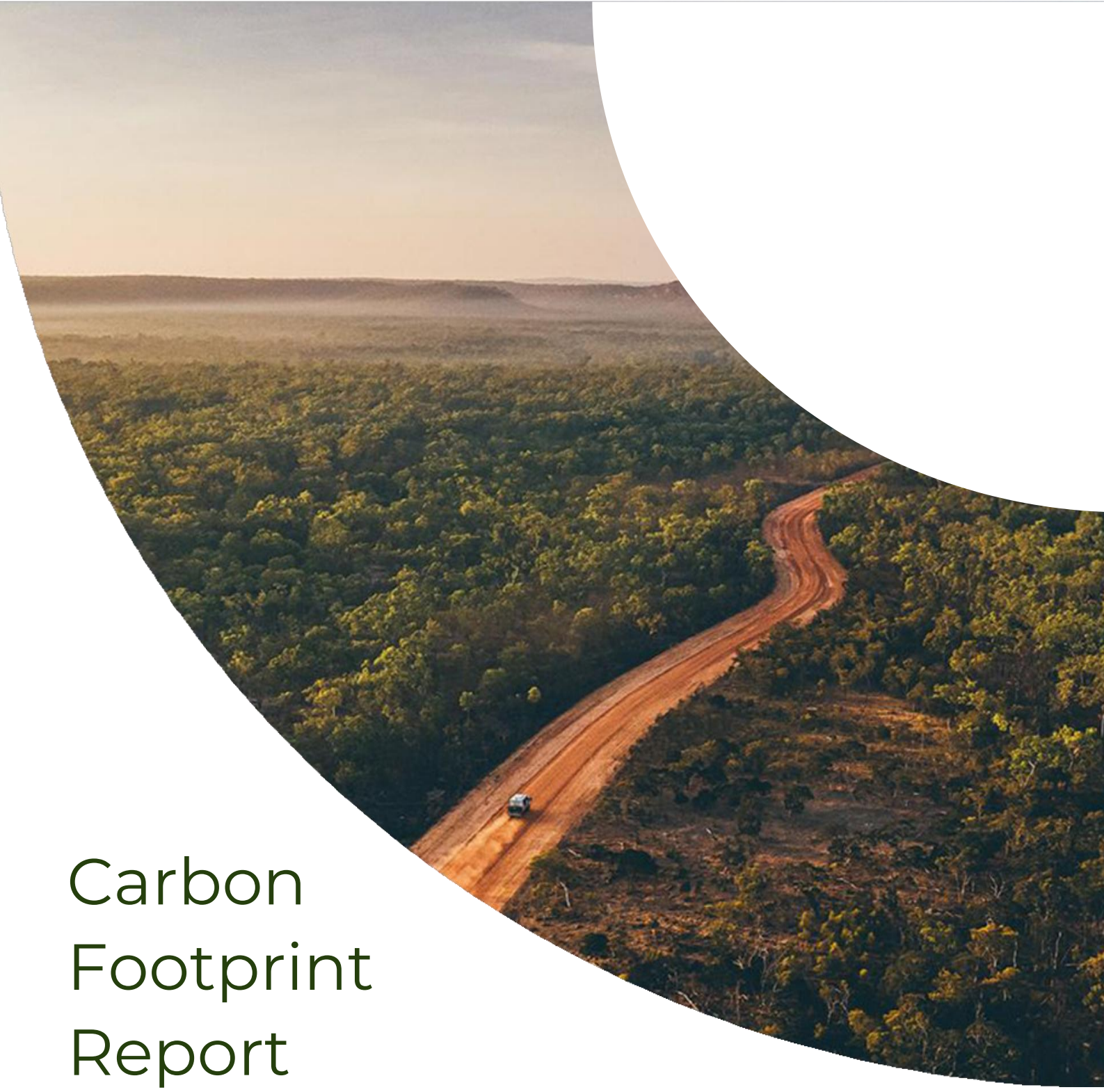

# Carbon Footprint Report

Final Version 1.1a

For **Rocky Ridge Brewing Co**

1 July 2022 to 30 June 2023

carbonneutral®

**Carbon Neutral Pty Ltd**

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# Disclaimer

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# Abbreviations

| | |
|---|---|
| $CH_4$ | Methane |
| $CO_2$ | Carbon dioxide |
| $CO_2$-e | Carbon dioxide equivalent |
| COD | Chemical Oxygen Demand |
| DBEIS | Department for Business, Energy & Industrial Strategy (UK) |
| EF | Emission factor |
| EPiC | Environmental Performance in Construction |
| GHG | Greenhouse gas |
| GJ. | Gigajoule |
| HSBI | Hotel Sustainability Benchmarking Index |
| HVAC | Heating, Ventilation and Air Conditioning |
| kg | Kilogram |
| kL | Kilolitre |
| kWh | Kilowatt-hour |
| L | Litre |
| ML | Mega litre |
| $N_20$ | Nitrous oxide |
| NGA. | National Greenhouse Accounts |
| $NO_x$ | Nitrogen oxides |
| PFC | Perfluorinated compound |
| p.km | Passenger kilometre |
| RFI | Radiative forcing index |
| RRBC | Rocky Ridge Brewing Co |
| t | Tonnes |
| t.km | Tonne kilometre |
| UK | United Kingdom |
| WBCSD | World Building Council for Sustainable Development |
| WRI | World Resources Institute |
| WTT | well to tank |

# Executive Summary

This Organisational Greenhouse Gas Inventory report has been prepared to assist Rocky Ridge Brewing Co (RRBC) understand its carbon footprint and set achievable targets to reduce its emissions.

This document describes the calculation boundaries, calculation methodologies, assumptions, measurement results, and key references used to prepare the Financial Year 2023 (FY23) greenhouse gas (GHG) inventory.

Scope 1, 2 and 3 GHG emissions in RRBC's operations and value chain have been included.

**RRBC's total organisational GHG emissions have been estimated at 1,000.88 tonnes of carbon dioxide equivalent (t $CO_2$-e) for the period 1 July 2022 to 30 June 2023.**

This is an increase on Gross GHG emissions from FY22 (877.71 t $CO_2$-e).

**After allowances for carbon offset air travel, net GHG emissions prior to the retirement of any other offsets are estimated at 994.68 t $CO_2$-e.**

The main GHG emitting activities were associated with purchased goods and services and stationary equipment fuel use.

31.4% of GHG emissions resulted from RRBC's Scope 1 (direct) fuel consumption and upstream freight. Scope 1 emitting activities were predominantly associated with stationary equipment use and on-site wastewater disposal.

0% of GHG emissions were related to grid supplied electricity use at RRBC's TapHouse facility (scope 2) when determined using the market based approach as 100% renewable energy is used at this facility.

68.6% of gross GHG emissions resulted from Scope 3 activities associated with RRBC's supply chain.

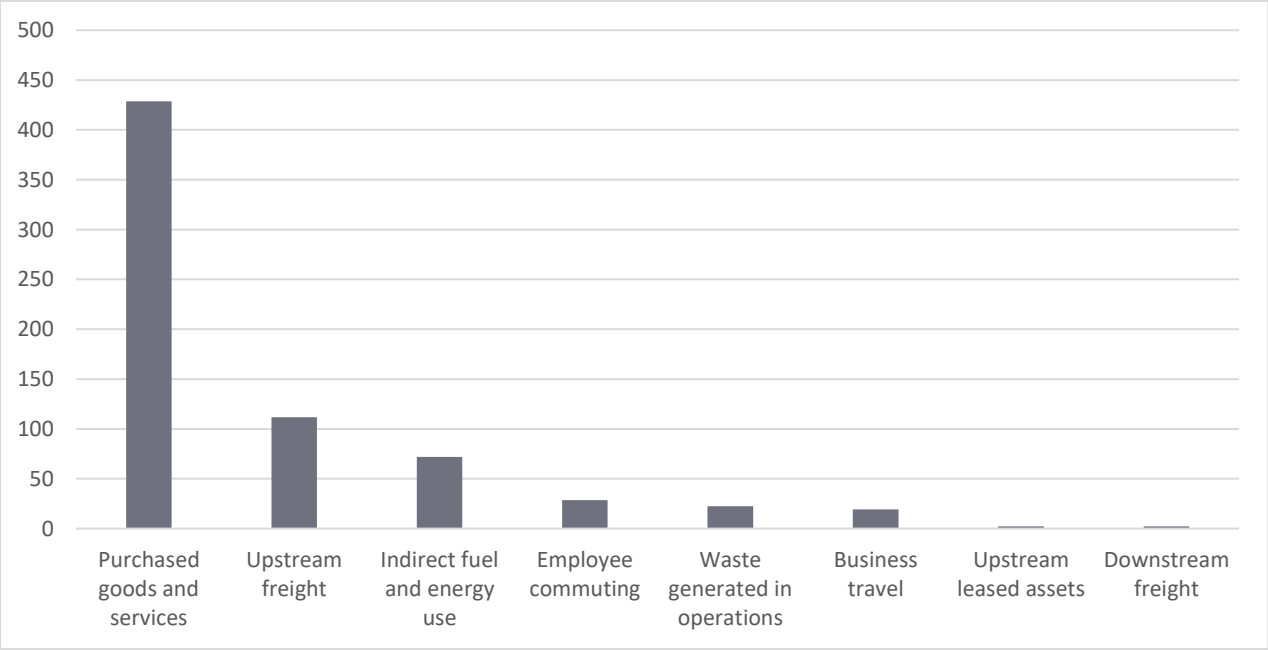


Figure 1 Summary of RRBC's emissions FY23.

# About Carbon Neutral

Carbon Neutral is a well-renowned Australian owned carbon solutions consultancy and offsets provider. We have over 22 years of experience and we have worked with over a thousand partners and organisations to deliver tangible climate change solutions.

Carbon Neutral assists organisations across Australia to minimise their impact on our environment by measuring, reducing and offsetting greenhouse gas emissions.  Carbon Neutral is a market leader, has built a strong reputation within the low carbon economy and was the developer of the first web-based vehicle emissions calculator in Australia.

Carbon Neutral's services include Carbon Consulting and Reduction Programs, carbon calculators, retailing of carbon offsets, developing biodiverse reforestation projects, energy and water auditing, and Environmental Management System development and implementation. To date, Carbon Neutral has planted 30+ million trees in rural Australia.

Carbon Neutral is a long-standing, award-winning organisation that works with partners and businesses of all sizes to enrich landscapes, reduce the effects of climate crisis and deliver practical carbon solutions.

We are an independently certified (Climate Active) carbon neutral organisation.

# About Rocky Ridge Brewing Co

Rocky Ridge Brewing Co (RRBC) is a family-owned business and producer of preservative free beer, made with predominantly locally sourced ingredients (Figure 2). The business is fiercely proud of growing the barley and the maority of hops used in its beer in an ecologically sustainable way.

Its core vision is one of sustainability and the business has implemented many practices to reduce its environmental footprint.

As well as the brewery, which is located on the family farm in Jindong, RRBC operates a cellar door/TapHouse in Busselton. It has a small head office located in shared facilities in West Leederville.

Business activity continues to grow compared to previous reporting periods both at its production facility which produced 21% more beer than the previous reporting period as well as for its TapHouse facility which was affected by COVID in FY22.

This is the fourth year that RRBC has estimated its emissions. Emissions from previous reporting periods have been offset by the business using carbon offsets.

Figure 2 Rocky Ridge Brewing Company (Image retrieved online on 26/04/2024).

# Organisational Boundary

RRBC's GHG emissions scope and organisational boundary have been determined in accordance with the GHG Protocol (World Business Council for Sustainable Development, World Resources Institute, 2004). The boundary follows the operational control model and includes the aspects of RRBC's supply chain that they have influence over (see Figure 3). GHG emissions from the organisation have been included and reported on where activity data was captured and recorded.

The business is deemed to have operational control over its brewery and TapHouse facilities.

Emissions associated with the operation of the family farm other than brewery operations are not included in the emissions boundary. Emissions from a small leased office space in West Leederville has minimal energy use associated with its use.

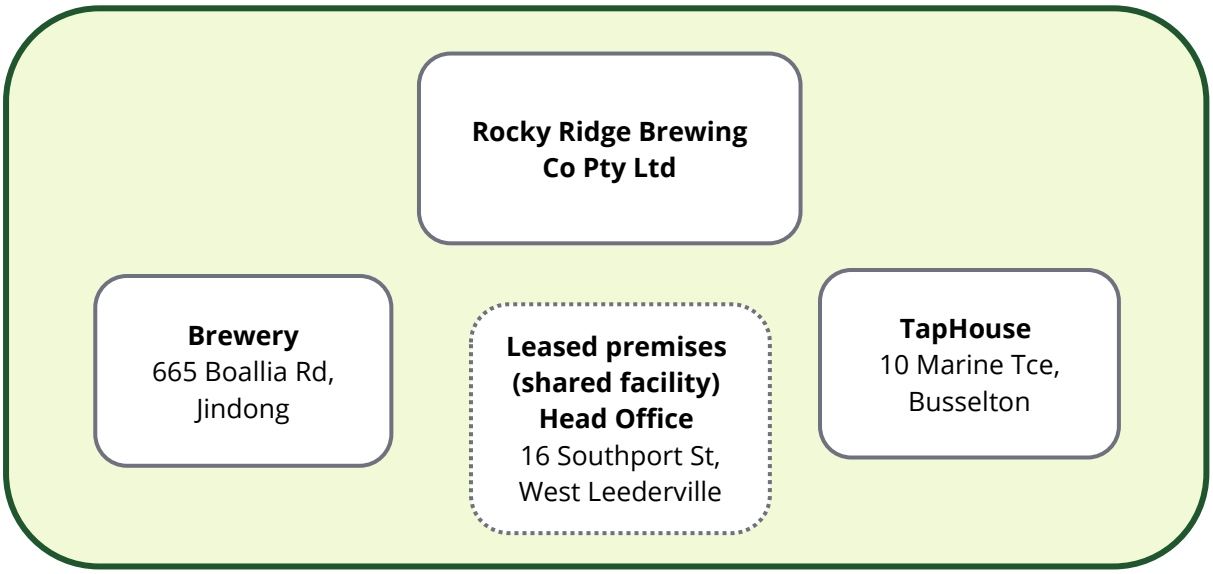


Figure 3 Organisational boundary of RRBC FY23 carbon footprint report.

# Emissions Scope

The seven key greenhouse gas sources recognised by the IPCC have been considered in this assessment, and include:

+ Carbon dioxide ($CO_2$),
+ Methane ($CH_4$),
+ Nitrous oxide ($N_20$),
+ Hydrofluorocarbons (HFCs),
+ Perfluorocarbons (PFCs),
+ Sulphur hexafluoride ($SF_6$) and,
+ Nitrogen trifluoride ($NF_3$)

All different sources are included and reported on as units of carbon dioxide equivalents ($CO_2$-e). This provides the ability to compare various greenhouse gasses as a single unit.

### Classification Method

The GHG Protocol categorises GHG emissions into three 'scopes' (see Figure 4).

### Scope 1

Direct GHG emissions from operations owned or controlled by the reporting company (e.g. emissions from fuel consumed by equipment and vehicles, on-site wastewater emissions and composting).

### Scope 2

Indirect emissions from the generation of purchased electricity or steam consumed by RRBC (e.g. indirect emissions from electricity consumption from the grid for TapHouse).

### Scope 3

Other indirect emissions (not included in Scope 2) that occur in the value chain of RRBC.

Activities included in this GHG emissions inventory are shown in Figure 5.

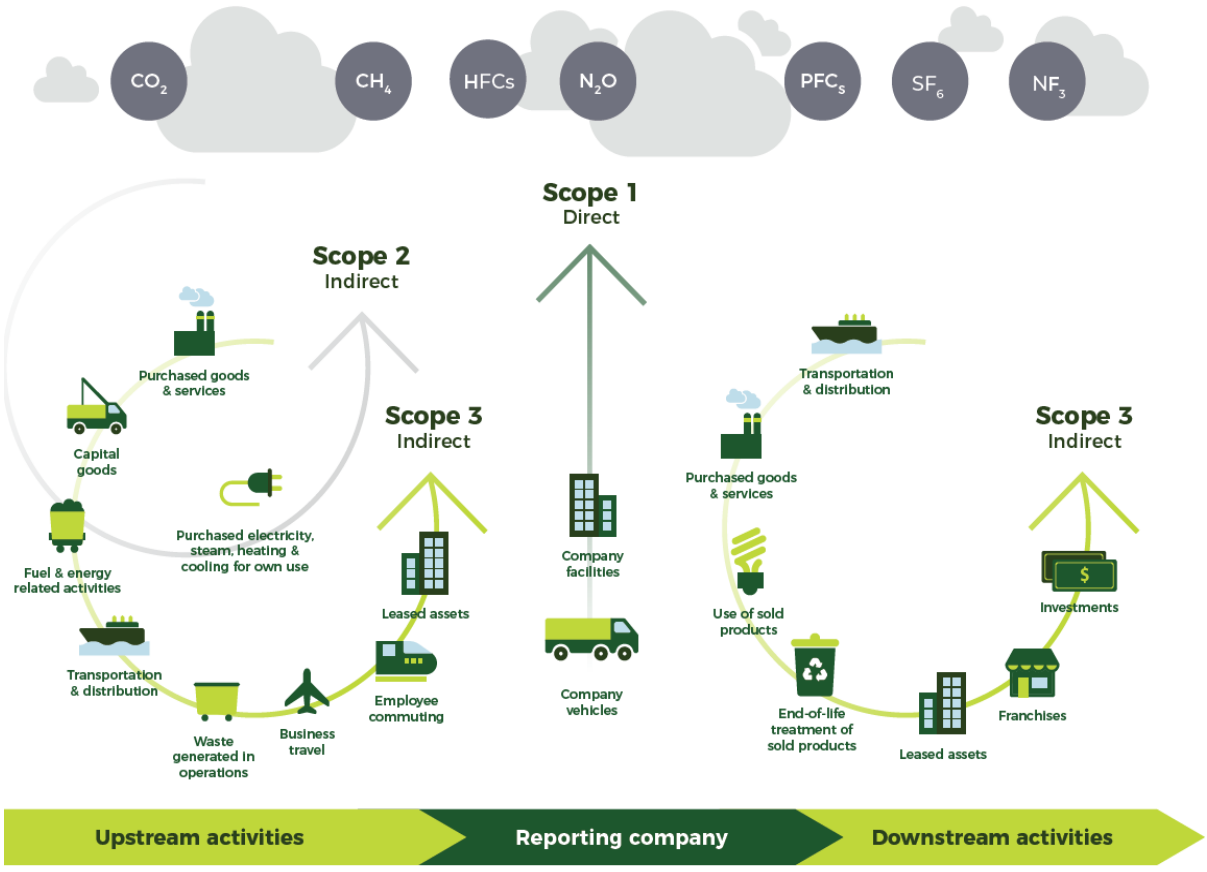


Figure 4 Diagram of scope of GHG emissions by source.

# Emission Boundary

| | Quantified | Excluded |
|---|---|---|
| **Scope 1** | Stationary fuel consumption | Refrigerant leaks (nil) |
| | Fleet fuel consumption | Fugitive ($CO_2$) emissions |
| | Wastewater disposal | |
| **Scope 2** | Electricity use | Imported steam (nil) |
| **Scope 3** | Purchased goods and services | Capital goods |
| | Indirect fuel and energy use | Processing of sold products (nil) |
| | Upstream freight | End-of-life treatment of sold products |
| | Waste generated in operations | Upstream leased assets (nil) |
| | Business travel | Franchises (nil) |
| | Employee commuting | Investments (nil) |
| | Upstream leased assets | Use of sold products |
| | Downstream freight | |

Figure 5 Activities included in RRBC's FY23 emissions inventory.

# Methodology, Data Sources & Assumptions

Except where otherwise stated, scope 1 and 2 emissions have been calculated using the methodology and emission factors presented by the Australian Government's Australian National Greenhouse Accounts (NGA) Factors and the UK government's GHG Conversion Factors for Company Reporting.

Scope 3 emissions are often more complicated to quantify due to their varied and indirect nature. For scope 3 emissions, a variety of sources have been used, with methodologies following the guidance of the GHG Protocol Corporate Value Chain (Scope 3) Standard.

Calculation methodologies specific to each emission category are referenced in the corresponding category sections in this report. The most common calculation methodologies include the Supplier-Specific Method, Hybrid Method, Average-Product Method and Average-Spend Method.

Main reference sources include the NGA Factors, UK government's GHG Conversion Factors for Company Reporting, and the University of Melbourne's Environmental Performance in Construction (EPiC) database.

Where the Economic Input-Output methodology was used, Carbon Neutral considered inflation and used the Reserve Bank of Australia's inflation calculator (Reserve Bank of Australia, 2024)

Emissions are attributed to individual facilities and operations (brewing and retail TapHouse) using information provided by RRBC.

All activity data provided by RRBC is taken to be complete and accurate. Carbon Neutral did not independently verify the completeness or accuracy of this data.

# Data Collection & Quality

Business activities outlined under the GHG Protocol Standard are reported against where relevant and where suitable activity data and emission factors are available.

Carbon Neutral endeavours to ensure that reliable and accurate data is used. All assumptions are outlined where appropriate.

The following process was followed:

1. Carbon Neutral provided RRBC with a list of data required to gather information about potential GHG emission activity sources.
2. RRBC provided Carbon Neutral with data relating to GHG emitting activities.
3. Carbon Neutral reviewed the supplied activity data.
4. Carbon Neutral sought clarification of activity data where necessary and provided advice and guidance to staff as required to ensure that the most complete, accurate and robust data sources were used where available.
5. Carbon Neutral applied suitable methodologies and emission factors to the supplied activity data to determine the organisational GHG emissions of RRBC for the reporting period.
6. Carbon Neutral calculated the GHG emissions of RRBC in accordance with the GHG Protocol Standard and AS ISO 14064.1 – 2018 Greenhouse gases Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.
7. Carbon Neutral prepared this Organisational Greenhouse Gas Emissions Inventory (Carbon Footprint) Report for RRBC for the reporting period 1 July 2022 to 30 June 2023 (FY23).

The veracity of the data provided by RRBC is taken to be complete and accurate and has not been audited or independently verified.

A site visit of the locations was not conducted as part of this assessment.

Carbon Neutral acknowledges the assistance of Mel Holland, RRBC Co-Founder and Owner, for the provision of activity data and information relating to this report.

# Total Emissions Summary

The total gross GHG emissions for RRBC for the Financial Year 2022/2023 period have been estimated at **1,000.88 t $CO_2$-e**.

A breakdown of GHG emissions by scope is presented below in Table 1 and Figure 6.

Table 1 Total gross GHG emissions

| GHG emissions scope | Emissions (t $CO_2$-e) | Percentage |
|---|---|---|
| **Scope 1 Emissions** | 314.13 | 31.4% |
| **Scope 2 Emissions** | 0 | 0.00% |
| **Scope 3 Emissions** | 688.13 | 68.6% |
| **Total Emissions** | **1,000.88** | **100%** |

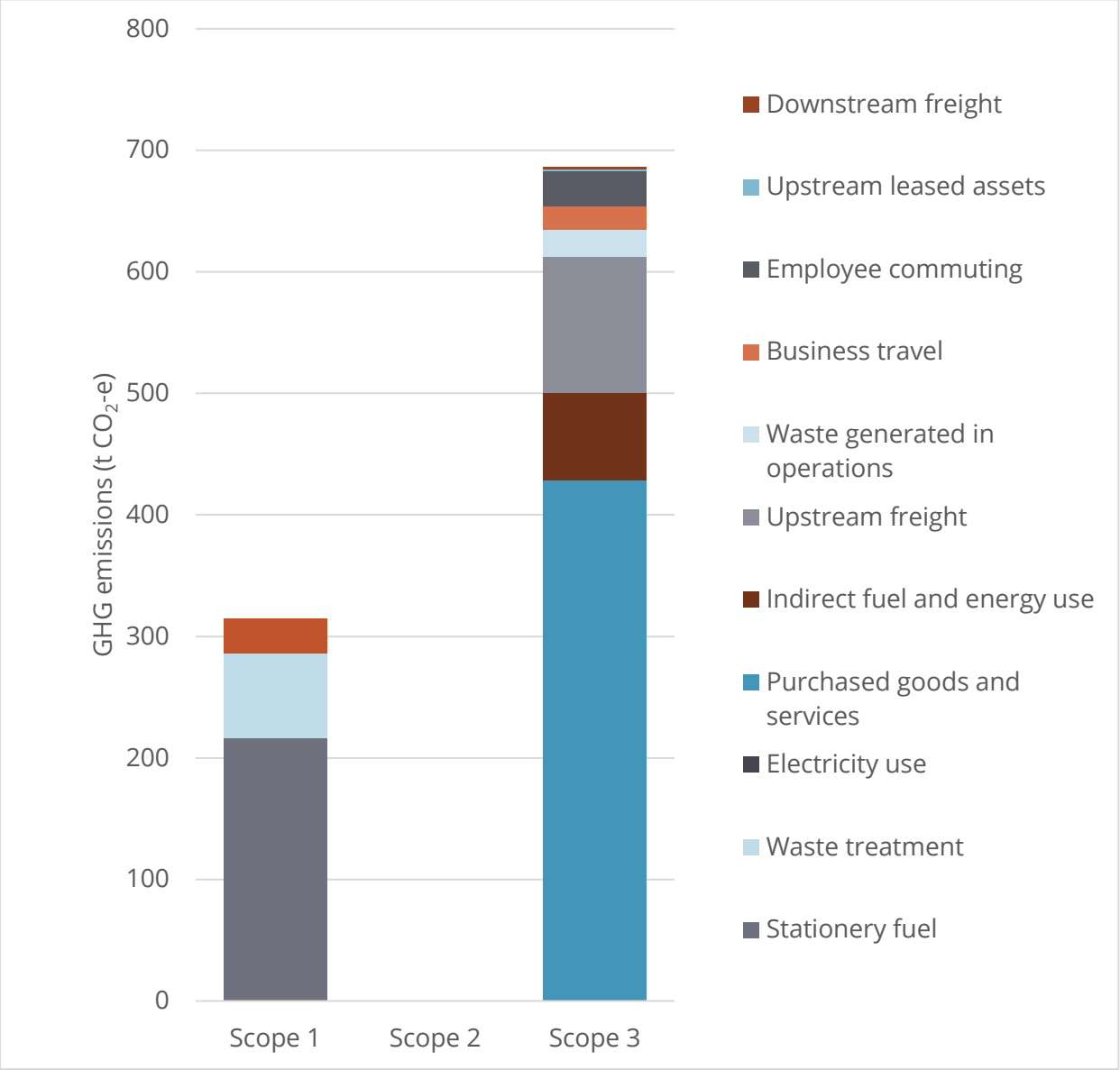


Figure 6 FY23 GHG emissions by scope for RRBC.

# Scope 1 Emissions

Scope 1 GHG emissions are released directly from sources that are controlled or operated by RRBC. Scope 1 emissions for RRBC were estimated at **314.13 t $CO_2$-e.**

Table 2 Scope 1 emissions summary

| Scope 1 activity | Quantity | $CO_2$ (t $CO_2$-e) | $CH_4$ (t $CO_2$-e) | $N_2O$ (t $CO_2$-e) | Emissions (t $CO_2$-e) |
|---|---|---|---|---|---|
| Fuel Consumption (Stationary) | | 215.12 | 0.56 | 0.68 | 216.35 |
| *Diesel* | *31,263 kL* | *84.35* | *0.12* | *0.24* | *84.71* |
| *LPG* | *84.521 kL* | *130.77* | *0.43* | *0.43* | *131.63* |
| Fuel Consumption (Stationary) | | 28.08 | 0.01 | 0.15 | 28.24 |
| *Gasoline* | *5.453 kL* | *12.57* | *0.00* | *0.04* | *12.61* |
| *Diesel* | *5,750 kL* | *15.51* | *0.00* | *0.11* | *15.63* |
| Wastewater (discharged on site) | 2,832 kL | | | | 69.55 |
| **Total Emissions Scope 1** | | | | | **315.90** |

### Fuel consumption (Stationary & transport)

Diesel and LPG used in stationary equipment in the brewery.

Diesel and gasoline used in fleet vehicles.

Carbon Neutral used 2022 NGA emission factors (Department of the Environment and Energy, November 2022) to estimate the total direct stationary fuel emissions for RRBC at **216.35 t $CO_2$-e** and total direct transport fuel emissions at **28.24 t $CO_2$-e**.

Table 3 Stationary equipment and transport fuel emission factors (by volume)

| Fuel type | Energy content factor | Emissions factor | | | |
|---|---|---|---|---|---|
| | | $CO_2$ | $CH_4$ | $N_2O$ | Scope 3 |
| | (GJ/kL) | (kg $CO_2$ e/GJ) | | | |
| **Stationary equipment** | | | | | |
| Liquified petroleum gasoline | 25.7 | 60.2 | 0.2 | 0.2 | 20.2 |
| Diesel oil | 38.6 | 69.9 | 0.1 | 0.2 | 17.3 |
| **Transport** | | | | | |
| Gasoline | 34.2 | 67.4 | 0.02 | 0.2 | 17.2 |
| Diesel oil | 38.6 | 69.9 | 0.01 | 0.5 | 17.3 |

(Department of the Environment and Energy, November 2022)

### Wastewater treatment

Wastewater generated from brewery operations and disposed of on site.

The volume of water disposed onto the farm was provided by RRBC.

Carbon Neutral used the default wastewater COD for beer sourced from the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Department of Industry, 2022) and the methodology from the Australian Greenhouse Office's Factors and Methods workbook (Australian Greenhouse Office, 2008) to estimate total on-site wastewater emissions for RRBC at **69.55 t $CO_2$-e.**

Table 4 Default wastewater emission factors

| Default wastewater commodity type | $COD_{con,i}$ |
|---|---|
| Beer (ANZSIC code 1212) | 6.0 |

(Department of Industry, 2022)

### Exclusions

Direct emissions associated with farm emissions have been excluded.

Emissions associated with composting of spent that are reapplied to the farm have also been excluded from emissions calculations.

Emissions calculations exclude $CO_2$ produced from fermentation during the beer making process and also any purchased $CO_2$ used in the brewery for carbonation of the beer at the request of the client.

# Scope 2 Emissions

Scope 2 emissions are indirect GHG emissions associated with imported electricity use.

Scope 2 emissions are relevant for the TapHouse facility only. 70% of the usage at the facility has been assigned to RRBC operations.

No imported electricity is used at the brewery which is powered by a solar PV and battery backup system.

Emissions from electricity use at the shared, leased head office have been reported as a scope 3 emission under upsteam leased assets. RRBC does not have operational control over this facility and sub-metered electricity usage was not available.

The GHG indirect emissions from electricity use for RRBC were estimated at 18.74 t $CO_2$-e for FY23 when determined using the locations based method.

**When determined using the market based method, emissions associated with electricity use equal zero as 100% renewable energy is used at facilities operated by the business.**

Table 5 Scope 2 emissions summary (locations-based method)

| GHG emissions – Scope 2 | Quantity (kWh) | Emissions (t $CO_2$-e) |
|---|---|---|
| Electricity use | 52,505 | 26.78 |
| Steam, heat or cooling as a service | Not applicable | Not applicable |

**Electricity use**

Imported electricity used in facilities controlled by the organisation.

Carbon Neutral used 2022 NGA emission factors to estimate imported electricity emissions for RRBC.

Table 6 Purchased electricity use emission factors (location based)

| Facility | State or Territory | Scope 2 EF (kg $CO_2$-e /kWh) | Scope 3 EF (kg $CO_2$-e /kWh) |
|---|---|---|---|
| TapHouse | Southwest Interconnected System (SWIS) in WA | 0.51 | 0.04 |

(Department of the Environment and Energy, November 2022)

The business purchases 100% GreenPower for its operations which is sourced from renewable energy supplies and has no GHG emissions associated with its use when determined using the market based approach.

**Net emissions from imported electricity use are taken to be zero t $CO_2$-e.**

# Scope 3 Emissions

The GHG protocol (GHG Protocol, Carbon Trust & WRI, 2013) identifies Scope 3 emissions as upstream and downstream emissions, based on the financial transactions of the reporting company.

+ **Upstream emissions** are indirect GHG emissions related to purchased or acquired goods and services.
+ **Downstream emissions** are indirect GHG emissions related to sold goods and services.

The GHG Protocol Scope 3 Standard further divides Scope 3 emissions into fifteen distinct categories. Scope 3 emissions inventory calculations are presented according to these categories.

Where it enhances relevance and transparency or where particular emissions sources are deemed critical by RRBC – Carbon Neutral further disaggregated this data.

Guidance on the inclusion of Scope 3 emission sources is further provided by Corporate Value Chain Accounting and Reporting Standard (World Resources Institute; World Business Council for Sustainable Development, 2011)

The indirect emissions of all Scope 3 categories were estimated at **686.75 t $CO_2$-e** for FY23 (see Figure 7).

The most significant contribution to Scope 3 emissions in RRBC value chain came from Purchased Goods and Services.

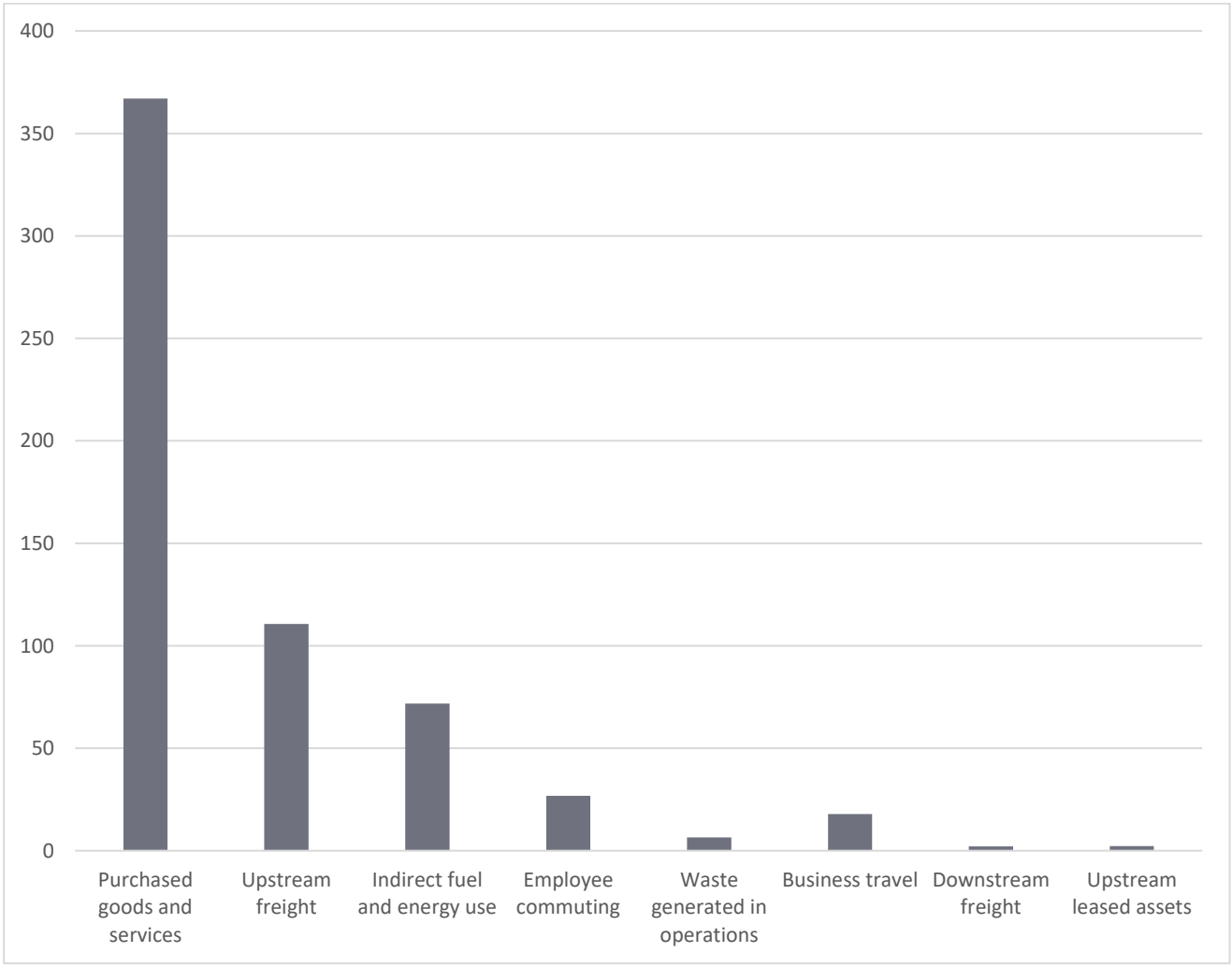


Figure 7 FY23 Scope 3 emissions by activity for RRBC (t $CO_2$-e).

# Scope 3 Emissions Summary

Table 7 FY23 Scope 3 gross GHG emissions by activity and location

| Scope 3 GHG emissions category | | Emissions (t $CO_2$-e) | | |
|---|---|---|---|---|
| | | Brewery | TapHouse | Total |
| | **Upstream emissions** | | | |
| 1 | Purchased goods and services | 366.95 | 61.65 | 428.60 |
| 2 | Capital goods | - | - | - |
| 3 | Indirect fuel and energy use | 71.80 | 0.15 | 71.80 |
| 4 | Upstream freight | 110.67 | 1.20 | 110.67 |
| 5 | Waste generated in operations | 6.55 | 15.99 | 6.55 |
| 6 | Business travel | 17.88 | 1.30 | 17.88 |
| 7 | Employee commuting | 26.76 | 1.66 | 26.76 |
| 8 | Upstream leased assets | 2.22 | | 2.22 |
| | **Downstream emissions** | | | |
| 9 | Downstream freight | 2.10 | | 2.10 |
| 10 | Processing of sold products | - | - | - |
| 11 | Use of sold products | - | - | - |
| 12 | End-of-life treatment of sold products | - | - | - |
| 13 | Downstream leased assets | - | - | - |
| 14 | Franchises | - | - | - |
| 15 | Investments | - | - | - |
| | **Total emissions Scope 3** | **604.93** | **81.81** | **686.75** |

# Scope 3 Standard Emissions Categories

| Category 1: Purchased goods and services | |
|---|---|
| **Category description** | Upstream (i.e., cradle-to-gate) GHG emissions from the production of products purchased or acquired by RRBC in FY22. This includes both goods (tangible products) and services (intangible products). |

| | Weight (tonnes) | Cost ($) | Emissions (t $CO_2$-e) |
|---|---|---|---|
| **Brewery** | | | |
| Barret Burston - Malt | 200.50 | | 105.84 |
| Bintani - Malt | 57.83 | | 30.53 |
| Bintani - Hops | 1.86 | | 4.51 |
| Bintani - Yeast | 0.73 | | 2.33 |
| Bintani -Process Aids | | $41,980 | 42.68 |
| Bintani - Extracts | 3.67 | | 4.96 |
| Bintani - Flavours | 14.14 | | 10.34 |
| Cryer Malt - Malt | 1.00 | | 0.53 |
| Cryer Malt - Hops | 0.10 | | 0.74 |
| Elleslie Hops - Hops | 1.80 | | 13.32 |
| Elleslie Hops - Malt | 0.20 | | 0.11 |
| Elleslie Hops - Additives | 0.19 | | 0.34 |
| Karridale Hops - Hops | 0.03 | | 0.19 |
| Magnum Flavourings | 2.82 | | 4.00 |
| Redox | 13.53 | | 32.62 |
| Refresh Juice | 0.22 | | 0.18 |
| SWAT | 0.05 | $860 | 0.36 |
| Unigrain | 9.60 | | 0.00 |
| Vanilla Pods | | $1,947 | 0.89 |
| Winequip - Yeast | 0.11 | | 0.34 |
| Winequip - Chemicals | | $130 | 0.05 |
| $CO_2$ (embodied) | 47.78 | | 10.51 |
| Fleet Card - Service & Car wash | | $980 | 0.24 |
| Gateway Printing | | $5,013 | 1.80 |
| MCC labels (Multicolour) | 1.31 | | 1.04 |
| Orora can & lid | 13.91 | | 62.47 |

| | Weight (tonnes) | Cost ($) | Emissions (t $CO_2$-e) |
|---|---|---|---|
| BioGone | | $4,313 | 0.73 |
| Cospac | 2.76 | | 6.22 |
| East Coast Canning | 0.86 | | 7.84 |
| Environex | 3.91 | | 11.27 |
| Klippakan | 3.21 | | 2.63 |
| Vinpac | 8.05 | | 6.61 |
| Visy | 0.33 | | 0.23 |
| Spice Digital | 0.04 | | 0.17 |
| Boxtec | 0.46 | | 0.33 |
| ***Sub-total*** | | | ***366.95*** |
| **TapHouse** | | | |
| Down South Wholesale | | $15,807 | 7.84 |
| Host | | $1,497 | 0.79 |
| CCA | 0.67 | | 0.46 |
| SW Provisions | 0.15 | $9 | 0.52 |
| LS Merchants | 2.75 | | 2.89 |
| Swings & Roundabouts | 0.98 | | 1.03 |
| Liquid Mix | 0.34 | | 0.32 |
| Magnum Flavourings | 0.40 | | 0.57 |
| The Common Goods Co | 0.01 | | 0.00 |
| Interchina Management | 0.10 | | 2.23 |
| Juiceprint | | $30,491 | 10.93 |
| The Fabric Printer | 1.63 | | 32.45 |
| $CO_2$ (embodied) | 3.93 | | 0.86 |
| Water use & disposal | 585.00 | | 0.76 |
| ***Sub-total*** | | | ***61.65*** |
| **Total** | | | **428.60** |

### Calculation boundary

This category covers emissions embodied within products and purchased by the business.

Materials used for packaging, ingredients (malt, hops, yeasts, extracts, syrups and fruit based flavourings), equipment and chemical purchases, marketing material and consumable purchases were included.

### Calculation methodology

A variety of methods were used to determine emissions from Purchased Goods and Services depending on the availability of data.

The 'spend-based' method was used to calculate some emissions, with industry-

average emission factors applied, based on the economic value of the goods and services.

The relevant economic sector emission factors from the EPiC database were then applied to calculate the overall emissions estimate for this category (Crawford, 2019).

Emission factors associated with the use of water and disposal of sewage are obtained from the Australian Bureau of Meteorology Department and the most recent National Performance Report 2022/23: Urban Water Utilities Dataset (BoM, 2023).

Emissions associated with packaging and some ingredients are determined using the mass of input materials where the weight of material by type was provided. Emission factors are obtained from a variety of sources including industry publications (Boortmalt, 2023), (COFALEC, 2015), published life cycle assessment studies, (CONCITO, 2024), (Ana Nica, 2010) and government sources, (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022), (City of Winnepeg, 2012). (Appendix A).

| **Category 2: Capital goods** | | | |
|---|---|---|---|
| **Category description** | GHG emissions generated upstream of RRBC operations associated with the extraction, production and transportation of capital goods purchased or acquired. | | |
| | | **Emissions (t $CO_2$-e)** | **Excluded** |

**Not Applicable**

RRBC did not report any capital equipment purchases and no emissions associated with capital equipment purchases have been included.

| Category 3: Indirect fuel and energy use | |
|---|---|
| **Category description** | Indirect GHG emissions from extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling. It also includes indirect emissions from the transmission and/or distribution of those resources. |

| Fuel | Usage | Emissions (t $CO_2$-e) |
|---|---|---|
| Diesel (non-transport) | 31.263 kL | 20.88 |
| LPG (non-transport) | 84.521 kL | 43.88 |
| Diesel (transport) | 5.750 kL | 3.84 |
| Gasoline (transport) | 5.453 kL | 3.21 |
| **Electricity** | | |
| TapHouse (market based) | 52,505 kWh | 0.00 |
| | **Total** | **71.80** |

### Calculation boundary

All fuel consumption (operations of stationary machinery and fleet) and grid purchased electricity were included in gross GHG emission calculation.

When determined using the locations based approach, GHG emissions associated with electricity used in the TapHouse facility are calculated at
0.21 t $CO_2$-e.

As GreenPower is used, net GHG emissions associated with indirect electricity emissions are zero when determined using the market based approach.

### Calculation methodology

Carbon Neutral used the average-data method to calculate emissions from this category, which involves estimating emissions using secondary (e.g., industry average) emissions factors for upstream emissions per unit of consumption.

Carbon Neutral used 2022 NGA emission factors to estimate indirect fuel and energy emissions for RRBC at **71.80 t $CO_2$-e (**Table 3 **and** Table 6**).**

| Category 4: Upstream freight | |
|---|---|
| **Category description** | GHG emissions from the transportation and distribution of products purchased by the reporting company in the reporting year between the company's suppliers and its operations.<br><br>It includes third-party transportation and distribution services *purchased* by the reporting company, including inbound logistics, outbound logistics and third-party transportation and distribution between a company's own facilities as well as its cutomers. |

| Freight type | Emissions (t $CO_2$-e) |
|---|---|
| **Brewery** | |
| Inbound freight | 83.52 |
| Outbound freight | 27.15 |
| **TapHouse** | |
| Inbound freight | 1.20 |
| **Total** | **111.88** |

### Calculation boundary

This category includes emissions from transportation and distribution of products purchased by RRBC, between their tier 1 suppliers and its operations (in vehicles and facilities not owned or controlled by RRBC).

All incoming and outgoing freight, where the cost of services was paid for by RRBC and not their clients, has been included.

### Calculation Methodology

Carbon Neutral used, where possible, the weight and distance-based method (tonne.km) to calculate emissions from this category. This involved determining the weight, distance, and transport method for each freight movement; then applying the appropriate mass-distance emission factor for the vehicle using DBEIS emission factors (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022).

For some local deliveries, where the weight of freight was not recorded, whole delivery vehicle emissions were used based on a distance (km) travelled; then applying the appropriate distance based emission factor for the vehicle using DBEIS emission factors (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022).

Where the weight of freight was not recorded for some Leeuwin freight movements, an emission factor of 0.07 kg $CO_2$-e / km was used to estimate emissions, based on freight cost. This emission factor was determined by calculating the average emissions per dollar expenditure of freight movements where both the weight and distance of shipments could be determined.

A more detailed breakdown of freight movements can be found in Appendix B. Total emissions of this category were calculated at **111.88 t $CO_2$-e**.

| Category 5: Waste generated in operations | |
|---|---|
| **Category description** | GHG emissions associated with waste treatment in facilities owned or operated by third parties. |

| Facility | Weight (tonnes) | Emissions (t $CO_2$-e) |
|---|---|---|
| Brewery waste | 5.04 | 6.55 |
| TapHouse general waste | 12.3 | 15.99 |
| | **Total** | **22.55** |

### Calculation boundary

This category included all emissions that resulted from waste generated in business operations and sent to landfill in FY23.

### Calculation methodology

The weight of waste materials sent to landfill from the brewery was provided by Veolia for brewery operations.

Emission factors are obtained from the 2022 NGA Factors. The emission factor for co-mingled commercial and industrial waste, 1.3 t $CO_2$-e/t waste, was used to estimate emissions (Department of Climate Change, Energy, the Environment and Water, November 2022).

For the TapHouse, the volume of waste generated for the year was based on three full 240 litre mobile garbage bins being collected weekly. A volume to weight conversion factor of 0.329 t/$m^3$ was applied based on the default waste stream percentage for waste mix types from the Commonwealth's NGER Determination (Department of Industry, 2022). This volume to waste conversion factor has been updated from 0.08 t/$m^3$, used in FY22, which was based on skip bin waste densities for the brewery.

Materials separated and sent for recycling or re-use are excluded from the emissions inventory. By recycling cardboard and diverting this away from landfill, 11.11 t $CO_2$-e of emissions have been avoided by the business.

Total emissions of category 5 were calculated at **22.55 t $CO_2$-e**.

| Category 6: Business travel | |
|---|---|
| **Category description** | GHG emissions from the transportation of employees for business-related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars. |

| Transportation | Distance | Emission factor | Emissions (t $CO_2$-e) |
|---|---|---|---|
| **Brewery** | | | |
| Taxi / Rideshare | 700 km | 0.259 kg $CO_2$-e/p.km | 0.18 |
| Bus | 150 p.km | 0.146 kg $CO_2$-e/p.km | 0.02 |
| Private vehicle | 33,500 p.km | 0.317 kg $CO_2$-e/p.km[1] | 10.63 |
| Domestic flight | 1,737 p.km | 0.2471 kg $CO_2$-e/p.km | 0.27 |
| Short haul economy flight | 53,803 p.km | 0.1518 kg $CO_2$-e/p.km | 5.75 |
| **TapHouse** | | | |
| Short haul economy flight | 12,617 p.km | 0.1518 kg $CO_2$-e/p.km | 1.23 |
| **Accommodation** | **Room nights** | | |
| **Brewery** | | | |
| Brisbane | 13.5 | 43.9 kg $CO_2$-e/room night | 0.55 |
| Melbourne | 7.5 | 62.18 kg $CO_2$-e/room night | 0.42 |
| New Zealand | 3 | 17.72 kg $CO_2$-e/room night | 0.05 |
| **TapHouse** | | | |
| Brisbane | 1.5 | 43.9 kg $CO_2$-e/room night | 0.03 |
| Melbourne | 1.5 | 62.18 kg $CO_2$-e/room night | 0.05 |
| | **Total** | | **19.19** |

### Calculation boundary

This category included all emissions that resulted from business related travel in FY23 for RRBC.

This includes road as well as air travel by staff for business-related purposes and the use of accommodation during business related trips.

### Calculation methodology

Details of work-related travel including vehicles used were obtained by staff survey and an estimate made of fuel consumed for these trips. Emissions from private vehicle use were then determined using 2022 NGA Factors (Department of the Environment and Energy, November 2022).

Emissions from flights and from the use of taxis/ride share and buses are determined using 2022 DBEIS Factors (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022).

[1] Average of staff vehicles

For air travel, no allowance has been made for radiative forcing index.

Emissions associated with accommodation are determined using emission factors from the Cornell Hotel Sustainability Benchmarking Index 2023 (Greenview, 2023). Where accommodation is shared between Brewery and TapHouse staff, emissions are equally assigned to both entities.

Where flights are said to be carbon offset, then net emissions associated with this flight are taken to be zero.

Emission factors and business-related travel allowances are shown in Appendix C.

Total gross GHG emissions of category 6 were calculated at **19.19 t $CO_2$-e.**

After allowances for carbon offset flights, net GHG emissions of category 6 are calculated at **12.99 t $CO_2$-e.**

| Category 7: Employee commuting | |
|---|---|
| **Category description** | GHG emissions from the transportation of employees between their homes and their worksites. Emissions from employee commuting may arise from private vehicle travel, bus travel, rail travel and/or air travel. |

| Brewery | Distance (km) | Fuel used (litres) | Emissions (t $CO_2$-e) |
|---|---|---|---|
| Private vehicle – petrol | 52,742 | 5,074 | 17.18 |
| Private vehicle – diesel | 43,780 | 3,302 | 9.58 |
| **TapHouse** | | | |
| Private vehicle – petrol | 8,730 | 574 | 1.66 |
| **Total** | **112,862** | **9,759** | **28.42** |

### Calculation boundary

Calculation for emissions of employee commuting arise from the commute from home to work and return.

Emissions from staff working from home during FY23 were immaterial and are not included.

### Calculation methodology

Staff surveys were conducted to obtain details of the mode of transport to and from work and details of vehicles used (Appendix D).

Distance travelled was used to determine fuel consumption for commuting in private vehicles and applied the appropriate emission factor based on the type of fuel used.

Emissions from private vehicle use are determined using 2022 NGA Factors (Department of the Environment and Energy, November 2022), based on estimated fuel consumption (Appendix D).

Total emissions of category 7 were calculated at **28.42 t $CO_2$-e.**

| Category 8: Upstream leased assets | | |
|---|---|---|
| **Category description** | GHG emissions from the operation of assets that are leased by RRBC. This category is applicable only to companies that operate leased assets (i.e., lessees). | |
| | **GJ** | **Emissions (t $CO_2$-e)** |
| Head office (shared facility) | 12.6 | **2.22** |

### Calculation boundary

This category included facilities used by RRBC that are not deemed to be under the operational control of the business and includes the energy used in its head offices (30$m^2$) in West Leederville.

### Calculation methodology

Metered electricity consumption was not available for RRBC's head office which is shared with other entities.

The 2022 Commercial Building Baseline Study was used to estimate electricity used in this facility. The average electrical energy intensity for offices in WA was used (420 MJ/sqm.a) to estimate electricity use at 12.6GJ for the year (Strategic Policy Research, 2022).

Emissions factors are obtained from the DoEE (Department of the Environment and Energy, November 2022). An emission factor of 176 kg $CO_2$-e/GJ was used.

In the previous reporting period, electricity consumption was estimated based on office equipment use,

Total emissions of category 8 were calculated at **2.22 t $CO_2$-e**.

| Category 9: Downstream freight | |
|---|---|
| **Category description** | GHG emissions from the transportation and distribution of sold products in vehicles and facilities not owned or operated by the reporting company.<br>It excludes third-party transportation and distribution services purchased by the reporting company and not paid for by customers. |

| Export shipments | Weight / Distance | Emissions (t $CO_2$-e) |
|---|---|---|
| Sea freight | 211,003 t.km | 2.10 |
| | **Total** | **2.10** |

### Calculation boundary

This category includes emissions from transportation and distribution of products sold by RRBC (in vehicles not owned or controlled by RRBC).

All outgoing freight where customers paid for the freight was included.

### Calculation Methodology

Emissions from sea freight are provided by RRBC based on average data provided by Singapore Ports.

Total emissions of category 9 were calculated at **2.10 t $CO_2$-e.**

| Category 10: Processing of sold products | |
|---|---|
| **Category description** | GHG emissions from the processing of sold intermediate products by third parties (e.g., manufacturers). Intermediate products are products that require further processing, transformation, or inclusion in another product before and therefore result in emissions from processing after sale and before use by the end consumer. |

| | Emissions (t $CO_2$-e) | Non-quantified |
|---|---|---|

### Non-quantified

RRBC's main operation consists of producing beer for consumption. This is generally consumed and not subject to further processing.

No allowances have been made for emissions associated with using the beer as an input material for another product. These emissions are considered immaterial and not included in the emissions inventory.

| Category 11: Use of sold products | |
|---|---|
| **Category description** | GHG emissions from the downstream use of goods sold by RRBC. RRBC scope 3 emissions from the use of sold products include the scope 1 and scope 2 emissions of end users. End users include both consumers and business customers that use final products. |

| | Emissions (t $CO_2$-e) | |
|---|---|---|
| | | **Non-quantified** |

**Non-quantified**

No allowances have been made for any emissions associated with use of the product. This includes refrigeration to keep product cold as well as any release of CO2 used in the product for carbonation.

| **Category 12: End-of-Life treatment of sold products** | | |
|---|---|---|
| **Category description** | GHG emissions from the waste disposal and treatment of products sold by RRBC at the end of the product's life. | |
| | **Emissions (t $CO_2$-e)** | **Non-quantified** |

**Non-quantified**

No allowances have been made for emissions associated with disposal of packaging materials (e.g. cardboard, aluminium, plastic ends etc). Cardboard and paper-based packaging is generally recyclable, and no emissions are emitted by inert materials such as aluminium and plastic sent to landfill.

Similarly, any emissions associated with washing equipment or premises used to serve the beer are not included in the emissions inventory.

| Category 13: Downstream leased assets | | | |
|---|---|---|---|
| **Category description** | GHG emissions from the operation of assets that are owned by the reporting company (acting as lessor) and leased to other entities in the reporting year that are not already included in scope 1 or scope 2. | | |
| | | **Emissions (t $CO_2$-e)** | **Non-quantified** |

**Not Applicable**

RRBC does not lease any premises to third parties. Therefore, this category is not applicable for the organisation.

| Category 14: Franchises | | | |
|---|---|---|---|
| **Category description** | GHG emissions from the operation of franchises not included in scope 1 or scope 2. A franchise is a business operating under a license to sell or distribute another company's goods or services within a certain location. | | |
| | | **Emissions (t $CO_2$-e)** | **Not Applicable** |

**Not Applicable**

RRBC does not have any franchisees. Therefore, this category is not applicable for the organisation.

| Category 15: Investments | | | |
|---|---|---|---|
| **Category description** | GHG emissions associated with RRBC's investments, not already included in scope 1 or scope 2. | | |
| | | **Emissions (t $CO_2$-e)** | **Not Applicable** |

**Not Applicable**

RRBC has not disclosed any investments. Therefore, this category is deemed not applicable for the organisation.

# Emissions Intensity

Emissions intensity expresses GHG impact per unit of physical activity or unit of economic output. These metrics allow for more meaningful comparison of emissions between years, operations and organisations.

The carbon intensity of an organisation's footprint can be calculated by dividing emissions by a relevant measure of activity.

RRBC's main operations consist of beer production. As such, an emissions intensity has been calculated per litre of beer produced for FY2023 brewery operations. This is represented in Table 5. Additionally, Table 9 displays the emissions intensity of RRBC's brewery operations per employee.

Table 8 FY23 Organisational emissions intensity (per litre of beer produced)[2]

| Emissions Intensity | Volume of beer produced (kL) | GHG Emissions (t $CO_2$-e) | GHG Emissions Intensity (kg $CO_2$-e/L) |
|---|---|---|---|
| FY2020 | 424 | 738.2 | 1.74 |
| FY2021 | 730 | 835.3 | 1.14 |
| *FY2022 (Gross)* | 893 | 877.7 | 0.98 |
| *FY2022 (Net)* | *893* | *853.06* | *0.86* |
| FY2023 (Gross) | 1,133 | 919.07 | 0.81 |
| FY2023 (Net) | *1,133* | *914.09* | *0.81* |

Table 9 FY22 emissions intensity (FTE)[3].

| Emissions Intensity FY22 | FTE | GHG Emissions (t $CO_2$-e) | GHG Emissions Intensity (t $CO_2$-e/FTE) |
|---|---|---|---|
| FY2020 | 7 | 738.2 | 105.5 |
| FY2021 | 18 | 835.3 | 46.4 |
| FY2022 (Gross) | 25 | 877.7 | 35.1 |
| *FY2022 (Net)* | *25* | *853.06* | *34.1* |
| FY2023 (Gross) | 24 | 919.07 | 38.3 |
| *FY2023 (Net)* | *24* | *914.09* | *38.1* |

[2] Includes brewery emissions only
[3] Excludes casual staff

# Historical GHG Emissions

Table 10 Historical Gross GHG emissions by activity – FY2020 to FY2023.

| | GHG Emissions (t $CO_2$-e) | | | |
|---|---|---|---|---|
| **Activity** | **FY2020** | **FY2021** | **FY2022** | **FY2023** |
| Scope 1 – Direct | | | | |
| Stationary equipment fuel use | 93.6 | 184.2 | 211.9 | 216.3 |
| Transport fuel use | 27.7 | 2.4 | - | 28.2 |
| Other emissions | 52.3 | 84.2 | 66.1 | 69.5 |
| Scope 2 – Indirect (electricity) | 27.6 | 22.0 | 8.0 | 0.00[4] |
| Scope 3 – Indirect (other) | | | | |
| 1 – Purchased goods and services | 338.3 | 405.2 | 422.3 | 366.9 |
| 2 – Capital goods | - | - | - | - |
| 3 – Indirect fuel and energy use | 8.3 | 10.9 | 12.0 | 71.8 |
| 4 – Upstream freight | 136.6 | 37.3 | 59.6 | 110.7 |
| 5 – Waste generated in operations | 3.5 | 16.3 | 12.4 | 6.6 |
| 6 – Business travel | 17.7 | 17.7 | 32.0 | 17.9 |
| 7 – Employee commuting | 4.9 | 20.7 | 27.6 | 26.8 |
| 8 – Upstream leased assets | 18.3 | 9.1 | 3.8 | 2.2 |
| 9 – Downstream freight | 9.5 | 25.3 | 21.9 | 2.1 |
| 10 – Processing of sold products | - | - | | - |
| 11 – Use of sold products | - | - | - | - |
| 12 – End-of-life treatment of sold products | - | - | - | - |
| 13 – Downstream leased assets | - | - | - | - |
| 14 – Franchises | - | - | - | - |
| 15 – Investments | - | - | - | - |
| **Total** | **738.2** | **835.3** | **835.3** | **919.07** |

[4] Determined using the market based approach from FY23 onwards

# Emissions by Operation

RRBC comprises of two separate operations. This includes its brewing operations as well as its TapHouse operations.

Emissions by operation can be seen in the following table. Emissions associated with RRBC's head office are assigned to its brewing operations in this table.

Table 11 Gross GHG emissions by operation FY23

| | GHG Emissions (t $CO_2$-e) | |
|---|---|---|
| **Activity** | **Brewing** | **TapHouse** |
| Scope 1 – Direct | | |
| Stationary equipment fuel use | 216.35 | |
| Transport fuel use | 28.24 | |
| Wastewater | 69.55 | |
| Scope 2 – Indirect (electricity) | 0.00 | 0.00 |
| Scope 3 – Indirect (other) | | |
| 1 – Purchased goods and services | 366.95 | 61.65 |
| 3 – Indirect fuel and energy use | 110.67 | 1.20 |
| 4 – Upstream freight | 71.80 | 0.00 |
| 5 – Waste generated in operations | 26.76 | 1.66 |
| 6 – Business travel | 6.55 | 15.99 |
| 7 – Employee commuting | 17.88 | 1.30 |
| 8 – Upstream leased assets | 2.22 | |
| 9 – Downstream freight | 2.10 | |
| **Total** | **919.07** | **81.81** |

Gross GHG emissions by facility can be seen in the following diagram.

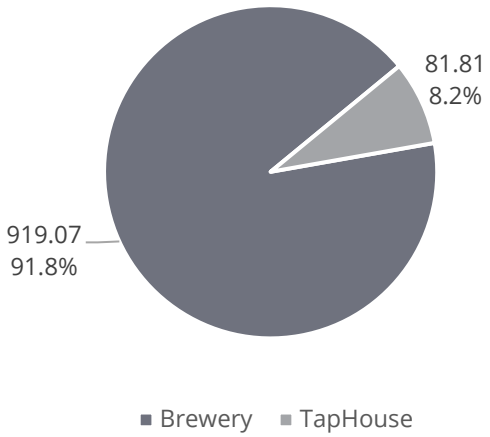


Figure 8 FY23 Scope 3 emissions by facility (t $CO_2$-e, %).

# Carbon Reduction Opportunities

The business has already implemented several measures which reduce their emissions.

This includes:

- Using 100% off grid solar power with battery storage for its brewery operations.
- Using rainwater and groundwater in its brewery operations.
- Capturing $CO_2$ from fermentation operations to carbonate product.
- Utilising cardboard packaging holders for 4 packs and cartons instead of plastic.
- Using reuseable Velcro wraps in lieu of plastic pallet wrap.
- Using aluminium packaging as opposed to glass to reduce the weight of materials transported and to increase recyclability of sold product.
- Using spent grain as animal fodder.
- Composting of spent trub from brewery operations.
- Reducing traditional water input to 3.5L/1L of beer produced, down from industry average of 6-10L water/1L of beer.
- Seeking input products from local sources where possible, with preference given to SW producers.
- Seeking to partner with supply chains that are also managing their carbon footprints.
- Recycling waste-paper and other materials after use where possible.
- Purchasing 100% renewable energy for its TapHouse operations.
- Offsetting some flights at the time of booking.

# Carbon Neutrality

To claim organisational "carbon neutrality", RRBC should seek opportunities to reduce its avoidable GHG emissions as much as possible and offset the remaining emissions.

RRBC's gross organisational carbon footprint for FY2023 is estimated at 1,000.88 t $CO_2$-e.

**After allowances for carbon offset flight purchases, net GHG emissions prior to further offsetting are estimated at 994.68 t $CO_2$-e.**

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# Appendix A

**Scope 3 – Category 1 Purchased goods and services**

Table A1 Purchased goods & services emission factors and references (by mass)

| Product | Emission Factor | Reference |
|---|---|---|
| Malt | 0.53 kg $CO_2$-e / kg | (Boortmalt, 2023) |
| Hops | 7.4 kg $CO_2$-e / kg | (HPA, 2021) |
| Flavours | <br>1.407 kg $CO_2$-e / kg<br>0.663 kg $CO_2$-e / kg<br>0.785 kg $CO_2$-e / kg<br>0.814 kg $CO_2$-e / kg<br>1.032 kg $CO_2$-e / kg<br>1.009 kg $CO_2$-e / kg<br>0.894 kg $CO_2$-e / kg<br>0.620 kg $CO_2$-e / kg<br>1.170 kg $CO_2$-e / kg<br>0.526 kg $CO_2$-e / kg<br>1.025 kg $CO_2$-e / kg<br>0.574 kg $CO_2$-e / kg<br>0.388 kg $CO_2$-e / kg | (CONCITO, 2024)<br>Orange Juice<br>Peach<br>Apricot<br>Banana<br>Blueberries<br>Cherries<br>Mango (Guava, Passionfruit)<br>Tangerine (Mandarins)<br>Blackberries (Mulberries)<br>Pineapple<br>Raspberries<br>Strawberries<br>Watermelon |
| Yeast / Pitch | 3.204 t $CO_2$-e / t | (COFALEC, 2015) |
| Extracts | 1.959 kg $CO_2$-e / kg<br><br>0.663 kg $CO_2$-e / kg | (CONCITO, 2024)<br>Sugar, sucrose, white sugar (dextrose/maltodextrin)<br>Milk, whole, 3.5% fat (lactose) |
| Juice | <br>0.636 kg $CO_2$-e / kg<br>0.563 kg $CO_2$-e / kg<br>1.419 kg $CO_2$-e / kg<br>0.724 kg $CO_2$-e / kg | (CONCITO, 2024)<br>Lemon<br>Lime<br>Syrup<br>Grapefruit |
| Citric Acid | 0.41 kg $CO_2$-e / kg | (Anca Nica, 2010) |
| Oats | 0 kg $CO_2$-e / kg | Reclaimed waste product |
| Labels | 0.790 kg $CO_2$-e / $[5] | (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022) |
| Cans & lids | 4.492 kg $CO_2$-e / kg[6] | |
| Glass | 1.403 kg $CO_2$-e / kg | |
| PET | 4.032 kg $CO_2$-e / kg | |
| HDPE | 3.270 kg $CO_2$-e / kg | |
| Cans | 9.122 kg $CO_2$-e / kg | |
| Cardboard | 0.821 kg $CO_2$-e / kg<br>0.719 kg $CO_2$-e / kg[7] | |

[5] 30% recycled content in labels
[6] 57% recycled content in aluminium cans
[7] 100% recycled content in cardboard

| Product | Emission Factor | Reference |
|---|---|---|
| Foamboard (polystyrene) | 3.778 kg $CO_2$-e / kg | |
| Peroxysan | 1.67 kg $CO_2$-e / kg | (City of Winnepeg, 2012), |
| Nitric acid | 3.18 kg $CO_2$-e / kg | |
| Hydrogen peroxide | 1.14 kg $CO_2$-e / kg | |
| Chlorine | 1.08 kg $CO_2$-e / kg | |
| Spironex | 2.32 kg $CO_2$-e / kg | |
| Soft drink | 0.56 kg $CO_2$-e / kg | (CONCITO, 2024) |
| Water (bottled) | 0.19 kg $CO_2$-e / kg | |
| Juice (apple) | 1.63 kg $CO_2$-e / kg | |
| Chips | 4.37 kg $CO_2$-e / kg | |
| Syrups | 1.42 kg $CO_2$-e / kg | |
| Sugars | 2.41 kg $CO_2$-e / kg | |
| Pretzels | 2.53 kg $CO_2$-e / kg | |
| Biscuits | 2.87 kg $CO_2$-e / kg | |
| Peanuts | 3.12 kg $CO_2$-e / kg | |
| Vodka & Spirits | 2.51 kg $CO_2$-e / kg | |
| Juice (fruit) | 2.34 kg $CO_2$-e / kg | |
| Beanies | 0.15 kg $CO_2$-e / kg[8] | (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022) |
| Clothing | 22.31 kg $CO_2$-e / kg | |
| Hoodies | 17.88 kg $CO_2$-e / kg[9] | |
| Wine | 1.05 kg $CO_2$-e / L | (Australian Wine Research Institute, 2023) |

[8] 100% recycled content in beanies
[9] 20% recycled content in hoodies

Table A2 Purchased goods & services emission factors and references (by cost)

| Product | Emission Factor | Reference |
|---|---|---|
| Process Aids & chemicals | 1.02 kg $CO_2$-e / $ | Basic Chemical Manufacturing |
| Barrels, wood chips | 0.41 kg $CO_2$-e / $ | Other Wood Products Manufacturing |
| Vanilla pods | 0.46 kg $CO_2$-e / $ | Fruit & Vegetable Product Manufacturing |
| Printing | 0.36 kg $CO_2$-e / $ | Printing |
| Packaging (bin liner, plastic equipment, lids, gloves, wrapping) | 0.49 kg $CO_2$-e / $ | Polymer Product manufacturing |
| Packaging (BioGone) | 0.17 kg $CO_2$-e / $ | Polymer Product manufacturing (adjusted for BioPlastic)[10] |
| Cleaning detergents | 0.39 kg $CO_2$-e / $ | Cleaning Compounds & Toiletry Preparation Manufacturing |
| Aluminium & metal products, cutlery | 0.51 kg $CO_2$-e / $ | Other Fabricated Metal Product manufacturing |
| Cleaning equipment | 0.42 kg $CO_2$-e / $ | Other Manufactured Products |
| Paper cups, straws, hand towels, bags, wrapping | 0.52 kg $CO_2$-e / $ | Paper Stationery & Other Converted Paper Product Manufacturing |
| Tea towels, rope, wipes | 0.68 kg $CO_2$-e / $ | Textile Product Manufacturing |
| Glasses, mugs and bowls | 0.53 kg $CO_2$-e / $ | Glass and Glass Product Manufacturing |

(Crawford, 2019); (Project Drawdown, 2025)

[10] Assumes bioplastic is 0.345 times less intensive than plastic containers. (Project Drawdown, 2025)

# Appendix B

**Scope 3 – Category 4 Upstream freight**

Table B1 Activity data, emission factors and GHG emissions (brewery)

| Provider/Product | Incoming / Outgoing | Tonne.km | Distance (Km) | Cost ($) | EF[11] (kg $CO_2$-e/t.km) (kg $CO_2$-e/km) (kg $CO_2$-e/$) | GHG emissions (t $CO_2$-e) |
|---|---|---|---|---|---|---|
| **Brewery** | | | | | | |
| Leeuwin | Incoming | - | - | $7,501 (road) | 0.07 | 0.49 |
| BioGone | Incoming | - | - | $1,320 (road) | 0.07[12] | 0.09 |
| Air Liquide | Incoming | 11,467 (road) | - | - | 0.132 | 1.52 |
| Barret Burston | Incoming | 47,118 (road) | - | - | 0.132 | 6.23 |
| Bintani Malt | Incoming | 279,120 (road) / 509,522 (sea) | - | - | 0.132 / 0.016 | 45.14 |
| Cryer malt | Incoming | 556 (road) / 1,365 (sea) | - | - | 0.132 / 0.016 | 0.43 |
| Ellersie | Incoming | 8,057 (road) / 21,509 (sea) | - | - | 0.132 / 0.016 | 1.41 |
| Magnum Flavourings | Incoming | 762 (road) | - | - | 0.132 | 0.10 |
| Redox | Incoming | 3,111 (road) | - | - | 0.132 | 0.41 |
| Refresh Juice | Incoming | 55 (road) | - | - | 0.314 | 0.02 |
| SWAT | Incoming | 36 (road) / 658 (sea) | - | - | 0.132 / 0.016 | 0.02 |
| Unigrain | Incoming | 2,400 (road) | - | - | 0.132 | 0.32 |
| Vanilla Pods | Incoming | 32 (road) / 58 (sea) | - | - | 0.132 / 0.016 | 0.01 |
| Winequip | Incoming | 229 (road) / 2,686 (sea) | - | - | 0.132 / 0.016 | 0.07 |

[11] Includes indirect (well to tank) emissions associated with fuel use

[12] Based on Leeuwin freight movements

| Provider/Product | Incoming / Outgoing | Tonne.km | Distance (Km) | Cost ($) | EF[11] (kg $CO_2$-e/t.km) (kg $CO_2$-e/km) (kg $CO_2$-e/$) | GHG emissions (t $CO_2$-e) |
|---|---|---|---|---|---|---|
| Express Link | Incoming | 213 (road) | - | - | 0.132 | 0.03 |
| Sands Freight | Incoming | 656 (road) | - | - | 0.132 / 0.314 | 0.12 |
| MCC Labels | Incoming | 394 (road) | - | - | 0.132 | 0.05 |
| Boxtec | Incoming | 101 (road) | - | - | 0.132 | 0.01 |
| Cospac | Incoming | 663 (road) | - | - | 0.132 | 0.09 |
| East Coast Canning | Incoming | 3,559 (road) | - | - | 0.132 | 0.47 |
| Environex | Incoming | 1,054 (road) | - | - | 0.132 | 0.14 |
| Konvoy keg hire | Incoming | 22,316 (road) | - | - | 0.132 | 2.95 |
| Klippakan | Incoming | 13,309 (road) | - | - | 0.132 | 1.76 |
| Vinpac | Incoming | 38,817 (road) | - | - | 0.132 | 5.13 |
| Visy | Incoming | 74 (road) | - | - | 0.132 | 0.01 |
| Leeuwin | Incoming | 40,815 (road) | - | - | 0.132 / 0.155 / 0.733 | 6.44 |
| Craft Transport | Incoming | 17,027 (road) | - | - | 0.132 / 0.680 | 10.10 |
| Leeuwin | Outgoing | - | - | $30,446 (road) | 0.07 | 1.99 |
| Express Link | Outgoing | 963 (road) | - | - | 0.132 | 0.13 |
| Sands Freight | Outgoing | 4,782 (road) | - | - | 0.132 / 0.314 | 1.18 |
| Leeuwin | Outgoing | 6,304 (road) | - | - | 0.132 / 0.733 | 2.74 |
| Craft Transport | Outgoing | 80,514 (road) | - | - | 0.132 / 0.680 | 17.69 |
| Minus 1 | Outgoing | 22,126 (road) | - | - | 0.155 | 3.42 |

(UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022)

Table B2 Activity data, emission factors and GHG emissions (TapHouse)

| Provider/Product | Incoming / Outgoing | Tonne.km | Distance (Km) | EF (kg $CO_2$-e/t.km) (kg $CO_2$-e/km) | GHG emissions (t $CO_2$-e) |
|---|---|---|---|---|---|
| LS Merchants | Incoming | - | 630 (road) | 0.290 / 0.680 | 0.24 |
| Down West Wholesale | Incoming | - | 160 (road) | 0.290 | 0.05 |
| Host | Incoming | 62 (road) | - | 0.132 | 0.01 |
| CCA | Incoming | 153 (road) | - | 0.132 | 0.02 |
| Liquid Mix | Incoming | 132 (road) | - | 0.132 | 0.02 |
| Magnum Flavourings | Incoming | 109 (road) | - | 0.132 | 0.01 |
| The Common Goods Co | Incoming | 50 (road) | - | 0.132 | 0.01 |
| Interchina Management | Incoming | 23 (road) / 502 (sea) | - | 0.132 / 0.016 | 0.01 |
| The Fabric Printer | Incoming | 414 (road) / 1,722 (air) | - | 0.132 / 1.130 | 0.09 |
| Air Liquide | Incoming | 4,790 (road) | - | 0.155 | 0.74 |

# Appendix C

**Scope 3 – Category 7 Business related emission factors**

Table C1 DoEE emission factors and allowances for fuel used in business land travel in private vehicles (Brewery)

| Fuel Combusted | Distance | Fuel used | EC | $CO_2$ EF | $CH_4$ EF | $N_2O$ EF | Scope 3 EF | GHG emissions |
|---|---|---|---|---|---|---|---|---|
| | (km) | (litres) | (GJ/kL) | (kg $CO_2$-e/) | | | | (t $CO_2$-e) |
| Gasoline (other than for use as fuel in an aircraft) Post 2004 vehicle | 6,800 | 554.2 | 34.2 | 67.4 | 0.02 | 0.2 | 17.2 | 1.61 |
| Diesel oil Post 2004 vehicle | 26,750 | 2,665 | 38.6 | 69.9 | 0.01 | 0.5 | 17.3 | 9.02 |

(Department of the Environment and Energy, November 2022)

Table C2 DBEIS emission factors and allowances for other land travel (Brewery)

| Mode of travel | Distance | $CO_2$ EF | GHG emissions |
|---|---|---|---|
| | | (kg $CO_2$-e/km/p.km) | (t $CO_2$-e) |
| Taxi/Uber | 700 km | 0.259 | 0.18 |
| Bus | 0.146 p.km | 0.146 | 0.02 |

(UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022)

Table C3 DBEIS emission factors and allowances for air travel (before offset purchases)

| Facility | Flight classification | Distance | $CO_2$ EF | $CH_4$ EF | $N_2O$ EF | WTT EF | GHG emissions |
|---|---|---|---|---|---|---|---|
| | | (p.km) | (kg $CO_2$-e/p.km) | | | | (t $CO_2$-e) |
| Brewery | All classes / Domestic | 1,737 | 0.13003 | 0.00010 | 0.00122 | 0.02691 | 0.27 |
| Brewery | Economy class / Medium | 53,803 | 0.07984 | 0.00001 | 0.00075 | 0.01654 | 5.75 |
| TapHouse | Economy class / Medium | 12,617 | 0.07984 | 0.00001 | 0.00075 | 0.01654 | 1.23 |

(UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022)

# Appendix D

### Scope 3 – Category 7 Employee commuting allowances and emissions

Table D1 Employee commuting allowances and GHG emissions

| Name | Distance (km) | Fuel type | Fuel used (litres) | EF[13] (kg $CO_2$-e/km) | GHG emission (t $CO_2$-e) |
|---|---|---|---|---|---|
| **Brewery** | | | | | |
| Ross | 8,100 | Diesel | 810 | 0.339 | 2.74 |
| Adam | 16,720 | Petrol | 1,170 | 0.203 | 3.40 |
| Ryan | 4,428 | Diesel | 531 | 0.406 | 1.80 |
| Ash | 1,050 | Petrol | 74 | 0.203 | 0.21 |
| Ash/Mitch[14] | 550 | Petrol | 50 | 0.261 | 0.14 |
| Mitch Ball | 1,850 | Petrol | 204 | 0.319 | 0.59 |
| Ben Spink | 6,300 | Diesel | 567 | 0.305 | 1.92 |
| Mike Patton | 1,704 | Diesel | 174 | 0.345 | 0.59 |
| Mitch Dekkers | 2,160 | Petrol | 229 | 0.307 | 0.66 |
| Andrus | 5,936 | Diesel | 416 | 0.237 | 1.41 |
| Shaun Pedrotti | 2,430 | Diesel | 243 | 0.339 | 0.82 |
| Sean Beckett | 2,754 | Diesel | 270 | 0.332 | 0.91 |
| Drew | 8,500 | Petrol | 595 | 0.203 | 1.73 |
| Beck | 3,880 | Diesel | 310 | 0.271 | 1.05 |
| Jenni | 5,060 | Petrol | 329 | 0.189 | 0.95 |
| Steven | 2,400 | Diesel | 216 | 0.305 | 0.73 |
| Ricky | 1,980 | Petrol | 77 | 0.113 | 0.22 |
| James | 6,800 | Diesel | 680 | 0.339 | 2.30 |
| Mini | 1,080 | Petrol | 86 | 0.232 | 0.25 |
| Liam | 256 | Petrol | 36 | 0.406 | 0.10 |
| Mel | 5,610 | Diesel | 617 | 0.372 | 2.09 |
| Sarah Tindall | 200 | Petrol | 15 | 0.220 | 0.04 |
| Ethan | 2,400 | Diesel | 240 | 0.339 | 0.81 |
| Steele | 4,374 | Petrol | 437 | 0.290 | 1.27 |
| **TapHouse** | | | | | |
| TJ Rocco | 4,320 | Petrol | 359 | 0.241 | 1.04 |
| Hannah[15] | 2,400 | Petrol | 74 | 0.090 | 0.22 |
| Waverley | 760 | Petrol | 76 | 0.290 | 0.22 |
| Kieran | 760 | Petrol | 65 | 0.247 | 0.19 |

(Department of the Environment and Energy, November 2022),

[13] Based on vehicle fuel efficiency and fuel type
[14] Car-pool
[15] Car-pool

# Appendix E (Brewery)

### GHG emissions inventory for Brewery operations

The GHG emissions associated with brewery operations are estimated at **920.07 t $CO_2$-e** for the period 1 July 2022 to 30 June 2023.

The main GHG emitting activities were associated with electricity use followed by stationary fuel consumption.

## Scope 1 Emissions - brewery

Scope 1 GHG emissions are released directly from the brewery. Scope 1 emissions associated with brewery operations were estimated at **314.13 t $CO_2$-e.**

Table 12 Scope 1 emissions summary - brewery

| Scope 1 activity | Quantity | $CO_2$ (t $CO_2$-e) | $CH_4$ (t $CO_2$-e) | $N_2O$ (t $CO_2$-e) | Emissions (t $CO_2$-e) |
|---|---|---|---|---|---|
| Fuel Consumption (Stationary) | | 215.12 | 0.56 | 0.68 | 216.35 |
| *Diesel* | *31,263 kL* | *84.35* | *0.12* | *0.24* | *84.71* |
| *LPG* | *84.521 kL* | *130.77* | *0.43* | *0.43* | *131.63* |
| Fuel Consumption (Stationary) | | 28.08 | 0.01 | 0.15 | 28.24 |
| *Gasoline* | *5.453 kL* | *12.57* | *0.00* | *0.04* | *12.61* |
| *Diesel* | *5,750 kL* | *15.51* | *0.00* | *0.11* | *15.63* |
| Wastewater (discharged on site) | 2,832 kL | | | | 69.55 |
| **Total Emissions Scope 1** | | | | | **314.13** |

### Fuel consumption (Stationary & transport)

Diesel and LPG used in stationary equipment in the brewery.

Diesel and gasoline used in fleet vehicles associated with the brewery.

Carbon Neutral used 2022 NGA emission factors (Department of the Environment and Energy, November 2022) to estimate the total direct stationary fuel emissions for RRBC at **216.35 t $CO_2$-e** and total direct transport fuel emissions at **28.24 t $CO_2$-e**.

Table 13 Stationary equipment and transport fuel emission factors (by volume) - brewery

| Fuel type | Energy content factor | Emissions factor | | | |
|---|---|---|---|---|---|
| | | $CO_2$ | $CH_4$ | $N_2O$ | Scope 3 |
| | (GJ/kL) | (kg $CO_2$ e/GJ) | | | |
| **Stationary equipment** | | | | | |
| Liquified petroleum gasoline | 25.7 | 60.2 | 0.2 | 0.2 | 20.2 |
| Diesel oil | 38.6 | 69.9 | 0.1 | 0.2 | 17.3 |
| **Transport** | | | | | |
| Gasoline | 34.2 | 67.4 | 0.02 | 0.2 | 17.2 |
| Diesel oil | 38.6 | 69.9 | 0.01 | 0.5 | 17.3 |

(Department of the Environment and Energy, November 2022)

### Wastewater treatment

Wastewater generated from brewery operations and disposed of on site.

The volume of water disposed onto the farm was provided by RRBC.

Carbon Neutral used the default wastewater COD for beer sourced from the National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Department of Industry, 2022) and the methodology from the Australian Greenhouse Office's Factors and Methods workbook (Australian Greenhouse Office, 2008) to estimate total on-site wastewater emissions for RRBC at **69.55 t $CO_2$-e.**

Table 14 Default wastewater emission factors

| Default wastewater commodity type | $COD_{con,i}$ |
|---|---|
| Beer (ANZSIC code 1212) | 6.0 |

(Department of Industry, 2022)

### Exclusions

Direct emissions associated with farm emissions have been excluded.

Emissions associated with composting of spent that are reapplied to the farm have also been excluded from emissions calculations.

Emissions calculations exclude $CO_2$ produced from fermentation during the beer making process.

## Scope 2 Emissions - brewery

There were no scope 2 emissions associated with brewery operations which are powered on solar PV and battery systems.

Emissions associated with on-site renewable energy use are zero when determined using the market based method.

## Scope 3 Emissions - brewery

The indirect emissions of all Scope 3 categories associated with the brewery were estimated at **604.93 t $CO_2$-e** for FY23.

The most significant contribution to Scope 3 emissions from the brewery's value chain came from Purchased Goods and Services.

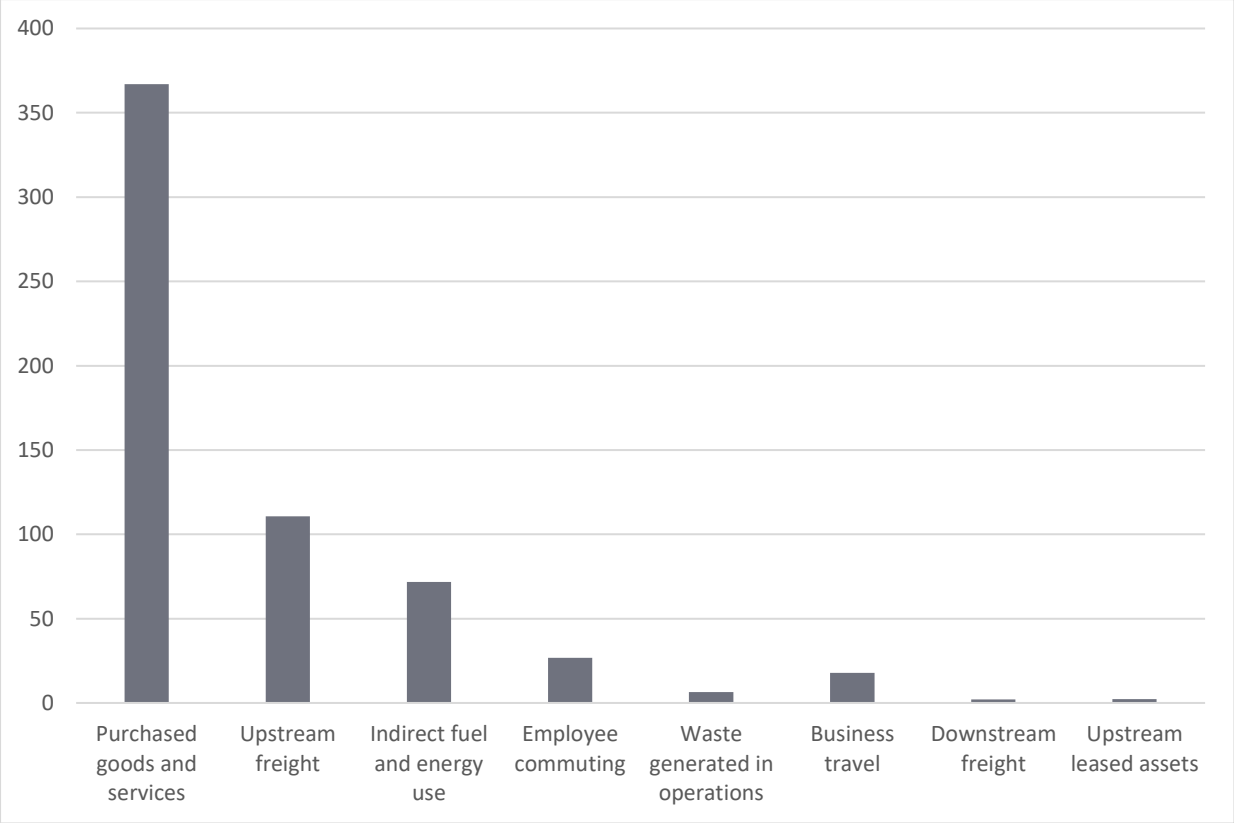


Figure 9 FY23 Scope 3 (gross) emissions by activity for brewery operations (t $CO_2$-e).

# Scope 3 Emissions Summary - brewery

Table 15 FY23 Scope 3 gross GHG emissions by activity for the brewery

| Scope 3 GHG emissions category | | Emissions (t $CO_2$-e) |
|---|---|---|
| | | Brewery |
| | **Upstream emissions** | |
| 1 | Purchased goods and services | 366.95 |
| 2 | Capital goods | - |
| 3 | Indirect fuel and energy use | 71.80 |
| 4 | Upstream freight | 110.67 |
| 5 | Waste generated in operations | 6.55 |
| 6 | Business travel | 17.88 |
| 7 | Employee commuting | 26.76 |
| 8 | Upstream leased assets | 2.22 |
| | **Downstream emissions** | |
| 9 | Downstream freight | 2.10 |
| 10 | Processing of sold products | - |
| 11 | Use of sold products | - |
| 12 | End-of-life treatment of sold products | - |
| 13 | Downstream leased assets | - |
| 14 | Franchises | - |
| 15 | Investments | - |
| | **Total emissions Scope 3** | **604.93** |

# Scope 3 Standard Emissions Categories

| Category 1: Purchased goods and services - brewery | |
|---|---|
| **Category description** | Upstream (i.e., cradle-to-gate) GHG emissions from the production of products purchased or acquired by RRBC in FY23. This includes both goods (tangible products) and services (intangible products). |

| | Weight (tonnes) | Cost ($) | Emissions (t $CO_2$-e) |
|---|---|---|---|
| **Brewery** | | | |
| Barret Burston - Malt | 200.50 | | 105.84 |
| Bintani - Malt | 57.83 | | 30.53 |
| Bintani - Hops | 1.86 | | 4.51 |
| Bintani - Yeast | 0.73 | | 2.33 |
| Bintani -Process Aids | | $41,980 | 42.68 |
| Bintani - Extracts | 3.66 | | 4.96 |
| Bintani - Flavours | 14.14 | | 10.34 |
| Cryer Malt - Malt | 1.00 | | 0.53 |
| Cryer Malt - Hops | 0.10 | | 0.74 |
| Elleslie Hops - Hops | 1.80 | | 13.32 |
| Elleslie Hops - Malt | 0.20 | | 0.11 |
| Elleslie Hops - Additives | 0.19 | | 0.34 |
| Karridale Hops - Hops | 0.03 | | 0.19 |
| Magnum Flavourings | 2.82 | | 4.00 |
| Redox | 13.53 | | 32.62 |
| Refresh Juice | 0.22 | | 0.18 |
| SWAT | | $1,135 | 0.36 |
| Unigrain | 9.60 | | 0.00 |
| Vanilla Pods | | $1,947 | 0.89 |
| Winequip - Yeast | 0.11 | | 0.34 |
| Winequip - Chemicals | | $255 | 0.05 |
| $CO_2$ (embodied) | 47.78 | | 10.51 |
| Service & Car wash | | $980 | 0.24 |
| Gateway Printing | | $5,013 | 1.80 |
| MCC labels (Multicolour) | 1.31 | | 1.04 |
| Orora can & lid | 13.91 | | 62.47 |
| BioGone | | $4,313 | 0.73 |
| Cospac | 2.76 | | 6.22 |
| East Coast Canning | 0.86 | | 7.84 |

| | | | |
|---|---|---|---|
| Environex | 3.91 | | 11.27 |
| Klippakan | 3.21 | | 2.63 |
| Vinpac | 8.05 | | 6.61 |
| Visy | 0.33 | | 0.23 |
| Spice Digital | 0.04 | | 0.17 |
| Boxtec | 0.46 | | 0.33 |
| **Total** | | | **366.95** |

### Calculation boundary

This category covers emissions embodied within products and purchased for the brewery.

Materials used for packaging, ingredients (malt, hops, yeasts, extracts, syrups and fruit based flavourings), equipment and chemical purchases, marketing material and consumable purchases were included.

### Calculation methodology

A variety of methods were used to determine emissions from Purchased Goods and Services depending on the availability of data.

The 'spend-based' method was used to calculate some emissions, with industry-average emission factors applied, based on the economic value of the goods and services.

The relevant economic sector emission factors from the EPiC database were then applied to calculate the overall emissions estimate for this category (Crawford, 2019).

For bioplastic, a hybrid emission factor has been used with the cost based method for plastic (polymer material) adjusted to be 0.345 times as emissions intensive based on information from Project Drawdown (Project Drawdown, 2025).

Emission factors associated with the use of water and disposal of sewage are obtained from the Australian Bureau of Meteorology Department and the most recent National Performance Report 2022/23: Urban Water Utilities Dataset (BoM, 2023).

Emissions associated with packaging and some ingredients are determined using the mass of input materials where the weight of material by type was provided.

Emission factors are obtained from a variety of sources including industry publications (Boortmalt, 2023), (COFALEC, 2015), published life cycle assessment studies, (CONCITO, 2024), (Ana Nica, 2010) and government sources, (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022), (City of Winnepeg, 2012). (Appendix A).

No embodied emissions are associated with the use of oat husks from Unigrain as this material is a waste by product from oat production.

Total emissions of category 1 for brewery operations were calculated at **366.95 t $CO_2$-e**.

| Category 3: Indirect fuel and energy use - brewery | |
|---|---|
| **Category description** | Indirect GHG emissions from extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling. It also includes indirect emissions from the transmission and/or distribution of those resources. |

| Fuel | Usage | Emissions (t $CO_2$-e) |
|---|---|---|
| Diesel (non-transport) | 31.263 kL | 20.88 |
| LPG (non-transport) | 84.521 kL | 43.88 |
| Diesel (transport) | 5.750 kL | 3.84 |
| Gasoline (transport) | 5.453 kL | 3.21 |
| | **Total** | **71.80** |

### Calculation boundary

All fuel consumption (operations of stationary machinery and fleet) and grid purchased electricity were included in gross GHG emission calculation.

### Calculation methodology

Carbon Neutral used the average-data method to calculate emissions from this category, which involves estimating emissions using secondary (e.g., industry average) emissions factors for upstream emissions per unit of consumption.

Carbon Neutral used 2022 NGA emission factors to estimate indirect fuel and energy emissions for brewry operations at **71.80 t $CO_2$-e** (Table 3 and Table 6)**.**

| Category 4: Upstream freight - brewery | |
|---|---|
| **Category description** | GHG emissions from the transportation and distribution of products purchased by the reporting company in the reporting year between the company's suppliers and its operations.<br><br>It includes third-party transportation and distribution services *purchased* by the reporting company, including inbound logistics, outbound logistics and third-party transportation and distribution between a company's own facilities as well as its cutomers. |

| **Freight type** | **Emissions (t $CO_2$-e)** |
|---|---|
| **Brewery** | |
| Inbound freight | 83.52 |
| Outbound freight | 27.15 |
| **Total** | **110.67** |

### Calculation boundary

This category includes emissions from transportation and distribution of products purchased for brewery operations, between their tier 1 suppliers and its operations (in vehicles and facilities not owned or controlled by RRBC).

All incoming and outgoing freight, where the cost of services was paid for by RRBC and not their clients, has been included.

### Calculation Methodology

Carbon Neutral used, where possible, the weight and distance-based method (tonne.km) to calculate emissions from this category. This involved determining the weight, distance, and transport method for each freight movement; then applying the appropriate mass-distance emission factor for the vehicle using DBEIS emission factors (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022).

For some local deliveries, where the weight of freight was not recorded, whole delivery vehicle emissions were used based on a distance (km) travelled; then applying the appropriate distance based emission factor for the vehicle using DBEIS emission factors (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022).

Where the weight of freight was not recorded for some Leeuwin freight movements, an emission factor of 0.07 kg $CO_2$-e / km was used to estimate emissions, based on freight cost. This emission factor was determined by calculating the average emissions per dollar expenditure of freight movements where both the weight and distance of shipments could be determined.

A more detailed breakdown of freight movements can be found in Appendix B.

Total emissions of this category for brewery operations were calculated at **110.67 t $CO_2$-e**.

| Category 5: Waste generated in operations - brewery | |
|---|---|
| **Category description** | GHG emissions associated with waste treatment in facilities owned or operated by third parties. |

| Facility | Weight (tonnes) | Emissions (t $CO_2$-e) |
|---|---|---|
| Brewery waste | **5.04** | **6.55** |

### Calculation boundary

This category included all emissions that resulted from waste generated in business operations and sent to landfill in FY23.

### Calculation methodology

The weight of waste materials sent to landfill from the brewery was provided by Veolia for brewery operations.

Emission factors are obtained from the 2022 NGA Factors. The emission factor for co-mingled commercial and industrial waste, 1.3 t $CO_2$-e/t waste, was used to estimate emissions (Department of Climate Change, Energy, the Environment and Water, November 2022).

Total emissions of category 5 for brewery operations were calculated at **6.55 t $CO_2$-e**.

| Category 6: Business travel - brewery | | | |
|---|---|---|---|
| **Category description** | GHG emissions from the transportation of employees for business-related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars. | | |
| **Transportation** | **Distance** | **Emission factor** | **Emissions (t $CO_2$-e)** |
| **Brewery** | | | |
| Taxi / Rideshare | 700 km | 0.259 kg $CO_2$-e/p.km | 0.18 |
| Bus | 150 p.km | 0.146 kg $CO_2$-e/p.km | 0.02 |
| Private vehicle | 33,500 p.km | 0.317 kg $CO_2$-e/p.km[16] | 10.63 |
| Domestic flight | 1,737 p.km | 0.2471 kg $CO_2$-e/p.km | 0.27 |
| Short haul economy flight | 53,803 p.km | 0.1518 kg $CO_2$-e/p.km | 5.75 |
| **Accommodation** | **Room nights** | | |
| **Brewery** | | | |
| Brisbane | 13.5 | 43.9 kg $CO_2$-e/room night | 0.55 |
| Melbourne | 7.5 | 62.18 kg $CO_2$-e/room night | 0.42 |
| New Zealand | 3 | 17.72 kg $CO_2$-e/room night | 0.05 |
| | **Total** | | **17.88** |

### Calculation boundary

This category included all emissions that resulted from business related travel in FY23 for brewery operations.

This includes road as well as air travel by staff for business related purposes and the use of accommodation during business related trips.

### Calculation methodology

Details of work-related travel including vehicles used were obtained by staff survey and an estimate made of fuel consumed for these trips. Emissions from private vehicle use were then determined using 2022 NGA Factors (Department of the Environment and Energy, November 2022).

Emissions from flights and from the use of taxis/rise share and busses are determined using 2022 DBEIS Factors (UK Government's Department for Business, Energy & Industrial Strategy,

[16] Average of staff vehicles

Department for Environment, Food & Rural Affairs., 2022).

For air travel, no allowance has been made for radiative forcing index.

Emissions associated with accommodation are determined using emission factors from the Cornell Hotel Sustainability Benchmarking Index 2023 (Greenview, 2023). Where accommodation is shared between Brewery and TapHouse staff, emissions are equally assigned to both entities.

Where flights are said to be carbon offset, then net emissions associated with this flight are taken to be zero.

Emission factors and business related travel allowances are shown in Appendix C.

Total gross GHG emissions of category 6 were calculated at **17.88 t $CO_2$-e.**

After allowances for carbon offset flights, net GHG emissions of category 6 for brewery operations are calculated at **12.91 t $CO_2$-e.**

| Category 7: Employee commuting - brewery | | | |
|---|---|---|---|
| **Category description** | GHG emissions from the transportation of employees between their homes and their worksites. Emissions from employee commuting may arise from private vehicle travel, bus travel, rail travel and/or air travel. | | |
| **Brewery** | **Distance (km)** | **Fuel used (litres)** | **Emissions (t $CO_2$-e)** |
| Private vehicle – petrol | 52,742 | 5,074 | 17.18 |
| Private vehicle – diesel | 43,780 | 3,302 | 9.58 |
| **Total** | **104,622** | **9,186** | **26.76** |

### Calculation boundary

Calculation for emissions of brewery employee commuting arise from the commute from home to work and return.

Emissions from staff working from home during FY23 were immaterial and are not included.

### Calculation methodology

Staff surveys were conducted to obtain details of the mode of transport to and from work and details of vehicles used (Appendix D).

Carbon Neutral the distance travelled to determine fuel consumption for commuting in private vehicles and applied the appropriate EF based on the type of fuel used.

Emissions from private vehicle use are determined using 2022 NGA Factors (Department of the Environment and Energy, November 2022), based on estimated fuel consumption (Appendix D).

Total emissions of category 7 from brewery operations were calculated at **26.76 t $CO_2$-e.**

| Category 8: Upstream leased assets - brewery | | |
|---|---|---|
| **Category description** | GHG emissions from the operation of assets that are leased by RRBC. This category is applicable only to companies that operate leased assets (i.e., lessees). | |
| | **GJ** | **Emissions (t $CO_2$-e)** |
| Head office (shared facility) | 12.6 | **2.22** |

### Calculation boundary

This category included facilities used by RRBC for brewery operations that are not deemed to be under the operational control of the business and includes the energy used in its head offices (30$m^2$) in West Leederville.

### Calculation methodology

Metered electricity consumption was not available for RRBC's head office which is shared with other entities.

The 2022 Commercial Building Baseline Study was used to estimate electricity used in this facility. The average electrical energy intensity for offices in WA was used (420 MJ/sqm.a) to estimate electricity use at 12.6GJ for the year (Strategic Policy Research, 2022).

Emissions factors are obtained from the DoEE (Department of the Environment and Energy, November 2022). An emission factor of 176 kg $CO_2$-e/GJ was used.

In the previous reporting period, electricity consumption was estimated based on office equipment use,

Total emissions of category 8 form brewery operations were calculated at **2.22 t $CO_2$-e**.

| Category 9: Downstream freight - brewery | |
|---|---|
| **Category description** | GHG emissions from the transportation and distribution of sold products in vehicles and facilities not owned or operated by the reporting company.<br>It excludes third-party transportation and distribution services purchased by the reporting company and not paid for by customers. |

| **Export shipments** | **Weight / Distance** | **Emissions (t $CO_2$-e)** |
|---|---|---|
| Sea freight | 211,003 t.km | 2.10 |
| | **Total** | **2.10** |

### Calculation boundary

This category includes emissions from transportation and distribution of products sold by RRBC (in vehicles not owned or controlled by RRBC).

All outgoing freight where customers paid for the freight was included.

### Calculation Methodology

Emissions from sea freight are provided by RRBC based on average data provided by Singapore Ports.

Total emissions of category 9 were calculated at **2.10 t $CO_2$-e.**

## Emissions Intensity - brewery

Emissions intensity expresses GHG impact per unit of physical activity or unit of economic output. These metrics allow for more meaningful comparison of emissions between years, operations and organisations.

The carbon intensity of an organisation's footprint can be calculated by dividing emissions by a relevant measure of activity.

RRBC's main operations consist of beer production. As such, an emissions intensity has been calculated per litre of beer produced for FY2023 brewery operations. This is represented in Table 16. Additionally, Table 17 displays the emissions intensity of RRBC's operations per employee.

Table 16 FY23 Brewery emissions intensity (per litre of beer produced)

| Emissions Intensity FY23 | Volume of beer produced (kL) | GHG Emissions (t $CO_2$-e) | GHG Emissions Intensity (kg $CO_2$-e/L) |
|---|---|---|---|
| FY2023 (Gross) | 1,133 | 919.07 | 0.81 |
| FY2023 (Net) | *1,133* | *914.09* | *0.81* |

Table 17 FY23 brewery emissions intensity (FTE).

| Emissions Intensity FY23 | FTE | GHG Emissions (t $CO_2$-e) | GHG Emissions Intensity (t $CO_2$-e/staff) |
|---|---|---|---|
| FY2023 (Gross) | 24 | 919.07 | 38.29 |
| FY2023 (Net) | *24* | *914.09* | *38.09* |

# Appendix F (TapHouse)

**GHG emissions inventory for TapHouse operations**

The GHG emissions associated with TapHouse operations are estimated at **81.81 t $CO_2$-e** for the period 1 July 2022 to 30 June 2023.

## Scope 1 Emissions - TapHouse

There are no direct emissions of GHG from the TapHouse. Emissions of CO2 used in RRBC produced beer are excluded from the GHG emissions inventory.

## Scope 2 Emissions – TapHouse

Scope 2 emissions are indirect GHG emissions associated with imported electricity use.

Scope 2 emissions are relevant for the TapHouse facility only and 70% of the premises' electricity use has been assigned to TapHouse operations.

The GHG indirect emissions from electricity use for RRBC were estimated at **26.78 t $CO_2$-e** for FY23 when determined using the locations-based method.

**When determined using the market-based method, emissions associated with electricity use equal zero as 100% renewable energy is used in the TapHouse.**

Table 18 Scope 2 emissions summary (locations-based method) - TapHouse

| GHG emissions – Scope 2 | Quantity (kWh) | Emissions (t $CO_2$-e) |
|---|---|---|
| Electricity use | 36,753 | 18.74 |
| Steam, heat or cooling as a service | Not applicable | Not applicable |

## Scope 3 Emissions - TapHouse

The indirect emissions of all Scope 3 categories associated with the TapHouse were estimated at **81.81 t $CO_2$-e** for FY23.

The most significant contribution to Scope 3 emissions from the TapHouse's value chain came from Purchased Goods and Services.

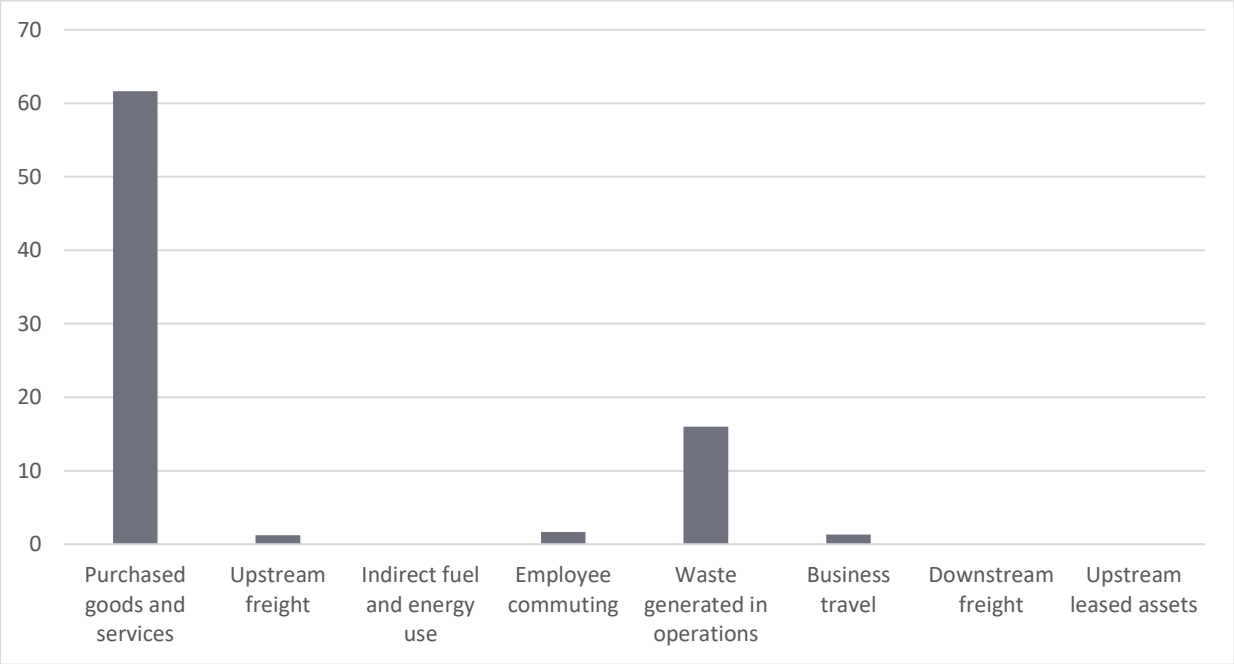


Figure 10 FY23 Scope 3 (gross) emissions by activity for TapHouse operations (t $CO_2$-e).

# Scope 3 Emissions Summary - TapHouse

Table 19 FY23 Scope 3 gross GHG emissions by activity for the TapHouse

| Scope 3 GHG emissions category | | Emissions (t $CO_2$-e) |
|---|---|---|
| | | TapHouse |
| | **Upstream emissions** | |
| 1 | Purchased goods and services | 61.65 |
| 2 | Capital goods | - |
| 3 | Indirect fuel and energy use (market based electricity) | 0.00 |
| 4 | Upstream freight | 1.20 |
| 5 | Waste generated in operations | 15.99 |
| 6 | Business travel | 1.30 |
| 7 | Employee commuting | 1.66 |
| 8 | Upstream leased assets | - |
| | **Downstream emissions** | |
| 9 | Downstream freight | - |
| 10 | Processing of sold products | - |
| 11 | Use of sold products | - |
| 12 | End-of-life treatment of sold products | - |
| 13 | Downstream leased assets | - |
| 14 | Franchises | - |
| 15 | Investments | - |
| | **Total emissions Scope 3** | **81.81** |

# Scope 3 Standard Emissions Categories

| Category 1: Purchased goods and services | |
|---|---|
| **Category description** | Upstream (i.e., cradle-to-gate) GHG emissions from the production of products purchased or acquired by RRBC in FY23. This includes both goods (tangible products) and services (intangible products). |

| | Weight (tonnes) | Cost ($) | Emissions (t $CO_2$-e) |
|---|---|---|---|
| **TapHouse** | | | |
| Down South Wholesale | | $15,807 | 7.84 |
| Host | | $1,497 | 0.79 |
| CCA | 0.67 | | 0.46 |
| SW Provisions | 0.15 | $9 | 0.52 |
| LS Merchants | 2.75 | | 2.89 |
| Liquid Mix | 0.34 | | 0.32 |
| Swings and Roundabouts | 0.98 | | 1.03 |
| Magnum Flavourings | 0.40 | | 0.57 |
| The Common Goods Co | 0.01 | | 0.00 |
| Interchina Management | 0.10 | | 2.23 |
| Juiceprint | | $30,491 | 10.93 |
| The Fabric Printer | 1.63 | | 32.45 |
| $CO_2$ (embodied) | 3.93 | | 0.86 |
| Mains water use & disposal | 585 | | 0.76 |
| **Total** | | | **61.65** |

### Calculation boundary

This category covers emissions embodied within products and purchased for the TapHouse.

### Calculation methodology

A variety of methods were used to determine emissions from Purchased Goods and Services depending on the availability of data.

The 'spend-based' method was used to calculate some emissions, with industry-average emission factors applied, based on the economic value of the goods and services.

The relevant economic sector emission factors from the EPiC database were then applied to calculate the overall emissions estimate for this category (Crawford, 2019).

Emission factors associated with the use of water and disposal of sewage are obtained from the Australian Bureau of Meteorology Department and the most recent National Performance Report 2022/23: Urban Water Utilities Dataset (BoM, 2023).

Emissions associated with some goods are determined using the mass of input materials where the weight of material by type was provided.

Emission factors are obtained from a variety of sources including industry publications, published life cycle assessment studies, and government sources, (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022), (Appendix A).

Total emissions of category 1 for TapHouse operations were calculated at **61.65 t $CO_2$-e**.

| **Category 3: Indirect fuel and energy use** | | |
|---|---|---|
| **Category description** | Indirect GHG emissions from extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling. It also includes indirect emissions from the transmission and/or distribution of those resources. | |
| TapHouse (market based) | 36,753 kWh | 0.00 |

### Calculation boundary

All grid purchased electricity use was included in gross GHG emission calculation.

When calculated using the locations-based method to determine emissions associated with electricity use, scope 3 emissions for this category are calculated at 0.21 t $CO_2$-e for TapHouse operations.

As GreenPower is used, net GHG emissions associated with indirect electricity emissions are zero when determined using the market-based approach.

### Calculation methodology

Carbon Neutral used the average-data method to calculate emissions from this category, which involves estimating emissions using secondary (e.g., industry average) emissions factors for upstream emissions per unit of consumption.

Carbon Neutral used 2022 NGA emission factors to estimate indirect fuel and energy emissions from the TapHouse at **0.00 t $CO_2$-e** (Table 3 and Table 6**).**

| Category 4: Upstream freight - TapHouse | |
|---|---|
| **Category description** | GHG emissions from the transportation and distribution of products purchased by the reporting company in the reporting year between the company's suppliers and its operations.<br><br>It includes third-party transportation and distribution services *purchased* by the reporting company, including inbound logistics, outbound logistics and third-party transportation and distribution between a company's own facilities as well as its cutomers. |

| TapHouse | Emissions (t $CO_2$-e) |
|---|---|
| Inbound freight | 1.20 |

### Calculation boundary

This category includes emissions from transportation and distribution of products purchased for TapHouse operations, between their tier 1 suppliers and its operations (in vehicles and facilities not owned or controlled by RRBC).

All incoming freight, where the cost of services was paid for by RRBC, has been included.

### Calculation Methodology

Carbon Neutral used, where possible, the weight and distance-based method (tonne.km) to calculate emissions from this category. This involved determining the weight, distance, and transport method for each freight movement; then applying the appropriate mass-distance emission factor for the vehicle using DBEIS emission factors (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022).

A more detailed breakdown of freight movements can be found in Appendix B.

Total emissions of this category for TapHouse operations were calculated at **1.20 t $CO_2$-e**.

| Category 5: Waste generated in operations - TapHouse | |
|---|---|
| **Category description** | GHG emissions associated with waste treatment in facilities owned or operated by third parties. |

| Facility | Weight (tonnes) | Emissions (t $CO_2$-e) |
|---|---|---|
| TapHouse general waste | 12.3 | 15.99 |

### Calculation boundary

This category included all emissions that resulted from waste generated in business operations and sent to landfill in FY23.

### Calculation methodology

The weight of waste materials sent to landfill from the TapHouse was provided by Veolia and by estimated based on weekly bin services for TapHouse operations.

Emission factors are obtained from the 2022 NGA Factors. The emission factor for co-mingled commercial and industrial waste, 1.3 t $CO_2$-e/t waste, was used to estimate emissions (Department of Climate Change, Energy, the Environment and Water, November 2022).

For the TapHouse, the volume of waste generated for the year was based on three full 240 litre mobile garbage bins being collected weekly. A volume to weight conversion factor of 0.329 t/$m^3$ was applied based on the default waste stream percentage for waste mix types from the Commonwealth's NGER Determination (Department of Industry, 2022). This volume to waste conversion factor has been updated from 0.08 t/$m^3$, used in FY22, which was based on skip bin waste densities for the brewery.

Total emissions of category 5 for TapHouse operations were calculated at **15.99 t $CO_2$-e**.

| Category 6: Business travel - TapHouse | |
|---|---|
| **Category description** | GHG emissions from the transportation of employees for business-related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars. |

| **Transportation** | **Distance** | **Emission factor** | **Emissions (t $CO_2$-e)** |
|---|---|---|---|
| **TapHouse** | | | |
| Short haul economy flight | 12,617 p.km | 0.1518 kg $CO_2$-e/p.km | 1.23 |
| **Accommodation** | **Room nights** | | |
| **TapHouse** | | | |
| Brisbane | 1.5 | 43.9 kg $CO_2$-e/room night | 0.03 |
| Melbourne | 1.5 | 62.18 kg $CO_2$-e/room night | 0.05 |
| | **Total** | | **1.30** |

### Calculation boundary

This category included all emissions that resulted from business related travel in FY23 for TapHouse operations.

This includes road as well as air travel by staff for business related purposes and the use of accommodation during business related trips.

### Calculation methodology

Details of work-related travel including vehicles used were obtained by staff survey and an estimate made of fuel consumed for these trips. Emissions from private vehicle use were then determined using 2022 NGA Factors (Department of the Environment and Energy, November 2022).

Emissions from flights and from the use of taxis/rise share and busses are determined using 2022 DBEIS Factors (UK Government's Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs., 2022).

For air travel, no allowance has been made for radiative forcing index.

Emissions associated with accommodation are determined using emission factors from the Cornell Hotel Sustainability Benchmarking Index 2023 (Greenview, 2023). Where accommodation is shared between Brewery and TapHouse staff, emissions are equally assigned to both entities.

Where flights are said to be carbon offset, then net emissions associated with this flight are taken to be zero.Emission factors and business related travel allowances are shown in Appendix C.

Total gross GHG emissions of category 6 for TapHouse operations were calculated at **1.30 t $CO_2$-e.**

After allowances for carbon offset flights, net GHG emissions of category 6 for TapHouse operations are calculated at **0.08 t $CO_2$-e.**

| Category 7: Employee commuting - TapHouse | |
|---|---|
| **Category description** | GHG emissions from the transportation of employees between their homes and their worksites. Emissions from employee commuting may arise from private vehicle travel, bus travel, rail travel and/or air travel. |

| TapHouse | Distance (km) | Fuel used (litres) | Emissions (t $CO_2$-e) |
|---|---|---|---|
| Private vehicle – petrol | 8,730 | 574 | 1.66 |

### Calculation boundary

Calculation for emissions of TapHouse employee commuting arise from the commute from home to work and return.

Emissions from staff working from home during FY23 were immaterial and are not included.

### Calculation methodology

Staff surveys were conducted to obtain details of the mode of transport to and from work and details of vehicles used (Appendix D).

Carbon Neutral the distance travelled to determine fuel consumption for commuting in private vehicles and applied the appropriate EF based on the type of fuel used.

Emissions from private vehicle use are determined using 2022 NGA Factors (Department of the Environment and Energy, November 2022), based on estimated fuel consumption (Appendix D).

Total emissions of category 7 from TapHouse operations were calculated at **1.66 t $CO_2$-e.**

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Dr Phil Ireland | Chief Executive Officer

**Issue Date:** 24 April 2025 | **Emissions Period:** 1 July 2022 - 30 June 2023

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