Environmental data

We measure our performance in areas that have an impact on the environment. One of the most important measures is our estimate of the CO2 emissions avoided as a result of customers' application of Novozymes' products in their products or processes. We also focus on reducing our own CO2 emissions and use of resources, and mitigating the risk of potential harm to the environment.

Estimated tons of CO2 saved from customers' application of Novozymes' products

76 million

CO2 intensity reduction compared with 2014 baseline

11%

Renewable energy share of total energy consumption

24%

7.1 Climate change

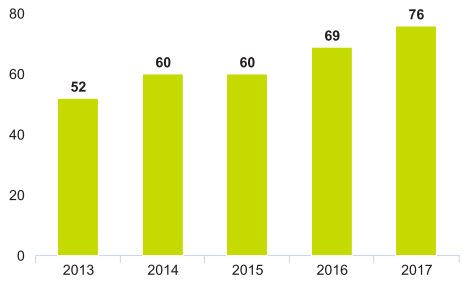
Climate change is material to Novozymes. Increasing demand for low-carbon products and solutions offers many opportunities for Novozymes to grow its business. On the other hand, impacts associated with climate change also pose multiple risks to Novozymes' supply chain and operations, such as regulatory action and physical or reputational damage. Our approach to climate change management is part of our strategy, and outlined in our Sustainability Policy and position paper on climate change. Several departments work closely to drive the climate change agenda, both inside and outside the organization.

We believe that a transition toward a biobased economy that relies on renewable biological resources can assist the planet in becoming more resource efficient and tackling climate change. Our biosolutions in industries such as bioenergy and agriculture typically offer customers and end users reduced greenhouse gas (GHG) emissions due to lower energy, water, raw material and chemical consumption compared with conventional technologies.

Novozymes has a long-term target that measures the net relative CO_2 impact that our products have on society compared with conventional technologies. This target is expressed as CO_2 emissions avoided over the life cycle of our products and also includes the CO_2 emissions generated across our supply chain and in our production. In 2017, we met the target for the year by helping customers save an estimated 76 million tons of CO_2 emissions through the application of our products. This is equivalent to taking approximately 32 million cars off the road.

Estimated annual CO2 savings

Million tons of CO2



Since 2004, Novozymes has documented the cradle-to-grave environmental impact of its biosolutions by conducting ISO14040-reviewed life cycle assessment (LCA) studies. Read more about our approach to LCA on Novozymes.com.

In 2017, we focused our efforts on supporting commercial stakeholders in their efforts to reduce GHG emissions by engaging directly with customers and trade publications. For instance, we developed and deployed a sustainability calculator for our feed enzyme customers in Latin America together with DSM. To engage a wider audience, we also published an article targeting global poultry and feed professionals, which demonstrated how feed enzyme solutions contribute to the UN Sustainable Development Goals. We also regularly engage with our customers in training sessions on how optimal animal nutrition can mitigate climate change impact and support sustainable development.

Novozymes also supports global climate action through transparent climate disclosure, responsible public advocacy and partnerships. To learn more, see Advocacy and policy engagement in the Sustainability section.

CRITICAL ACCOUNTING ESTIMATES AND JUDGMENTS

Novozymes uses LCAs to estimate the CO_2 emissions that customers avoid by using Novozymes' products in their processes or products. A calculation methodology to consolidate the LCAs has been defined and consistently applied; however, the individual LCAs depend on assumptions and estimates, which means that the result of the calculation will be an approximation.

7.1 Climate change (continued)

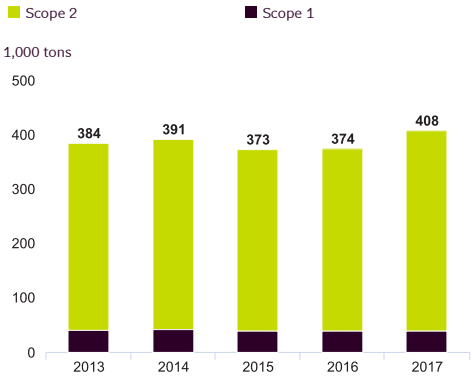
Novozymes' efforts to reduce greenhouse gas (GHG) emissions in its operations are driven by its target to reduce CO_2 intensity. This target is closely linked to the targets to improve energy efficiency and increase the share of energy sourced from renewable sources in our operations. In 2017, our CO_2 intensity reduction stood at 11%, meeting the target of 9%. We report our performance on the energy targets in Note 7.2 Energy.

Novozymes strives to make its operations less carbon intensive by implementing various energy efficiency projects. In 2017, we executed a portfolio of projects with focus on regions with high carbon footprint, to maximize CO_2 savings. More than half of the energy savings realized in 2017 came from projects undertaken at sites located in regions with a high carbon footprint, such as the US and China. We will share and implement best practices learnt from these projects across all our production sites.

Going forward, Novozymes will continue to focus on reducing its CO_2 intensity by purchasing more energy from renewable sources and reducing consumption of fossil-based energy through efficiency projects.

According to the Scope 2 Guidance in the GHG Protocol, scope 2 CO_2 emissions must be calculated using both the location-based and market-based methods. For Novozymes, the difference between market-based and location-based CO_2 emissions is most significant in Denmark, where we purchase 100% renewable electricity.

5-year operational emissions (CO2 -eqv.)



CO_2-equivalent emissions

1,000 tons	2017	2016
Natural gas	38	38
Gas oil, light fuel oil and diesel oil	-	-
HCFCs	1	1
Scope 1	**39**	**39**
District heat	10	8
Electricity	283	258
Steam	76	69
Scope 2 (market-based)	**369**	**335**
Ship	7	5
Truck	17	17
Air freight	15	17
Scope 3	**39**	**39**
Emissions, total ESG	**447**	**413**

Market-based vs. location-based scope 2 emissions

1,000 tons	2017	2016
Scope 2 CO_2 emissions (market-based)	369	335
Scope 2 CO_2 emissions (location-based)	442	389

7.1 Climate change (continued)

ACCOUNTING POLICIES

The estimated reduction in CO_2 emissions resulting from customers' application of Novozymes' products is based on annually updated life cycle assessments (LCAs) of Novozymes' products. The LCAs are prepared and updated by Novozymes and subject to assumptions and estimates.

Reported CO_2 emissions comprise scope 1, scope 2 and emissions from outbound transport of products.

CO_2 from internally generated energy (scope 1) is calculated based on the amount of fuel consumed, using local emission factors.

CO_2 from externally generated energy (scope 2) is reported in accordance with both the market-based and the location-based method, as defined by the Greenhouse Gas (GHG) Protocol. The location-based method uses annually determined local emission factors from power plants or their organizations. If emission factors are not available, annually determined emission factors from Danish authorities and suppliers are used.

Transport-related CO_2 emissions (scope 3) are calculated based on principles described in the GHG Protocol. Reported quantities comprise CO_2 emissions related to transport from all primary enzyme production sites to the customer where Novozymes pays for the freight. Transport between production sites is also included. Transport of raw materials to a production site is not included. CO_2 emissions generated at external warehouses are not included. Emission data are calculated based on distance and emission factors from the GHG Protocol.

The environmental impact potentials for global warming and ozone layer depletion are calculated on the basis of data published by the US Environmental Protection Agency (EPA) and the Montreal Protocol published by the United Nations Environment Programme (UNEP).

CO_2 intensity is measured as CO_2 emissions (scope 1+2) less emissions from energy offset by green energy produced from Novozymes' waste, divided by gross profit. The intensity reduction is calculated as the relative improvement in intensity compared with the base year (2014).

For sites acquired in 2015 or later, the baseline index is calculated based on the data reported in the first full year of operating as a Novozymes site. Divested sites are removed from the index for the full period. Newly constructed sites are included from the first quarter after qualification.

7.2 Energy

Energy is material to Novozymes' operations, as our production processes are dependent largely on electricity and steam. Across the value chain, our biosolutions enable customers and end users to save energy in certain applications compared with conventional methods.

Novozymes' approach to managing energy in its own operations focuses on improving energy efficiency at its production sites and increasing the share of renewables in its energy mix. Our performance in these two areas is driven by targets. For more information, see Outlook 2018. Novozymes' Supply Operations and Sourcing departments are responsible for managing all energy efficiency and renewable energy-sourcing efforts.

In 2017, Novozymes' energy efficiency improved by 4% compared with the 2014 baseline, falling short of the target of 7%. This was because absolute energy consumption increased at a higher rate than gross profit, resulting in reduced performance compared with 2016. The increase in consumption was due to significantly higher capacity utilization at Novozymes' production sites. Throughout the year, several energy efficiency projects were undertaken globally with increased focus at sites with a higher carbon footprint (e.g. in the US and China). We estimate that these projects resulted in energy savings of around 25,000 GJ.

Energy from renewable sources accounted for 24% of the total energy consumed in 2017. In Denmark, we purchase all our electricity from renewable sources, specifically from the Horns Rev II wind farm. In March 2017, we also began purchasing all our electricity in Brazil from renewable sources.

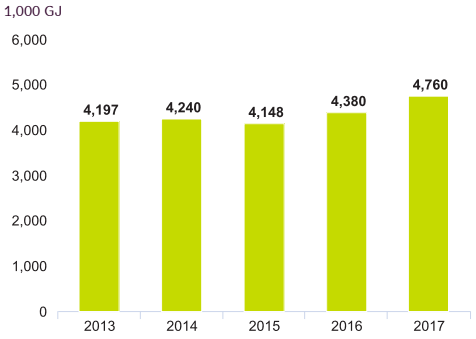
In 2017, Novozymes signed a new 20-year agreement to transition its supply of steam to renewable sources for its largest production site in Kalundborg, Denmark. In collaboration with Novo Nordisk and the utility companies Kalundborg Forsyning and Ørsted, this agreement will enable Denmark's largest coal-fired power station unit, the Asnæs Power Station, to phase out coal and replace it with wood chips by the end of 2019.

Going forward, Novozymes will continue to focus on finding opportunities to procure renewable energy in each of its operating regions. Furthermore, we will prioritize investment in energy efficiency in geographies where there are limited options to procure renewable energy.

Energy consumption by primary source

1,000 GJ		2017	2016
Natural gas		696	691
Biogas		69	55
Gas oil, light fuel oil and diesel oil		7	5
Internally generated energy, total		**772**	**751**
Electricity – conventional		1,780	1,636
Electricity – renewable		1,080	967
District heat – conventional		181	156
District heat – renewable		2	9
Steam		945	861
Externally purchased energy, total		**3,988**	**3,629**
Energy consumption, total	ESG	**4,760**	**4,380**
Energy production from waste		36	72

5-year energy consumption



7.2 Energy (continued)

§ ACCOUNTING POLICIES

Net energy consumption includes quantities consumed both in the production process and in other areas, less energy production from Novozymes' waste.

Internally generated energy is measured as fuel consumption converted to energy based on the lower combustion value and weight by volume, except in the US, where legal requirements for reporting of CO_2 state that the higher combustion value is to be applied. Fuel consumption comprises all types of fuels used to produce electricity, heat and steam on site and is converted to energy using factors supplied by utility providers or local authorities. Fuel for transportation is not included.

Externally generated energy is the input to Novozymes of externally generated electricity, heat and steam.

Energy produced from waste or wastewater is renewable and corresponds to the total energy (heat, electricity or steam) produced by an internal or external utility provider. An example is energy produced from biomass waste or biogas.

Reported quantities are based on meter readings, with the exception of steam, which may be subject to calculation.

Energy efficiency is measured by dividing net energy consumption by gross profit. The efficiency improvement is calculated as the relative improvement in efficiency compared with the base year (2014).

The quantities used in the calculation correspond to those reported as net energy consumption, i.e. purchased energy less energy produced from Novozymes' biomass waste.

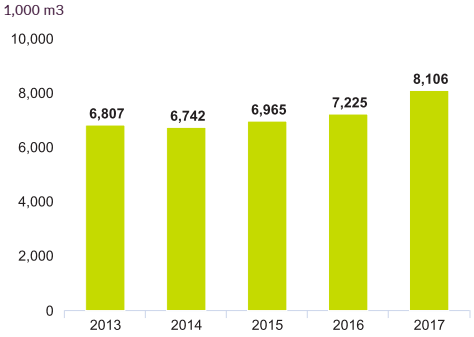
For sites acquired in 2015 or later, the baseline index is calculated based on the data reported in the first full year of operating as a Novozymes site. Divested sites are removed from the index for the full period. Newly constructed sites are included from the first quarter after qualification.

The renewable energy percentage is calculated by dividing consumed renewable energy by total energy consumption. Renewable energy used at Novozymes sites comprises energy that is generated from natural processes and continuously replenished. Sources include solar, wind and hydropower-based electricity and energy from biogas.

7.3 Water

Water is material to Novozymes within its operations, as well as across the value chain, as enzyme production is water intensive and generates substantial amounts of wastewater. Water is also crucial in the production of the agriculture-based raw materials required for enzyme manufacturing.

5-year water consumption



Novozymes' solutions can help customers and consumers reduce water consumption compared with conventional methods in certain applications (e.g. textile processing), while the wastewater treatment solutions can improve treatment processes and the quality of treated water.

We strive to mitigate the risks associated with water usage and wastewater disposal by managing water within our operations. We are committed to improving our water efficiency and ensuring compliance with wastewater discharge regulations at all our significant sites. This approach to water management is anchored in our Sustainability Policy, and is reinforced by our target to improve water efficiency in operations. For more information, please refer to Outlook 2018.

Novozymes' Supply Operations and Quality, Environment & Safety departments manage and monitor all water efficiency and wastewater management efforts.

Novozymes continued to emphasize water savings at its various sites in 2017. For example, at our production site in Kalundborg, Denmark, we estimate that we saved around 73,000 m^3 of water through various projects and process optimization. However, despite these efforts, Novozymes' water efficiency in 2017 declined by 2%, compared with the 2014 baseline, falling short of the target of a 4% improvement. This was because absolute water consumption increased at a higher rate than gross profit, resulting in reduced performance compared with 2016. This increase in consumption was due to significantly higher capacity utilization at Novozymes' production sites.

Water by primary source

1,000 m^3		2017	2016
Drinking water		5,427	4,984
Industrial water		2,339	1,931
Steam		340	310
Water, total	ESG	**8,106**	**7,225**

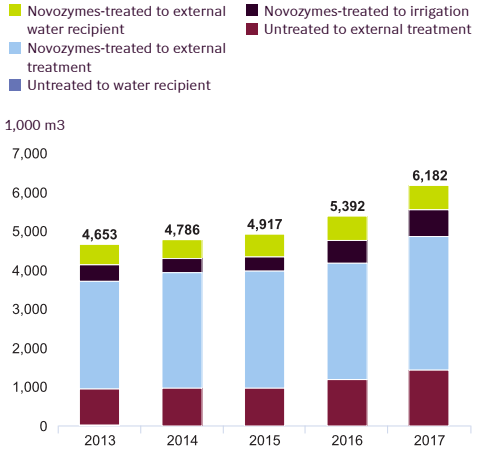
7.3 Water (continued)

Wastewater treatment is high on the agenda at our production sites. Currently, most of our wastewater is treated in biological wastewater treatment systems and then discharged either to further municipal treatment facilities or other recipients, or used for irrigation in agriculture.

In 2017, Novozymes invested around DKK 75 million to increase the capacity of the wastewater treatment plant at the Kalundborg site in Denmark. This expansion will also result in an increase in on-site renewable energy production through the generation of biogas.

Looking ahead, we will improve our understanding of site-specific water-related risks. We also aim to identify new opportunities for water savings and wastewater capture and reuse, and share best practices across sites.

Wastewater by treatment method



Wastewater treatment

1,000 m³		2017	2016
Wastewater used for irrigation		673	596
Wastewater discharged		5,509	4,796
Wastewater volume, total	ESG	**6,182**	**5,392**

ACCOUNTING POLICIES

Water includes drinking water, industrial water and externally supplied steam. Drinking water is water of drinking-water quality. Industrial water is not of drinking-water quality, but is suitable for certain industrial processes, for example for use in cooling towers. Industrial water can come from lakes or wells.

The reported quantities are stated based on the metered intake of water to Novozymes and include quantities consumed both in the production process and in other areas. The reported quantities of steam are converted to volume of running water and are therefore subject to calculation.

Water efficiency is measured by dividing water consumption by gross profit. The efficiency improvement is calculated as the relative improvement in efficiency compared with the base year (2014). The quantities used in the calculation correspond to those reported as water consumption.

For sites acquired in 2015 or later, the baseline index is calculated based on the data reported in the first full year of operating as a Novozymes site. Divested sites are removed from the index for the full period. Newly constructed sites are included from the first quarter after qualification.

Wastewater is measured as the volume discharged by Novozymes or calculated based on water consumption.

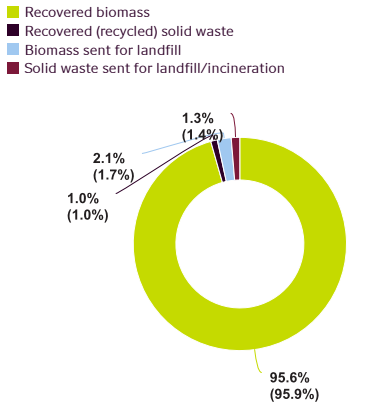
7.4 Waste

Novozymes is committed to supporting the transition to a circular economy through sustainable consumption and production practices. That is why the responsible management and disposal of waste and by-products is included in the median category in Novozymes' materiality matrix.

Novozymes' waste and by-products consist of three broad categories: biomass, nonhazardous solid waste and hazardous waste. Each production site regularly reports waste and by-products generated in terms of category and disposal method. We have adopted a site-specific management approach, because waste handling is a complex issue that is regulated locally and involves many external service providers.

Biomass, which accounts for the majority of total waste and by-products generated by Novozymes' production sites, is a by-product rich in nitrogen and phosphorus. 98% of total biomass generated in 2017 was recovered and sold to local farmers as NovoGro®, an organic agricultural fertilizer, or composted.

Waste and by-products recovered 2017 (2016)



In 2017, Novozymes signed an agreement with two Danish energy companies, Ørsted and Bigadan, to further utilize the biomass generated at its production site in Kalundborg to produce biogas. Ørsted and Bigadan will construct a new biogas plant, which is expected to be operational in 2018. After being processed at the biogas plant, the biomass will continue to be used as fertilizer on fields. This agreement exemplifies Novozymes' commitment to the circular economy. The plant is expected to process approximately 300,000 tons of biomass to generate 8 million m^3 of biogas annually. The inclusion of biogas in the local natural gas network is expected to result in annual CO_2 savings of around 17,000 tons.

Biomass

1,000 tons		2017	2016
NovoGro®		399	375
NovoGro® 30		171	152
Compost		19	13
Landfill		13	10
Biomass, total	ESG	**602**	**550**

§ ACCOUNTING POLICIES

Biomass is measured or calculated on the basis of volume or weight produced and transported from Novozymes as liquid fertilizer (NovoGro®), converted to a fertilizer product with a higher dry matter content (NovoGro® 30 or compost) or dried and used as fuel for energy production. Biomass from a newly built plant is sent for landfill with energy production (biogas) as a temporary disposal method.

Waste is the registered volume of waste broken down into hazardous and nonhazardous waste, and by disposal method. The amount recycled is the quantity recycled internally or sent to an external service provider for recycling. Biomass is not included in the reported amounts of waste.

7.4 Waste (continued)

Nonhazardous solid waste and hazardous waste account for 2% of the total waste and by-products generated and include materials such as paper, food waste, laboratory waste and chemicals. In 2017, the total solid waste sent for landfill or for incineration without energy recovery was 8,199 tons. The rate of recycling of solid waste was 43% in 2017, compared with 44% in 2016.

Novozymes strives to increase the amount of solid waste diverted from landfill. In 2017, we initiated a pilot project to identify opportunities to increase waste diversion across three of our largest production sites, in Denmark, the US and China. Going forward, we will use the learnings from this pilot to improve waste management practices globally.

Waste

1,000 tons	2017	2016
Nonhazardous waste		
Incineration	1.7	1.9
Landfill	3.9	4.1
Recycling (external)	4.3	4.3
Recycling (internal)	0.1	0.1
Nonhazardous waste, total	**10.0**	**10.4**
Hazardous waste		
Incineration	2.5	1.4
Recycling (external)	0.2	0.2
Recycling (internal)	1.6	1.4
Other	-	0.1
Hazardous waste, total	**4.3**	**3.1**
Waste, total ESG	**14.3**	**13.5**

7.5 Environmental compliance, etc.

Novozymes aims to comply with all environmental regulations and strives to minimize the number of complaints from its neighbors.

In 2017, 24 breaches of regulatory limits were registered worldwide, compared with 37 in 2016. The majority of these relate to wastewater treatment and effluent discharge limits.

Action plans have been agreed on with the relevant environmental authorities to address all pending issues.

We received 12 complaints from neighbors, up from nine complaints in 2016. These were related to air pollution and waste management.

§ **ACCOUNTING POLICIES**

Breaches of environmental regulatory limits is measured as the number of incidents in the reporting year considered not to be in conformity with environmental permits or requirements under environmental law.

Breaches related to annual control measurements of spills reported in previous years are not included, as they are not indicative of performance during the reporting year.

Neighbor complaints refers to the number of registered environmental complaints, primarily odor and noise related.

7.6 Bioethics & biodiversity

Our business is based on bioinnovation. This includes the process of taking samples of fungi, bacteria and enzymes among the available biodiversity in nature for biotechnological research to develop specific applications for our customers. That is why “bioethics & biodiversity” is a material issue for Novozymes’ operations and its relationships with external stakeholders.

Novozymes’ position paper on industrial biotechnology articulates its management approach to supporting safe and sustainable use, and the adoption of robust, science-based regulations for processes and products involving gene technology. We acknowledge the need for engaging with stakeholders to improve the general level of knowledge about the opportunities presented by biology, industrial biotechnology and gene technology, and their role in society.

The position paper on biodiversity articulates how Novozymes endorses, acknowledges and respects the globally recognized principles on the utilization of genetic resources according to the United Nations Convention on Biological Diversity (CBD) and the complementary Nagoya Protocol on Access and Benefits Sharing (ABS). Novozymes has internal procedures to ensure that the company lives up to its commitments.

We acknowledge the importance of biodiversity and healthy ecosystems in ensuring sustainable development and achievement of the UN Sustainable Development Goals (SDGs). Business & Biodiversity is a new focus area that emphasizes private sector engagement and responsibility toward biodiversity-related issues. Going forward, Novozymes will assess and monitor outcomes in this new area and undertake a broader strategic discussion regarding its management and reporting of biodiversity issues.

7.7 Product stewardship

Product stewardship is material to Novozymes, as our biological solutions are used as industrial processing aids or ingredients in consumer goods. Our enzyme products and microorganisms are formulated with other ingredients (e.g. as encapsulated granulates) so that they are safe when used and are stable in terms of shelf life.

Novozymes' approach to product stewardship is to mitigate the risk of potential harm to both human health and the environment during the manufacture, handling and use of its products.

Novozymes ensures this by the implementation of its Quality and Product Safety Policy, which is an essential component of Novozymes' Quality Management System. This is supplemented by our approach to and position on related topics such as REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals), product information and labeling, traceability and animal testing.

Documented processes for product stewardship are enforced globally and externally audited by Bureau Veritas.

Many cross-functional teams contribute to the implementation of this approach, but the primary responsibility rests with the Vice President for Intellectual Property, Regulatory and Product Safety.

In 2017, Novozymes continued its preparations and is on track to meet the 2018 registration deadline to ensure that technical enzymes sold in lower volumes are in compliance with REACH.

Novozymes also continued to promote adherence to enzyme safety standards throughout the industry value chains, to reduce the risk of enzyme allergies among employees and downstream users. Novozymes chairs the Enzyme Safety Working Group, which has a coordinating role within the Association of Manufacturers and Formulators of Enzyme Products (AMFEP) to promote advanced safety procedures related to the use of enzyme products through trade associations.