

RESOURCE EFFICIENCY

# Reducing both costs and environmental impacts

ABB is committed to optimize the use of resources, minimize waste and ensure that the materials and components we use and the products we produce comply with our own and our stakeholders' standards.

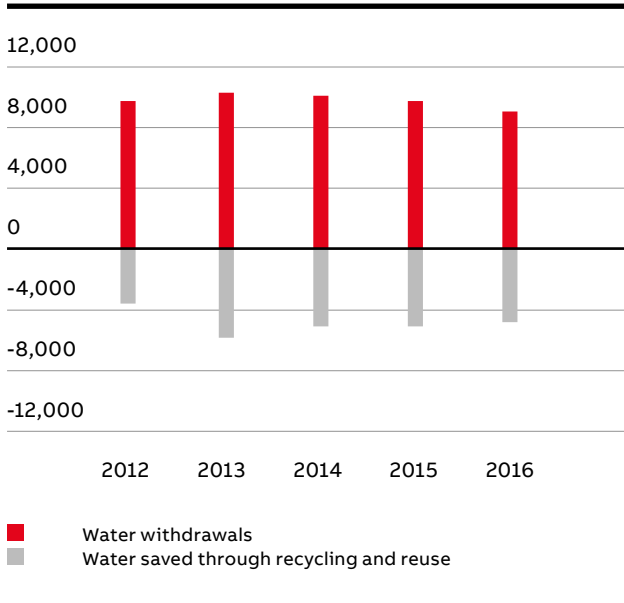
### Water in our global operations

Although the majority of our manufacturing processes do not consume significant amounts of water, ABB is nonetheless committed to reducing our impact on water resources.

Across ABB Group, water withdrawals were reduced by six percent (570 kilotons or 570,000 m<sup>3</sup>) during 2016. This was achieved with a variety of water efficiency projects that included improved monitoring of water flows, upgraded processes for increased recycling or reuse of water, repair and refurbishment of water systems and water conservation training and awareness-raising programs.

The use of closed-loop systems for process water and the reuse of water in other ways, such as in gardening, saved approximately 4,800 kilotons (4.8 million m<sup>3</sup>) of water in 2016. Without this recycling and reuse, ABB's water withdrawals would have been 52 percent higher. In addition, the use of closed-loop systems for cooling water eliminated more than 5,800 kilotons in water withdrawals.

### Water withdrawals and water reused / recycled (kilotons)

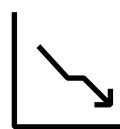


Almost 50 percent of ABB's total water withdrawals were used for cooling processes, 20 percent for manufacturing processes and the remainder for domestic purposes such as sanitation, cooking or garden maintenance.

### Reducing impact where it's most needed

In order to focus savings where water stress is felt most acutely, ABB is committed to reduce absolute water withdrawals by 25 percent between 2013 and 2020 at facilities in watersheds with extremely high, high, and medium to high baseline water stress.

We have mapped our facilities using the World Business Council for Sustainable Development's [Global Water Tool](#) and have classified them according to the level of "baseline water stress" of the watershed where they are located. Higher stress values indicate more competition among users within the watershed.



**15%**  
decrease in water withdrawals in water stressed areas in 2016

Of the 581 ABB locations mapped in 2016, 81 are located in watersheds with extremely high water stress, 116 in areas with high stress and 90 in areas with medium to high stress. Even though approximately 50 percent of our facilities and offices and our employees are located in these high water stress areas, these facilities accounted for only 30 percent of ABB's global water withdrawal in 2016.

We have selected 64 of these sites, located in 23 countries, as the initial focus of our 2020 water reduction commitment. In 2016, these 64 facilities accounted for 72 percent of ABB's water withdrawal in extremely high, high and medium to high stress watersheds.

To support these locations in their water reduction efforts, we updated and simplified our ABB Water Tool for mapping and analysis of water flows and retrained our

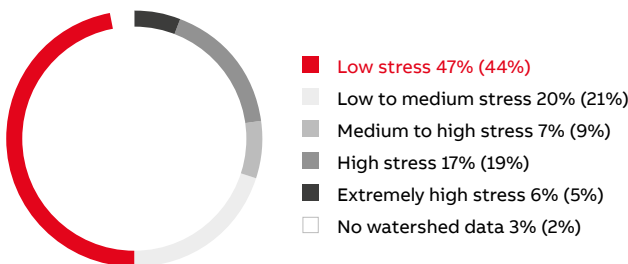
environmental network in its use. Case studies of good practices provided inspiration for further activities.

Many of the selected facilities have initiated activities to reduce their water withdrawals and improve their water efficiency. Some have made significant investments in new processes to reduce water consumption, while others have redesigned systems to transport, treat, recycle and reuse water.

 → [Read more at abb.com/sustainability](http://abb.com/sustainability)

These investments and process changes have brought results. By the end of 2016, the 64 selected sites had already recorded an overall 25 percent reduction in water withdrawals compared with their 2013 baseline. For all ABB sites in these stressed watersheds, total water withdrawals in 2016 were 18 percent lower than the 2013 baseline – well on the way to achieving our 2020 reduction target.

### Water withdrawal per water stress area in 2016 (2015)



### Waste and recycling

ABB products contain mostly steel, copper, aluminum, oil and plastics. Consequently, the main waste streams at ABB facilities are metal, oil and plastic, as well as wood and cardboard from packaging materials and paper from office activities.



**16%**  
reduction in waste generated since 2013

We aim to optimize material use, reduce the amount of waste generated and increase the share of waste that is reused or recycled. We are committed to reduce the amount of waste sent to final disposal – both hazardous and non-hazardous – by 20 percent by 2020. This is measured as the proportion of total waste that is sent for final disposal and compared with a 2013 baseline.

In 2016 we saw good progress to that objective, with 16 percent less waste generated than in 2013, while the proportion of waste sent to final disposal was down to 18 percent compared to 20 percent in 2013. In-house recycling and reuse, mainly of packaging materials and thermoplastics, reduced the amount of waste by 3,500 tons.

This improvement in performance was supported in 2016 by a Group-wide systematic analysis of existing waste practices that resulted in the roll out of an ABB guideline on good practice in material flows and resource efficiency. The guideline, specific to ABB’s business operations, was designed to reinforce action to reduce use of raw materials in processes and to increase recycling and reuse of waste.

 → [Read more at abb.com/sustainability](http://abb.com/sustainability)

Around 80 recycling or waste reduction projects were under way in 2016, half of which focused on improved recycling practices. A number of these programs included a detailed waste analysis to ensure improvement activities were well-targeted. In Canada, employees at seven locations even undertook ‘dumpster dives’ to conduct mini waste audits and examine how much recyclable material was being disposed. Site level improvement targets and programs were then developed to address issues identified at each of the sites.

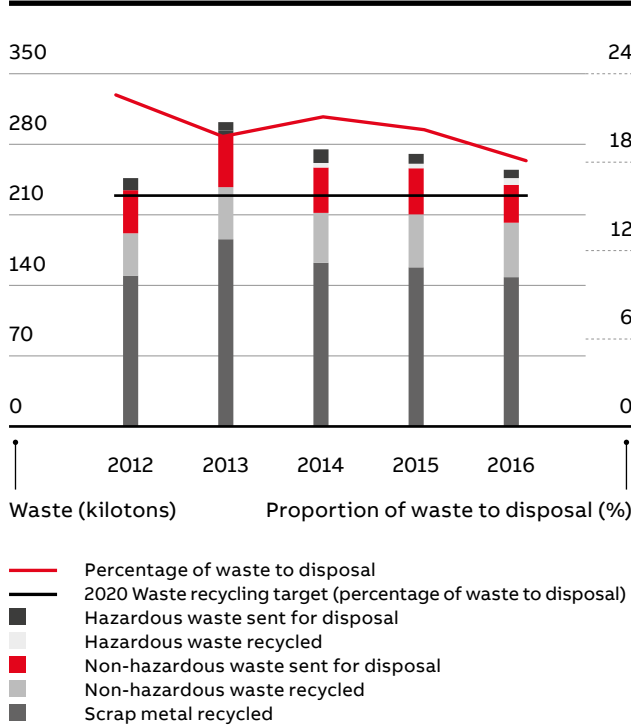
Many other sites focused on replacement of disposable products such as plastic and Styrofoam containers and paper towels with more sustainable alternatives and on better separation of food waste for composting.

Several facilities, for example in Mexico and South Africa, have gone further and engaged permanent employees from their recycling vendor companies to ensure appropriate sorting and waste management on site. Others have invested in equipment such as cardboard balers and shredders or a magnetic labeling system. These investments have been worthwhile, resulting in significant savings from less waste to landfill, reduced hazardous waste treatment and disposal from better waste classification, and improved rebates from better quality recycled materials.

As part of their continuous improvement programs, our operations also review production processes to identify cost savings from process efficiencies and input optimization. Inevitably, these improvements result in decreased environmental impacts as well, often due to reduction of waste.

For example, a project at our manufacturing plant at Santa Palomba, Italy made significant cost savings by reusing plastic material left over from the molding process, reducing waste to zero, without compromising the quality of products. Prior to the project, about 15 per-

## Waste and recycling



cent of plastic material was wasted across the plant, ranging from two to 57 percent depending on product line. A multi-disciplinary team developed a pilot program focused on one product line and saved 17 percent of the previously-wasted material with no impact on product quality. This achievement earned the team a bronze CEO Excellence Award in 2016 and the program is now being expanded to further product lines at the plant.

Another process optimization project at an ABB plant in Sweden aimed to reduce scrap in filament winding by minimizing variation along the entire process chain. The project realized cost savings of 30 times the project investment and also reduced waste by 130 tonnes, 60 percent greater than originally forecast.

### Reducing hazardous substances

ABB continues to phase out hazardous substances in products and processes, where technically and economically feasible. We have compiled lists of prohibited and restricted substances to guide this process and update them regularly, in line with international regulations. These lists help our facilities to comply with regulatory requirements, ensure a high level of protection for human health and the environment, and manage risks encountered by chemicals present in various products.

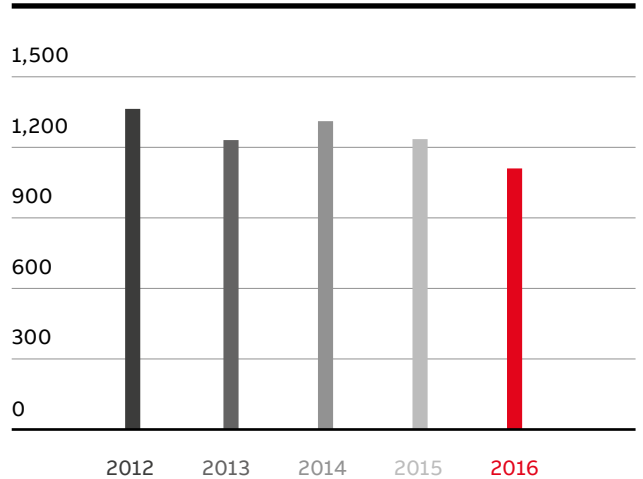
Regulatory compliance is also part of ABB's Global Terms and Conditions for suppliers and our Supplier Code of Conduct. We have developed a [Guide for Suppliers to the ABB List of Prohibited and Restricted Substances](#) to support suppliers' understanding of their obligations.

As well as ensuring compliance with the list of prohibited and restricted substances, ABB facilities are required to work to phase out hazardous substances in their in-processes and products. In 2016, more than 40 projects were under way to reduce hazardous substances and volatile organic compounds (VOC) emissions.

As facilities continue to phase-out the use of solvent-based paints and other products, we saw a 10 percent reduction in VOC emissions during 2016. Much of this success has come via collaborative efforts with suppliers, raising awareness about our needs and the opportunities for substitution.

Due to the variety of manufacturing processes and products across ABB, reducing hazardous substances is generally implemented site by site, depending on site and product characteristics and supply chain. However, ABB in Sweden is taking a systematic, country-wide approach, in a phased, multi-year process. All substances have been identified and ranked on priority for substitution, according to advice from government chemicals agencies. Progress is tracked at quarterly country management meetings to ensure that hazardous substances are phased out according to the agreed schedule.

## Emissions of total volatile organic compounds (tons)



### Promoting material compliance

ABB's network of environmental specialists works alongside our product development and supply chain function to promote material compliance. During 2016, we developed further training on the application of REACH and RoHS to ABB products and processes and delivered that training to our environment and R&D staff as well as other functions, including supply chain and sales.