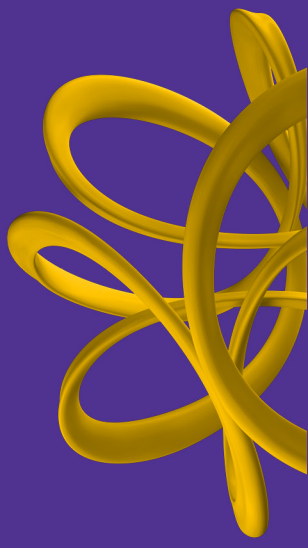
ENVIRONMENT



Environmental stewardship

Our business activities generate greenhouse gas emissions, wastewater and waste. In addition, we use materials that can adversely affect the environment if not handled properly. At all our production sites, we meet a strict set of environmental regulations and continually adapt our processes to new regulatory requirements. We also aim to make the most efficient use of increasingly scarce resources.

Our approach to environmental stewardship

Minimizing negative environmental impacts and taking meaningful climate action requires a holistic approach while also constantly monitoring practices and performance. Our goal is to avoid harmful emissions into the air, water and soil as far as possible. Our production sites are located in established industrial and commercial zones. Before acquiring a company – and thus its facilities – we first conduct an environmental risk assessment, taking into consideration information from publicly accessible sources such as local residents and non-governmental organizations (NGOs).

Roles and responsibilities

The Chair of the Executive Board and CEO of Merck KGaA, Darmstadt, Germany is responsible for environmental stewardship, which also covers climate action, water management waste and recycling, biodiversity, and plant and process safety. Her duties include the approval of overarching Group-wide guidelines such as our EHS Policy.

The Group function Corporate Sustainability, Quality and Trade Compliance (SQ) is responsible for steering all the related measures globally. SQ senior leadership approves operational standards and regularly reports on environmental stewardship to the Executive Board. Every year, Corporate Sustainability, Quality and Trade Compliance (SQ) prepares an environment, health and safety report that covers topics such as climate action, water management, waste and recycling, and plant and process safety. The Executive Board uses this report to steer the strategic direction and as verification for our ISO 14001 certifications.

At our individual sites, each site director is responsible for environmental stewardship as well as occupational health and safety at the operational level. At larger facilities, the site directors receive support and advice from EHS managers, with EHS coordinators performing this role at smaller sites. These local EHS units report to the corresponding business sectors, working in close collaboration with them. As of December 31, 2021 we employed **more than 280 EHS managers**, supported at the local level by further staff members.

Within our business sectors, the Operations Leadership Committee (OLC) makes strategic decisions on issues pertaining to emissions, energy, water and waste topics. This body consists of representatives from Life Science, Healthcare and Electronics as well as from Corporate Sustainability, Quality and Trade Compliance (SQ). Decisions made by the OLC and any resulting actions are implemented by the respective business sector. Once per quarter, the OLC members update their leaders on matters relating to environmental stewardship.

Whenever designing new sites or plants, we always involve Corporate Sustainability, Quality and Trade Compliance (SQ), which is responsible for reviewing the ecological aspects of a project and advising our sites. Additionally, SQ performs detailed environmental impact assessments for large-scale projects. In 2021, we worked to integrate sustainability criteria more strongly into the investment process.

Our commitment: Standards and standard operating procedures

Our approach to environmental management is founded on our **Group** EHS (Environment, Health and Safety) Policy, which has been approved by our Executive Board. Aligned with the requirements of the chemical industry's Responsible Care® Global Charter and the ISO 14001 environmental management standard, this policy underscores our leaders' responsibility for environmental stewardship and health and safety. It is also aimed at our suppliers, calling on them to likewise adopt higher standards of environmental sustainability and safety. Our EHS policy thus complements the Responsible Sourcing Principles of our Group Procurement function. In addition, through our Contractor EHS Management Standard, we ensure that our contract partners also take environment, health and safety aspects into account.

Internal guidelines, standards and standard operating procedures define how we put the principles of our EHS Policy into practice, **structure our environmental stewardship efforts and implement occupational safety Group-wide**. In addition, we also have in place a number of other internal environmental stewardship standards such as our Air Emissions Standard, Waste Management Standard, sustainable water management standards, and Energy Management Standard.

Potential EHS risks posed by acquisitions, divestments or site closures are assessed within the scope of due diligence, a process defined in our EHS Due Diligence and Post Merger Transaction Standard. We prioritize new sites when performing audits.

Material investments in environmental impact mitigation

Efforts to prevent and monitor air, water and soil emissions entail significant expense on our part, as does proper waste disposal. Moreover, we set up provisions for **groundwater and soil remediation** to ensure that we can execute all the necessary measures. As of December 31, 2021, our provisions for environmental protection totaled € 153 million, 94% of which was attributable to Merck KGaA, Darmstadt, Germany.

Assessing environmental impacts

As a matter of principle, we conduct risk-based assessments along with audits on all our production facilities every three years with the goal of analyzing and minimizing our environmental footprint. Conducted by Corporate Sustainability, Quality and Trade Compliance (SQ) , these assessments serve to ensure that our requirements are being met, with appropriate corrective measures being implemented as needed. In our Group EHS audits, we assess our sites' performance on a five-tier scale ("excellent", "good", "satisfactory", "poor", and "critical"), which in turn determines how frequently audits are conducted. If the findings are deemed to be good, we audit the facility less often, while significant violations can increase the frequency. In 2021, we commissioned a **total of 51 audits**, which were conducted either virtually or on site (in 2020, only 10 audits were conducted because of Covid-19). All audited sites received either a "good" or "satisfactory" rating and no site was rated as "critical".

Reporting incidents and violations

To review critical situations, near misses and environmental incidents as quickly as possible and take countermeasures, we have a set of **reporting procedures** in place that allow us to track the respective incident, its degree of severity and all risk mitigation efforts. We record all incidents Group-wide and report them to the Executive Board on an annual basis.

In the event of a major occurrence, our digital **Rapid Incident Report System** (RIRS) promptly notifies the Executive Board as well as Corporate Sustainability, Quality and Trade Compliance (SQ) and Group Communications functions. Major incidents could include fatalities, accidents with multiple casualties, incidents that impact neighboring communities, or natural disasters such as earthquakes and flooding. Through the RIRS, we can quickly coordinate with all those involved and inform the other sites immediately of the respective event. In addition, employees can report any violations of our standards to Group Compliance.

As in 2020, we recorded **no significant violations** of environmental laws or regulations Group-wide in 2021.

Environmental training and continuing education

All new EHS managers are required to complete a three-day orientation course at our global headquarters in Darmstadt. The seminar covers energy efficiency and climate action, water management, occupational safety, and process and plant safety along with our Rapid Incident Report System (RIRS). In 2021, we conducted EHS onboarding online.

ISO 14001:2015 Group certificate

Since 2009, our company has held an ISO 14001 Group certificate that requires all production sites with more than 50 employees to implement an **environmental management system with predefined indicators** such as greenhouse gas emissions and water consumption. Other facilities are not obligated to undergo certification. The annual internal audit reports and management reviews carried out under the Group certificate give us a better overview of how all our sites are performing. In 2021, 90 of our sites worldwide were covered by the ISO 14001 certificate.

Every year we contract a third party to perform a certification audit. In 2021, a sampling of eight sites underwent an audit for our Group certificate, with all audited facilities passing. Beyond undergoing external inspections, we also conduct internal audits to ensure Group-wide compliance with our requirements.

Biodiversity at our sites

Unsealed surfaces represent an important habitat for plants and animals. At our facilities, however, we are required to seal certain surfaces to minimize the risk of chemicals entering the ecosystem. When safety requirements permit, we increase the amount of surfaces that are unsealed. In 2021, we conducted a species conservation assessment for the Darmstadt site. This documented the species present along with the protected nesting areas and refuges located on our premises.

Climate action

Climate change is one of the major challenges facing us in the 21st century. In 2015, 195 nations collectively agreed to take action to significantly limit the rise in global temperatures. Because climate action and energy efficiency will pay off in the long run – for both the environment and our business – we have also made it our mission to help stem the tide of climate change.

How we are taking climate action

We want to do our part to preserve the climate and achieve the Paris Agreement on Climate Change. In 2020, we therefore drew up new objectives:

By 2030, we intend to lower our direct (Scope 1) and indirect (Scope 2) greenhouse gas **emissions by 50% compared with 2020.** This is to be achieved by reducing process-related emissions, implementing energy efficiency measures, and purchasing more electricity from renewable sources. We are also aiming to cover **80% of our purchased electricity with renewables** by 2030.

Moreover, we plan to lower our indirect emissions along our entire value chain (Scope 3) by 1,500 metric kilotons of CO_2 equivalents (CO_2eq) by 2030. By 2040, we intend to have achieved **climate-neutral operations** throughout our entire value chain, a target that covers our Scope 1, 2 and 3 emissions.

In November 2021, our company decided to join the Science Based Targets initiative. In becoming part of this effort, we have committed ourselves to taking concrete steps to reach the Paris Agreement targets.

Roles and responsibilities

Corporate Sustainability, Quality and Trade Compliance (SQ), is responsible for overseeing all climate action efforts throughout the Group, with our individual sites and business units worldwide implementing the necessary measures at the local level. You can find more information under "Environmental Stewardship".

Our commitment: Standards and legal frameworks

We have three EHS standards in place to manage energy and process-related emissions consistently across the Group, specifically “Energy Management”, “Emissions” and “Emissions of Refrigerants”. We utilize an internal audit process to randomly check compliance with all EHS standards.

In addition to our own standards, **we are subject to a wide array of national and international energy and climate regulations**. At European level, for instance, we are required to comply with the EU Energy Efficiency Directive 2012/27/EU, which stipulates that companies must conduct regular energy audits or implement an ISO 50001-certified energy management system. The sites subject to these requirements are responsible for taking the requisite actions and furthermore undergo audits conducted by internal and external experts. In total, 14 sites have been certified to ISO 50001 thus far.

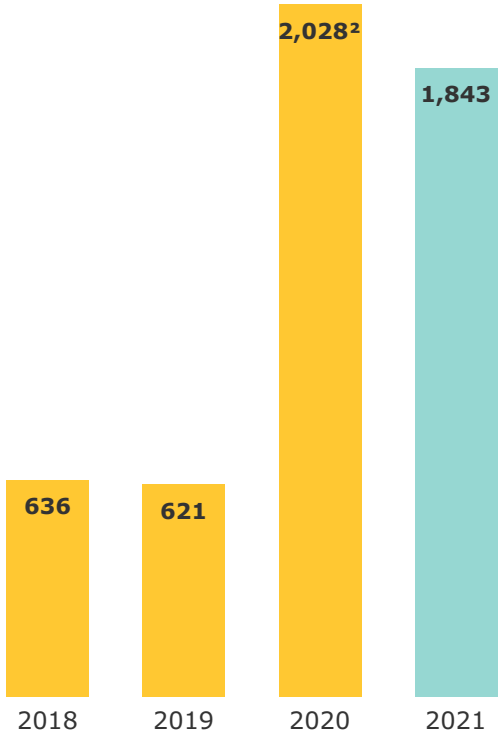
Our co-generation plant in Darmstadt and heating plant in Gernsheim (both in Germany) have made it necessary for us to participate in EU emissions trading since 2005. The EU's 2030 Climate and Energy Framework is designed to achieve the objectives of the 2015 Paris Agreement, with **EU emissions trading** playing a key role in reaching the greenhouse gas reduction targets. The amended EU Emissions Trading Directive (2003/87/EC) took effect in April 2018, thereby updating the legal framework for the fourth phase of the EU emissions trading program (2021-2030) and tightening the rules for free CO_2 allowances. Going forward, we will therefore increasingly have to purchase CO_2 emission allowances.

Emissions Reduced

In 2021, we emitted approximately 1,843,000 metric tons of CO_2 equivalents (CO2eq) (2020: 2,028,000 metric tons). Our direct emissions (Scope 1) totaled 1,522,000 metric tons of CO2eq, with process-related emissions accounting for 1,261,000 metric tons of CO2eq and fuel use accounting for the remainder. Indirect emissions (Scope 2) totaled roughly 321,000 metric tons calculated according to the market-based method, (approximately 385,000 metric tons according to the location-based method, which does not specifically take renewable energy sources into account). Greenhouse gas emission intensity (Scope 1 and 2) amounted to 0.09 kg of CO2eq per € of net sales in this period.

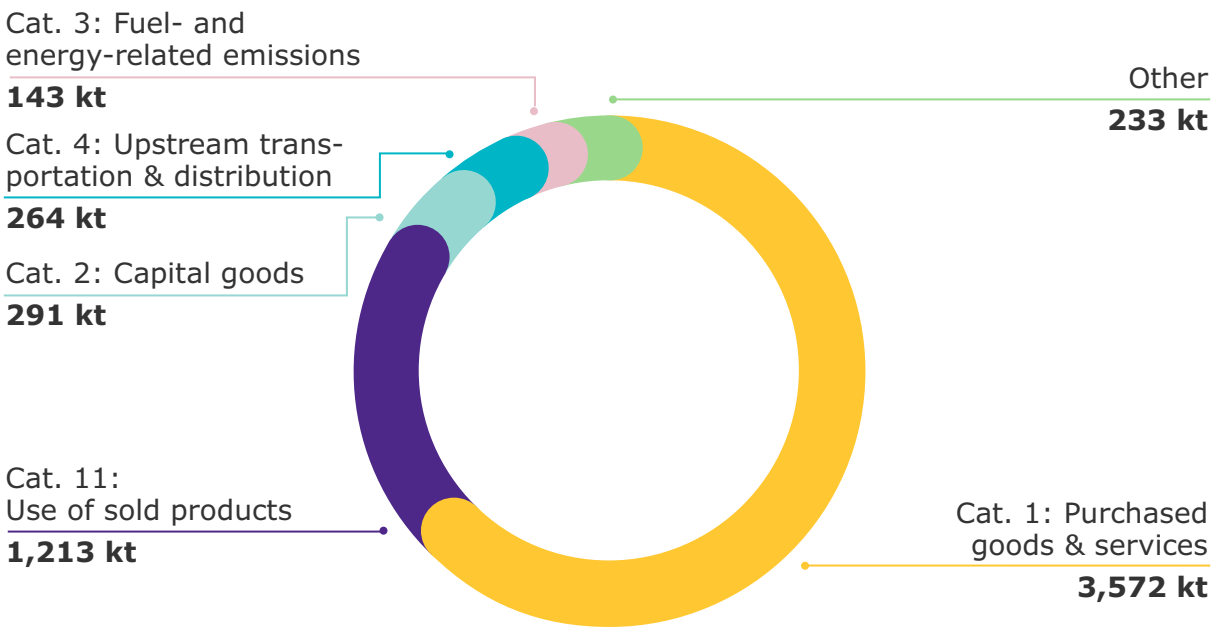
In 2020 and 2021, we focused on creating more transparency on our Scope 3 emissions. The Greenhouse Gas Protocol defines 15 categories for Scope 3 emissions from upstream and downstream activities. In 2021, our emissions totaled 5,716,000 metric tons of CO_2eq. Categories 1 and 2 (Purchased Goods and Services and Capital Goods) accounted for the lion's share, representing 68% of our total Scope 3 emissions in this period.

Greenhouse gas emissions in metric kilotons of CO_2 equivalents, Scope 1 & 2[1]



1) In line with the Greenhouse Gas Protocol, for all previous years greenhouse gas emissions were calculated based on the current corporate structure as of Dec. 31 of the reporting year and retroactively adjusted for acquisitions or divestments of (parts of) companies, or for changes in emission factors (portfolio-adjusted).
2) The increase in greenhouse gas emissions as of 2020 is attributable to the acquisition of Versum in 2019.

Greenhouse gas emissions 2021 in metric kilotons of CO_2 equivalents, Scope 3



Reducing process-related emission

With the integration of Versum Materials, acquired in 2019, into the Electronics business sector, our process-related emissions increased sharply – mainly in the production of special chemicals for the electronics industry. In 2021, we continued the investigations into reduction measures that we had begun in the previous year. In the process, we found new solutions for process optimization and for waste gas purification. We launched an initial pilot project for the thermal treatment of waste gas streams at the end of 2020.

In our Life Science business sector, we are recording process-related emissions primarily from the release of perfluorinated hydrocarbons (PFCs). In response, we have already replaced some emission-intensive production lines with equipment that does not emit PFCs.

Reducing emissions within our supply chain

You can find more information on the Supplier Decarbonisation Program under “Sustainable supply chain”.

Shifting to ocean freight

In 2019, our Healthcare business unit initiated a major transformation of its means of transport, which is expected to significantly reduce not only our CO_2 emissions but also our logistics expenses. As part of the “Spezzatino” initiative, we reduced greenhouse gas emissions by switching all our products **from air to sea transport wherever possible.** We set ourselves the goal of transporting less than 10% of our healthcare products by air by 2023, thereby reducing our annual CO_2 emissions by 10,000 metric tons. We already achieved this target by the end of 2021 and structurally reduced our transport-related emissions by 10,000 metric tons of CO_2.

Transparency on CO_2 emissions and energy consumption

We report to the Carbon Disclosure Project (CDP) on an annual basis. This organization assesses the ways in which companies are working to lower greenhouse gas emissions and minimize the risks and consequences of climate change, along with their success and strategy for doing so. Companies are rated from A to D-, with A being the top score. As in 2020, we received a B for 2021.

Green mobility

We aim to transition our car fleet primarily to lower emission engines by 2025 and are working to reduce the average emissions of our vehicles by approximately 50% relative to 2020 levels. Through our Green Fleet pilot, we are seeking to conserve resources and help employees at our German sites make the change to electric vehicles. Our employees can recharge their company, department or personal cars at 66 charging stations across six sites in Germany. We intend to double the number of charging stations by 2022. We also provide our employees in other countries with access to charging facilities, such as France, Switzerland, the United Kingdom, and the United States.

For those on the road, we offer the “Laden@road” program, which allows our employees to charge their company cars or personal vehicles at roughly 160,000 stations across Europe.

Through “Laden@home”, an initiative launched in Germany in April 2021, we provide € 1,700 to help cover the use of home wall charging stations and also pay for the resulting electricity costs.

Energy efficiency

In 2021, a variety of **energy efficiency initiatives** helped us save around 1,700 metric tons tons of CO_2eq at our global headquarters in Darmstadt. For instance, we updated heating, ventilation and air conditioning systems, implemented energy-saving lighting concepts.

As part of the energy and water efficiency program of our Life Science business sector, we rolled out new tools in 2021 to help us assess projects for saving energy and water. In addition, we trained 40 employees from sites outside of Germany on energy management.

Slight rise in energy consumption

We consumed 2,454 gigawatt hours of energy in 2021, versus 2,374 gigawatt hours in 2020. Our energy intensity relative to sales totaled 0.12 kWh/€ in 2021.

Purchasing electricity from renewable sources

In 2021 we increased our focus on purchasing **electricity from renewable sources**. In this period, we sourced 30% of our purchased electricity from renewable energies (2020: 27%). Renewables represented 13% of our total energy consumption.

In 2021, we announced our lead role in one of the world's largest buyer-organized aggregated procurements for renewable electricity to-date. We joined three other companies to sign 12-year Virtual Power Purchase Agreements (VPPAs) – bringing new renewable electricity to the grid. Construction of the 350-megawatt Azure Sky Wind and Storage project, which is located in the United States, is on-schedule with commercial operation planned for April 2022. We contracted for 68 megawatts of the 111 megawatts of capacity purchased by our buyers' consortium. The Renewable Energy Certificates received through this agreement will match 65% of our total electricity consumption across all business sectors in the United States – and 100% of our Life Science sector in the United States. Starting in 2021, we also covered the power needs of our Brazil sites entirely through renewables. In line with our renewable energy strategy, we completed an assessment of the European renewable electricity markets to determine our best path forward. This assessment will guide our renewable electricity purchasing strategy in the coming years.

Employee incentives

We encourage our people to do their part to preserve the climate. Aside from regularly reporting on our **Group-wide climate actions** in our EHS newsletters, we also provide all employees with helpful information and tips on our Intranet. Moreover, we support members of our workforce who are seeking greener modes of transportation.

- At our German subsidiaries, we offer a subsidy of € 150 towards monthly lease payments to employees who opt for a **greener car model**.
- At our German sites, we also encourage workers to use climate-friendly forms of transportation through "bike4me", a program enabling them to **lease a bike** at discounted rates with payments coming out of their pre-tax income.

Resource efficiency

Water management

Water is becoming increasingly scarce globally. Since our company also depends on the availability of water, sustainable water management is an important part of our environmental stewardship. Our wastewater may also contain trace substances, such as heavy metals. We conscientiously observe water protection laws and immediately adapt our practices and processes if these laws are tightened.

Our approach to sustainable water management

To us, sustainable water management means obtaining freshwater or discharging treated wastewater without negatively impacting aquatic ecosystems.

We are also concerned with addressing water scarcity. To determine whether a site is located in a water-stressed area, we use the Aqueduct Water Risk Atlas of the World Resources Institute (WRI). A water-stressed area is created when the water withdrawn exceeds the amount of water renewed.

We want to reduce the environmental impact of our wastewater and make our processes more water efficient. In the medium term, we will also take into account water-related risks that exist in our supply chain when purchasing important raw materials. In the long term, we intend to transparently map out the water use and environmental impacts throughout the entire life cycle of our products.

Our regular EHS audits at our production and development facilities also review **site-specific water management practices**.

Our water management efforts focus more heavily on our manufacturing sites than our administrative facilities because production generally poses a higher risk to aquatic ecosystems.

Roles and responsibilities

The Group function Corporate Sustainability, Quality and Trade Compliance (SQ) is responsible for water management. At our sites, engineers work in close collaboration with our EHS managers to lower water consumption and treat wastewater.

Further information can be found under Environmental stewardship.

Our commitment: Standards and procedures

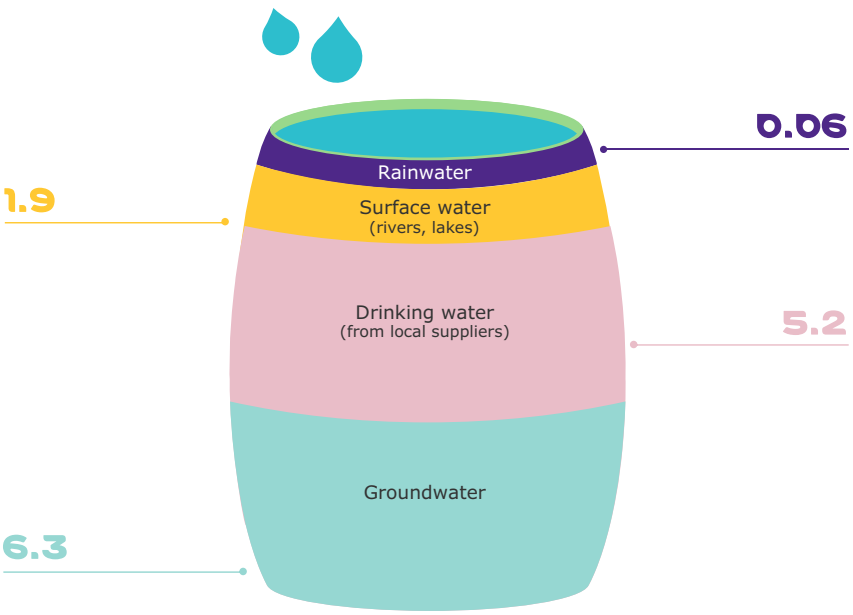
Our Group-wide “Sustainable Water Management Part 1 – Wastewater”, “Sustainable Water Management Part 2 – Water Use” and “Sustainable Management Part 3 – Water Risk Management” standards detail the way we integrate **mechanisms of sustainable water management** into our management system. All three standards are based on the commitments we made under the Responsible Care® initiative. At the same time, our “Sustainable water management principles”, which were published in 2021, set the framework for the three aforementioned standards. Our “Wastewater” standard defines criteria for assessing our wastewater discharges into the ecosystem. It also helps us to achieve our target as regards trace substances in wastewater from our operations.

The “Water Use” standard sets out mandatory Group-wide requirements for the responsible consumption of water. The “Water Risk Management” standard establishes a way for us to manage the risks that arise from direct or indirect water extraction and also covers risks such as contaminated rainwater and flooding. We perform internal EHS audits to verify that our sites comply with our three standards. They are all required to measure and assess the risks and impacts of the hazardous substances in their wastewater. Moreover, they must also analyze withdrawal and wastewater risks and comply with the respective requirements of the local authorities.

Water withdrawn from our own sources

For the most part, we draw water used for our production processes from our own wells and source drinking water from local suppliers. In doing so, we do not want to impair any protected areas, sensitive ecosystems or habitats. Nevertheless, we keep an eye on trends that could potentially lead to sources being reclassified in the future.

Water withdrawals (millions of m^3) – 2021



The cooling water used for our production processes generally runs in a circular system. Depending on regulatory standards and the energy footprint, we sometimes use freshwater for cooling in a once-through system. For certain applications, we treat production wastewater and reuse it. In 2021, we recycled a total of 23,5 million cubic meters of water.

Using water more efficiently

We seek to minimize our impact on the water situation in the vicinity of our sites. In 2021, we withdrew 13,4 million cubic meters of water in total. In the reporting year, we carried out a water recirculation project at our site in Rio de Janeiro. This project contributed to saving around 30000 cubic meters of groundwater - 29% more than in the previous year.

Local conditions determine whether a sufficient supply of water is available. In our water conservation efforts, we are particularly concerned with sites in water-scarce areas. To improve our water efficiency, we therefore defined an intensity score – the "Water Intensity Score". The score relates the amount of water purchased at a site to the number of hours worked, while taking the local availability of water into account. To calculate this, we use the local water stress factor according to the “Aqueduct Water Risk Atlas” of the World Resources Institute (WRI). We aim to lower our water intensity score by 10% by 2025 compared with 2020. We changed the baseline year from 2019 to 2020 in order to align it with our climate action target, thus also seamlessly connecting to our previous target. Since our water consumption already decreased from 2019 to 2020, our adapted target is even more ambitious.

Our wastewater

In 2021, we generated a total of 13,3 million cubic meters of wastewater. This consisted of around 9,5 million cubic meters of freshwater, which we discharged into surface waters. 3,8 million cubic meters was classified as other water and was treated at external treatment plants or disposed of in an ecologically sustainable manner. When directly discharging wastewater into aquatic ecosystems, we comply with the respective legal requirements. Before we obtain a discharge permit, the local authorities review the profile of the local aquatic ecosystems on site to ensure that they will not be compromised by our activities. 57% of our total wastewater was discharged by three of our sites. Our Gernsheim (Germany) discharges its treated wastewater into the Rhine and our Onahama site (Japan) into the Pacific Ocean. The wastewater generated at our Darmstadt site in Germany is treated in our own treatment plants before being released into the Schwarzbach/Ried Creek, a tributary of the Rhine River. The volume of treated wastewater we discharge represents approximately 3,3% of the average annual water volume of the Schwarzbach/Ried Creek, which complies with all statutory regulations. We are preparing for a potential tightening of the statutory requirements on discharging treated wastewater.

Since November 2021, we have been expanding our central wastewater treatment plant in Darmstadt by adding a fourth purification stage. Its current treatment performance of up to 98% is to be further increased in the future thanks to activated carbon filters. We are planning to commission the improved plant at the end of 2023.

Residues in wastewater

We continuously work to optimize our production streams and purification processes in order to conserve water and minimize residues. An expert has been appointed for each of our business sectors to provide guidance for our sites. At our pharmaceutical production sites, our top priority is to prevent or reduce **pharmaceutical active ingredient residues** in our wastewater. All such sites have their own wastewater treatment plants and regularly analyze their wastewater to check for harmful substances.

We also process antibiotic active ingredients on a small scale. To prevent adverse effects on people and the environment, the wastewater generated from these activities undergoes an additional purification process. Only then do we discharge it into the ecosystem, thereby minimizing remaining antibiotic residues.

When it comes to discharging wastewater, we strictly adhere to government regulations. However, even though we meet all applicable requirements, slight amounts of trace substances still end up in the ecosystem. Our target therefore goes beyond the stipulations of legal requirements: By 2030, we plan to reduce potentially harmful residues in our wastewater to **below the no-effect threshold**, a scientifically defined limit below which no negative environmental impacts are to be expected.

Assessing our water management practices

In addition to reporting on our climate action efforts, we also report water-related data to the CDP, which collects environmental data from companies once a year, evaluating their processes and performance on a scale from A to D-. In 2021, we were awarded a “A-” for our water management practices (2020: B).

Waste & recycling

Although waste contains valuable raw materials that can be reused in the production stream, it can also pose a wide range of risks to the environment. We therefore consider it essential to either prevent or recycle as much of our waste as possible.

Our approach to waste and recycling

We aim to both limit the loss of raw materials and reduce the impact of our waste disposal practices on ecosystems. To this end, we are working to lower our Waste Score, our key waste management indicator, by 5% by 2025 (2016 baseline).

We prevent the generation of waste by, for instance, developing new production processes or optimizing existing ones. When prevention is not feasible, we do our best to recover materials or energy from the waste we create. Our waste scoring system helps us support a circular economy. Waste separation makes it possible to **recover and recycle raw materials**, while unrecyclable waste is disposed of in an environmentally sustainable manner in line with the strictest waste disposal standards. In doing so, we comply with local legal regulations and take into account the available disposal options.

Responsibility for the waste disposal process

As a generator of waste, we are responsible for the ultimate disposal of our waste products and therefore choose our service providers with the utmost care, contractually stipulating disposal requirements. We conduct random audits to verify their **compliance with our disposal standards**, especially when it comes to hazardous waste.

Roles and responsibilities

Our Corporate Sustainability, Quality and Trade Compliance (SQ) function bears overall responsibility for our waste management and recycling practices, while our EHSmanagers are in charge of implementing our requirements at our individual sites. We have a Group-wide committee consisting of experts from SQ and our business sectors to coordinate our approach to waste management.

Waste management forms part of our Group-wide environmental management system, with 90 sites certified to ISO 14001. In addition to undergoing external certification, we also conduct internal EHS audits to review our waste management practices. Moreover, we regularly host activities such as EHS forums and conferences to keep our local EHS managers and site directors up to date on the topic and to raise awareness. Unfortunately, no such events took place in 2021 due to the Covid-19 pandemic.

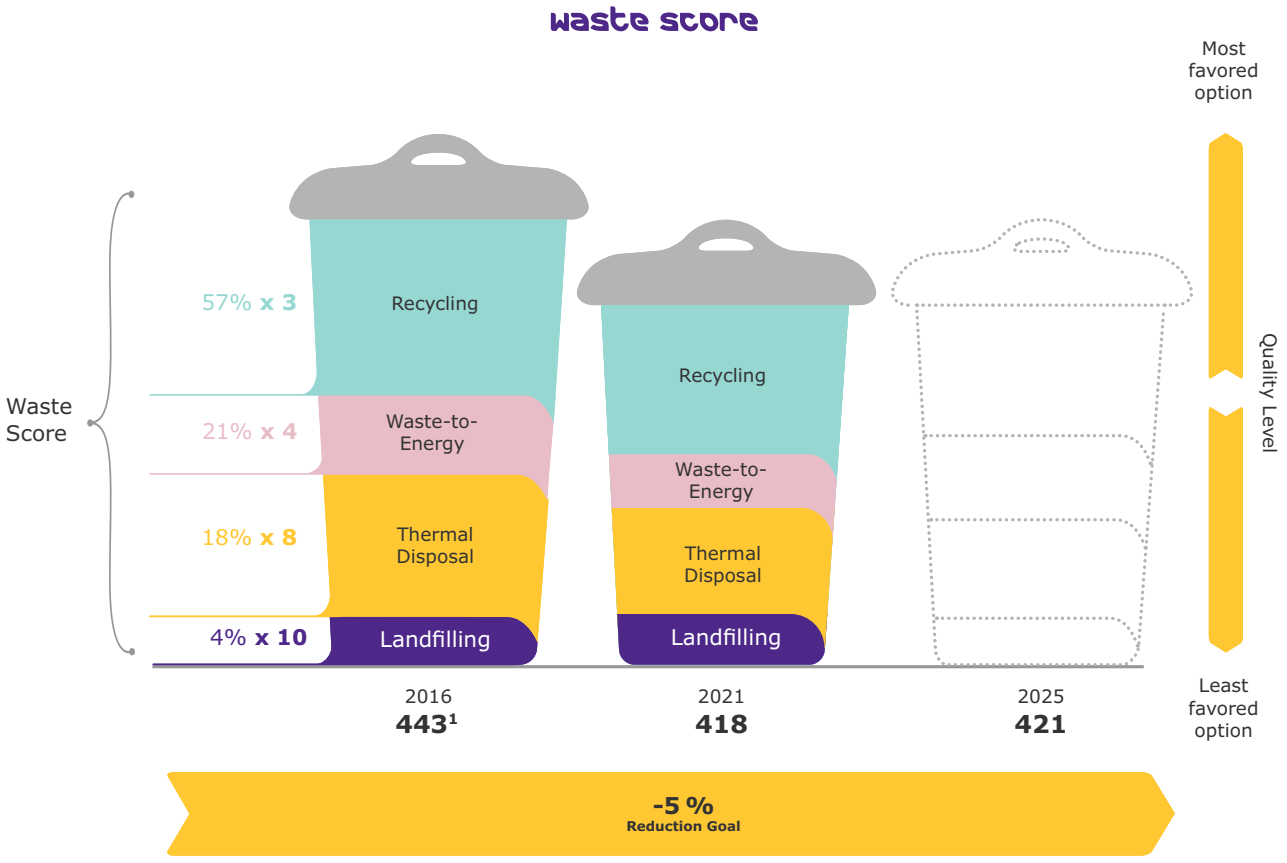
Further information can be found under Environmental stewardship.

Our commitment: Group-wide EHS standards

Our Group-wide EHS Waste Management Standard provides a **consistent framework for waste management across all our sites**, defining organizational structures and minimum requirements. This standard also stipulates that all facilities document their waste by type and quantity and report this data to our Group SQ function.

Systematic waste reduction

We use a variety of methods for recycling, recovering and disposing of the waste we generate, each of which has a different impact on the environment. To systematically account for these effects, we have put in place a waste scoring system that allows us to compare the amount of waste our individual sites generate and track our various waste streams. Under this system, our waste streams are broken down into five categories by percentage: landfilling, thermal disposal, waste-to-energy, recycling, and prevention. This percentage is then multiplied by a factor that increases based on the disposal method's environmental impact. The total from each category is added together to yield our total Waste Score. Prevented waste is multiplied by a factor of zero, thus lowering the overall score.



[1] The base was retroactively adjusted owing to subsequent data corrections.

Reducing the environmental impacts of waste

We use our company´s Waste Score to systematically track the environmental footprint of our waste disposal activities. We are aiming to reduce this score by 5% by 2025 compared with 2016. To achieve this goal, we continually examine our production processes and disposal methods to identify potential areas for improvement, an endeavor supported by the EHS units of the business sectors at each respective site. They regularly discuss best practices, share lessons learned across our sites, and drive the transition to greener disposal methods. In 2021, we succeeded in reducing our total Waste Score by 5.6% relative to 2016.

Year on year, the amount of waste we generated in 2021 decreased slightly, totaling 213 metric kilotons (2020: 231 metric kilotons). Soil, construction and demolition waste accounted for 20% of our total waste in 2021 (2020: 21%). Our Waste Score does not factor in this type of waste, which can rarely be avoided and must be discarded in accordance with clearly prescribed methods.

Promoting the circular economy

Through our ProMec (Progressive Material Economy) initiative at the Darmstadt site, we are promoting a **sustainable, resource-efficient circular economy.** We are refining our solvent recycling practices, thereby minimizing the adverse environmental impacts from the disposal of our production waste. In 2021, we expanded our solvent recycling program to include a variety of solvents from Organics production, which has allowed us to recycle an additional 985 metric tons of solvents in 2021. This move has sustainably boosted the recycling rate of our production waste in Darmstadt from 8.6% to 16.4%.

Together with the Technical University of Darmstadt (TU Darmstadt), we began developing a **digital platform for the optimum use of waste** in April 2021. The project aims to bring together waste generators and specialized waste recyclers in Darmstadt.

We have been working on an innovative **information management system for the circular economy** since 2021. The circular economy makes a key contribution to sustainability and resource efficiency by re-introducing high-quality secondary raw materials back into production. The new system connects all the participants in a network and offers the trustworthy, safe exchange of data.

Shifting from landfill to waste-to-energy

At our site in St. Louis, Missouri (USA) we employ **waste-to-energy recovery for vast portions** of our waste instead of landfilling it. By the end of 2021, this applied to 626 metric tons. This disposal channel has an 89% lower CO_2 emission rate than landfill. Avoiding landfill will help us reduce our emissions from waste at St. Louis by 120 metric tons of CO_2 per year. In 2022, the site is planning to shift further waste streams from landfill to waste-to-energy recovery.

Plant, process & transport safety

Avoiding harm to human health and the environment has top priority for us. We have management systems in place to help ensure the safety of our plants and processes and to protect our employees and the environment. In addition, we do everything in our power to ensure that our chemical and pharmaceutical compounds are transported and stored properly.

Our approach to plant, process and transport safety

We seek to **minimize manufacturing process hazards** wherever possible in order to avoid workplace accidents, production outages and chemical spills, which is why we regularly review our approach to plant and process safety and continuously gauge it using our EHS performance indicators.

Moreover, all our shipments are to reach our customers and sites safely, undamaged and with the required safety information. Several of the materials we store and transport are classified as hazardous. The storage of such dangerous goods and the transport thereof – whether by road, rail, air, or water – are governed by global regulations. To minimize risks to people and the environment, we apply **strict safety requirements across the Group** that also comply with applicable laws. We conduct regular reviews to ensure our own warehouses as well as those of third parties comply with these regulations.

We train our employees regularly in an effort to prevent human error and also to detect technical defects before they can cause harm.

Roles and responsibilities

Overriding responsibility for plant, process and transport safety lies with Corporate Sustainability, Quality and Trade Compliance (SQ), which coordinates plant and process safety for the company and defines Group-wide EHS standards and regulations. In addition, our individual sites are subject to national and international regulations governing environmental stewardship and public safety. At the local level, the **respective site directors** are responsible for ensuring compliance with all safety requirements.

We have appointed an EHS manager for each of our sites as well as a **dangerous goods manager** for every site with logistics activities. The role of the dangerous good manager corresponds to the EU regulations pertaining to the “Dangerous Goods Safety Advisor”. Both individuals advise the site manager on plant, process and transport safety and regularly monitor compliance with safety requirements.

Our commitment: Internal standards and international rules

To ensure safe operation throughout the lifetime of a plant, our Group-wide EHS standards contain specific rules for production plants and processes. These include specifications that determine how special risk analyses and hazard assessments are to be carried out. We have also defined measures for the event of accidental release of chemical substances and for fire protection.

Our Group-wide EHS standards stipulate the safety levels for the storage of hazardous materials at our sites. Along with supplementary standard operating procedures and best practice documents, these EHS standards describe the technology, equipment and organizational infrastructure needed to achieve the appropriate safety levels. Contract warehouses must also adhere to our strict safety requirements. Before we sign a contract with an operator, they must submit a statement detailing how they meet our prerequisites. Our Group-wide EHS standards also define the **technical and organizational requirements** for such warehouses.

Our Group Transport Safety Standard is based on the United Nations Recommendations on the Transport of Dangerous Goods. This guideline is especially important for sites in countries with insufficient local regulations covering the conveyance of hazardous materials.

Assessing potential risks

Before commissioning a plant, we draft a safety concept and that is subject to continuous review throughout the entire lifetime of the facility and, when necessary, updated until the facility is decommissioned. This safety concept contains an overview of potential risks and specifies corresponding protective measures. After any alterations are made to a plant, we also reassess the hazard and risk situation.

Our Risk Management Process guides all our sites in **identifying and assessing risks** and is used to devise further measures to minimize them.

We use internal **EHS audits** to complement the inspections conducted by our EHS and dangerous goods managers in order to ensure that our sites comply with process, plant, transport and storage safety regulations. Normally, these audits are conducted every three years at productions sites and every four years at warehouse and distribution sites. If major shortcomings are identified, we re-audit the respective site the following year. Conversely, we may decide to extend the period between audits at facilities where, based on the findings from previous audits, we deem the potential risk to be low. Our sites are required to rectify any deficiencies discovered during the audit, with the auditor subsequently checking whether the specified corrective actions have been taken.

In 2021, we conducted 51 EHS audits in accordance with our Group-wide EHS standards. Our own warehouse locations accounted for 19 of these audits and interfaces to third-party warehouses for a further 7. Due to the Covid 19 situation, all audits were conducted remotely.

We report transportation incidents and accidents in accordance with the Recommendations on the Transport of Dangerous Goods – Model Regulations (UN Orange Book, 9.9) in conjunction with the criteria of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR, 1.8.5.). There were two reportable events in the reporting period. In both cases, the reporting obligation did not lie with our company.

Keeping a close eye on safety

We track **EHS performance indicators** at all production and warehouse facilities, as well as at major research sites, including both accidents and near misses. We investigate each individual incident and then devise appropriate countermeasures in an effort to reduce the likelihood of such events reoccurring in the future. EHS performance indicator data are reported once a month within each business sector, with the Executive Board receiving reports on the topic once a year. Four indicators are particularly important to us here:

- Under our EHS Incident Rate (EHS IR), we track and evaluate all major and minor accidents and incidents as well as further EHS-relevant incidents. The EHS IR covers both our own employees as well as those of contractors. To calculate it, we put the number of incidents and the severity of the event in proportion to the number of hours worked. The lower the EHS Incident Rate, the safer the site is. Our EHR IR of 3.9 in 2021 was slightly lower than the year-earlier figure of 3.4.
- The EHS IR also includes our Loss of Primary Containment (LoPC) indicator. In 2021, we recorded no significant incident-related spills at any of our production, research or warehouse sites Group-wide.
- A further important indicator is the EHS Leading Rate (EHS LR), which reflects the number and the results of the analyses of near misses and critical situations. Some of our individual business sectors have also defined their own annual targets for EHS IR and EHS LR.
- In 2021, we set ourselves a new goal for the Lost Time Injury Rate (LTIR) (number of accidents Group-wide resulting in at least one missed day of work per million hours worked). We aim to bring our LTIR below 1.0 Group-wide by 2025. In 2021, our LTIR was 1.2 (2020: 1.3).

Employee training and best-practice sharing

In line with their specific tasks and responsibilities, our employees undergo regular training that is conducted by either their respective supervisor or our EHS managers. They present EHS standards applicable Group-wide, site-specific standards and processes, address changes to international requirements and explain the proper procedures for dealing with incidents. In addition, all newly hired EHS managers complete introductory courses on plant and process safety during their EHStart-up! onboarding.

In the interest of improving safety, we consider it extremely important to continuously **share best practices and lessons learned**. We want all our production sites to be able to learn from incidents at other facilities and implement preventive measures. Once a month, for instance, site directors and EHS managers participate in safety leadership calls to share new lessons learned. Additionally, the EHS managers of the individual sites regularly hold sessions to discuss matters.