# Responsibility along the value chain
## Suppliers


**Our objective is to secure competitive advantages for BASF through professional procurement structures. Our suppliers are an important part of our value chain. Together with them, we aim to create value and minimize risks.**

### Strategy

As well as a reliable supply of raw materials, technical goods and services at competitive prices, our partnerships with suppliers are based on mutual value creation. We work together in an open and transparent way to realize long-term benefits for both sides. In doing so, we create added value that goes above and beyond procurement alone, for example by developing solutions to target market-specific customer requirements together with our suppliers.

Our sustainability-oriented supply chain management also contributes to risk management by clarifying our expectations and standards for our suppliers, and by supporting them in carrying out our requirements. We count on reliable supply relationships and want to make our suppliers' contribution to sustainable development transparent. In order to achieve this, we set ourselves an ambitious goal: By 2020, we aim to evaluate the sustainability performance of 70% of the BASF Group's relevant suppliers[1] and develop action plans for any necessary improvements.

**2020 Goal**

**Percentage of relevant suppliers evaluated for their sustainability performance** 70%

In 2017, we reviewed our evaluation methods for high-risk suppliers in order to focus even more closely on relevant issues. For example, we increased the weighting of industry- and country-specific risks in the evaluation to avoid the ambiguities in the previous system. The proportion of relevant suppliers evaluated by the end of 2017 in accordance with the new risk approach was 56%.[2]

### Worldwide procurement

Our 70,000+ suppliers play a significant role in value creation at our company. We work in long-term partnership with companies from different industries around the world. They supply us with important raw materials, chemicals, investment goods and consumables, and perform a range of services. BASF acquired raw materials, goods and services for our own production totaling approximately €38 billion in value in 2017. There were no substantial changes with respect to our suppliers in 2017.

### What we expect from our suppliers

- Global Supplier Code of Conduct
- Country-specific risk analysis forms basis of new supplier selection

New suppliers are selected and existing suppliers are evaluated not only on the basis of economic criteria, but also on environmental, social and corporate governance standards. Our Supplier Code of Conduct is founded on internationally recognized guidelines, such as the principles of the United Nations' Global Compact, the International Labor Organization (ILO) conventions and the topic areas of the Responsible Care® initiative. The Code of Conduct covers compliance with human rights, labor and social standards, and antidiscrimination and anticorruption policies in addition to protecting the environment. The Code is available in 26 languages.

A country-based risk analysis forms the basis of our selection process for new suppliers. As a result of the country-related risks identified in South America and Asia, we specifically asked 6,467 suppliers in these regions to commit to the values of our Supplier Code of Conduct in 2017. Only those companies that have committed to our Code of Conduct actually became new suppliers.

[1] Our suppliers are evaluated based on risk due to the size and scale of our supplier portfolio. We define relevant suppliers as those showing an elevated sustainability risk potential as identified by our risk matrices and our purchasers' assessments. We also use further sources of information to identify relevant suppliers such as evaluations from Together for Sustainability (TfS), a joint initiative of chemical companies for sustainable supply chains.

[2] The proportion of relevant suppliers evaluated by the end of 2016 in accordance with the new risk approach was 55% (in accordance with the previous risk approach: 32%). The change in the percentage figure is due to the amended risk evaluation method and the greater integration of evaluations from other TfS companies.

## Training

In 2017, we continued our collaborations in China and Brazil to instruct suppliers on sustainability standards. 179 suppliers received training in 2017 as part of local partnerships with the East China University of Science and Technology in Shanghai and the Espaço Eco® Foundation in Brazil, for example. In addition, we instructed 704 BASF employees on sustainability-oriented supplier management. These are ways in which potential supply chain risks can be identified and minimized together with our suppliers.

## Evaluating our suppliers

- **"Together for Sustainability" initiative aims to harmonize and standardize supplier assessments and audits**
- **120 raw material supplier sites audited**

BASF is a founding member of the Together for Sustainability (TfS) initiative of leading chemical companies for the global standardization of supplier evaluations and auditing. With the help of TfS, we promote sustainability in the supply chain. The initiative aims to develop and implement a global program for the responsible supply of goods and services and improve suppliers' environmental and social standards. The evaluation process is simplified for both suppliers and TfS member companies by a globally uniform questionnaire. The 20 members of the initiative conducted a total of 1,794 sustainability assessments and 441 audits in 2017. The collaboration between the TfS initiative and the China Petroleum and Chemical Industry Federation (CPCIF) to educate suppliers and raise awareness of sustainability topics continued in 2017. More than 300 participants took part in a joint TfS/CPCIF course.

Using TfS evaluations, we pursue a risk-oriented approach with clearly defined, BASF-specific follow-up processes. A total of 120 raw material supplier sites were audited on sustainability standards in 2017. We also received sustainability assessments for 513 suppliers from an external service provider.

If we identify potential for improvement, we support suppliers in developing measures to fulfill our standards. We conduct another review according to a defined timeframe based on the sustainability risk measured. If the weak points discovered were particularly severe and we are unable to confirm any improvement, we reserve the right to terminate the business relationship. This occurred in one case in 2017. We use this approach to evaluate suppliers with an elevated sustainability risk at least every five years. The approach itself is reviewed every two years to identify possibilities for optimization.

For more information on "Together for Sustainability," see basf.com/en/together-for-sustainability

## Audit results

Our audits have identified some deviations with respect to environmental, social and corporate governance standards, for example in waste and wastewater management and relating to occupational safety, working hours and minimum wage. In the follow-up audits conducted in 2017, we found improvements in all areas. None of our 2017 audits identified instances of child labor. For the suppliers we reviewed, persons under 18 were excluded from overtime and dangerous work. We did not find any incidences of forced labor in 2017.

BASF undertook a thorough examination of the issues raised at platinum supplier Lonmin Plc, London, in connection with the events in Marikana, South Africa.[1] We intensified our regular dialog with both Lonmin and with local stakeholders, such as leading industry and human rights representatives. We had an internationally recognized audit firm conduct a follow-up audit conducted at Lonmin in January 2017. This reviewed to which extent Lonmin had resolved the weaknesses we had identified in the first audit in 2015. The audit also addressed working conditions below ground, social and work schedules, communication between Lonmin and local stakeholders and affected parties, as well as the progress of the construction of employee housing. This follow-up audit reported positive findings in several areas such as working standards. However, it also identified gaps that Lonmin still has to close, such as assessing the impact of Lonmin's operations on local communities, improving dialog with various stakeholders in the community and implementing a grievance mechanism. We maintain an ongoing, close dialog with Lonmin and will continue to support the company in its improvement process.

For more information on suppliers, see basf.com/suppliers

[1] In 2012, an extended strike at a Lonmin Plc mine in Marikana, South Africa, culminated in a violent confrontation between mine workers and armed South African police. Employees of the platinum supplier Lonmin were among the fatalities. For more information on the supplier relationship with Lonmin, see basf.com/audits-lonmin.

# Raw materials


**Responsible resource management is an integral part of our strategy. It is applied within the company through our Verbund concept, our innovative products and the use of renewable raw materials. In the search for alternative raw materials, we employ solutions that contribute to sustainability.**

## Strategy

The Verbund system is an important component of our resource efficiency strategy: The by-products of one plant often serve as feedstock elsewhere, thus helping us to use raw materials more efficiently. In 2017, BASF purchased a total of around 30,000 different raw materials from more than 6,000 suppliers. Some of our most important raw materials are naphtha, natural gas, methanol, ammonia and benzene. In addition to fossil resources, we also employ renewable raw materials. We use these to manufacture products that either cannot be made with fossil resources, or only at significantly greater expense, for example. Depending on the application, the better solution can be fossil or renewable raw materials. Renewable raw materials are not sustainable per se, but can contribute to sustainability by, for example, reducing greenhouse gas emissions.

## Renewable resources

- Joint venture with Avantium
- Numerous projects to improve sustainability along the value chain

In 2017, around 5% of the raw materials we purchased worldwide were from renewable resources. To make the use of these materials more competitive, we work on product innovations based on renewable raw materials as well as on enhancing production processes.

We also further established our biomass balance approach on the market in 2017. The goal here is to replace natural gas and naphtha at the beginning of the value chain with biogas and bio-naphtha from certified sustainable production. Should a customer select a biomass balanced product, the proportion of renewable feedstock to be used is calculated based on the formulation. The calculation model is certified by an independent third party (TÜV Süd). Our Verbund production ensures that the properties and quality of all end products remain unchanged and that our customers can use them as usual. This method has already been applied for more than 50 BASF products – for example, for superabsorbents, dispersions, plastics such as polyamides and polyurethanes, and for intermediates available on the market as "drop-in products." These can be used in place of previously employed products in the production process without having to change the process itself.

Synvina C.V., Netherlands, a joint venture of BASF and Avantium based in Amsterdam, has been producing and marketing furandicarboxylic acid (FDCA) from renewable resources since being established in 2016. FDCA is the most important chemical component of polyethylenefuranoate (PEF), a new plastic that is marketed by Synvina. In 2017, Synvina intensified its cooperation with partners along the entire value chain with the aim of making PEF commercially available in the medium term. One major step was the preliminary approval granted in 2017 to recycle PEF bottles in the European market and thus to integrate PEF into the circular economy. PEF has a broad application profile and is especially suitable for producing certain food packaging materials, such as films and plastic bottles. Compared with conventional plastics, PEF demonstrates higher barrier properties for gases like carbon dioxide and oxygen, extending the shelf life of packaged products. In addition, its higher degree of mechanical strength allows for thinner – and therefore lighter – packaging. Another product based on renewable feedstock that we offer our customers on a commercial scale is 1,4-butanediol (BDO), which is made from sugars. We use BDO to produce bio-based polytetraydrofuran 1000 (PolyTHF® 1000), which primarily serves as a chemical component in thermoplastic polyurethane (TPU), an ingredient used to manufacture ski boots and roller skates, shoe soles, dashboard films in the automotive industry, and other products.

Palm oil, palm kernel oil, and their derivatives are some of our most important renewable raw materials. We aim to ensure that these raw materials come from sustainable, certified sources, and actively support the Roundtable on Sustainable Palm Oil (RSPO). In 2017, we published our first progress report – the BASF Palm Progress Report – for greater transparency in the value chain. Based on the voluntary commitment to sustainably source palm oil products that we expanded in 2015, we were able to purchase large volumes of certified palm kernel oil in 2017 despite a difficult business environment. In addition, our BASF Palm Sourcing Policy addresses the requirements for protecting and preserving forests and peatland, along with the involvement of local communities in decision-making processes.

We further expanded the support offered to our customers to help them meet their voluntary commitments: BASF stepped up its commitment to certified sustainable oil palm products in the German, Austrian and Swiss markets by joining the Forum for Sustainable Palm Oil in 2017 as a manufacturer of oleo derivatives. Demand for certified products again increased significantly.

In order to involve smallholder farmers and improve their living conditions, BASF and Henkel have cooperated with the development organization Solidaridad since 2016 to provide training for around 5,500 farmers in Indonesia. To date, more than 1,700 smallholders have completed a training program as part of the Farmer Field School initiative.

BASF also advanced the RSPO supply chain certification of its sites for cosmetic ingredients. In 2017, 20 production sites worldwide were RSPO certified. Our goal is to only source RSPO certified palm oil and palm kernel oil by 2020, provided it is available on the market. By 2025, this voluntary commitment will be expanded to include the most important intermediate products based on palm oil and palm kernel oil; these include fractions and primary oleochemical derivatives as well as edible oil esters.

BASF is working together with Cargill, Proctor & Gamble and the German governmental agency for international cooperation (Gesellschaft für Internationale Zusammenarbeit, or GIZ) to help set up a certified and transparent supply chain for coconut oil in the Philippines and Indonesia. The project is being financed in part by the "develoPPP.de" program of the German Federal Ministry for Economic Cooperation and Development (BMZ). It is expected to improve income and living standards for around 3,300 smallholders.

The joint initiative established by BASF together with Arkema, Jayant Agro and the non-governmental organization Solidaridad to promote sustainability in the castor oil supply chain continued in 2017. With the Sustainable Castor Initiative – Pragati, the project members aim to improve the economic situation of castor oil farmers and their employees in India by helping them to optimize their yield and reduce the impact on the environment. The first smallholders were trained and audited in 2017 based on a newly developed sustainability code. This enables the Indian smallholders to offer certified sustainable castor oil on the global market in the future. The project is scheduled to run for three years until 2019.

For more information on renewable resources, see basf.com/renewables
For more information on our voluntary commitment to palm oil products, see basf.com/en/palm-dialog

## Mineral raw materials

We procure a number of mineral raw materials, like precious metals, that we use to produce process and mobile emissions catalysts. In suspected cases, we track the origins of minerals – as defined in the Dodd-Frank Act – to see if they come from mines in conflict regions. We reserve the right to conduct an external audit and, if necessary, terminate our business relationship. The suppliers addressed have confirmed to us that they do not source minerals matching this definition of conflict minerals from the Democratic Republic of the Congo or its neighboring countries.

BASF is working on the implementation of the E.U. Conflict Minerals Regulation published in May 2017. This lays down supply chain due diligence obligations that must be met by importers and processors of certain mineral raw materials such as tin, tantalum, tungsten, their ores and gold originating from conflict regions and high-risk areas.

BASF is committed to fostering a responsible and sustainable global supply of cobalt. As such, in 2017 BASF became a founding member of the Responsible Cobalt Initiative and the World Economic Forum's Global Battery Alliance. These initiatives were created by companies in collaboration with international organizations such as the OECD and UNICEF to address fundamental challenges in the supply chain of battery materials.

BASF mainly uses the mineral raw material mica and mica-based effect pigments in the production of coatings. Our demand is largely met with mica from our own mine in Hartwell, Georgia. We require our mica suppliers to comply with internationally recognized standards, including the prohibition of child labor. As a member of the Responsible Mica Initiative (RMI), BASF is actively working to eradicate child labor and unacceptable working conditions in the mica supply chain in India.

# Environment, health, safety and security
# Responsible Care Management System


**The protection of people and the environment is our top priority. Our core business – the development, production, processing and transportation of chemicals – demands a responsible approach. We systematically address risks with a comprehensive Responsible Care Management System, which is constantly being further developed. We expect our employees and contractors to know the risks of working with our products, substances and plants and handle these responsibly.**

## Responsible Care Management System

- Global directives and standards for safety, security, health and environmental protection
- Regular audits to monitor performance and progress

BASF's Responsible Care Management System comprises the global directives, standards and procedures for safety, security, health and environmental protection for the various stations along our value chain. Our regulations cover the transportation of raw materials, activities at our sites and warehouses, and distribution of our products as well as our customers' application of the products. Specifications for implementing these measures are laid out in binding directives that are introduced in consultation with employee representatives. These describe the relevant responsibilities, requirements and assessment methods. Our policies and requirements are constantly updated. We also maintain a dialog with government institutions, associations and other international organizations.

We set ourselves ambitious goals for safety and security, and health and environmental protection. We regularly conduct audits to monitor our performance and progress. We assess the potential risks and weak points of all our activities – from research to production and logistics – and the effects of these on the safety and security of our employees, the environment or our surroundings. In our databases, we document accidents, near misses and safety-related incidents at our sites as well as along our transportation routes to learn from these; appropriate measures are derived according to specific cause analyses.

For more information on Responsible Care®, see basf.com/en/responsible-care

## Audits

- 109 safety, security, health and environmental protection audits performed at 83 sites

Regular audits help ensure that standards are met for safety, security, health and environmental protection. We conduct audits at BASF sites and at companies in which BASF is a majority shareholder. Sites and companies acquired as part of acquisitions are audited in a timely manner to bring these into line with our standards and directives. We have defined our regulations for Responsible Care audits in a global Group requirement. During our audits, we create a safety and environmental profile that shows if we are properly addressing the existing hazard potential. If this is not the case, we agree on measures and conduct follow-up audits on their implementation.

Our internal audit system complies with the standards for external auditing procedures ISO 19011 and OHSAS 18001. Worldwide, 178 BASF production sites are certified in accordance with ISO 14001 (2016: 155).

In the BASF Group in 2017, 109 environmental and safety audits were conducted at 83 sites. The focus was on auditing sites based on the level of risk. For production plants with a medium and high hazard potential, we conducted an additional 63 short-notice audits at 47 sites. We audited 13 sites with respect to occupational medicine and health protection in 2017. The number of these audits declined due to the risk-based approach to site selection. In addition, 31 health performance control visits were conducted at sites with low to medium health risks.

For more information on occupational safety and health protection, see page 98 onward

**Costs and provisions for environmental protection in the BASF Group** (million €)

| | 2017 | 2016 |
|---|---|---|
| Operating costs for environmental protection | 1,024 | 1,011 |
| Investments in new and improved environmental protection plants and facilities[1] | 234 | 206 |
| Provisions for environmental protection measures and remediation[2] | 600 | 588 |

[1] Investments comprise end-of-pipe measures as well as integrated environmental protection measures.

[2] Values shown refer to December 31 of the respective year.

For more information, see the Notes to the Consolidated Financial Statements on pages 196 and 217

# Production


**For occupational and process safety as well as health and environmental protection and corporate security, we rely on comprehensive preventive measures and expect the cooperation of all employees and contractors. Our global safety and security concepts serve to protect our employees, contractors and neighbors as well as to prevent property and environmental damage and protect information and company assets.**

## Strategy

- Global safety standards
- Strengthening risk awareness
- Comprehensive incident analyses and global experience and information exchange

The safety of our employees, contractors, neighbors and the environment is our top priority. This is why we have set ourselves ambitious goals for occupational and process safety as well as health protection.

We stipulate globally mandatory standards for safety, security, and environmental and health protection. A worldwide network of experts supports us in their implementation. We regularly monitor progress toward our goals as part of our continuous improvement process.

Risk-conscious working behavior is promoted for every individual through measures like systematic hazard assessments, specific and ongoing qualification measures and global safety initiatives.

We analyze accidents, incidents and their causes in detail at a global level to learn from these. Hazard analyses and the risk minimization measures derived from them are an important prevention tool. We also promote regular dialog across different sites to strengthen risk awareness among our employees and contractors, to learn from examples of good practice and in this way, continually develop the safety culture.

Based on our corporate values, leaders serve as safety role models for our employees.

## Global safety initiative

- Global Safety Days focus on order, cleanliness and discipline

Our global safety initiative was established in 2008 and plays a key role in the continuous development of the safety culture. With over 930 activities at around 360 sites, our 2017 Global Safety Days focused on order, cleanliness and discipline to help reduce the risk of accidents. At the Ludwigshafen site alone, 13,000 employees and contractors registered to participate. This involvement and lively discussion make a major contribution to our safety culture.

For more information on the global safety initiative, see basf.com/global-safety-initiative

## Occupational safety

- Employees and contractors worldwide instructed on safe behavior

We have made it our goal to reduce the worldwide lost-time injury rate per one million working hours to 0.5 at most by 2025.[1] To prevent work-related accidents, we promote risk-conscious behavior and safe working practices for every individual. We are constantly refining and enhancing our requirements.

In addition to the legally required briefings, we also held training courses on safe procedures in 2017 to strengthen risk awareness among our employees and contractors and prevent work-related accidents. At the Ludwigshafen site in Germany, our training center has offered continuous further education on diverse safety and security topics for employees and contractors since 2010. Some 22,000 participants received training in 2017.

**2025 Goal[1]**

**Reduction of worldwide lost-time injury rate**
per one million working hours

≤0.5

In 2017, 1.4 work-related accidents per one million working hours occurred at BASF sites worldwide (2016: 1.5[2]), reducing the proportion of chemical-related accidents to 5% (2016: 9%). The rate of work-related accidents for contractors was at 1.5 in 2017 (2016: 1.5).

Unfortunately, there were two fatal work-related accidents in 2017. In 2016, four incidents occurred with a total of eight fatalities (seven in the same year). BASF is performing a comprehensive analysis of the incidents and using the findings to derive appropriate measures.

One employee of a contractor died during demolition work in McIntosh, Alabama, in November. The cause of the accident is still being investigated by BASF and the relevant authorities in Alabama. In November, one employee of a contractor died as a result of a traffic accident at the Shanghai-Pudong site in China. The cyclist was hit by a truck. The exact cause of the accident is still being investigated by BASF and the relevant

[1] For 2018, we will adapt our reporting on accidents and process safety incidents to the recommendations of the International Council of Chemical Associations (ICCA), the European Chemical Industry Council (CEFIC) and the German Chemicals Industry Association (VCI). To implement these recommendations, we also have to convert our targets. Consequently, our goal from 2018 onward is to reduce occupational and process safety incidents to a rate of no more than 0.1 per 200,000 working hours by 2025 (previous goal: a rate of no more than 0.5 incidents per one million working hours).

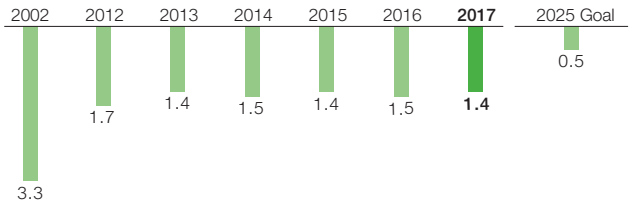
[2] The 2016 figure has been restated as against the previous year's report from 1.4 to 1.5 due to retrospective accident reports.

local authorities. Refresher training on traffic safety was held for employees of contractors at the site following the accident. We will review additional measures based on the results of the investigation into the cause of the accident.

In September 2017, one employee of the BASF fire department succumbed to injuries sustained in the accident at the North Harbor at BASF SE in Ludwigshafen, Germany, in October 2016. An explosion and subsequent fires occurred during work on a pipeline. Four employees of the BASF fire department and one barge crewman lost their lives in or as a result of the accident. Twenty-eight people were injured. According to a report on the cause of the fire commissioned by the district attorney's office of the city of Frankenthal, Germany, the explosion and subsequent fires occurred during work performed with an angle grinder. It states that one employee of a contractor cut into the wrong pipeline, triggering the chain reaction that caused the explosion. The report rules out other causes or technical defects at the North Harbor plants. BASF continues to support the relevant authorities in their investigations.

For more information on occupational safety, see basf.com/occupational_safety

**Lost-time injury rate per one million working hours**




## Process safety

- Plant protection plans to reduce process safety incidents
- Network of experts and global training methods foster dialog

Process safety is a core part of safe and efficient production. We meet high safety standards in the planning, construction and operation of our plants around the world. Some of these go beyond local legal requirements.

Our global process safety standards provide the framework for the safe construction and operation of our plants as well as the protection of people and the environment. Our experts have developed a protection plan for every plant that considers the key aspects of safety, health and environmental protection – from conception to startup – and stipulates specific protection measures for each.

We use the number of process safety incidents per one million working hours as a key performance indicator, following to a large extent the definition set by the European Chemical Industry Council (CEFIC). In 2017, we recorded 2.0 process safety incidents per one million working hours worldwide (2016: 2.0). We pursue continual improvement by investigating every incident in detail, analyzing root causes and using the findings to derive suitable measures. We have set ourselves the goal of reducing process safety incidents to a rate of no more than 0.5 per one million working hours by 2025.[1]

**2025 Goal[1]**

**Reduction of worldwide process safety incidents**
per one million working hours

≤0.5

In order to maintain the highest level of safety at our plants across their entire life cycle, we review the implementation of our protection plans in all facilities at regular intervals and depending on hazard potential. We periodically perform in-depth audits of our plants and update their safety concepts where necessary. Our training methods are constantly refined and enhanced to increase risk awareness.

We are working on increasing the availability of our plants and determining the optimum point in time for maintenance measures. The aim is to further reduce unscheduled shutdowns with a digitalization pilot project. Implementation began in 2017, starting with the steam cracker in Ludwigshafen and other plants at the following sites: Ludwigshafen, Germany; Antwerp, Belgium; Schwarzheide, Germany; Port Arthur, Texas; Geismar, Louisiana; and Freeport, Texas. We also plan to implement this at further plants around the world.

We play an active role in improving process safety around the world in a global network of experts, through our involvement in organizations such as the International Council of Chemical Associations (ICCA), the Center for Chemical Process Safety (CCPS) and the European Process Safety Centre (EPSC), and by fostering dialog with government institutions.

For more information on process safety, see basf.com/process_safety

[1] For 2018, we will adapt our reporting on accidents and process safety incidents to the recommendations of the International Council of Chemical Associations (ICCA), the European Chemical Industry Council (CEFIC) and the German Chemicals Industry Association (VCI). To implement these recommendations, we also have to convert our targets. Consequently, our goal from 2018 onward is to reduce occupational and process safety incidents to a rate of no more than 0.1 per 200,000 working hours by 2025 (previous goal: a rate of no more than 0.5 incidents per one million working hours).

## Health protection

- Global corporate health management standards
- Focus in 2017: Lung and respiratory health

Our global health management serves to promote and maintain the health and productivity of our employees. Our worldwide standards for occupational medicine and health protection are specified in a directive that is implemented by a global network of experts. This was once again supported by numerous emergency drills and health promotion measures in 2017.

We measure our performance in health protection using the Health Performance Index (HPI). The HPI comprises five components: recognized occupational diseases, medical emergency preparedness, first aid, medical surveillance examinations and health promotion. Each component contributes a maximum of 0.2 to the total score. The highest possible score is 1.0. Our goal is to reach a value of more than 0.9 every year. With an HPI of 0.97, we once again fulfilled the ambitious goal of exceeding 0.9 each year in 2017 (2016: 0.96).

Our 2017 global health campaign focused on lung and respiratory health. Employees received an individual recommendation based on a self-evaluation, including lung function testing or consultation with a physician as necessary. The health campaign was offered by over 450 sites worldwide.

**Annual goal**

**Health protection**
Health Performance Index
Maximum score 1.0

>0.9

We raise employee awareness of health topics through offers tailored toward specific target groups. The BASF health checks form the foundation of our global health promotion program and are offered to employees at regular intervals.

For more information on occupational medicine, health promotion campaigns and the HPI, see basf.com/health

## Emergency response and corporate security

- Regular review of emergency systems and crisis management structures
- Comprehensive protection measures against third-party interference

We are well prepared for crisis situations thanks to our global crisis management system. In the event of a crisis, our global, regional or local emergency response plans and crisis management structures are engaged, depending on the impact scope. We involve situation-related partners and suppliers as well as cities, communities and neighboring companies.

We regularly check our emergency systems, crisis management structures and drill procedures with employees, contractors, and local authorities and emergency rescue workers. Through 202 drills and simulations in 2017, we instructed participants in our emergency response measures. We analyze the potential risks associated with investment projects and define appropriate emergency response plans.

We also protect our employees, sites and company know-how against third-party interference. This includes, for example, addressing potential terrorist risks in the communities around our sites.

We inform business travelers, transferees and employees about appropriate protection measures prior to and during travel in countries with elevated security risks. After any major incident such as a terrorist attack or a natural catastrophe, we have the possibility of more quickly and accurately locating and contacting employees in the affected regions through a standardized global travel research system. We discuss safe conduct in crisis situations with leaders and employees and train them on this.

Aspects of human rights related to site security, such as the right to liberty and security of person, are a component of the global qualification requirements of our security personnel. Respect for human rights is a mandatory element of any contract with service providers of the BASF Group who are active in this area.

Our investment projects include performing comprehensive analyses of potential risks and defining appropriate protection measures. In 2017, we standardized the use of security services in further countries in order to increase effectiveness and efficiency.

Around the world, we work to sensitize all employees about protecting information and know-how. For example, we further strengthened our employees' awareness of risks in 2017 with training, case studies and interactive offerings. We have defined mandatory information protection requirements to ensure compliance with our processes for protecting sensitive information and perform audits to monitor this.

Our worldwide network of information protection officers comprises more than 600 employees. They support the implementation of our uniform requirements and conduct seminars on secure behaviors. We provided information protection instruction to more than 72,000 participants in 2017. In addition, we published standardized Group-wide recommendations for the protection of information and knowledge.

For more information on emergency response, see basf.com/emergency_response

For more information on corporate security, see basf.com/corporate-security

# Product stewardship


**We review the safety of our products from research and development through production and all the way to our customers' application. We work continuously to ensure that our products pose no risk to people or the environment when they are used responsibly and in the manner intended.**

## Strategy

■ **Global directives with uniformly high standards for product stewardship**

We are committed to continuously minimizing the negative effects of our products on the environment, health, safety and security along the value chain – from development to disposal. This commitment to product stewardship is enshrined in our Responsible Care® charter and the initiatives of the International Council of Chemical Associations (ICCA). We also ensure uniformly high standards for product stewardship worldwide. Some of our voluntary initiatives go beyond local legal requirements.

We provide extensive information on all our chemical sales products to our customers with safety data sheets in around 40 languages. This is achieved with the help of a global database in which we maintain and evaluate continuously updated environmental, health and safety data for our substances and products. Our global emergency hotline network provides information around the clock. We train and support our customers in fulfilling their industry-specific or application-specific product requirements.

For example, in cooperation with the chemical association ICCA, BASF is pushing for the establishment of a voluntary global commitment to the controlled marketing of chemicals that could be misused for purposes other than industrial chemical applications. Producers in North America and Europe are already implementing the voluntary commitment. Manufacturers in China and Taiwan are currently in talks about joining the scheme as well.

Our risk assessment goals support the implementation of initiatives such as the Global Product Strategy (GPS) of the International Council of Chemical Associations (ICCA). GPS is establishing worldwide standards and best practices to improve the safe management of chemical substances. In addition, we are also involved in workshops and training seminars in developing countries and emerging markets. In order to facilitate public access to information, we are participating in the setup of an ICCA online portal that provides more than 4,500 GPS safety summaries.

For more information on GPS, see basf.com/en/gps

## Global goal

By 2020, we will conduct risk assessments for more than 99% of the substances and mixtures sold by BASF worldwide in quantities of more than one metric ton per year. We already reached 76.2% of this goal in 2017 (2016: 75.4%). The risk associated with using a substance is determined by the combination of its hazardous properties and its potential exposure to people and the environment.

**2020 Goal**

**Risk assessment of products**
that we sell in quantities of more than one metric ton per year

>99%

## REACH and other legal requirements

■ **Third registration phase of REACH**

We are working on registering substances produced in annual volumes between one and one hundred metric tons for the third and final phase of the E.U. chemicals regulation, REACH, which will end on May 31, 2018. Our REACH activities are increasingly determined by E.U. authorities' decisions on additional studies in connection with the evaluation of submitted dossiers. Independently of this, BASF is also obligated to continuously update the registration dossiers it has submitted. Over 80% of our dossiers have already been updated, although the majority of these updates were undertaken on our own initiative and not as a response to official inquiry.

We apply the experience we have gathered with REACH to fulfill new legal requirements around the world, such as in South Korea and Turkey. In 2017, BASF took the industry lead in South Korea with a large number of substance registrations and was one of the first companies to receive such registrations. We also advised government representatives on chemicals legislation in 2017, for example in Brazil and Columbia.

We are seeing a rise in both regulatory requirements for agrochemicals and the number of additional studies required to obtain or extend approval for crop protection products. Potential risks for people and the environment are carefully assessed and minimized throughout the research, development and registration process for crop protection agents. We perform a large number of scientific studies every year to ensure that our products meet the highest safety requirements.

## Environmental and toxicological testing

### Use of alternative and complementary methods for animal studies

Before launching products on the market, we subject them to a variety of environmental and toxicological testing. We apply state-of-the-art knowledge in the research and development phase of our products. For instance, we only conduct animal studies when they are required by law and approved by respective authorities. Animal studies are at times stipulated by REACH and other national legislation outside the European Union in order to obtain more information on the properties and effects of chemical products.

We adhere to the specifications laid down by the German Animal Welfare Act as well as the requirements of the Association for Assessment and Accreditation of Laboratory Animal Care – the highest standard for laboratory animals in the world. We are continually developing and optimizing alternative and complementary methods, and we use them wherever it is possible and approved by the authorities. We use alternative and complementary methods in more than a third of our tests. Currently, 30 replacement and supplementary methods are being used in our labs and another 19 are in the development stage. BASF spent €3.4 million toward this purpose in 2017. One focus area of our research in 2017 and subsequent years is the development of alternative methods for testing the potential of substances that negatively affect organisms' growth and development.

Since 2016, our Experimental Toxicology and Ecotoxicology department has been working together with a total of 39 partners on one of the largest European collaborative projects for alternative methods. The project, planned to run for six years, aims to develop alternative methods to the point that chemical risk assessments can be efficiently conducted largely without animal testing.

For more information on alternative methods, see basf.com/alternative_methods

## Management of new technologies

### Continual safety research on nano- and biotechnology

Nano- and biotechnology offer solutions for key societal challenges – for example, in the areas of climate protection or health and nutrition.

Safe handling of nanomaterials is stipulated in our Nanotechnology Code of Conduct. Over recent years, we have conducted over 250 scientific studies and participated in over 35 different projects related to the safety of nanomaterials. The results were published in more than 100 scientific articles. One important finding is that toxicity is determined not by the size of the particles but by the intrinsic properties of the substance.

The European Chemicals Agency (ECHA) as well as the OECD and national authorities are currently developing regulatory concepts to systematically test and assess nanomaterials. We contribute our expertise through various ECHA working groups or the OECD's Business and Industry Advisory Group (BIAC). In May 2017, the ECHA published guidance on the registration of nanomaterials, which we helped to develop. The E.U.-funded NanoDefine project, in which we developed measurement strategies for identifying nanomaterials together with 27 partners, was also concluded in 2017.

BASF makes successful use of biotechnology. We produce a range of established products with the help of biotechnological methods. This provides us with extensive experience in the safe use of biotechnological methods in research and development as well as in production. When employing biotechnology, we adhere to all standards and legal regulations. We are guided by the code of conduct set out by EuropaBio, the European biotechnology association.

For more information on nanotechnology and the Nanotechnology Code of Conduct, see basf.com/nanotechnology

# Transportation and storage


**Our regulations and measures for transportation and warehouse safety cover the delivery of raw materials, the storage and distribution of chemical products among BASF sites and customers, and the transportation of waste from our sites to the disposal facilities.**

## Strategy

- **Risk minimization along the entire transportation chain**

We want our products to be safely loaded, transported, handled and stored. This is why we depend on reliable logistics partners, global standards and an effective organization. Our goal is to minimize risks along the entire transportation chain – from loading and transportation to unloading. Some of our guidelines for the transportation of dangerous goods go above and beyond national and international dangerous goods requirements. We have defined global guidelines and requirements for the storage of our products and regularly monitor compliance with these.

## Accident prevention and emergency response

- **Risk assessments for transportation and storage**

We regularly assess the safety and environmental risks of transporting and storing raw materials and sales products with high hazard potential using our global guideline. This is based on the guidelines of the European Chemical Industry Council, CEFIC. We also have binding global standards for load safety.

We stipulate worldwide requirements for our logistics service providers and assess them in terms of safety and quality. Our experts use our own evaluation and monitoring tools as well as internationally approved schemes.

## Transportation incidents

We are systematically implementing our measures to improve transportation safety and report in particular on dangerous goods spillages that could lead to significant environmental impacts. We report on dangerous goods leaks of BASF products in excess of 200 kilograms on public transportation routes, provided BASF arranged the transport.

We have been able to reduce the number of transportation accidents per 10,000 shipments worldwide by around 70% since 2003. We recorded three incidents in 2017 with spillage of more than 200 kilograms of dangerous goods (2016: 2). None of these transportation incidents had a significant impact on the environment (2016: 0).

## Activities in external networks

We are actively involved in external networks, which quickly provide information and assistance in emergencies. These include the International Chemical Environmental (ICE) initiative and the German Transport Accident Information and Emergency Response System (TUIS), in which BASF plays a coordinating role. In 2017, we provided assistance to other companies in 178 cases worldwide. We apply the experience we have gathered to set up similar systems in other countries: For example, we intensified our activities in Asia Pacific in 2017.

For more information, see basf.com/distribution_safety and basf.com/emergency_response

# Energy and climate protection

Suppliers → BASF → Customers

**As an energy-intensive company, we are committed to energy efficiency and global climate protection. We want to reduce emissions along the value chain and utilize, for example, efficient technologies for generating steam and electricity, energy-efficient production processes, and comprehensive energy management. Our climate protection products make an important contribution toward helping our customers avoid emissions.**

## Strategy

### ■ We are committed to energy efficiency and global climate protection along the value chain

We want to reduce greenhouse gas emissions in our production and along the entire value chain. To this end, we have thoroughly analyzed the greenhouse gas emissions from our production in the past few years and implemented comprehensive reduction measures.

Comparisons with European emissions trading benchmarks show that our greenhouse gas-intensive chemical plants operate at above-average efficiency. To supply our production sites with energy, we rely on highly efficient combined heat and power plants with gas and steam turbines, and on the use of heat released by production processes.

Our success also depends on the long-term security and competitiveness of our energy supplies. Furthermore, we are committed to energy management that helps us analyze and further improve the energy efficiency of our plants. We continuously analyze potential risks to our business operations arising in connection with the topics of energy and climate protection and derive appropriate measures.

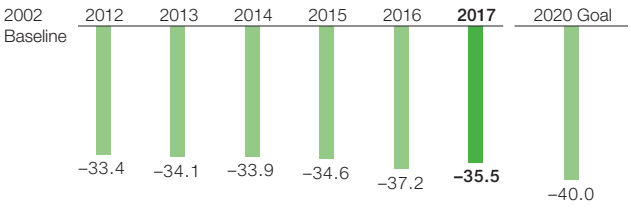
We offer our customers solutions that help prevent greenhouse gas emissions and improve energy and resource efficiency. Around half of our total annual research and development spending goes toward developing these products and optimizing our processes.

Our climate protection activities are based on a comprehensive analysis of our emissions. We report on greenhouse gas emissions in accordance with the Greenhouse Gas Protocol Standard, as well as the sector-specific standard for the chemical industry. Since 2004, we have participated in the international non-profit organization CDP's program for reporting on data relevant to climate protection. BASF again achieved a score of A- in CDP's rating for 2017, awarding it "Leadership" status. Companies on the "Leadership" level are distinguished by factors such as the completeness and transparency of their reporting. They also pursue comprehensive approaches in managing the opportunities and risks associated with climate change as well as emissions reduction strategies to achieve company-wide goals.

Climate protection is a shared global task. We advocate climate protection by supporting initiatives to this end. In 2017, companies from G20 countries – the Business 20 (B20) – developed recommendations on energy, climate and resource efficiency for state and government leaders. BASF led this B20 task force. BASF supports a consistent implementation of the Paris climate accord as the necessary basis for limiting global warming. We therefore also joined the World Economic Forum's CEO Climate Leaders initiative in 2017.

For more information on climate protection, see basf.com/climate_protection

**Reduction of greenhouse gas emissions per metric ton of sales product in BASF operations excluding Oil & Gas[1]** (%)




[1] The value for the 2012 business year was not adjusted to reflect the currently applied global warming potential factors.
For more information on our data collection methods, see page 105.

**BASF Group's greenhouse gas emissions according to the Greenhouse Gas Protocol**[1] (million metric tons of $CO_2$ equivalents)

| BASF operations including Oil & Gas | 2002 | 2016 | 2017 |
|---|---|---|---|
| Scope 1[2] | | | |
| $CO_2$ (carbon dioxide) | 14.634 | 16.215 | 16.813 |
| $N_2O$ (nitrous oxide)[3] | 6.407 | 0.586 | 0.747 |
| $CH_4$ (methane) | 0.244 | 0.045 | 0.048 |
| HFC (hydrofluorocarbons) | 0.061 | 0.087 | 0.081 |
| $SF_6$ (sulfur hexafluoride) | 0 | 0 | 0 |
| Scope 2[4] | | | |
| $CO_2$ | 5.243 | 3.884 | 3.796 |
| **Total** | **26.589** | **20.817** | **21.485** |
| | | | |
| **Sale of energy to third parties (Scope 1)**[5] | | | |
| $CO_2$ | 0.347 | 1.161 | 1.086 |
| **Total** | **26.936** | **21.978** | **22.571** |

[1] BASF reports separately on direct and indirect emissions from the purchase of energy. Scope 1 emissions encompass both direct emissions from production and generation of steam and electricity, as well as direct emissions from the generation of steam and electricity for sale. Scope 2 emissions comprise indirect emissions from the purchase of energy for BASF's use.

[2] Emissions of $N_2O$, $CH_4$, HFC and $SF_6$ have been translated into $CO_2$ emissions using the Global Warming Potential, or GWP, factor. GWP factors are based on the Intergovernmental Panel on Climate Change (IPCC) 1995 (2002 emissions) and IPCC 2007, errata table 2012 (2016 and 2017 emissions). HFC (hydrofluorocarbons) are calculated using the GWP factors of the individual components.

[3] The 2016 figure has been adjusted due to updated data.

[4] Location-based approach. Information on the calculation of market-based Scope 2 emissions can be found in the GRI and Global Compact Index; see basf.com/en/gri_gc

[5] Includes sale to BASF Group companies; as a result, emissions reported under Scope 2 can be reported again in some cases.

## Global goals and measures

- Reduction of greenhouse gas emissions per metric ton of sales product
- Introduction of energy management systems in accordance with ISO 50001

We aim to reduce our greenhouse gas emissions per metric ton of sales product by 40% by 2020, compared with baseline 2002. Our emissions rose year-on-year in 2017, mainly due to higher production levels of precursors within the Group and an increase in nitrous oxide emissions. In 2017, we reduced greenhouse gas emissions per metric ton of sales product by 35.5% compared with baseline 2002 (2016: reduction of 37.2%). Since 1990, we have been able to lower our overall greenhouse gas emissions from BASF operations (excluding Oil & Gas) by 48.3% and even reduce specific emissions by 74.7%.

We set ourselves a new energy efficiency goal in 2015 covering both the chemicals and the oil and gas businesses. By 2020, we want to have introduced certified energy management systems (DIN EN ISO 50001) at all relevant production sites.[6] Taken together, this represents 90% of BASF's primary energy demand. This is one of the ways in which we intend to identify and carry out improvements in energy efficiency, reducing not only greenhouse gas emissions and saving valuable energy resources, but also increasing the BASF Group's competitive ability.

**2020 Goal**

**Reduction of greenhouse gas emissions per metric ton of sales product**
Baseline 2002
BASF operations excl. Oil & Gas

**–40%**

**2020 Goal**

**Coverage of our primary energy demand through certified energy management systems at all relevant sites**
BASF operations incl. Oil & Gas

**90%**

The introduction and implementation of the energy management systems is steered by a global working group. All energy efficiency measures are recorded and analyzed in a global database and made available to BASF sites as best practices. Currently, over 100 measures are being pursued to reduce energy consumption and increase competitive ability. Sites and pilot plants across all regions were certified in accordance with ISO 50001 in 2017. These include the Verbund site in Antwerp, Belgium, production plants at the Guaratinguetá site in Brazil and Freeport in Texas, as well as another 10 sites in China, India, Singapore, Ireland, Norway and Switzerland. At the moment, 43 sites are certified worldwide, representing 54.3% of our primary energy demand.

[6] The selection of relevant sites is determined by the amount of primary energy used and local energy prices.

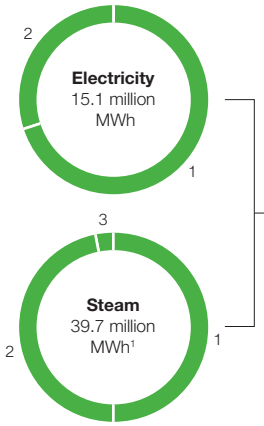
**Energy supply of the BASF Group 2017**

**Electricity supply**

| | | |
|---|---|---|
| 1 | Internally generated | 70% |
| 2 | Purchased | 30% |

**Steam supply**

| | | |
|---|---|---|
| 1 | Internally generated | 50% |
| 2 | Waste heat | 47% |
| 3 | Purchased | 3% |

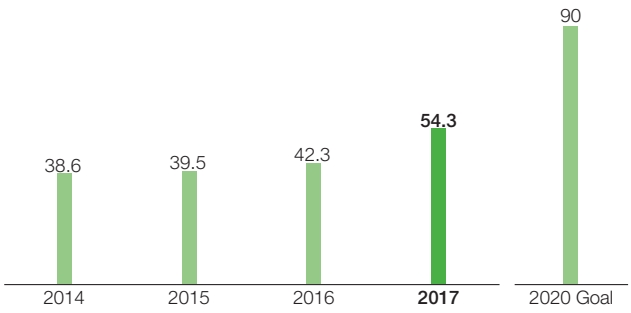



**Fossil and residual fuels used for own generation in power plants of the BASF Group**

| | | |
|---|---|---|
| 83.4% | **Natural gas** | 31.2 million MWh |
| 0.2% | **Heating oil** | 0.1 million MWh |
| 2.3% | **Coal** | 0.8 million MWh |
| 14.1% | **Residual fuels** | 5.3 million MWh |
| | **Total:** | 37.4 million MWh |

[1] Conversion factor: 0.75 MWh per metric ton of steam

**Certified energy management systems (ISO 50001) introduced at BASF Group sites worldwide, in terms of primary energy demand** (%)




## Energy supply and efficiency

### ■ Verbund system as important component of our energy efficiency strategy

Gas and steam turbines in our combined heat and power plants enable us to fulfill more than 70% of the electricity demand of the BASF Group. Compared with separate methods of generating steam and electricity, we saved 12.7 million MWh of fossil fuels and prevented 2.6 million metric tons of carbon emissions in 2017. The Verbund system is an important component of our energy efficiency strategy: Waste heat from one plant's production process is used as energy in other plants. In this way, the Verbund saved us around 19.2 million MWh in 2017, which translates to 3.9 million metric tons less of $CO_2$ released to the environment. With combined power and steam generation as well as our continuously enhanced Energy Verbund, we were thus able to prevent a total of 6.5 million metric tons of carbon emissions in 2017.

We were able to further optimize the resource and energy consumption of our production in numerous projects around the world in 2017. In Ludwigshafen, for example, we were able to reduce the energy required for cooling by systematically analyzing the cold supply and using a new absorption chiller to make the existing waste heat steam available for cooling. Furthermore, process improvements at many additional sites have led to savings in steam and electricity.

We also rely on locally available energy sources for energy supply at our sites. Especially in the growing Asian market, we and our energy suppliers also utilize coal as an energy source in individual cases since the more climate-friendly natural gas is not available in sufficient quantities at competitive prices.

We are continuously exploring the use of renewable energies. The focus here is on the purchase of electricity. It only makes economic sense to replace highly efficient internal electricity and steam generation using natural gas once renewable energies offer the necessary supply security and are available at competitive prices.

Our research also contributes to increasing the efficiency of technologies for the use of renewable energy sources.

**Key indicators for energy and climate protection in BASF operations excluding Oil & Gas**

| | Baseline 2002[1] | 2016 | 2017 |
|---|---|---|---|
| Greenhouse gas emissions[2] (million metric tons of $CO_2$ equivalents) | 24.713 | 19.976 | 20.716 |
| Specific greenhouse gas emissions (metric tons of $CO_2$ equivalents per ton of sales product) | 0.897 | 0.564 | 0.579 |
| Primary energy demand[3] (million MWh) | 55.759 | 57.423 | 57.268 |
| Energy efficiency (kilograms of sales product per MWh) | 494 | 617 | 625 |

[1] The values for baseline 2002 were not adjusted to reflect the currently applied global warming potential factors.

[2] Scope 1 and Scope 2 (location-based) according to the GHG Protocol Standard, excluding emissions from the generation of steam and electricity for sale to third parties; information on market-based Scope 2 emissions can be found in the GRI and Global Compact Index; see basf.com/en/gri_gc

[3] Primary energy used in BASF's plants as well as in the plants of our energy suppliers to cover energy demand for production processes

## Carbon footprint and climate protection products

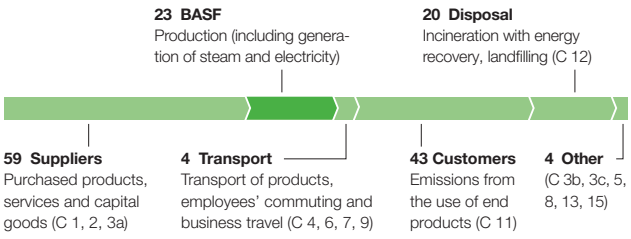
- Reporting on greenhouse gas emissions along the entire value chain
- Customers' use of climate protection products sold in 2017 avoids 570 million metric tons of $CO_2$ equivalents

BASF has been publishing a comprehensive corporate carbon footprint since as early as 2008. This reports on all emissions along the value chain and shows the volume of emissions prevented through the use of our climate protection products. We plan our climate protection activities along the value chain based on our corporate carbon footprint.

Through various measures to reduce our raw material and energy requirements, the emission of greenhouse gases associated with producing the raw materials was decreased by a total of around 153,000 metric tons in 2017.

Our climate protection products help us offer solutions to our customers to avoid greenhouse gas emissions over their entire lifecycle as compared with reference products. According to the systematic sustainability analysis we conduct on our portfolio – using the Sustainable Solution Steering® method – such products are referred to as "Accelerator" solutions as using them contributes positively to climate protection and energy. One example is the ammonium stabilizer DMPP. As the main component of BASF's Vizura® fertilizer additive, it helps to increase plant uptake efficiency. This reduces the use of fertilizers or liquid manure and cuts nitrous oxide emissions by 50% on average.

**Greenhouse gas emissions along the BASF value chain in 2017[4]**
(million metric tons of $CO_2$ equivalents)



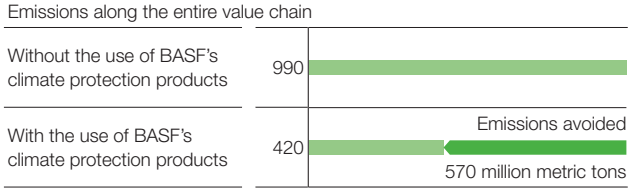

[4] According to Greenhouse Gas Protocol, Scope 1, 2 and 3; categories within Scope 3 are shown in parentheses

An analysis of 23 climate protection product groups revealed that customers' use of products sold in 2017 helps to avoid 570 million metric tons of $CO_2$ equivalents. Every product makes an individual contribution in the value chain of customer solutions. Value chains are assessed in terms of BASF's economic share of the respective customer solution. On average, 6% of the emissions avoided were attributable to BASF in 2017. The calculation of avoided greenhouse gas emissions took into account the chemical industry standards of the International Council of Chemical Associations (ICCA) and the World Business Council for Sustainable Development (WBCSD).

For more information on our emissions reporting, see basf.com/corporate_carbon_footprint

For more information on the sustainability analysis of our product portfolio, see page 32

**Prevention of greenhouse gas emissions through the use of BASF products** (million metric tons of $CO_2$ equivalents)



# Water


**Water is of fundamental importance in chemical production. It is used as a coolant, solvent and cleaning agent, as well as to make our products. We are committed to its responsible use along the entire value chain and especially in our production sites' water catchment areas. We have set ourselves a global goal for sustainable water management.**

## Strategy

### ■ Sustainable water management

We aim to use water as sparingly as possible and further reduce emissions to water. To do so, we have set out a Group directive with globally applicable standards.

We are introducing sustainable water management at all relevant production sites. These include our major Verbund sites as well as the sites in water stress areas – regions in which more than 60% of available water is used by industry, household and agriculture. We consider the quantitative, qualitative and social aspects of water use. We want to identify where we can improve at our sites, and use as little water as possible, especially in water stress areas.

We offer our customers solutions that help purify water and use it more efficiently while minimizing pollution.

In order to ensure transparency in our reporting on water, we once again took part in CDP reporting in 2017. According to CDP, an international nonprofit organization, BASF is a world leader in sustainable water management and was again included in CDP's Water A List. Of the 742 companies evaluated, only 73 of them received the top score of "A" – among them, BASF. CDP's evaluation of sustainable water management includes how transparently companies report on their water management activities and what they do to reduce risks, such as water scarcity. CDP also assesses the extent to which product developments – even at the customers of the companies under evaluation – can contribute to sustainable water management.

For more information on the CDP water survey, see basf.com/en/cdp

## Global goal and measures

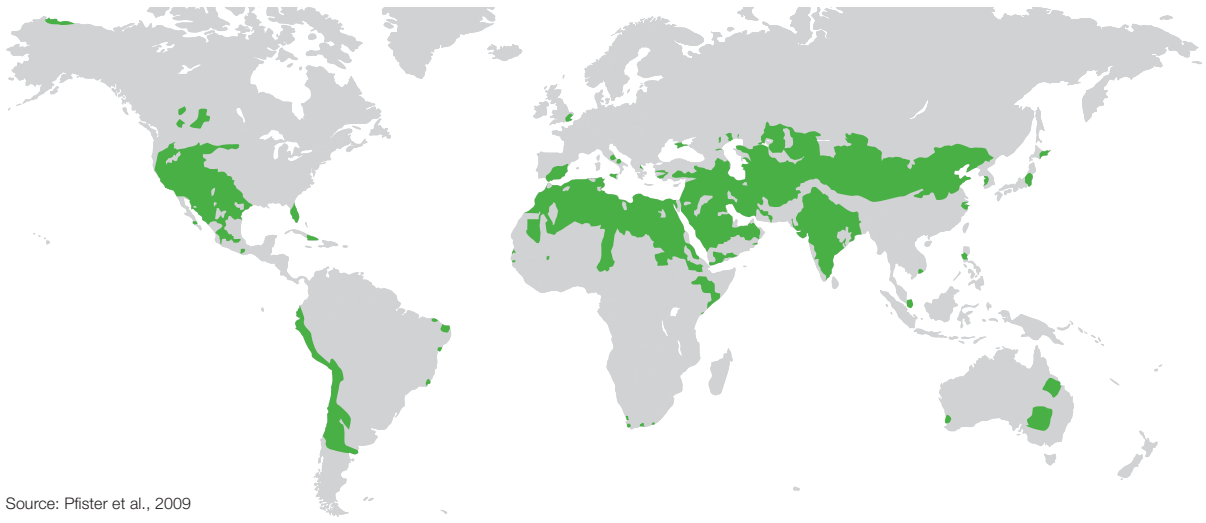
By 2025, we want to introduce sustainable water management at all sites in water stress areas and at our Verbund sites, covering 93% of BASF's entire water abstraction. We achieved 45.2% of this goal in 2017 (2016: 42.6%).

We pursue our goal by applying the European Water Stewardship standard, which rests on four principles: sustainable water abstraction, maintaining good water quality, preserving conservation areas, and ensuring continuous improvement processes, including in cooperation with other users.

In 2017, around 24% of our production sites were located in water stress areas. Around 1% of BASF's total water supply was abstracted from these sites.

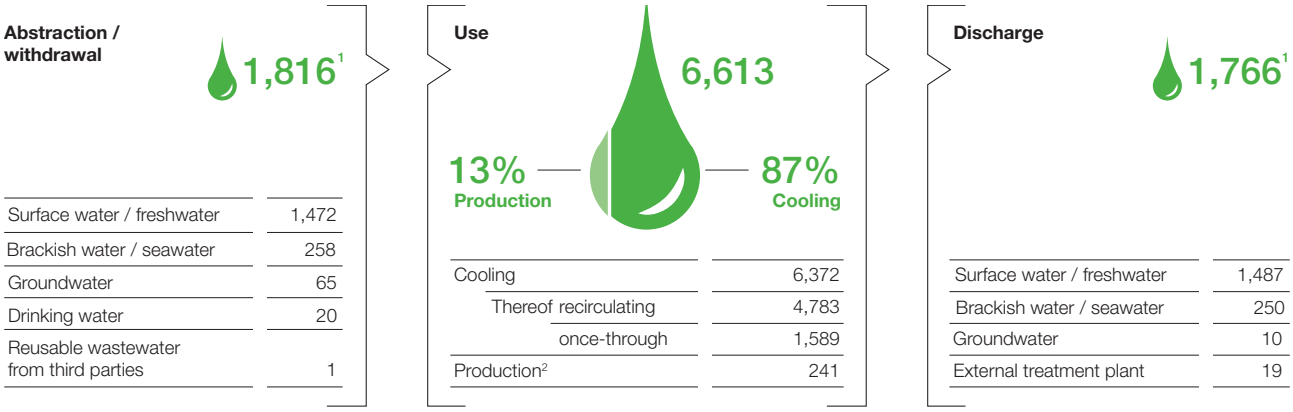
The number of BASF sites in water stress areas rose significantly in 2017 as a result of the acquisition of Chemetall in December 2016. In 2017, BASF introduced sustainable water management at three sites in China and two sites in North America.

**Water stress areas around the world**



Source: Pfister et al., 2009

**Water in the BASF Group 2017** (million cubic meters per year)




[1] The difference between the volume of water drawn and the volume discharged is primarily attributable to evaporation losses during closed-circuit cooling.

[2] Total from production processes, graywater, rinsing and cleaning in production

**2025 Goal**

**Introduction of sustainable water management at all production sites in water stress areas and at all Verbund sites**
BASF operations excl. Oil & Gas

100%

## Water use

### Using water responsibly

Our water usage totaled 1,816 million cubic meters in 2017. This demand was covered for the most part by surface water, such as rivers and lakes. At some sites, we use alternative sources such as treated municipal wastewater, brackish water or seawater, reducing our need for freshwater.

We predominantly use water for cooling purposes (87%), after which we recirculate it back to our supply sources. We reduce our water use by recirculating as much water as possible. Our larger sites have recooling plants that allow water to be reused several times and which reduce the temperature of used cooling water before it is discharged back into a body of water.

The supply, treatment, transportation and recooling of water is associated with a considerable energy demand. We employ various means in our efforts to minimize this as much as possible. We are constantly working to optimize our energy consumption and the amount of water we use, and to adapt to the needs of our business and the environment.

## Emissions to water

### Low level of emissions

A total of 1,766 million cubic meters of water were discharged from BASF production sites in 2017, including 177 million cubic meters of wastewater from production. Emissions of nitrogen to water amounted to 2,800 metric tons (2016: 2,900 metric tons). Around 14,100 metric tons of organic substances were emitted in wastewater (2016: 15,900 metric tons). Our wastewater contained 25 metric tons of heavy metals (2016: 23 metric tons). Phosphorus emissions amounted to 420 metric tons (2016: 310 metric tons). Our wastewater is treated through different methods depending on the type and degree of contamination – including biological processes, oxidation, membrane technologies, precipitation or adsorption.

In order to avoid unanticipated emissions and the pollution of surface or groundwater, we create water protection strategies for our production sites. This is mandatory for all production plants as part of the Responsible Care® initiative. The wastewater protection plans involve evaluating wastewater in terms of risk and drawing up suitable monitoring approaches. We use audits to check that these measures are being implemented and complied with.

For more information, see basf.com/water

# Air and soil


**We want to further reduce emissions to air from our production, prevent waste and protect the soil. We have set ourselves standards for doing so in global directives. If no recovery options are available for waste, we dispose of it in a proper and environmentally responsible manner.**

## Strategy

- Regular monitoring of emissions to air
- Professional disposal of hazardous waste

Regular monitoring of our emissions to air is a part of environmental management at BASF. Aside from greenhouse gases, we also measure emissions of other pollutants into the atmosphere. Our reporting does not take into account air pollutant emissions from oil and gas operations due to their substantial fluctuation during exploration phases.

Our Raw Material Verbund helps us prevent or reduce waste. We regularly carry out audits to inspect external waste disposal companies to ensure that waste is properly disposed of. In this way, we also contribute to preventive soil protection and keep today's waste from becoming tomorrow's contamination.

When treatment is required for soil and groundwater contamination at active and former BASF sites, proper remediation measures are reviewed based on prevailing legal and current technical standards, and undertaken as necessary.

## Emissions to air

- Further reduction of emissions

Absolute emissions of air pollutants from our chemical plants amounted to 25,706 metric tons in 2017. Emissions of ozone-depleting substances as defined by the Montreal Protocol totaled 23 metric tons in 2017 (2016: 23 metric tons[1]). Emissions of heavy metals in 2017 amounted to 3 metric tons (2016: 3 metric tons).

**Emissions to air (metric tons)**
Air pollutants from BASF operations excluding Oil & Gas

| | 2016 | 2017 |
|---|---|---|
| CO (carbon monoxide) | 3,585 | 3,644 |
| $NO_x$ (total nitrogen oxides) | 11,143 | 11,205 |
| NMVOC (nonmethane volatile organic compounds) | 4,824 | 4,727 |
| $SO_x$ (total sulfur oxides) | 1,872 | 1,753 |
| Dust[1] | 2,338 | 2,207 |
| $NH_3$ (ammonia) and other inorganic substances | 2,229 | 2,170 |
| **Total** | **25,991** | **25,706** |

[1] The 2016 figure has been adjusted due to updated data.

Our product portfolio contains a variety of catalysts used in the automotive sector and in industry to reduce the emission of air pollutants.

## Management of waste and contaminated sites

- Total waste volume on a level with the previous year
- Systematic management of contaminated sites

Waste prevention is our topmost goal. If waste is unavoidable, we review the options for recycling or energy recovery, using BASF's existing Verbund structures for efficient waste management. Total waste volume amounted to 2.12 million metric tons in 2017 (+1.0%).

**Waste management in the BASF Group** (million metric tons)

| | 2016 | 2017 |
|---|---|---|
| **Total waste generation[2]** | **2.10** | **2.12** |
| Thereof from oil and gas exploration | 0.06 | 0.10 |
| **Waste recovered** | **0.77** | **0.79** |
| Recycled | 0.26 | 0.27 |
| Thermally recovered | 0.51 | 0.52 |
| **Waste disposed of** | **1.33** | **1.34** |
| In underground landfills | 0.14 | 0.17 |
| In surface landfills | 0.47 | 0.39 |
| Through incineration | 0.72 | 0.77 |
| **Classification of waste for disposal[3]** | | |
| Nonhazardous waste | 0.46 | 0.47 |
| Hazardous waste | 0.87 | 0.87 |
| Transported hazardous waste | 0.23 | 0.23 |

[2] Comprises all production waste and hazardous waste from construction activities
[3] The classification of waste into hazardous and nonhazardous waste is performed according to local regulations.

We set out global standards for our approach to managing contaminated sites. A worldwide network of experts ensures their proper implementation. We develop remediation solutions that combine nature conservation, climate protection concerns, costs, and social responsibility. This means making customized decisions on a case-by-case basis, founded on the legal framework and current technological possibilities.

We have been documenting relevant sites in a contaminated site database since 2013. Ongoing remediation work around the world continued on schedule and planning was concluded on future landfill remediation projects.

For more information, see the Notes to the Consolidated Financial Statements on pages 196 and 217