Carbon Footprint Report

Final 1.0

3/7/2023

For **Rocky Ridge Brewing Co**

1 July 2021 to 30 June 2022

carbonneutral

Carbon Neutral Pty Ltd

Prepared by Dr Ahmad Rashedi & Scott Favacho
Phone +61 (0)435175766
Email *ahmad.rashedi@carbonneutral.com.au*
scott.favacho@carbonneutral.com.au

Prepared at the request of

Mel Holland
Co-Founder & Owner
mel@rockyridgebrewing.com

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Abbreviations

CH_4	Methane
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
DBEIS	Department for Business, Energy & Industrial Strategy (UK)
EF	Emission factor
EPiC	Environmental Performance in Construction
GHG	Greenhouse gas
GJ.	Gigajoule
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 2022 (FY22) 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 877.71 tonnes of carbon dioxide equivalent (t CO_2-e) for the period 1 July 2021 to 30 June 2022.

After allowances for carbon offset air travel, net GHG emissions prior to the retirement of any other offsets are estimated at 853.06 t CO_2-e.

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

About 31.7% of gross GHG emissions resulted from RRBC's Scope 1 (direct) fuel consumption and fugitive emissions. Scope 1 emitting activities were predominantly associated with stationary equipment use and on-site wastewater disposal.

Approximately 67.4% of gross GHG emissions resulted from Scope 3 activities associated with RRBC's supply chain.

The remaining 0.9% of gross emissions were related to grid-supplied electricity use at RRBC's Taphouse facility (scope 2).

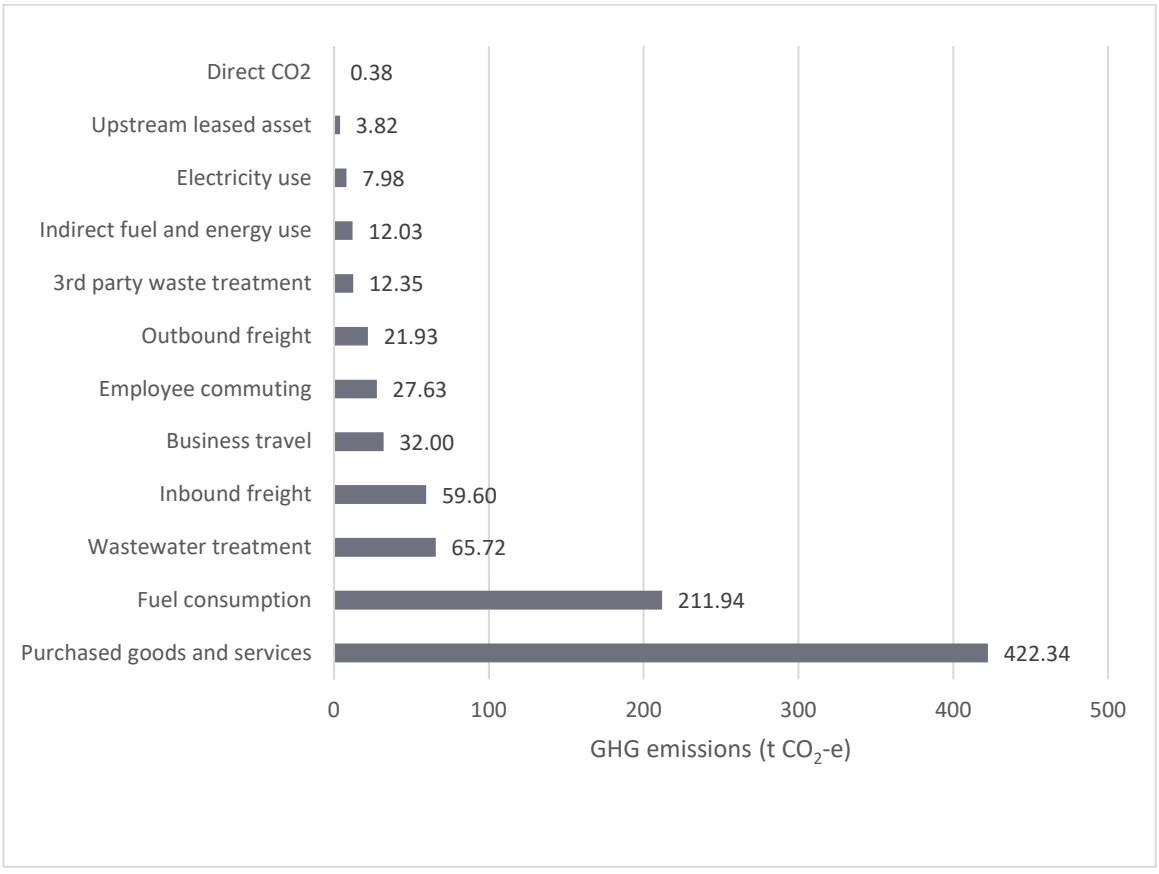

Figure 1 Summary of RRBC's emissions FY22.

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 hops and barley 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 and leased part of a cool room facility in Jindong. It has a small head office located in shared facilities in West Leederville.

Business activity has increased significantly since the previous reporting period of FY20 both in terms of the number of staff employed as well as the volume of beer produced.

This is the third year that RRBC has estimated its emissions. Emissions from the FY20 and FY21 reporting periods had been offset by the business using carbon offsets.

Figure 2 Rocky Ridge Brewing Company (Image retrieved online on 29/03/22).

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.

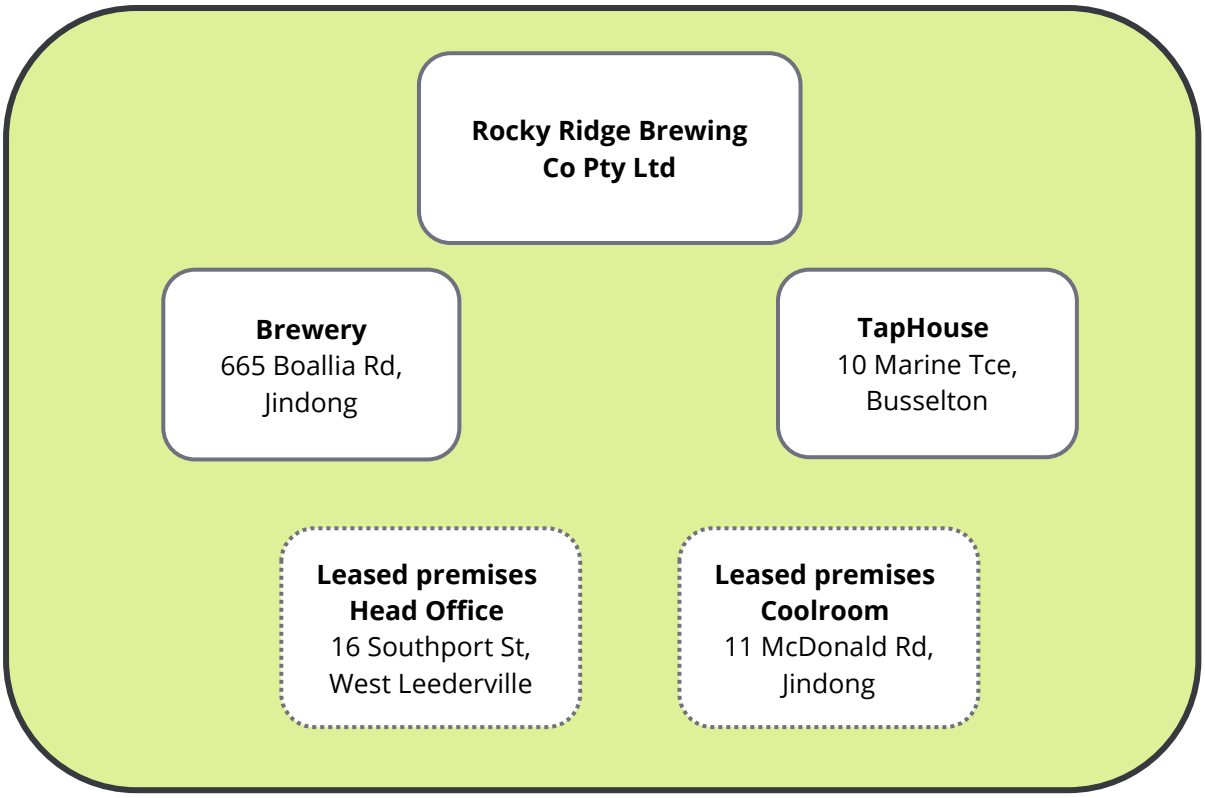

Figure 3 Organisational boundary of RRBC FY22 carbon footprint report.

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, CO_2 use in the brewery 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.

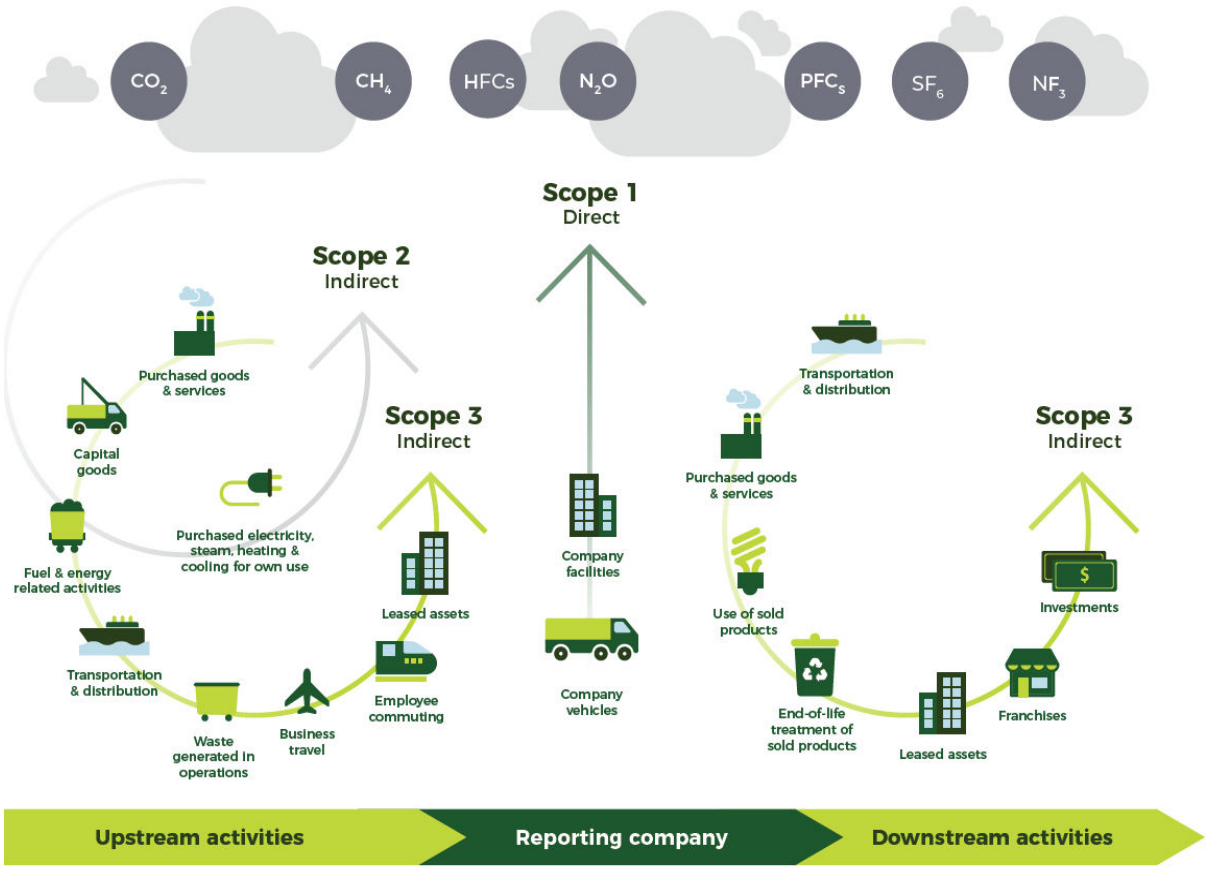

Figure 4 Diagram of scope of GHG emissions by source.

Emission Boundary

	Quantified	Non-quantified	Excluded
Scope 1	Stationary fuel consumption	Fugitive and Process emissions	Refrigerant leaks
	Waste treatment		Fleet fuel consumption
Scope 2	Electricity use		Imported steam
Scope 3	Purchased goods and services	Waste treatment (sent for recycling)	Capital goods
	Indirect fuel and energy use	Processing of sold products	Downstream leased assets
	Upstream & downstream freight	Use of sold products	Franchises
	Waste generated in operations	End-of-life treatment of sold products	Investments
	Business travel		
	Employee commuting		
	Upstream leased assets		

Figure 5 Activities included in RRBC's FY22 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.

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.

Sources include the UK government's GHG Conversion Factors for Company Reporting 2022, the University of Melbourne's Environmental Performance in Construction (EPiC) database, Australian Bureau of Statistics and Bureau of Meteorology.

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, 2022).

All energy and 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 2021 to 30 June 2022 (FY22).

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 2021/22 period have been estimated at **877.71 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	278.03	31.7%
Scope 2 Emissions	7.98	0.9%
Scope 3 Emissions	591.70	67.4%
Total Emissions	**877.71**	**100 %**

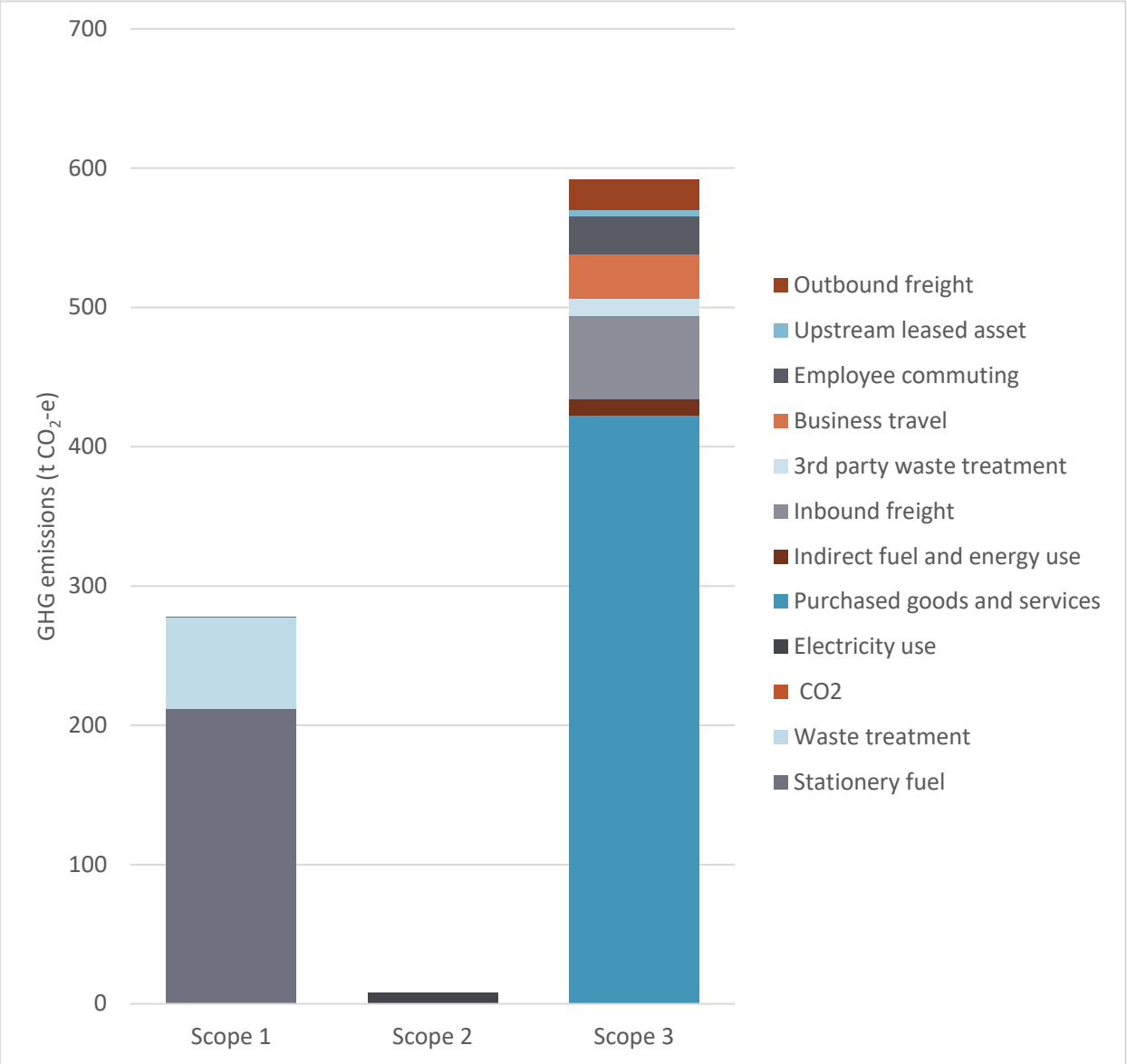

Figure 6 FY22 GHG emissions by scope for RRBC.

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 **278.03 t CO_2-e.**

Table 2 Scope 1 emissions summary

Scope 1 activity	Quantity	Emissions (t CO_2-e)
Fuel Consumption (Stationary)		211.94
Diesel	*- 38.726 kL*	*- 83.26*
LPG	*-82.623 kL*	*-128.68*
Wastewater treatment	2,676 kL	65.72
Direct CO_2 used in brewery	378.2 kg	0.38
Total Emissions Scope 1		**278.03**

Fuel consumption (Stationary)

Diesel and LPG used in stationary equipment in the brewery.

Carbon Neutral used 2021 NGA emission factors (Appendix A) to estimate total stationary fuel consumption emissions for RRBC a **211.94 t CO_2-e.**

Wastewater treatment

Wastewater generated from brewery operations and disposed of on site.

Carbon Neutral used 2021 NGA emission factors (Appendix B) to estimate total on-site wastewater emissions for RRBC at **65.72 t CO_2-e.**

Direct CO_2 use

Purchased carbon dioxide used in brewery.

Emissions calculations exclude CO_2 produced from fermentation during the beer making process which is considered to be part of the short-term carbon cycle.

Embodied emissions associated with the production of the gas and freight emissions are accounted for as a scope 3 emission.

The direct emissions from CO_2 use is based on the weight of CO_2 purchased during the year at **0.38 t CO_2-e.**

Scope 2 Emissions

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

Scope 2 emissions are relevant for the TapHouse/Cellar door.

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 leased head office and coolroom facility are reported as scope 3 emissions under Category 8 Upstream Leased Assets as RRBC does not have operational control over these facilities.

The GHG indirect emissions from electricity use for RRBC were estimated at **7.98 t CO_2-e** for FY22.

Table 3 Scope 2 emissions summary

GHG emissions – Scope 2	Quantity (kWh)	Emissions (t CO_2-e)
Electricity use	11,729	7.98
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 (Appendix C) to estimate imported electricity emissions for RRBC at 7.98 t CO_2-e.

The business purchases 100% GreenPower for its operations which is sourced from renewable energy supplies and has no GHG emissions associated with its use.

Net emissions from imported electricity use are therefore 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 **591.70 t CO_2-e** for FY22 (see Figure 7).

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

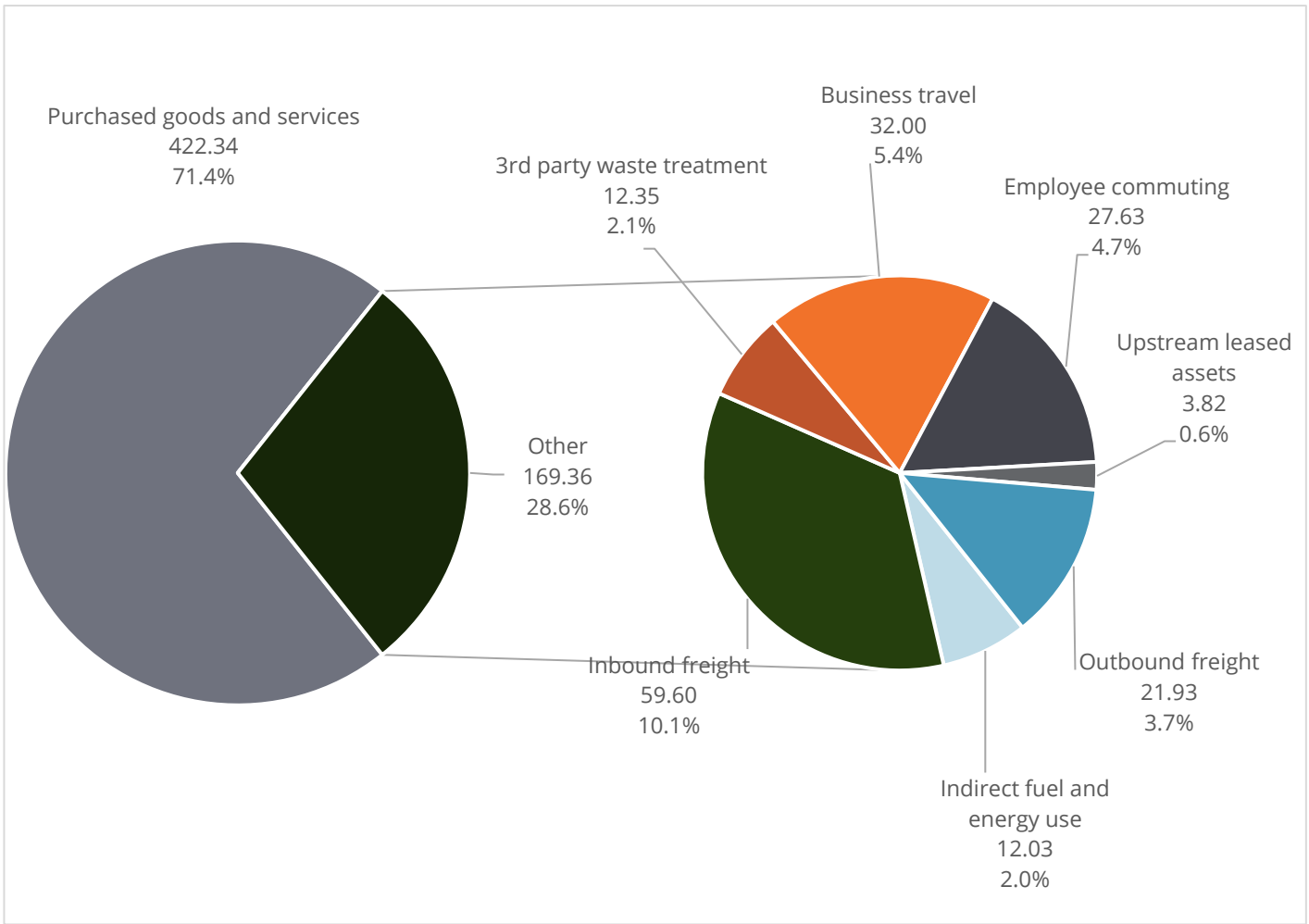

Figure 7 FY22 Scope 3 emissions by activity for RRBC (t CO_2-e; % of scope 3).

Scope 3 Emissions Summary

Table 4 Scope 3 gross GHG emissions

Scope 3 GHG emissions category		Emissions (t CO_2-e)
	Upstream emissions	
1	Purchased goods and services	422.34
2	Capital goods	Not applicable
3	Indirect fuel and energy use	12.03
4	Inbound freight	59.60
5	Waste generated in operations	12.35
6	Business travel	32.00
7	Employee commuting	27.63
8	Upstream leased assets	3.82
	Downstream emissions	
9	Outbound freight	21.93
10	Processing of sold products	Non-quantified
11	Use of sold products	Non-quantified
12	End-of-life treatment of sold products	Non-quantified
13	Downstream leased assets	Not applicable
14	Franchises	Not applicable
15	Investments	Not applicable
	Total emissions Scope 3	**591.70**

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).

	Cost / Weight / Usage	Emissions (t CO_2-e)
Barret Burston malt	201.04 t	112.30
Bintani malt, hops, yeast and flavourings	60.91 t	39.96
Cryer malt, hops & fruit	6.32 t	3.58
MCC labels (Multicolour)	1.08 t	2.45
CRT store	$16,615	12.09
Elleslie hops and yeast	24.73 t	12.45
Environex chemicals	6,685 kg	4.18
Magnum flavoring	382 kg	0.34
Gabriels chocolates	212.75 kg	0.81
Staleys food	464 kg	5.77
SWAT	$4,956.03	2.23
Clarified rice syrup	2,726 kg	2.52
Winequip	91 kg	0.29
N2 & O2 & CO2	0.66 t	0.18
Juice print (marketing materials)	$8,867.60	3.32
Orora can & lid	18.13 t	91.73
Pricemark (barcodes)	46.85 kg	0.16
VISY (cardboard cartons & pallets)	19.25 t	13.05
LS Merchants wine	2.909 kL	3.05
CCA soft drinks	0.2624 t	0.14
Hip Pocket workwear	8.65 kg	0.19
SW provisions	$69	0.29
Host hospitality	4.8 kg	0.01
Additional marketing material	$68,620	25.44
Cravens food	35.64 kg	0.15
Down South Wholesale	$57,267	23.40

Swings wine	12.8925 kL	13.54
Fabric printer	2,073 kg	45.92
Water use	639 kL	0.75
Hotel stay	59 room nights	2.04
Total		**422.34**

Calculation boundary

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

Materials used for packaging, ingredients (malt, hops, yeasts, extracts 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 (Crawford, 2019) were then applied to calculate the overall emissions estimate for this category.

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 2019/20: Urban Water Utilities Dataset (BoM, 2021).

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), (Kieran Hirlam, 2023), (Paper Australia Pty Ltd, 2021) published life cycle assessment studies (Clune, 2016), (The Climate Conservancy, 2008), (CONCITO, 2021), (Anca Nica, 2010) and government databases (DBEIS, 2021), (City of Winnepeg, 2012). (Appendix D).

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

Purchases of capital equipment such as electric pumps and tanks have been included under Category 1 Purchased goods and services.

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)	30.726 kL	4.27
LPG (non-transport)	82.623 kL	7.64
Electricity		
TapHouse	11,729 kWh	0.12
	Total	**12.03**

Calculation boundary

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

This includes diesel and LPG.

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.

An allowance of 30% electricity use has been allowed for MRBC which leases a portion of the Taphouse site and is excluded from emissions calculations.

Carbon Neutral used 2022 NGA emission factors to estimate indirect fuel and energy emissions for RRBC at **12.03 t CO_2-e.**

Category 4: Inbound 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.

Supplier	Usage	Emissions (t CO_2-e)
Barret Burston Malt	47,244 t.km (road)	6.31
Bintani	167,463 t.km (road) 553,801 t.km (ship)	31.33
Cryer Malt	1,926 t.km (road) 16,907 t.km (ship)	0.53
MCC Labels	281 t.km (road)	0.04
Ellersie	91,503 t.km (road)	12.21
Air Liquide	91 t.km (road)	0.01
Orora	4,169 t.km (road)	0.56
Visy	4,428 t.km (road)	0.59
Leeuwin Transport	59,664 t.km (road)	7.95
Magnum Flavouring	103 t.km (road)	0.01
Fabric Printers	318 t.km	0.07
	Total	**59.60**

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 freight was included.

Calculation Methodology

Carbon Neutral used (where applicable) the weight and distance-based method to calculate emissions from this category. This involved determining the weight, distance, and transport method of each shipment; then applying the appropriate mass-distance emission factor for the vehicle using DBEIS (DBEIS, 2021).

Total emissions of this category were calculated at **59.60 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 / Volume	Emissions (t CO_2-e)
Brewery waste	6.421 t	**8.35**
TapHouse general waste	3.082 t	**4.01**
	Total	**12.35**

Calculation boundary

This category included all emissions that resulted from waste generated in FY22 for RRBC.

Calculation methodology

The volume and weight of waste materials sent to landfill from the brewery was provided by Suez.

The weight of waste generated in the TapHouse is estimated based on the number of bin services with a volume to weight conversion based on the brewery's (0.084 t/m^3).

Carbon Neutral used, where applicable, the weight or volume of waste generated from operations to calculate emissions from this category. Emission factors for commercial and industrial waste are obtained from the NGA Factors (Australian Government, Department of the Environment and Energy, 2021).

Materials separated and sent for recycling or re-use are excluded from the emissions inventory.

Total emissions of category 5 were calculated at **12.35 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 medium	Distance	Emissions (t CO_2-e)
Private vehicle	94,125 km	11.47
Taxi / Rideshare	3,200 km	0.83
Train	1,550 p.km	0.06
Domestic haul flight	3,641 p.km	0.58
Medium haul economy	62,941 p.km	6.11
Long haul economy	32,835 p.km	3.10
Long haul business	36,048 p.km	9.86
	Total	**32.00**

Calculation boundary

This category included all emissions that resulted from business related travel in FY22 for RRBC.

This includes road as well as air travel by staff for business related purposes.

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 are determined using 2021 NGA Factors (Australian Government, Department of the Environment and Energy, 2021) based on estimated fuel consumption (Appendix E).

Emissions from flights are determined using 2021 DBEIS Factors (DBEIS, 2021), (Appendix E).

No allowance has been made for radiative forcing index.

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

Total gross GHG emissions of category 6 were calculated at **32.00 t CO_2-e.**

After allowances for carbon offset flights, net GHG emissions of category 6 are calculated at **15.44 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.

Transportation medium	Usage	Emissions (t CO_2-e)
Private vehicle	10,443 litres	27.53
Train	3072 p.km	0.10
	Total	**27.63**

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 FY22 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 or public transport used (Appendix F).

Carbon Neutral used a combination of the distance-based method for public transport and the fuel-based method, to determine fuel consumption for commuting in private vehicles and applied the appropriate EF for all travel data.

Emissions from public transport use are determined using 2021 DBEIS Factors (DBEIS, 2021).

Emissions from private vehicle use are determined using 2021 NGA Factors (Australian Government, Department of the Environment and Energy, 2021) based on estimated fuel consumption (Appendix E).

Total emissions of category 7 were calculated at **27.63 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).

	kWh	Emissions (t CO_2-e)
Coolroom hire	4,880 kWh	3.37
Head office (shared facility)	654 kWh	0.45
	Total	**3.82**

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:

- A cool room facility (part) that was used for four months of the reporting period; and
- Its head offices (shared space) in West Leederville.

Calculation methodology

Metered electricity consumption was not available for these facilities, parts of which are leased by the business during the reporting period.

Emissions factors are obtained from the DoEE (Australian Government, Department of the Environment and Energy, 2021), (Appendix C).

RRBC's share of energy consumption has been estimated at:

- Cool room facility – 4,880 kWh based on four months in FY 2022
- Head office – 654 kWh based on equipment use provisions. This office was used sporadically by sales-based staff.

Total emissions of category 8 were calculated at **3.82 t CO_2-e**.

Category 9: Outbound freight		
Category description	GHG emissions that occurred from transportation and distribution of sold products in vehicles not owned or controlled by RRBC.	
Supplier	**Usage**	**Emissions (t CO_2-e)**
Leeuwin Transport	104,495 t.km (road)	13.95
Shipping	4,479 t.km (sea)	2.23
Craft Transport	29,280 t.km (road)	5.75
	Total	**21.93**

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 was included.

Calculation Methodology

Carbon Neutral used (where applicable) the weight and distance-based method to calculate emissions from this category. This involved determining the weight, distance, and transport method of each shipment; then applying the appropriate mass-distance emission factor for the vehicle using DBEIS (DBEIS, 2021).

For the export shipping, emissions from the freighting of this material were provided by the service provider.

Total emissions of category 9 were calculated at **21.93 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 in FY22. 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 emissions associated with displaying the beer for sale, transporting of the beer after retail purchase or chilling the beer prior to consumption. These emissions would be difficult to accurately quantify and are considered immaterial and not included in the emissions inventory.

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
Electricity used by MRBC at facilities it leases from RRBC are excluded from this carbon footprint inventory.

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 FY2022 operations. This is represented in Table 5. Additionally, Table 6 displays the emissions intensity of RRBC's operations per employee.

These tables have been backdated to allow for beer ingredients which were excluded in the previous carbon footprint assessments.

Table 5 FY22 Organisational emissions intensity (per litre of beer produced)

Emissions Intensity	Volume of beer produced (litres)	GHG Emissions (t CO_2-e)	GHG Emissions Intensity (kg CO_2-e/L)
FY2020	424,000	738.2	1.74
FY2021	730,000	835.3	1.14
FY2022 (Gross)	893,000	877.7	0.98
FY2022 (Net)	893,000	853.06	0.86

Table 6 FY22 emissions intensity (FTE).

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	853.1	34.1

Historical GHG Emissions

Table 7 Historical Gross GHG emissions by activity – FY2020 to FY2022.

	GHG Emissions (t CO_2-e)		
Activity	**FY2020**	**FY2021**	**FY2022**
Scope 1 – Direct			
Stationary equipment fuel use	93.6	184.2	211.9
Transport fuel use	27.7	2.4	-
Other emissions	52.3	84.2	66.1
Scope 2 – Indirect (electricity)	27.6	22.0	8.0
Scope 3 – Indirect (other)			
1 – Purchased goods and services	338.3	405.2	422.3
2 – Capital goods	-	-	
3 – Indirect fuel and energy use	8.3	10.9	12.0
4 – Inbound freight	136.6	37.3	59.6
5 – Waste generated in operations	3.5	16.3	12.4
6 – Business travel	17.7	17.7	32.0
7 – Employee commuting	4.9	20.7	27.6
8 – Upstream leased assets	18.3	9.1	3.8
9 – Outbound freight	9.5	25.3	21.9
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**	**877.7**

Carbon Reduction Opportunities

Given that approximately two thirds of the RRBC's emissions are directly linked to purchased goods and services, carbon reduction strategies should consider utilising carbon neutral upstream and downstream supply chains.

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

- Using 100% off grid solar power for its brewery operations.
- Using rainwater and groundwater in its brewery operations.
- Utilising biopack (sugar cane) packaging holders for 4/6 packs (instead of plastic).
- Using cardboard packaging for cartons.
- Using aluminium packaging as opposed to glass to reduce the weight of materials transported.
- Composting spent grain and solid wastes from brewery operations for re-use in the farm.
- Reducing traditional water input to 4L/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.

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 FY2022 is estimated at **877.71 t CO_2-e**.

After allowances for carbon offset flight purchases, net GHG emissions prior to further offsetting are estimated at **853.06 t CO_2-e.**

Appendix A

Scope 1 – Operations fuel consumption, emission factors

Table A1 Stationary equipment fuel use and emission factors

Fuel Combusted	EC (GJ/kL)	CO_2 EF (kg CO_2-e/GJ)	CH_4 EF (kg CO_2-e/GJ)	N_2O EF (kg CO_2-e/GJ)
Diesel oil	38.6	69.9	0.1	0.2
Liquefied petroleum gas	25.7	60.2	0.2	0.2

(Australian Government, Department of the Environment and Energy, 2021)

Appendix B

Scope 1 – On-site wastewater emission factors

Table B1 Wastewater generation on site and default wastewater emission factors

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

(Australian Government, Department of the Environment and Energy, 2021)

Appendix C

Scope 2 – State-based electricity use emission factors

Table C1 Purchased electricity use emission factors

Facility	State or Territory	Scope 2 EF (kg CO_2-e /kWh)
TapHouse	Southwest Interconnected System (SWIS) in Western Australia	0.68

(Australian Government, Department of the Environment and Energy, 2021)

Appendix D

Scope 3 – Category 1 Purchased goods and services emission factors

Table D1 Purchased beer ingredients emission factor references (by mass)

Product	Suppliers	Reference
Malt	Bintani, Cryer,	(Boortmalt, 2023)
Hops	Bintani, Ellersie, Cryer,	(The Climate Conservancy, 2008)
Fruit	Bintani, Cryer, Staley	(CONCITO, 2021)
Yeast	Bintani, Ellersie, Winequip,	(COFALEC, 2015)
Syrups	Bintani, BeerCo,	(CONCITO, 2021)
Extracts	Bintani,	(City of Winnepeg, 2012)
Flavourings	Magnum Flavourings	(CONCITO, 2021)
Nuts	Staley	(CONCITO, 2021)
Labels	MCC Labels, Pricemark	(Paper Australia Pty Ltd, 2021)
Cans and lids	Orora	(DBEIS, 2021)
Pallets	Visy	(DBEIS, 2021)
Cartons	Visy	(DBEIS, 2021)
Snacks	SW Provisions, Cravens	(CONCITO, 2021)
Wine	LS Merchants, Swings	(Kieran Hirlam, 2023)
Soft drinks	CCA Soft Drinks	(CONCITO, 2021)
Chocolate	Host	(CONCITO, 2021)
Clothing	Fabric Printer, Hip Pocket	(DBEIS, 2021)
Chemicals	Environex chemicals	(City of Winnepeg, 2012), (Anca Nica, 2010)

Table D2 Purchased beer ingredients emission factor references (by cost)

Product	Suppliers	Reference
Brewery supplies	SWAT	(Crawford, 2019)
Marketing materials	Juiceprint, G Force, Splash Printing, Signarama, Better China, Shade Australia, Leaderpress Printing, Haonest Carpet, Allflags, Signs & Banners, Hisco, Appliances Online, Sticker Mule, e Print Online, Cycle Dog, Design Stuff, 33 Books Co, Boxtrec	(Crawford, 2019)
Cleaning supplies	Down South Wholesale	(Crawford, 2019)
Brewery Equipment	CRT – Busselton Agricultural Services	(Crawford, 2019)

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Appendix E

Scope 3 – Category 7 Employee commuting emission factors

Table E1 DoEE emission factors for fuel used in business land travel and staff commuting in private vehicles

Fuel Combusted	EC	CO_2 EF	CH_4 EF	N_2O EF	Scope 3 EF
	(GJ/kL)	(kg CO_2-e/GJ)			
Gasoline (other than for use as fuel in an aircraft) Post 2004 vehicle	34.2	67.4	0.02	0.2	3.6
Diesel oil Post 2004 vehicle	38.6	69.9	0.01	0.5	3.6

Scope 3 – Category 7 Employee commuting emission factors

Table E2 DBEIS emission factors for air travel

Flight classification	CO_2 EF	CH_4 EF	N_2O EF	WTT EF
	(kg CO_2-e/p.km)			
All classes / Domestic	0.13003	0.00010	0.00122	0.02691
Business class / Long	0.22671	0.00001	0.00202	0.04466
Economy class / Long	0.07818	0.00001	0.00070	0.01540
Economy class / Medium	0.07984	0.00001	0.00075	0.01654

Appendix F

Scope 3 – Category 7 Employee commuting allowances and emissions

Table F1 Employee commuting allowances and GHG emissions

Staff	Mode of transport / type of fuel	Distance (km)	Fuel used (litres)	GHG emission (t CO_2-e)
Steele	Train & Car (petrol)	3,888	194	0.57
Ross	Car (diesel)	9,150	915	2.61
Ethan	Car (diesel)	9,550	955	2.73
Hamish				
Ricky	Car (petrol)	9,072	354	0.86
Beck	Car (diesel)	640	51	0.15
Adam	Car (petrol)	17,100	1,197	2.92
Pedro	Car (diesel)	1,080	108	0.31
Ben	Car (petrol)	10,800	1,015	2.47
Mitch D	Car (diesel)	2,160	238	0.68
Ash	Car (petrol)	1,800	105	0.26
Sean	Car (diesel)	7,650	750	2.14
Mitch B	Car (petrol)	2,160	238	0.43
Drew	Car (diesel)	7,344	918	2.62
Andrus	Car (diesel)	5,292	370	1.06
James	Car (diesel)	2,584	258	0.74
Mini	Car (petrol)	5,760	461	1.12
Mike	Car (petrol)	1,740	122	0.30
Toby	Walk			
Jason	Car (petrol)	6,650	466	1.13
Jason	Car (diesel)	2,850	342	0.98
TJ	Car (petrol)	4,320	359	0.87
Waverley	Car (petrol)	5,510	551	1.34
Liam	Car (petrol)	2,304	323	0.79
Hannah	Car (petrol)	2,400	149	0.36
Mel	Car (diesel)	612	67	0.19
Total		**10,691**		**27.63**

(Australian Government, Department of the Environment and Energy, 2021),

(DBEIS, 2021)

This is to certify that

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Australian Native Reforestation – Gold Standard PER credits
from the *Yarra Yarra Biodiversity Corridor*, and
Renewable Energy (Wind) - VCS VCU, *Hebei Yuxian* project, China.

Thank you for choosing to make a difference by combating climate change.

Dr Phil Ireland | Chief Executive Officer

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