

Environment

We consider it highly important to mitigate our impact on the environment. We utilize resources such as energy, water and raw materials as efficiently as possible while reducing our waste and emissions.

Climate impact mitigation and resource scarcity are key challenges facing society in the 21st century. For us, it goes without saying that we must take on responsibility and do our part. Through our certified environmental management system, 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.

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our principles

Our environmental activities are governed by our **Corporate Environment, Health and Safety (EHS) Policy**. This framework is based on documents such as the **Responsible Care Global Charter** of the chemical industry; it also draws on ISO 14001 and OHSAS 18001, two internationally recognized standards that govern environmental management systems as well as occupational health and safety systems. Our policy is implemented through internal guidelines such as our EHS, Security and Quality Manual.

Since 2009, we've had an ISO 14001:2004 group certificate for our environmental management system. We successfully passed the surveillance audits conducted in 2015. These audits also

examined whether we were meeting the new ISO 14001:2015 requirements released in September 2015. The analysis showed that we already have good practices in place to meet all major new requirements. We plan on expanding these efforts as well as adapting our environmental management system, EHS Policy, and our EHS, Security and Quality Manual accordingly. In 2015, we furthermore had nine facilities **achieve OHSAS 18001 (p. 22)** certification for the first time.

We have set the goal of reducing our greenhouse gas emissions by 20% by 2020, relative to the 2006 baseline. All respective activities have been consolidated under our EDISON program, which was launched in 2009.

progress

Over 400 climate impact mitigation measures initiated

In order to attain our CO₂ reduction target, we launched the EDISON climate impact mitigation program in 2009. All our climate impact mitigation and energy efficiency efforts are consolidated under this initiative. Since 2012, we have initiated or implemented more than 400 measures, roughly 60% of the total projects planned under EDISON. Through these efforts, we are aiming to cut CO₂ emissions by about 90,000 metric tons per year in the medium term. In 2015, the following projects made a major contribution toward this goal:

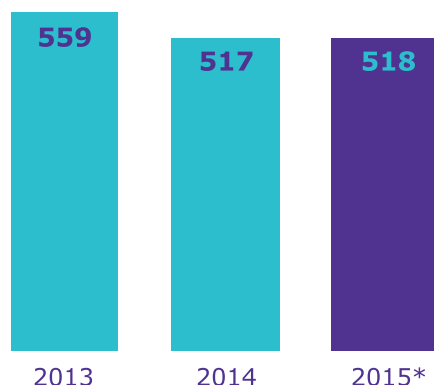
- By 2014, process optimizations had resulted in a two-thirds reduction in process-related emissions at our facility in Jaffrey, New Hampshire (USA). In 2015, we initiated a project to cut emissions even further.

- Our plant in Onahama, Japan, where we manufacture Xirallic® effect pigments for high-quality automotive coatings, is one of our five largest CO₂ producers. In 2015, we instituted two measures to cut down CO₂ emissions there. First, since January 2016 we've been using natural gas to meet all the site's energy needs. Second, in the course of 2016 we plan to replace the old boilers for steam production with new ones. These two efforts combined will save roughly 3,200 metric tons of CO₂ per year. The project is viewed throughout the country as a best practice.
- In summer 2015 in Shanghai, China, we commissioned a new photovoltaic plant with an output of 400 kW, which will reduce this facility's CO₂ emissions by 280 metric tons per year.

In total, we cut our 2015 greenhouse gas emissions by approximately 8% relative to 2006, despite growth in our operating business. In 2015, the Executive Board once more earmarked funds specifically for additional energy cutting and greenhouse gas reduction initiatives.

Total greenhouse gas emissions (metric kilotons)

CO₂ equivalents



* Figures do not include Sigma-Aldrich, which was acquired in November 2015.

Award for responsible conduct in China

At all our facilities, we consistently meet our own high environmental standards as well as the respective local statutory regulations. In 2015, the [Association of International Chemical Manufacturers](#) (AICM) presented Merck KGaA, Darmstadt, Germany Chemicals China with the Responsible Care Chairman Award. This prize recognizes the example we have set for responsible conduct, as well as its efforts to promote sustainable growth in the chemical industry. The award was given specifically for the recycling system at our site in Suzhou, which employs vacuum distillation to treat hazardous waste, thereby significantly reducing the amount of solvent wasted. We are thus adhering strictly to both our own internal hazmat regulations as well as to local statutes.

Employees develop recycling process for acetone

At the organic production plant at our Darmstadt site, we utilize large quantities of the solvent acetone to clean multi-purpose devices. Until recently, the used solvent was disposed of as waste. In response to this situation, Production employees worked together with Process Development staff to co-develop a new

procedure that allows up to 90% of the used acetone to be treated. We successfully implemented the procedure within our Darmstadt site in 2014, which enabled us to recycle 270 metric tons of acetone in 2015, thus saving roughly € 210,000.

Working hard to reduce water use

In many parts of the world, water is becoming ever scarcer, which is why we're working to utilize water at our sites in a responsible manner. In our production operations, we employ water primarily for cooling and as process water. In 2015, we used internal consumption data along with tools such as the [Water Risk Filter](#) and [Aqueduct Water Risk Atlas](#) to systematically analyze our sites. The aim was to identify the ones that consume large quantities of water as well as those located in areas of high water stress (i.e. regions where water is a particularly precious resource). At the beginning of 2016, we set the goal of implementing a sustainable water management system at facilities with high consumption levels, to be accomplished by 2020. At sites with relevant water use located in areas of high water stress, we are aiming to cut our water consumption by 10% by 2020 (2014 baseline).