Commercial in confidence

# ORGANISATIONAL GREENHOUSE GAS INVENTORY (CARBON FOOTPRINT) REPORT

for

## Rocky Ridge Brewing Brewing Co

1 July 2019 to 30 June 2020
Final version

Prepared by Scott Favacho
Senior Carbon Advisor
Carbon Neutral
Phone +1300 851 211
scottf@carbonneutral.com.au
carbonneutral.com.au

carbonneutral®

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# TABLE OF CONTENTS

# ABBREVIATIONS

| | |
|---|---|
| ABS | Australian Bureau of Statistics |
| $CH_4$ | methane |
| C & I | commercial and industrial |
| $CO_2$ | carbon dioxide |
| $CO_2$-e | carbon dioxide equivalent |
| DBEIS | Department for Business, Energy & Industrial Strategy |
| Defra | Department for Environment, Food and Rural Affairs |
| EF | emissions factor |
| EPiC | Environmental Performance in Construction |
| G.W.P. | global warming potential |
| GHG | greenhouse gas |
| GJ | gigajoule |
| HFC | hydrofluorocarbon |
| HGV | Heavy goods vehicle |
| IT | Information Technology |
| kg | kilogram |
| kL | kilolitre |
| kWh | kilowatt hour |
| LPG | Liquefied petroleum gasoline |
| l | litre |
| ML | mega litre |
| $N_20$ | nitrous oxide |
| NGA | National Greenhouse Accounts |
| NGER | National Greenhouse Energy Reporting |
| $NO_x$ | nitrogen oxides |
| PFC | perfluorinated compound |
| N/R | Not reported |
| pkm | 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

Carbon Neutral has been engaged to assess Rocky Ridge Brewing Co's (RRBC) organisational greenhouse gas (GHG) emissions inventory, also known as a carbon footprint, for the period 1 July 2019 to 30 July 2020 (FY2020).

**RRBC's total organisational GHG emissions have been estimated at 434.14 tonnes carbon dioxide equivalents (t $CO_2$-e) for the period.**

**RRBC has retired 435 tonnes of carbon credits so that its organisational GHG emissions for the year equal zero.**

The main GHG emitting activities were incoming freight followed by LPG used in the brewery.

*Any claims made in relation to "carbon neutrality" of the business are done so based on the cancellation of emissions identified in this report using carbon offsets and carbon neutral services and products.*

# ABOUT THE ORGANISATION

RRBC is a family-owned business and producer of beer with no artificial preservatives, made with predominantly locally sourced ingredients. 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 in Busselton and a cool room facility in Jindong. It employed seven fulltime staff and produced 424kL of beer in the FY20 period.

This is the first time that the organisation has calculated its carbon footprint and this report outlines details of the activities included in its emissions inventory.

# SCOPE & ORGANISATIONAL BOUNDARY

The emissions scope and organisational boundary for the GHG emissions inventory has been developed in accordance with the GHG Protocol and includes GHG emitting activities considered to be under the *operational control* of RRBC.

The following facilities were under operational control of RRBC during the FY2020 period.

Figure 1: Operational boundary of FY2020 carbon footprint

| BREWERY | CELLAR DOOR | COOLROOM |
|---|---|---|
| 665 Boallia Rd<br>JINDONG WA | 10 Marine Tce<br>BUSSELTON WA | 11 McDonald Rd<br>JINDONG WA |

The seven greenhouse gas sources covered by the Kyoto Protocol: carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_20$), hydrofluorocarbons (HFCs), perflourocarbons (PFCs) sulphur hexafluoride ($SF_6$) and nitrogen trifluoride ($NF_3$) are included and reported on as units of $CO_2$-e. This provides the ability to add, subtract and present various greenhouse gasses in one unit.

## CLASSIFICATION METHOD

Greenhouse gas emissions from the business are categorised into three greenhouse gas scopes.

### SCOPE 1

These are the direct emissions relating to the burning of fossil fuels to run equipment or fuel for company-controlled vehicles.

### SCOPE 2

These are the indirect emissions from electricity purchased from power stations to run electrical equipment, heating and lighting systems.

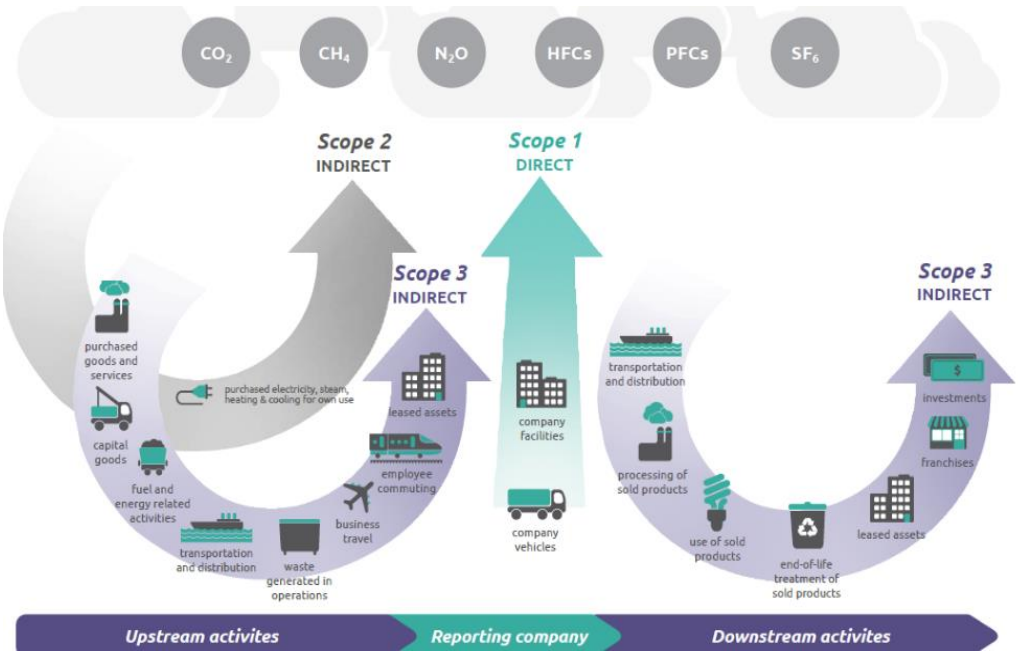
### SCOPE 3

The inclusion of scope 3 emissions provides an opportunity to be innovative in GHG management.

These are indirect emissions from activities such as business-related travel, freight, waste to landfill and services and products provided by third parties.

The full fuel cycle for energy includes emissions associated with extraction, refining, transportation and delivery. The boundary of this scope generally includes only what the business can quantify and influence.

Figure 2: Diagram of scope by source (source: GHG Protocol Standard)



# 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, accurate data is used and outlines all assumptions 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 activity data provided and sought clarification of activity data where necessary. Advice and guidance to staff was provided to ensure that the most complete, accurate and robust data sources were used where available.
4) Carbon Neutral applied suitable methodologies and emission factors to the activity data collected to determine the organisational GHG emissions of RRBC for the reporting period.
5) Carbon Neutral calculated the GHG emissions of RRBC in accordance with the GHG Protocol Standard (www.ghgprotocol.org) and AS ISO 14064.1 – 2006 Greenhouse gases Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals.
6) Carbon Neutral prepared this Organisational Greenhouse Gas Emissions Inventory (Carbon Footprint) Report for RRBC for the reporting period 1 July 2019 to 30 June 2020 (FY2020).

   RRBC provided Carbon Neutral with the activity data that has been used to calculate GHG emissions.

   *The veracity of this data 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.

Surveys were also conducted to obtain data used for the carbon footprint determination. This information was used to determine emissions associated with commuting and business travel.

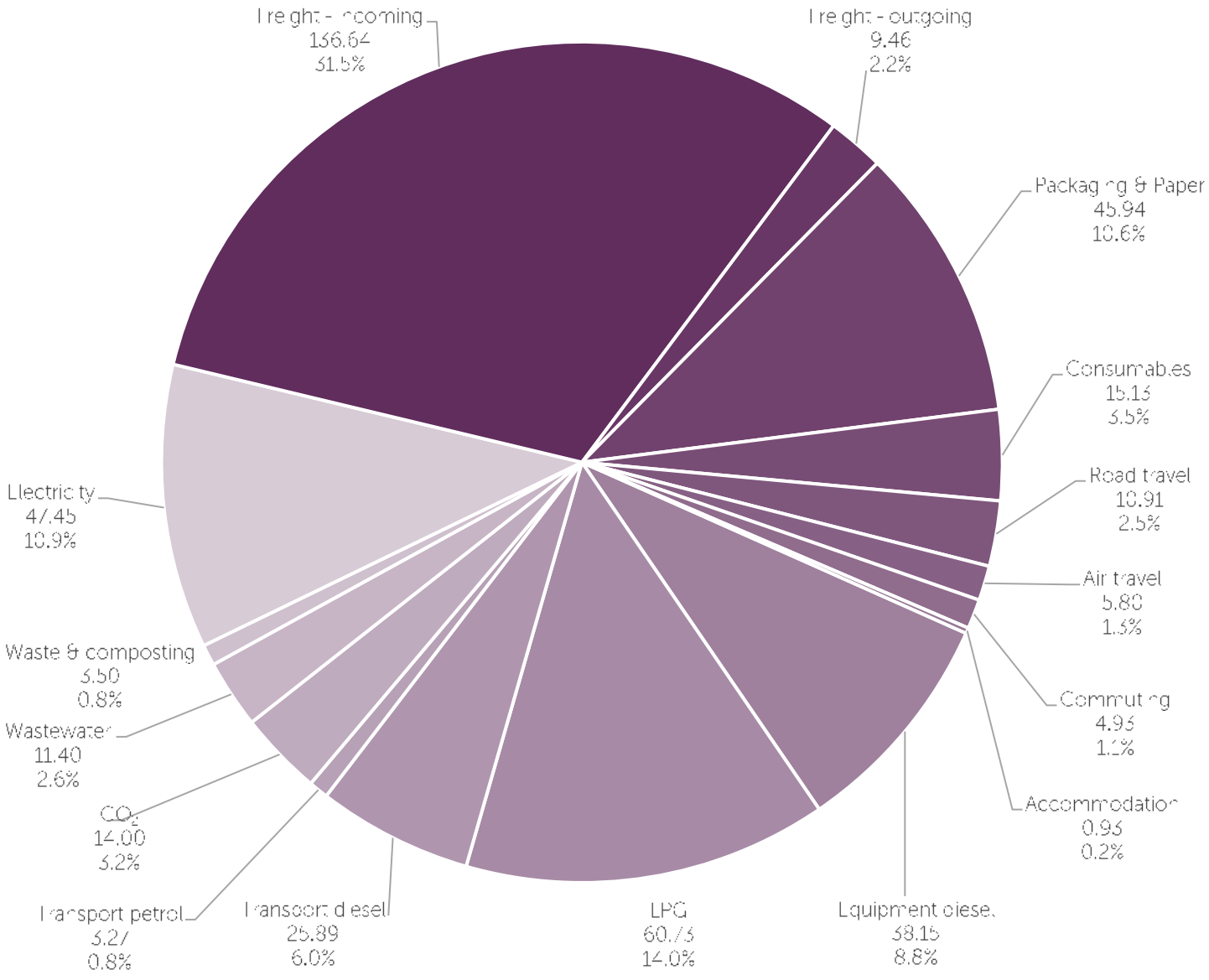
Carbon Neutral acknowledges the assistance of Mel Holland and Hamish Coates for the provision of activity data used in this report.

# FY2020 GHG EMISSIONS INVENTORY BY ACTIVITY

**Total gross GHG emissions for RRBC are estimated at 434.14 tonnes of carbon dioxide equivalent (t $CO_2$-e) in FY2020.**

A summary of GHG emissions sources by activity can be seen in the following diagram

Figure 3: GHG emissions by activity – RRBC FY2020 (t $CO_2$-e; %)



# GHG EMISSIONS BY SCOPE

## SCOPE 1

Scope 1 emissions by the business arise from diesel combustion in equipment and company owned vehicles, petrol combustion in company owned vehicles, LPG combustion in brewery operations and from purchased $CO_2$ used in brewery operations. On-site composting also accounts for a small contribution to RRBC's direct scope 1 emissions.

## SCOPE 2

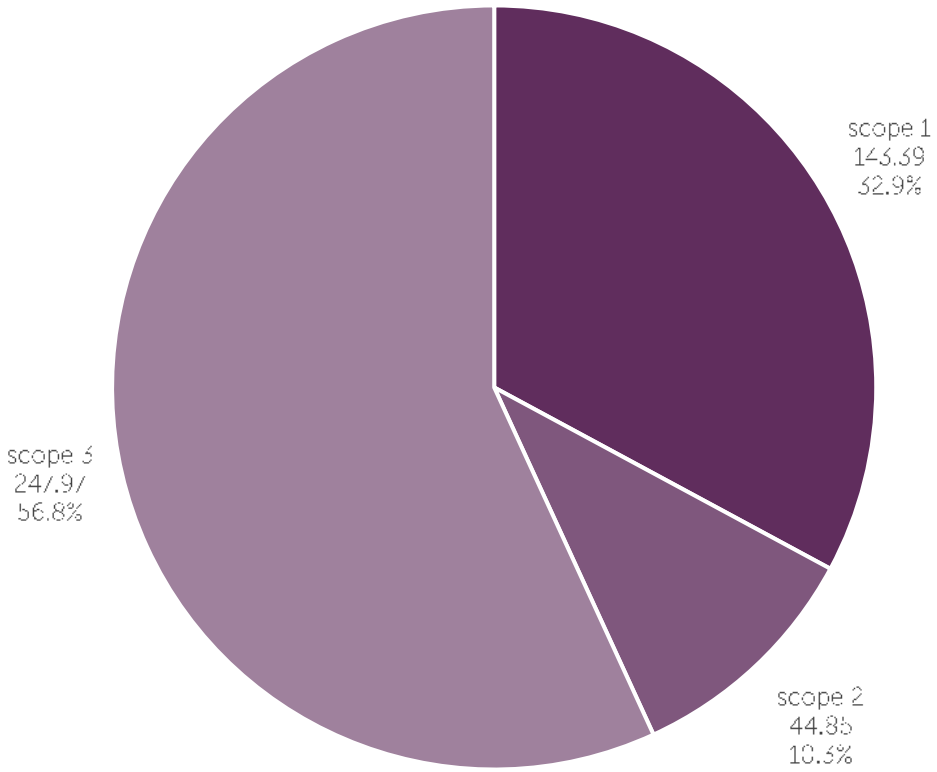
Scope 2 emissions arise from the use of purchased electricity in cellar door and coolroom facilities.

## SCOPE 3

Included scope 3 emissions for the business arise from emissions associated with:

- Freight (incoming and outgoing)
- Packaging (embodied)
- Consumables (embodied)
- Business related travel (air and road)
- Waste (landfilled)
- Staff commuting
- Accommodation
- Electricity & fuel (extraction, refining, supply, transmission and distribution)

Figure 4: GHG emissions by scope – RRBC FY2020 (t $CO_2$-e; %)



# GHG ACCOUNTING PRINCIPLES

## PRINCIPLES

Carbon Neutral conducts its assessment of RRBC's GHG emissions inventory in accordance with the GHG Protocol Standard.

These principles are consistent with those outlined under AS ISO 14064: Greenhouse gases Part 1, 2 and 3. This carbon footprint assessment has not been third party verified. A copy of the principles applied can be found in the table below

Table 1: GHG Accounting Principles (GHG Protocol Standard)

| | |
|---|---|
| Relevance | Ensure the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users – both internal and external to the company. |
| Completeness | Account for and report on all GHG emission sources and activities within the inventory boundary. Disclose and justify any specific exclusion. |
| Consistency | Use consistent methodologies to allow for meaningful performance tracking of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series. |
| Transparency | Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used. |
| Accuracy | Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable confidence as to the integrity of the reported information. |

# METHODOLOGY, DATA SOURCES AND ASSUMPTIONS

Except where otherwise stated in this report, Carbon Neutral has calculated RRBC' GHG emissions using emission factors sourced from the NGA Factors 2019.

Scope 3 emissions can be difficult to quantify as these emissions come from various sources with no direct way to measure the contribution easily or accurately to climate change.

Carbon Neutral's emissions factors are referenced at the end of this report.

Data for the determination of GHG emissions was provided by RRBC. This data is taken to be complete and accurate and Carbon Neutral has not independently verified the completeness or accuracy of this data.

Assumptions or estimates used in the absence of detailed data are stated in the report.

# GHG EMITTING ACTIVITIES

## FLEET FUEL USE (SCOPES 1 & 3)

**GHG emissions associated with fuel used in the company vehicles are estimated at 29.16 t $CO_2$-e.**

Consumption is obtained from supplier spreadsheets which provided the volume by type of fuel purchased during the year.

| | |
|---|---|
| Emissions factor reference | NGA Factors 2019<br><br>Diesel (post 2004 vehicle)<br>Energy content – 38.6 GJ/kL<br>Scope 1 – 70.51 kg $CO_2$-e/GJ<br>Scope 3 – 3.6 kg $CO_2$-e/GJ<br><br>Gasoline (post 2004 vehicle)<br>Energy content - 34.2 GJ/kL<br>Scope 1 – 67.62 kg $CO_2$-e/GJ<br>Scope 3 – 3.6 kg $CO_2$-e/GJ |
| Assumptions & allowances | Diesel – 9,087 litres<br>Gasoline – 1,344 litres |
| GHG emissions | Diesel (t $CO_2$-e)<br>$CO_2$ – 24.52; $CH_4$ – 0.04; $N_2O$ – 0.07<br><br>Gasoline (t $CO_2$-e)<br>$CO_2$ – 3.10; $CH_4$ – 0.00; $N_2O$ – 0.01<br><br>Scope 1 – 27.73 t $CO_2$-e<br>Scope 3 – 1.43 t $CO_2$-e<br>Total – 29.16 t $CO_2$-e |

## EQUIPEMENT FUEL USE (SCOPES 1 & 3)

**GHG emissions associated with fuel used in stationary equipment are estimated at 38.15 t $CO_2$-e.**

Consumption is obtained from supplier spreadsheets which provided the volume by type of diesel purchased during the year.

| | |
|---|---|
| Emissions factor reference | NGA Factors 2019<br>Diesel (stationary equipment)<br>Energy content – 38.6 GJ/kL<br>Scope 1 – 70.2 kg $CO_2$-e/GJ<br>Scope 3 – 3.6 kg $CO_2$-e/GJ |
| Assumptions & allowances | Diesel – 13,393 litres |
| GHG emissions | $CO_2$ - 36.1; $CH_4$ – 0.05; $N_2O$ – 0.10<br>Scope 1 – 36.29 t $CO_2$-e<br>Scope 3 – 1.86 t $CO_2$-e<br>Total – 38.15 t $CO_2$-e |

## LPG (SCOPES 1 & 3)

**GHG emissions associated with LPG used in the boiler are estimated at 60.73 t $CO_2$-e.**

Liquefied petroleum gasoline (LPG) usage is obtained from supplier spreadsheet which indicated the litres of LPG delivered to the brewery during the year.

| | |
|---|---|
| Emissions factor reference | NGA Factors 2019<br>LPG equipment<br>- 1.650 g $CO_2$-e/l |
| Assumptions & allowances | Equipment LPG – 36,807 litres |
| GHG emissions (t $CO_2$-e)) | $CO_2$ – 56.95; $CH_4$ – 0.19; $N_2O$ – 0.19<br>Scope 1 – 57.32 t $CO_2$-e<br>Scope 3 – 3.41 t $CO_2$-e<br>Total – 60.73 t $CO_2$-e |

## CARBON DIOXIDE USE (SCOPES 1 & 3)

**GHG emissions from the use of carbon dioxide in the winery are estimated at 14.00 tonnes of $CO_2$-e.**

Direct GHG emissions from the use of purchased carbon dioxide are included as a scope 1 emission while a scope 3 allowance has been included for the first time in this reporting period. Scope 3 emissions include an allowance for liquefaction of the $CO_2$ as well as transport from Perth.

Carbon dioxide produced from fermentation is excluded as it is not considered part of the short-term carbon cycle.

GHG emissions and activity data from the use of purchased $CO_2$ is shown in the following table.

| | |
|---|---|
| Emissions factor reference | Transport – DBEIS 2019<br>All Articulated trucks (average laden) – 0.103 kg $CO_2$/t.km<br>Liquefaction - Industrial Gas Handbook: Gas Separation and Purification (based on $N_2$) |
| Assumptions & allowances | Weight of $CO_2$ – 10.6 tonnes<br>Based on 0.25 kg $CO_2$/l beer produced.<br>$CO_2$ liquefaction assumed to be in Perth. Allowance of 400 kWh/t.<br>Distance transported – 240 km |
| GHG emissions (t $CO_2$-e) | Scope 1 – 10.60<br>Scope 3 – 3.14<br>Total – 14.00 t $CO_2$-e |

## WASTEWATER DISPOSAL (SCOPE 1)

**GHG emissions from the on-site disposal of wastewater are estimated at 11.40 tonnes of $CO_2$-e.**

Wastewater emissions are reported as a scope 1 emission as RRBC reuses its wastewater for fertigation on the farm.

Wastewater generation is estimated at 1,696 kL for the period.

| | |
|---|---|
| Emissions factor reference | NGA Factors 2019<br>Default industrial wastewater treatment parameters.<br>COD – 1.50 kg/$m^3$ WW |
| Assumptions & allowances | Volume of wastewater – 1,696 kL |
| GHG emissions (t $CO_2$-e) | Total – 11.40 t $CO_2$-e |

## COMPOSTING (SCOPE 1)

**GHG emissions from the composting of spent yeast, fruits and hops are estimated at 0.04 tonnes of $CO_2$-e.**

RRBC reuses some of its waste as compost which is mixed with cattle manure from a neighbouring dairy farm. Approximately 2 tonnes of brewery waste were reused for composting during the year.

Emissions from cattle manure are excluded from this activity.

Activity data and GHG emissions from the use of compost are shown in the following table.

| | |
|---|---|
| Emissions factor reference | NGA Factors<br>$CH_4$ - 0.019 kg $CO_2$-e/t wet waste<br>$N_2O$ – 0.029 kg $CO_2$-e/ t wet waste |
| Assumptions & allowances | Weight of material composted – 2 tonnes |
| GHG emissions (t $CO_2$-e) | $CH_4$ – 0.04 t $CO_2$-e<br>$N_2O$ – 0.01 t $CO_2$-e<br>Total – 0.04 t $CO_2$-e |

## ELECTRICITY (SCOPE 2 & 3)

**GHG emissions associated with electricity use are estimated at 47.45 t of $CO_2$-e.**

Electricity is not supplied to the brewery which utilised a solar PV system and battery with back up supply provided by the diesel generator.

No GHG emissions are attributable to the use of on-site generated electricity from the solar PV and battery system.

Electricity use in the cool room and cellar door is based on the average daily electricity use for the year.

| | |
|---|---|
| Emissions factor reference | NGA Factors 2019 - SWIS<br>Scope 2 – 0.81 kg $CO_2$-e/kWh<br>Scope 3 – 0.09 kg $CO_2$-e/kWh |
| Assumptions & allowances | Electricity use<br>Cellar door – 40,000 kWh<br>Coolroom – 25,000 kWh |
| Opportunity for data improvement | Obtain metered consumption data for the cellar door and coolroom facilities. |
| GHG emissions | Cellar door<br>Scope 2 – 27.60 t $CO_2$-e<br>Scope 3 – 1.60 t $CO_2$-e<br>Total – 29.20 t $CO_2$-e<br>Coolroom<br>Scope 2 – 17.25 t $CO_2$-e<br>Scope 3 – 1.00 t $CO_2$-e<br>Total – 18.25 t $CO_2$-e |

## FREIGHT (SCOPE 3)

**Gross GHG emissions from freight are estimated at 146.10 t $CO_2$-e for the period.**

**GHG emissions from incoming freight are estimated at 136.64 t $CO_2$-e and outgoing freight at 9.46 t $CO_2$-e for the period.**

Allowances are made for direct freight deliveries to retailers and customer distribution centres and exclude any further movements e.g. from distribution centres to individual chain retail outlets or from retail outlets to customers homes.

Freight activity data was obtained from the following:

- Craft Transport spreadsheet – Outgoing carton and keg freight. Number of kegs and cartons delivered.
- E-mail from RRBC – Outgoing shipping. Weight and destination of products shipped by sea container.
- Leeuwin Transport spreadsheet – Incoming and outgoing freight. Number of items and receiver's details. Weights provided for some deliveries.
- RRBC procurement spreadsheet – Incoming freight. Weight and description of material.
- Orara Group email – incoming weight of cans.
- Visy packaging customer analysis report – incoming weight of material by type.

| | |
|---|---|
| Emissions factor reference | DBEIS 2019 – Freighting goods including Well to Tank (WTT)<br>Road Freight: All articulated, average laden - 0.1030 kg $CO_2$/tonne.km (Procurement spreadsheet, general freight, Orara Group, Visy Report)<br>Road Freight: All Heavy Goods Vehicles, average laden - 0.1367 kg $CO_2$/tonne.km (Leeuwin Transport, Craft Transport – deliveries to Perth)<br>Road Freight: Vans, Average up to 3.5 tonnes – 0.77523 kg $CO_2$/tonne.km (Craft transport – local deliveries, shipping)<br>Air: N/A<br>Shipping: Cargo ship: Container ship Average. – 0.0232 kg $CO_2$/tonne.km (shipping) |
| Assumptions & allowances | **Distance**<br>Where details of the receiver could not be identified by Google Map search, the following allowances are made:<br>Deliveries to the Metropolitan area – 250 km; Local deliveries – 10 km; International shipment (Hong Kong and Singapore) road allowance – 20 km<br>**Weights**<br>Not all freight providers were able to report the weight of materials transported. Where details of the weight of outgoing freight was not recorded, the following allowances have been made:<br>Cartons – 7.5 kg; Empty packaging – 65 kg; Kegs – 60 kg; Pallets (general and alcohol) – 733 kg; Pallets of beer – 1,000 kg; Pallets of packaging – 225 kg; Empty keg – 15 kg; Skid – 100 kg;<br>Wine barrel – 410 kg.<br>**Craft Transport**<br>Local deliveries – Total weight – 50,445 kg; 504 tonne.km;<br>Deliveries to Perth – Total weight – 80,115 kg; 20,029 tonne.km<br>**Shipping**<br>Container ship – Total weight – 10,466 kg; 62,901 tonne.km; Local road – 209 tonne.km<br>**Leeuwin Transport**<br>Outgoing – Total weight – 226,126 kg; 34,462 tonne.km;<br>Incoming – Total weight – 320,335 kg; 19,598 tonne.km<br>**Procurement Spreadsheet (General incoming freight)**<br>Road – Total weight – 483,023 kg; 928,639 tonne.km; Shipping - 1,613,170 tonne.km |

| | |
|---|---|
| | **Orara Group (Cans)**<br>Road – Total weight – 8,763 kg; 2,106 tonne.km<br><br>**Visy (Cartons & Pallets)**<br>Road – Total weight – 24,990 kg; 5,748 tonne.km |
| Opportunities for data improvement | Record the weight of all incoming and outgoing freight.<br><br>Record the distance/location of all outgoing freight. |
| GHG emissions | **Craft Transport**<br>Local deliveries (Vans) – 0.39 t $CO_2$-e; Outgoing to Perth (HGVs) – 2.74 t $CO_2$-e.<br><br>**Shipping**<br>Local deliveries (Vans) – 0.16 t $CO_2$-e; Outgoing shipping (Container ship) – 1.46 t $CO_2$-e.<br><br>**Leeuwin Transport**<br>Outgoing (HGVs) – 4.71 t $CO_2$-e; Incoming (HGVs) – 2.68 t $CO_2$-e.<br><br>**Procurement Spreadsheet (General incoming freight)**<br>Incoming (Articulated vehicles) – 95.65 t $CO_2$-e; Shipping (Container ship) – 37.51 t $CO_2$-e.<br>- Malt, wheat and oats (WA, SA) – 27.65 t $CO_2$-e;<br>- Malt & rye (Imported) – 39.69 t $CO_2$-e;<br>- Brewing Aids (Vic.) – 19.42 t $CO_2$-e;<br>- Brewing Aids (Imported) – 0.16 t $CO_2$-e;<br>- Hops (Imported) – 1.72 t $CO_2$-e;<br>- Tropico (Qld) – 44.40 t $CO_2$-e;<br>- Yeast (Imported) – 0.11 t $CO_2$-e.<br><br>**Orara Group (Cans)**<br>Incoming (Articulated vehicles) – 0.21 t $CO_2$-e<br><br>**Visy (Cartons & Pallets)**<br>Incoming (Articulated vehicles) – 0.59 t $CO_2$-e<br><br>Total incoming – 136.64 t $CO_2$-e;<br>Total outgoing – 9.46 t $CO_2$-e;<br>**Total – 146.10 t $CO_2$-e.** |

## PACKAGING (SCOPE 3)

**Embodied GHG emissions associated with packaging materials are estimated at 45.94 t $CO_2$-e.**

Data for this activity was obtained from the following:

- Orara Group e-mail.
- Visy Packaging spreadsheet.

| | |
|---|---|
| Emissions factor reference | DBEIS 2019<br>- Cans: Closed Loop Source - Metal: aluminium cans and foil – 3,012.34 kg $CO_2$-e/t<br>- Pallets: Primary material production – Wood – 414.29 kg $CO_2$-e/t<br>- Cartons: Closed Loop Source – Paper and Board: board – 794.24 kg $CO_2$-e/t |
| Assumptions & allowances | Cans (0.014 kg per can); Total weight – 8,763 kg<br>Pallets (15 kg per pallet); Total weight – 795 kg<br>Cartons (0.035 kg per carton); Total weight – 24,195 kg |
| GHG emissions | Cans – 26.40 t $CO_2$-e<br>Pallets – 0.33 t $CO_2$-e<br>Cartons – 19.22 t $CO_2$-e<br>Total – 45.94 t $CO_2$-e |

## WASTE (SCOPE 3)

**GHG emissions associated with waste sent for burial at landfill are estimated at 3.46 t $CO_2$-e.**

Materials separated and sent for recycling are excluded from the GHG emissions inventory.

This excludes emissions associated with composting brewery waste on-site which are reported as a scope 1 emission.

Emissions associated with the transportation of waste material to transfer stations and landfill facilities are excluded.

| | |
|---|---|
| Emissions factor reference | NGA Factors 2019<br>Co-mingled commercial waste<br>- 1.2 kg $CO_2$-e/kg waste |
| Assumptions & allowances | Volume of waste – 24 $m^3$<br>Co-mingled conversion – 0.12 t/$m^3$<br>Total weight – 2.88 tonnes |
| GHG emissions | Total – 3.46 t $CO_2$-e |

## CONSUMABLES (SCOPE 3)

**Embodied GHG emissions associated with packaging materials are estimated at 15.13 t $CO_2$-e.**

Data for this activity was obtained from the following:

- Down South Wholesale Sales report
- Email (RRBC) – No reams of office paper used

| | |
|---|---|
| Emissions factor reference | EPiC Database 2019 (adjusted for inflation using RBA inflation calculator)<br>- Specialised and other Machinery and Equipment Manufacturing - 0.32 kg $CO_2$-e/$<br>- Cleaning Compounds and Toiletry Preparation Manufacturing - 0.46 kg $CO_2$-e/$<br>- Textile Manufacturing – 0.13 kg $CO_2$-e/$<br>- Polymer Product Manufacturing – 0.57 kg $CO_2$-e/$<br>- Paper Stationery and Other Converted Paper Product Manufacturing – 0.60 kg $CO_2$-e/$<br>Australian Paper Climate Active Program Disclosure Statement 2019 and Indufor (Australian Paper) Recycled paper project report (2016)<br>- Domestic virgin – 2.54 t $CO_2$/t paper |
| Assumptions & allowances | Box sealing machine (specialised machinery) - $3,890<br>Sanitisers, cleaner, soaps and disinfectants - $343.35<br>Wipes, tea towels and muslin cloth - $123.04<br>Spray bottles, plastic wrap, bags and liners - $2,234.07<br>Beer holders, toilet paper, napkins and hand towels - $20,143.97<br>Office paper – 20 reams of A4; 4 reams of A3. Total weight of paper – 70 kg |
| GHG emissions | Box sealing machine (specialised machinery) – 1.26 t $CO_2$-e<br>Sanitisers, cleaner, soaps and disinfectants – 0.16 t $CO_2$-e<br>Wipes, tea towels and muslin cloth – 0.13 t $CO_2$-e<br>Spray bottles, plastic wrap, bags and liners – 1.28 t $CO_2$-e<br>Beer holders, toilet paper, napkins and hand towels – 12.13 t $CO_2$-e<br>Office Paper – 0.18 t $CO_2$-e<br>Total – 15.13 t $CO_2$-e |

## ROAD TRAVEL (SCOPE 3)

**GHG emissions from business related road travel are estimated at 10.91 t $CO_2$-e for the period.**

Activity data was obtained from staff survey which provided the estimated distance travelled and fuel efficiency of private vehicles.

Allowances are made for indirect emissions associated with extraction, production and transport for fuels used in private vehicles and Uber.

| | |
|---|---|
| Emissions factor reference | NGA Factors 2019<br>ABS Survey of Motor Vehicle Use 2020 – Passenger vehicles WA<br>Car: post 2004 vehicle<br>- diesel: 2.861 kg $CO_2$-e/l<br>Car: post 2004 vehicle<br>- petrol: 2.436 kg $CO_2$-e/l |
| Assumptions & allowances | **Private vehicle emissions intensities**<br>Hamish – 257.5 g $CO_2$-e/km<br>Ross – 257.5 g $CO_2$-e/km<br>Ricky – 73.1 g $CO_2$-e/km<br>Ash – 170.5 g $CO_2$-e/km<br>Rohan – 171.7 g $CO_2$-e/km<br>Hamish – 21,600 km; 1,944 l diesel<br>Ross – 900 km; 81 l diesel<br>Ricky – 5,400 km; 162 l petrol<br>Ash – 4,500 km; 315 l petrol<br>Rohan – 17,500 km; 1,050 l diesel<br>**Uber**<br>Emission factor– 297 kg $CO_2$-e/pkm<br>Total distance travelled – 3,180 km |
| GHG emissions | Hamish – 5.56 t $CO_2$<br>Ross – 0.23 t $CO_2$<br>Ricky – 0.39 t $CO_2$<br>Ash – 0.77 t $CO_2$<br>Rohan – 3.00 t $CO_2$<br>Uber – 0.95 t $CO_2$<br>**Total – 10.91 t $CO_2$-e** |

## COMMUTING (SCOPE 3)

**GHG emissions from employee commuting are estimated at 4.93 t $CO_2$-e for the period.**

Activity data was obtained from staff survey which provided the estimated distance commuted during the reporting period and fuel efficiency of private vehicles.

Allowances are made for indirect emissions associated with extraction, production and transport for fuels used in private vehicles.

| | |
|---|---|
| Emissions factor reference | NGA Factors 2019<br>ABS Survey of Motor Vehicle Use 2020 – Passenger vehicles WA<br>Car: post 2004 vehicle<br>- diesel: 2.861 kg $CO_2$-e/l<br>Car: post 2004 vehicle<br>- petrol: 2.436 kg $CO_2$-e/l<br>Car: general transport<br>- petrol: 2.507 kg $CO_2$-e/l |
| Assumptions & allowances | **Private vehicle allowances**<br>Hamish – 257.5 g $CO_2$-e/km<br>Ross – 257.5 g $CO_2$-e/km<br>Ricky – 73.1 g $CO_2$-e/km<br>Ash – 170.5 g $CO_2$-e/km<br>Sean – 351.0 g $CO_2$-e/km<br>Waverley – 194.9 g $CO_2$-e/km<br>Hamish – 4,416 km; 397 l diesel<br>Ross – 5,760 km; 518 l diesel<br>Ricky – 7,680 km; 230 l petrol<br>Ash – 5,760 km; 403 l petrol<br>Sean – 384 km; 54 l petrol<br>Waverley – 3,264 km; 261 l diesel |
| GHG emissions | Hamish – 1.14 t $CO_2$<br>Ross – 1.48 t $CO_2$<br>Ricky – 0.56 t $CO_2$<br>Ash – 0.95 t $CO_2$<br>Sean – 0.13 t $CO_2$<br>Waverley – 0.64 t $CO_2$<br>**Total – 4.93 t $CO_2$-e** |

## AIR TRAVEL (SCOPE 3)

**GHG emissions associated with air travel are estimated at 5.80 t $CO_2$-e.**

Data for this activity was obtained from staff surveys which provided the distance and cabin classification of all flights taken by staff for the year.

GHG emissions include well to tank emissions associated with extracting, processing and delivery losses. Carbon Neutral also applies an allowance for radiative forcing for all flights greater than 400km in length to allow for the non-$CO_2$ contribution to global warming.

| | |
|---|---|
| Emissions factor reference | DBEIS/DEFRA 2019<br>Short haul economy - 0.1728 kg $CO_2$-e/pkm<br>International/long haul economy - 0.1536 kg $CO_2$-e/pkm |
| Assumptions & allowances | Short haul (785 – 3,700 km) - economy – 15,912 km<br>Long haul (>3,700km) - economy – 19,974 km |
| GHG emissions | Total – 5.80 t $CO_2$-e |

## ACCOMMODATION (SCOPE 3)

**GHG emissions from the use of accommodation during business trips are estimated at 0.93 t $CO_2$-e for the period.**

Activity data is obtained from staff survey.

| | |
|---|---|
| Emissions factor reference | Hotel Footprints dataset<br>Australia 3 star – 16.7 kg $CO_2$-e/night<br>Australia 4 star – 31.0 kg $CO_2$-e/night<br>Hong Kong 4 star – 27.0 kg $CO_2$-e/night<br>Japan 4 star – 46.4 kg $CO_2$-e/night<br>Singapore 4 star – 23.5 kg $CO_2$-e/night |
| Assumptions & allowances | Australia 3 star – 5 nights<br>Australia 4 star – 8 nights<br>Hong Kong 4 star – 5 nights<br>Japan 4 star – 8 nights<br>Singapore 4 star – 4 nights |
| GHG emissions | Australia 3 star – 0.08 t $CO_2$<br>Australia 4 star – 0.25 t $CO_2$<br>Hong Kong 4 star 0.13 t $CO_2$<br>Japan 4 star – 0.37 t $CO_2$<br>Singapore 4 star – 0.09 t $CO_2$<br>Total – 0.93 t $CO_2$-e |

# EXCLUSIONS

The GHG Protocol provides guidance on determining relevant scope 3 emission sources that should be included in organisational GHG inventories.

Exclusions and justifications are provided where adequate activity data was not available, where emissions were deemed to be insignificant or immaterial and where emissions factors are difficult to obtain.

A scope 3 emission can be considered "immaterial" if it is responsible for less than 1% of total GHG emissions for the business.

## MATERIALS SENT FOR RECYCLING

Materials sent for recycling have not been included in emissions calculations in this Report.

Emissions associated with the treatment of these materials are accounted for when these materials are re-processed and re-used.

Avoided landfill emissions associated with the recycling of materials such as paper and cardboard away from landfill are estimated at 1.94 t $CO_2$-e. This is the amount of $CO_2$ equivalent that would have been released as methane had this material be sent to landfill for burial (no allowance for emissions associated with recycling).

## DOWNSTREAM USE

GHG emissions associated with end-of-life disposal of packaging material are excluded. Packaging used by the business is compostable and/or recyclable and could be diverted away from landfill.

Emissions from display, storage and chilling of the beer prior consumption are also excluded.

## FUGUTIVE EMISSIONS

GHG emissions arising from leaks in chillers are excluded. No refrigerant gas replenishments were required during the reporting period. These will be included in future reporting periods if relevant.

## FARM EMISSIONS

GHG emissions associated with the growing of hops and barley are excluded. Emissions from cattle manure which is added as a soil conditioner and fertiliser (in lieu of the use of synthetic fertilisers) and from farm equipment use have not been included.

## WASTE

GHG emissions arising from waste generated in the cellar door and cool room facilities have not been included.

Emissions associated with the transportation of waste materials to transfer stations, materials recovery and landfill facilities are also excluded.

## WATER USE

GHG emissions arising from mains water use is excluded. The brewery and farm do not have mains supply and there was minimal use in the cellar door and cool room facilities.

## EMBODIED ENERGY

Embodied emissions associated with ingredients in the beer are not included. A life cycle assessment would be required to accurately estimate these emissions, many of which are grown on the farm and sourced as locally as possible, and this is outside the scope of this organisational carbon footprint.

## PUBLIC TRANSPORT

GHG emissions associated with the use of public transport for business related travel are excluded due to immateriality. Staff surveys indicate that only 20km was travelled by staff in buses during the period.

# CARBON REDUCTION ACTIONS

To claim "carbon neutrality" as an organisation, RRBC should seek to reduce its avoidable GHG emissions by modifying operations and processes where possible before purchasing carbon offsets so that net GHG emissions are zero.

By managing and reducing its carbon footprint, the business can encourage its personnel and its circle of influence to do the same, leading by example and promoting the actions it is taking.
Several environmental improvement and carbon reduction activities have been implemented by the business.

The following table lists the initiatives implemented by RRBC to reduce its carbon footprint and other negative environmental impacts.

Table 2: Carbon reduction initiatives implemented by RRBC

| |
|---|
| A 30kW Solar PV system with 30kWh battery is used to supply renewable energy supply to the brewery. |
| Rainwater is captured and used along with groundwater in the brewery. |
| Biopack (plant based bioplastic) is used for beer holders in lieu of petroleum based plastic. |
| Aluminium cans are used in lieu of glass which reduces transport weight. Although more energy intensive to produce, aluminium cans are easier to recycle compared to glass.<br>Orara claims that its cans are made are made with up to 70% recycled content which requires only 5% of the energy used to create virgin aluminium. |
| Brewery waste is re-used as compost which is mixed with cattle manure from the dairy farm in lieu of synthetic fertilisers. |
| Spent grain is re-used as animal fodder. |
| RRBC beer has a water input of 4.25 litres per litre of beer produced while the industry average is 6 litres per litre of beer produced. |
| Energy efficiency measures in the brewery include insulation to reduce heat gain and minimise losses, the use of smart controllers and variable speed drives to maximise motor and pumping efficiency. |
| The business grows many of the ingredients used in its beer and seeks to purchase locally produced products which reduces emissions associated with transportation and freight. |
| Actions being considered and implemented for the FY2021 reporting period include adding additional solar PV and battery storage, upgrading the back up generator to a lower emission model and investigating opportunities to treat and re-use water to further improve water efficiency.<br>The business continues to explore opportunities in energy efficiency, soil biodiversity and carbon and on-site revegetation. |

# EMISSIONS INTENSITY

As this is RRBC's first assessment of its carbon footprint, the business uses the following metrics which show the GHG emissions intensity against a number of measures.

Using total GHG emissions may not be accurate if business activity increases or decreases substantially on a year-to-year basis.

Table 3: Emission intensities – FY2020

| Measure/Metric | $CO_2$-e per measure for FY 2020 |
|---|---|
| Number of full-time employees | 62.02 t $CO_2$-e / FTE |
| Per $ gross revenue | 17.37 g $CO_2$-e / $ gross revenue |
| Per litre of beer produced | 1.02 kg $CO_2$-e / litre of beer |

# CARBON NEUTRALITY

To claim organisational "carbon neutrality" RRBC should seek opportunities to **reduce** its avoidable GHG emissions by exploring where the greatest reduction could potentially be achieved and where carbon reduction initiatives could be implemented easily or at little cost.

Carbon Neutral estimates RRBC's carbon footprint to be 434.14 t $CO_2$-e for FY2020.

RRBC would need to purchase and surrender 435 carbon credits to cancel all of its unavoidable GHG emissions for the year.

**By purchasing and surrendering carbon credits to offset all of its GHG emissions, RRBC claims organisational carbon neutrality for the period 1 July 2019 to 30 June 2020.**

The following table shows net GHG emissions after the purchase and retirement of carbon offsets.

Table 4: RRBC's Net Organisational GHG emissions – FY2020

| DETAILS | SERIAL NUMBERS | t $CO_2$-e |
|---|---|---|
| FY2020 GHG emissions | | 434.14 |
| **Carbon Offsets** | | |
| Gold Standard PER – Australian Native Reforestation Yarra Yarra Biodiversity Corridor, Vintage 2022 | GS1-1-AU-GS3039-21-2022-19221-9796-1000<br>GS1-1-AU-GS3039-21-2022-20595-592-604 | (-218) |
| Australian Biodiverse Reforestation Carbon Offsets | 12PWA176195B – 12PWA176411B | (-217) |
| *Stapled CDM CER - China Wind-farm Project - Renewable Energy, Vintage 2013-2016* | *CN-316 1,011,039,633 – 1,011,040,067* | *-435* |
| 2019/20 Net GHG emissions | | ZERO (-0.86) |

*NOTE: Gold Standard PERs and Biodiverse Reforestation Carbon Offsets*

*To ensure claims of carbon neutrality, and because it may be some years before actual carbon is sequestered, an equivalent number of verified carbon credits from a certified, international project have been surrendered.*

# DISCLAIMER

*Whilst every care has been taken to ensure that the information contained in this report is accurate, complete, current, reliable and free from error, Carbon Neutral or any of its staff, members or Directors does not provide any warranty nor accept any responsibility or liability for any errors in the information provided. This report is made in good faith based on the information provided by staff and service contractors. You should and are advised to make your own due diligence inquiry as to the appropriateness and suitability of the information for your circumstances. This report is solely for the use of RRBC. No part of it or any part of Carbon Neutral's intellectual property such as our logo is to be circulated, quoted or distributed to third parties without prior written approval from Carbon Neutral Pty Ltd.*

# REFERENCES


1) Australian Government Bureau of Statistics (2021). *9208.0 - Survey of Motor Vehicle Use, Australia, 12 months ended 30 June 2020*. Commonwealth of Australia, Data Cubes.

2) Australian Government Department of the Environment and Energy (2019). National Greenhouse Accounts Factors. The Department of the Environment and Energy.

3) Australian Government Department of the Environment and Energy (2017). *National Greenhouse and Energy Reporting Scheme Measurement Technical Guidelines for the estimation of emissions by facilities in Australia. August 2016.*

4) Australian Paper (2020) *Climate Active Public Disclosure Summary Reporting period 1st January 2019 – 31st December 2019*. Available at: https://www.climateactive.org.au/buy-climate-active/certified-members/opal-australian-paper

5) Crawford, R, Stephen, A & Prideaux, F (2019). *Database Environmental Performance in Construction (EPiC)*. The University of Melbourne, Melbourne.

6) Hotel Footprints (2020). [online] Available at: https://www.hotelfootprints.org/footprinting

7) Icao.int. (2021). [online] Available at: https://www.icao.int/environmental-protection/CarbonOffset/Pages/default.aspx

8) Indufor (2016) - *Emissions differentials: Recycled paper: A comparison of greenhouse gas emissions associated with locally made and imported paper products*, Australian Paper.

9) Kerry, F (2007). *Industrial Gas Handbook. Gas Separation and Purification*. CRC Press.

10) Google Maps. (2020). [online] Available at: https://maps.google.com/

11) Reserve Bank of Australia. (2018). *Inflation Calculator | RBA*. [online] Available at: http://www.rba.gov.au/calculator/

12) Sea Distances (2020). [online] Available at: https://sea-distances.org/

13) UK Government Department for Business, Energy & Industrial Strategy, Department for Environment, Food & Rural Affairs 2019 *UK Government GHG Conversion Factors for Company Reporting. 2019.*

14) World Resources Institute and World Business Council for Sustainable Development, (2004). *The GHG Protocol A Corporate Accounting and Reporting Standard. Revised Edition.* USA

15) World Resources Institute and World Business Council for Sustainable Development, (2011). *Corporate Value Chain (Scope 3) Accounting and Reporting Standard. Supplement to the GHG Protocol Corporate Accounting and Reporting Standard. E-reader Version.* [online] Available at: https://ghgprotocol.org/standards/scope-3-standard

In accordance with its **carbon footprint**

# Rocky Ridge Brewing Co

has permanently surrendered

## 435 tonnes

of

**Australian Native Reforestation - Gold Standard PERs**
and
**Biodiverse Reforestation Carbon Offsets**
from the *Yarra Yarra Biodiversity Corridor*.

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

Ray Wilson | Chief Executive Officer

**Issue Date:** 16 April 2021 | **Emissions Period:** 1 July 2019 - 30 June 2020

Carbon Neutral retires an equivalent number of verified carbon credits from an international project for all Gold Standard PERs for any claims of carbon offsetting (and carbon neutrality where applicable).

carbonneutral
Turn Emissions into Trees

Encouraging positive social, environmental and economic change with solutions that help overcome the effects of the climate crisis.

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