Environment

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Environmental stewardship

Part of the non-financial report

Our business operations impact the environment, generating greenhouse gas emissions, wastewater and waste. In addition, we also make use of use materials that can adversely affect ecosystems if not handled properly. Across all our production sites, we meet a strict set of environmental regulations and continually adapt our processes to new regulatory requirements. With natural resources growing ever scarcer, we aim to utilize energy, water and materials as efficiently as possible.

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. We do our best to prevent detrimental emissions into the air, water and soil. 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 neighbors and non-governmental organizations (NGOs).

How we structure environmental stewardship

The Vice Chair of the Executive Board and Deputy CEO 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.

Our Group Environment, Health, Safety, Security, Quality (EQ) function oversees all related efforts Group-wide. EQ senior leadership approves operational standards and regularly reports on environmental sustainability to the Executive Board. Once a year, EQ prepares an environment, health and safety report for the Executive Board 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 documentation 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 from EHS managers, with EHS coordinators performing this role at smaller sites. These local EHS units report to the respective business sector and work in close collaboration with EQ. In 2020, we employed **more than 200 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 and energy, water and waste. This body consists of representatives from Healthcare, Life Science, Performance Materials, and our Group EQ function. 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 sustainability.

Whenever designing new sites or plants, we always involve EQ, which is responsible for reviewing the ecological aspects of a project and advising our sites. Additionally, EQ performs detailed environmental impact assessments for large-scale projects.

Our commitment: Standards and standard operating procedures

Our approach to environmental management is built on our **Group EHS (Environment, Health and Safety) Policy**, which has been approved by our Executive Board. Closely 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, 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.

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 sustainability 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 outlined 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, 2020, our provisions for environmental protection totaled € 148 million,

95% of which was attributable to Merck KGaA, Darmstadt, Germany.

Assessing environmental impacts

In general, we conduct risk-based assessments along with **internal and external audits** on all our production facilities every three years with the goal of analyzing and minimizing our environmental footprint. Conducted by our Group EQ function, these assessments serve to ensure that our requirements are being met, with appropriate corrective measures being taken 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. Because of the travel restrictions during the Covid-19 pandemic, we could not conduct the majority of the audits scheduled for 2020 and therefore postponed them to 2021. It was, however, possible to perform audits either virtually or on site in ten cases. All audited sites received 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 our Group EQ and 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 impacted sites immediately of the respective event. Apart from using this system to identify issues, we also encourage employees to report potential breaches of our standards to Group Compliance. In 2020, we recorded no significant violations of environmental laws or regulations Group-wide.

Environmental training and continuing education

All new EHS managers are required to complete EHStart-up!, a three-day orientation held at our global headquarters in Darmstadt. This seminar covers energy efficiency and climate action, water management, occupational health and safety, and plant and process safety, along with our Rapid Incident Report System (RIRS). In 2020, the Covid-19 pandemic prompted us to offer this onboarding as a series of topic-specific webinars. We recorded these classes so that they are accessible on our intranet any time. Beyond this training, all EHS managers also regularly participate in virtual and in-person courses on new requirements and regulations.

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** for factors such as greenhouse gas emissions and water consumption. Other sites are not obligated to undergo this certification. The annual internal audit reports and management reviews carried out under the Group certi

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of our sites worldwide are currently covered by our ISO 14001 certificate.

Every year we contract a third party to perform a certification audit. In 2020, a random sampling of 13 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 number of surfaces that are unsealed. The next species conservation assessment of our Darmstadt site is scheduled for 2021 and will document the species present along with the protected nesting areas and refuges located on our premises. The last species conservation assessment was conducted in 2015.

* The paragraph on Biodiversity has been assigned to the chapter on Environmental Stewardship for thematic reasons. Since Biodiversity does not correspond to the criteria of double materiality, this paragraph is not part of the non-financial report.

climate action

Part of the non-financial report

Climate change is one of the major challenges facing us in the 21st century. Because our company is no exception when it comes to generating greenhouse gases, we aim to reduce these emissions in order to mitigate our impact on the climate. This issue matters not only to us, but also to our customers and many other stakeholders. Changes in the climate can lead to planning and investment uncertainty. Regulations and legal requirements are also evolving in a bid to encourage climate-friendly behavior. We believe that climate action and energy efficiency will pay off in the long run, benefiting both the environment and our business.

Our contribution to climate action

We are taking action to mitigate our impact on the climate. In 2009, we set out to reduce our direct (Scope 1) and indirect (Scope 2) greenhouse gas emissions by a total of 20% by the end of 2020 (2006 baseline), a goal that we achieved on schedule.

In 2020, we therefore drew up new objectives. **By 2030**, we intend to **lower our direct (Scope 1) and indirect (Scope 2) emissions by 50%** (2020 baseline), to be achieved by executing energy efficiency measures, reducing process-related emissions, and purchasing more electricity from renewable sources. We are also aiming to **cover 80% of our electricity consumption with renewables** by 2030. Moreover, we plan to set a new reduction target for our emissions from the upstream and downstream value chain (Scope 3). We are currently setting up processes to record non-reported Scope 3 data more precisely. We will validate the data basis for a specific target in 2021.

By 2040, we intend to achieve **net zero carbon operations** along our entire value chain. This target covers our Scope 1, 2 and 3 greenhouse gas emissions.

How we structure our climate action

Our Group Environment, Health, Safety, Security, Quality (EQ) function is responsible for overseeing climate action within our company, with our individual sites worldwide implementing the necessary measures at the local level. Further information can be found under Environmental stewardship.

Our commitment: Standards and legal frameworks

Two of our EHS standards, "Energy Management" and "Emissions of Refrigerants", enable energy and process-related emissions to be managed consistently across the Group. We utilize an internal audit process to check compliance with all EHS standards on a random basis.

In addition to our own standards, we are subject to a wide array of **national and international energy and climate regulations**. At the 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, 13 sites have been certified to ISO 50001.

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 emissions 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 emission allowances.

The German Fuel Emissions Trading Act (BEHG) stipulates the introduction of a **national carbon pricing system for fuel** in Germany starting in 2021. We therefore expect the cost of fossil fuels to increase.

Slight rise in energy consumption

We consumed 2,372 gigawatt hours of energy in 2020, versus 2,178 gigawatt hours in 2019. Our energy intensity relative to sales totaled 0.14 kilowatt hours per euro in 2020.

Our emissions

In 2020, we integrated Versum Materials, which we acquired in October 2019, into our reporting. Because Versum Materials has no data that dates back to 2006, we could not reflect these additional emissions in our 2020 climate action target.

We **lowered** the greenhouse gas emissions of our legacy business (excluding Versum) **by roughly 25%** from our 2006 baseline, thus achieving our overall reduction goal despite growth in our operating business.

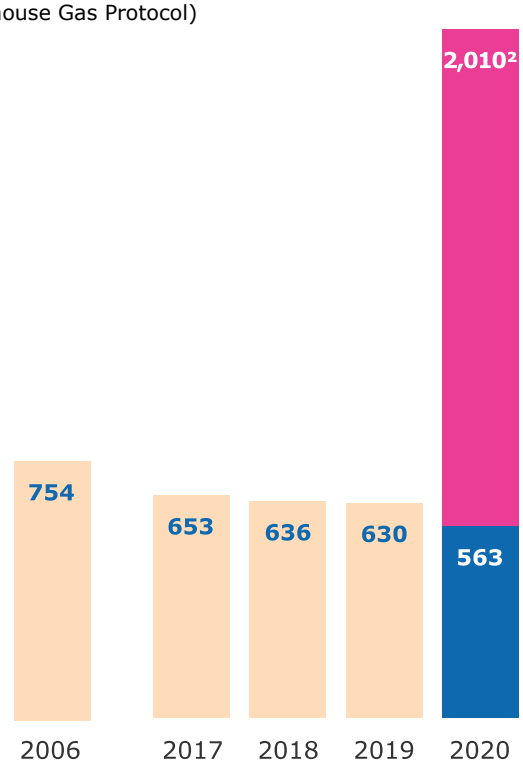
The integration of Versum Materials caused our greenhouse gas emissions to rise sharply. In 2020, we emitted aproximately 2,010,000 metric tons of CO_2 equivalents (CO_2eq) (2019: 630,000). Our direct emissions (Scope 1) totaled 1,706,000 metric tons of CO_2eq, with indirect emis-

sions (Scope 2) of roughly 304,000 metric tons calculated according to the market-based method (2,101,000 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 0.11 kg of CO_2eq per euro of net sales in this period.

In 2020, we focused on creating more **transparency** on our **Scope 3 emissions**. Going forward, we will be including all Scope 3 categories in our reporting.

Greenhouse gas emissions, Scope 1 & 2 (metric kilotons)[1]

(Scope 1 and Scope 2 of the Greenhouse Gas Protocol)



[1] In line with the Greenhouse Gas Protocol, for all previous years (up to the 2006 baseline), greenhouse gas emissions have been calculated based on the current Group structure in the fiscal year and retroactively adjusted for acquisitions and divestments of (parts of) companies, or for changes in emission factors (portfolio-adjusted).

[2] Emissions including Versum materials. In blue:emissions excluding Versum materials.

Transparency on CO_2 emissions and energy consumption

Since 2008, we have been reporting to the 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. We improved to a B in 2020 (2019: C).

Climate action

In 2020, our emissions reduction efforts focused on **purchasing electricity generated from renewable energy sources**. In 2020, we sourced 27% of our purchased electricity from renewables (2019: 19%). Renewables represented 12% of our total energy consumption.

Driving energy efficiency in Darmstadt

In 2020, a variety of **energy efficiency initiatives** helped us save around 1,700 metric 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 and optimized cooling lines.

Reducing process-related emissions

Several of our production lines record high levels of process-related emissions. In our Life Science business sector, this is first and foremost caused by the release of perfluorinated carbons (PFCs). In 2020, our Jaffrey plant (New Hampshire, USA) replaced two emission-heavy production lines with equipment that does not emit PFC. Thus, a total of **four out of 14 production lines** at the site now operate **PFC-free**. As a result, we anticipate a 28% reduction from existing PFC emissions in 2021 compared to 2020. Furthermore, four additional PFC-free production lines are ready to be placed into service in 2021. Two of these are new assets built for increased production capacity.

With Versum Materials now integrated into our Performance Materials business sector, our process-related emissions have risen sharply. A large percentage of these emissions arises from the production of specialty chemicals

for the electronics industry. We are currently looking into ways to lower these emissions.

Switching to sea freight

In an effort to lower greenhouse gas emissions resulting from the transport of our products, we **use sea freight** rather than air shipping whenever possible. To this end, in 2019 our Healthcare business sector launched the transformation program "Spezzatino". One of its objectives is to transport less than 10% of our Healthcare products by air by 2023, converting a majority of transport lanes to sea freight. This will lower our annual CO_2 emissions by 10,000 metric tons. Between 2019 and 2020, we achieved a reduction of 5,000 metric tons.

Green mobility

In recent years, we have significantly lowered the average CO_2 emissions of our company car fleet. Nevertheless, we did not achieve the 30% reduction in these emissions by the end of 2020 as originally planned (2013 baseline). In 2020, we drafted a new Group-wide guideline and an action plan aimed at making our fleet more eco-friendly. These will both take effect in 2021. Our objective is to transition most of the vehicles in our car fleet to lower emission engines by 2025, enabling us to reduce the total emissions of our vehicles by 25% compared to 2020. This would equal approximately 733 metric tons of CO_2. In this endeavor, we are basing our calculations and measurements on the **worldwide harmonized light vehicle test procedure** (WLTP).

The average emission rate of our company car fleet in Darmstadt and Gernsheim (both Germany) is currently 111 g/km. The fleet features 26 electric and hybrid cars, representing a share of 16%. To facilitate this shift, we have installed an extensive charging infrastructure at our global headquarters, part of which is available to our employees for their own personal use. In addition, we also provide charging stations for company and personal vehicles at sites in France, India, Ireland, Switzerland, the United Kingdom, and the United States.

Employee incentives

We encourage our employees to play their part in preserving the climate. Aside from regularly reporting on **our Group-wide climate actions** in our EHS newsletter, we also provide helpful information and tips on our intranet. Moreover, we support employees who are seeking greener modes of transportation.

- At our German subsidiaries, we offer a subsidy of € 100 towards monthly lease payments to employees who opt for a **greener company car model**.
- Our workforce in Darmstadt also has access to a **"Jobticket", an annual public transit pass** whose cost is partially covered by our company. Additionally, we also make available an online tool that helps our people arrange carpools.
- 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. Furthermore, employees throughout Germany can also take advantage of the Call a Bike service offered by Deutsche Bahn (the German railway company). This gives them access to a shared bike that is free of charge for the first half hour and can be borrowed and/or returned in the immediate vicinity of our sites.
- In the United States, we also offer our workforce financial incentives to choose a more sustainable lifestyle. For example, employees can receive up to US$ 1,000 in subsidies towards the installation of solar power on their home and up to US$ 100 towards the cost of an energy audit. They are also eligible for as much as US$ 3,500 towards the purchase of a hybrid or electric vehicle that has been designated as "SmartWay Elite" by the U.S. Environmental Protection Agency.

waste and 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 waste, or to reuse and recycle as much of it 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 this 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 company that generates 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.

How we organize our waste management and recycling

Our Group Environment, Health, Safety, Security, Quality (EQ) function bears overall responsibility for our waste management and recycling practices, while our EHS managers are in charge of implementing our requirements at our individual sites. We have a Group-wide committee consisting of experts from EQ and our business sectors to coordinate our approach to waste management.

Waste management forms part of our Group-wide environmental management system, with 92 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 raise awareness. In 2020, we resorted to virtual training due to the global restrictions resulting from the Covid-19 pandemic.

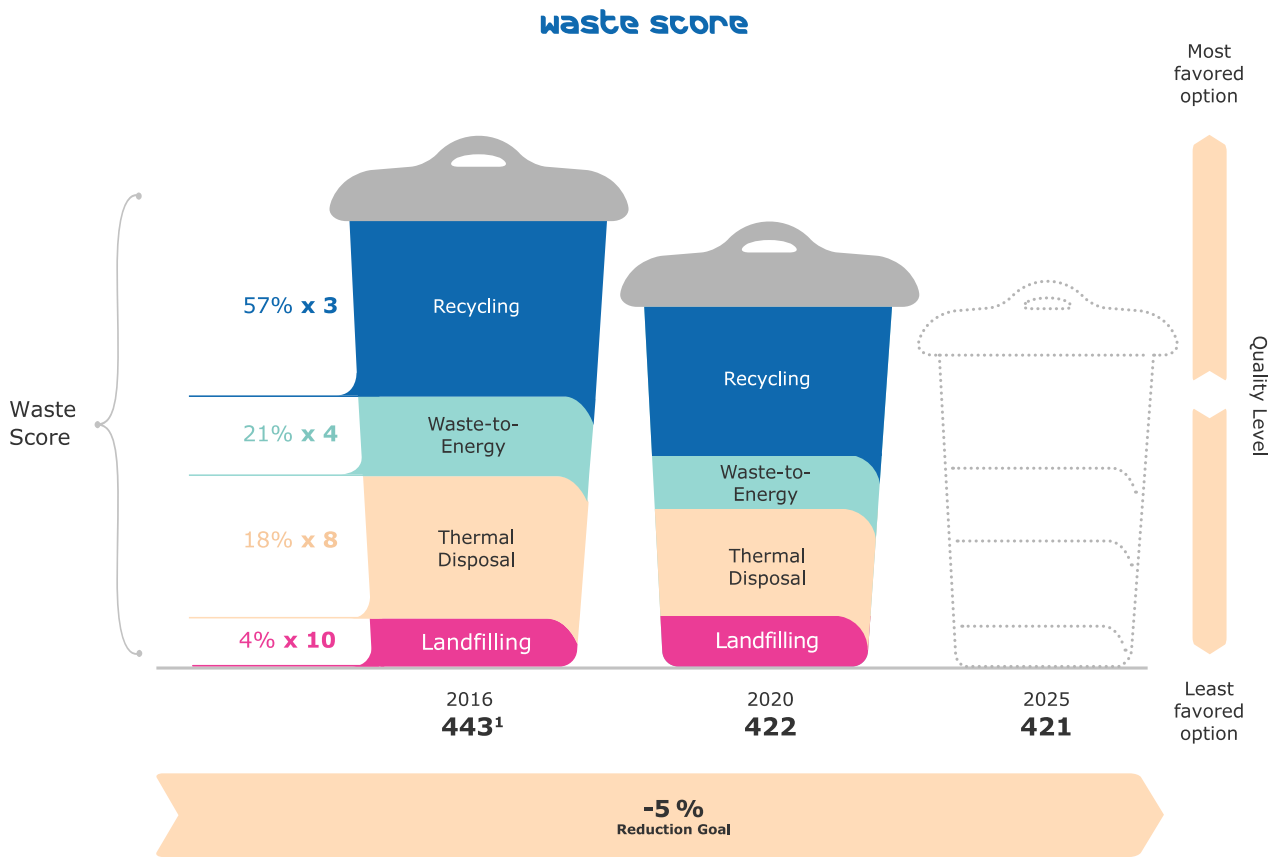
Further information can be found under Environmental stewardship.

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 EQ 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 baseline was retroactively adjusted owing to subsequent data corrections.

Reducing the environmental impacts of waste

To systematically account for the environmental footprint of our waste, we have put in place our Group-wide Waste Score. We are aiming to reduce this score by 5% by 2025 compared with 2016. To achieve this goal, we constantly 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 2020, we succeeded in reducing our total Waste Score by 4,6% relative to 2016.

Year on year, the amount of waste we generated in 2020 decreased slightly, totaling 231 metric kilotons (2019: 244 metric kilotons). Soil, construction and demolition waste accounted for 21% of our total waste in 2020 (2019: 31%). 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

Under the ProMec initiative at our 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 2020, we expanded our solvent recycling program to include a variety of solvents from Organics production, which has allowed us to recycle an additional 600 metric tons of solvent. This move has sustainably boosted the recycling rate of our production waste in Darmstadt from 8% to 16%.

Shifting from landfill to waste-to-energy

In mid-2020, our St. Louis (Missouri, USA) hub shifted a large portion of its **waste disposal from landfill to waste-to-energy recovery**. By the end of 2020, more than 140 metric tons of waste had been sent to waste-to-energy plants. In 2021, we expect 330 metric tons at a minimum to be processed via this disposal channel, which 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 2021, the site is planning to shift further waste streams from landfill to waste-to-energy recovery.

water management

Water scarcity is affecting more and more regions worldwide. Because we too depend on the availability of water, our environmental stewardship efforts focus heavily on sustainable water management. In addition, our wastewater may contain trace substances such as heavy metals or active pharmaceutical ingredients. Our water management practices and processes comply with all applicable water protection laws and are immediately adapted to tightened regulations.

Our approach to sustainable water management

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

To promote sustainable, efficient water management practices, we avail ourselves of the European Chemical Industry Council (Cefic) assessment tool. Our sites used this tool to evaluate their water management, drew up action plans and implemented them stepwise by the end of 2020.

We are also concerned with addressing water scarcity. To help us determine whether a site is located in a water-stressed area, we utilize tools such 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 systematically analyze our water withdrawal data and set clear reduction targets. Our previous goal aimed to **lower our water consumption at sites in water-stressed areas by 10% by 2020 (2014 baseline)**, which we had achieved by the end of 2020.

We have therefore defined new targets to be achieved by 2025 and 2030 (see "Using water more efficiently" and "Our wastewater"). We wish to curb the environmental impacts of our wastewater and make our processes more efficient when it comes to water use. Going forward, we will also be taking into account water-related risks that are associated with key raw materials in our supply chain. 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 they have a greater potential for impacting local aquatic ecosystems.

How we approach water management

Our Group Environment, Health, Safety, Security, Quality (EQ) function bears overall responsibility 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

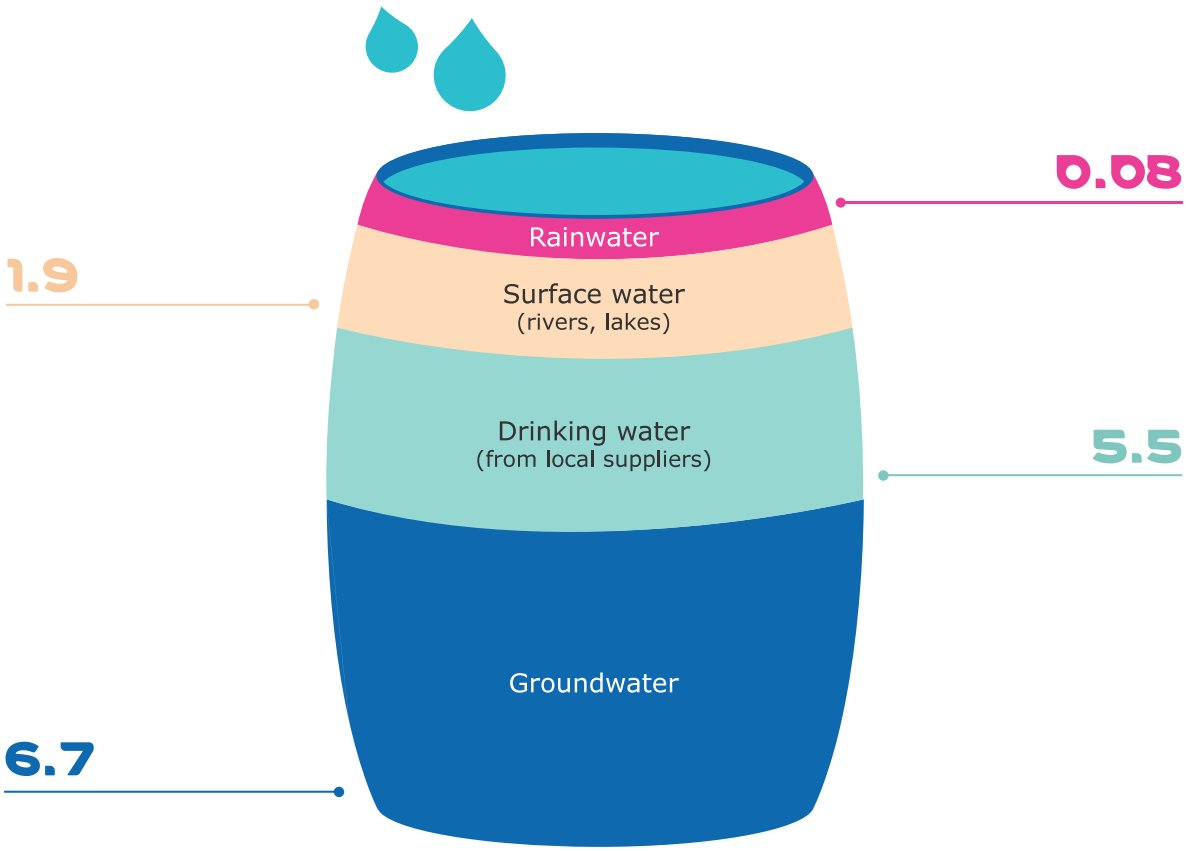
Our Group-wide "Sustainable Water Management Part 1 – Wastewater" and "Sustainable Water Management Part 2 – Water use and stormwater protection" standards detail the way we integrate **state-of-the-art mechanisms for sustainable water stewardship** into our management system. Both are based on the commitments we have made under the global Responsible Care® initiative.

Our "Wastewater" standard defines criteria for assessing our wastewater discharges into the ecosystem, while "Water use and stormwater protection" sets out Group-wide requirements for the responsible consumption of water as a resource. In addition, it 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 these standards. All our sites are required to measure and assess the risks and impacts of the hazardous substances in their wastewater and to analyze water withdrawal and rainwater risks. They must also comply with the respective requirements imposed by 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. We never do anything to compromise sensitive water sources. Nevertheless, we keep an eye on trends that could potentially lead to sources being reclassified as sensitive.

Water withdrawals (millions of m^3) – 2020



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 2020, we recycled a total of 22 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 2020, we withdrew 14.2 cubic meters of water in total, with 700,000 cubic meters originating in water-stressed areas. This figure includes our manufacturing facilities in Mexico City (Mexico), Mollet del Vallès (Spain), Kankakee (Illinois, USA), Norwood (Ohio, USA), Savannah (Georgia, USA), and Hsinchu and Taoyuan (both in Taiwan). These seven sites must both **transparently report their water use** and identify the process steps that require a particularly high volume of water. Building on this information, we are drawing up action plans to help these facilities lower their water consumption. At our Taiwan sites, for instance, we utilize process wastewater for heating and cooling and also collect rainwater.

Our goal for 2020 was a 10% reduction in annual water consumption in water-stressed areas (2014 baseline). By the end of 2020, the respective sites had cut down their water withdrawals by roughly 27% versus 2014, which means that we actually exceeded our target.

New goal for 2025

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 boost our water efficiency, we have therefore created our "Water Intensity Score" that reflects the amount of water withdrawn at a given site relative to the local availability of water and the number of man-hours worked. We have committed to improving this indicator by 10% by 2025 (2019 baseline). In calculating our Water Intensity Score, we factor in the local water stress levels as mapped out in the Aqueduct Water Risk Atlas of the World Resources Institute (WRI).

Our wastewater

In 2020, we generated 13.4 million cubic meters of wastewater. This consisted of around 9.2 million cubic meters of freshwater, which was directly discharged into

surface waters, and 4.2 million cubic meters of other water, which was treated at external treatment plants or disposed of in an ecologically sustainable manner. When directly discharging wastewater into aquatic ecosystems, we comply with all legal requirements. Before we obtain a discharge permit, the local authorities review the profile of the local aquatic ecosystems to ensure that they will not be compromised by our activities. Approximately 50% of our total wastewater was discharged by three of our sites. Our Gernsheim site in Germany discharges its treated wastewater into the Rhine and our Onahama site in 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 4% of the average annual water volume of the Schwarzbach/Ried Creek, which complies with all statutory regulations. We coordinate closely with the respective authorities to address and adapt to the increasingly stringent legal requirements for the discharge of treated wastewater.

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. For our pharmaceutical manufacturing facilities, this pertains in particular to **active pharmaceutical 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. In order to prevent adverse effects, the wastewater generated from these activities undergoes an additional purification process before being discharged into the ecosystem, thereby minimizing remaining antibiotic residues.

New goal for 2030

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 environment. Our new 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.

Enhancing water treatment quality

In 2020, our new industrial water treatment plant in Jaffrey (New Hampshire, USA) opened its gates. The facility will allow for the reuse of up to 90,000 cubic meters annually. This equals a water reusage rate of 80% and significantly reduces the wastewater loadings to the local municipal treatment works. Additionally, the plant generates energy savings of more than 500,000 kilowatt hours per year due to various process improvements.

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 2020, we were awarded a "B" for our water management practices (2019: B).

plant and process safety

Part of the non-financial report

The safety of our plants and processes is a key function of our management systems for environmental stewardship and occupational health and safety, allowing us to protect both our employees while on the job as well as the people in the immediate vicinity of our sites. Besides management systems, we also have high-performance safety systems in place to minimize production errors and lower the risk of financial losses.

Our approach to plant and process 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. Our EHS performance indicators (see "Keeping a close eye on safety") are utilized to continuously gauge our safety performance and practices. We train our employees regularly in an effort to prevent human error and also to detect technical defects before they can cause harm.

How we organize our plant and process safety

Our Group Environment, Health, Safety, Security, Quality (EQ) function coordinates plant and process safety within our company. At the operational level, this is handled by our individual site directors with support from their local EHS managers/coordinators.

Further information can be found under Environmental stewardship.

Our commitment: Standards and legislation

Setting forth the safety rules for all production plants and warehouses, our Group-wide EHS Plant and Process Safety standard covers the entire life cycle of a plant, from planning and construction to operation, retooling, servicing, and maintenance through to decommissioning. Our EHS Spillage Control standard governs the **handling of hazardous materials** Group-wide and stipulates organizational requirements to prevent toxic substances from spilling or leaking during storage and transport. Our Fire Protection standard provides our sites with a clear framework of fire protection requirements.

Alongside these standards, our Risk Management Process guides all our sites in identifying and assessing risks and is used to devise further measures to minimize them. Our Group Procedure Hazard and Operability Study defines the individuals responsible for pinpointing potential hazards during new plant construction, plant retooling or safety-related plant modifications; it also outlines the manner in which these dangers should be assessed and documented.

Assessing potential risks

Before commissioning a plant, we draft a safety concept that is then subject to continuous review and, when necessary, updated until the facility is decommissioned. This concept contains an overview of potential risks and the corresponding protective measures. After any alterations are made to a plant, we also reassess the hazard and risk situation. At our Darmstadt site, we revised our plant safety concept in 2020 to incorporate the latest recommendations from the German Commission on Process Safety (KAS).

We conduct internal EHS audits (see Environmental stewardship) to verify the safety of our plants and processes. Our sites are required to rectify any deficiencies discovered during the audit, with the auditor then checking whether the specified corrective actions have been taken.

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. **Five indicators** are particularly important to us here:

- Under our EHS Incident Rate (EHS IR, see below), we track and evaluate all major and minor accidents and incidents.
- The EHS IR also includes our Loss of Primary Containment (LoPC) indicator.
- Also important is the EHS Leading Rate (EHS LR), which is calculated based on an analysis 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 the United States, we additionally use the Occupational Illness Rate (OIR) to track work-related illnesses and their long-term effects.
- Our goal was to stabilize our Lost Time Injury Rate (LTIR) – the number of accidents Group-wide resulting in at least one missed day of work per million man-hours) at 1.5 Group-wide by 2020. We exceeded our objective, having achieved an LTIR of 1,3 in 2020.

EHS Incident Rate

To document accidents and other incidents, we track the EHS Incident Rate (EHS IR), an indicator that covers the following four types of data:

- The number of workplace accidents involving our employees and the contractors who work at our sites
- Environmentally relevant incidents as defined by the European Chemical Industry Council (Cefic) and the German Chemical Industry Association (VCI), for instance product spills
- The activation of operational safety precautions with no adverse impact on people or the environment, such as preemptive systems shutdowns
- Deviations identified during third-party reviews and audits conducted by regulatory agencies and/or our certifiers

The calculation of the EHS Incident Rate includes the number of incidents and the severity of the event relative to the number of man-hours worked. The lower the EHS Incident Rate, the safer the site is.

3.4

Our EHS IR was 3.4 in 2020, representing a slight decrease compared to 2019 (3.6).

In 2020, we recorded no significant incident-related spills across any of our production, research and warehouse sites Group-wide.

Training and sharing lessons learned

The safety of our plants and processes is predicated on the smooth interplay of man and machine. We provide our employees with regular plant and process safety training and offer internal continuing education to site, production, engineering, and EHS leaders. Likewise, we train all newly hired EHS managers on plant and process safety (see Environmental stewardship) during their EHStart-up! onboarding.

In the interest of improving safety, it is extremely important to continuously **share best practices and lessons learned**. This approach enables all our production sites to learn from incidents at other facilities and take preventive measures. Once a month, for instance, site directors and EHS managers participate in safety leadership calls to share new lessons learned. Additionally, our site EHS managers regularly hold discussion sessions to benefit from each other's experiences.

Transparent communication

In line with the stipulations of the German Hazardous Incident Ordinance, our **safety reports** are fully accessible to the public upon request. At our Darmstadt site, we hold **neighborhood meetings** to inform people about potential hazards and protective measures in the event of a hazardous incident. Further information can be found in our accompanying Incident Brochure, which we update every three years and send to approximately 17,000 households in the vicinity of our global headquarters. This document is also available on our website.