HHL LEIPZIG GRADUATE SCHOOL OF MANAGEMENT

DIE BIEROTHEK®

Ecological Footprint of Ordering Beer Online – Die Bierothek SCP 4

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Agenda

1 **Executive Summary & Project Recap**

2 Summary of our Findings

3 Calculation Model Deep Dive

4 Example Calculations for Breweries

5 External Validation of Toolkit

6 Implementation Suggestions

The current status of sustainability in brewing beers is critical as there are large amounts of emissions and water and electricity usage

Sustainability in brewing beers

- ✓ In the period of last few months, we interviewed and analyzed the data by different brewers and retailers to create the Die Bierothek Sustainability toolkit.
- ✓ We work in an industry that generates a brutal amount of CO^2. Let's not kid ourselves about that. We produce about ***five kilograms of CO^2 per hectoliter of beer*** -Sebastian Suslik, Teacher at the Brewing Berufsschule Dresden
- ✓ It takes between ***three to seven barrels of water*** to make ***one single barrel of beer*** -University of Vermont
- ✓ In 2020, New Belgium's Fat Tire became the first major brewery to be certified carbon-neutral.

Important sustainability focus points and their solutions

Focus Points	Current solutions
Energy	Energy efficiency, Green Energy, Heat Exchanger
Water	Saving water practices, Clean-in-place systems, anaerobic digesters
Solid Waste	Spent Grains, Recycling & reusing programs and composting
Carbon Use	CO^2-recovery systems, Carbon capture systems and Nitrogren Generators
Social Aspects	Building better partnerships, interfirm cooperation, fair trade prices and practices

To calculate the carbon footprint of a company, the three scopes of carbon emissions set by the GHG protocol can be used

Scope of Sustainability

The Carlsberg Definition of Sustainability

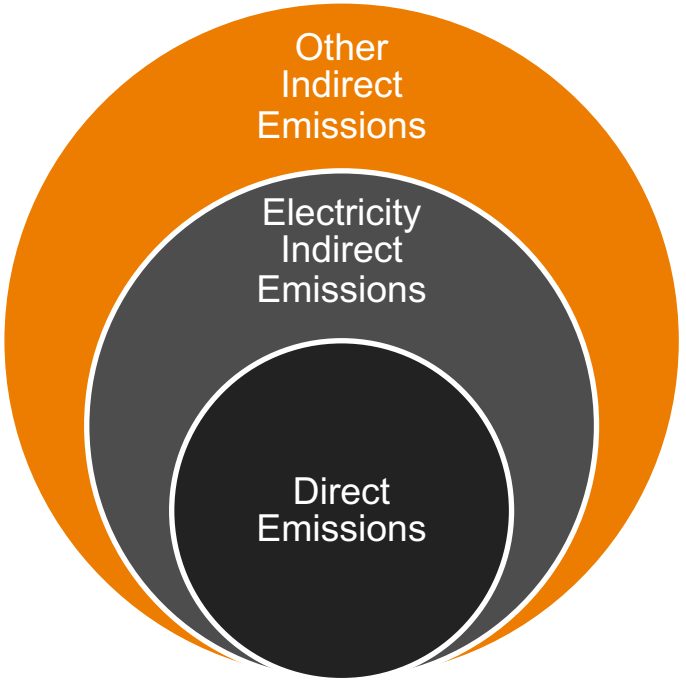
ZERO Carbon Footprint	ZERO Waste Water	ZERO Irresponsible Drinking	ZERO Accidents

The Greenhouse Gas Protocol: Official Reporting Standard for CO^2-emissions

- World's most widely used greenhouse gas accounting standards
- **9 out of 10** Fortune 500 **companies** use these standards
- Provide **open access calculation** tools

The 3 Scopes of CO^2 Reporting

- **Scope 3:** Generated through economic activity by sources outside the company
- **Scope 2:** Generated in the production of purchased electricity
- **Scope 1:** Generated directly through company-owned sources during operational activities



Sources: Carlsberg Sustainability Report 2020; Greenhouse Gas Protocol Reporting Standard

Based on the industry guidance, we would divide our carbon footprint calculation into different lifecycle stages

Life-Cycle Stage Methodology

Life-Cycle Stages for the Carbon footprint calculation of beer

Beer Value Chain - Fig. 5

Source: Beverage Industry Greenhouse Gas Emíssions Sector Guidance, 2022

General Principles of the Approach:

1. Carbon Footprint is calculated across life cycle stages
2. The Life Cycle Stages cover all the CO^2-sources across the value chain
3. CO^2-emissions are calculated until the beer is „in hand“

Over the course of the project, we focused on gathering external data and used it to design and iterate our calculation model

Recap on the Project Phases

The 3 phases of the Bierothek SCP

Initial Phase

Progress: Completed

- ✓ Interview with different point of contact.
- ✓ Studying different sustainability models by companies
- ✓ Reaching out to breweries

Modeling Phase

Progress: Completed

- ✓ Creating blueprint for Bierothek by using Carbon Footprinting methodologies of beer industry, EU, tools by other breweries

Iteration Phase

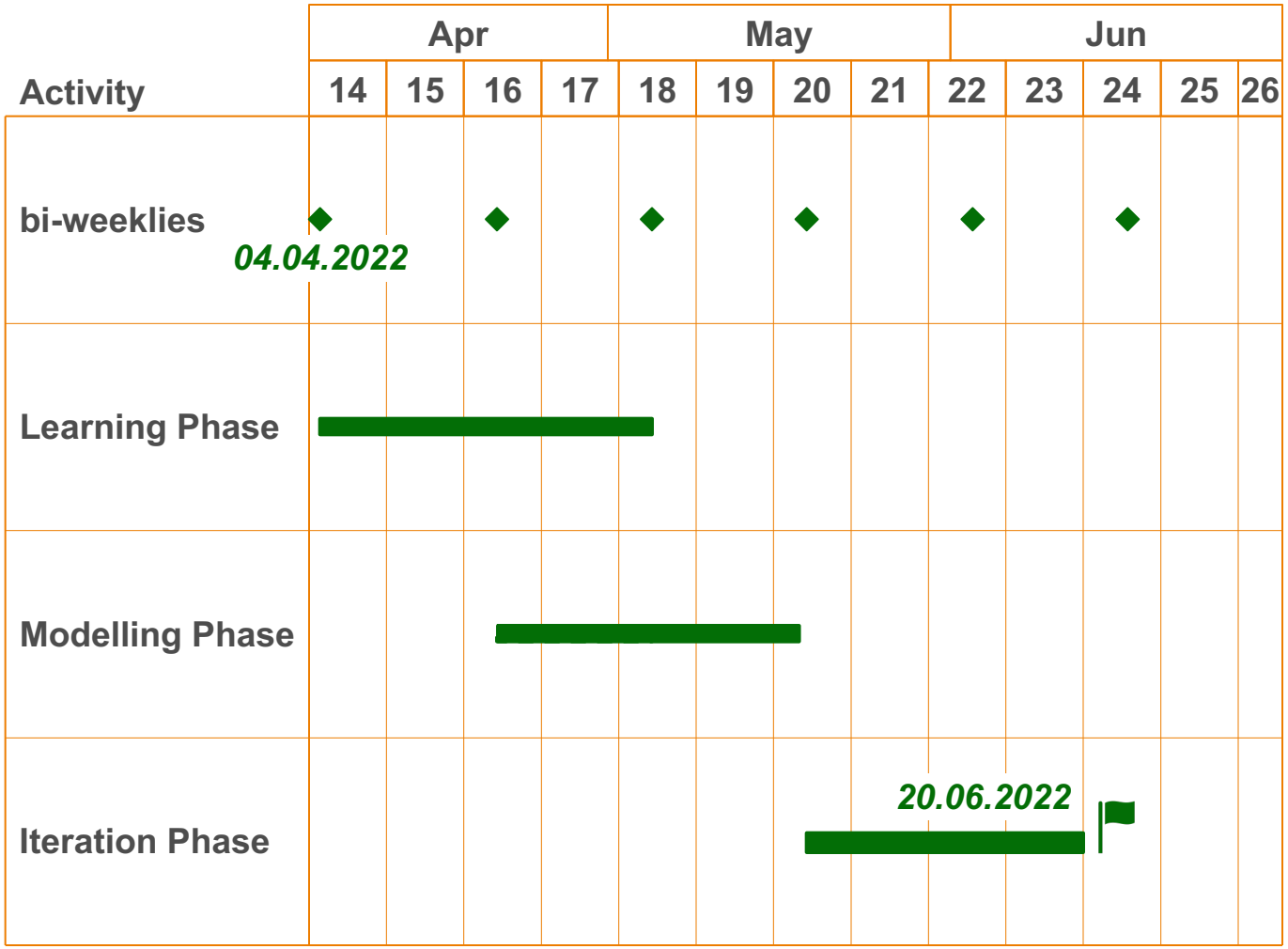
Progress: Completed

- ✓ Improved older models to narrow the gap and make our model more accurate
- ✓ Planned visualization and communication for our analysis

In the period of last few months, we interviewed and analysed the data by different brewers and retailers to create Die Bierothek Sustainability toolkit.

Finishing the iteration phase, we developed the sustainability toolkit and suggestions for customer communication

Project Plan



Scope per project phase

Discuss **progress and get feedback**
What are your expectations?

Interview partner companies
Conduct further **research**

Set up **initial scoring model**
And **go-to-market strategy**

Iterate the model,
involve further elements
into analysis

Meeting dates for the bi-weeklies need to be fixed

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Transport routes and the countries' recycling affinity influence whether glass bottles or aluminum cans are more sustainable

Glass Bottle vs. Aluminum Can Emissions

Main findings of debate

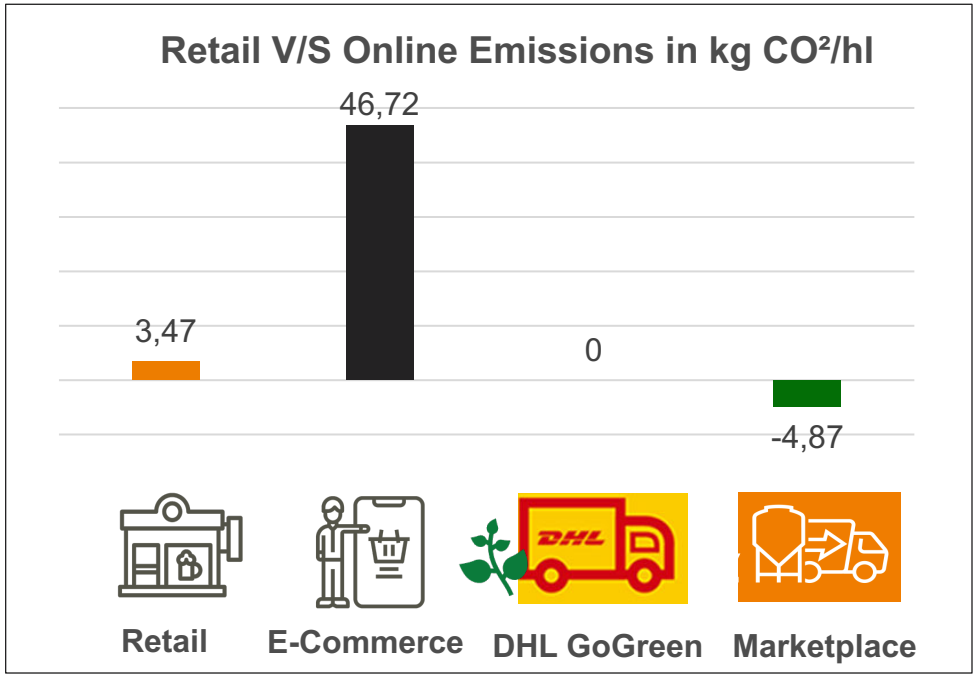
- ✓ Lower **production** emissions for glass bottles as can's bauxite refining requires heavy
- ✓ Lower **transport** emissions for cans as they are lighter and thus require less fuel
- ✓ **Recycling** depends on the country's affinity to recycle glass as aluminum recycling is more common

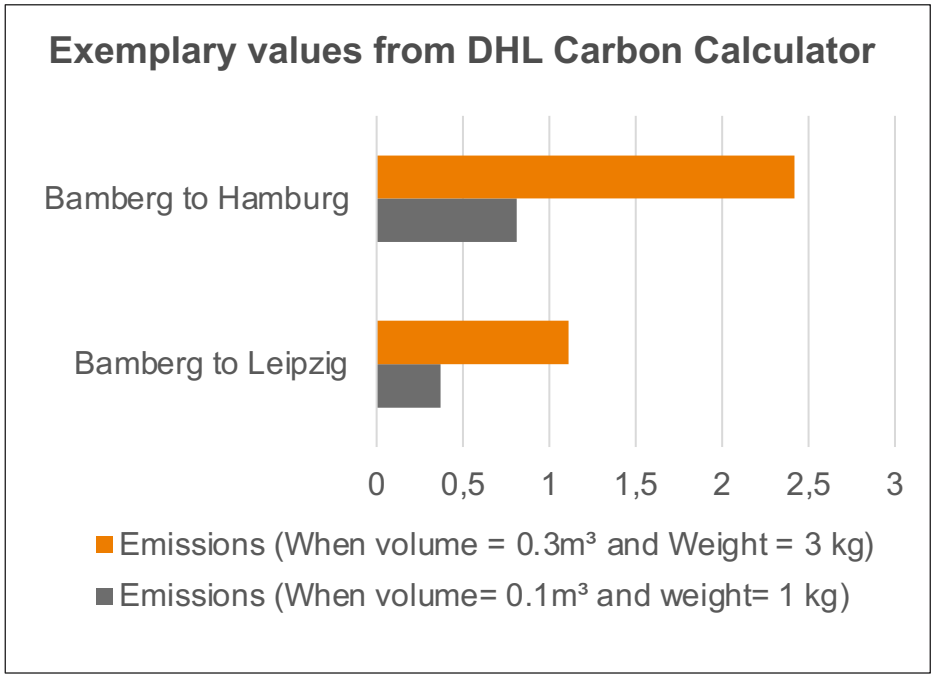
	Glass Bottle		Aluminum Can
Production	**0,69kg-1,25kg** CO^2 / kg Glass	<	**5,1kg-8,5kg** CO^2 / kg Aluminum
Transport	**195g – 345g** Weight per bottle	>	**13g – 15g** Weight per can
Recycling	**0%-100%** as countries vary in their recycling efforts for glass	~	**69%** as aluminum recycling is more standardized

Packaging emissions depend on **transport route** and the **country's recycling affinity**: Shorter transport routes favor glass bottles while countries that don't recycle favor the usage of cans

Based on DHL carbon calculations, standard online delivery seems to create 10x more carbon emissions than the offline sales model

Retail vs. Online Emissions





Taking the calculated emissions from the DHL calculator, **sending a 2,5 kg package of a 6-pack of beer** creates **more than 10x the emissions** than the offline transportation of large quantities to the Bierothek retail store. As Bierothek however only offers the **DHL climate-neutral delivery option**, these **emissions are offset. Through the marketplace**, the total beer-in-hand emissions could be **lowered by almost 5 kg/hl.**

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Averaging our 14 example breweries, the total beer-in-hand carbon footprint of a beer is 92.46 kg CO^2/hl

Detailed Value Chain Components

Average total beer-in-hand carbon footprint: 92.46 kg CO2/hl






Cultivation	Malt Production	Beer Production	Packaging	Distribution	Retail
17.73 kg CO2/hl (19%)	3.01 kg CO2/hl (3%)	7.03 kg CO2/hl (8%)	25.13 kg CO2/hl (27%)	36.08 kg CO2/hl (39%)	3.47 kg CO2/hl (4%)

Baseline Components for each stage

Cultivation	Malt Production	Beer Production	Packaging	Distribution	Retail
✓ Electricity usage in seeds preparation ✓ Diesel usage in planting ✓ Electricity usage in planting ✓ Chemical production ✓ Soil emissions	✓ Natural gas usage including an average of 25% renewable energy usage ✓ Electricity usage	✓ Electricity usage and % of renewable energy in electricity mix of the brewery ✓ Natural gas usage including a brewery-specific % of renewable energy usage	✓ Emissions during production of non-reusable glass ✓ Emissions during production of reusable glass ✓ Emissions during production of aluminium cans	✓ Transportation emissions from the cultivation location to the malt producer ✓ Transportation emissions from the malt producer to the brewery ✓ Transportation emissions from brewery to Bierothek	✓ Electricity consumption by retail store ✓ Transport from Bierothek to retail ✓ Transport from Bierothek to customer

the average is calculated from the results for all our 14 example breweries

Our calculation variables are affecting all lifecycle stages and include data on the energy mix, the beer type and distances

Brewery-specific variables in our calculation

Variable	Affected emission drivers and lifecycle stages	Default
Country of the brewery	LCS 2: CO^2 emissions from electricity usage during malt production LCS 3: CO^2 emissions from electricity usage within the brewery	**Germany**
Beer Type	LCS 1: All emission drivers LCS 2: All emission drivers LCS 5: CO^2-emissions from transporting barley from cultivation to malt production LCS 5: CO^2-emissions from transporting malt to the brewery	**Pils**
Packaging Type	LCS 4: Selection of correct emission driver LCS 5: Selection of correct emission factors LCS 6: Selection of correct emission factors	**Reusable 0.33l bottle**
% of renewable sources for thermal energy	LCS 3: CO^2-emissions from thermal energy usage within the brewery	**0%**
% of renewable sources for electricity	LCS 3: CO^2-emissions from electricity usage within the brewery	**0%**

Cont‘d on the next slide

Our calculation variables are concentrated in the lifecycle stages 2-5 and include data on the energy mix, the beer type and the distances

Brewery-specific variables in our calculation

Variable	Affected emission drivers and lifecycle stages	Default
Distance from brewery to Bierothek	LCS 5: CO^2-emissions for transporting beer from the brewery to the Bierothek	**0**
Location of the final customer	LCS 6: CO^2-emissions for transporting beer from the Bierothek to the retail store or the final customer	**Leipzig**
Distance from brewery to the location of the final customer	LCS 4: CO^2-emissions for returning the reusable 0,33l glass bottles to the brewery	**0**

We have developed an index with a **small set of variables**. However, these variables affect all lifecycle stages and can **easily be found out from an outside-in approach**.

The five big emission drivers in the cultivation are quite evenly matched with the emissions from vehicle fuel being the highest

Detailed Value Chain Components – LCS 1

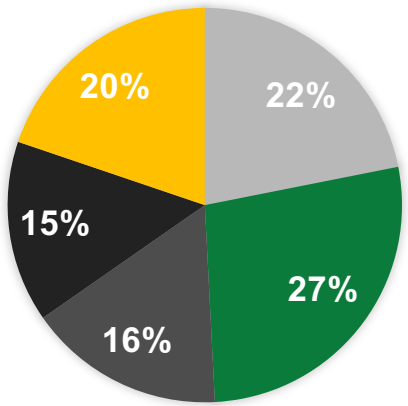
Average total CO^2 emissions from Cultivation: 17.73 kg CO2/hl

CO^2-emissions due to electricity usage in seeds preparation	CO^2-emissions due to diesel usage in planting	CO^2-emissions due to electricity in planting	CO^2-emissions due to chemical production	CO^2-emissions due to soil emission
3.88 kg CO2/hl	4.84 kg CO2/hl	2.86 kg CO2/hl	2.64 kg CO2/hl	3.51 kg CO2/hl

Assumptions

- ✓ The main emission drivers during the cultivation processes are fertilizer emission, agriculture, soil emission, and seeds preparation
- ✓ For large farming machinery, mainly diesel without biofuels added to it, is used to power the vehicles`
- ✓ The energy consumption related to seeds preparation are assumed as 100% electricity
- ✓ As a baseline, the farm takes 100% of their used electricity from the grid, without a focus on green energy.

EMISSIONS (KG CO2/HL)



The largest emission drivers in the cultivation of barley are the **emissions from diesel usage in farming vehicles and electricity usage emissions.** However, this lifecycle stage is the hardest to assess due to **high in transparencies of the exact origin** of used barley per brewery.

Divided into emissions from thermal energy use and electricity use, the malting process emits on average only 3.01kg CO^2/hl

Detailed Value Chain Components – LCS 2

Average total CO2 emissions from Malting: 3.01 kg CO2/hl

CO^2-emissions due to natural gas usage including an average of 25% renewable energy usage

2.25 kg CO2/hl

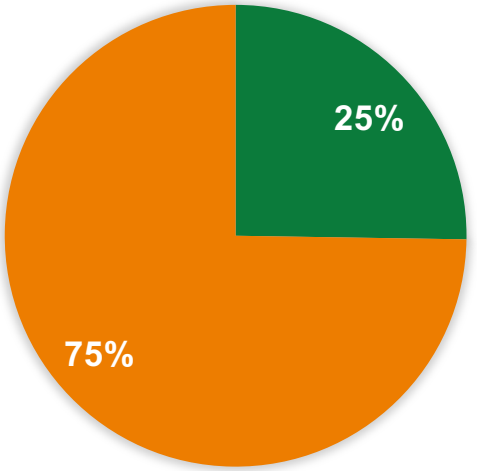
CO^2-emissions due to electricity usage

0.76 kg CO2/hl

Assumptions

- ✓ The main emission drivers during the malting processes are emissions from the usage of non-renewable electricity and thermal energy resources.
- ✓ The production mix of electricity within the entire country is used as the underlying factor in determining the emissions per kWh.
- ✓ Average values regarding the energy and electricity consumption within a malting plant are used.
- ✓ We have collected thermal energy source percentages from different companies (Boortmalt, Muntons, Viking Malt, etc) who altogether make up 16% of the total market.
- ✓ We assume that their average of using renewable resources for 25% of their thermal energy need is representative for the entire industry.

EMISSIONS (KG CO2/HL)



Overall, the emissions from malt production are quite low, whereby the **usage of thermal energy** from non-renewable resources represents **the biggest driver**.

Emissions from thermal energy sources play a larger role than the electricity emissions during the production of the beer

Detailed Value Chain Components – LCS 3

Average total CO2 emissions from Beer Production: 7.03 kg CO2/hl

CO^2-emissions from thermal energy usage within the brewery

4.59 kg CO2/hl

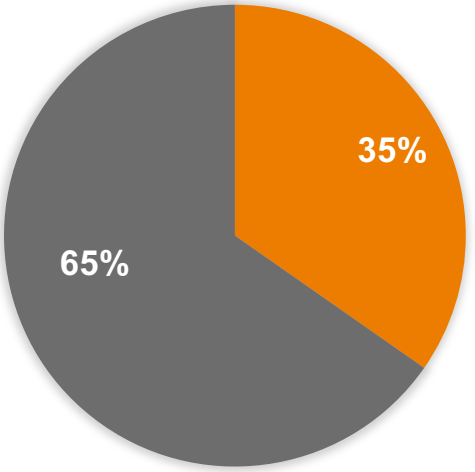
CO^2-emissions from electricity usage within the brewery

2.44 kg CO2/hl

Assumptions

- ✓ The main emission drivers during the brewing processes are emissions from the usage of non-renewable electricity and thermal energy resources.
- ✓ If there are no specific information given on usage percentages of renewable sources for thermal energy, we assume that 100% of the thermal energy demand is covered by natural gas.
- ✓ As a baseline, we assume that the brewery takes 100% of their used electricity from the grid, without a focus on green energy. Only if brewery-specific electricity mix percentages are given, we use these adjusted numbers.
- ✓ Average values regarding the energy and electricity consumption within a brewery are used.

EMISSIONS (KG CO2/HL)



On average **two-thirds of the emissions** during the brewing process come from the usage of **non-renewable resources for thermal energy.** Depending on the brewery however, this value can fluctuate

Reusing a glass bottle significantly lowers the emissions of packaging production in comparison to an aluminum can.

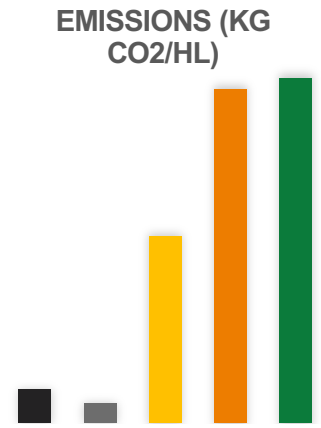
Detailed Value Chain Components – LCS 4

Average total CO^2 emissions from Packaging Production: 25.13 kg CO2/hl

CO^2 emissions for a reusable 0.33l glass bottle production including the trip rate	CO^2 emissions for a reusable 0.5l glass bottle production including the trip rate	CO^2 emissions for a 0.33l aluminum can	CO^2 emissions for a 0.33l non-reusable glass bottle	CO^2 emissions for a 0.5l non-reusable glass bottle
5.15 kg CO2/hl	3.06 kg CO2/hl	29,14 kg CO2/hl	52 kg CO2/hl	53.82 kg CO2/hl

Assumptions

- ✓ The main emission drivers in this lifecycle stage are the general emissions from the production of packaging materials
- ✓ For the purpose of this general baseline, existing emission factors will be used.
- ✓ Since these emission factors are recommended by the BIER, we assume them to be usable and representative for the real emissions per bottle (or can, …).
- ✓ We assume that a reusable glass bottle can be used on average 30 times during its life.
- ✓ Glass Bottles are assumed to have 52% recycled content.
- ✓ Aluminium cans are assumed to have 0% recycled content.
- ✓ Every glass bottle used by breweries within Germany is reusable. For glass bottles of beer from outside of Germany, we assumed that no reuse is possible.



Reusable Glass bottles have a significantly **lower carbon footprint than aluminum cans** or non-reusable glass bottles.

Due to the many international breweries, the average transport emissions from brewery to Bierothek overshadow other factors

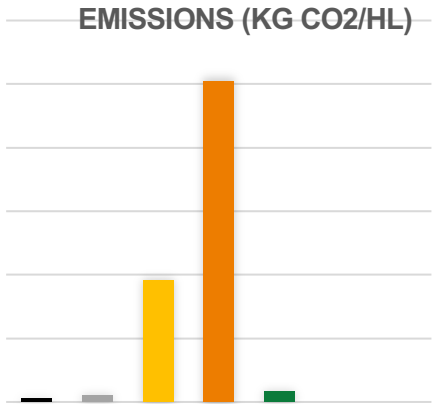
Detailed Value Chain Components – LCS 5

Average total CO^2 emissions from Distribution: 36.08 kg CO2/hl

CO^2-emissions for transporting barley from cultivation to malt production	CO^2-emissions for transporting malt from the malt producer to the brewery	CO^2-emissions for transporting beer from the brewery to the Bierothek in 0.33l cans	CO^2-emissions for transporting beer from the brewery to the Bierothek in 0.33l bottles	CO^2-emissions for transporting beer from the brewery to the Bierothek in 0.5l bottles*
0.51 kg CO2/hl	1.05 kg CO2/hl	19.06 kg CO2/hl	50.48 kg CO2/hl	1.64 kg CO2/hl

Assumptions

- ✓ The main emission drivers during the transportation processes are emissions from the vehicles using gasoline or other CO^2-emitting natural resources.
- ✓ All beers are transported from the brewery to the Bierothek via a medium-to heavy load tractor trailer who runs on diesel.or a usual container ship running on heavy fuel oil.
- ✓ The way from the brewery is estimated as the fastest possible transport route by road or by sea. If a sea carrier is involved then it is assumed that the ships will unload at Hamburg.
- ✓ Since often in beer production the location of barley cultivation and malt producing is unknown, we assume benchmark values from Boortmalt as representative for these transport emissions.
- ✓ Since often in beer production the location of malt production and its distance from the brewery, we assume benchmark values from Boortmalt as representative for these transport emissions.



Transporting beer from the brewery to Bierothek is a very large emission driver, whereby transport across the sea**, heavily increases the average** emission of a beer during the distribution stage.

* This value is so low, due to only German breweries selling in 0.5l bottles within the sample

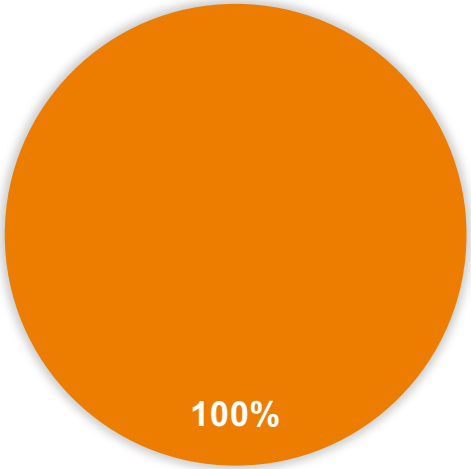
Transporting the beers in large quantities to the retail stores leads to comparatively low emissions in the offline retail model

Detailed Value Chain Components – LCS 6

Average total CO^2 emissions from Retail: 3.47 kg CO2/hl

Annual emissions from electricity in stores	CO^2-emissions per trip from Bierothek warehouse to retail store	CO^2-emissions for DHL shipment of standard sixpack package to customer in Leipzig
0 kg CO2/hl	3.47 kg CO2/hl	0 kg CO2/hl

EMISSIONS (KG CO2/HL)



Assumptions

- ✓ The main emission drivers during retail are the emissions from electricity used in the store, emissions from vehicles used for transport of beer from warehouse to retail stores and the emissions of direct DHL delivery to the customers
- ✓ Since Bierothek uses 100% green energy in its stores the emissions from electricity are 0.
- ✓ For comparison purposes, we hereby focused on the offline retail model
- ✓ Based on the statement of Christian Klemenz during the meeting on 11.05.22, that Bierothek retail stores get biweekly deliveries, we assume the number of trips from warehouse to the store to be 26 on average per year.
- ✓ The beers are transported in the amount of two pallets within a heavy duty truck.

For a better overall comparability of the results, we only **focused on the offline retail model**. A more detailed comparison between offline and online emissions will follow.

There are additional factors, which our model leaves out and which could be included at a later stage to minorly improve the accuracy

Future improvement possibilities

Lifecycle Stage	Recommendations for Improvements
Cultivation	Inclusion of other fuel and energy sources during cultivation
Malt production	Extend the data table with malt amounts per beer type with expert information
Beer production	Inclusion of purchased CO^2 needed for brewery operations
Packaging production	Inclusion of different can sizes
Distribution	Better modelling of barley and malt transports
Retail	Inclusion of emissions from used refrigerants

All the mentioned recommendations would be **incremental steps** to make the calculation **more realistic and accurate**. However, from our research we can say, that these improvements would be minor and would **not make a major difference** across breweries and across the value chain.

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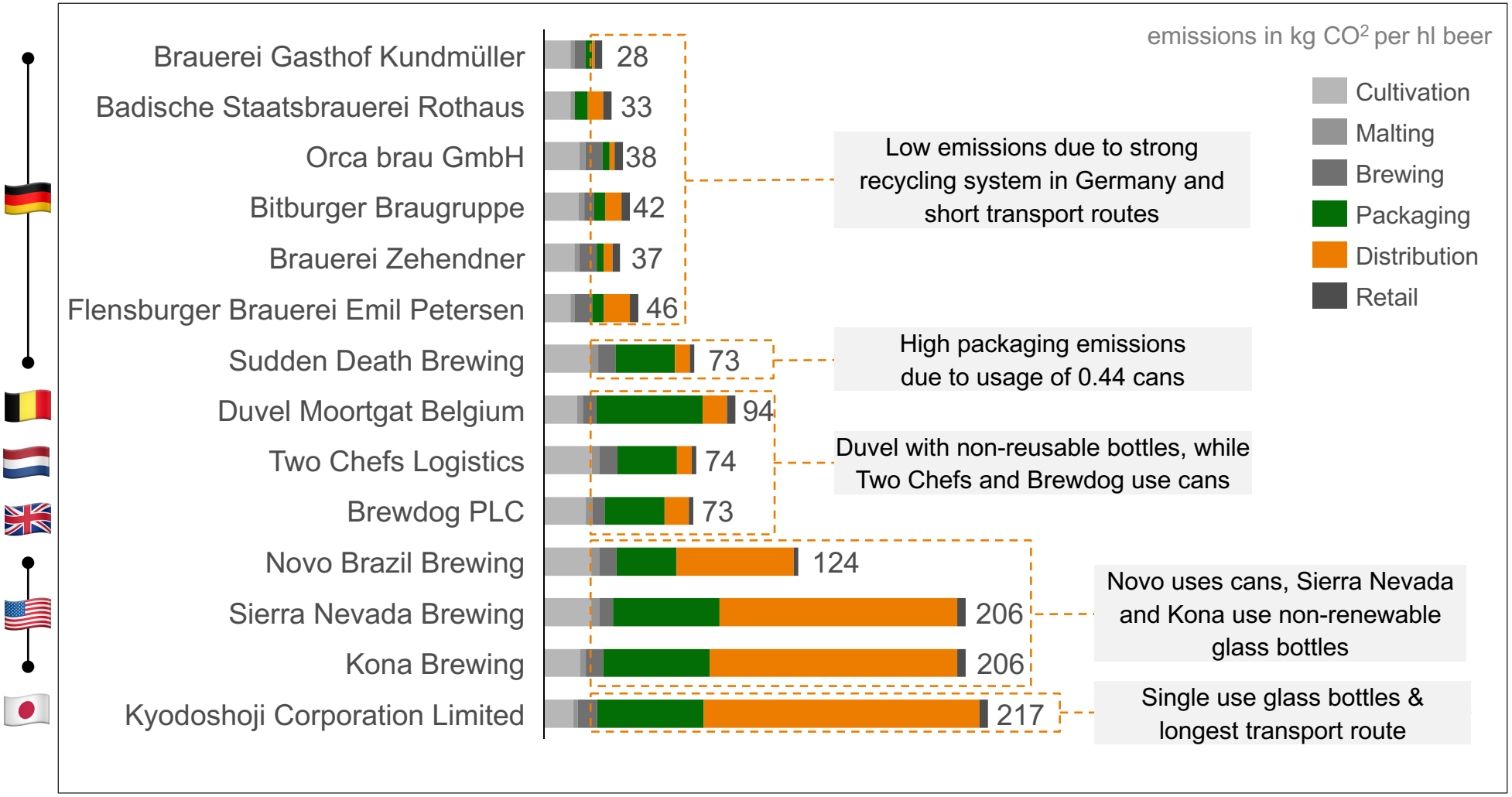
Major differences can be witnessed in the distribution and packaging segments while the initial steps (cultivation – brewing) are similar

Example Brewery Calculations



Rothaus without Brewing emissions as brewery focuses on 100% renewable energy and electricity

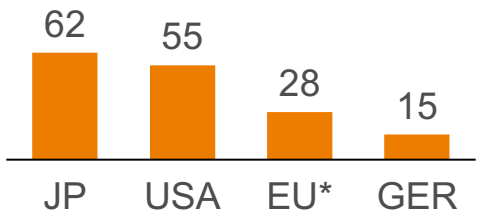
International beer emits high distribution emissions, yet packaging in cans helps to reduce emissions over non-reusable glass

Key Emissions in Example Calculations

Key Emission Drivers

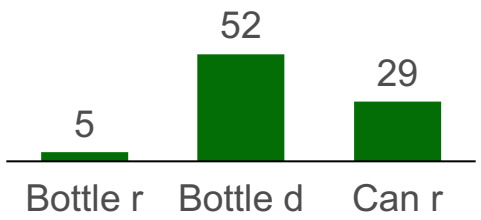
#1 Distance matters

share of **distribution** emissions in %



#2 Recycling matters

share of **packaging** emissions in %



Implications

Distribution as biggest differentiator for breweries
as international transport results in high fuel consumption

No incentive in buying international beers possible
as higher transport emissions are considered in sustainability index

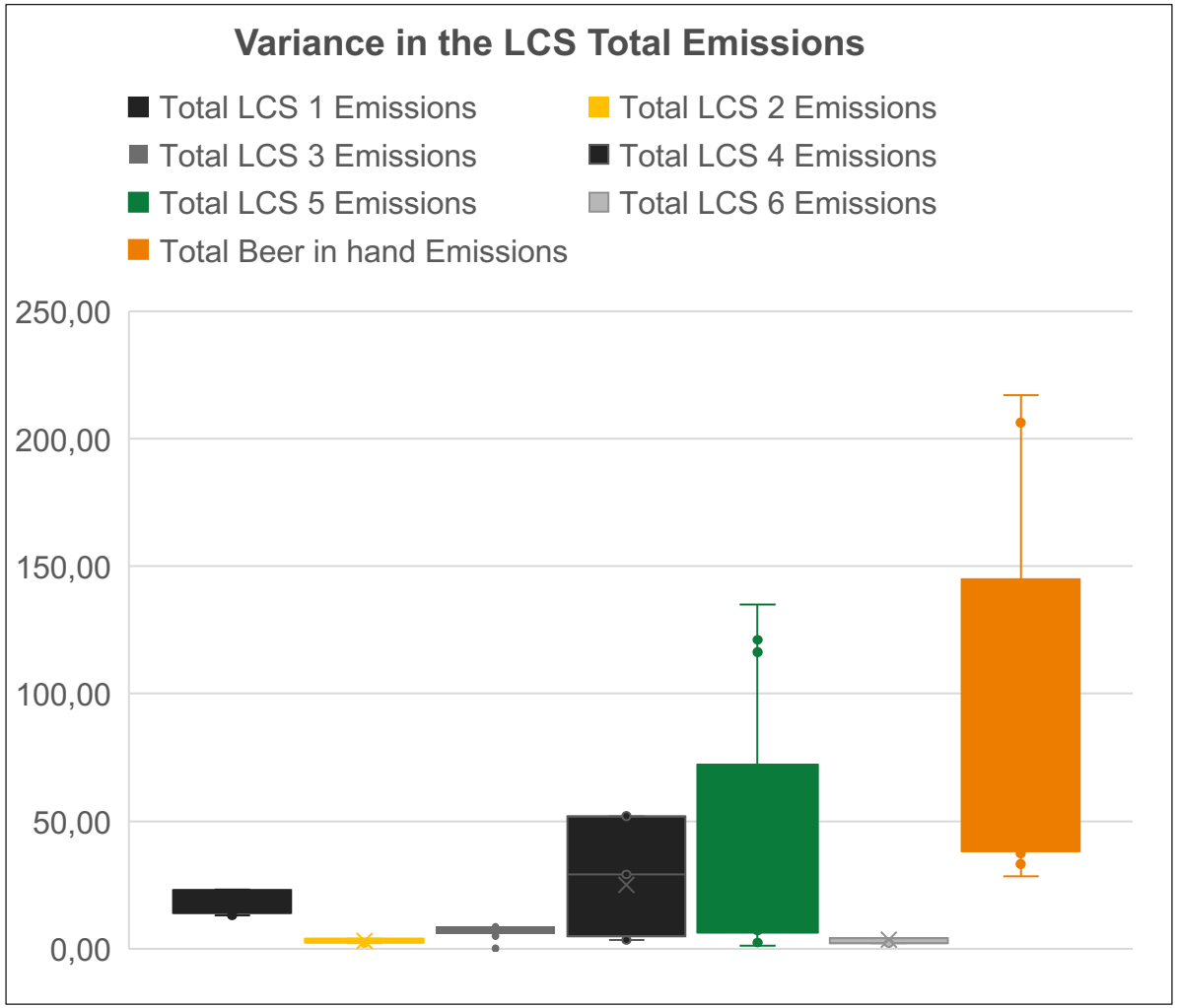
Glass bottles are beneficial on a national level
as glass bottles are cheaper in production but depend on a well-established recycling system

Cans emit less while travelling the globe
are lighter and thus need less fuel; they can more easily (but only partially) be recycled

r = recycled; d = disposed // EU = Europe as continent (UK included)

Especially in the stages of packaging and distribution the variance of our results is very high and influences the total variance

Variance in Example Calculation



Implications

✓ **Highest variance in the distribution stage**

Due to the **strongly varying distances** between breweries and Bierothek, the emission variance in this stage is very high and **highly influences the total variance**

✓ **Medium variance in cultivation:**

The different values in this lifecycle stage are based on the **different malt inputs per beer** and its effects on the amount of barley needed per hektoliter

✓ **Energy mix variations rather insignificant**

Variations in the energy mix influence the total emissions not as much, as we expected them to do.

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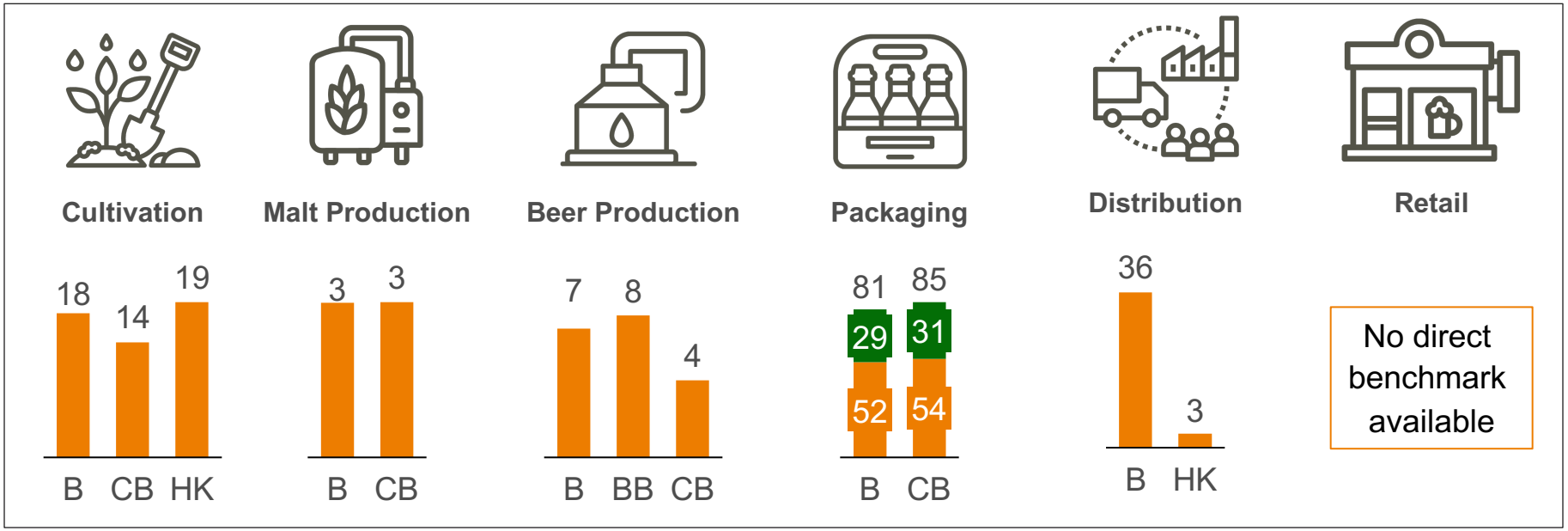
Reviewing the current calculation model, one can see similar emission values between the calculation and industry benchmarks

Benchmark

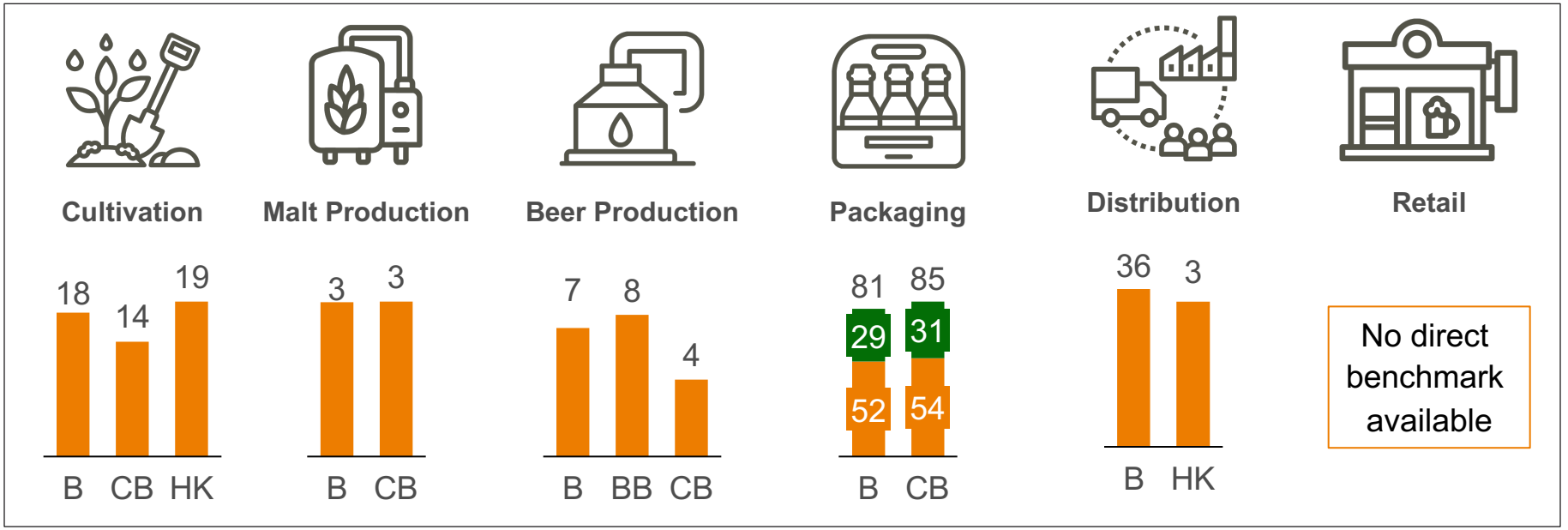


The Calculation Toolkit for Die Bierothek (B) is in line with external benchmarks from companies such as Heineken (HK), Carlsberg (CB) and Bitburger (BB).

Can
Bottle (non-recyclable)

Reviewing the current calculation model, one can see similar emission values between the calculation and industry benchmarks

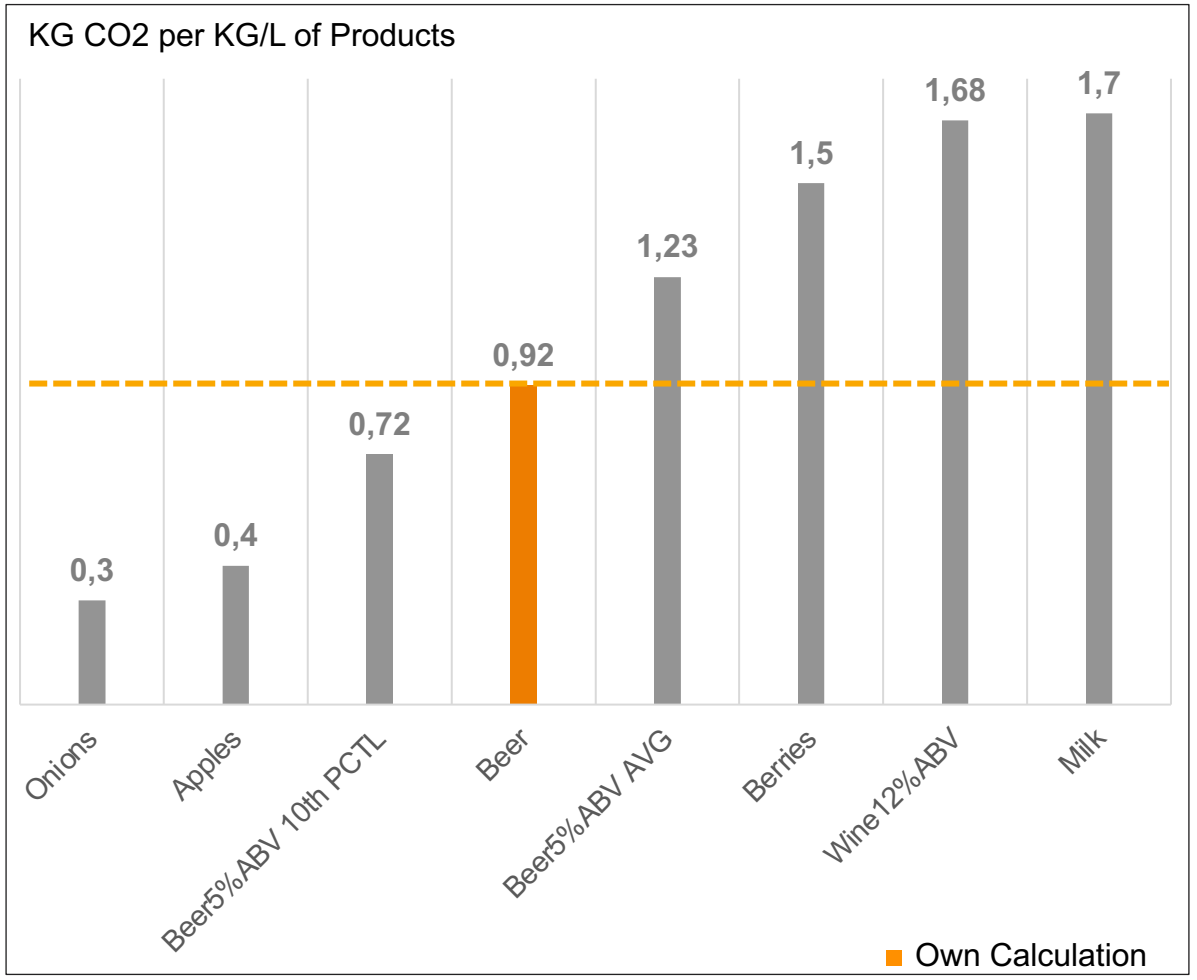
Benchmark



The Calculation Toolkit for Die Bierothek (B) is in line with external benchmarks from companies such as Heineken (HK), Carlsberg (CB) and Bitburger (BB).

The CO2 emission result demonstrates a great potential of sustainability through our calculation compared to other products

Emission comparison with other consumer products



Implications

✓ **We put sustainability into calculation**

Sustainability such as recycling leads to reductions in carbon emissions.

✓ **Comparison with beer industry:**

Our result looks reasonable as performing between the 10th percentile and average score for the beer brewery. But there are differences and in transparencies as we don't know how they exactly calculated the values and what falls into the category.

✓ **Comparison with other industries**

It is relatively easy to reduce carbon emissions depending on the nature of the beer and the complexity of the process.

Sources: Poore & Nemecek (2019)

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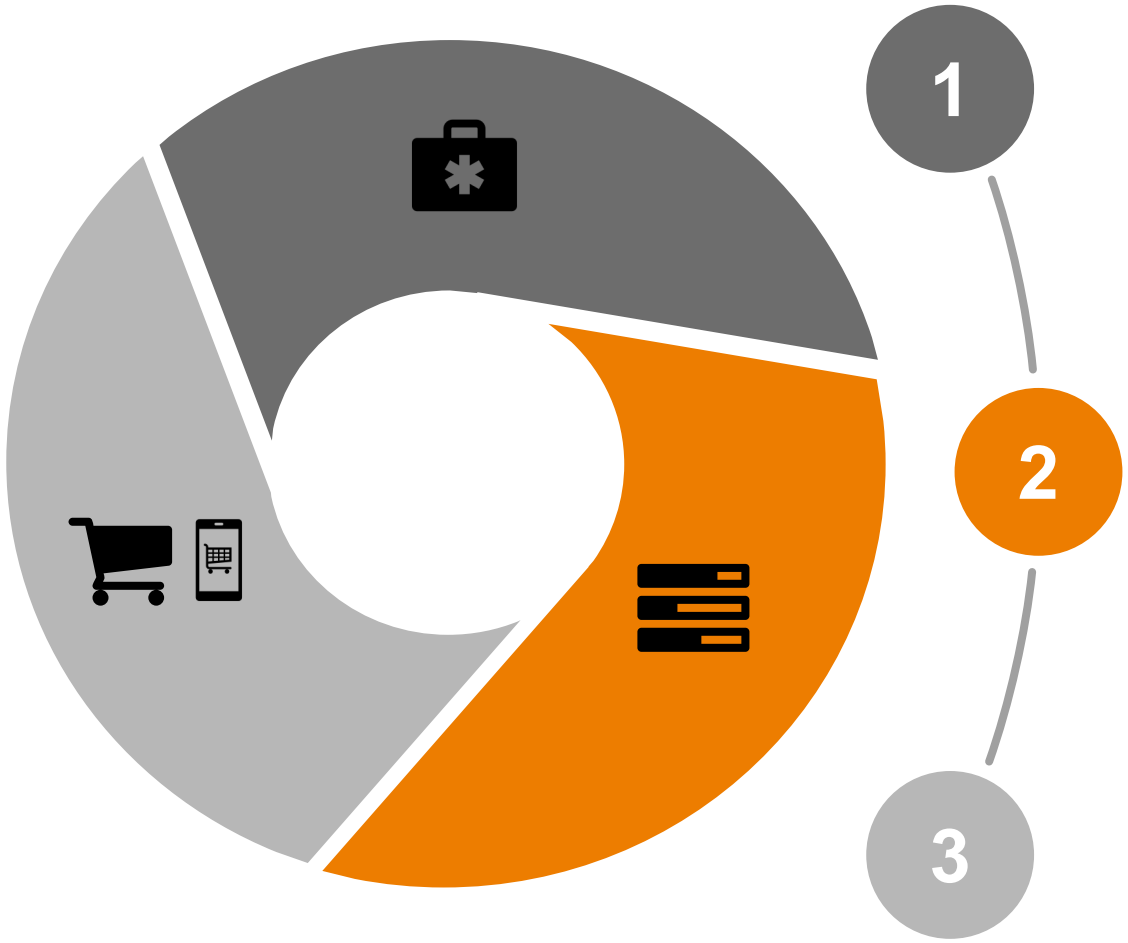
6 **Implementation Suggestions**

Communication of our toolkit and results to the stakeholders can take place in many ways

Methods we are considering to communicate



Tool Kit

We will be using our toolkit not just for ourselves but also inviting other industry players to contribute to the same

Scoring beers and comparison study

Using our scoring method to rate all beers and also our comparison study with the chocolate or egg as well as our competitors

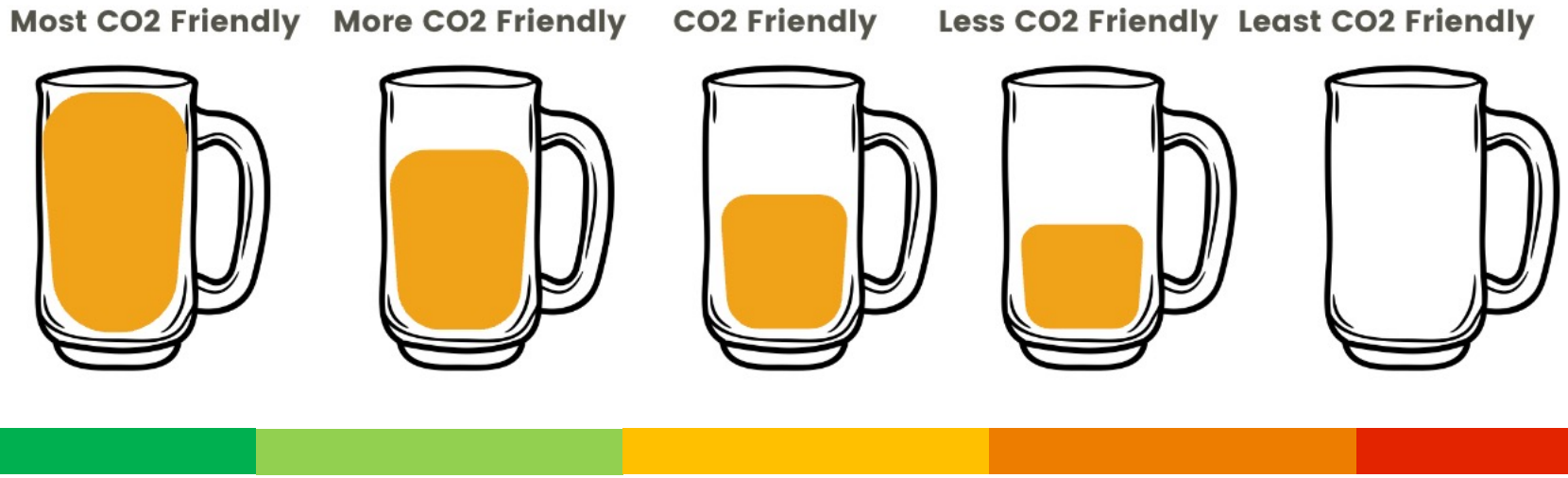
User Journey

Designing a blue-print for Bierothek customers to make them aware of our sustainability initiative on the go.

Idea #1: We propose beers mugs representing CO2 friendliness of our beers

Way of communicating beer-in-hand emissions to the consumer

Die Bierothek Sustainability Index

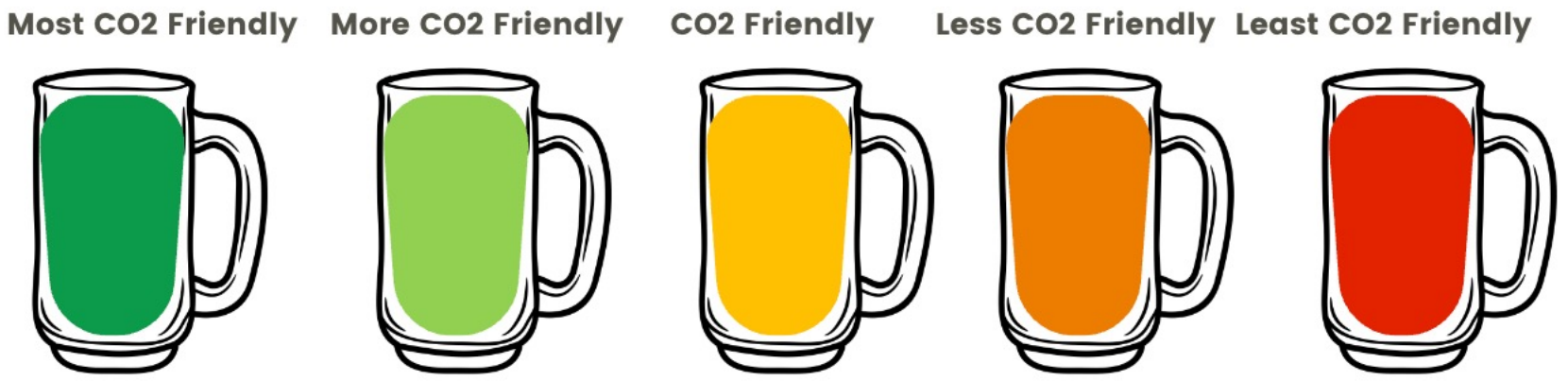


Showing our beer CO2 friendliness with the amount of beer in the beer mugs can be easy to understand and also go with our product. With the maximum being most to minimum as least, we do not rate any beer 5 or 0 but draw a comparison with each other.

Idea #2: We propose beers mugs representing CO2 friendliness of our beers

Way of communicating beer-in-hand emissions to the consumer

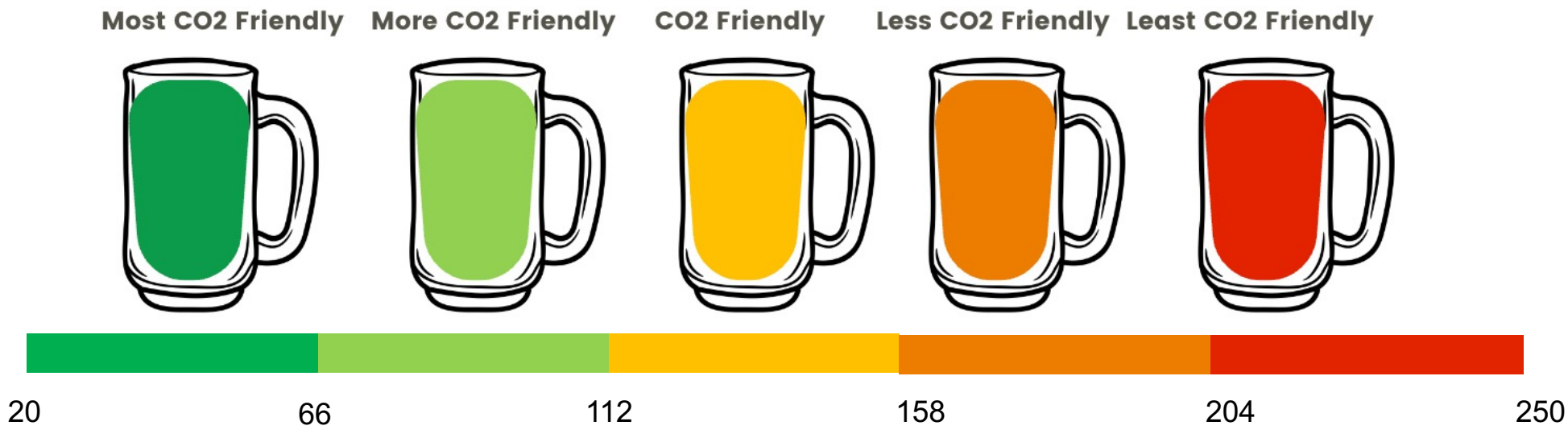
Die Bierothek Sustainability Index



Showing our beer CO2 friendliness with the colored beer can also be another way to represent sustainability and is easy to understand and go with our product.

The intervals with which we can categorize our example breweries are determined by our assumed minimum and maximum results

Die Bierothek Sustainability Index – Category Intervals



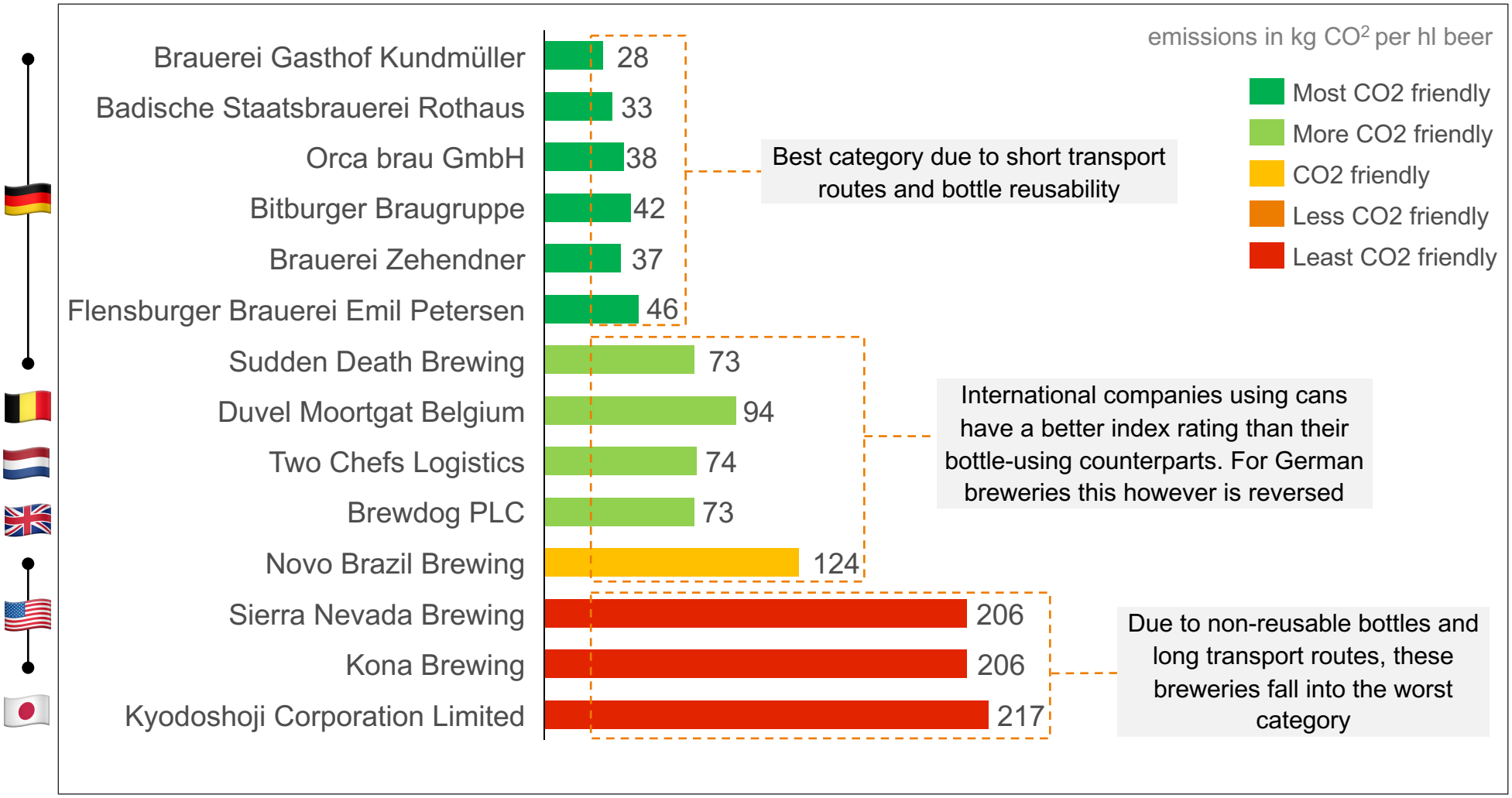
With a minimization of transport routes, we assume the minimum possible value for our model is:
~ 20 kg CO^2/hl

Based on the Japanese brewery result, we assume a maximum possible value of our model of:
~ 250 kg CO^2/hl

To illustrate the Bierothek Sustainability Index, we decided to order the results of our example breweries into the 5 different categories.
All categories have the same interval length and are determined by the minimum and maximum values we assume for our model.

Due to the varying CO^2-footprint, most German breweries fall into the best category while international ones are ranked low

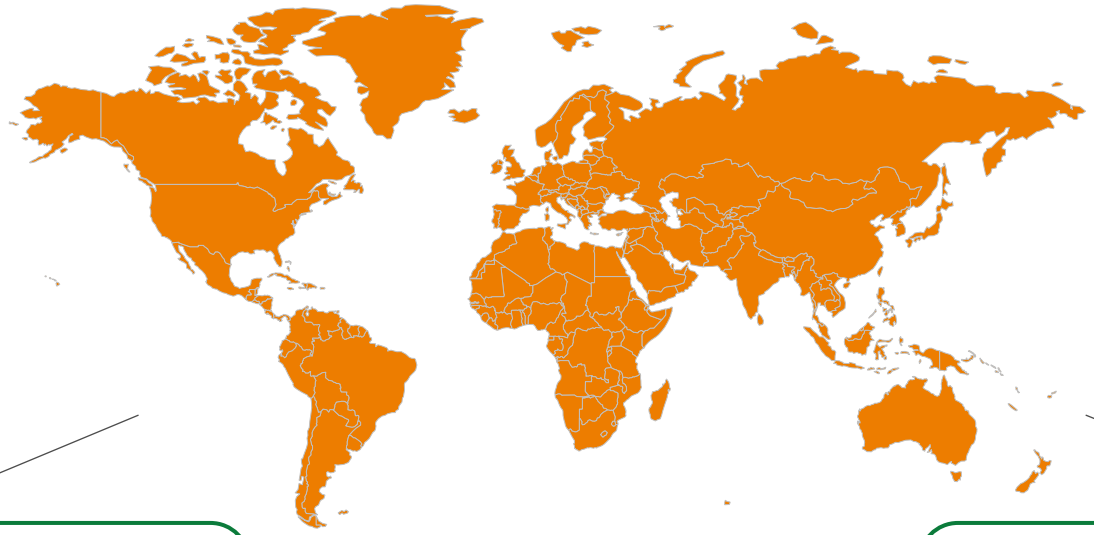
Example Brewery Calculations



Idea #3 To include international beers and benchmark them accordingly, we can try different ideas

Benchmarking International Beers

Creating Clusters
Making clusters based on the regions and benchmarking beers based on clusters



Ranking only CO2 friendly beers
Try excluding higher emissions beers and awarding scores to beers with low CO2 emissions

Launch and Expand
Launch first in Germany, get more industry and expert reviews and then expand to benchmarking

Idea #4: Different touchpoints can be created in online user journey to promote sustainability efforts

User journey for online customers

Incoming Traffic → **Website** → **Follow-Up***

Online

The online ecosystem can have various touchpoints

- SEA and SEO campaigns (keywords that link Bierothek with "sustainable beer"
- Influencer/Affiliates that are thought leaders in the beer industry
- Our website with different color coding to show a sustainable ecosystem
- And our billing can promote offsetting CO2

Website

Landing Page
Own **landing page for sustainability** efforts

Product Info
Rank beers according to **CO^2 footprint**

Toolkit Page
Show **calculation** and further **details** (e.g. assumptions & sample calculation)

Shopping Basket
Show **Offsetting Options** and emissions per beer as a "**bill**"

Checkout Summary
Show **saved emissions** for online purchase & **Full sustainability report**

Follow-Up*

Email Marketing

"Sustainability in brewing" **newsletter** (e.g. highlight current trends in reducing emissions)

Send **full sustainability report** based on previous purchases + **suggestion** for sustainable beers

Loyalty Incentives

Emission tracker card (collect reduced emissions from buying sustainable beer) and get sustainable beer for free if emission milestone** is reached

App in future for calculating CO2 footprint on purchase

Focus on next pages

*if permission is granted
**milestone is based on difference between emissions of purchased beer and average emissions per beer

Idea #4: Different touchpoints can be created in retail user journey to promote sustainability efforts

User journey for retail customers

Incoming Traffic → **Retail Store** → **Follow-Up***

Offline

Offline tools can include:

- Promote toolkit and sustainability efforts at industry fairs/events
- Cooperate with industry magazines for toolkit promotion
- Include carbon offsetting in our billing system
- Color coding our beers with different colors to show the eco-friendliness of the beers

Visiting the Store

Idea: Have **dedicated section** with sustainable beer in store

Showcase **index directly on the shelves** and have a **flyer for the full report** (+ sample calculation and assumptions) available

Sales Support

Educate staff on main emission drivers in beer

Integrate sustainability impact of beers in **sales conversations** (if customer is interested)

Purchase

Hand out **flyer explaining index** for beer in general

Offer **detailed report** for purchased beer as email, **offsetting options** for purchase and access to **sustainability reports**

Retail Marketing

Having sustainability brochure including all beers and their category

Organize store beers according to sustainability friendliness

Loyalty Incentives

Emission tracker card (collect reduced emissions from buying sustainable beer) and get sustainable beer for free if emission milestone** is reached

Offsetting option after billing, giving seeds to consumers

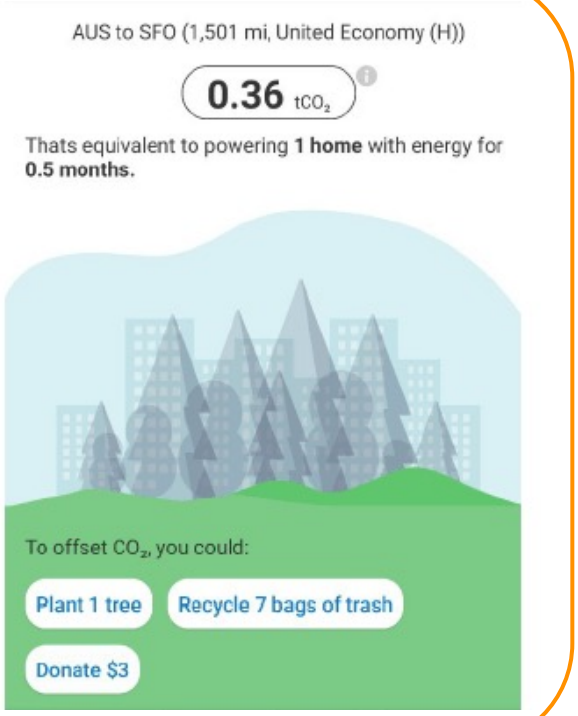
Focus on next pages

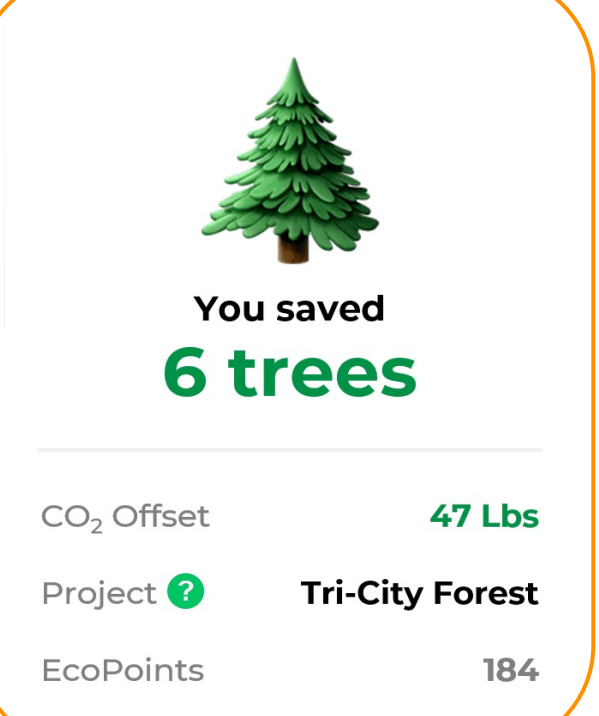
*if permission is granted

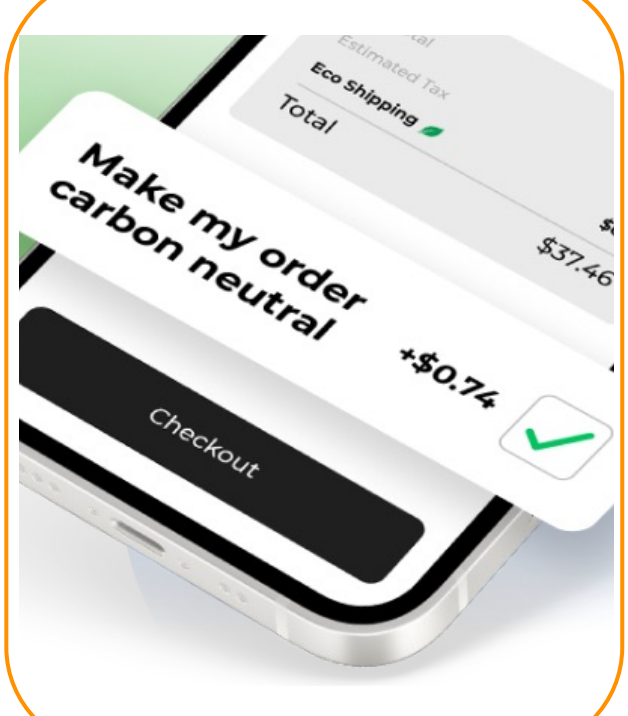
**milestone is based on difference between emissions of purchased beer and average emissions per beer

Some examples for online billing and marketing for offsetting emissions in checkout basket online

Promotion Ideas







We can tie up with different projects all around the world and use it in our app or billing system/login infrastructure where people can choose how to offset their emissions.

Some examples for email marketing and graphics for promoting sustainability

Promotion Ideas

As we already are aware recycling a glass bottle can reduce our CO2 emissions, we can always promote different ways of recycling and also showcase particular brand which uses maybe 100% solar energy or green fiber bottle separately.

Setting sustainability branding for future and giving labels to brands to communicate different sustainability

Promotion Ideas

If this label is present, the brewery that produces this beer has actively engaged in **water conservation practices** (like investing in automated cleaning systems to reduce water use).

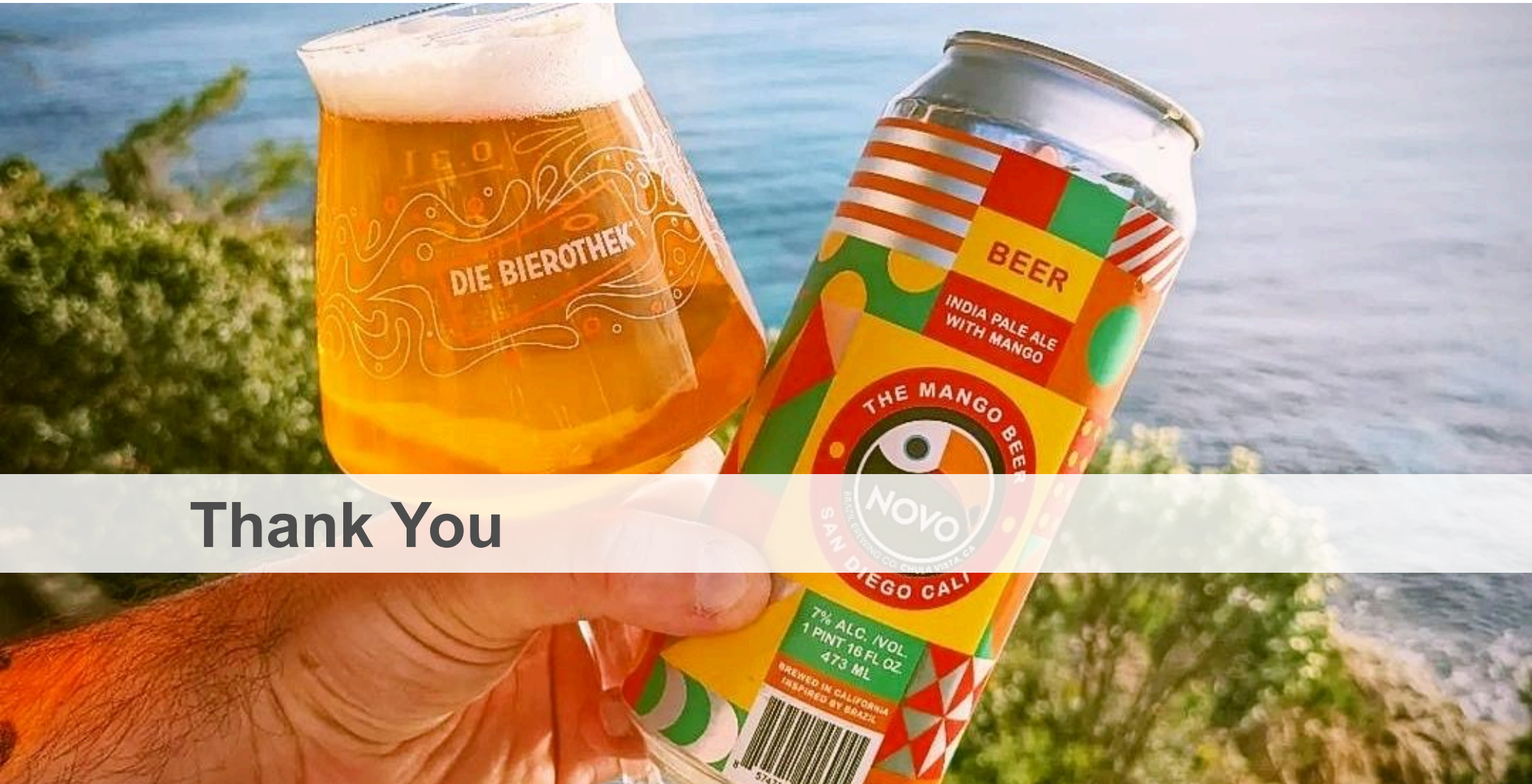
If this label is present, the brewery that produces this beer has actively engaged in **energy use reduction practices** (like investing in solar panels at the brewery).

If this label is present, the brewery that produces this beer has actively engaged in **landfill diversion practices** (like investing in recycling programs).

Lastly, having different symbols to represent CO2 friendliness or sustainability efforts by different brewers across the world. We can also integrate SDG goals which are more known to showcase our various efforts which meets different SDG Goals

HHL LEIPZIG GRADUATE SCHOOL OF MANAGEMENT

DIE BIEROTHEK®



Thank You

We bring a variety of backgrounds and working experiences into the project that help us to think about the global beer market / value chain

The project team

Zichao Li

B.Sc. Hospitality Management at TJCU China

Human Resource

Westmalle

Kiran

Bachelors in Commerce at Lucknow University

Marketing (Traditional & Online)

Hoegaarden, Looking for a new favorite

Adrian Slowik

B.A. International Management at HTWK Leipzig

Digital Tools & Processes

Störtebeker Bernsteinweizen

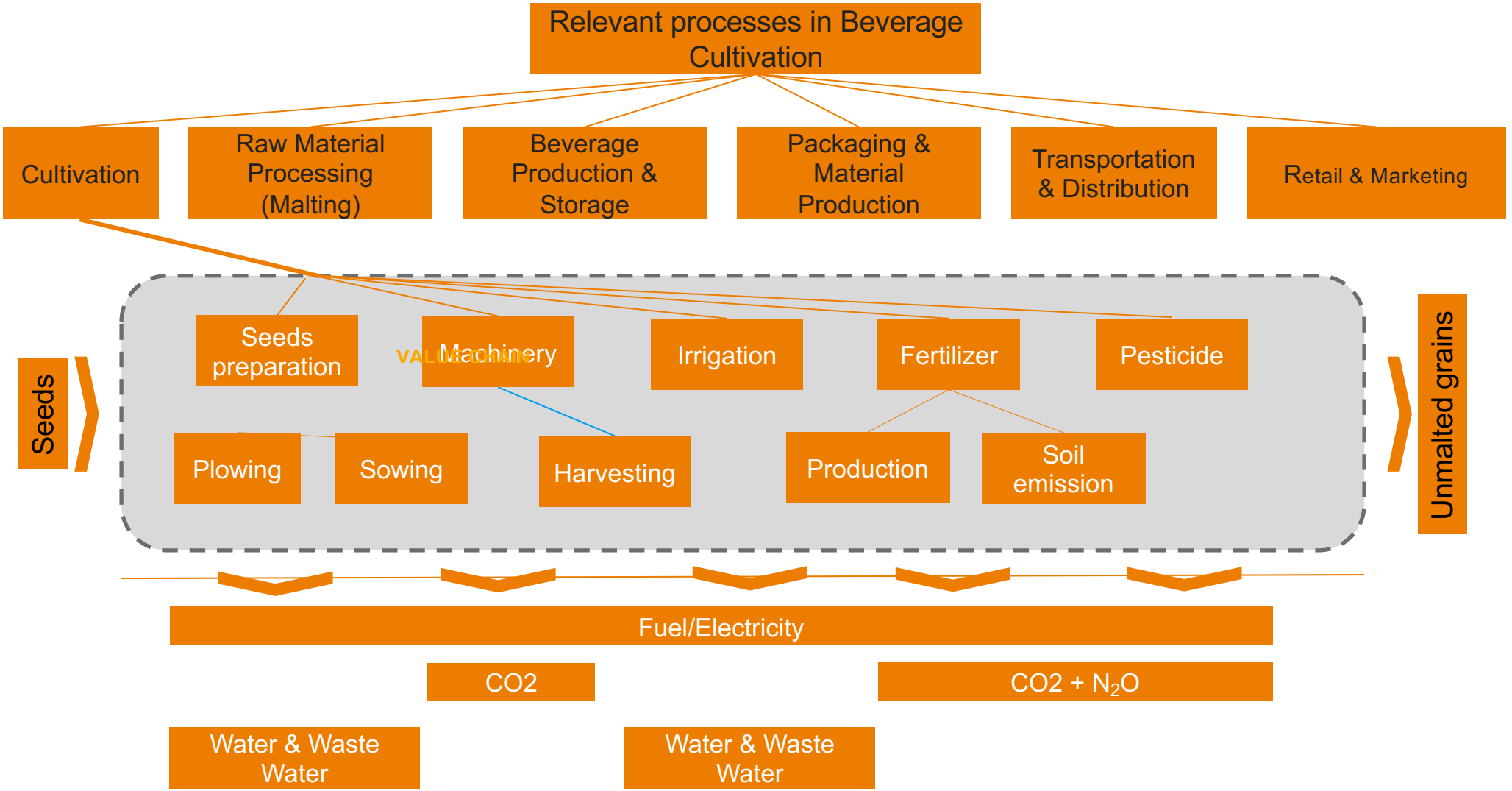
Marvin Blome

B.Sc. International Management at ISM Hamburg

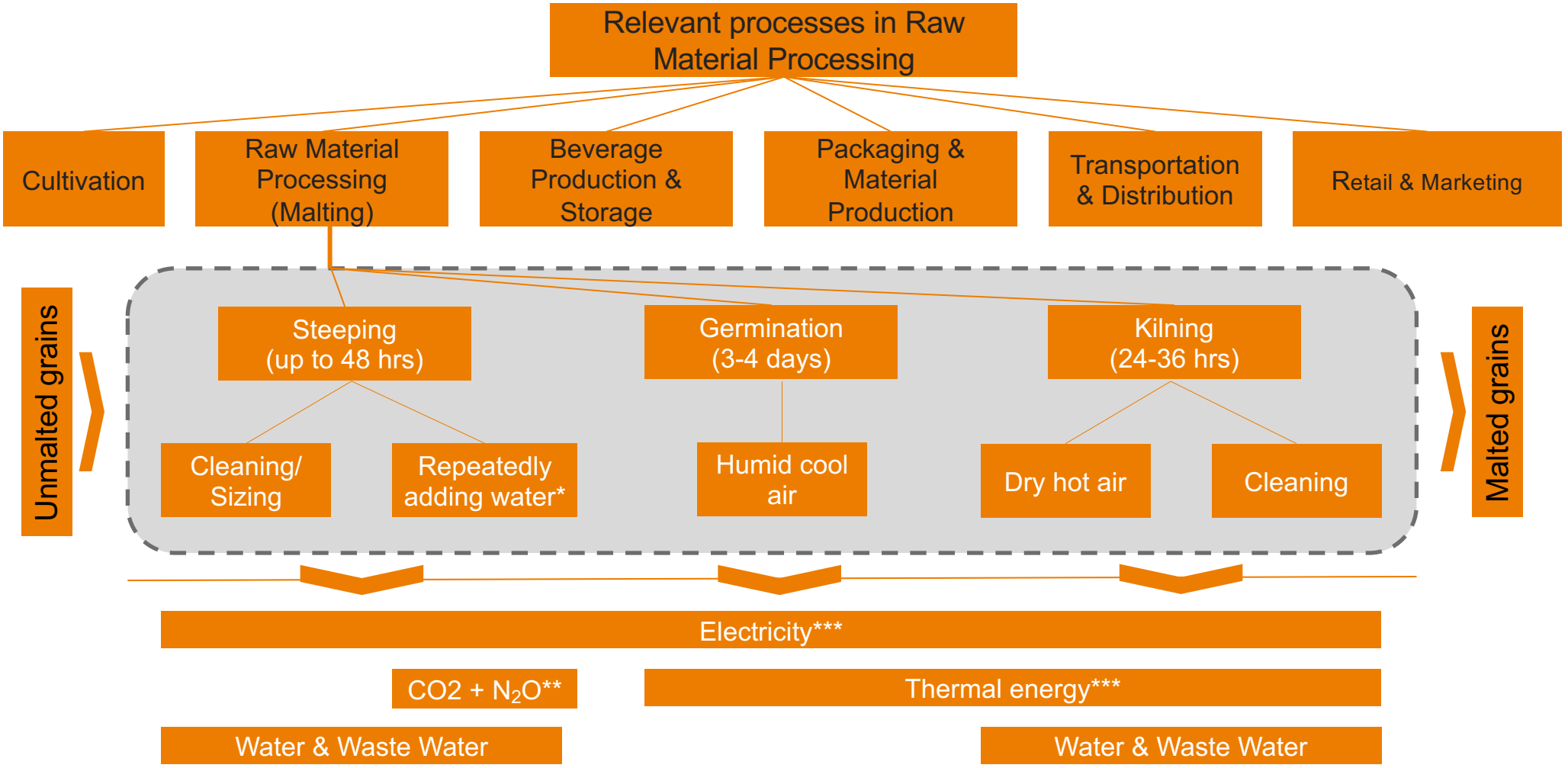
Marketing & Sales

Regional: Herforder
Overall: Tannenzäpfle, Hacker-Pschorr, Leffe

The main emissions during cultivation come from the machine fuel, electricity consumption and fertilizer usage

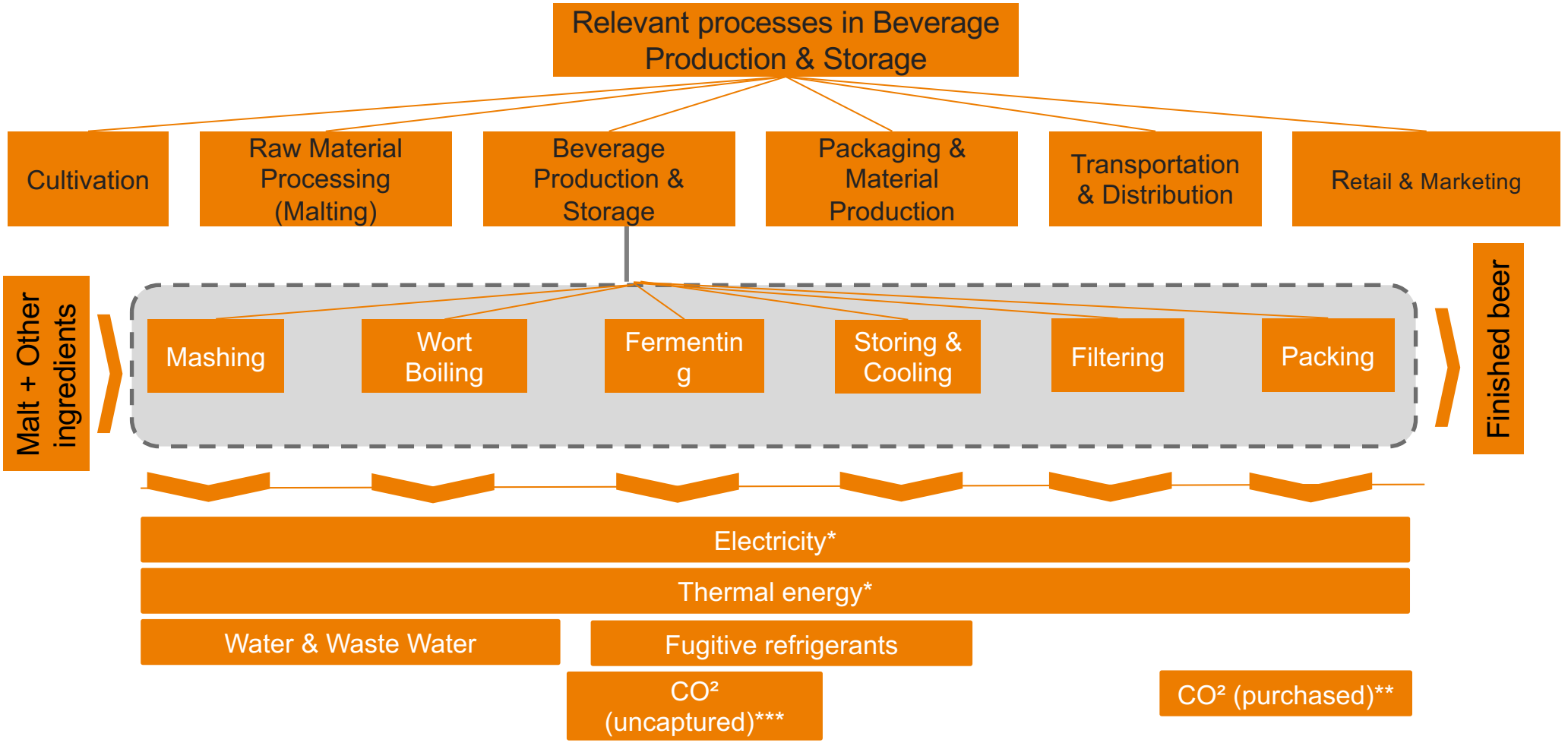


The main emissions during malting come from the electricity and thermal energy needed during production



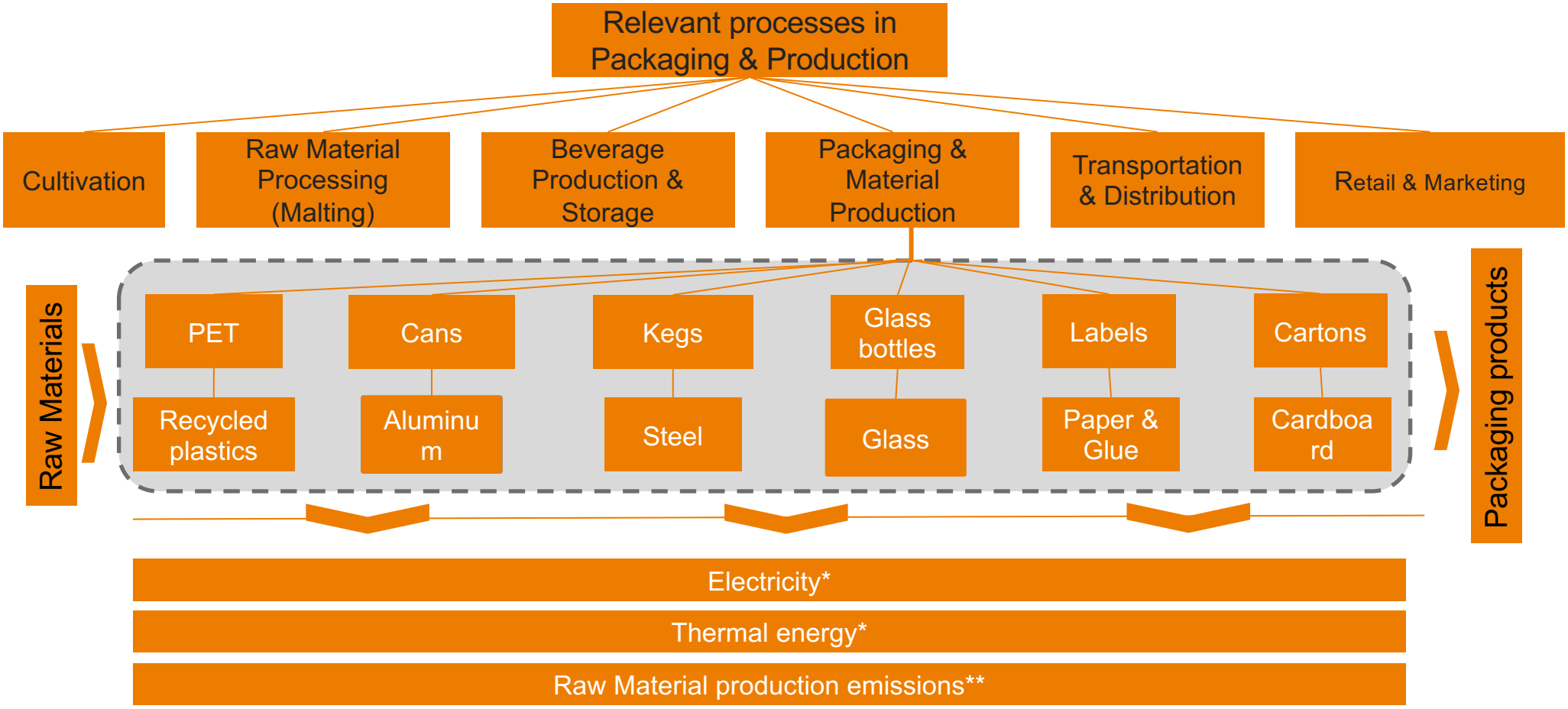
*steeping consists of dry and wet periods
**CO2 during dry periods in steeping, N_2O during wet periods in steeping
***Electricity and thermal energy from Natural Gas, Coal and Oil

The main emissions during brewing operations come from the electricity and thermal energy needed during production



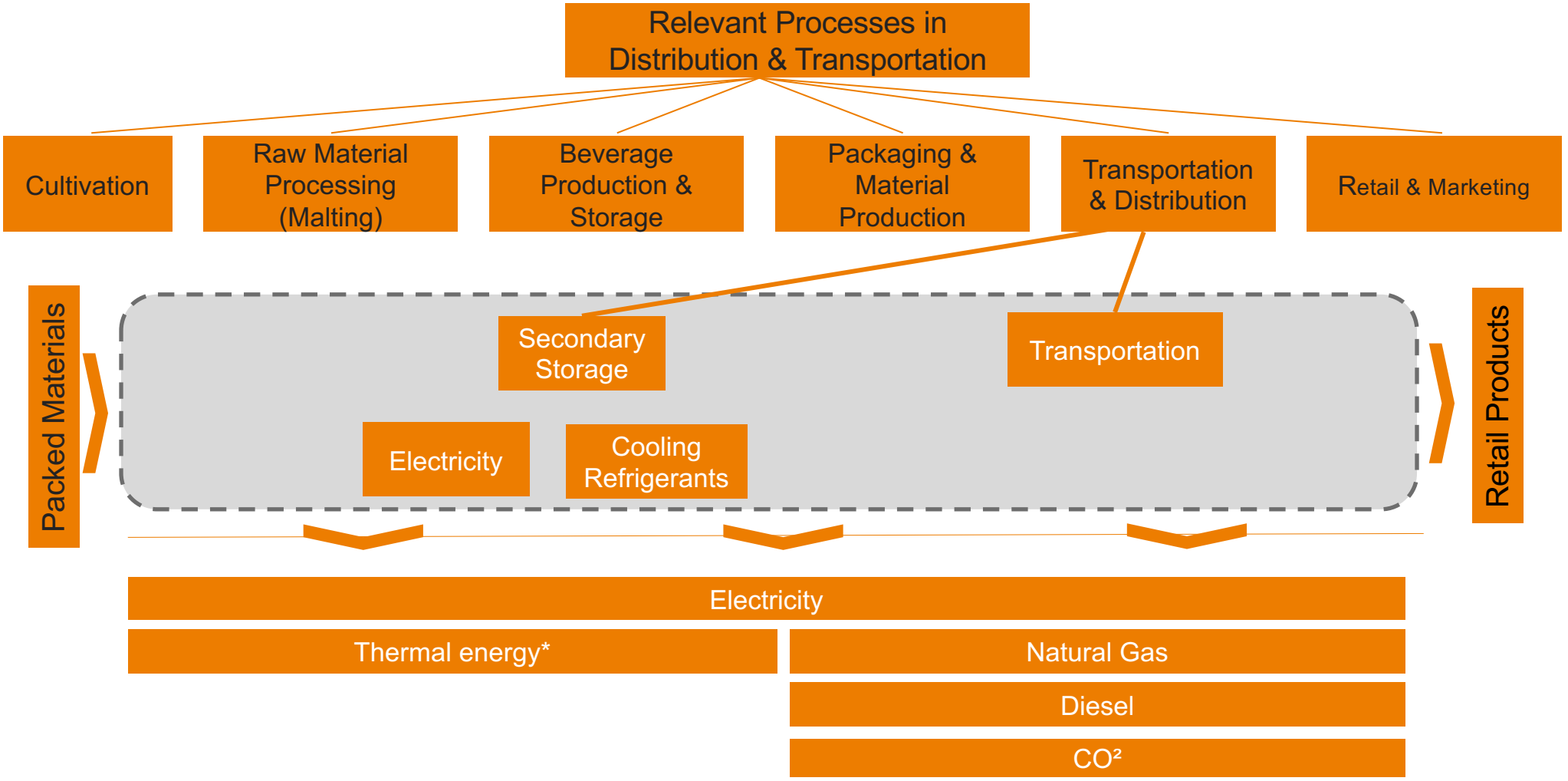
*Electricity and thermal energy from Natural Gas, Coal and Oil
** Quantity of additional purchased CO^2 for usage within the production process
*** Quantity of uncaptured CO^2 during the fermentation process

The main emissions during packaging production come from the emissions of raw materials and electricity used during production

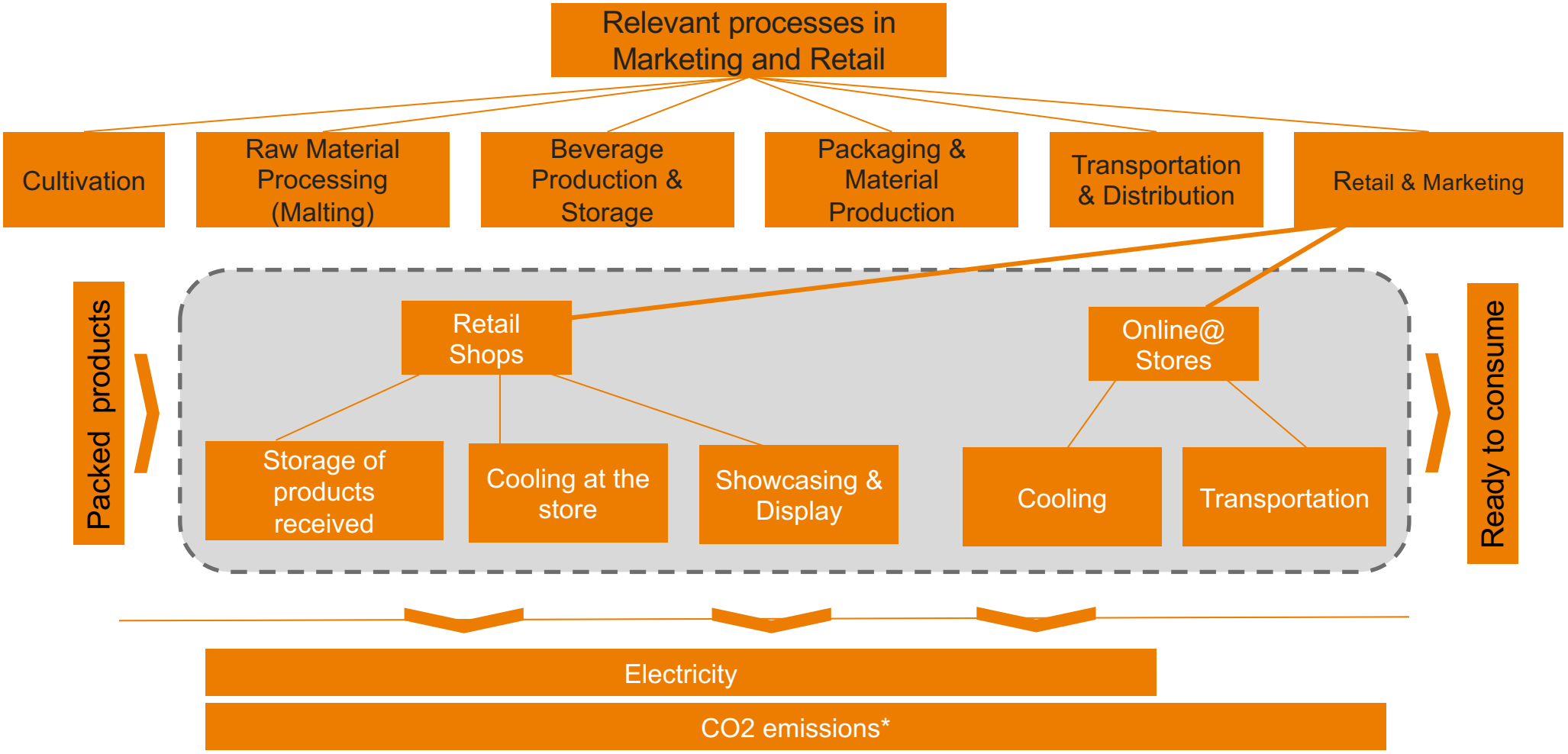


*Electricity and thermal energy from Natural Gas, Coal and Oil
** Production mix between fossil and recycled ingredients needs to be determined

The main emissions during distribution come from the fuel of transport vehicles and electricity needed in warehouses



The main emissions during retail come from the electricity needed for product cooling



From Christian Temme, we gained valuable infos and referrals regarding the sustainability challenges in malting and cultivation

Most important points from Christian Temme

		General Insights	Referrals	Limitations & Difficulties
Cultivation	Barley/ Wheat	Fertilizer: regenerate / emission Usable barley restricted in sugar content Use of leftover wheat	SAI platform Farm Sustainability Assessment (Membership or consulting fees)	Leftover use makes it difficult to delineate wheat CO2 footprint
Cultivation	Hops	Growers' number decreased Monopoly in supply High water consumption	Hopfenring Sustainability Annual Report	Creditability of reports Breweries seldom know the origin
Malting		Malting barley is a commodity Data during this process is untransparent Outsourcing by breweries is common from many countries	SGS Fresenius: Barley water consumption in general & modeling Malting Bund – Deutscher Mälzerbund	Limited amounts of traders and they avoid giving out information
Brewing		Regional products potentially have a higher accessibility of data	Brauerei Zoetler: example for reduced energy consumption RMI Analytics: brewing of raw materials consulting Brewers of Europe	Willingness of sharing information

Die Bierothek can have a dedicated page on website for sustainability

Suggestions for tool kit communication

Three ways we can use the sustainability tool kit

For Suppliers

- ✓ Making them aware of their CO2 consumption
- ✓ Communicating value chain steps to reduce their emissions

Industry Sustainability Leader

- ✓ Release the toolkit results among few breweries
- ✓ Test out different beers and make toolkit more accurate

Spreading Awareness

- ✓ Making consumers aware of our sustainability efforts
- ✓ Making consumers conscious and helping them stay green

Three types of comparision analysis

With other commodities

- ✓ Comparisons with daily used products such as eggs, milk, etc to help consumers have a better understanding

Within Industry

- ✓ Comparisons with industry dominators such as Heineken, Carlsberg, etc

With our own brands

- ✓ Comparisons with industry dominators such as Heineken, Carlsberg, etc

- https://paxex.aero/tripit-carbom-emissions-tracking/
- https://ecocart.io/
- https://www.prnewswire.com/news-releases/conscious-container-start-up-and-anheuser-busch-invite-the-north-bay-to-refill-my-beer-301176836.html