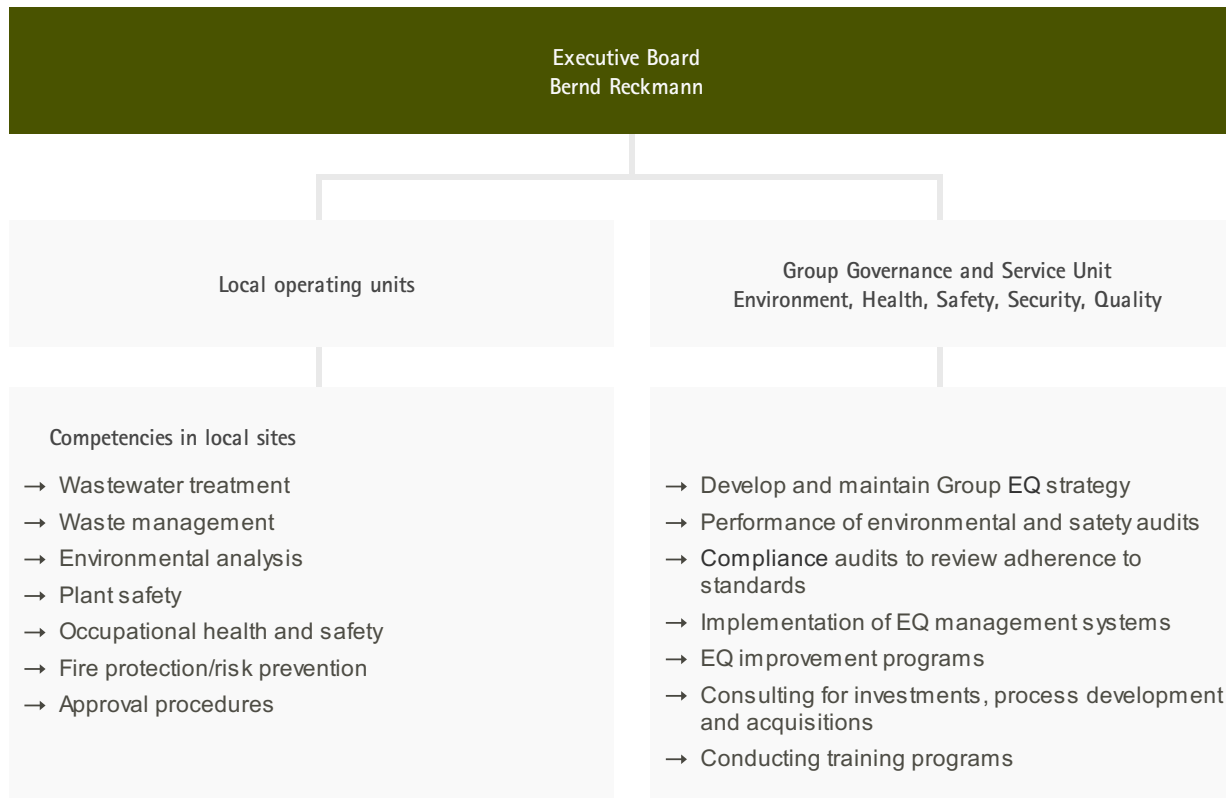


Environment



Our responsibility to protect the environment is derived from our values and our corporate strategy. We have instituted Group-wide principles, strategies and organizational structures for corporate environmental protection and have also implemented a certified environmental management system for our Group-wide activities. In this way, we aim to reduce our emissions and waste while also ensuring that resources such as energy, water and raw materials are utilized as efficiently as possible. Process safety is a key prerequisite here.

Management of company environmental protection measures



Our responsibility to protect the environment is derived from our Values and our corporate strategy. We aim to continually improve our performance and reduce our impact on the environment by applying the precautionary principle. This especially includes utilizing resources such as energy, water and raw materials both efficiently and economically. Furthermore, we strive to lower our emissions and waste so that we can reduce our costs as well as our impact on the environment. As part of our contribution to climate protection, we have set a goal of reducing our direct and indirect greenhouse gas emissions by 20% by 2020, measured against the 2006 baseline.

Our Corporate "EHS Policy" provides the framework for principles, strategies, and organizational structures for environment, health and safety at Merck KGaA, Darmstadt, Germany. The policy is implemented through internal guidelines and instruction manuals such as our EHS, Security and Quality Manual, which tells our employees how to apply the EHS principles in their day-to-day work. Our guidelines are based on the Responsible Care Charter, which the chemical industry drafted in 2005.

Overall responsibility for environment, health, and safety is born by Executive Board Member Bernd Reckmann. The function Environment Health Safety Security Quality (EQ) is responsible for globally steering all environmental measures. At the individual sites, the local EHS managers are in charge of operational environmental protection measures.

Through internal and external audits, EQ monitors adherence to local environmental protection laws, regulatory requirements, standards and business requirements. During the 2011-2012 period, the Millipore sites acquired in summer 2010 were integrated into EQ's structural organization and processes. Reporting was harmonized as well. Environmentally relevant data are regularly collected at the individual sites via the LION electronic data management system; the data are then reported to EQ, mostly on a yearly basis, but sometimes several times a year, or even monthly.

We manage our Group-wide environmental protection activities through an environmental management system that complies with ISO 14001. All production sites are required to implement this environmental management system, which is annually certified by an accredited organization. Since 2009, Merck KGaA, Darmstadt, Germany has held an ISO 14001:2004 Group certificate for its environmental management system, which covered 49 sites at the end of 2012. New

→ Climate protection

production sites must subsequently set up and implement a certifiable environmental management system that conforms to Group standards. This has been accomplished for the majority of the Millipore sites acquired in 2010. At the remaining four Millipore production sites, enough progress has been made in setting up the corresponding management systems that they are scheduled to be externally certified and added to the Group certificate in 2013.

In both 2011 and 2012, we successfully passed the audit that is conducted every year in November as part of the certification process. During the audits, the certifier identified only a few areas with potential for improvement at select sites, after which appropriate action plans were defined to address them.

All employees with environmental protection responsibilities are trained on a continuous basis and obtain additional qualifications. Besides local programs, this training also includes the annual international EHS Congress in Darmstadt as well as the regional EHS Forum. Both events inform attendees about new EHS issues as well as updates to guidelines and laws; they furthermore encourage best practice sharing at an expert level.

Spending on environment, health and safety totaled € 141 million in 2011 and € 146 million in 2012. These totals also include investments made during the respective years.

Goals: Environmental management

Strategic goal	Action	By?	Status in 2011 and 2012	Status
Obtain ISO 14001:2004 Group certificate	Certify all production sites to ISO 14001:2004; certify the Millipore sites acquired in July 2010	Ongoing	New production sites were successively added to the Group certificate. Four Millipore production sites are scheduled to be externally certified and added to the Group certificate in 2013.	

Legend: Achieved In progress Not achieved New goal

Climate protection

Climate change and its consequences, one of the key challenges facing society in the 21st century, are already impacting life on earth today.

Being a responsible company, we are resolute in our quest to help reduce greenhouse gas emissions, which we are accomplishing by lowering our greenhouse gas emissions and by offering products that help our customers reduce their own emissions in turn. Within the scope of the Carbon Disclosure Project, we have been reporting for several years now in detail to our stakeholders – in particular customers, NGOs and shareholders – regarding our activities, measures, and achievements. In addition, our engagement in climate protection activities is also of financial benefit since improved energy-efficiency means that we save on energy costs. Pressure from a growing number of statutory regulations governing greenhouse gas emissions – such as those found in emissions trading systems – has also encouraged us to take action. Furthermore, our customers are likewise increasingly expecting us to engage in climate protection activities.



Steering activities centrally

The Merck KGaA Darmstadt, Germany function Environment Health Safety Security Quality (EQ) is responsible for globally steering all climate protection measures. At our individual sites, operational units are responsible for implementing climate protection measures.

→ Climate protection

Strategic goal and EDISON program

In 2009, we set the goal of reducing our greenhouse gas emissions by 20%, measured against the 2006 baseline. In order to achieve this goal, we initiated the EDISON (Energy Efficiency and Climate Protection) program, which consolidates the climate protection activities of Merck KGaA, Darmstadt, Germany. 20 sites worldwide are responsible for around 80% of the greenhouse gas emissions at Merck KGaA, Darmstadt, Germany, which is why EDISON is focusing on these sites.

The reduction of our energy-related emissions is one of our primary measures. To this end, we are working to reduce greenhouse gas emissions from our own energy generation as well as to enhance the energy efficiency of research and production processes. Furthermore, we wish to lower process-related emissions through measures such as a quality control process at the life science tools division. Improving our building management in terms of energy-related aspects is another measure that will contribute.

Goal 2020

-20%

Greenhouse gas emissions

EQ collaborates with a cross-divisional working group founded in 2011 to create and implement climate protection projects. This working group develops measures itself and evaluates site-related project proposals using a method it created to systematically evaluate projects. In 2012, the Executive Board of Merck KGaA, Darmstadt, Germany earmarked € 10 million for projects. Of the more than 130 approved projects, we have initiated or successfully implemented around half. This includes the construction of a biomass power plant at our site in Goa, India, and the cogeneration plant in Gernsheim, Germany that will go on line in mid-2013.

The Executive Board has also earmarked € 10 million for 2013 as well. Some of this will be used to continue projects that were launched in 2012, and some of it will go to support the 73 new projects that were submitted by the EDISON working group in September 2012 and were approved. Through approximately 200 individual projects, we are aiming to reduce emissions by around 64,000 metric tons of CO₂ per year in the medium term.

Energy management is another component of EDISON. In 2012, our production sites in Darmstadt and Gernsheim, responsible for around 40% of our global energy consumption, were certified to ISO 50001 "Energy management systems".

The economical use and energy efficiency of company cars also constitutes part of our climate protection measures. The Group-wide company car guidelines are being revised this year and will establish solid upper limits for vehicle CO₂ emissions.

Climate protection figures for 2011 and 2012

We produced 521,000 metric tons of greenhouse gas emissions in 2011, and 516,000 metric tons in 2012. In 2012, the sites that produced the most emissions included the Darmstadt and Gernsheim sites in Germany, the Jaffrey, New Hampshire and Savannah, Georgia sites in the United States, the Cork site in Ireland, and the Molsheim site in France. Greenhouse gas emissions are reported in line with the Greenhouse Gas (GHG) Protocol, an international standard for greenhouse gas emissions reporting. Merck KGaA, Darmstadt, Germany currently reports Scopes 1 and 2 of the GHG protocol. Scope 1 covers direct emissions that the company produces itself through fossil fuel combustion or through its own processes. Scope 2 pertains to emissions from consumption of purchased electricity, heat or steam. Scope 3 includes emissions such as those from the manufacture and transportation of raw materials, products, and waste, or from employee business travel. Due to the complexity of Scope 3 emissions reporting, Merck KGaA, Darmstadt, Germany is currently only reporting on Scope 3 emissions from business travel (plane and train travel, rental cars).

The Darmstadt and Gernsheim sites in Germany were also our largest CO₂ producers in 2011 and 2012. With the cogeneration plant in Darmstadt and the heating plant in Gernsheim, these two sites are subject to the EU Emissions Trading System. The final carbon credit allowances have not yet been defined for the third trading period (2013-2020). However, based on the current status, Merck KGaA, Darmstadt, Germany will have to purchase additional allowances.

Increasing employee awareness

We want climate protection to be lived throughout the whole company. At several sites, Merck KGaA, Darmstadt, Germany calls on employees to contribute their own ideas for saving energy and conserving resources. In the United States, the life science tools division also supports employees' personal climate protection activities, such as incentives for installing solar panels in their homes. With global campaigns such as the Energy Month campaign, the life science tools division is increasing employees' environmental awareness.

→ Resource consumption

In order to keep our employees informed, we publish a selection of climate protection facts and figures on our intranet. Furthermore, various tools such as energy checklists or best practice examples are also available to help employees share information and learn from one another. We also continuously provide information on climate protection at Merck KGaA, Darmstadt, Germany in our employee newspaper and in an employee newsletter. In addition to this, we give our employees tips, such as how to reduce fuel consumption by modifying their driving habits. As an incentive to use public transportation. Our Darmstadt site offers a job ticket, for which the company covers part of the cost. More than 3000 employees take advantage of this offer.

Goals: Climate protection

Strategic goal	Action	By?	Status in 2011 and 2012	Status
20% reduction of direct and indirect greenhouse gas emissions (Scope 1 and 2) of Merck KGaA, Darmstadt, Germany (2006 baseline)	Systematically examine the energy consumption at the individual sites	End of 2020	The production plants in Darmstadt and Gernsheim were systematically examined in terms of energy savings potential. In addition to this, energy checks were conducted at the Altdorf, Semoy, Taicang, Savannah, and Eppenheim sites.	■
	Identify and implement potential ways to save energy	End of 2020	Nearly 70 projects to save energy or reduce greenhouse gas emissions have been initiated, and some of them have already reached completion.	■
	Reduce process-related emissions	End of 2020	We have made progress in reducing process-related emissions. Despite increased production volume, we managed to lower emissions slightly.	■

Legend: ■ Achieved ■ In progress ■ Not achieved + New goal

Resource consumption

For our business activities, we require resources such as energy, water, and raw materials, as well as numerous other materials, which we mostly utilize for production purposes. Given that resources are becoming ever scarcer and more costly, efficient energy and material use is a crucial factor in staying competitive.

Through our Group-wide program to continually improve business processes, called Operational Excellence (OE), we are aiming to achieve the most economic, efficient level of operation in all our production facilities. All Merck KGaA, Darmstadt, Germany production sites were included in the program in 2011 and 2012. In previous years, the program focused primarily on globalizing structures and processes, as well as enhancing efficiency. For example, utility management (with an emphasis on energy management) became mandatory for chemical production in 2012, after having already been applied to pharmaceutical production in 2011.



Energy consumption

In 2012, Merck KGaA, Darmstadt, Germany consumed 1,438 GWh of energy, which represents a slight decrease compared to 2011 (1,446 GWh).

Merck KGaA, Darmstadt, Germany also operates its own plants to generate power and steam, such as the gas turbine power plant in Darmstadt and the heating plant in Gernsheim. The power plant in Darmstadt is a cogeneration plant, which means

→ Water protection

that the heat created from generating power is then utilized for other purposes. Using a generator, a gas turbine transforms natural gas into power; the waste heat from the turbine and the hot exhaust resulting from combustion are then utilized to create steam and warm water for production.

In mid-2013, a cogeneration plant is also scheduled to go on line in Gernsheim, which will save around 6,000 metric tons of carbon dioxide per year.

Water consumption

We utilized 17.6 million cubic meters of fresh water in 2011, and 16.2 million cubic meters in 2012, consisting of 33% groundwater, 43% surface water, and 24% water from the public water supply. No sensitive water sources were impacted by our water intake.

The largest percentage of water, 86%, was utilized in Europe; 8% was used in Asia, Australia and Africa, 5% in North America, and 1% in Latin America.

Material consumption

Merck KGaA, Darmstadt, Germany especially utilizes production materials such as chemical and pharmaceutical raw materials. In addition, we also employ operating supplies and packaging materials such as folding boxes, glass bottles and ampules.

We generally quantify the weight of purchased materials used directly in our chemicals and pharmaceuticals. We utilized 389 metric kilotons of these materials in 2011, and 360 metric kilotons in 2012. The portfolio of our life science tools division includes numerous devices and work instruments for whose production we need semifinished and finished materials such as ready-assembled electronic components or casing for devices. We record these in unit numbers.

The figures do not include packaging materials and operating supplies such as energy or lubricants.

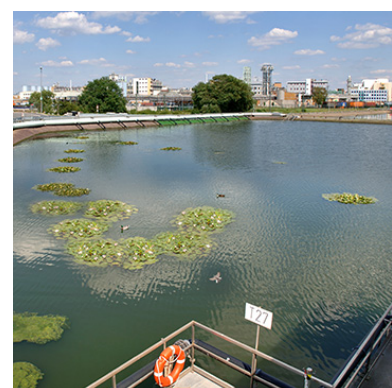
Water protection

At Merck KGaA, Darmstadt, Germany, water is used in production primarily for cooling, as process water, or for exhaust air purification. After being used, the water may contain eutrophication substances, heavy metals, or active pharmaceutical ingredients (APIs). The treatment of this wastewater, and thus the prevention of environmental pollution, is a fundamental part of our corporate environmental protection measures worldwide.

The function Environment Health Safety Security Quality (EQ), which is in charge of environmental protection, bears overall responsibility for water protection. At the individual Merck KGaA, Darmstadt, Germany sites worldwide, the local EHS managers are in charge of this. Our employees regularly receive training and obtain additional qualifications.

In 2011–2012, Merck KGaA, Darmstadt, Germany made significant revisions to its Group-wide "Water Protection" standard. Based on our Responsible Care obligations, this standard defines the processes and responsibilities required for clean wastewater at Merck KGaA, Darmstadt, Germany, and also covers the hiring of third parties to handle it.

The standard also requires all sites to estimate the specific risks and effects of wastewater, as well as to assess these risks and effects using ecotoxicological data. The individual sites must develop and implement a water pollution response plan that features specific measures to prevent wastewater or reduce its volume. This plan takes into account API emissions, among others, and also defines the documentation process for wastewater volume, point of origin, and local limits.



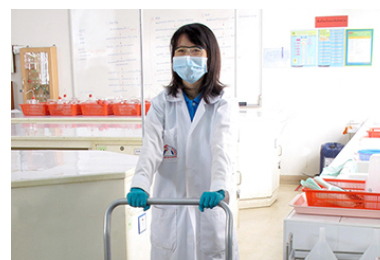
→ Waste management

The standard also provides strict guidelines for wastewater handling via external service providers. The wastewater quality to be attained is, if not already specified in law, contractually defined, as are the responsibilities involved. Furthermore, service providers are regularly audited.

Waste management

For Merck KGaA, Darmstadt, Germany, waste management is a key aspect of its corporate environmental protection activities. This includes measures to prevent and reduce waste, as well as recycling when possible and disposing of waste properly. Proper waste handling with regard to occupational safety and storage on site is also of key importance.

During the process development phase, we pay particular attention to making the processes efficient, to minimizing the resulting waste, and to ensuring that the materials utilized pose as little danger to people and the environment as possible. We also work to optimize existing production processes. Efficient resource use is an important goal here, for cost-related reasons as well.

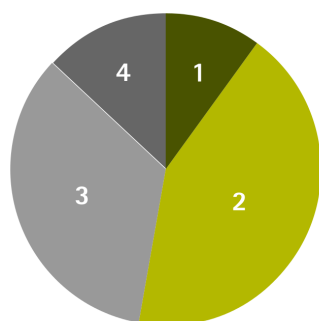


The function Environment Health Safety Security Quality (EQ), which is in charge of environmental protection, bears overall responsibility for waste management. Local EHS managers are in charge of this at the individual sites worldwide. EHS managers receive regular training from EQ. The type and quantity of waste is logged and documented at all sites.

With our Group-wide "Waste Management" standard, we have introduced a uniform waste management framework for all Merck KGaA, Darmstadt, Germany sites. This standard defines organizational structures and processes and is regularly updated – the last update was in August 2011.

The majority of waste is recycled or disposed of externally. As the generator of the waste, Merck KGaA, Darmstadt, Germany is ultimately responsible for the final disposal of the waste and selects its service providers with extreme care. The terms and conditions for disposal are contractually defined. Service providers are also required to properly document the disposal process. They are regularly audited by Merck KGaA, Darmstadt, Germany, especially if they handle hazardous waste. When possible, waste such as solvents is also processed and recycled in-house.

Waste by disposal method



Waste for disposal

1 Landfill waste	10%
2 Incinerated waste	43%

Recycled waste

3 Recycled solid waste	34%
4 Recycled energy	13%

We produced less waste in 2012 than in 2011 (2012: 189,000 metric tons, 2011: 199,000 metric tons). As in the past several years, waste from construction and renovation projects had a strong influence on waste volume also in 2012, with 34% of the total waste volume consisting of construction, excavation and demolition waste (2011: 36%). Due to a major demolition and renovation project at the Darmstadt site, large quantities of hazardous waste had to be disposed of in 2012. At the same time, the volume of recyclable non-hazardous waste declined. A large portion of this waste was generated in 2011 during a major construction project in Darmstadt that was completed in 2012. This impacted the recycling rate, which dropped from 60% in 2011 to 47% in 2012.

Process and plant safety

Plant and process safety has high priority at Merck KGaA, Darmstadt, Germany. Safety system failures can lead to the release of chemicals, which can in turn impact people and the environment as well as result in financial damage, such as from production stoppages.

The function Environment Health Safety Security Quality (EQ), in charge of environmental protection, are the experts in plant and process safety guidelines as well as all related topics. At the individual Merck KGaA, Darmstadt, Germany sites worldwide, local EHS managers have been appointed to handle issues pertaining to plant and process safety.

We apply the same uniform standard to plant and process safety across the globe. Our Group-wide "Plant and Process Safety" standard mandates safety-related requirements to be applied to the entire life cycle of a plant – including construction, normal operation, modifications, maintenance, repair, and shutdown. This standard applies to production plants and warehouses. Before a plant goes on line, a safety concept is always developed for each plant, which is then continuously updated. It contains an overview of potential risks and the corresponding protective measures.

The Group-wide standard "Spillage Control" defines the organizational measures for preventing spillage during storage and transport, and also details how to handle hazardous materials. The Group-wide standard operating procedure "Risk Management Process" defines how to identify and assess risks, as well as how to develop and implement measures to minimize them.

In order to continuously identify potential for improvement, we assess the plant and process safety for each site using the EHS performance indicators. This gives us a comprehensive overview of safety at our sites. Here, we use lagging indicators to analyze incidents retrospectively and leading indicators to make a perspective analysis of near-incidents.

Data on spillage at our plants are evaluated using process safety indicators and are also incorporated into the overarching EHS indicators. In 2011, we registered 41 substance spills in total due to incidents at 108 production, research and storage sites. In 2012, 36 incidents were registered at 107 sites. Each individual incident was investigated at the respective site. Appropriate countermeasures were taken in order to prevent the same scenario – or a similar one – from recurring. Information on the incidents is regularly communicated so that all production sites can learn from the situation and implement preventive measures.

Since plant and process safety involves the interaction of man and machine, we consider it highly important for our employees to be well-trained and to receive further training on a regular basis. In 2012, a new internal continuing education program was set up for site managers – as well as for production, engineering and EHS managers at the individual sites – and rolled out within the Chemicals divisions. The primary topics here included systematic risk identification in processing plants, explosion protection, and static electricity.



Biodiversity

Since the signing of the [Convention on Biological Diversity](#), the concept of biodiversity has included diversity within species, between species and of ecosystems. This convention, signed in 1992 at the United Nations Conference on Environment and Development ([UNCED](#)) in Rio de Janeiro, has the following three main goals: conservation of biological diversity, sustainable use of its components, and fair and equitable sharing of benefits arising out of the utilization of genetic resources.



The loss of biodiversity is one of the greatest challenges of our time. Ecosystems provide us with services and resources such as sufficient quantities of good-quality water that are absolutely essential to our business operations worldwide. We therefore consider it extremely important to protect biodiversity.

Our production sites are located in established industrial and commercial zones, and the corresponding operating permits are reviewed via audits. In order to prevent substances that could negatively impact biodiversity from being released into the environment, we plan and operate our facilities according to strict Group-wide safety requirements. In our Group-wide standards, we have defined measures for processing waste and production wastewater. We have furthermore implemented a Group-wide program called EDISON to reduce greenhouse gas emissions

We improve the habitats for animals and plants at our sites, for instance by increasing the amount of unsealed surface area. This is, however, not always possible since we seal certain surfaces to protect them from any leakage that may occur.

In 1995, we developed a green open space concept for our Darmstadt site in Germany. Around 30% of the premises have now been greened. The green areas are designed to improve the functionality of the production areas as well as enhance the ecological value of the open areas. In 2008, we signed an agreement with the city of Darmstadt that established the framework for increasingly taking nature conservation into account. This agreement applies to the industrial use of the site and its better integration into the urban surroundings. The stipulated planning guidelines require, for example, an increase in the percentage of native plants.

When planning new sites and facilities, we consider environmental aspects such as aeration, land use structures that contribute to a favorable microclimate, and energy-efficient building concepts. For example, when planning the expansion of our site in Corsier-sur-Vevey, Switzerland, we conducted a biodiversity study. To protect the bordering alpine meadows, we developed a landscape plan in which the meadows are tended to by a local farmer.

When we acquire new sites and investigate their environmental situation, we also take into consideration information from public sources such as neighbors or NGOs. We assume responsibility for the pollution we have caused and investigate our sites before selling them.