ENVIRONMENTAL STATEMENT 2020

DATABASE 2019

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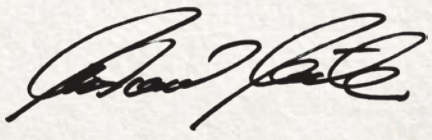
1. FOREWORD

Dear friends of the brewery,
we at Hofbräu München have been brewing beers in accordance with the Bavarian Purity Law for more than 400 years. This oldest food law in the world, dating from 1516, is the sacred seal of approval for the purity and quality of our beers.
Only water, malt and hops are used in our brewing process, because beer is a natural product. Our commitment to a careful and sustainable approach to the environment is derived from this claim.
Economic and ecological trade are important principles for our company. We strive for a balance between long-term economic success and continuous ecological improvement.
This Environmental Statement defines the goals of the company's environmental policy that are supported by the management, the company management and the employees.
The construction of the brewery in Munich-Riem in 1988 laid the foundation for the combination of brewing expertise and environmental protection.
Through continuous modernization measures, we ensure that our production process is environmentally friendly. Traditional brewing methods and the best regional raw materials ensure that our beer is of the highest possible quality and that the lovers of our beer enjoy it in the knowledge that it has been brewed with respect for the environment.
The main goal of our environmental measures is climate protection. We take part in numerous projects that go far beyond just the production of beer.

We rely on the latest state-of-the-art technology. We are working with solar energy, LEDs and the latest systems for measuring and saving energy, but also on digitizing our processes. Outside the brewery, we are working on improving biodiversity and participate in regional, Bavarian CO_2 compensation projects.


Foto: Sandro Jödicke I whitedesk

For over twenty years, we have been using EMAS* to audit all activities and processes related to the production and distribution of our products. This begins in the field where our raw materials grow and extends to the glasses our customers drink from.
As a state-owned brewery, we take responsibility for better climate protection. For our environment and our customers. As a model for other companies.



Dr. Michael Möller

*Eco-Management and Audit Scheme - the EC Eco-Audit

2. 2. ABOUT THE COMPANY
2.1 A short introduction

NAME:	Staatliches Hofbräuhaus in München
ADRESSE:	Hofbräuallee 1, 81829 München Phone: +49 (0)89 921 05 0 Fax: +49 (0)89 90 64 26
HOMEPAGE:	www.hofbraeu-muenchen.de
FINANCIAL YEAR:	Calendar year
DIRECTOR:	Dr. Michael Möller
ENVIRONMENTAL OFFICER:	Sebastian Utz
EMPLOYEES :	140 (incl. 5 trainees; as of 12.31.2019)
BEER OUTPUT OWN PRODUCTION :	344,167 hl (2019)
SALES:	approx. 51.5 million Euro (2019)

The standard industry benchmark for many of the statements in this Environmental Statement is the hectoliter. 1 hl = 0.1 m^3

2.2 Our story

1589 Foundation of the Hofbräuhaus

1602 Hofbräu brews wheat beer

1607 Relocation of the brewery to the Platzl

1614 Hofbräu brews the first Munich Maibock

1810 Birth of the Oktoberfest

1828 The Hofbräuhaus becomes public

1879 HB becomes a registered trademark

1896 Relocation of the brewery to Wiener Platz

1897 Renovation of the Hofbräuhaus

1988 Construction of the new brewery in Munich-Riem

1998 Start of the EMAS process (eco-audit)

2001 EMAS initial validation

2003 Member of the Environmental Pact of Bavaria

2007 Brewing wheat from water protection areas

2009 100 % green electricity

2011 Determination of the climate gas emissions of beer production from the field to the glass within the scope of a diploma thesis

2012 "From old to new" – recycling of beer crates
New bottle washing machine

2013 Logistics expansion
electric car as pool vehicle

2015 Photovoltaic system for power generation Start of changing lighting to LED

2016 Membership to B.A.U.M. e.V. (German Working Group for Environmentally Conscious

2017 Hybrid cars for field service Pilot project for climate gas compensation in Bavarian moors
Environmental award for 24 x 0.33 crates New dry section of the bottling plant

2018 „HB for Honeybee" as a sustainability project for apprentices

2019 CO_2 emissions compensation (see certificate for scope of application) of all the Hofbräu beer serving establishments at the Oktoberfest

2019 Completion of the conversion of the brewhouse Laboratory
Support for the "Hektar-Nektar" project

2020 New bottle filler and new labeling machine
Changeover to paperless billing for Haustrunk

2.3 The raw materials and the brewing process

MALT: Barley and wheat grains are germinated with water. The germinated grain is dried and from this point on is called malt. The longer the malt is dried at different temperatures, the darker its color becomes, which later is decisive for the color intensity and taste of the beer. On average, we buy about 6,000 tons annually from regional Bavarian malt houses.

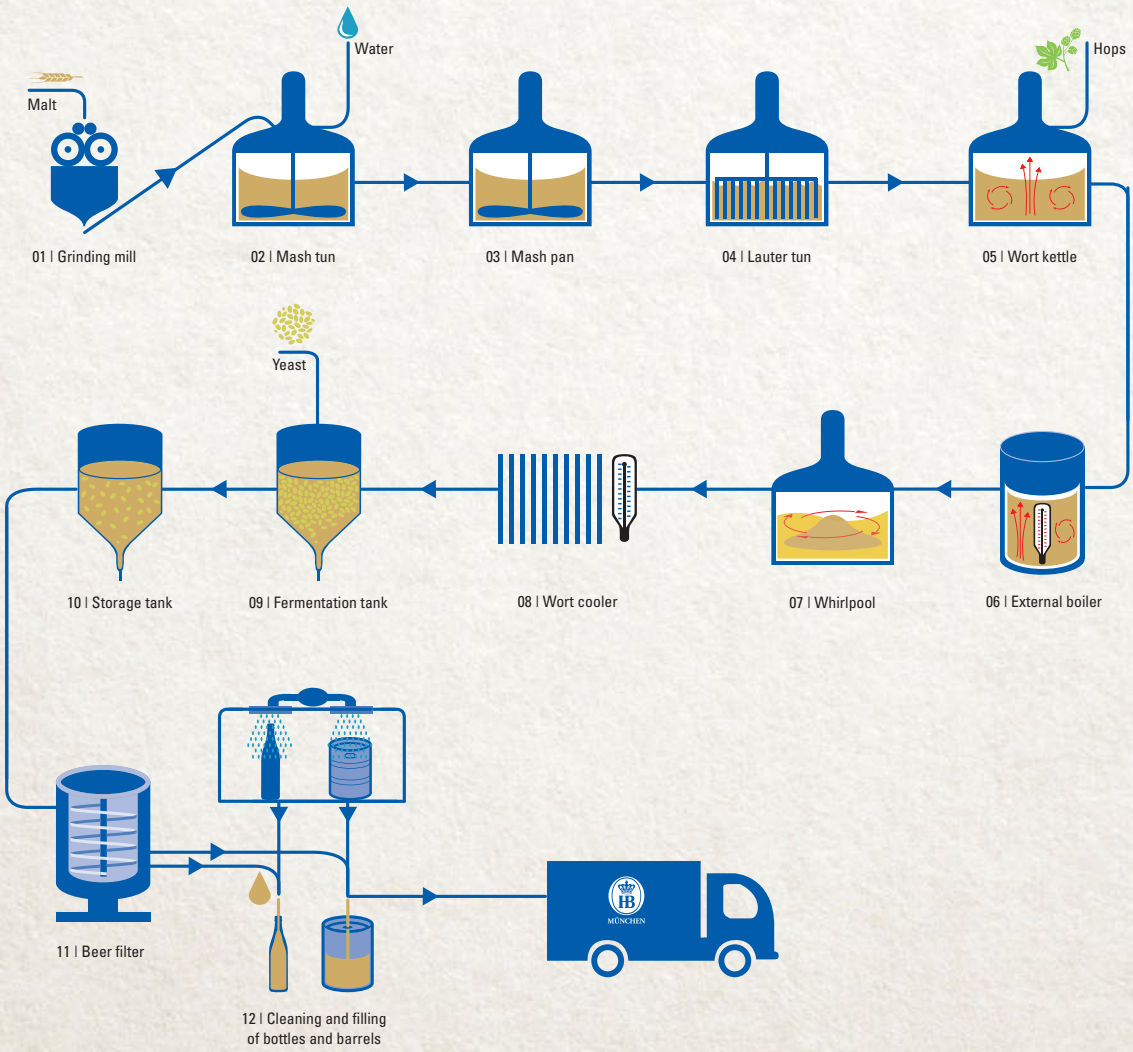
WATER: At Hofbräu München we only use brewing water from our deep wells for brewing beer. Water is extracted at a depth of around 150 meters, which lies directly below the multi-layered Munich gravel plain and is therefore well protected from pollution. This is not normal groundwater, but water from the Pleistocene Age. The water, which is about 15,000 years old, was left behind in the foothills of the Alps during the Ice Age.

HOP: The pleasant bitterness of the beer is provided by the hops, which are added as a bitter seasoning during the brewing process. Hofbräu München obtains aroma and bitter hops from the Hallertau region north of Munich, the largest continuous hop-growing area in the world.

YEAST: It is responsible for alcoholic fermentation in beer production. The sugar dissolved from the malt is converted into alcohol and carbonic acid in a natural metabolic process – two important components of beer. Hofbräu München only uses yeast from its own pure yeast cultivation plant.

Before our brewers can process the malt in the brewhouse, it must be ground in the malt mill. The malt grist is then mixed with water in the mash tun (in technical terms: „mashing“) and heated to dissolve the strength of the malt and break it down into fermentable sugars. In the lauter tun, the husks (shells of the barley grain) and other insoluble ingredients are separated from the „wort“. Hops are added in the wort kettle and the wort is boiled. In this process, the hop ingredients are dissolved, enzymes are deactivated, and the original wort (concentration) is adjusted. The brew master constantly monitors this process, because quality has to be checked. In the whirlpool, the trub is separated from the beer wort by rotation. On the way to the beer cellar, we cool the wort to cellar temperature, depending on the type of beer.

The fermentation process begins in the fermentation tank with the addition of beer yeast: The metabolism of the yeast converts fermentable sugars of the wort into alcohol and carbonic acid. The fermentation with bottom-fermenting yeasts lasts about 6 to 7 days at temperatures between 7 and 9°C. The name „bottom-fermenting yeast“ comes from the fact that the yeast settles on the bottom. Top-fermented yeast ferments the wort in 4 to 5 days at temperatures of 18 to 20°C and then rises to the surface. After the main fermentation, the yeast is drawn off from the tank. The resulting „young beer“ is stored at approx. 0°C for several weeks until it is fully mature. After storage, the bottom-fermented beer is filtered and placed in pressure tanks for bottling.



2.4 Our beers

From the historical beginnings of brown, wheat and bock beers, our master brewers have developed an impressive range of traditional beers, which are sold by the brewery „Staatliches Hofbräuhaus in Munich" under the umbrella brand „Hofbräu München".

Our strength lies in bottom-fermented varieties such as Hofbräu Original and Hofbräu Dunkel. To celebrate the Purity Law, we have been offering the traditional, tasty Hofbräuhaus Hell since 2016. In addition, there are the seasonal specialties Hofbräu Oktoberfestbier and Hofbräu Maibock as well as Hofbräu Sommer and Winterzwickl.

Our product range is complemented by the top-fermented specialties Münchner Weisse and Hofbräu Schwarze Weisse.

With a good 50 percent of sales, Hofbräu Original is the favorite in our range. The refreshingly off-dry Hofbräu Original embodies the special character of beers from Munich like no other beer and carries it all over the world.

With the seasonal specialties, we underline cultural diversity and offer beer lovers special beers with a special atmosphere. A mix that goes down well, because seasonal beer specialties entice you to drink beer.

	 **20 x 0,5 l** Reusable crate	 **24 x 0,33 l** Reusable crate	 **20 x 0,33 l** Reusable crate	 * **20 x 0,5 l** Disposable carton	 * **24 x 0,33 l** Disposable carton	 * **6 x 0,33 l** 6-pack disposable Open Carrier	 **5 l** Can (disposable)	 **30 l** Keg	 **50 l** Keg	 **30 l** Party keg wooden look	**Tank**
Hofbräu Original	●	●		●	●	●	●	●	●	●	●
Hofbräu Dunkel	●			●		●		●	●		
Münchner Weisse	●			●		●	●	●	●		
Hofbräu Schwarze Weisse	●			●			●	●	●		
Hofbräu Maibock	●					●		●	●		
Hofbräu Urbock								●			
Hofbräu Doppelbock					●			●	●		
Hofbräu Sommerzwickl naturtrüb	●							●	●		
Hofbräu Oktoberfestbier	●			●	●	●	●	●	●		●
Hofbräu Winterzwickl naturtrüb	●							●			
Hofbräu Kristall Weisse	●										
Hofbräu Weisse leicht	●										
Hofbräu Weisse Alkoholfrei	●										
Hofbräu Alkoholfrei	●										
HB Pure		●									
Hofbräuhaus Hell	●		●								

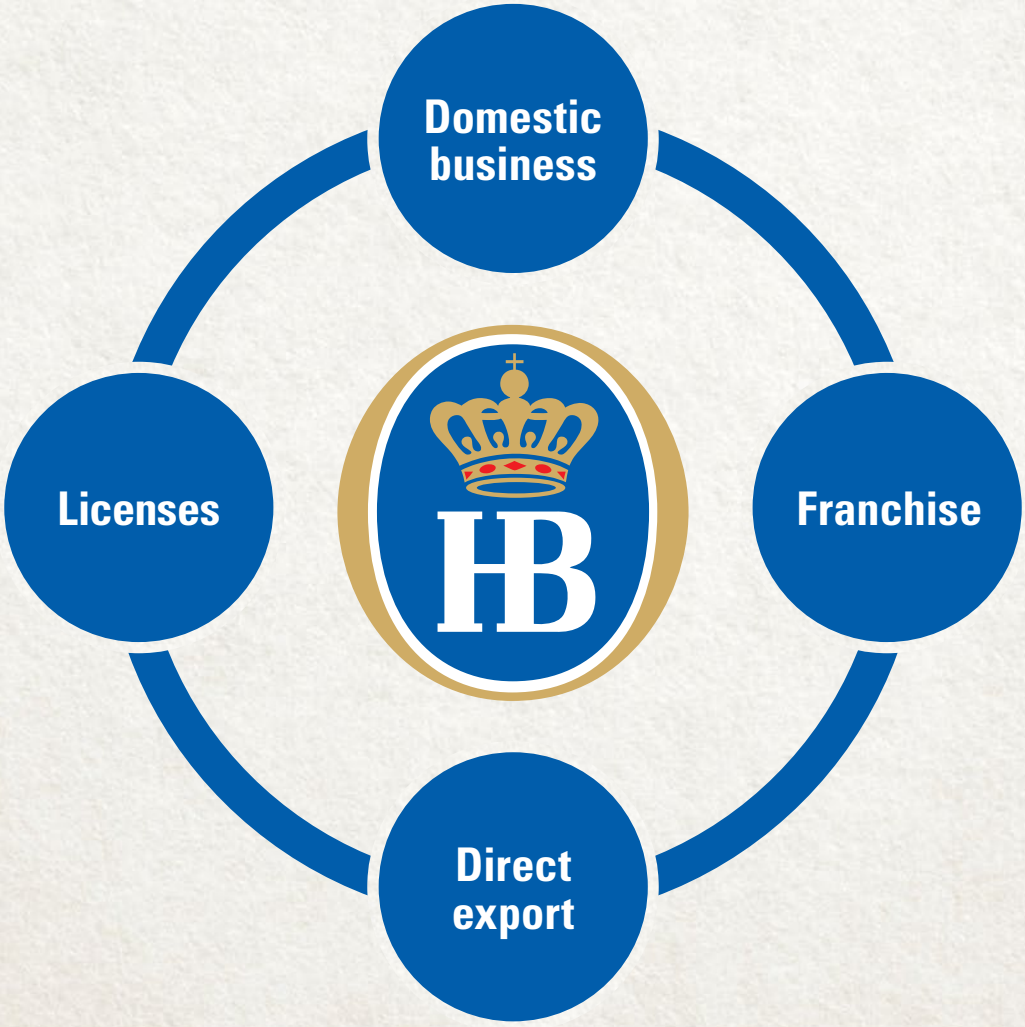
*) Disposable containers are only available in export markets. Special packaging is not included in this list.

2.5 Our business areas

Due to our unique history, we have developed into an internationally operating brewery. Our main business areas are the production of high-quality beers and their national distribution in gastronomy and trade. We export to over 40 countries. In selected markets, we issue brew licenses and transport the atmosphere and flair of the Hofbräuhaus around the world within a franchise concept.

We have built up an internationally known, high-quality brand that offers beer lovers the feeling of an elevated quality of life and conscious enjoyment.

Our strategy is qualitative growth in the upper price segment of the retail trade as well as in traditional and Bavarian modern gastronomy. This is the basis of our sales policy.



3. CORPORATE GOALS

Our goal is to secure our economic success in a sustainable manner.

We want to grow profitably against the declining German beer market. Establishing numerous new Hofbräu restaurants and Hofbräu houses in our core markets will help us to achieve this. Conscious of our responsibility for the future, our long-term goal is to align our business processes as well as achieving carbon-neutral production and distribution of our beers for future generations.

We consistently align our organization, investments and maintenance work to these standards. In order to achieve climate targets or to set the course for achieving them, we will make ecological decisions over economic ones, depending on the situation. As a company of the Free State of Bavaria, we have a special, high-profile role: to bring living tradition and historical knowledge into harmony with modern corporate planning and production technology.

In recent years, consumer habits have developed towards more diversity with products and containers. Trends that are not always environmentally friendly and market driven. We therefore assess and measure these developments with economic and ecological criteria that we use to make our decisions.

The other business areas, direct export, license and franchise business, are also based on this decision matrix.

We pay particular attention to the economical use of resources, such as raw materials and energy, as well as auxiliary materials. We continuously screen the entire production process for any areas that we could potentially improve. When selecting the containers, packaging and packaging materials, we orientate ourselves on the market, the material properties and the recycling possibilities of the resulting waste materials.

Own beer (hl)

4. ENVIRONMENTAL MANAGEMENT

4.1 Environmental Management System

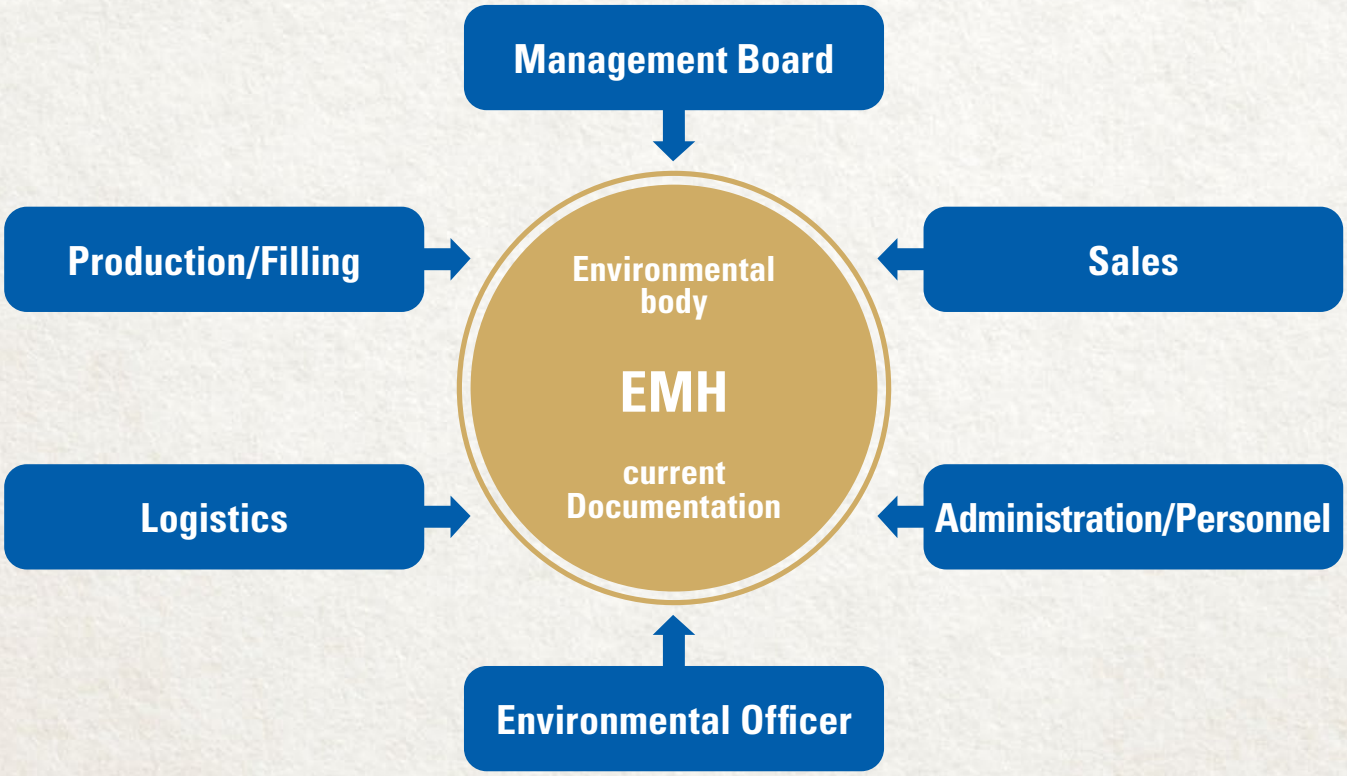
The environmental management system creates the prerequisites for achieving our environmental policy.

Here, we define responsibilities, competences and procedures for the implementation of corporate environmental protection. Since 2015, Mr. Sebastian Utz has been responsible for environmental protection in our company.

The entire environmental management system is documented in the Environmental Management Handbook (EMH). As part of the environmental audit, we check the environmental management system with annual audits and system assessments.

The decisions and operating procedures of the management are lived by all department heads and all employees of the brewery as guidelines and directives to ensure ecological management.

All employees contribute significantly to our continuous improvement process through their suggestions. The environmental committee is composed of the employees and meets several times a year to discuss goals, measures and additions to the implementation of the EMH.



LEGAL PROVISIONS

All relevant laws, ordinances and technical rules are recorded in a legal register and are continuously updated. In addition to the Federal Emission Control Act, its individual regulations play a central role.

An exemplary storage facility for hazardous substances with multiple safeguards prevents the escape of hazardous substances. A closed system ensures the highest possible level of protection against undesirable environmental effects, such as potentially hazardous materials like the coolant ammonia.

ORGANIZATIONAL CHANGES

We have integrated our entire environmental management system into the company's IT system. The input-output balance sheet was set up as an „environmental database".

In 2016, we joined B.A.U.M. e.V., the German Working Group for Environmentally Conscious Management, in order to support our efforts to achieve the best possible environmental protection through external consulting.

In order to increase the scope of our environmental protection activities, we began analyzing related interest groups in 2018 (so-called „stakeholder analysis").

In 2019, our long-standing environmental adviser, Mr. Manfred Mödinger, retired from the consultancy business. After more than 20 years of professional consulting, a change was therefore necessary. We chose Arqum GmbH to be our new environmental consulting company.

For the first time, we use factors from GEMIS (Version 5.0, 2019) to calculate the emissions for this Environmental Statement. This results in deviations from the previous calculation. These are marked and explained at the appropriate place.

TECHNICAL AND STRUCTURAL CHANGES

In 2017, after completion of the major conversions, the logistics expansion, a new bottle washing machine and the commissioning of a new steam boiler, the dry section of the bottling plant was upgraded.

In April 2019, we completed the conversion of our brewhouse. Since then, a condensation condenser has been used for heat recovery. With the conversion, we were able to establish the world's most advanced energy measurement system in a brewery. In addition, over 100 newly installed electricity consumption meters provide us with system-specific information on our total electricity consumption.

To increase operational safety, we modernized the heating system of the administration building. The administration building was given a green roof to create a natural insulation and at the same time to promote biodiversity on the brewery site.
To increase the comfort of our employees, we renovated the staff kitchens.

We are committed to continuously improving the environmental situation of the brewery as far as economically justifiable, to continuously reduce the pollution resulting from the operation of the brewery and to always comply with the legal environmental regulations and our binding obligations or to achieve better results.
With our strategy „Avoid – Reduce –Compensate", we will produce our beers carbon-neutral and sustainable way in the long run. The main emphasis of the measures must be on avoiding CO_2 emissions.

EMAS
GEPRÜFTES
UMWELTMANAGEMENT
DE-155-00208

4.2 Environmental policy and strategy

Within the framework of our environmental policy, we define our environmental goals and follow the following principles:

- We want to continuously develop the ecological improvement process.
- We commit ourselves to the continuous improvement of the environmental management system.
- By the economical use of resources, auxiliary and operating materials we constantly reduce environmental pollution.
- We want to reduce the climate gas emissions associated with our beers or compensate for them in a comprehensible manner.
- All systems and operating procedures are regularly checked by us in order to assess the effects on the environment and to avoid accident-related damage.
- We promote our employee's environmental awareness through regular information and training.
- We integrate contractual partners such as suppliers and service providers into our environmental policy.
- The brewing water from our own deep well is used responsibly and maintains its high quality.
- With a detailed waste management concept, we specifically reduce our residual waste quantities and promote the recycling of materials.
- We foster an open dialog with the public.

4.3 Environmental goals 2020 - 2023 & status of environmental goals 2019

In the last few years, we have carried out numerous conversions. In April 2019, the brewhouse was completed and, at the beginning of 2020, the new bottling plant was opened. Due to the many changes and construction work, we have had to postpone some of our environmental goals to a later date. With the completion of the major conversion work, we have now achieved a stable status quo in terms of heat and electricity consumption. For the new EMAS period until 2023, we have set new goals and are continuing to pursue the goals that we have not yet achieved.

The percentages given always refer to reductions in specific consumption (i.e. consumption per hectoliter of home-produced beer) in the reference year 2015.

ENERGY/EMISSIONS
Goals that we are pursuing:

1. The specific heat consumption is to be reduced by 4.0%.

In 2019, we were not able to achieve the desired result (decline of 0.9%) due to the modernization work.
As a further consequence of the conversion measures, we expect an additional reduction in heating requirements and are adhering to the originally planned target of 23.36 kWh/hl.

2. Specific electricity consumption is to be reduced by 2.0%.

Electricity consumption also rose as a result of the modernization work from 2016 to 2018.
Nevertheless, in 2019, we reached approximately the same level as in 2015. Our target remains a reduction of 2.0% by 2023 compared with 2015.

3. The operational truck consumption of diesel in l/100km should continue to decrease.

The consumption of truck diesel compared to 2018 was reduced. With various measures, we will pursue an increased reduction in average consumption.

4. The operational CO_2 emissions should be reduced by 30 %.

Due to the increased energy consumption caused by the modernization measures,
our Scope 1 CO_2 emissions unfortunately also increased. This explains the increase in 2019.
However, the reduction target will be maintained until 2023.
*From 2019, CO_2 emissions will be calculated with new calculation factors according to GEMIS factors (5.0).

RESOURCES

5. Carbon neutrality of the brewery before 2025

We are facing the challenge of reducing our greenhouse gas emissions in order to do our bit in the fight against climate change. In all conversion measures, we place great importance on using the best technology available. At the same time, we are constantly striving to improve our environmental performance with various measures. Since 2009, we have been purchasing exclusively green electricity.

True to the motto "Avoid – Reduce – Compensate", we have been offsetting parts of our CO_2 emissions through regional climate protection projects since 2017. The rewetting of the moor "Weitmoos südlich Schleinsee" together with the Bavarian Nature Conservation Fund in 2017 was our pilot project and the beginning of it. With this measure, we achieved a certified-CO_2 savings of 1,115 t CO_2 equivalents over a period of 50 years. This means a compensation of 22.3 t CO_2 per year.

We have high standards for our projects and so, in 2018, we successfully started looking for suitable, credible projects in Bavaria to achieve our compensation target. In 2019, we supported projects to build up humus and bind CO_2 on Bavarian farmland. With this measure, an additional 100 tons of CO_2 per year were offset, thereby significantly exceeding our previous target. In order to continue to live up to our responsibility in the future, we want to make our brewery operations carbon-neutral by 2025 as part of our regional projects and measures.


1115 moorbenefits

Die
Firma Hofbräu München
hat durch ihre Maßnahmen
im Projekt Weitmoos/Schleinsee eine Einsparung*
von 1115 t CO_2-Äquivalenten erzielt
und trägt dadurch maßgeblich bei zum

KLIMASCHUTZ
DURCH MOORRENATURIERUNG

München, den 30. August 2017

Ulrike Scharf MdL
Bayerische Staatsministerin für
Umwelt und Verbraucherschutz

6. The consumption of cleaning and disinfecting agents is to be reduced in general.

Our previous goal focused solely on caustic soda solution consumption. By 2023, we want to concentrate on reducing all cleaning and disinfecting agents.

7. Paper consumption is to be reduced by 100,000 sheets.

Instead of the planned reduction, there was a further increase in 2019 (18.3% compared to the previous year). We started a large-scale project to save paper and reduce the number of printers at the same time. We will continue to pursue the goal of reducing paper consumption consistently in the coming years.

8. Raw materials and supplies are to be continuously converted to more ecological articles.

Since 2007, we have been purchasing the brewing wheat for our wheat beer specialties from water protection areas in Lower Franconia, Bavaria. We maintain a sustainable contract with the farmer, which guarantees price security for both sides and counteracts world market speculation. By 2019, we wanted to extend this sustainable goal to around 20% of our malting barley requirements. The initiative "Save the bees" changed the legal situation. Mälzerei Hausladen was our partner for this project. Due to the discontinuation of the malting business, it was not possible to conclude corresponding contracts. We will resume the search for new partners for sustainable and regional brewing malts in 2020.

We are working on a conversion to beer filtration without diatomaceous earth, as this is very CO_2 intensive. Two pilot projects with this goal have already been carried out. Further measures are being planned.

9. Reduction of water consumption by 10%.

The brewery's specific water consumption is to be reduced by 10% by 2023. One of the measures to achieve the target is the purchase of a new, more efficient bottle filler in 2020.

ORGANIZATION

10. Employees and suppliers should be motivated to reduce indirect environmental impacts associated with us.

In 2016, HB München joined B.A.U.M. e.V., the German Working Group for Environmentally Conscious Management, and is constantly receiving motivation to make improvements.

A new project, which was very positively accepted by many employees, is the management of four beehives on the brewery premises. Our brewer apprentices look after the honeybees under the expert guidance of a beekeeper. Our employees also enjoy taking part in public projects to promote environmental protection and their own mobility, such as "city cycling".

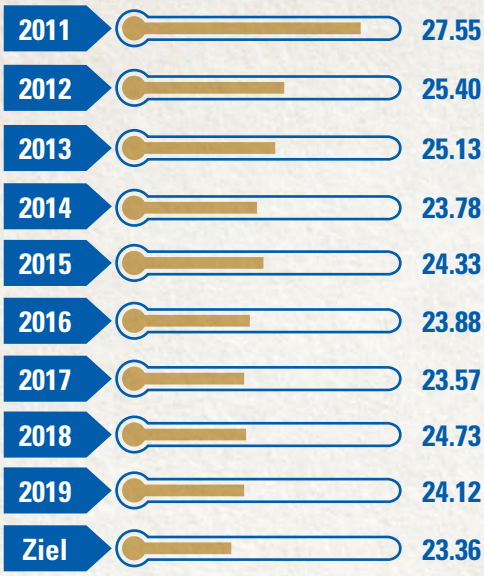
Our purchasing department will continue to select our service providers and suppliers on the basis of ecological criteria.

WASTE

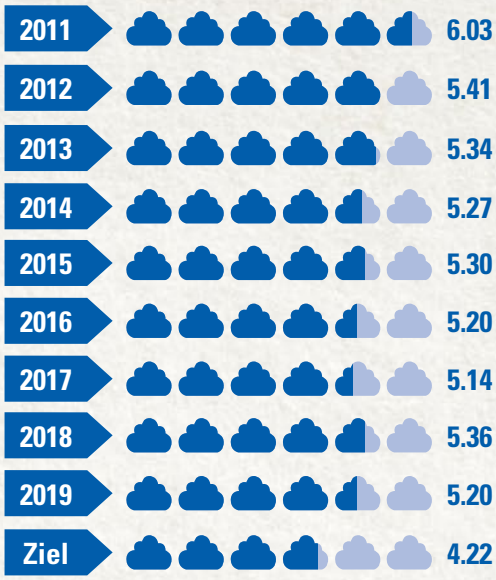
11. Non-recyclable municipal waste (esp. residual waste) is to be reduced by 15 %.

With a value of 26.5%, we have exceeded the target without a shadow of a doubt.

Spec. heat consumption (kWh/hl)

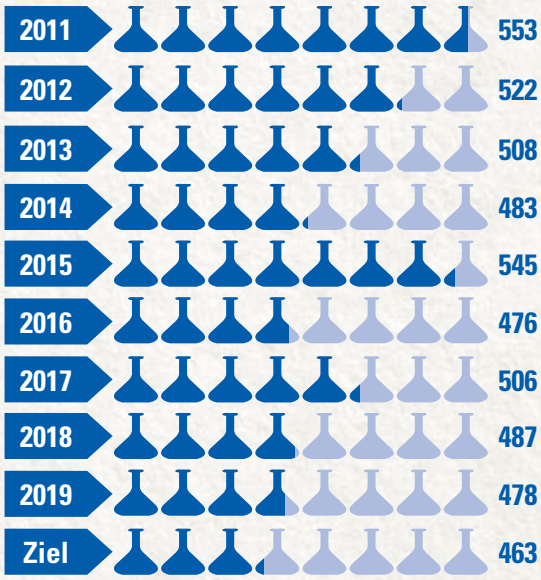


CO_2 emissions (kg/hl) - Scope 1



Spec. power consumption (kWh/hl)

NaOH consumption (g/hl)



4.4 Environmental program 2020 – 2023

Environmental goal reference ENERGY	Measure	Status
No. 1, 2, 4	Extension brewery (malt mill, lauter tun, vapor condenser and energy storage)	☑
No. 1, 4	Reduction of the evaporation rate after brewery conversion	☑
No. 1, 2	Modernization of energy measurement in the brewery	☑
No. 1, 2	Planning work for CHP plant (load profile determination after conversion of KEG plant)	2023
No. 1, 2, 4	Construction of a CHP plant	2025
No. 1, 2,	Construction of a new KEG plant with possible use of the old plant for disposable KEG for exportation	planned before 2022
No. 1, 2	Green roof areas of the administration building assists with thermal insulation	☑
No. 1,2	Construction of a new heating system for the administration building	☑
No. 2	Conversion of the lighting to energy-saving LED systems	ongoing
No. 1, 2	Analysis of the actual state of the technology to uncover further savings potential	2020
No. 4	Construction of a PV system on the administration building	2021
No. 2	Installation of new Bottle Filler and labeling machine	☑
No. 2, 4	Conversion of postal and parcel delivery to "Go-Green"	☑
No. 2, 6, 8	New tender for a filtration plant free of diatomaceous earth	2023
No. 3	Route optimization of trucks	ongoing
No. 3	ECO driver training for truck drivers	
No. 3	ECO driver training for field staff	

Environmental goal reference RESOURCES	Measure	Status
Nr. 5	CO_2 compensation through regional projects for binding CO_2 in humus	☑
Nr. 6	Optimization of the setting of the new NaOH concentrate dosing system and the minimum cleaning concentration specifications	☑
Nr. 7	Introduction an electronic ordering system for customers	2022
Nr. 7	Change to electronic PDF receipt	2020/21
Nr. 7	sue of the house drink account as pdf	since 2019
Nr. 7, 8, 10	Introduction of electronic order processing (EDI)	2020
Nr. 8, 10	Digitalization of the documents which accompany truck deliveries	☑
Nr. 7	Program for paper saving and equipment consolidation (PaGe)	from 2020
Nr. 8	With regional malthouses and farmers from the "South of Munich", 20% of the barley malt demand is to be covered by long-term contracts with stable revenues for the farmers.	delayed
Nr. 10	HB examines the integration of its hop suppliers into the sustainability system for the German hop growing ring	2021
Nr. 10	Participation in Munich city cycling with our own team "Hofbräu München – HaBe die Wadln"	since 2017
Nr. 10	Trainee training at the IHK München offer for energy scout	2020

Environmental goal ORGANIZATION	Measure	Status
Nr. 10	Development of HB criteria for ecological supplier assessment	ongoing
Nr. 10	Introduction of ecological supplier evaluation as part of a general, new supplier evaluation system	ongoing
Nr. 10	Optimization of employee use of the electric pool vehicle	ongoing
Nr. 10	Introduction a digital suggestion box for employees	ongoing
Nr. 10	Installation of e-charging points for employees	in planning

Environmental goal reference WASTE	Measure	Status
Nr. 11	Employee training for correct waste sorting	ongoing
Nr. 8, 11	Audit the conversion of the load securing of the KEGs	with new KEG

5. ASSESSMENT OF THE MOST IMPORTANT ENVIRONMENTAL IMPACTS

The environmental effects described below are continuously determined by a comprehensive system of internal data collection. An equally continuous and systematic monitoring of environmental legislation checks the legal relevance of individual environmental aspects. These were examined with regard to their significance (A-high, B-medium and C-low) as well as the influence of the brewery (I-high, II-medium, III-low).

The assignment to these assessments is based on the experience of the environmental managers of the brewery and the environmental consultants involved. Our most important direct and indirect environmental impacts are shown below.

DIRECT ENVIRONMENTAL IMPACTS

5.1 Energy use and Efficiency

PRIMARY ENERGY CONSUMPTION OF THE CURRENT EMAS PERIOD

		2019	2018	2017
Heat – Gas	kWh	**8,302,766**	**8,444,589**	**7,926,061**
Heat – fuel oil	kWh	0	0	0
Electricity	kWh	3,761,704	3,848,188	3,706,214
Total production	kWh	**12,064,470**	**12,292,777**	**11,632,275**
Diesel:Truck & car	kWh	649,687	735,283	758,479
Gasoline	kWh	13,129	27,746	14,360
Gas-powered forklift(*)	kWh	354	438	-
Total logistics	kWh	**663,170**	**763,029**	**772,839**
Total (new)	kWh	**12,727,640**	**13,056,245**	**12,405,114**

(*) The internal logistics are partly carried out with gas and partly with electric forklift trucks.

Compared to the previous year, a reduction of the total energy consumption by 2.4% has been recorded. The total energy consumption of **12,727,640 kWh** is divided into 12,064,470 kWh for production (35.05 kWh/hl) and 663,170 kWh (1.82 kWh/hl) for the company's own logistics.

The decline in energy consumption in logistics is attributable to the lower diesel consumption of the new trucks. In addition, our field staff covered a shorter total distance. In 2019, 29.6% of our energy consumption in production and logistics was covered by renewable sources.

5.2 CO_2 Emissions

Carbon dioxide

In 2019, 1,273 t were released from alcoholic fermentation. This amount is not included in the scope consideration, since a corresponding CO_2 binding takes place during the growth of the grain. Furthermore, a CO_2 recovery plant enables the collection of fermentation carbon dioxide and its use for technical processes.
Since 01.01.2009, the brewery has been purchasing only green electricity from completely renewable energy sources. This means that it has no share of fossil CO_2 emissions in Scope 1, but only in Scope 2.
We have been using an electric car as our pool vehicle since 2013. A hybrid car has been in use in the field since 2017. Their charging is done with green electricity from hydropower or by means of our solar cells.

Scope 2:

Our 100 % green electricity comes from large hydroelectric power plants. During its production there are small amounts of CO_2 emissions.
For the amount of electricity we purchase, this corresponds to **10.5 tons**.

By switching to green electricity, we are making a major contribution to climate protection every year: with this measure, we avoided **1,830 t CO_2 eq.** last year.

Conversion factors:

- For the first time, we are using factors from GEMIS (version 5.0, 2019) to calculate the emissions of this Environmental Statement. This results in deviations from the previous calculation. These are marked and explained at the appropriate place.
- CO_2 emissions heat = 202 g/kW CO_2 eq. (Without upstream chain)
- CO_2 output power Scope 1: since 2009, the CO_2 emissions through electricity, as 100% of the electricity used has been converted to green electricity.
- CO_2 output power Scope 2: according to the eco-balance sheet database GEMIS 5.0, the emission factor for electricity generation from hydropower at 2.78 g CO_2 eq./kWh, the federal mix at 489.17 g CO_2 eq./kWh
- Fuel oil/diesel: 9,9 kWh/l
- CO_2 eq.
  Diesel passenger cars: 204.13 g/kWh;
  Diesel trucks: 98.4 g/kWh;
  Diesel transporters: 305.9 g/kWh
  (all with upstream chain)
- Gasoline:
  8.85 kWh/l; 236.23 g/kWh (with upstream chain); 2.36 kg CO_2/l
- Propane:
  274.64 g CO_2 eq./kWh (with upstream chaine)
- Alcoholic fermentation: Release of 3.7 kg CO_2/hl as the difference between the CO_2 produced and the CO_2 remaining in the beer based on an average of 12.5% of the original wort (Source: Dissertation by Angelika Großer, TU Munich-Weihenstephan 2006)

SCOPE 1: CO_2 OUTPUT OF THE CURRENT EMAS PERIOD – OLD CALCULATION

		2019	2018	2017
Heat – gas (old)	t	1,536	1,562	1,466
Heat – fuel oil	t	0	0	0
Electricity	t	0	0	0
Total production (old)	**t**	**1,536**	**1,562**	**1,466**
CO_2 output traffic	t	167	197	210
Gas-powered forklift *	t	19	24	---
Total logistics	**t**	**174**	**221**	**210**
CO_2 eq. from refrigerant	**t**	**0**	**0**	**3,9**
Total (old)	**t**	**1,640**	**1,783**	**1,680**

new: From 2019, the CO_2 emissions with factors according to GEMIS 5.0.
(*) The internal logistics are partly carried out with gas and partly with electric forklifts.

SCOPE 1: CO_2 OUTPUT OF THE CURRENT EMAS PERIOD – NEW CALCULATION

		2019	2018	2017
Heat – gas (new)	t	1,677	1,706	1,601
Heat – fuel oil	t	0	0	0
Electricity	t	0	0	0
Total production (new)	**t**	**1,677**	**1,706**	**1,601**
Diesel Truck & car (*)	t	109	118.7	122.9
Gasoline	t	3	6.4	3.3
Gas-powered forklift	t	0.1	0.1	---
Total logistics	**t**	**112**	**125.2**	**210**
CO_2 eq. from refrigerant	**t**	**0**	**0**	**3.9**
Total (new)	**t**	**1,789**	**1,831.2**	**1,731**

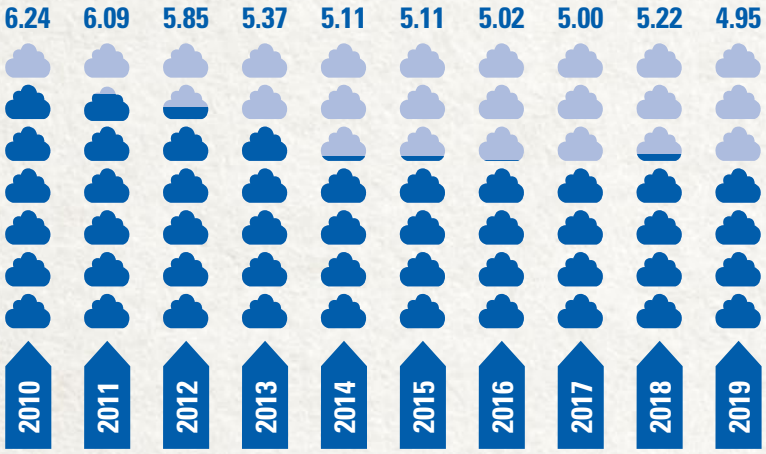
In relation to 1 hl beer, CO_2 emissions have risen when compared to 2015: At 5.2 kg CO_2/hl, it is about 2% more than in 2015. Production accounted for 4.87 kg/hl and logistics for 0.48 kg/hl. The main reason for this increase can be found in a change in the factors used to calculate CO_2 emissions (p. 28).

A recording of indirect transport emissions by freight forwarders and collectors, as well as large parts of the indirect climate gas emissions designated as Scope 3 according to the GHG protocol, is not possible at reasonable expense. As part of a Scope 3 analysis, the CO_2 emissions associated with the operational flights were determined at 135 t.

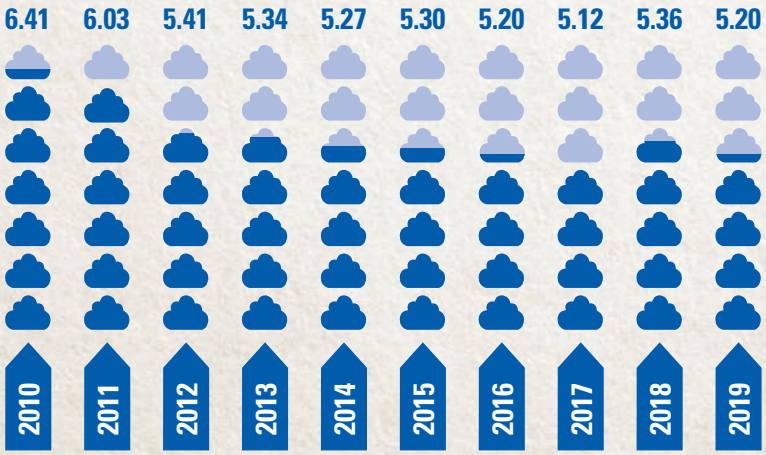
The following diagrams show the long-term development of fossil CO_2 emissions in relation to the amount of beer produced. However, the CO_2 emissions of upstream suppliers (agriculture) and distribution (transport, trading partners and end consumers) are not included in this calculation.

Since the introduction of environmental management, the overall development has been characterized by a significant reduction in CO_2 emissions per hectoliter of beer produced (regardless of the calculation method).

Specific CO_2 emissions [kg/hl] since 2010 – old calculation



Specific CO_2 emissions [kg/hl] since 2010 – new calculation



5.3 Other emissions

Noise and odor emissions

Our location is designated as an industrial estate. The specified noise reference values of 60 dB(A) during the day and 45 dB(A) at night are always observed. There have been no noise-related complaints or complaints about environmental effects in general.

Emissions from evaporative cooling systems

A hazard analysis was prepared for our evaporative cooling system. The laboratory tests carried out confirm compliance with the requirements of the 42nd Federal Emission Control Act (BImSchV).

Other emissions to air

The emissions from our boilers are regularly checked and are below the prescribed limit values of the 44th Federal Emission Control Act (BImSchV).

- **Sulfur dioxide**
  From production and car/truck/air traffic, the SO_2 emission for the year 2019 is 291.5 kg (GEMIS 5.0).
- **NO**
  From production and car/truck/air traffic the NO_x emission for the year 2019 is 1,619 kg. The emissions of the boiler were calculated on the basis of our own measurements. In 2019, this figure remained at the previous year's level.
- **PM10**
  A potential source of fine dust emissions from the brewery (except for motor vehicles) is the malt dust plant. The weekly inspection of the plant shows no dust emission.
  The recording of the differential pressure measurement of the dedusting plant showed no leaks. From other production (boilers) and car/truck/air traffic, PM10 emissions in 2019 will amount to 1,311 kg.

5.4 Water and wastewater

Water is the main raw material in the brewery and the main auxiliary material for cleaning. The water consumption was already optimally adjusted during the construction of the brewery plants. In 2019, the water consumption of 4.24 hl per hl of beer produced was lower than in 2015. This is due to the continuous optimization of our cleaning processes.

Monitoring the wastewater for its pollution load in 2019 showed that the impact on the environment was reduced to a minimum. For years, we have been continuously complying with the discharge conditions of the municipal sewerage system by connecting mixing and equalizing reservoirs or the neutralization plant. For the neutralization, we use flue gas from the boiler and a carbon dioxide air mixture from the fermentation cellar. Our wastewater volumes are proportional to freshwater consumption and are declining overall: In 2003, 4.55 hl of wastewater were produced per hl of beer produced, in 2019 it was only 3.06 hl/hl.

5.5 Waste and residue material

All employees in administration, production and filling avoid waste and collect residual materials to be cleaned separately. In continuous dialog with our recyclers, we continuously optimize our central recycling collection station. We are continuously improving the separation and collection system through regular employee training.

Waste balance

In 2019, the modernization of the brewery was inevitably accompanied by significant increases in waste volumes. The disposal of solid material from the oil separator further worsened the result.

Balance sheet item Waste		**2019**	**2018**	**2017**
dangerous waste	kg g/hl	18,354 53.3	9,271 27.1	14,376 42.8
non-hazardous waste (not recycled)	kg g/hl	58,930 171	84,260 247	64,200 191
* of which were municipal and commercial waste	kg g/hl	50,400 146.4	42,390 124	50,970 151.6
* of which was grease separator slurry	kg g/hl	8,000 23.2	6,000 17.6	3,000 9.1
* of which was wastewater slurry	kg g/hl	0 0.0	0 0.0	0 kg 0.0
Other waste excluding spent grains and spent yeast	kg kg/hl	244,950 0.7	403,290 1.2	462,400 1.4

5.6 Material efficiency

An overview of the production-related mass flows with key figures according to absolute and specific consumption in the years 2019, 2015, and 2011.
In 2016, on the occasion of the 500th anniversary of the Purity Law, a new variety "Hofbräuhaus Hell" was introduced with its own packaging (own crate and Euro-bottle). Since then, it has enjoyed massive growth in sales. Consequently, new crates and Euro bottles had to be purchased in 2019 as well.
The reusable 24 x 0.33 l crate, also newly introduced in 2017, won the reusable innovation prize from Environmental Action Germany and the foundation, Stiftung Initiative Mehrweg (SIM).

We optimized our cleaning processes. The environmental impact has been considerably reduced by the further use of used caustic solutions, the use of lower concentrations of cleaning agents and their lower mass flow rate (e.g. caustic soda) in production and filling. At the same time, these measures also reduce the potential danger.
Compared to the EMAS start year in 2000, we now need less than half the amount of cleaning agents and disinfectants and only about 55% of the amount of caustic soda solution to produce one hectoliter of beer.

		2019	2015	2011
Malt	t	6,110	6,197	5,345
Reusable new glass	Stk. %	921,167 5.5	866,318 6.6	368,186 2.62
Glue	kg g/TFL	6,479 226	9,066 325	12,789 494
Filter aids	kg g/hl	67,190 195	65,850 250	60,100 264
Belt lubricant	kg g/TFL	3,900 136	4,180 150	3,800 147
CO_2 recovery	kg g/hl	763,900 2,220	915,648 2,700	771,805 2,690
Caustic soda 50%	kg g/hl	164,447 478	184,770 545	158,522 553
Hydrochloric acid regeneration	kg g/hl	68,152 198	93,187 275	71,002 248
other R & D total	kg g/hl	33,835 98	35,673 105	33,779 118

5.7 Land use and biodiversity

LAND USE

The brewery site covers a total area of 96,268.2 m².
This area is subdivided into:

- 43,122.8 m² (44.8%) of sealed area, of which 22,494.9 m² is pure building space
- 2,112.4 m² (2.2 %) partially sealed surface
- 51,033.0 m² (53.0 %) of unsealed area, of which 45,236.6 m² is planting area

There are no known contaminated sites on the brewery premises.
The graveled flat roofs of the administration building were planted in 2019 to reduce the amount of land sealed.

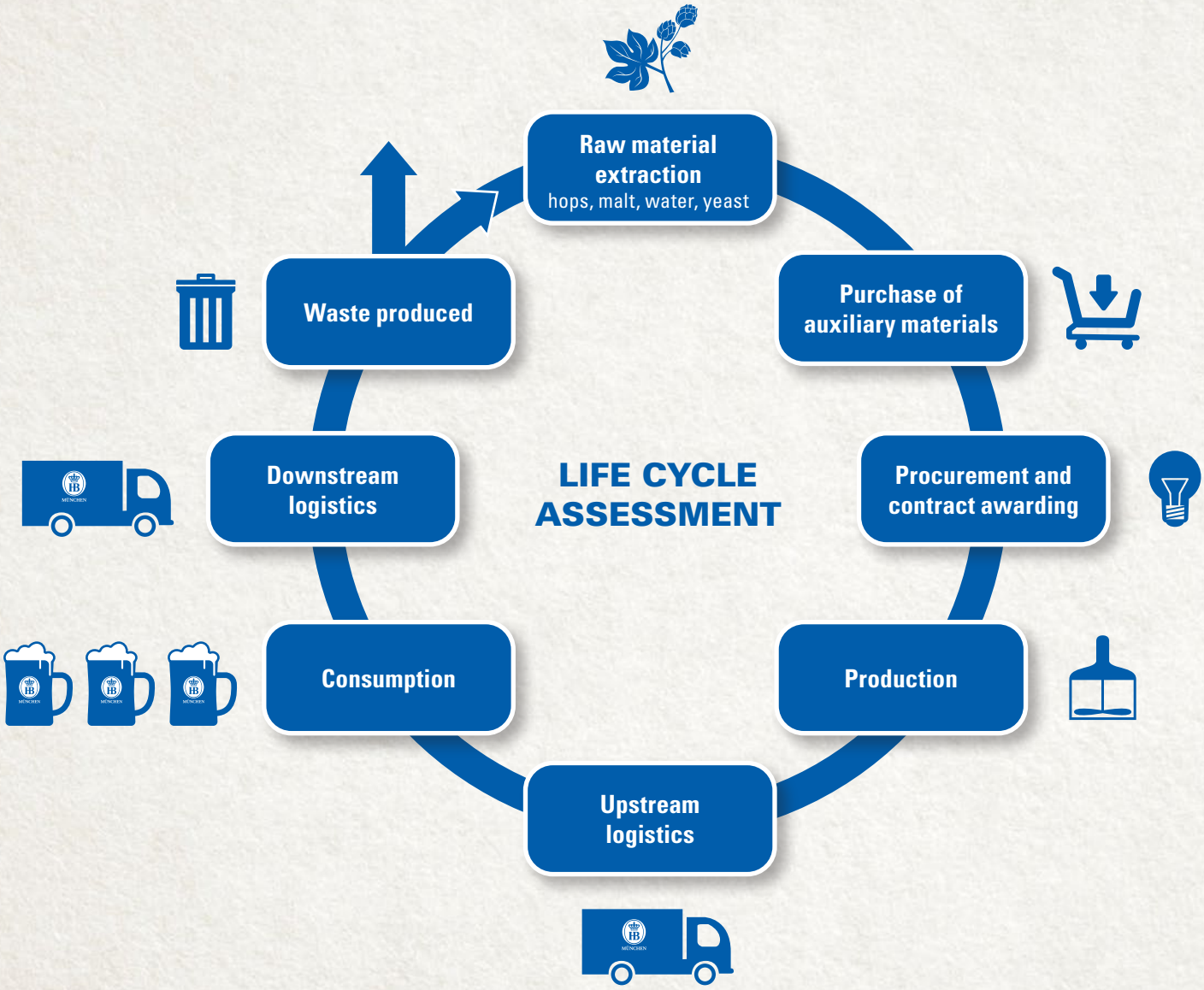
BIOLOGICAL DIVERSITY

In 2017, three bee colonies found a home on our brewery site.
Together with a beekeeper, our trainees look after the hard-working "ladies" as a sustainability project. In 2019, another bee colony was added, and the first queen bee born on the brewery premises. A large part of the green roof of the administration building was planted with a special seed mixture to become a meadow for bees.
To support young beekeepers in our region, we started a partnership with "Hektar-Nektar" in 2018. This is how we finance the basic equipment for five young beekeepers.
In order to further promote biodiversity and to set a mark against insect mortality, we have purchased a large insect hotel to accommodate wild bees.
For the year 2019, we analyzed our indirect environmental impact in detail on the basis of a life cycle assessment.
The most important indirect environmental impacts are examined in more detail below.

INDIRECT ENVIRONMENTAL EFFECTS

For the year 2019, we have analyzed our indirect environmental impact in detail on the basis of a life cycle assessment.

The most important indirect environmental impacts are examined in more detail below.



5.8 Production and equipment

We completed our major brewery modernization project in spring 2019. The vapor compressor previously used to save energy was replaced by a ladle vapor condenser. By changing our wort boiling system, we have considerably reduced the evaporation rate, thereby requiring significantly less primary energy. The brewery conversion gave us the opportunity to install the world's most modern system for energy measurement in breweries. But we have not only strengthened our position in the production, but also in the bottling of the beer: A new bottle filler and a new labeling machine make filling more efficient and save detergent and water.

5.9 Environmental performance of suppliers

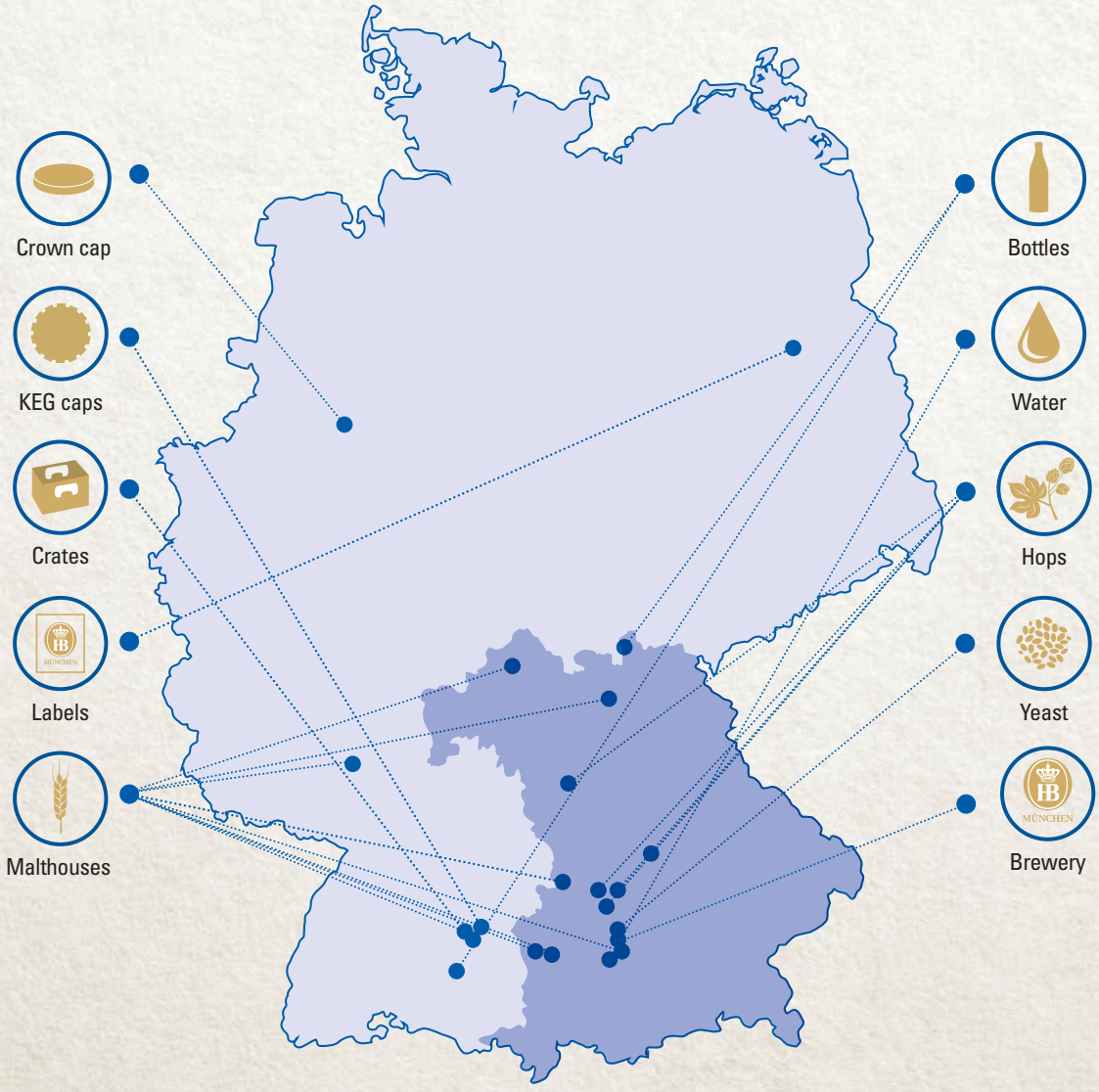
Our employees in administration, production and purchasing are called upon to pay more attention to environmentally friendly products. Partners and suppliers are also encouraged to offer environmentally compatible products and services.

When placing orders, we make sure that the suppliers deliver only a limited number of disposable containers (e.g. pallets, foils, canisters) and recyclable materials for packaging and securing the goods.

In addition to the 80 % of beer filled in reusable containers (tanks, KEG barrels, reusable crates, reusable bottles), we offer disposable bottles, and 0.5 and 5 l cans only for the international market. In doing so, we take into account the fact that disposable packaging is more suitable for transporting beer over very long distances (according to the UBA I life cycle assessment). For these types of packaging, we only use recyclable material.

To better determine and consider our stakeholders as well as their expectations and demands on our company, we carry out a so-called "stakeholder analysis" using tools from the Environmental Pact of Bavaria.

With an inspection catalog for suppliers according to a bonus-malus system and continuous discussion of ecological concerns, we want to further strengthen our influence on suppliers and their ecological performance. In this way, we want to improve the sustainability of our supply chain.



5.10 Vehicle fleet

The diesel consumption of our truck fleet was reassessed in 2017. The consumption of vans has since been recorded separately. Compared to 2018, the consumption of the truck fleet fell significantly to 27.3 l/100 km. In contrast, the consumption of our vans rose significantly from 7.8 l/100km to 13.8 l/km. Together, the two groups would arrive at a comparative value of 26.3 l/100 km, which is below the value for the reference year 2015.
Diesel consumption of passenger cars remained almost the same at an average of 7.4 l/100km (2018: 7.3 l/100km). The total number of kilometers traveled in passenger cars fell by 42,803 km when compared to the previous year. As a result, the total consumption of diesel and the resulting emissions fell. Since 2013, we have been using an electric car as a pool vehicle for the journeys around Munich. To this end, we added a hybrid car for our field service fleet in 2017. Both vehicles are charged with green electricity on the brewery premises. The purely electric vehicle is therefore almost carbon-neutral.

5.11 Work safety and emergency organization

All employees are given basic and regular training on occupational safety and environmental protection measures and the handling of hazardous substances through instructions and notices.
Our managers, employees and safety officers are a well-rehearsed team that takes measures to improve occupational safety on the basis of legal regulations and thus effectively prevents accidents and their consequences for the environment. As part of the risk assessment, the current status in all areas was recorded during a site inspection with an external safety expert. From this, we have drawn up a concept for improving and updating occupational safety and have implemented it step by step.

5.12 CO_2 compensation

Together with the Bavarian Nature Fund, we implemented the moor restoration project "Weitmoos südlich Schleinsee". According to the certification, this means **savings of 1,115 t CO_2 equivalents**. Spread over the certification period of 50 years, this means compensation of **22.3 t CO_2 equivalents per year**. As part of our future projects, which will of course be exclusively Bavarian, we will focus on binding CO_2 by building up humus on farmland and in hop gardens. With this commitment, we have been offsetting another **100 t CO_2 equivalents** annually since 2019. We are developing our own climate protection program with credible, regional measures. Wherever possible, we prevent the generation of CO_2 emissions. Where this is not possible, we compensate for it with our ambitious projects. We want to achieve a program with the "Bavarian Gold Standard". This means additional emission savings and ensuring ecological, economic and socially sustainable development.

6. OUR ENVIRONMENTAL PERFORMANCE AT A GLANCE

The following table shows a summary of our specific consumption and core indicators at a glance.

Core indicators		2017	2018	2019
Energy				
Total energy consumption	kWh/hl	34.59	35.99	35.05
Power consumption	kWh/hl	11.02	11.27	10.93
Natural gas consumption	kWh/hl	23.57	24.73	24.12
Fuel consumption	kWh/hl	2.30	2.23	1.93
Total consumption of renewable energy	kWh/hl	11.02	11.27	10.93
Total amount of renewable energy generated	kWh/hl	0.05	0.06	0.06
Material				
Caustic soda 50%	kg/hl	0.51	0.49	0.48
Cleaning and disinfectant agents	kg/hl	0.10	0.10	0.10
Water				
Water consumption	hl/hl	4.19	4.47	4.24
Waste				
Non-hazardous waste	kg/hl	1.40	1.43	1.57
Hazardous waste	kg/hl	0.043	0.027	0.053
Waste glass	kg/hl	0.28	0.23	0.33

Land use in relation to biodiversity		2017	2018	2019
Total land use	m^2	96,268.2	96,268.2	96,268.2
Sealed area	m^2	45,235.2	45,235.2	45,235.2
Nature area at the site	m^2	51,033.0	51,033.0	51,033.0
Nature area away from the site	m^2	0	0	0
Greenhouse gas emissions				
Total emissions of CO_2 equivalent	kg CO_2e/hl	5.14	5.36	5.20
Total emissions to air				
SO_2	g/hl	0.09	0.09	0.09
NO_X	g/hl	2.19	2.22	2.20
PM_{10}	g/hl	0.10	0.10	0.09

7. LOOKING BACK

In 2001, we joined the Community Eco-Management and Audit Scheme (EMAS). Since then, we have regularly monitored our environmental performance through an external environmental assessment and an audit. EMAS is a performance-based system that goes far beyond the legal requirements. Among 624 Bavarian breweries, we are one of a total of 18 EMAS-validated breweries.

With this most demanding environmental management system in the world, we have been successfully pursuing a path towards greater sustainability and environmental protection since the turn of the millennium. This has enabled us to reduce our specific CO_2 emissions [kg CO_2 hl] by 67% (compared with 2001 to 2018). Compared to the beginning of our environmental data collection (1998), we were even able to reduce specific CO_2 emissions by 73%.

Environmental sector		Status 2000	Status 2019	Change
Natural gas & fuel oil	kWh/hl	31.90	24.12	-24.4%
Stromverbrauch	kWh/hl	14.10	10.93	-22.5%
Wasserverbrauch	hl/hl	5.89	4.24	-28.0%
Bandschmiermittel	g/TFl.	111	136	22.5%
Leim	g/TFl.	558	226	-59.5%
Natronlauge	g/hl	859	478	-44.4%
Reinigungs- & Desinfektionsmittel	g/hl	218	98	-55.0%

8. OUTLOOK

In the coming years, we will continue to expand our function as a role model in environmental protection. We were the first German brewery to have our climate gas emissions extensively determined. From this, we developed our climate protection strategy. With the extensive investments planned for the coming years, we will reduce greenhouse gas emissions per hectoliter of beer by 30%. In cooperation with Bavarian partners, we want to develop and implement further Bavarian greenhouse gas compensation measures. Our goal is to implement a climate strategy of the highest credibility.

The humus project offers the fascinating opportunity to combine soil and water conservation with climate protection. In this way, we will succeed in the medium term in producing our beers in a carbon-neutral way.

Dr. Michael Möller (Director)

9. ENVIRONMENTAL EXPERT/ ENVIRONMENTAL EXPERT ORGANIZATION

ENVIRONMENTAL STATEMENT

The next updated Environmental Statement will be submitted for validation in June 2022 at the latest. The next consolidated Environmental Statement will be submitted for validation in June 2024 at the latest. In years when no consolidated or updated Environmental Statement is validated by the environmental expert, a non-validated Environmental Statement is submitted to the responsible registry office.

ENVIRONMENTAL EXPERT/ ENVIRONMENTAL EXPERT ORGANIZATION

As an environmental expert/environmental expert organization was commissioned:
Dr.-Ing. R. Beer (Authorization No. DE-V-0007) for the area 11.05 (NACE Code Rev.2)
Intechnica Cert GmbH (Authorization No. DE-V-0279)
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