

Qualifying Explanatory Statement

According to PAS 2060:2014

*Achievement of and Commitment to Product
Carbon Neutrality for Fat Tire® Amber Ale*

Prepared for:
New Belgium Brewing Company

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1.0 Introduction

New Belgium Brewing Company (New Belgium), maker of Fat Tire® Amber Ale (Fat Tire®) and many other beers, is a leading craft brewing company headquartered in Fort Collins, Colorado with breweries in Fort Collins, Colorado and Asheville, North Carolina. Founded in 1991, New Belgium is an early leader in corporate sustainability, having commissioned the first carbon footprint study for beer in 2007, focused on a 6-pack of Fat Tire®. In 2022 the company purchased Bell's Brewery and has more than 1,300 employees nationwide. The combined company is owned by Lion Little World, a subsidiary of Kirin Holdings

Since its founding, New Belgium has included environmental stewardship as a core value and key aim. As the effects of climate change are starting to appear in the supply chain and general marketplace, accelerating carbon neutral goals is a top priority for New Belgium. Voluntary commitments include: (1) carbon neutral certification for all beers by 2030, (2) sourcing 100% renewable electricity by 2030 or sooner (under Kirin and listed in [RE100](#)), and (3) an absolute reduction in GHG emissions in alignment with the Science Based Targets Initiative limiting warming to 1.5° C (under Kirin listed in the [SBTI registry](#)).

This document forms the PAS 2060 Qualifying Explanatory Statement to demonstrate that Fat Tire® Amber Ale products have achieved carbon neutrality in accordance with PAS 2060:2014 on January 1, 2022 for calendar year 2022, with commitment to maintain carbon neutrality through December 31, 2023. All information provided within this report has been reviewed and certified by a third party.

This document will be updated at least every 12 months to reflect New Belgium's status toward its carbon neutrality targets. The report is publicly available at www.drinkfattire.com/drink-sustainably/

2.0 Declaration of commitment to carbon neutrality

New Belgium is fully committed to achieving carbon neutrality for our Fat Tire® product line, in all formats as of 2019 and to maintain this commitment through 2023. We are pleased to have reached this goal through a variety of high-impact carbon offset projects, as documented and independently certified below.



PAS 2060: 2014 Other Party Validation Requirement	Response
Individual responsible:	Walker Modic, Director, Environmental Programs
Entity making declaration:	New Belgium Brewing Company
Subject of PAS 2060 declaration:	Fat Tire® Amber Ale
Description of subject:	See Table 2
Function of Subject:	Serve as an alcoholic beverage
Rationale for selection of the subject:	The scope and subject of this PAS 2060 includes entire product life cycle emissions including the following: (i) raw material extraction and processing (ii) production and packaging and (iii) product distribution, retail and consumption and (iv) end-of-life.
Boundaries of the subject	The scope and subject of this PAS 2060 includes entire product life cycle emissions including the following: (i) raw material extraction and processing (ii) production and packaging and (iii) product distribution, retail and consumption and (iv) end-of-life.
What type of conformity assessment has been undertaken?	OPV-3: Other party validation- unified (achievement and commitment)
Confirmation that methodology was applied in conformance with PAS 2060:2014	The application of the methodology conforms to principles set out in clause 6.1.2 of PAS 2060:2014.
Baseline period for PAS 2060: 2014 program:	1st January 2019- 31st December 2019
Achievement period:	1st January 2022- 31st December 2022
Commitment period:	1st January 2023- 31st December 2023
Standard for assessment of GHG emissions	GHG Protocol Product Life Cycle Accounting and Reporting Standard; The Beverage Industry Greenhouse Gas Emissions Sector Guidance.
Justification of assessment method	The methodology prescribed in the guidelines aligns with WRI's Product Life Cycle Accounting and Report Standard, meets PAS 2060 requirements, and is specific to the product sector.
Product Carbon Footprint Results	See Table 3A in Section 3 Fat Tire® 2022 Carbon Footprint
Executive Signature: Walker Modic Director, Environmental Programs	

3.0 Fat Tire® Amber Ale Carbon Footprint

3.1 Introduction

The foundation of a carbon neutral certification is a full lifecycle carbon footprint analysis. This section describes the carbon footprint for Fat Tire® for calendar year 2022. Analysis of the carbon footprint allows prioritization of key action areas for greenhouse gas emissions reduction in both the short term and long term.

The terms “carbon emissions” and “greenhouse gas (GHG) emissions” are used interchangeably throughout the report.

3.2 Methodology

The methodology for the product carbon footprint accounting followed WRI GHG Protocol Product Standard¹, in conformance with the requirements of PAS 2060:2014². The Beverage Industry Environmental Roundtable (BIER) Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance³ was also instrumental in guiding the modeling of greenhouse gas emissions. The system boundary and calculation methodology for product carbon footprints were based on the BIER guidance⁴. The methodology for quantifying product footprints in the underlying assessment meets the accounting requirements and the publication of this document on the New Belgium website meets the communication requirements of WRI’s Product Life Cycle Accounting and Report Standard a GHG assessment standard approved by PAS 2060:2014⁵.

The assessment includes GHG emissions across the product life cycle for the following phases: (i) raw material extraction and processing, (ii) production and packaging, and (iii) product distribution, retail and consumption and (iv) end-of-life. These calculations were made and reported prior to the purchase of any carbon offsets by New Belgium.

The Scope 1-3 categorization of the WRI GHG Protocol does not apply to product carbon footprints. This PCF takes into account all emissions, direct and indirect, with the exception of those related to exclusions, see section 3.4.6, across the product life cycle.

The Fat Tire® carbon footprint was verified by Thomas P. Gloria, an independent LCA expert from Industrial Ecology Consultants⁶.

Table 2. *General information and scope of the PCF.*

Product Assessed	Fat Tire® Amber Ale
Product Description	<p>Fat Tire® Amber is an easy-drinking Amber Ale</p> <p>Visual: Clear, amber and bright with white lacing.</p> <p>Flavor: Toasty malt, gentle sweetness, flash of fresh hop bitterness. The malt and hops are perfectly balanced.</p> <p>Aroma: Sweet biscuity and caramel malts, subtle notes of fresh fennel and green apple.</p> <p>Mouthfeel: Carbonation and light sweetness finish clean on your palate. Medium body.</p> <p>ABV: 5.2%</p> <p>IBU: 22</p>

¹ Greenhouse Gas Protocol. Product Life Cycle Accounting and Reporting Standard. World Resources Institute, and World Business Council for Sustainable Development. 2013.

² The British Standards Institution. (2014). PAS 2060:2014: Specification for the demonstration of carbon neutrality.

³ Beverage Industry Environmental Roundtable (BIER). (2019) “Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance.”

⁴ Beverage Industry Environmental Roundtable (BIER) (2018). “The Beverage Industry Greenhouse Gas Emissions Sector Guidance. Version 4.0” <https://www.bieroundtable.com/publication/greenhouse-gas-emissions-sector-guidance/>

⁵ See Appendix A in WRI’s Product Life Cycle Accounting and Report Standard.

⁶ <http://www.industrial-ecology.com/>

Unit of Analysis	12-fl oz of beer packaged in different packaging types: 12-fl oz glass bottle 12-fl oz aluminum can 16-fl oz aluminum can 19.2-fl oz aluminum can 1 standard size keg (15.5 U.S. gallons - for commercial consumption) 1 slim keg (1/6 bbl or 5.17 US gallons – also for commercial consumption)
Reference Flow	12-fl oz (355 mL) of packaged Fat Tire®
Type of GHG Inventory	Cradle-to-Grave
Time Period	2022, calendar year

Emissions are reported in MT CO₂e, in line with PAS 2060, and includes the emissions of all applicable Kyoto protocol pollutants, namely Carbon Dioxide, Methane, Nitrous Oxide, Sulfur Hexafluoride and refrigerants.

3.2.1 The Product System under Study

New Belgium Fat Tire® Amber Ale is the flagship beer of New Belgium Brewery produced in their brewing facilities located in Fort Collins, Colorado and Asheville, North Carolina. The product system was modeled based on primary data and information provided by New Belgium. The study included several key data requirements:

- Purchased material inputs to Fat Tire® (malted barley, hops, CO₂, water, primary and secondary packaging)
- Material weights per product for primary packaging and secondary packaging
- Scrap generated during the packaging process for packaging
- Transportation data for Fat Tire® raw materials
- Primary data for New Belgium operations, including energy use and waste generation
- Primary data on product distribution
- Secondary data to estimate the electricity consumed during product use
- Secondary data from the Ecoinvent v3.9.1 database for many unit processes with a prioritization for data with the highest degree of representativeness of the actual material or process

Representative inventory data for many unit processes was selected using secondary data from the Ecoinvent⁷ life cycle database with a prioritization for data with the highest degree of representativeness of the actual material or process.

⁷ Ecoinvent Centre (2018) Ecoinvent data from v3.5. Swiss Center for Life Cycle Inventories, Dübendorf, 2017 <http://www.Ecoinvent.org>

Life cycle modeling of Fat Tire® was divided into the following distinct life cycle phases:

- **Material acquisition and pre-processing:** This stage begins with agricultural production of the main ingredients, barley and hops. Barley production has been found to be a major contributor to the carbon footprint of beer in previous PCFs⁸, by requiring the use of seed production, irrigation, agricultural machinery, pesticide and herbicide use and production and tillage. Once barley has been harvested it is transferred to a malting facility where it is germinated and dried to produce malt, a process that requires water and energy. This stage includes GHG impacts associated with the transportation of these material inputs to the facilities in Fort Collins, CO and Asheville, NC, and ends when the product components enter the gate of the respective production facilities. Additionally, included in this stage is the extraction of resources from nature for production components and packaging materials. Packaging has also been found to be a significant contributor to the overall product carbon footprint⁹, depending upon the material used. Purchased CO₂ transportation is included in the scope, but the production of CO₂ is excluded as per the BIER guidelines because of the particular CO₂ is a byproduct of a biogenic process. The release of biogas (CO₂) is also excluded as the origin of this CO₂ was from carbon uptake. See Section 2.9 for additional detail on the processes included in this stage.
- **Production:** The production stage begins when the product components enter the breweries and ends when the packaged beverage leaves the production gate for distribution. The functional unit is 12-fl oz of beer packaged in a variety of different types of packaging. It includes GHG emissions from energy use, facility waste treatment, and refrigerant use involved with the brewing and packaging of the Fat Tire®.
- **Product Distribution and Retail:** This stage begins when the finished product leaves the gate of the Fort Collins or Asheville breweries and continues until it is transported to a retail vendor. It represents the greenhouse gas emissions associated with transport of the finished product from the breweries to various distributors.
- **Product Use:** The use stage includes the retail and consumer energy use to cool the beer prior to consumption.
- **End-of-Life:** This stage includes greenhouse gas emissions from transport of product packaging to waste treatment facilities and from waste treatment activities, landfill or incineration, from product packaging. Recycling processes are not included due to the use of the recycled content cut-off allocation method; in the recycled content approach, only the benefit from using recycled materials is accounted for (i.e., zero burden from prior life cycle), while the impact from recycling a waste material is attributed to the product system that utilizes the recycled material. No credit is applied to a product system that produces a material that will be recycled. For on-premise consumption, kegs are collected and may be reused 100 times or more. Previous

⁸ State of Oregon Department of Environmental Quality (2017). *Food Product Environmental Footprint Literature Summary: Beer*. <https://www.oregon.gov/deq/FilterDocs/PEF-Beer-FullReport.pdf>

studies have modeled keg re-use 70 times⁹. New Belgium notes that their kegs are re-used hundreds of times but unable to measure the number with certainty.

3.2.2 Allocation Procedures

Allocation is required when a single product system produces more than one product. Allocation addresses the problem of how to divide resource use, energy use and emissions between multiple products produced at the same production facility. For instance, the Fort Collins and Asheville facilities brew multiple types of beer, and in cases where the data was available specifically for Fat Tire® production, this data was used. In cases where only facility-level data was available, resource use was allocated to the beers by the proportion of Fat Tire® to total beer production at that facility on a volume basis. Allocation guidelines in ISO 14044, the GHG Protocol Product Standard and PAS 2060, state that wherever possible, the use of allocation should be minimized. However, if allocation is required, ISO 14044 and the GHG Protocol state that a physical allocation approach, in this case based on volume of the different types of beer produced, should be used preferentially over economic allocation. For this reason, a volume-based allocation approach was used where necessary.

This volume-based allocation method was applied to determine the amount of energy and resource inputs relative to one 12 oz serving of Fat Tire® produced at the Fort Collins and Asheville facilities. Since Fat Tire® is brewed at two facilities, a production weighted average based on the volume of Fat Tire® produced from the Fort Collins and Asheville facilities was used.

Allocation used within the secondary databases utilized for the system is primarily based on physical relationships. Impacts from transportation were allocated based on the mass of material multiplied by the distance transported.

3.2.3 Cut-off Criteria

All significant inputs and outputs relevant to the Fat Tire® product system were included in the PCF calculations with the exception of some materials which represent less than 1% of total greenhouse gas emissions, namely yeast and minor brewing ingredients, packaging adhesives and shrink wrap. Impacts associated with capital goods (e.g. machinery, trucks, infrastructure), overhead operations (e.g. facility lighting), corporate activities (e.g. research and development, travel) are defined as non-attributable processes and are also excluded based on ISO 14044 and the GHG Protocol. All known materials and

⁹ Cimini and Moresi (2016). Carbon footprint of a pale lager packed in different formats: assessment and sensitivity analysis based on transparent data. *Journal of Cleaner Production* 112: 4196- 4213.

processes contributing greater than 1% of the total greenhouse gas emissions were included in the life cycle inventory.

3.2.4 Carbon Footprint Methodology and Interpretation Used

Greenhouse gas (GHG) emissions were calculated by multiplying life cycle inventory data, also referred to as activity data by the GHG Protocol, by an emission factor that represents the total, fossil, biogenic, and LULUC CO₂-eq emissions associated with producing one unit of the required input or output. All contributing GHGs, included in the IPCC AR6 (2021) assessment, for all sources and sinks within the life cycle system boundary for the assessed products were included. Life cycle inventory, or activity data, consists of the inputs and outputs required to satisfy the functional unit (12-fl oz of packaged beer). A variety of databases and published literature were used to acquire the emission factors used to calculate the Fat Tire® product carbon footprints and include the Ecoinvent v3.9.1 database¹⁰ extracted using openLCA v2.0.1¹¹ software, BIER guidance on the carbon footprint of a beer¹², the US EPA GHG Emission Factor Hub¹³, and the IPCC AR6 GWPs¹⁴. These are summarized in Section 3.1, Table 14.

Excel was used to calculate the Fat Tire® carbon footprints from New Belgium's life cycle inventory data and the emission factors used.

Results are reported in units of grams CO₂ eq across the life cycle, as well as by contributing life cycle phase. Greenhouse gas emissions are also summarized separately for fossil, biogenic, and land use and use change (LULUC) emissions. All LULUC emissions were calculated using the openLCA v2.0.1 software, which utilized Ecoinvent processes and the openLCA IPCC 2021 impact method. Emission factors used by BIER and the US EPA GHG Emission Factor hub did not subcategorize the source of the impact (i.e., it did not provide information on the GWPs produced from LULUC impacts).

3.3 Product lifecycle boundaries

This footprint includes "cradle-to-grave" GHG emissions associated with Fat Tire® in all forms and packaging, brewed at the Fort Collins, Colorado and Asheville, NC facilities. Shown below is a process map for the entire lifecycle of Fat Tire® beer from raw ingredients through final consumption by consumers.

The process map in Figure 1 defines the life cycle stages and illustrates the key processes contributing measurably to category indicator results for the greenhouse gas indicators specified in the GHG Protocol

¹⁰ Ecoinvent Centre (2022). Ecoinvent data from v3.9. Swiss Center for Life Cycle Inventories, Dübendorf, 2022
<http://www.Ecoinvent.org>

¹¹ GreenDelta, 2023. openLCA 2.0. <https://www.openlca.org/openlca/>

¹² Beverage Industry Environmental Roundtable (BIER). (2012) "Research on the Carbon Footprint of Beer."

¹³ US EPA, 2022. 2022 GHG Emission Factors Hub. <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>

¹⁴ ERCE, 2021. IPCC Sixth Assessment Report Global Warming Potentials. <https://erce.energy/erceipccsixthassessment/>

Product Standard. Impacts associated with capital goods (e.g., machinery, trucks, infrastructure), overhead operations (e.g., office lighting), corporate activities (e.g. research and development, travel) are defined as non-attributable processes and are not included in the PCF.

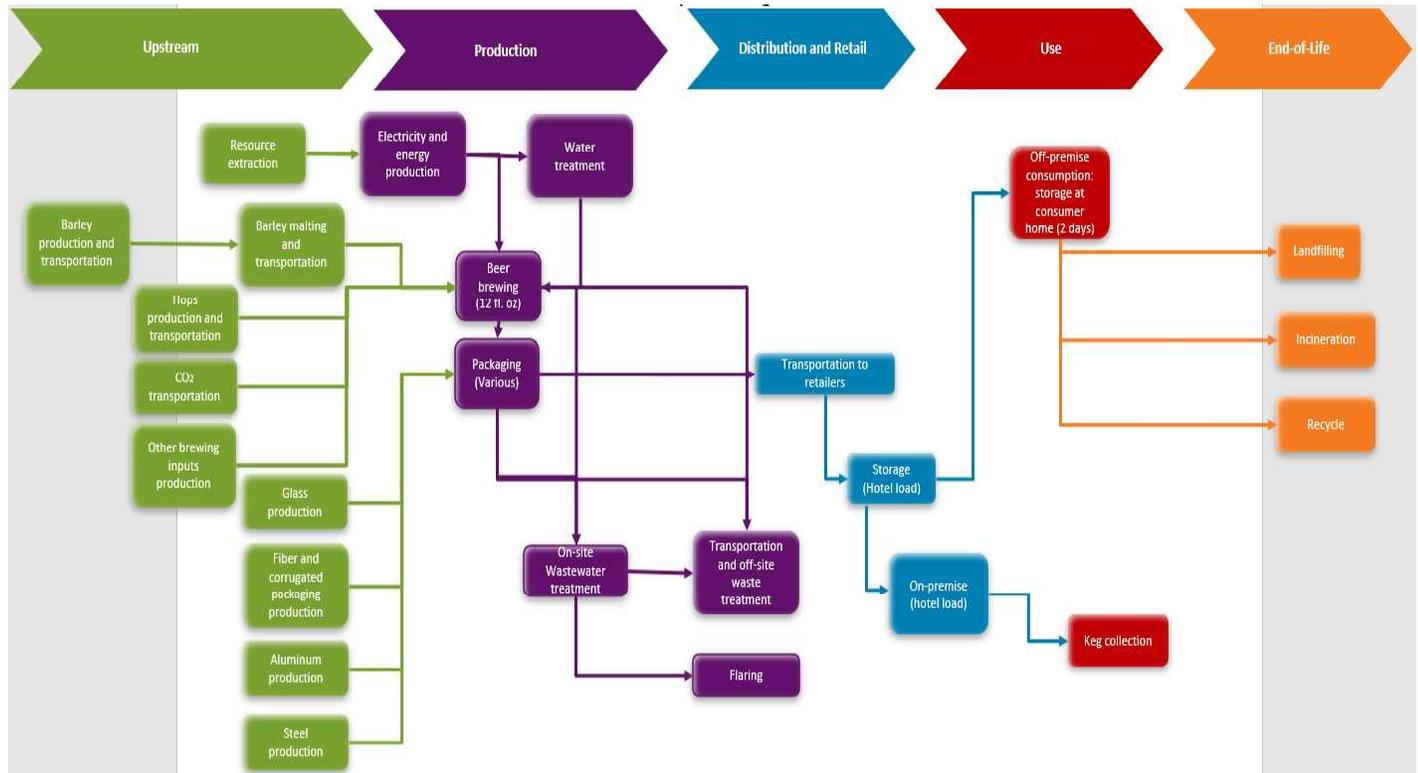


Figure 1. Process map illustrating the key processing included by life cycle stage of 12-fl oz of Fat Tire® beer.

3.4 Total carbon footprint

The GHG emissions for all Fat Tire® products produced between January 1, 2022 and December 31, 2022 equals 30,600 MT CO₂e. Comparing these results to the baseline year (2019) shows on an absolute basis, the GHG emissions for Fat Tire decreased from 43,224 MT CO₂e in 2019 to 30,600 MT CO₂e in 2022. The number of 12-fl oz services of Fat Tire in 2019 was 88,743,407 compared to 66,011,463 in 2022. Using the total 12-fl oz servings to convert the GHG emissions for 2019 and 2022 to an intensity-based figure, results in .49 Kgs CO₂e per 12-fl oz serving in 2019 versus .46 Kgs CO₂e per 12 ounce serving in 2022. On an intensity basis, this equates to a 6% decrease in GHG emissions in 2022. Table 3A and 3B summarize the GHG emission results for 2022 and 2019 respectively.

Table 3A. Summary of cradle-to-grave product carbon footprint, total 2022 12oz servings, and total 2022 emissions of the Fat Tire® products assessed for 2022. *Note – annual totals are expressed in metric tons CO2e.*

Fat Tire® Product	Cradle-to-Grave per serving (g CO ₂ eq)	Total servings (12-fl oz/ 355mL)	Cradle-to-Grave Total (MT CO ₂ -eq)	Cradle-to-Grave Total (Kgs CO ₂ e/12-fl oz)
12-fl oz bottle	540	42,368,981	22,877	-
12-fl oz can	407	8,386,226	3,417	-
16-fl oz can	417	403,103	168	-
19.2-fl oz can	419	72,287	30	-
Slim keg	285	4,034,530	1,149	-
Standard keg	276	10,746,336	2,959	-
TOTAL	-	66,011,463	30,600	.46

* *Some totals may not add up due to rounding.*

Table 3B. Summary of cradle-to-grave product carbon footprint for Fat Tire® Amber Ale, and the total Cradle to Grave for Fat Tire® products, for 2019. *Note – annual totals are expressed in metric tons CO2e.*

Product	Cradle-to-Grave per serving (g CO ₂ eq)	Total servings (12-fl oz/ 355mL) by packaged product	Cradle-to-Grave Total (2021) (MT CO ₂ -eq)	Cradle-to-Grave Total (Kgs CO ₂ e/12-fl oz)
12-fl oz bottle	563	58,212,875	32,799	-
22-fl oz bottle	620	250,314	155	-
12-fl oz can	432	8,067,275	3,486	-
16-fl oz can	420	1,405,413	590	-
Standard keg	295	15,040,373	4,442	-
Slim keg	304	5,767,157	1,751	-
TOTAL		88,743,407	43,224	.49

* *Some totals may not add up due to rounding.*

The results for 2019 baseline period represent a recalculation over the initial baseline period. This is a requirement of the GHG Protocol when significant methodological changes have been made. The changes include the inclusion of upstream impacts of fuel production, changes to the distribution method from the 2020 and 2021 CFs, and differentiated activity data for each product depending upon their production in Fort Collins or Asheville (for Fat Tire).

The emission factors in this recalculation are taken from the 2022 Product Carbon Footprint Report. Both the 2019 and 2022 Carbon Footprints are calculated using 100-year Global Warming Potentials (GWPs)

from IPCC AR6 (2021)¹⁵ and are reported in grams CO₂e. Tables 4A through 4F summarize the GHG emissions for 2022 by the individual products.

Table 4A. Summary of cradle-to-grave product carbon footprint results for 12-fl oz (355 mL) of Fat Tire®, packaged in a 12-fl oz aluminum can, calculated using IPCC 2021 metrics.*

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	407	216	57.0	81.9	50.9	1.76
Fossil CO ₂ eq	g CO ₂ eq	367	190	43.9	81.9	50.8	-
Biogenic CO ₂ eq	g CO ₂ eq	17.8	14.3	0.798	0.476	0.221	-
LULUC CO ₂ eq	g CO ₂ eq	0.730	0.657	4.07x10 ⁻³	4.28x10 ⁻²	2.26x10 ⁻²	-

Table 4B. Summary of cradle-to-grave product carbon footprint results for 12-fl oz (355 mL) of Fat Tire®, packaged in a 16-fl oz aluminum can, calculated using IPCC 2021 metrics.*

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	417	215	55.4	94.1	50.9	2.09
Fossil CO ₂ eq	g CO ₂ eq	378	189	44.6	94.0	50.8	-
Biogenic CO ₂ eq	g CO ₂ eq	20.5	17.6	0.216	0.547	0.221	-
LULUC CO ₂ eq	g CO ₂ eq	0.701	0.622	3.93x10 ⁻³	4.91x10 ⁻²	2.60x10 ⁻²	-

Table 4C. Summary of cradle-to-grave product carbon footprint results for 12-fl oz (355 mL) of Fat Tire® in a 12-fl oz glass bottle, calculated using IPCC 2021 metrics.*

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (Packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	540	300	57.3	119	55.4	8.17
Fossil CO ₂ eq	g CO ₂ eq	491	274	43.7	119	55.3	-
Biogenic CO ₂ eq	g CO ₂ eq	40.9	36.8	0.911	0.690	0.241	-
LULUC CO ₂ eq	g CO ₂ eq	0.327	0.233	4.10x10 ⁻³	6.20x10 ⁻²	2.83x10 ⁻²	-

Table 4D. Summary of cradle-to-grave product carbon footprint results for 12-fl oz (355 mL) of Fat Tire®, packaged in a 19.2-fl oz aluminum can, calculated using IPCC 2021 metrics.*

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	419	217	55.1	93.9	50.8	2.68

¹⁵ IPCC is the Intergovernmental Panel on Climate Change (<http://www.ipcc.ch/>).

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Fossil CO ₂ eq	g CO ₂ eq	379	190	44.6	93.8	50.8	-
Biogenic CO ₂ eq	g CO ₂ eq	26.2	23.3	0.216	0.546	0.221	-
LULUC CO ₂ eq	g CO ₂ eq	0.693	0.614	3.93x10 ⁻³	4.90x10 ⁻²	2.60x10 ⁻²	-

Table 4E. Summary of cradle-to-grave product carbon footprint results for 12-fl oz (355 mL) of Fat Tire®, packaged in a regular keg (1/2 bbl, 1,984-fl oz), calculated using IPCC 2021 metrics.*

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	276	89.1	57.6	91.9	37.3	0.222
Fossil CO ₂ eq	g CO ₂ eq	238	65.1	43.6	91.8	37.2	-
Biogenic CO ₂ eq	g CO ₂ eq	3.86	0.695	1.01	0.534	0.162	-
LULUC CO ₂ eq	g CO ₂ eq	8.32x10 ⁻²	1.21x10 ⁻²	4.13x10 ⁻³	4.79x10 ⁻²	1.91x10 ⁻²	-

Table 4F. Summary of cradle-to-grave product carbon footprint results for 12-fl oz (355 mL) of Fat Tire®, packaged in a slim keg (1/6 bbl, 660-fl oz), calculated using IPCC 2021 metrics.*

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	285	89.8	57.6	99.6	37.3	0.323
Fossil CO ₂ eq	g CO ₂ eq	246	65.8	43.6	99.6	37.2	-
Biogenic CO ₂ eq	g CO ₂ eq	3.93	0.719	1.01	0.579	0.162	-
LULUC CO ₂ eq	g CO ₂ eq	8.73x10 ⁻³	1.21x10 ⁻²	4.13x10 ⁻³	5.20x10 ⁻²	1.91x10 ⁻²	-

*Results are rounded to three or more significant figures. Some totals may not add up due to rounding.

3.4.1 Upstream Emissions

The processes covered in the Upstream Materials life cycle stage include both cultivation of ingredients and raw material processing for the agricultural products (malted barley and hops), primary packaging (glass, aluminum, and steel), secondary packaging (corrugated cardboard), CO₂ liquefaction, and the transportation of raw materials to New Belgium’s Fort Collins and Asheville breweries.

Barley cultivation consists of the seed production, irrigation, fertilizer and pesticide use, soil emissions, and agricultural machinery for agricultural products; the barley is then transported to a malting facility where it is partially dried, then transported to the breweries. Carbon dioxide is purchased as a byproduct from a fertilizer producer and used as a barrier between the beer and oxygen throughout the brewing process except for fermentation. It is also used to push draft beer from the keg to the faucet.

Other minor components and ingredients of the manufacturing process, such as yeast, were used in small amounts, and assumed to contribute less than 1% of environmental impact and no more than 5% when summed together. Based on these considerations they were excluded.

The mass of packaging materials allocated to each Fat Tire product are based on the quantity of packaged products in 2022 and the mass of packaging materials for each product. Production loss (scrap losses) for aluminum and glass products are based upon the aluminum and glass wastes produced at FTC and AVL in 2022. Production loss for the corrugated cardboard packaging materials during the packaging process are based upon the difference between packaging materials received and those shipped in 2022. Packaging for on-premise consumption is done by New Belgium and is transferred to distributor. The distributor collects kegs and a third party collects and transports empty kegs back to New Belgium, as needed.

3.4.2 Production Emissions

The Fat Tire® production processes begin with the receipt of upstream materials, and continues with brewing, packaging, and waste treatment. Fat Tire® was produced at both the NBB facilities in Fort Collins, CO and Asheville, NC. Both production facilities produce additional beer products. Both production sites contain multiple operation sites, including the main brewery, water treatment (PWTP), aerobic and anaerobic digestion facilities, flaring of biogas produced during anaerobic digestion, and out-of-scope operations such as the medical clinic and offices.

The manufacturing facilities make use of the following processes which contribute to the overall greenhouse gas emissions:

- *Natural gas combustion.* Data calculated based on natural gas purchases for Fort Collins and Asheville breweries. Includes natural gas used at all buildings at both locations (FTC: Main brewery, PWTP, Distribution Center; AVL: Main Brewery, Distribution Center and PWTP). The natural gas for facilities outside of the brewing scope is assumed to be insignificant.
- *Flaring,* from biogas produced during anaerobic digestion of organic manufacturing wastes. Data calculated by New Belgium using the flow rate of flaring and amount of time flaring took place. The methane content of the biogas was determined to be 75.3% by New Belgium in previous analyses, and the flaring efficiency was 98% and 99% for FTC and AVL, respectively, based upon GHG Protocol Documentation and the Manufacturer specifications.
- *Fugitive emissions,* calculated from charged refrigerant purchases, and calculated CO₂ losses while assisting beer pushing.
- *Purchased electricity,* calculated from monthly meter readings. The Ecoinvent v3.9.1 database was used to model the life cycle impacts from consumed electricity, however the grid mix was updated based on the 2022

eGRID resource mix for the RMPA and SRVC eGRID subregions¹⁶, which were used for the Fort Collins, Colorado (FTC) and Asheville, North Carolina (AVL) facilities, respectively.

- *Manufacturing wastes*, includes consideration of transportation for recycling, transportation to and emissions from landfilling, incineration, and composting of wastes generated at the breweries.
- *Manufacturing byproducts*, Transportation for three manufacturing byproducts: spent grains which are sold to agricultural applications, spent yeast which are also sold; and land-applied sludge produced as a byproduct of anaerobic digestion.
- Biomass: Cogeneration of biogas, was not calculated as the source of the CO₂ released was from biogenic uptake.

3.4.3 Distribution Emissions

Fat Tire® is produced in Fort Collins, CO and Asheville, NC and is distributed across North America by truck, with approximately 0.69% of all Fat Tire® beer shipped internationally. A small amount of product is transferred between Fort Collins and Asheville, as needed. Distribution is based upon the assumption that 95 beer barrels (bbls), or approximately 2,950 gallons, are contained in a shipment, an assumption made by New Belgium.

3.4.4 Retail and Product Use Emissions

Products are sold from third parties for consumption on or off-premise. On-premise consumption refers to the hotel load and cooling of kegs for draught beer at hotels, bars, restaurants, etc. Off-premise consumption refers to the hotel load and cooling required for bottles and cans at a liquor store, convenience store, or supermarket and final consumption by the consumer at home. Retail scenarios are based on input from the manufacturer and BIER documentation guidelines^{17,18}. Assumptions about the average electricity use and average retail size are based on the EIA Consumer Building Energy Consumption Survey (CBECS). The breakdown of product sold at convenience stores and larger, supermarket-type retailers is taken from primary data obtained from NBB.

Once consumers arrive at home with their product, additional refrigeration and energy are often required prior to final consumption. Assumptions and calculations for at-home refrigeration are based on the BIER documentation. Emissions from electricity used for both on-premise and off-premise retail and use are

¹⁶ US EPA, 2023. eGRID Data Explorer. <https://www.epa.gov/egrid/data-explorer>

¹⁷ Beverage Industry Environmental Roundtable (BIER). (2019) "Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance."

¹⁸ Beverage Industry Environmental Roundtable (BIER). (2012) "Research on the Carbon Footprint of Beer."

based upon the 2022 US national average electricity supply mix derived from eGRID because Fat Tire® is purchased and consumed throughout the US. It is assumed that retail and product use in international locations is significantly similar to that in the US given that much of consumption is in European and OECD countries, and international consumption consists of .69% of total consumption.

3.4.5 End-of-Life Emissions

At end-of-life, the packaging materials are disposed of. No specific data are available regarding the specific waste processing of Fat Tire® packaging materials. It is assumed that after consumption, the packaging materials are transported to a waste treatment facility. The type of waste treatment, by packaging material type, is taken from the US Environmental Protection Agency¹⁹ data for packaging materials.

Table 5. Assumed management for Fat Tire® packaging materials at end of life by material type.

Packaging	Landfilled	Incinerated	Recycled
Glass	55%	13%	31%
Aluminum	52%	13%	35%
Fiberboard	15%	4%	81%
Steel	21%	5%	74%

3.4.6 Exclusions

All significant inputs and outputs relevant to the Fat Tire® product system are included in the product carbon footprint calculations with the exception of some materials which represent less than 1% of total impact. All known materials and processes contributing greater than 1% of the total environmental impact indicator for each impact were included in the life cycle inventory. Notable omissions of less than 1% of total impact include yeast, minor brewing ingredients, packaging adhesives, and shrink wrap.

4.0 Fat Tire® Amber Ale Carbon Management Plan

4.1 Introduction

New Belgium Brewing Company, maker of Fat Tire® Amber Ale (Fat Tire®), Mountain Time® Lager and a host of other brands is headquartered in Fort Collins, Colorado with an east coast brewery in Asheville, NC. Since its founding in 1991, New Belgium has been a leader in sustainability, becoming the first wind-powered brewery in 1999, commissioning the first carbon footprint study for a beer in 2008 and becoming the first craft brewer in the United States to achieve carbon neutral certification in 2019 for its flagship

¹⁹ US Environmental Protection Agency. 2020. "Advancing Sustainable Materials Management: 2018 Fact Sheet." https://www.epa.gov/sites/production/files/2019-11/documents/2017_facts_and_figures_fact_sheet_final.pdf

beer, Fat Tire®. In 2022 the company purchased Bell's Brewery and has more than 1,300 coworkers nationwide. The combined company is owned by Lion Little World, a subsidiary of Kirin Holdings.

For over 30 years, New Belgium has prioritized environmental stewardship as a core value and key aim. With the effects of climate change already impacting the craft brewing supply chain and being felt across the globe, accelerating action to avert the worst impacts is a top priority for New Belgium. Voluntary commitments include (1) carbon neutral certification for all beers by 2030, (2) sourcing 100% renewable electricity by 2030 (under our parent company Kirin listed in RE100), and (3) absolute reduction in GHG emissions in alignment with the Science-Based Targets Initiative, limiting warming to 1.5 Celsius. A 55% reduction in Scopes 1-2, 30% reduction in Scope 3 (under our parent company Kirin listed in the SBTi registry).

This document will be updated at least every 12 months to reflect New Belgium's status toward its carbon neutrality targets. The report is publicly available at www.drinkfattire.com/drink-sustainably/.

4.2 Fat Tire® Amber Ale base year carbon footprint

The carbon footprint as described in section 3 used primary data from calendar year 2022 as the baseline for this carbon neutral achievement and commitment.

4.3 Historic and ongoing reduction in emissions

For 30+ years New Belgium has been targeting resource conservation and GHG emissions reductions. Beginning in the original basement brewhouse the company's cofounder rigged a rudimentary heat exchanger onto the kettle capturing and reusing heat energy from the boil. In the 1990s and with every expansion, energy efficiency was designed into buildings and multiple heat capture and reuse technologies were implemented wherever possible. In 1999, coworkers offered up annual profit sharing to help bring wind power to the City of Fort Collins, making New Belgium the first wind-powered brewery in the United States. In the 2000s, a project to light-weight glass bottles reduced emissions from the production and shipping of these containers. Eliminating cardboard dividers in 12-packs has also saved both weight and space on trucks. In 2002 an onsite process water treatment plant began capturing methane-rich biogas and the addition of combined heat and power (CHP) engines converts the biogas to electricity helping power brewing operations. With a recent upgrade, our 500 KW CHP engine is producing roughly 1,000,000 KWs per year and about 2 million gallons of heated brewing water from waste heat. In the 2010s, New Belgium installed – what was at the time – the largest privately-owned solar array in Colorado. In 2011, company sales reps moved to 100% electric vehicles and hybrid delivery trucks. Onsite charging stations are available for both coworkers and guests. Instead of locating our large-scale expansion at our current site in Colorado, we chose North Carolina to reduce the emissions from cross-country shipping. The buildings on this new

campus are all LEED-certified at Silver, Gold, or Platinum levels. In 2022 the Asheville brewery installed a 446 KW solar array estimated to produce 620,000 kWh of electricity annually. The new solar array along with several other capital expenditures representing \$1+ million in investments will reduce CO₂e emissions by an estimated 700 metric tons/year.

To drive GHG reductions in our value chain, New Belgium's philanthropy program has provided grants to barley breeders to support the development of more climate-friendly and climate-resilient barley varieties. In 2015 New Belgium co-founded the Glass Recycling Coalition, a value-chain-led organization that seeks to improve glass recycling in the United States, a necessary step in reducing GHG emissions from glass bottles. Partially as a result of our efforts in 2018, the City Council in Fort Collins adopted its own 100% renewable electricity by 2030 goal. As 100% renewable electricity is most efficiently achieved at scale, New Belgium is active in policy advocacy at local, state, and national levels. In 2020 we brewed Torched Earth Ale to demonstrate what the future of beer could taste like if climate change continues unchecked. We followed this up by publishing the entirety of our carbon neutral blueprint for businesses to help others take action to reduce their GHG emissions and join us on the road to carbon neutrality (www.drinkfattire.com/drink-sustainably/).

Each of the initiatives listed above and more are ongoing at New Belgium targeting emissions reductions related to Fat Tire® Mountain Time® and every other beer we brew.

4.4 Future emissions reduction plan

We've allocated over \$6 million for capital expenditures in 2024 to be used in decarbonizing our breweries that make Fat Tire and Mountain Time Lager. Ahead of those expenditures, there was substantial work in 2023 that went into design, planning, engineering, and procurement to integrate three significant projects. One of these will capture biogas from our on-site wastewater treatment plant in Asheville, NC and blend it with natural gas in the brewery boilers netting an estimated savings of 400,000 kg CO₂e annually. A second project located at our Fort Collins, CO brewery will pilot a 650-kW thermal electrified boiler. When powered by renewable electricity the AtmosZero boiler will provide steam without Scope 1 GHG emissions. Finally, at our Fort Collins location in late 2024 we will commission a CO₂ collection system to recover fermentative CO₂ so it can be repurposed in our brewing processes and net an annual CO₂e reduction of 2,000 metric tons. We'll continue to evaluate emerging technologies and low to no carbon energy sources for brewery operations.

As 86% of New Belgium's annual GHG emissions are a result of upstream and downstream activities, i.e., non-manufacturing related emissions, we also recognize a need to reduce emissions within our value chain. In 2022 New Belgium launched a Sustainable Supplier Program aimed at helping suppliers reduce emissions related to our top three sources. One element of the program is an interactive supplier portal providing

guidance and resources to help suppliers decarbonize. Through the portal we are collecting emissions data from suppliers of categories that represent 52% of Scope 3 emissions, increasing our understanding of New Belgium’s Scope 3 impact.

Carbon neutral certification for Fat Tire® and Mountain Time® in 2022 has been achieved through historical GHG reductions and the purchase of carbon offsets and will be followed by a continued effort to reduce actual GHG emissions throughout the lifecycle of these and other beers.

4.5 The use of carbon offsets

For unavoidable GHG emissions with the lifecycle of Fat Tire®, New Belgium will purchase carbon offsets to satisfy requirements for carbon neutral certification. The credits will be sourced from projects that meet the following criteria: 1) create genuine, additional reductions in GHG emissions free of double-counting, (2) ensure a high level of confidence in permanence, (3) avoid and fully account for leakage and error, (4) verified by an independent, certified third party verifier, (5) issued after the emission reduction has taken place, (6) meet nationally recognized standards established by credible organizations and stored and retired within their registries with publicly available documentation, (7) align with our source of emissions and value chain.

5.0 Declaration of achievement of carbon neutrality for 2022

PAS 2060: 2014 Other Party Validation Requirement	Response
Achievement period	1 st January 2022- 31st December 2022
Carbon footprint of the subject during the achievement period	.46 Kgs CO ₂ e per 12-fl oz serving (intensity basis)
Means by which reductions have been achieved	Carbon offsetting
Standard and methodology used to achieve carbon offset	See Section 6.
Carbon offsetting information required to comply with clause 9.1.2	See Section 6
What type of conformity assessment has been undertaken?	OPV-3: Other party validation- unified (achievement and commitment)
Standard for assessment of GHG emissions	The Beverage Industry Greenhouse Gas Emissions Sector Guidance. The methodology prescribed in the guidelines aligns with WRI’s Product Life Cycle Accounting and Report Standard.
Date	04/01/24
Executive Signature: Walker Modic Director, Environmental Programs	

6.0 Carbon offsetting

Carbon offsets equivalent to 30,600 MT CO₂e have been purchased from the following projects to achieve carbon neutral certification for Fat Tire® for the calendar year of 2022. Note that the total number of offsets purchased by New Belgium Brewing exceeds the product carbon footprint of the subject during the achievement period.

Project 1

Project Title and ID Number: HT HFC Reclamation Project Champaign 2021; ACR-US-818-2021-1810-404407 to 404670 and ACR-US-818-2021-1810-406371 to 432281

Country: United States

Project Type: Industrial Process Emissions

Project Standard: American Carbon Registry

Methodology Used: Certified Reclaimed HFC Refrigerants, Propellants, and Fire Suppressants

Vintage: 2021

Project documentation database link:

<https://acr2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=10124&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc> and

<https://acr2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=9862&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc>

Alignment with New Belgium selection criteria: **Supporting recovery and reuse of HFC refrigerants used in refrigeration of beer.**

Project 2

Project Title and ID Number: Indigo U.S. Project No. 1; CAR-1-US-1459-47-1002-MA-2018-7513-1801 to 2400; CAR-1-US-1459-47-1002-MA-2019-7511-4801 to 6500; CAR-1-US-1459-47-1002-MA-2020-7509-6101 to 8200 and CAR-1-US-1459-47-1002-MA-2021-7507-7301 to 9400

Country: United States

Project Type: Soil Enrichment

Project Standard: Climate Action Reserve

Methodology Used: U.S. Soil Enrichment Protocol V 1.1

Vintage: 2018, 2019, 2020, & 2021

Project documentation database link:

<https://thereserve2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=13401&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc;>

<https://thereserve2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=13402&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc;>

<https://thereserve2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=13403&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc;>

<https://thereserve2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=13404&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc>

Alignment with New Belgium selection criteria: **Supporting sequestration of emissions related to fugitive emissions, transportation, and fiber packaging.**

Appendix A: Secondary Data and Emissions Factors

Component	Dataset/ Emission Factor	Source	Publication Date
FAT TIRE and MOUNTAIN TIME			
Barley	barley production barley grain Cutoff, U - CA-QC	Ecoinvent v3.9.1	2022
Malt	Malting emissions per serving	BIER Carbon Footprint ²⁰	2012
Hops	Hops production per serving	BIER Carbon Footprint ²⁸	2012
CO ₂	CO ₂ liquefaction electricity intensity; Electricity emission factor from US 2022 grid mix;	CO ₂ supplier eGRID	2008 2023
PACKAGING			
Glass	packaging glass production, brown packaging glass, brown Cutoff, U - RER w/o CH+DE	Ecoinvent v3.9.1	2022
Aluminum	Custom dataset built in Ecoinvent based on LCI data taken from the following reports: "Life Cycle Assessment of North American Aluminum Cans" "Updated Life Cycle Analysis of Aluminum Production and Semi-Fabrication for the GREET Model"	Ecoinvent v3.9.1 Sphera for The Aluminum Association Argonne National Laboratory	2022 2021 2015
Steel kegs	sheet rolling, steel sheet rolling, steel Cutoff, U - RER steel production, converter, low-alloyed steel, low-alloyed Cutoff, U - RER steel production, electric, low-alloyed steel, low-alloyed Cutoff, U - Europe without Switzerland and Austria	Ecoinvent v3.9.1	2022
Corrugated	market for corrugated board box corrugated board box Cutoff, U - US	Ecoinvent v3.9.1	2022
PRODUCTION			
Electricity	Ecoinvent datasets edited to reflect 2022 electricity mix of eGRID subregions: market for electricity, medium voltage electricity, medium voltage Cutoff, U - SERC market for electricity, medium voltage electricity, medium voltage Cutoff, U - WECC, US only	Grid mixes for eGRID 2022 subregions RMPA and SRVC, Ecoinvent v3.9.1	2023 2022
Natural Gas	heat production, natural gas, at boiler condensing modulating >100kW heat, district or industrial, natural gas Cutoff, U - Europe without Switzerland	Ecoinvent v3.9.1	2022
Flaring	Primary data from New Belgium; 2% efficiency assumption from WRI, 2016 ²¹	New Belgium	2023
Wastewater Treatment	Electricity intensity based on 2008 published LCA ²²	The Climate Conservancy	2008
PRODUCT USE			

²⁰ Note: BIER documentation is from 2012 and references IPCC 2006 document that uses IPCC Third Assessment Report. Methane emissions may be underestimated using TAR report. Product CFs remain unchanged with increased methane emission factor.

²¹ World Resources Institute (WRI) (2016) "https://ghgprotocol.org/sites/default/files/standards/WRI16_WorkingPaper_FF.pdf

²² The Climate Conservancy, 2008. The Carbon Footprint of Fat Tire®. https://www.ess.uci.edu/~sjdavis/pubs/Fat_Tire_2008.pdf

Component	Dataset/ Emission Factor	Source	Publication Date
Use and Retail	Cooling and hotel load calculated with assumptions from BIER ²³ ; NBB assumptions used for refrigerator size, bottles per refrigerator and related factors;	BIER Carbon Footprint	2012
	data on electricity consumption and sq ft for retail from EIA CBECS 2012 building survey ²⁴ ;	EIA CBECS	2012
	Electricity emissions from US 2022 grid mix,	eGRID2020	2023
TRANSPORTATION			
Truck	market for transport, freight, lorry 16-32 metric ton, EURO4 Cutoff, U	Ecoinvent v3.9.1	2022
Rail	market for transport, freight train transport, freight train Cutoff, U - US	Ecoinvent v3.9.1	2022
Shipping	transport, freight, sea, transoceanic ship transport, freight, sea, transoceanic ship Cutoff, U	Ecoinvent v3.9.1	2022
END-OF-LIFE			
Landfill	Material and waste treatment specific emission factors, including transport to treatment facility	US EPA 2022 GHG Emission Factor Hub	2023
Incineration	Material and waste treatment specific emission factors, including transport to treatment facility	US EPA 2022 GHG Emission Factor Hub	2023
Compost	Material and waste treatment specific emission factors, including transport to treatment facility	US EPA 2022 GHG Emission Factor Hub	2023

²³ Beverage Industry Environmental Roundtable (BIER). (2012) "Research on the Carbon Footprint of Beer."

²⁴ US EIA, 2012. Commercial Buildings Energy Consumption Survey (CBECS).

<https://www.eia.gov/consumption/commercial/data/2012/#b22-b33>

Appendix B: Carbon Footprint Assurance Statement



Industrial Ecology Consultants

Statement of Verification of Product Carbon Footprints

New Belgium Brewery Company

Verification Scope

Industrial Ecology Consultants (IEC) has conducted a verification of *New Belgium Brewing Company's* Carbon Footprint for their *Fat Tire® Amber Ale* and *Mountain Time® Lager* products. IEC conducted the desktop review using documentation supplied by SCS Global Services as the basis for the evaluation.

Verification Objectives

- Evaluate whether *New Belgium Brewing Company's Fat Tire® Amber Ale* and *Mountain Time® Lager* product carbon footprints are in accordance with:
 - Greenhouse Gas Protocol. Product Life Cycle Accounting and Reporting Standard. World Resources Institute, and World Business Council for Sustainable Development. 2013.
 - ISO 14044:2006 Environmental management – Life Cycle Assessment – Requirements and guidelines.
 - Beverage Industry Environmental Roundtable (BIER). (2019) "Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance."
 - The British Standards Institution. (2014). PAS 2060:2014 : Specification for the demonstration of carbon neutrality.
- Evaluate reasonableness of *New Belgium Brewing Company's Fat Tire® Amber Ale* and *Mountain Time® Lager* product carbon footprints based on review of project documentation, calculation procedures and data sources.
- Develop a Product Carbon Footprint Assurance Statement for *New Belgium Brewing Company's Fat Tire® Amber Ale* and *Mountain Time® Lager* product.

Verification Opinion

This Verification Statement documents that IEC has conducted verification activities in compliance with the:

- World Resources Institute, and World Business Council for Sustainable Development. 2013.
- ISO 14044:2006 Environmental management – Life Cycle Assessment – Requirements and guidelines.
- Beverage Industry Environmental Roundtable (BIER). (2019) "Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance."
- The British Standards Institution. (2014). PAS 2060:2014 : Specification for the demonstration of carbon neutrality.

IEC finds *New Belgium Brewing Company's* Product Carbon Footprint assertion for the *Fat Tire® Amber Ale* and *Mountain Time® Lager* products materially correct and a fair representation of the GHG emissions associated with the cradle-to-grave life cycle of the products.



Thomas P. Gloria PhD
Chief Sustainability Engineer
Industrial Ecology Consultants
Verification Date: March 5th, 2024
Certificate Number: IEC-PCF-24003

Appendix C: Qualifying explanatory statements (QES) checklists

In accordance with PAS 2060: 2014 requirements, the QES checklist to support declaration of commitment to carbon neutrality is provided in the table below.

Table C1. Checklist for QES supporting declaration of commitment to carbon neutrality (based on Table B.1 of the PAS 2060: 2014 standard).

QES Checklist Requirements	Response
1) Identify the individual responsible for the evaluation and provision of data necessary for the substantiation of the declaration including that of preparing, substantiating, communicating and maintaining the declaration.	Refer to Section 2
2) Identify the entity responsible for making the declaration.	Refer to Section 2
3) Identify the subject of the declaration.	Refer to Section 2
4) Explain the rationale for the selection of the subject.	Refer to Section 2
5) Define the boundaries of the subject.	Refer to Section 2
6) Identify all characteristics (purposes, objectives or functionality) inherent to that subject.	Refer to Section 2
7) Identify and take into consideration all activities material to the fulfilment, achievement or delivery of the purposes, objectives or functionality of the subject.	Refer to Sections 2 and 3
8) Select which of the 3 options within PAS 2060 you intend to follow.	Refer to section 2
9) Identify the date by which the entity plans to achieve the status of “carbon neutrality” of the subject and specify the period for which the entity intends to maintain that status.	Refer to section 2
10) Select an appropriate standard and methodology for defining the subject, the GHG emissions associated with that subject and the calculation of the carbon footprint for the defined subject.	Refer to section 2
11) Provide justification for the selection of the methodology chosen.	Refer to section 2
12) Confirm that the selected methodology was applied in accordance with its provisions and the principles set out in PAS 2060.	Refer to section 2
13) Describe the actual types of GHG emissions, classification of emissions (Scope 1, 2 or 3) and size of carbon footprint of the subject exclusive of any purchases of carbon offsets.	Refer to section 3
a) All greenhouse gases shall be included and converted into tCO ₂ e.	Refer to section 3
b) 100% Scope 1 (direct) emissions relevant to the subject shall be included when determining the carbon footprint.	Refer to section 3. Scope categorization not applicable to product footprint
c) 100% Scope 2 (indirect) emissions relevant to the subject shall be included when determining the carbon footprint.	Refer to section 3. Scope categorization not applicable to product footprint.
d) Where estimates of GHG emissions are used in the quantification of the subject carbon footprint (particularly when associated with scope 3 emissions) these shall be determined in a manner that precludes underestimation.	Refer to section 3. Scope categorization not applicable to product footprint.
e) Scope 1, 2 or 3 emission source estimated to be more than 1% of the total carbon footprint shall be taken into consideration unless evidence can be provided to demonstrate that such quantification would not be technically feasible or cost effective.	Refer to section 3.
f) The quantified carbon footprint shall cover at least 95% of the emissions from the subject.	Refer to section 3.

QES Checklist Requirements	Response
g) Where a single source contributes more than 50% of the total emissions, the 95% threshold applies to the remaining sources of emissions.	No source contributes over 50% of emissions. Refer to section 3.
h) Any exclusion and the reason for that exclusion shall be documented.	Refer to section 3.
14) Where the subject is an organization/company or part thereof, ensure that:	Subject is not an organization.
a) Boundaries are a true and fair representation of the organization's GHG emissions (i.e., shall include all GHG emissions relating to core operations including subsidiaries owned and operated by the organization).	Subject is not an organization.
b) Either the equity share or control approach has been used to define which GHG emissions are included. Under the equity share approach, the entity accounts for GHG emissions from the subject according to its share of equity in the subject. Under the control approach, the entity shall account for 100% of the GHG emissions over which it has financial and/or operational control.	Subject is not an organization.
15) Identify if the subject is part of an organization or a specific site or location and treat as a discrete operation with its own purpose, objectives and functionality.	Subject is not an organization.
16) Where the subject is a product or service, include all Scope 3 emissions (as the lifecycle of the product/service needs to be taken into consideration).	Refer to section 3. Scope categorization not applicable to product footprint.
17) Describe the actual methods used to quantify GHG emissions (e.g. use of primary or secondary data), the measurement unit(s) applied, the period of application and the size of the resulting carbon footprint.	Refer to section 3.
18) Provide details of, and explanation for, the exclusion of any Scope 3 emissions.	Refer to section 3. Scope categorization not applicable to product footprint.
19) Document all assumptions and calculations made in quantifying GHG emissions and in the selection or development of greenhouse gas emission factors.	Section 3
20) Document your assessments of uncertainty and variability associated with defining boundaries and quantifying GHG emissions including the positive tolerances adopted in association with emission estimates.	Section 3
21) Document carbon footprint management plan:	Refer to section 4.
a) Make a statement of commitment to carbon neutrality for the defined subject.	Section 2 and 4.
b) Set timescales for achieving carbon neutrality for the defined subject.	Section 4.
c) Specify targets for GHG reduction for the defined subject appropriate to the timescale for achieving carbon neutrality including the baseline date, the first qualification date and the first application period.	Section 4.
d) Document the planned means of achieving and maintaining GHG emissions reductions including assumptions made and any justification of the techniques and measures to be employed to reduce GHG emissions.	Section 4.
e) Specify the offset strategy including an estimate of the quantity of GHG emissions to be offset, the nature of the offsets and the likely number and type of credits.	Section 4 and 6
22) Implement a process for undertaking periodic assessments of performance against the Plan and for implementing corrective action to ensure targets are achieved.	Section 1.
23) Where the subject is a non-recurring event such as weddings or concert, identify ways of reducing GHG emissions to the maximum extent commensurate with enabling the event to meet its intended objectives before the event takes place and include post event review to determine whether or not the expected minimization in emissions has been achieved.	Not applicable
24) For any reductions in the GHG emissions from the defined subject delivered in the period immediately prior to the baseline date and not otherwise taken into account in any GHG emissions quantification (historic reductions), confirm:	Not applicable

QES Checklist Requirements	Response
<ul style="list-style-type: none"> the period from which these reductions are to be included; that the required data is available and that calculations have been undertaken using the same methodology throughout; that assessment of historic reduction has been made in accordance with this PAS, reporting the quantity of historic reductions claimed in parallel with the report of total reduction. 	
25) Record the number of times that the declaration of commitment has been renewed without declaration of achievement.	Not applicable
26) Specify the type of conformity assessment: a) independent third party certification; b) other party validation; c) self-validation.	Other party validation
27) Include statements of validation where declarations of commitment to carbon neutrality are validated by a third party certifier or second party organizations	Validated by SCS Global Services (other party/second party)
28) Date the QES and have it signed by the senior representative of the entity concerned (e.g. CEO of a corporation; Divisional Director, where the subject is a division of a larger entity; the Chairman of a town council or the head of the household for a family group).	Section 2 and 5
29) Make QES publicly available and provide a reference to any freely accessible information upon which substantiation depends (e.g. via websites).	Final QES to be made publicly available via the New Belgium Brewing Company website
30) Update the QES to reflect changes and actions that could affect the validity of the declaration of commitment to carbon neutrality.	Not Applicable

Table C2. Checklist for QES supporting declaration of achievement to carbon neutrality (based on Table B.2 of the PAS 2060: 2014 standard).

QES Checklist Requirements	Response
1) Define standard and methodology used to determine its GHG emissions reduction	Beverage Industry Environmental Roundtable (BIER). (2019) "Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance" in accordance with WRI GHG Protocol
2) Confirm that the methodology used was applied in accordance with its provisions and the principles set out in PAS 2060 were met.	Refer to Section 2
3) Provide justification for the selection of the methodologies chosen to quantify reductions in the carbon footprint, including all assumptions and calculations made and any assessment of uncertainty.	The methodology prescribed in the BIER guidelines aligns with WRI's Product Life Cycle Accounting and Report Standard and is specific to the product sector.
4) Describe the means by which reductions have been achieved and any applicable assumptions or justifications	Section 4.
5) Ensure that there has been no change to the definition of the subject.	Section 2 and 5
6) Describe the actual reductions achieved in absolute and intensity terms and as a percentage of the original carbon footprint.	Section 3
7) State the baseline/qualification date.	Section 5.
8) Record the percentage economic growth rate for the given application period used as a threshold for recognizing reductions in intensity terms	Section 3
9) Provide an explanation for circumstances where a GHG reduction in intensity terms is accompanied by an increase in absolute terms for the determined subject.	Not Applicable

QES Checklist Requirements	Response
10) Select and document the standard and methodology used to achieve carbon offset.	Section 6
11) Confirm that	
a) Offsets generated or allowance credits surrendered represent genuine, additional GHG emission reductions elsewhere	Section 6
b) Projects involved in delivering offsets meet the criteria of additionality, permanence, leakage and double counting.	Section 6
c) Carbon offsets are verified by an independent third party verifier.	Section 6
d) Credits from carbon offset projects are only issued after the emission reductions	Section 6
e) Credits from carbon offset projects are retired within 12 months from the date of the declaration of achievement	Section 6
f) Provision for event related option of 36 months to be added here	Not applicable
g) Credits from carbon offset projects are supported by publicly available project documentation on a registry which shall provide information about the offset project, quantification methodology and validation and verification procedures	Section 6
h) Credits from carbon offset projects are stored and retired in an independent credible registry	Section 6
12) Document the quantity or GHG emissions credits and the type and nature of credits actually purchased including the number and type of credits used and the time period over which credits were generated	
a) Which ghg emissions have been offset	Section 4 and 6.
b) The actual amount of carbon offset	Section 6
c) The type of credits and projects involved	Section 6
d) The number and type of carbon credits used and the time period over which the credits have been generated	Section 6
e) For events, a rationale to support any retirement of credits in excess of 12 months including details of any legacy emission savings, taken into account	Not applicable
f) Information regarding the retirement/cancellation of carbon credits to prevent their use by others including a link to the registry or equivalent publicly available record, where the credit has been retired	Section 6
13) Specify the type of conformity assessment	Other party validation , OPV-3
14) include statements of validation where declarations of achievement of carbon neutrality are validated by a third party certifier or second party organizations	Validated by SCS Global Services (other party/second party).
15) Date the QES and have it signed by the senior representative of the entity concerned	Section 5 of this document
16) Make QES publicly available and provide a reference to any freely accessible information upon which substantiation depends (e.g. via websites).	Final QES to be made publicly available via the New Belgium Brewing Company website

Qualifying Explanatory Statement

According to PAS 2060:2014

*Achievement of and Commitment to Product
Carbon Neutrality for Mountain Time® Lager*

Prepared for:
New Belgium Brewing Company

Date Completed:
February 22, 2024

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1.0 Introduction

New Belgium Brewing Company (New Belgium), maker of Mountain Time® Lager (Mountain Time®) and many other beers, is a leading craft brewing company headquartered in Fort Collins, Colorado with breweries in Fort Collins, Colorado and Asheville, North Carolina. Founded in 1991, New Belgium is an early leader in corporate sustainability, having commissioned the first carbon footprint study for beer in 2007, focused on a 6-pack of Fat Tire® Amber Ale. In 2022 the company purchased Bell's Brewery and has more than 1,300 employees nationwide. The combined company is owned by Lion Little World, a subsidiary of Kirin Holdings.

Since its founding, New Belgium has included environmental stewardship as a core value and key aim. As the effects of climate change are starting to appear in the supply chain and general marketplace, accelerating carbon neutral goals is a top priority for New Belgium. Voluntary commitments include: (1) carbon neutral certification for all beers by 2030, (2) sourcing 100% renewable electricity by 2030 or sooner (under Kirin and listed in [RE100](#)), and (3) An absolute reduction in GHG emissions in alignment with the Science Based Targets Initiative limiting warming to 1.5° C (under Kirin and listed in the [SBTI registry](#)).

This document forms the PAS 2060 Qualifying Explanatory Statement to demonstrate that Mountain Time® products have achieved carbon neutrality in accordance with PAS 2060:2014 on January 1, 2022 for calendar year 2022, with commitment to maintain carbon neutrality through December 31, 2023. All information provided within this report has been reviewed and verified by a third party.

This document will be updated at least every 12 months to reflect New Belgium's status toward its carbon neutrality targets. The report is publicly available at www.drinkfattire.com/drink-sustainably/.

2.0 Declaration of commitment to carbon neutrality

New Belgium is fully committed to achieving carbon neutrality for our Mountain Time® product line, in all formats as of 2019 and to maintain this commitment through 2023. We are pleased to have reached this goal through a variety of high-impact carbon offset projects, as documented and independently certified below.



PAS 2060: 2014 Other Party Validation Requirement	Response
Individual responsible:	Walker Modic, Director, Environmental Programs
Entity making declaration:	New Belgium Brewing Company
Subject of PAS 2060 declaration:	Mountain Time® Lager
Description of subject:	See Table 2
Function of Subject:	Serve as an alcoholic beverage
Rationale for selection of the subject:	The scope and subject of this PAS 2060 includes entire product life cycle emissions including the following: (i) raw material extraction and processing (ii) production and packaging and (iii) product distribution, retail and consumption and (iv) end-of-life.
Boundaries of the subject	The scope and subject of this PAS 2060 includes entire product life cycle emissions including the following: (i) raw material extraction and processing (ii) production and packaging and (iii) product distribution, retail and consumption and (iv) end-of-life.
What type of conformity assessment has been undertaken?	OPV-3: Other party validation- unified (achievement and commitment)
Confirmation that methodology was applied in conformance with PAS 2060:2014	The application of the methodology conforms to principles set out in clause 6.1.2 of PAS 2060:2014.
Baseline period for PAS 2060: 2014 program:	1st January 2019- 31st December 2019
Achievement period:	1 st January 2022- 31st December 2022
Commitment period:	1 st January 2023- 31st December 2023
Standard for assessment of GHG emissions	GHG Protocol Product Life Cycle Accounting and Reporting Standard; The Beverage Industry Greenhouse Gas Emissions Sector Guidance.
Justification of assessment method	The methodology prescribed in the guidelines aligns with WRI's Product Life Cycle Accounting and Report Standard, meets PAS 2060 requirements, and is specific to the product sector.
Product Carbon Footprint Results	See Table 3A in Section 3 Mountain Time® 2022 Carbon Footprint
Executive Signature: Walker Modic Director, Environmental Programs	

3.0 Mountain Time® Lager Carbon Footprint

3.1 Introduction

The foundation of a carbon neutral certification is a full lifecycle carbon footprint analysis. This section describes the carbon footprint for Mountain Time® for calendar year 2022. Analysis of the carbon footprint allows prioritization of key action areas for greenhouse gas emissions reduction in both the short term and long term.

The terms “carbon emissions” and “greenhouse gas (GHG) emissions” are used interchangeably throughout the report.

3.2 Methodology

The methodology for the product carbon footprint accounting followed WRI GHG Protocol Product Standard¹, in conformance with the requirements of PAS 2060:2014². The Beverage Industry Environmental Roundtable (BIER) Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance³ was also instrumental in guiding the modeling of greenhouse gas emissions. The system boundary and calculation methodology for product carbon footprints were based on the BIER guidance⁴. The methodology for quantifying product footprints in the underlying assessment meets the accounting requirements and the publication of this document on the New Belgium website meets the communication requirements of WRI’s Product Life Cycle Accounting and Report Standard a GHG assessment standard approved by PAS 2060:2014⁵.

The assessment includes GHG emissions across the product life cycle for the following phases: (i) raw material extraction and processing, (ii) production and packaging, and (iii) product distribution, retail and consumption and (iv) end-of-life. These calculations were made and reported prior to the purchase of any carbon offsets by New Belgium.

The Scope 1-3 categorization of the WRI GHG Protocol does not apply to product carbon footprints. This PCF takes into account all emissions, direct and indirect, with the exception of those related to exclusions, see section 3.4.6, across the product life cycle.

The Mountain Time® carbon footprint was verified by Thomas P. Gloria, an independent LCA expert from Industrial Ecology Consultants⁶.

Table 2. General information and scope of the PCF.

Product Assessed	Mountain Time® Lager
Product Description	Mountain Time® Lager is produced with a variety of malts and hops and 4.4% alcohol by volume.

¹ Greenhouse Gas Protocol. Product Life Cycle Accounting and Reporting Standard. World Resources Institute, and World Business Council for Sustainable Development. 2013.

² The British Standards Institution. (2014). PAS 2060:2014: Specification for the demonstration of carbon neutrality.

³ Beverage Industry Environmental Roundtable (BIER). (2019) “Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance.”

⁴ Beverage Industry Environmental Roundtable (BIER) (2018). “The Beverage Industry Greenhouse Gas Emissions Sector Guidance. Version 4.0” <https://www.bierroundtable.com/publication/greenhouse-gas-emissions-sector-guidance/>

⁵ See Appendix A in WRI’s Product Life Cycle Accounting and Report Standard.

⁶ <http://www.industrial-ecology.com/>

Unit of Analysis	12-fl oz of beer available in different packaging types: 12-fl oz glass bottle 12-fl oz aluminum can 19.2-fl oz aluminum can 1 slim keg (1/6 bbl or 660-fl oz - also for commercial consumption) 1 standard size keg (1/2 bbl or 15.5 U.S. gallons - for commercial consumption)
Reference Flow	12-fl oz (355 mL) of packaged Mountain Time® Lager
Type of GHG Inventory	Cradle-to-Grave
Time Period	2022, calendar year

Emissions are reported in MT CO₂e, in line with PAS 2060, and includes the emissions of all applicable Kyoto protocol pollutants, namely Carbon Dioxide, Methane, Nitrous Oxide, Sulfur Hexafluoride and refrigerants.

3.2.1 The Product System under Study

New Belgium Mountain Time® is a craft beer of New Belgium Brewery produced in their brewing facilities located in Fort Collins, Colorado and Asheville, North Carolina. In 2022, Mountain Time® was only produced in the Fort Collins brewery. The product system was modeled based on primary data and information provided by New Belgium. The study included several key data requirements:

- Purchased material inputs to Mountain Time® (malted barley, hops, CO₂, water, primary and secondary packaging),
- Material weights per product for primary packaging and secondary packaging,
- Scrap generated during the packaging process for packaging,
- Transportation data for Mountain Time® raw materials,
- Primary data for New Belgium operations, including energy use and waste generation,
- Primary data on product distribution,
- Secondary data to estimate the electricity consumed during product use
- Secondary data from the Ecoinvent v3.9.1 database for many unit processes with a prioritization for data with the highest degree of representativeness of the actual material or process

Representative inventory data for many unit processes was selected using secondary data from the Ecoinvent⁷ life cycle database with a prioritization for data with the highest degree of representativeness of the actual material or process.

Life cycle modeling of Mountain Time® was divided into the following distinct life cycle phases:

⁷ Ecoinvent Centre (2018) Ecoinvent data from v3.5. Swiss Center for Life Cycle Inventories, Dübendorf, 2017 <http://www.Ecoinvent.org>

- **Material acquisition and pre-processing:** This stage begins with agricultural production of the main ingredients, barley and hops. Barley production has been found to be a major contributor to the carbon footprint of beer in previous PCFs⁸, by requiring the use of seed production, irrigation, agricultural machinery, pesticide and herbicide use and production and tillage. Once barley has been harvested it is transferred to a malting facility where it is germinated and dried to produce malt, a process that requires water and energy. This stage includes GHG impacts associated with the transportation of these material inputs to the facility in Fort Collins, CO, and ends when the product components enter the gate of the respective production facilities. Additionally, included in this stage is the extraction of resources from nature for production components and packaging materials. Packaging has also been found to be a significant contributor to the overall product carbon footprint⁹, depending upon the material used. Purchased CO₂ transportation is included in the scope, but the production of CO₂ is excluded as per the BIER guidelines because of the particular CO₂ is a byproduct of a biogenic process. The release of biogas (CO₂) is also excluded as the origin of this CO₂ was from carbon uptake.
- **Production:** The production stage begins when the product components enter the brewery and ends when the packaged beverage leaves the production gate for distribution. The functional unit is 12-fl oz of beer packaged in a variety of different types of packaging. It includes GHG emissions from energy use and emissions associated with brewing and packaging of the finished Mountain Time®.
- **Product Distribution and Retail:** This stage begins when the finished product leaves the gate of the Fort Collins brewery and continues until it is transported to a retail vendor. It represents the greenhouse gas emissions associated with transport of the finished product from the breweries to various distributors.
- **Product Use:** The use stage includes the retail and consumer energy use to cool the beer prior to consumption.
- **End-of-Life:** This stage includes greenhouse gas emissions from transport of product packaging to waste treatment facilities and from waste treatment activities, landfill or incineration, from product packaging. Recycling processes are not included due to the use of the recycled content cut-off allocation method; in the recycled content approach, only the benefit from using recycled materials is accounted for (i.e., zero burden from prior life cycle), while the impact from recycling a waste material is attributed to the product system that utilizes the recycled material. No credit is applied to a product system that produces a material that will be recycled. For on-premise consumption, kegs are collected and may be reused 100 times or more. Previous studies have modeled keg re-use 70 times¹⁰. New Belgium notes that their kegs are re-used hundreds of times but unable to measure the number with certainty.

⁸ State of Oregon Department of Environmental Quality (2017). *Food Product Environmental Footprint Literature Summary: Beer*. <https://www.oregon.gov/deq/FilterDocs/PEF-Beer-FullReport.pdf>

⁹ Cimini and Moresi (2016). *Carbon footprint of a pale lager packed in different formats: assessment and sensitivity analysis based on transparent data*. *Journal of Cleaner Production* 112: 4196- 4213.

¹⁰ Cimini and Moresi (2016). *Carbon footprint of a pale lager packed in different formats: assessment and sensitivity analysis based on transparent data*. *Journal of Cleaner Production* 112: 4196- 4213.

3.2.2 Allocation Procedures

Allocation is required when a single product system produces more than one product. Allocation addresses the problem of how to divide resource use, energy use and emissions between multiple products produced at the same production facility. For instance, the Fort Collins facility brews multiple types of beer, and in cases where the data was available specifically for Mountain Time® production, this data was used. In cases where only facility-level data was available, resource use was allocated to the beers by the proportion of Mountain Time® to total beer production at that facility on a volume basis. Allocation guidelines in ISO 14044, the GHG Protocol Product Standard and PAS 2060, state that wherever possible, the use of allocation should be minimized. However, if allocation is required, ISO 14044 and the GHG Protocol state that a physical allocation approach, in this case based on volume of the different types of beer produced, should be used preferentially over economic allocation. For this reason, a volume-based allocation approach was used where necessary.

This volume-based allocation method was applied to determine the amount of energy and resource inputs relative to one 12 oz serving of Mountain Time® produced at the Fort Collins facility.

Allocation used within the secondary databases utilized for the system is primarily based on physical relationships. Impacts from transportation were allocated based on the mass of material multiplied by the distance transported.

3.2.3 Cut-off Criteria

All significant inputs and outputs relevant to the Mountain Time® product system were included in the PCF calculations with the exception of some materials which represent less than 1% of total greenhouse gas emissions, namely yeast and minor brewing ingredients, packaging adhesives and shrink wrap. Impacts associated with capital goods (e.g. machinery, trucks, infrastructure), overhead operations (e.g. facility lighting), corporate activities (e.g. research and development, travel) are defined as non-attributable processes and are also excluded based on ISO 14044 and the GHG Protocol. All known materials and processes contributing greater than 1% of the total greenhouse gas emissions were included in the life cycle inventory.

3.2.4 Carbon Footprint Methodology and Interpretation Used

Greenhouse gas (GHG) emissions were calculated by multiplying life cycle inventory data, also referred to as activity data by the GHG Protocol, by an emission factor that represents the total, fossil, biogenic, and LULUC CO₂-eq emissions associated with producing one unit of the required input or output. All

contributing GHGs, included in the IPCC AR6 (2021) assessment, for all sources and sinks within the life cycle system boundary for the assessed products were included. Life cycle inventory, or activity data, consists of the inputs and outputs required to satisfy the functional unit (12-fl oz of packaged beer). A variety of databases and published literature were used to acquire the emission factors used to calculate the Mountain Time® product carbon footprints and include the Ecoinvent v3.9.1 database¹¹ extracted using openLCA v2.0.1¹² software, BIER guidance on the carbon footprint of a beer¹³, the US EPA GHG Emission Factor Hub¹⁴, and the IPCC AR6 GWPs¹⁵. These are summarized in Section 3.1, Table 14.

Excel was used to calculate the Mountain Time® carbon footprints from New Belgium’s life cycle inventory data and the emission factors used.

Results are reported in units of grams CO₂ eq across the life cycle, as well as by contributing life cycle phase. Greenhouse gas emissions are also summarized separately for fossil, biogenic, and land use and use change (LULUC) emissions. All LULUC emissions were calculated using the openLCA v2.0.1 software, which utilized Ecoinvent processes and the openLCA IPCC 2021 impact method. Emission factors used by BIER and the US EPA GHG Emission Factor hub did not subcategorize the source of the impact (i.e., it did not provide information on the GWPs produced from LULUC impacts).

3.3 Product lifecycle boundaries

This footprint includes “cradle-to-grave” GHG emissions associated with Mountain Time® in all forms and packaging, brewed at the Fort Collins, CO facility. Shown below is a process map for the entire lifecycle of Mountain Time® beer from raw ingredients through final consumption by consumers.

The process map in Figure 1 defines the life cycle stages and illustrates the key processes contributing measurably to category indicator results for the greenhouse gas indicators specified in the GHG Protocol Product Standard. Impacts associated with capital goods (e.g., machinery, trucks, infrastructure), overhead operations (e.g., office lighting), corporate activities (e.g. research and development, travel) are defined as non-attributable processes and are not included in the PCF.

¹¹ Ecoinvent Centre (2022). Ecoinvent data from v3.9. Swiss Center for Life Cycle Inventories, Dübendorf, 2022
<http://www.Ecoinvent.org>

¹² GreenDelta, 2023. openLCA 2.0. <https://www.openlca.org/openlca/>

¹³ Beverage Industry Environmental Roundtable (BIER). (2012) "Research on the Carbon Footprint of Beer."

¹⁴ US EPA, 2022. 2022 GHG Emission Factors Hub. <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>

¹⁵ ERCE, 2021. IPCC Sixth Assessment Report Global Warming Potentials. <https://erce.energy/erceipccsixthassessment/>

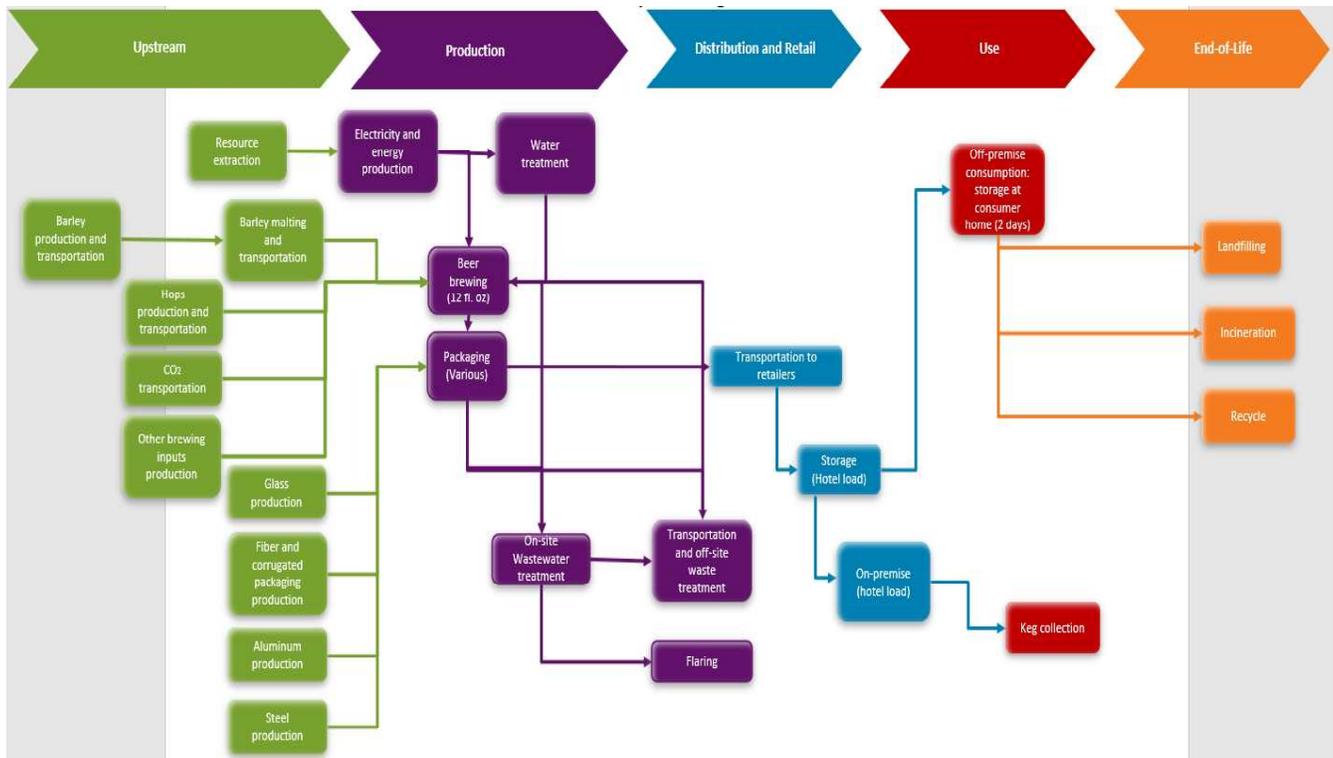


Figure 1. Process map illustrating the key processing included by life cycle stage of 12-fl oz of Mountain Time® beer.

3.4 Total carbon footprint

The GHG emissions for all Mountain Time® products produced between January 1, 2022 and December 31, 2022 equals 2,073 MT CO₂e. Comparing these results to the baseline year (2019) shows on an absolute basis, the GHG emissions for Mountain Time® increased from 684 MT CO₂e in 2019 to 2,073 MT CO₂e in 2022. This increase can be attributed to a 225% increase in the production of Mountain Time® from 2019 to 2022. The number of 12-fl oz servings of Mountain Time® in 2019 was 2,052,038 compared to 6,670,423 in 2022. Using the total 12-fl oz servings to convert the GHG emissions for 2019 and 2022 to an intensity-based figure, results in .33 Kgs CO₂e per 12-fl oz serving in 2019 versus .31 Kgs CO₂e per 12 ounce serving in 2022. This equates to a 6% decrease in GHG emissions in 2022. Table 3A and 3B summarize the GHG emission results for 2022 and 2019 respectively.

Table 3A. The cradle-to-grave product carbon footprint, total 2022 12oz servings, and total 2022 emissions of the Mountain Time Lager® products assessed in this PCF for 2022. Note – annual totals are expressed in metric tons CO₂e.

Product	Cradle-to-Grave per serving (g CO ₂ e)	Total servings (12-fl oz/ 355mL) by packaged product	Cradle-to-Grave Total (2022) (MT CO ₂ e)	Cradle-to-Grave Total (Kgs CO ₂ e/12-fl oz)
12-fl oz bottle	450	329,013	148	-
12-fl oz can	345	4,378,440	1,513	-
19.2-fl oz can	345	12,863	4	-
Slim Keg	212	0	0	-
Standard keg	209	1,950,107	408	-
TOTAL	-	6,670,423	2,073	.31

* Some totals may not add up due to rounding.

Table 3B. Summary of cradle-to-grave product carbon footprint for Mountain Time®, and the total Cradle to Grave for all Mountain Time® products, for 2019. Note – annual totals are expressed in metric tons CO₂e.

Product	Cradle-to-Grave per serving (g CO ₂ e)	Total servings (12-fl oz/ 355mL) by packaged product	Cradle-to-Grave Total (2019) (MT CO ₂ e)	Cradle-to-Grave Total (Kgs CO ₂ e/12-fl oz)
12-fl oz can	376	1,352,149	509	-
19.2-fl oz can	372	122,710	46	-
Standard keg	224	577,179	129	-
TOTAL	-	2,052,038	684	.33

* Some totals may not add up due to rounding.

The results for 2019 baseline period represent a recalculation over the initial baseline period. This is a requirement of the GHG Protocol when significant methodological changes have been made. The changes include accounting for the upstream impacts of fuel production, changes to the distribution method from the 2020 and 2021 CFs, and differentiated activity data for each product depending upon their production in Fort Collins (for Mountain Time®).

The emission factors in this recalculation are taken from the 2022 Product Carbon Footprint Report. Both the 2019 and 2022 Carbon Footprints are calculated using 100-year Global Warming Potentials (GWPs) from IPCC AR6 (2021)¹⁶ and are reported in grams CO₂e. Tables 4A through 4E summarize the GHG emissions for 2022 by the individual products.

¹⁶ IPCC is the Intergovernmental Panel on Climate Change (<http://www.ipcc.ch/>).

Table 4A. Summary of cradle-to-grave product carbon footprint absolute results for 12-fl oz (355 mL) of Mountain Time® in a 12-fl oz aluminum can, calculated using IPCC 2021 metrics. *

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	345	213	55.1	24.6	50.9	1.77
Fossil CO ₂ eq	g CO ₂ eq	307	187	44.6	24.6	50.8	-
Biogenic CO ₂ eq	g CO ₂ eq	16.9	14.4	0.216	0.143	2.21	-
LULUC CO ₂ eq	g CO ₂ eq	0.699	0.656	3.93x10 ⁻³	1.29x10 ⁻²	2.60x10 ⁻²	-

Table 4B. Summary of cradle-to-grave product carbon footprint absolute results for 12-fl oz (355 mL) of Mountain Time®, packaged in a 19.2-fl oz aluminum can, calculated using IPCC 2021 metrics. *

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	345	211	55.1	24.5	50.8	2.68
Fossil CO ₂ eq	g CO ₂ eq	305	185	44.6	24.5	50.8	-
Biogenic CO ₂ eq	g CO ₂ eq	25.8	23.3	0.216	0.142	0.221	-
LULUC CO ₂ eq	g CO ₂ eq	0.656	0.614	3.93x10 ⁻³	1.28x10 ⁻²	2.60x10 ⁻²	-

Table 4C. Summary of cradle-to-grave product carbon footprint absolute results for 12-fl oz (355 mL) of Mountain Time®, packaged in a 12- fl oz glass bottle, calculated using IPCC 2021 metrics*

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	450	294	55.1	36.8	55.4	8.16
Fossil CO ₂ eq	g CO ₂ eq	404	267	44.6	36.7	55.3	-
Biogenic CO ₂ eq	g CO ₂ eq	39.6	36.8	0.216	0.213	0.241	-
LULUC CO ₂ eq	g CO ₂ eq	0.280	0.229	3.93x10 ⁻³	1.92x10 ⁻²	2.83x ⁻²	-

Table 4D. Summary of cradle-to-grave product carbon footprint absolute results for 12-fl oz (355 mL) of Mountain Time®, packaged in a slim keg (1/6 bbl, 660-fl oz), calculated using IPCC 2021 metrics*

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	212	88.0	55.1	31.7	37.3	0.323
Fossil CO ₂ eq	g CO ₂ eq	178	64.0	44.6	31.7	37.2	-
Biogenic CO ₂ eq	g CO ₂ eq	2.70	0.680	0.216	0.184	0.162	-
LULUC CO ₂ eq	g CO ₂ eq	4.98x10 ⁻²	1.03x10 ⁻²	3.93x10 ⁻³	1.66x10 ⁻²	1.91x10 ⁻²	-

Table 4E. Summary of cradle-to-grave product carbon footprint absolute results for 12-fl oz (355 mL) of Mountain Time®, packaged in a keg (1/2 bbl, 1,984-fl oz), calculated using IPCC 2021 metrics*

Greenhouse Gas Indicators	Units	Total (cradle-to-grave)	Upstream Materials	Production	Distribution	Product Use	End-of-Life (packaging)
Cradle-to-Grave Carbon Footprint							
Total	g CO₂ eq	209	87.4	55.1	29.2	37.3	0.222
Fossil CO ₂ eq	g CO ₂ eq	174	63.3	44.6	29.2	37.2	-
Biogenic CO ₂ eq	g CO ₂ eq	2.66	0.656	0.216	0.170	1.62	-
LULUC CO ₂ eq	g CO ₂ eq	4.85x10 ⁻²	1.03x10 ⁻²	3.93x10 ⁻³	1.53x10 ⁻²	1.91x10 ⁻²	-

*Results are rounded to three significant figures. Some totals may not add up due to rounding.

3.4.1 Upstream Emissions

The processes covered in the Upstream Materials life cycle stage include both cultivation of ingredients and raw material processing for the agricultural products (malted barley and hops), primary packaging (glass, aluminum, and steel), secondary packaging (corrugated cardboard), CO₂ liquefaction, and the transportation of raw materials to New Belgium’s Fort Collins brewery.

Barley cultivation consists of the seed production, irrigation, fertilizer and pesticide use, soil emissions, and agricultural machinery for agricultural products; the barley is then transported to a malting facility where it is partially dried, then transported to the breweries. Carbon dioxide is purchased as a byproduct from a fertilizer producer and used as a barrier between the beer and oxygen throughout the brewing process except for fermentation. It is also used to push draft beer from the keg to the faucet.

Other minor components and ingredients of the manufacturing process, such as yeast, were used in small amounts, and assumed to contribute less than 1% of environmental impact and no more than 5% when summed together. Based on these considerations they were excluded.

The mass of packaging materials allocated to each Mountain Time® product are based on the quantity of packaged products in 2022 and the mass of packaging materials for each product. Production loss (scrap losses) for aluminum and glass products are based upon the aluminum and glass wastes produced at the Fort Collins, CO brewery in 2022. Production loss for the corrugated cardboard packaging materials during the packaging process are based upon the difference between packaging materials received and those shipped in 2022. Packaging for on-premise consumption is done by New Belgium and is transferred to distributor. The distributor collects kegs, and a third party collects and transports empty kegs back to New Belgium, as needed.

3.4.2 Production Emissions

The Mountain Time® production processes begin with the receipt of upstream materials, and continues with brewing, packaging, and waste treatment. Mountain Time® was only produced at the NBB facility in Fort Collins, CO. in 2022. This production facility produces additional beer products. The production site contains multiple operation sites, including the main brewery, water treatment (PWTP), aerobic and anaerobic digestion facilities, flaring of biogas produced during anaerobic digestion, and out-of-scope operations such as the medical clinic and offices.

The manufacturing facilities make use of the following processes which contribute to the overall greenhouse gas emissions:

- *Natural gas combustion.* Data calculated based on natural gas purchases for Fort Collins brewery, includes natural gas used at all buildings (FTC: Main brewery, PWTP, Distribution Center). The natural gas for facilities outside of the brewing scope is assumed to be insignificant.
- *Flaring,* from biogas produced during anaerobic digestion of organic manufacturing wastes. Data calculated by New Belgium using the flow rate of flaring and amount of time flaring took place. The methane content of the biogas was determined to be 75.3% by New Belgium in previous analyses, and the flaring efficiency was 98% for FTC based upon GHG Protocol Documentation and the Manufacturer specifications.
- *Fugitive emissions,* calculated from charged refrigerant purchases, and calculated CO₂ losses while assisting beer pushing.
- *Purchased electricity,* calculated from monthly meter readings. The Ecoinvent v3.9.1 database was used to model the life cycle impacts from consumed electricity; however, the grid mix was updated based on the 2022 eGRID resource mix for the RMPA eGRID subregions¹⁷, which were used for the Fort Collins, Colorado (FTC) facility.
- *Manufacturing wastes,* includes consideration of transportation for recycling, transportation to and emissions from landfilling, incineration, and composting of wastes generated at the brewery.
- *Manufacturing byproducts,* Transportation for three manufacturing byproducts: spent grains which are sold to agricultural applications, spent yeast which are also sold; and land-applied sludge produced as a byproduct of anaerobic digestion.
- *Biomass:* Cogeneration of biogas was not calculated as the source of the CO₂ released was from biogenic uptake.

¹⁷ US EPA, 2023. eGRID Data Explorer. <https://www.epa.gov/egrid/data-explorer>

3.4.3 Distribution Emissions

Mountain Time® is produced in Fort Collins, CO and shipped to domestically by truck transport with .81% shipped internationally. Distribution is based upon the assumption that 95 beer barrels (bbls), or approximately 2,950 gallons, are contained in a shipment, an assumption made by New Belgium.

3.4.4 Retail and Product Use Emissions

Products are sold from third parties for consumption on or off-premise. On-premise consumption refers to the hotel load and cooling of kegs for draught beer at hotels, bars, restaurants, etc. Off-premise consumption refers to the hotel load and cooling required for bottles and cans at a liquor store, convenience store, or supermarket and final consumption by the consumer at home. Retail scenarios are based on input from the manufacturer and BIER documentation guidelines^{18,19}. Assumptions about the average electricity use and average retail size are based on the EIA Consumer Building Energy Consumption Survey (CBECS). The breakdown of product sold at convenience stores and larger, supermarket-type retailers is taken from primary data obtained from NBB.

Once consumers arrive at home with their product, additional refrigeration and energy are often required prior to final consumption. Assumptions and calculations for at-home refrigeration are based on the BIER documentation. Emissions from electricity used for both on-premise and off-premise retail and use are based upon the 2022 US national average electricity supply mix derived from eGRID because Mountain Time® is purchased and consumed throughout the US. It is assumed that retail and product use in international locations is significantly similar to that in the US given that much of consumption is in European and OECD countries, and international consumption consists of .69% of total consumption.

3.4.5 End-of-Life Emissions

At end-of-life the packaging materials are disposed of. No specific data are available regarding the specific waste processing of Mountain Time® packaging materials. It is assumed that after consumption, the packaging materials are transported to a waste treatment facility. The type of waste treatment, by packaging material type, is taken from the US Environmental Protection Agency²⁰ data for packaging materials.

Table 5. Assumed management for Mountain Time® packaging materials at end of life by material type.

Packaging	Landfilled	Incinerated	Recycled
Glass	55%	13%	31%

¹⁸ Beverage Industry Environmental Roundtable (BIER). (2019) "Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance."

¹⁹ Beverage Industry Environmental Roundtable (BIER). (2012) "Research on the Carbon Footprint of Beer."

²⁰ US Environmental Protection Agency. 2020. "Advancing Sustainable Materials Management: 2018 Fact Sheet." https://www.epa.gov/sites/production/files/2019-11/documents/2017_facts_and_figures_fact_sheet_final.pdf

Aluminum	52%	13%	35%
Fiberboard	15%	4%	81%
Steel	21%	5%	74%

Transportation at end of life assumes a 20-mile average distance to disposal, consistent with assumptions used in the US EPA WARM model²¹.

3.4.6 Exclusions

All significant inputs and outputs relevant to the Mountain Time® product system are included in the product carbon footprint calculations with the exception of some materials which represent less than 1% of total impact. All known materials and processes contributing greater than 1% of the total environmental impact indicator for each impact were included in the life cycle inventory. Notable omissions of less than 1% of total impact include yeast, minor brewing ingredients, packaging adhesives, and shrink wrap.

4.0 Mountain Time® Lager Carbon Management Plan

4.1 Introduction

New Belgium Brewing Company, maker of Fat Tire® Amber Ale (Fat Tire®), Mountain Time® Lager and a host of other brands is headquartered in Fort Collins, Colorado with an east coast brewery in Asheville, NC. Since its founding in 1991, New Belgium has been a leader in sustainability, becoming the first wind-powered brewery in 1999, commissioning the first carbon footprint study for a beer in 2008 and becoming the first craft brewer in the United States to achieve carbon neutral certification in 2019 for its flagship beer, Fat Tire®. In 2022 the company purchased Bell’s Brewery and has more than 1,300 coworkers nationwide. The combined company is owned by Lion Little World, a subsidiary of Kirin Holdings.

For over 30 years, New Belgium has prioritized environmental stewardship as a core value and key aim. With the effects of climate change already impacting the craft brewing supply chain and being felt across the globe, accelerating action to avert the worst impacts is a top priority for New Belgium. Voluntary commitments include (1) carbon neutral certification for all beers by 2030, (2) sourcing 100% renewable electricity by 2030 (under our parent company Kirin listed in RE100), and (3) absolute reduction in GHG emissions in alignment with the Science-Based Targets Initiative, limiting warming to 1.5 Celsius. A 55% reduction in Scopes 1-2, 30% reduction in Scope 3 (under our parent company Kirin listed in the SBTi registry).

²¹ "WARM Model Transportation Research - Draft." Memorandum from ICF Consulting to United States Environmental Protection Agency. September 7, 2004. <http://epa.gov/epawaste/conservation/tools/warm/SWMGHGreport.html#background>.

This document will be updated at least every 12 months to reflect New Belgium's status toward its carbon neutrality targets. The report is publicly available at www.drinkfattire.com/drink-sustainably/

4.2 Mountain Time® Lager base year carbon footprint

The carbon footprint as described in section 3 used primary data from calendar year 2022 as the baseline for this carbon neutral achievement and commitment.

4.3 Historic and ongoing reduction in emissions

For 30+ years New Belgium has been targeting resource conservation and GHG emissions reductions. Beginning in the original basement brewhouse the company's cofounder rigged a rudimentary heat exchanger onto the kettle capturing and reusing heat energy from the boil. In the 1990s and with every expansion, energy efficiency was designed into buildings and multiple heat capture and reuse technologies were implemented wherever possible. In 1999, coworkers offered up annual profit sharing to help bring wind power to the City of Fort Collins, making New Belgium the first wind-powered brewery in the United States. In the 2000s, a project to light-weight glass bottles reduced emissions from the production and shipping of these containers. Eliminating cardboard dividers in 12-packs has also saved both weight and space on trucks. In 2002 an onsite process water treatment plant began capturing methane-rich biogas and the addition of combined heat and power (CHP) engines converts the biogas to electricity helping power brewing operations. With a recent upgrade, our 500 KW CHP engine is producing roughly 1,000,000 KWs per year and about 2 million gallons of heated brewing water from waste heat. In the 2010s, New Belgium installed – what was at the time – the largest privately-owned solar array in Colorado. In 2011, company sales reps moved to 100% electric vehicles and hybrid delivery trucks. Onsite charging stations are available for both coworkers and guests. Instead of locating our large-scale expansion at our current site in Colorado, we chose North Carolina to reduce the emissions from cross-country shipping. The buildings on this new campus are all LEED-certified at Silver, Gold, or Platinum levels. In 2022 the Asheville brewery installed a 446 KW solar array estimated to produced 620,000 kWh of electricity annually. The new solar array along with several other capital expenditures representing \$1+ million in investments will reduce CO₂e emissions by an estimated 700 metric tons/year.

To drive GHG reductions in our value chain, New Belgium's philanthropy program has provided grants to barley breeders to support the development of more climate-friendly and climate-resilient barley varieties. In 2015 New Belgium co-founded the Glass Recycling Coalition, a value-chain-led organization that seeks to improve glass recycling in the United States, a necessary step in reducing GHG emissions from glass bottles. Partially as a result of our efforts in 2018, the City Council in Fort Collins adopted its own 100% renewable electricity by 2030 goal. As 100% renewable electricity is most efficiently achieved at scale, New Belgium is active in policy advocacy at local, state, and national levels. In 2020 we brewed Torched Earth Ale to demonstrate what the future of beer could taste like if climate change continues unchecked. We followed

this up by publishing the entirety of our carbon neutral blueprint for businesses to help others take action to reduce their GHG emissions and join us on the road to carbon neutrality (www.drinkfattere.com/drink-sustainably/).

Each of the initiatives listed above and more are ongoing at New Belgium targeting emissions reductions related to Mountain Time® Fat Tire® and every other beer we brew.

4.4 Future emissions reduction plan

We've allocated over \$6 million for capital expenditures in 2024 to be used in decarbonizing our breweries that make Fat Tire and Mountain Time Lager. Ahead of those expenditures, there was substantial work in 2023 that went into design, planning, engineering, and procurement to integrate three significant projects. One of these will capture biogas from our on-site wastewater treatment plant in Asheville, NC and blend it with natural gas in the brewery boilers netting an estimated savings of 400,000 kg CO₂e annually. A second project located at our Fort Collins, CO brewery will pilot a 650-kW thermal electrified boiler. When powered by renewable electricity the AtmosZero boiler will provide steam without Scope 1 GHG emissions. Finally, at our Fort Collins location in late 2024 we will commission a CO₂ collection system to recover fermentative CO₂ so it can be repurposed in our brewing processes and net an annual CO₂e reduction of 2,000 metric tons. We'll continue to evaluate emerging technologies and low to no carbon energy sources for brewery operations.

As 86% of New Belgium's annual GHG emissions are a result of upstream and downstream activities, i.e., non-manufacturing related emissions, we also recognize a need to reduce emissions within our value chain. In 2022 New Belgium launched a Sustainable Supplier Program aimed at helping suppliers reduce emissions related to our top three sources. One element of the program is an interactive supplier portal providing guidance and resources to help suppliers decarbonize. Through the portal we are collecting emissions data from suppliers of categories that represent 52% of Scope 3 emissions, increasing our understanding of New Belgium's Scope 3 impact.

Carbon neutral certification for Fat Tire® and Mountain Time® in 2022 has been achieved through historical GHG reductions and the purchase of carbon offsets and will be followed by a continued effort to reduce actual GHG emissions throughout the lifecycle of these and other beers.

4.5 The use of carbon offsets

For unavoidable GHG emissions with the lifecycle of Mountain Time®, New Belgium will purchase carbon offsets to satisfy requirements for carbon neutral certification. The credits will be sourced from projects that meet the following criteria: 1) create genuine, additional reductions in GHG emissions free of double-counting, (2) ensure a high level of confidence in permanence, (3) avoid and fully account for leakage and error, (4) verified by an independent, certified third party verifier, (5) issued after the emission reduction

has taken place, (6) meet nationally recognized standards established by credible organizations and stored and retired within their registries with publicly available documentation, (7) align with our source of emissions and value chain.

5.0 Declaration of achievement of carbon neutrality for 2022

PAS 2060: 2014 Other Party Validation Requirement	Response
Achievement period	1 st January 2022- 31st December 2022
Carbon footprint of the subject during the achievement period	.31 Kgs CO ₂ e per 12-fl oz serving (intensity basis)
Means by which reductions have been achieved	Carbon offsetting
Standard and methodology used to achieve carbon offset	See Section 6.
Carbon offsetting information required to comply with clause 9.1.2	See Section 6
What type of conformity assessment has been undertaken?	OPV-3: Other party validation- unified (achievement and commitment)
Standard for assessment of GHG emissions	The Beverage Industry Greenhouse Gas Emissions Sector Guidance. The methodology prescribed in the guidelines aligns with WRI's Product Life Cycle Accounting and Report Standard.
Date	04/01/24
Executive Signature: Walker Modic Director, Environmental Programs	

6.0 Carbon offsetting

Carbon offsets equivalent to 2,073 MT CO₂e have been purchased from the following projects to achieve carbon neutral certification for Mountain Time® for the calendar year of 2022. Note that the total number of offsets purchased by New Belgium Brewing exceeds the product carbon footprint of the subject during the achievement period.

Project 1

Project Title and ID Number:

HT HFC Reclamation Project Campaign 2021; ACR-US-818-2021-1810-404407 to 404670 and ACR-US-818-2021-1810-406371 to 432281

Country: United States

Country: United States

Project Type: Industrial Process Emissions

Project Standard: American Carbon Registry

Methodology Used: Certified Reclaimed HFC Refrigerants, Propellants, and Fire Suppressants

Vintage: 2021

Project documentation database link:

<https://acr2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=10124&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc> and

<https://acr2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=9862&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc>

Alignment with New Belgium selection criteria: **Supporting recovery and reuse of HFC refrigerants used in refrigeration of beer.**

Project 2

Project Title and ID Number: **Indigo U.S. Project No. 1; CAR-1-US-1459-47-1002-MA-2018-7513-1801 to 2400; CAR-1-US-1459-47-1002-MA-2019-7511-4801 to 6500; CAR-1-US-1459-47-1002-MA-2020-7509-6101 to 8200 and CAR-1-US-1459-47-1002-MA-2021-7507-7301 to 9400**

Country: **United States**

Project Type: **Soil Enrichment**

Project Standard: **Climate Action Reserve**

Methodology Used: **U.S. Soil Enrichment Protocol V 1.1**

Vintage: **2018, 2019, 2020 & 2021**

Project documentation database link:

<https://thereserve2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=13401&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc>;

<https://thereserve2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=13402&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc>;

<https://thereserve2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=13403&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc>;

<https://thereserve2.apx.com/mymodule/rpt/CertificateInfo.asp?rhid=13404&ftType=PRO&r=206&ad=Prpt&act=update&type=PRO&aProj=icrt&tablename=doc>

Alignment with New Belgium selection criteria: **Supporting sequestration of emissions related to fugitive emissions, transportation, and fiber packaging.**

Appendix A: Secondary Data and Emissions Factors

Component	Dataset/ Emission Factor	Source	Publication Date
FAT TIRE and MOUNTAIN TIME			
Barley	barley production barley grain Cutoff, U - CA-QC	Ecoinvent v3.9.1	2022
Malt	Malting emissions per serving	BIER Carbon Footprint ²²	2012
Hops	Hops production per serving	BIER Carbon Footprint ²⁸	2012
CO ₂	CO ₂ liquefaction electricity intensity; Electricity emission factor from US 2022 grid mix;	CO ₂ supplier eGRID	2008 2023
PACKAGING			
Glass	packaging glass production, brown packaging glass, brown Cutoff, U - RER w/o CH+DE	Ecoinvent v3.9.1	2022
Aluminum	Custom dataset built in Ecoinvent based on LCI data taken from the following reports: "Life Cycle Assessment of North American Aluminum Cans" "Updated Life Cycle Analysis of Aluminum Production and Semi-Fabrication for the GREET Model"	Ecoinvent v3.9.1 Sphera for The Aluminum Association Argonne National Laboratory	2022 2021 2015
Steel kegs	sheet rolling, steel sheet rolling, steel Cutoff, U - RER steel production, converter, low-alloyed steel, low-alloyed Cutoff, U - RER steel production, electric, low-alloyed steel, low-alloyed Cutoff, U - Europe without Switzerland and Austria	Ecoinvent v3.9.1	2022
Corrugated	market for corrugated board box corrugated board box Cutoff, U - US	Ecoinvent v3.9.1	2022
PRODUCTION			
Electricity	Ecoinvent datasets edited to reflect 2022 electricity mix of eGRID subregions: market for electricity, medium voltage electricity, medium voltage Cutoff, U - SERC market for electricity, medium voltage electricity, medium voltage Cutoff, U - WECC, US only	Grid mixes for eGRID 2022 subregions RMPA and SRVC, Ecoinvent v3.9.1	2023 2022
Natural Gas	heat production, natural gas, at boiler condensing modulating >100kW heat, district or industrial, natural gas Cutoff, U - Europe without Switzerland	Ecoinvent v3.9.1	2022
Flaring	Primary data from New Belgium; 2% efficiency assumption from WRI, 2016 ²³	New Belgium	2023
Wastewater Treatment	Electricity intensity based on 2008 published LCA ²⁴	The Climate Conservancy	2008
PRODUCT USE			

²² Note: BIER documentation is from 2012 and references IPCC 2006 document that uses IPCC Third Assessment Report. Methane emissions may be underestimated using TAR report. Product CFs remain unchanged with increased methane emission factor.

²³ World Resources Institute (WRI) (2016) "https://ghgprotocol.org/sites/default/files/standards/WRI16_WorkingPaper_FF.pdf

²⁴ The Climate Conservancy, 2008. The Carbon Footprint of Fat Tire®. https://www.ess.uci.edu/~sjdavis/pubs/Fat_Tire_2008.pdf

Component	Dataset/ Emission Factor	Source	Publication Date
Use and Retail	Cooling and hotel load calculated with assumptions from BIER ²⁵ ;	BIER Carbon Footprint	2012
	NBB assumptions used for refrigerator size, bottles per refrigerator and related factors;		
	data on electricity consumption and sq ft for retail from EIA CBECS 2012 building survey ²⁶ ;	EIA CBECS	2012
	Electricity emissions from US 2022 grid mix,	eGRID2020	2023
TRANSPORTATION			
Truck	market for transport, freight, lorry 16-32 metric ton, EURO4 Cutoff, U	Ecoinvent v3.9.1	2022
Rail	market for transport, freight train transport, freight train Cutoff, U - US	Ecoinvent v3.9.1	2022
Shipping	transport, freight, sea, transoceanic ship transport, freight, sea, transoceanic ship Cutoff, U	Ecoinvent v3.9.1	2022
END-OF-LIFE			
Landfill	Material and waste treatment specific emission factors, including transport to treatment facility	US EPA 2022 GHG Emission Factor Hub	2023
Incineration	Material and waste treatment specific emission factors, including transport to treatment facility	US EPA 2022 GHG Emission Factor Hub	2023
Compost	Material and waste treatment specific emission factors, including transport to treatment facility	US EPA 2022 GHG Emission Factor Hub	2023

²⁵ Beverage Industry Environmental Roundtable (BIER). (2012) "Research on the Carbon Footprint of Beer."

²⁶ US EIA, 2012. Commercial Buildings Energy Consumption Survey (CBECS).

<https://www.eia.gov/consumption/commercial/data/2012/#b22-b33>

Appendix B: Carbon Footprint Assurance Statement



Industrial Ecology Consultants

Statement of Verification of Product Carbon Footprints

New Belgium Brewery Company

Verification Scope

Industrial Ecology Consultants (IEC) has conducted a verification of *New Belgium Brewing Company's* Carbon Footprint for their *Fat Tire® Amber Ale* and *Mountain Time® Lager* products. IEC conducted the desktop review using documentation supplied by SCS Global Services as the basis for the evaluation.

Verification Objectives

- Evaluate whether *New Belgium Brewing Company's Fat Tire® Amber Ale* and *Mountain Time® Lager* product carbon footprints are in accordance with:
 - Greenhouse Gas Protocol. Product Life Cycle Accounting and Reporting Standard. World Resources Institute, and World Business Council for Sustainable Development. 2013.
 - ISO 14044:2006 Environmental management – Life Cycle Assessment – Requirements and guidelines.
 - Beverage Industry Environmental Roundtable (BIER). (2019) "Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance."
 - The British Standards Institution. (2014). PAS 2060:2014 : Specification for the demonstration of carbon neutrality.
- Evaluate reasonableness of *New Belgium Brewing Company's Fat Tire® Amber Ale* and *Mountain Time® Lager* product carbon footprints based on review of project documentation, calculation procedures and data sources.
- Develop a Product Carbon Footprint Assurance Statement for *New Belgium Brewing Company's Fat Tire® Amber Ale* and *Mountain Time® Lager* product.

Verification Opinion

This Verification Statement documents that IEC has conducted verification activities in compliance with the:

- World Resources Institute, and World Business Council for Sustainable Development. 2013.
- ISO 14044:2006 Environmental management – Life Cycle Assessment – Requirements and guidelines.
- Beverage Industry Environmental Roundtable (BIER). (2019) "Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance."
- The British Standards Institution. (2014). PAS 2060:2014 : Specification for the demonstration of carbon neutrality.

IEC finds *New Belgium Brewing Company's* Product Carbon Footprint assertion for the *Fat Tire® Amber Ale* and *Mountain Time® Lager* products materially correct and a fair representation of the GHG emissions associated with the cradle-to-grave life cycle of the products.



Thomas P. Gloria PhD
Chief Sustainability Engineer
Industrial Ecology Consultants
Verification Date: March 5th, 2024
Certificate Number: IEC-PCF-24003

Appendix C: Qualifying explanatory statements (QES) checklists

In accordance with PAS 2060: 2014 requirements, the QES checklist to support declaration of commitment to carbon neutrality is provided in the table below.

Table C1. Checklist for QES supporting declaration of commitment to carbon neutrality (based on Table B.1 of the PAS 2060: 2014 standard).

QES Checklist Requirements	Response
1) Identify the individual responsible for the evaluation and provision of data necessary for the substantiation of the declaration including that of preparing, substantiating, communicating and maintaining the declaration.	Refer to Section 2
2) Identify the entity responsible for making the declaration.	Refer to Section 2
3) Identify the subject of the declaration.	Refer to Section 2
4) Explain the rationale for the selection of the subject.	Refer to Section 2
5) Define the boundaries of the subject.	Refer to Section 2
6) Identify all characteristics (purposes, objectives or functionality) inherent to that subject.	Refer to Section 2
7) Identify and take into consideration all activities material to the fulfilment, achievement or delivery of the purposes, objectives or functionality of the subject.	Refer to Sections 2 and 3
8) Select which of the 3 options within PAS 2060 you intend to follow.	Refer to section 2
9) Identify the date by which the entity plans to achieve the status of “carbon neutrality” of the subject and specify the period for which the entity intends to maintain that status.	Refer to section 2
10) Select an appropriate standard and methodology for defining the subject, the GHG emissions associated with that subject and the calculation of the carbon footprint for the defined subject.	Refer to section 2
11) Provide justification for the selection of the methodology chosen.	Refer to section 2
12) Confirm that the selected methodology was applied in accordance with its provisions and the principles set out in PAS 2060.	Refer to section 2
13) Describe the actual types of GHG emissions, classification of emissions (Scope 1, 2 or 3) and size of carbon footprint of the subject exclusive of any purchases of carbon offsets.	Refer to section 3
a) All greenhouse gases shall be included and converted into tCO ₂ e.	Refer to section 3
b) 100% Scope 1 (direct) emissions relevant to the subject shall be included when determining the carbon footprint.	Refer to section 3. Scope categorization not applicable to product footprint
c) 100% Scope 2 (indirect) emissions relevant to the subject shall be included when determining the carbon footprint.	Refer to section 3. Scope categorization not applicable to product footprint.
d) Where estimates of GHG emissions are used in the quantification of the subject carbon footprint (particularly when associated with scope 3 emissions) these shall be determined in a manner that precludes underestimation.	Refer to section 3. Scope categorization not applicable to product footprint.
e) Scope 1, 2 or 3 emission source estimated to be more than 1% of the total carbon footprint shall be taken into consideration unless evidence can be provided to demonstrate that such quantification would not be technically feasible or cost effective.	Refer to section 3.
f) The quantified carbon footprint shall cover at least 95% of the emissions from the subject.	Refer to section 3.
g) Where a single source contributes more than 50% of the total emissions, the 95% threshold applies to the remaining sources of emissions.	No source contributes over 50% of emissions. Refer to section 3.
h) Any exclusion and the reason for that exclusion shall be documented.	Refer to section 3.

QES Checklist Requirements	Response
14) Where the subject is an organization/company or part thereof, ensure that:	Subject is not an organization.
a) Boundaries are a true and fair representation of the organization's GHG emissions (i.e., shall include all GHG emissions relating to core operations including subsidiaries owned and operated by the organization).	Subject is not an organization.
b) Either the equity share or control approach has been used to define which GHG emissions are included. Under the equity share approach, the entity accounts for GHG emissions from the subject according to its share of equity in the subject. Under the control approach, the entity shall account for 100% of the GHG emissions over which it has financial and/or operational control.	Subject is not an organization.
15) Identify if the subject is part of an organization or a specific site or location and treat as a discrete operation with its own purpose, objectives and functionality.	Subject is not an organization.
16) Where the subject is a product or service, include all Scope 3 emissions (as the lifecycle of the product/service needs to be taken into consideration).	Refer to section 3. Scope categorization not applicable to product footprint.
17) Describe the actual methods used to quantify GHG emissions (e.g. use of primary or secondary data), the measurement unit(s) applied, the period of application and the size of the resulting carbon footprint.	Refer to section 3.
18) Provide details of, and explanation for, the exclusion of any Scope 3 emissions.	Refer to section 3. Scope categorization not applicable to product footprint.
19) Document all assumptions and calculations made in quantifying GHG emissions and in the selection or development of greenhouse gas emission factors.	Section 3
20) Document your assessments of uncertainty and variability associated with defining boundaries and quantifying GHG emissions including the positive tolerances adopted in association with emission estimates.	Section 3
21) Document carbon footprint management plan:	Refer to section 4.
a) Make a statement of commitment to carbon neutrality for the defined subject.	Section 2 and 4.
b) Set timescales for achieving carbon neutrality for the defined subject.	Section 4.
c) Specify targets for GHG reduction for the defined subject appropriate to the timescale for achieving carbon neutrality including the baseline date, the first qualification date and the first application period.	Section 4.
d) Document the planned means of achieving and maintaining GHG emissions reductions including assumptions made and any justification of the techniques and measures to be employed to reduce GHG emissions.	Section 4.
e) Specify the offset strategy including an estimate of the quantity of GHG emissions to be offset, the nature of the offsets and the likely number and type of credits.	Section 4 and 6
22) Implement a process for undertaking periodic assessments of performance against the Plan and for implementing corrective action to ensure targets are achieved.	Section 1.
23) Where the subject is a non-recurring event such as weddings or concert, identify ways of reducing GHG emissions to the maximum extent commensurate with enabling the event to meet its intended objectives before the event takes place and include post event review to determine whether or not the expected minimization in emissions has been achieved.	Not applicable
24) For any reductions in the GHG emissions from the defined subject delivered in the period immediately prior to the baseline date and not otherwise taken into account in any GHG emissions quantification (historic reductions), confirm: <ul style="list-style-type: none"> • the period from which these reductions are to be included; • that the required data is available and that calculations have been undertaken using the same methodology throughout; 	Not applicable

QES Checklist Requirements	Response
<ul style="list-style-type: none"> that assessment of historic reduction has been made in accordance with this PAS, reporting the quantity of historic reductions claimed in parallel with the report of total reduction. 	
25) Record the number of times that the declaration of commitment has been renewed without declaration of achievement.	Not applicable
26) Specify the type of conformity assessment: a) independent third party certification; b) other party validation; c) self-validation.	Other party validation
27) Include statements of validation where declarations of commitment to carbon neutrality are validated by a third party certifier or second party organizations	Validated by SCS Global Services (other party/second party)
28) Date the QES and have it signed by the senior representative of the entity concerned (e.g. CEO of a corporation; Divisional Director, where the subject is a division of a larger entity; the Chairman of a town council or the head of the household for a family group).	Section 2 and 5
29) Make QES publicly available and provide a reference to any freely accessible information upon which substantiation depends (e.g. via websites).	Final QES to be made publicly available via the New Belgium Brewing Company website
30) Update the QES to reflect changes and actions that could affect the validity of the declaration of commitment to carbon neutrality.	Not Applicable

Table C2. Checklist for QES supporting declaration of achievement to carbon neutrality (based on Table B.2 of the PAS 2060: 2014 standard).

QES Checklist Requirements	Response
1) Define standard and methodology used to determine its GHG emissions reduction	Beverage Industry Environmental Roundtable (BIER). (2019) "Beverage Industry Greenhouse Gas (GHG) Emissions Sector Guidance" in accordance with WRI GHG Protocol
2) Confirm that the methodology used was applied in accordance with its provisions and the principles set out in PAS 2060 were met.	Refer to Section 2
3) Provide justification for the selection of the methodologies chosen to quantify reductions in the carbon footprint, including all assumptions and calculations made and any assessment of uncertainty.	The methodology prescribed in the BIER guidelines aligns with WRI's Product Life Cycle Accounting and Report Standard and is specific to the product sector.
4) Describe the means by which reductions have been achieved and any applicable assumptions or justifications	Section 4.
5) Ensure that there has been no change to the definition of the subject.	Section 2 and 5
6) Describe the actual reductions achieved in absolute and intensity terms and as a percentage of the original carbon footprint.	Section 3
7) State the baseline/qualification date.	Section 5
8) Record the percentage economic growth rate for the given application period used as a threshold for recognizing reductions in intensity terms	section 3
9) Provide an explanation for circumstances where a GHG reduction in intensity terms is accompanied by an increase in absolute terms for the determined subject.	Section 3
10) Select and document the standard and methodology used to achieve carbon offset.	Section 6
11) Confirm that	

QES Checklist Requirements	Response
a) Offsets generated or allowance credits surrendered represent genuine, additional GHG emission reductions elsewhere	Section 6
b) Projects involved in delivering offsets meet the criteria of additionality, permanence, leakage and double counting.	Section 6
c) Carbon offsets are verified by an independent third party verifier.	Section 6
d) Credits from carbon offset projects are only issued after the emission reductions	Section 6
e) Credits from carbon offset projects are retired within 12 months from the date of the declaration of achievement	Section 6
f) Provision for event related option of 36 months to be added here	Not applicable
g) Credits from carbon offset projects are supported by publicly available project documentation on a registry which shall provide information about the offset project, quantification methodology and validation and verification procedures	Section 6
h) Credits from carbon offset projects are stored and retired in an independent credible registry	Section 6
12) Document the quantity of GHG emissions credits and the type and nature of credits actually purchased including the number and type of credits used and the time period over which credits were generated	
a) Which ghg emissions have been offset	Section 4 and 6.
b) The actual amount of carbon offset	Section 6
c) The type of credits and projects involved	Section 6
d) The number and type of carbon credits used and the time period over which the credits have been generated	Section 6
e) For events, a rationale to support any retirement of credits in excess of 12 months including details of any legacy emission savings, taken into account	Not applicable
f) Information regarding the retirement/cancellation of carbon credits to prevent their use by others including a link to the registry or equivalent publicly available record, where the credit has been retired	Section 6
13) Specify the type of conformity assessment	Other party validation , OPV-3
14) include statements of validation where declarations of achievement of carbon neutrality are validated by a third party certifier or second party organizations	Validated by SCS Global Services (other party/second party).
15) Date the QES and have it signed by the senior representative of the entity concerned	Section 5 of this document
16) Make QES publicly available and provide a reference to any freely accessible information upon which substantiation depends (e.g. via websites).	Final QES to be made publicly available via the New Belgium Brewing Company website