy used in DB rail transport will be increased to 45% by 2020. Train noise will be cut in half compared with 2000.

27,5% → 30% in 2020

is the percent by which DB has reduced their worldwide CO₂e emissions per passenger and ton kilometer between 2006 and 2016.

42% → 45% in 2020

is the share of **renewable energy** used in DB rail transport.

60%

CO₂e reduction from 2006 to 2016 through using larger vessels and throttled engines, hydrodynamic design, and eco speeding.

13 g CO₂e

Are emitted on average per passenger and kilometer on DB long-distance trains. They are thus substantially more **climate-friendly** than planes, cars, and long-distance buses.

0 g CO₂

is the amount emitted by customers who chose **Umwelt-Plus** and **DBeco plus** green products for travel and shipping.

93%

of DB's trucks used on long-distance routes fulfill the **highest emission standards**.

10%

is the amount of energy that train, bus, and truck drivers can save if they drive in an **energy-efficient** manner, which they have been trained to do.

97%

is the percent by which the **filters** used in DB Cargo's 130 shunting locomotives reduce particulate emissions.

35% CO₂e

less compared with conventional warehouses - **this is** what the DB Schenker eco warehouse concept stands for.

DB's wildlife

Cranes, wild horses, lizards – DB's wildlife and nature conservation

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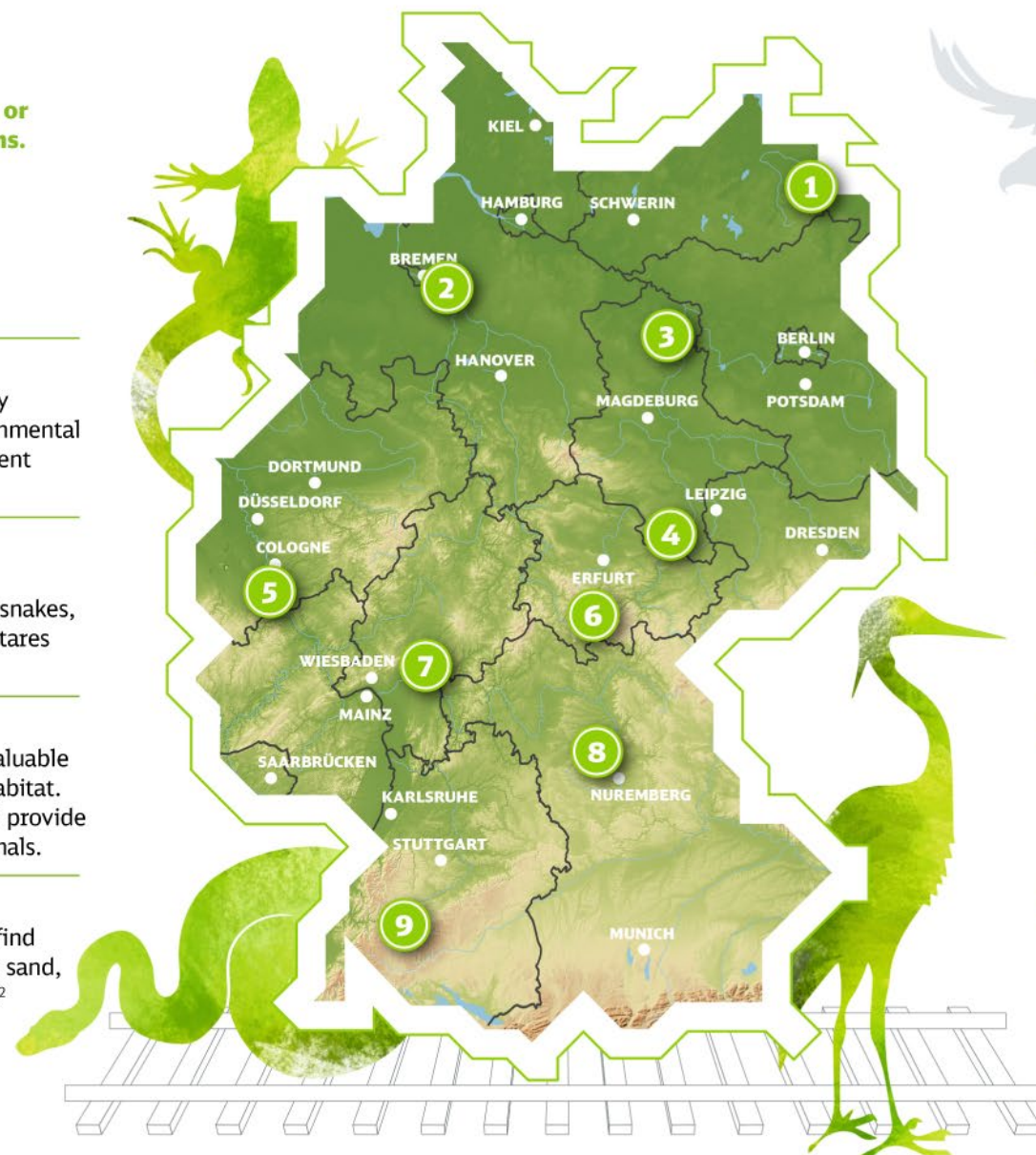
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