

**Think Blue. Factory.**

**Greater sustainability.**  
**Lower environmental impact.**



# What? How? Where?

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A collaborative  
project.

# A collaborative project.

For ecological production.

Dear Employees,

Dear Colleagues,

Manufacturers of cars must act responsibly. And the Volkswagen brand has faced up to this responsibility with the “Think Blue.” concept, a holistic approach to matters of ecological sustainability, a concept applied to passenger cars, components and commercial vehicles alike. This involves more than just environmentally friendly products. We engage in environmental protection, and we want to involve customers and those interested in this topic and motivate them to act in an environmentally aware manner. We use “Think Blue. Factory.” to transfer this attitude to production.

Our ambitious aims for ecological production of our vehicles and components are clearly defined, and are made transparent within and outside the company. By 2018, we intend to reduce energy and water consumption, waste, solvent emissions and CO<sub>2</sub> emissions by 25 percent from 2010 values in all our plants around the world.

“Think Blue. Factory.” is a holistic approach that bundles all our ecological activities in order to achieve these objectives. Our structured company programme will allow us to put our environmental aims into practice. Sustainable and efficient production is a clear competitive advantage, and will continue to secure attractive jobs at Volkswagen.

In the same way that “Think Blue.” reminds everyone to make a contribution to environmental protection, “Think Blue. Factory.” will encourage all our colleagues to make our production process more environmentally friendly every day.

Together we will handle resources even more responsibly and avoid emissions.



**Hubert Waltl**

Member of the Board of Management of the Volkswagen brand with responsibility for Production and Logistics



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**Bernd Wehlauer**

Deputy Chairman of the Group and General Works Councils of Volkswagen AG

# What is Think Blue. Factory?

Our effective know-how in a holistic program.

Using resources more efficiently.

Reducing emissions.

At all production sites of the  
Volkswagen brand.

# That is Think Blue

**ue. Factory.**

# From product to production.

How we are turning ecological sustainability into the new standard.

**“Think Blue.” is an attitude.** And our response to the question of how to combine individual mobility with sustainable action. Everything is connected. All around the world, and in all car-related matters, “Think Blue.” inspires and motivates people to change the way they think – and to join in. In 2005 we set an important milestone in the history of ecological sustainability at Volkswagen with the more efficient BlueMotion models. We are now building on this achievement and writing the next chapter.

**Rolling up our sleeves.** In “Think Blue. Factory.” we are pursuing a clear strategy to extend to our production department our claim to environmental leadership. We are bundling all sustainable activities, taking advantage of our employee’s know-how on site, and facilitating communication between our plants. From component production to vehicle manufacture.

2005

2008

2010

2012

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BlueMotion

BlueMotion  
Technologies

Think Blue.

Think Blue.  
Factory.

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**One product. One label.** With the Polo BlueMotion, we began the most successful environmentally friendly car label for efficiency technologies in the vehicle: BlueMotion.

**Many products and technologies.** A strategic umbrella brand. We continuously improve our environmentally friendly products and technologies.

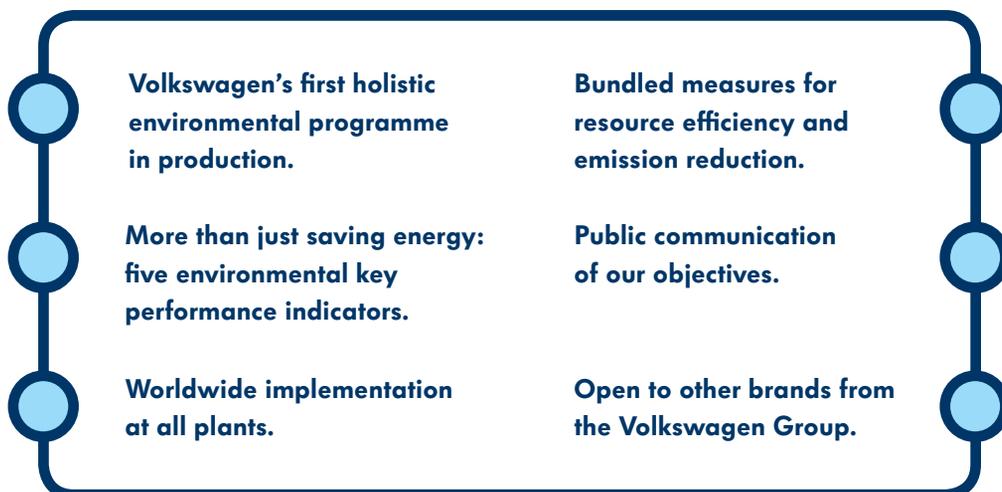
**One attitude. All markets.** We give our customers an overall impression of Volkswagen’s environmental activities far beyond individual products and technologies.

**One program. All plants.** We incorporate our existing and effective know-how into production and implement the “Think Blue.” concept inside the company.

**“Think Blue. Factory.” – the name becomes the agenda.** Sustainable factories set a signal for environmentally sound production: we are reducing the environmental impact, consistently and continuously. We understand this as an opportunity to take advantage of potentials and achieve measurable successes. Our ambitious targets also become comprehensible to our customers. After all, environmental protection begins in the factory hall and does not end on the street.

**Once thought out, implemented around the world. “Think Blue. Factory.”** is the first holistic programme that we have developed together – and are now implementing together at all our locations. Because we all have a shared goal: by striving for innovation, perfection and responsible action, we intend to be at the top of the automotive industry by 2018 – economically and ecologically.

## **A holistic programme. With all our effective know-how.**



# What are the aims of Think Blue. Factory?

By 2018 we intend to reduce the environmental impact of each produced vehicle and component part by 25 percent from 2010 levels. Sustainably and continuously.

25

less:

# 0%



**Energy**



**Water**



**Waste**



**CO<sub>2</sub>**



**Solvent  
emissions**

# This is how we measure ourselves.

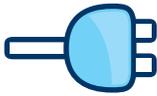
## Our environmental key performance indicators.

**All that counts.** We measure ourselves not only by quality and costs, but also by our environmental balance. And because we are already thinking of tomorrow, our bottom line is that we need to lower the environmental impact of our plants by 25 percent from 2010 values for every produced vehicle and manufactured component part by 2018. Experience at our factories around the world has shown that this is possible.

**From measurable to feasible.** The five key indicators are the regulators for “Think Blue. Factory.” and make our success visible: the specified key performance indicators for energy, water, waste, CO<sub>2</sub> and solvent emissions allow us to monitor our progress in detail – and make it visible to everyone.

**Less is more.** “Think Blue. Factory.” will help us implement our environmental leadership claim by means of sustainable production: fewer emissions, more resource conservation. A true added value in economic terms as well.

## Energy consumption



From electricity for installations and machines, to natural gas for production processes, to space heating and technical heat: for all types of consumption, we are taking advantage of potential savings and deploying efficient technologies – whether we generate the energy ourselves or obtain it from outside. To give an example: we have reduced our energy consumption by controlling ventilation systems intelligently by means of sensors.

## Water consumption



Whether our water comes from our own wells, from precipitation or from other sources: we are steadily increasing our water treatment and reducing our use of fresh water. For example by replacing wet scrubbing with dry paint separation in the body paint shop.

## Waste for disposal



We recycle materials left over from production, packaging materials and residues from workshops and technical development. And we are working on avoiding the type of waste that requires disposal, for example by using filtration procedures that do not require filtering aids.

## CO<sub>2</sub> emissions



By using climate-friendly energy from renewable sources such as wind, water and sun, we reduce the CO<sub>2</sub> emissions created during energy generation. And we are reducing indirect CO<sub>2</sub> emissions by deploying optimised systems technology – more efficient hydraulic pumps, for example.

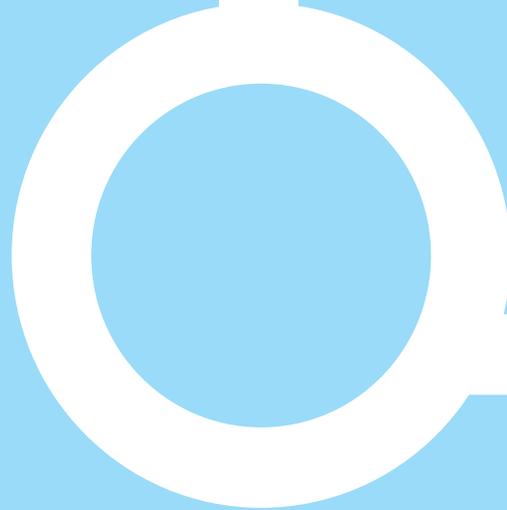
## Solvent emissions



We are reducing our solvent emissions in all areas. In paint shops with innovative procedures for waste air purification, for example. Or with new technologies to reduce the consumption of rinsing agents.

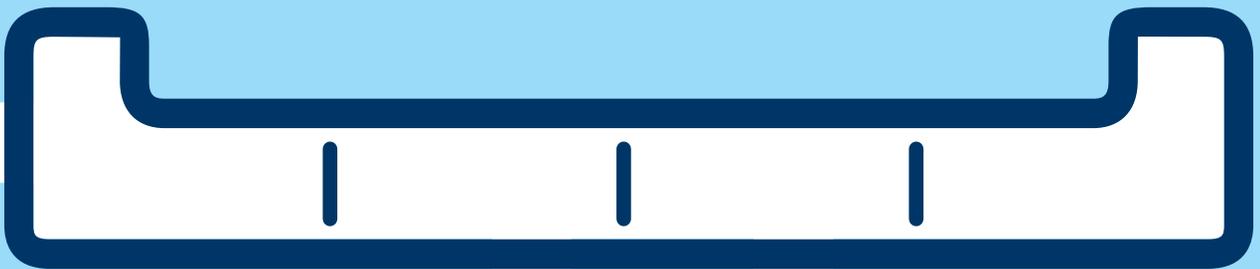
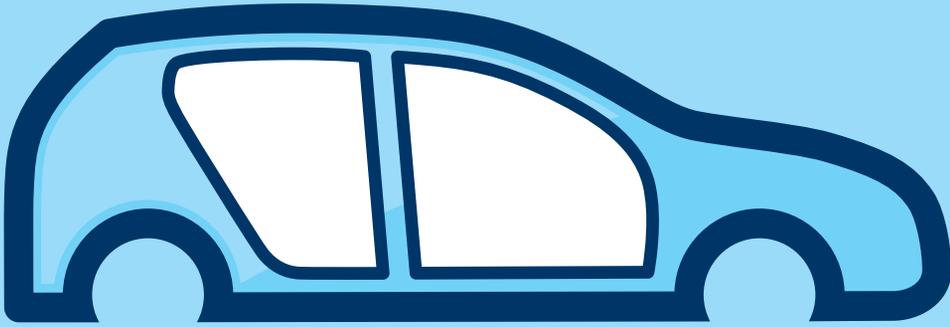
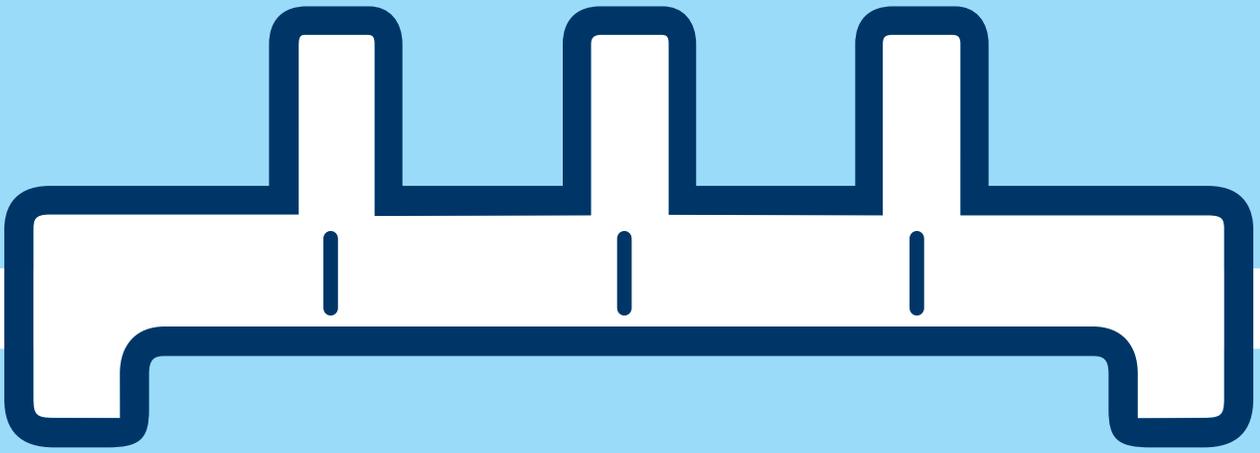
# How does Think Blue. Factory. work?

We are making ecologically sustainable factories possible with a holistic approach and individual measures.



# Rethink. Switch gears.

# Get ahead.



# New paths, new plants.

How we are turning our know-how into a tool for everyone.

**Step by step to an ecologically sustainable factory.** In order to achieve our global 25 percent goal, we are developing existing plants along so-called migration paths and setting up new plants according to our latest insights. One way or another, in the end we will have ecologically sustainable factories.

**A suitcase full of options.** We are working with the plants to develop individual development plans – with levels and steps for each location and plant type. Suitable equipment and tools are provided by the “Think Blue. Factory.” suitcase with an extensive catalogue of methods and measures that are based on our effective know-how. Based on the modular principle. And always open to new ideas.

**Sharing is fashionable.** Just like “Think Blue.”, “Think Blue. Factory.” thrives on dialogue. Development is speeded up because plants submit and share their own ideas and measures. At the same time, more and more new insights from system development and process improvements are being incorporated in production technology. Our own experience on site is steadily increasing the fund of possible and feasible ideas. Every component has the potential to be a milestone. And that is bringing us steadily closer to our goal of setting global standards by 2018.

**Ecologically sustainable factories.**

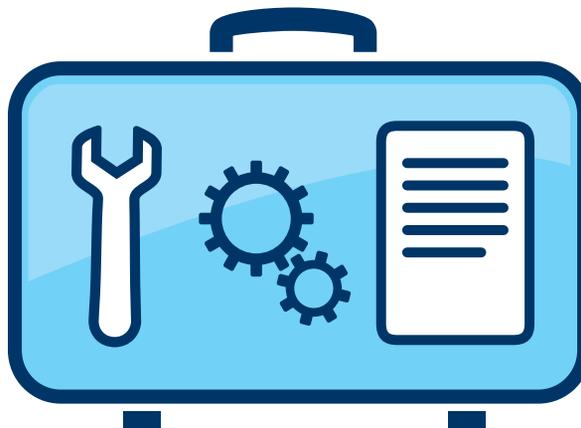
**Current factories.**



This is where we are investing our entire effective know-how. To find the right path for every plant to become an ecologically sustainable factory.



**Know-how and tools for everyone.**



# And this is what it could look like.

Examples from our blueprint for an ecologically sustainable factory.

## Foundry

- Shaped blow-off systems for core cooling
- Optimisation of the hydraulic systems in pressure casting machines
- Use of inorganic bonding agents
- Use of low-emission paint on casting furnaces
- Heat recovery systems on casting furnaces

## Plastic production

- Insulation of injection moulding machines
- New paint for plastic parts
- Compressed-air conservation valve for the immersion test of the fuel tank
- Inductive heating for plasticising units
- Inside coating for system pumps

## Paint shop

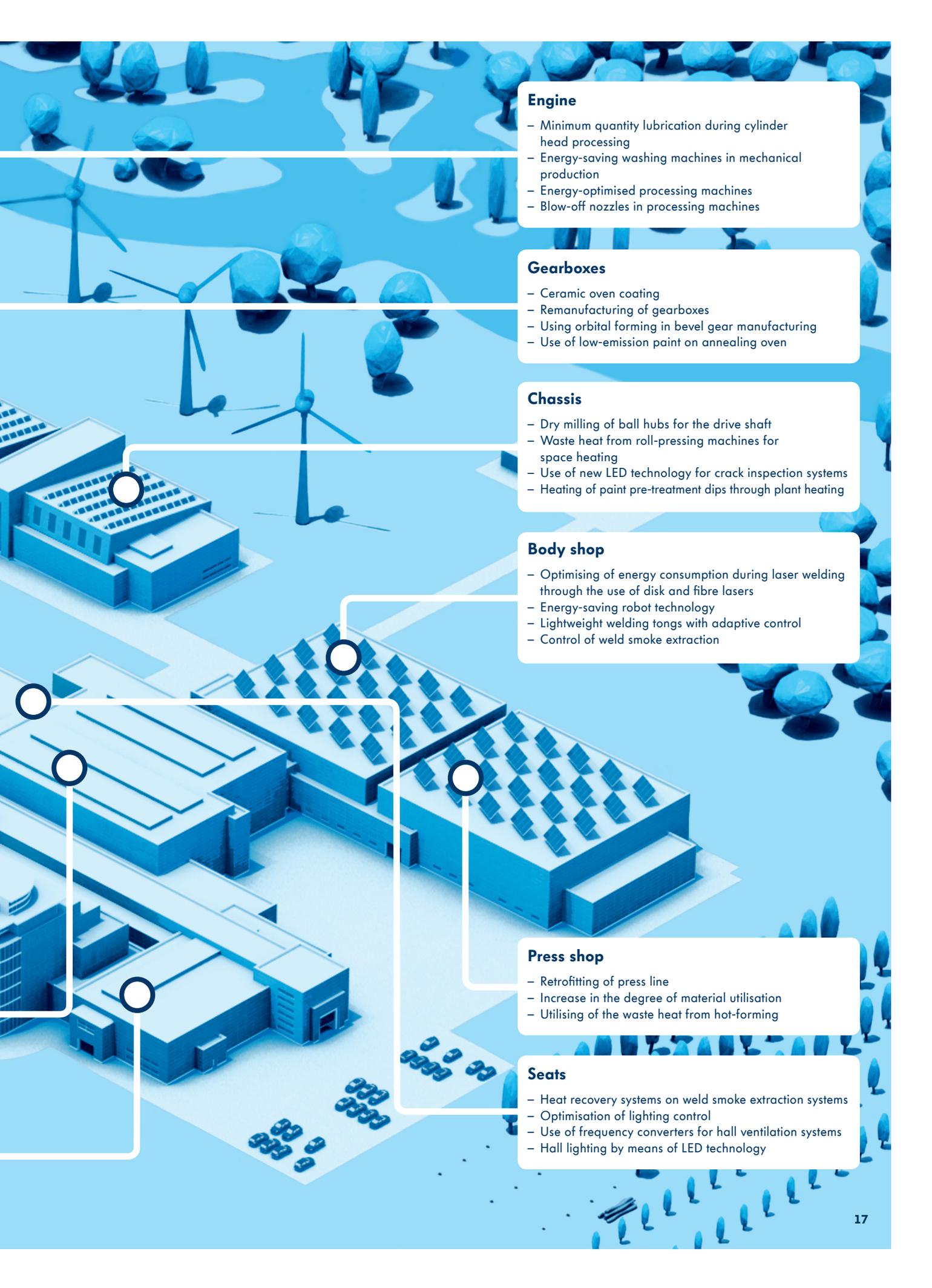
- Oxidation catalysts in the waste air purification system of the paint shop
- Modern colour changer
- Latest robot generation and ultra-modern application systems

## Assembly

- Recuperation for roller test rigs
- Electrical tools instead of compressed-air tools
- Drive systems and platforms with energy recovery
- Gravity conveyors
- Thermal insulation of glass bonding systems

## Infrastructure

- Energy-saving lighting system
- Heat recovery systems on compressed-air generators
- Web-based lighting control system
- Energy-saving drive systems



### Engine

- Minimum quantity lubrication during cylinder head processing
- Energy-saving washing machines in mechanical production
- Energy-optimised processing machines
- Blow-off nozzles in processing machines

### Gearboxes

- Ceramic oven coating
- Remanufacturing of gearboxes
- Using orbital forming in bevel gear manufacturing
- Use of low-emission paint on annealing oven

### Chassis

- Dry milling of ball hubs for the drive shaft
- Waste heat from roll-pressing machines for space heating
- Use of new LED technology for crack inspection systems
- Heating of paint pre-treatment dips through plant heating

### Body shop

- Optimising of energy consumption during laser welding through the use of disk and fibre lasers
- Energy-saving robot technology
- Lightweight welding tongs with adaptive control
- Control of weld smoke extraction

### Press shop

- Retrofitting of press line
- Increase in the degree of material utilisation
- Utilising of the waste heat from hot-forming

### Seats

- Heat recovery systems on weld smoke extraction systems
- Optimisation of lighting control
- Use of frequency converters for hall ventilation systems
- Hall lighting by means of LED technology

## Who is working on Think Blue. Factory?

Think Blue. Factory. was devised together with the plants, and will now be implemented in the same way. For a Volkswagen brand that is strong for the long term, worldwide.

**Everyone is  
pulling together.**





# Around the globe. Across the departments.

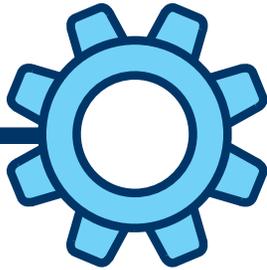
**How everything is connected and brings everyone together.**

**A worldwide collaboration.** “Think Blue. Factory.” is a collaborative project that was conceived together with the plants – and is now being implemented at all our locations worldwide. The direct connection to the plants means “Think Blue. Factory.” is bringing together the right minds and concepts.

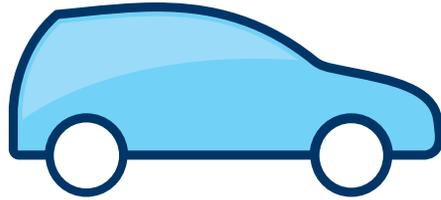
**A worldwide network.** Our experiences are as different as the countries we produce in, and as varied as the people with whom we work. That is why we promote communication between the locations and the departments. What are the new features in Chattanooga? What is important to the plant in Chemnitz? How is it going with the colleagues in Poznań? And what are headquarters in Wolfsburg planning?

**Our capital consists of know-how and creative minds.** At the annual “Think Blue. Factory.” day, employees can meet and exchange ideas for measures and experiences with their implementation. They are actively involved in the whole project and become ambassadors for “Think Blue. Factory.” Commitment that deserves recognition – and receives it, with the Volkswagen Energy Cup for outstanding solutions to reduce energy consumption in production.

**Support arising from conviction.** “Think Blue. Factory.” is only successful because of our employees’ commitment. By acting responsibly, and by applying, expanding and exchanging existing know-how, we are getting closer and closer to our goal: increasing resource efficiency and reducing emissions. That is how we will carry Volkswagen into the future. Ecological – and successful.



**Volkswagen Components**



**Volkswagen Vehicle Manufacturing**



**Volkswagen Commercial Vehicles**



**Networking in the Group**

# 21 locations. 21 success stories.

And that is just the beginning.

03 Chattanooga

16 Puebla

## 01 Bratislava, Slovakia

Intelligent control programmes regulate exterior lighting to suit requirements. That saves 179 MWh of electric energy and 42 tons of CO<sub>2</sub> per year.

## 02 Braunschweig, Germany

The optimised use of gate curtaining systems and quick-opening gates reduces power consumption and also keeps heat in the production halls. That saves 630 MWh of heating energy every year.

## 03 Chattanooga, USA

Dry paint separation reduces fresh water requirements to zero. The LED lighting system and complete building insulation increase energy efficiency.

## 04 Chemnitz, Germany

After the energy flows had been analysed and optimised, energy consumption for existing washing processes in mechanical production was reduced by 21 percent.

## 05 Dresden, Germany

Mechanical preconditioned climate control for the building ensures declining power consumption and CO<sub>2</sub> emissions and provides fresh air over night.

## 06 Emden, Germany

Modern sensors continuously measure air quality and use these measurements to regulate the ventilation systems. Annual CO<sub>2</sub> emissions are reduced by around 2,750 tons.

## 07 Hanover, Germany

Waste heat generated by weld-smoke extraction systems is recovered. The system automatically switches itself off during break times and at weekends, thereby saving money and reducing CO<sub>2</sub> emissions.

## 08 Kaluga, Russia

More efficient ventilation systems in the production halls and offices improve the ambient air as well as the energy balance at the site.

08 Kaluga

06 Emden 07 Hanover

11 Osnabrück 20 Wolfsburg 15 Poznań

02 Braunschweig 05 Dresden 14 Polkowice

18 Salzgitter 04 Chemnitz 10 Martin

09 Kassel 21 Zwickau 01 Bratislava

13 Pamplona

12 Palmela

### 09 Kassel, Germany

Ceramic coating improves the insulation of furnaces used to heat the mould-hardening sheets – and reduces the consumption of natural gas by 14 percent per year.

### 10 Martin, Slovakia

Hall lighting is controlled by modern brightness sensors. The result: 264 tons reduction in CO<sub>2</sub> per year.

### 11 Osnabrück, Germany

Development of ecological small-series production. Recycling of contaminated flushing thinners from the paint shop. Re-use of recycled PVC in the paint shop.

### 12 Palmela, Portugal

Waste heat that used to escape unutilized through the smoke stack is now converted into energy for the paint furnace.

### 13 Pamplona, Spain

Optimised use of bonding agents makes it possible to use 100 percent of the materials – so five tons of special waste and solvents no longer require disposal.

### 14 Polkowice, Poland

A hydropower plant provides the location with electricity that is 100 percent carbon-neutral.

### 15 Poznań, Poland

Adjustments to the basic settings in the compressor room reduce CO<sub>2</sub> emissions by around 770 tons per year. Using shaped blow-off systems for core cooling in the foundry saves 367 MWh of electric power per year.

19 Uitenhage

**17 Pune**

**16 Puebla, Mexico**

The extraction systems in production only run when production is running, and not during breaks. Savings per year: 24.5 MWh of energy.

**17 Pune, India**

A modern control system for compressed air reduces the required pressure from 6.6 kg/cm<sup>2</sup> to 6.2 kg/cm<sup>2</sup>. This saves energy and CO<sub>2</sub> emissions.

**18 Salzgitter, Germany**

Switching to mechanical cylinder-head processing and minimum quantity lubrication allows savings of 2,000 m<sup>3</sup> of water, 2.4 MWh of electric energy and 143 tons of CO<sub>2</sub> per year.

**19 Uitenhage, South Africa**

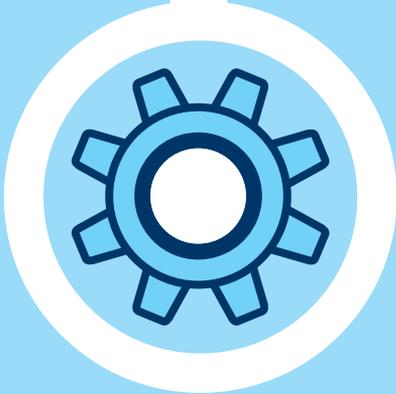
The press shop is built in line with the most recent environmental standards and consumes 150 MWh less energy and 270 m<sup>3</sup> less water per year than its predecessor.

**20 Wolfsburg, Germany**

Modern filters make ventilation systems even more efficient and save 2,050 tons of CO<sub>2</sub> per year. Compared to wet processing, the dry milling of ball hubs for the drive shaft saves 824 MWh of electric power and 638 tons of CO<sub>2</sub> per year. In addition, insulating injection moulding machines saves a further 737 MWh of electric power per year at this location.

**21 Zwickau, Germany**

By switching to power-heat cogeneration and using natural gas, an environmentally friendly energy source, production has reduced its CO<sub>2</sub> emissions by 23,000 tons per year.



# Find out more.

Contact Think Blue. Factory.

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