

# **BHP**

## **Scope 1, 2 and 3 Emissions Calculation Methodology 2020**

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# Scope 1, 2 and 3 Emissions Calculation Methodology 2020

## About this document

This document describes the calculation boundaries, methodologies, assumptions and key references used in the preparation of the FY2020 inventory of Scope 1, 2 and 3 greenhouse gas (GHG) emissions in BHP's value chain, as published in the BHP Annual Report 2020, BHP Climate Change Report 2020 and BHP Sustainability Navigators and Databook 2020, available online at [bhp.com/climate](http://bhp.com/climate).

Emissions for our business are calculated using methodologies consistent with the Greenhouse Gas (GHG) Protocol: A Corporate Accounting and Reporting Standard, with reference to the additional guidance provided in the GHG Protocol: Scope 2 Guidance (amendment to GHG Protocol), GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (Scope 3 Standard) and GHG Protocol Technical Guidance for Calculating Scope 3 Emissions (Scope 3 Guidance) as appropriate<sup>1</sup>. We have also reviewed emissions guidance across a range of other standards in preparing these disclosures, including Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories, International Standard ISO 14064-1 and the Sustainability Accounting Standards Board (SASB).

This document, in combination with the published data on Scope 1, Scope 2 and Scope 3 GHG emissions for our business, meets the disclosure requirements of Global Reporting Initiative (GRI) standard GRI 305<sup>2</sup>. Our disclosures are also aligned with the recommendation of the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD) that organisations disclose "Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas emissions, and the related risks".

Ernst & Young (EY) has provided reasonable assurance over Scope 1 and Scope 2 emissions data and limited assurance over Scope 3 emissions data; a copy of EY's independent assurance statement can be found in our Annual Report 2020.

## Changes from prior year

Emissions reporting area	Details of change
<b>Scope 1 and Scope 2 reporting boundaries</b>	BHP has disclosed Scope 1 and Scope 2 emissions totals based on an operational control approach to boundaries for many years. In FY2020, we have for the first time also disclosed total emissions under a financial control approach and an equity share approach, providing more detail on emissions associated with our investments. Details on how these inventories were prepared are provided in the Organisational boundary, Scope 1 emissions – Operated assets and Scope 2 emissions – Operated assets sections of this document.
<b>Scope 3 processing and use of sold products</b>	In FY2020 we have added a lower-end estimate for the emissions arising from downstream use of our iron ore and metallurgical coal in steelmaking processes. This is intended to provide a more representative indication of the potential Scope 3 emissions associated with these products, including addressing the inherent double-counting challenges highlighted in previous years' reporting.

<sup>1</sup> The GHG Protocol Corporate Accounting and Reporting Standard, Scope 2 guidance, Scope 3 Standard and Scope 3 Guidance are published by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), and were developed with the aim of providing a standardised approach and set of principles for companies to use in preparing emissions inventories. These Standards are the accounting standard used by the majority of companies that report Scope 1, 2 and 3 emissions.

<sup>2</sup> 'Disclosure 305-1: Direct (Scope 1) GHG emissions', 'Disclosure 305-2: Energy indirect (Scope 2) GHG emissions', 'Disclosure 305-3: Other indirect (Scope 3) GHG emissions'

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## GHG Protocol emissions scopes

The GHG Protocol Corporate Accounting and Reporting Standard classifies corporate GHG emissions into three 'scopes'.

**Scope 1** emissions are direct GHG emissions from operations that are owned or controlled by the reporting company (e.g. for BHP, emissions from fuel consumed by haul trucks at our mine sites).

**Scope 2** emissions are indirect emissions from the generation of purchased energy consumed by a company (e.g. emissions from electricity BHP buys from the grid for use at our mine sites).

**Scope 3** emissions are all other indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company (e.g. for BHP, emissions from our customers burning the energy coal we sell in their power stations, or processing our iron ore to steel).

## Organisational boundary

From FY2020, BHP has developed Scope 1 and Scope 2 emissions totals based on the following organisational consolidation approaches to boundaries, consistent with the GHG Protocol Corporate Accounting and Reporting Standard definitions:

- **Operational control approach:** We account for 100 per cent of Scope 1 and 2 emissions from operations over which BHP or one of its subsidiaries has operational control, but not for emissions from operations in which BHP owns an interest but does not have operational control.
- **Financial control approach:** We account for Scope 1 and 2 emissions based on the accounting treatment in BHP's consolidated financial statements, as follows:
  - 100 per cent for operations accounted for as subsidiaries, regardless of equity interest owned.
  - For operations accounted for as a joint operation, the company's interest in the operation.
  - Emissions are excluded for operations that are accounted for using the equity method in the company's financial statements.
- **Equity share approach:** We account for BHP's equity share of Scope 1 and 2 emissions for all operations in which BHP owns an interest.

Scope 3 emissions are the indirect GHG emissions resulting from activities in our value chain outside of our Scope 1 and 2 **operational control approach** emissions. As such, reported Scope 3 emissions include emissions from our non-operated assets<sup>3</sup>. When considering the different inventories reported under different boundary definitions, it should be noted that non-operated asset emissions are also included under the Scope 1 and 2 financial control and equity share emissions where relevant criteria are met as described above.

<sup>3</sup> Assets that are owned as a joint venture but not operated by BHP.

## Scope 1 emissions – Operated assets

Scope 1 emissions for facilities already reporting to mandatory local regulatory programs are required to use the same factors and methodologies for reporting under BHP's operational control boundary. This ensures that a single emissions inventory is maintained for consistency and efficiency. Local regulatory programs were applicable to 79 per cent of BHP's Scope 1 emissions inventory in FY2020 (operational control boundary), as listed in the table below.

A local regulatory program in this context refers to any scheme requiring emissions to be calculated using mandated references (e.g. the Green Tax legislation in Chile, which require emissions to be calculated using the IPCC factors) or mandated factors (e.g. the Australian NGER or US GHGRP which publish factors specific to the programs).

In the absence of local mandatory regulations, the Australian NGER (Measurement) Determination has been set as the default source for factors and methodologies for consistency with the majority of the emissions inventory.

## Scope 2 emissions – Operated assets

Scope 2 emissions totals are reported using both the market based method (default calculation approach unless otherwise stated) and the location based method, as recommended by the *GHG Protocol Scope 2 Guidance*. Definitions of location and market based reporting used in BHP's accounting are consistent with the GHG Protocol terminology as follows:

- **Market-based reporting:** Scope 2 GHG emissions based on the generators (and therefore the generation fuel mix) from which the reporter contractually purchases electricity and/or is directly provided electricity via a direct line transfer.
- **Location-based reporting:** Scope 2 GHG emissions based on average energy generation emission factors for defined geographic locations, including local, subnational, or national boundaries (i.e. grid factors). In the case of a direct line transfer, the location-based emissions are equivalent to the market-based emissions.

For facilities where market-based reporting is required, electricity emission factors are sourced directly from the supplier in the first instance. This includes emission factors available in the public domain for the specific generation plant supplying the facility. An emission factor in the public domain, which is specific to the generation plant supplying the facility, is considered equivalent to a supplier-specific factor in this context.

Where supplier-specific factors are not available, a default emission factor for off-grid electricity is used instead, as published in local regulations or industry frameworks (or the default off-grid electricity emission factor from the Australian NGER (Measurement) Determination in the case where no local default is available).

The location-based method is applied using electricity emission factors for the relevant grid network, as sourced from local regulations, industry frameworks or publications from the local grid administrator.

Asset	Location	Local regulations
BMA, BMC, NSW Energy Coal, Olympic Dam, Nickel West, WA Iron ore, Petroleum - Australia	Australia	National Greenhouse and Energy Reporting Scheme (NGER)
Escondida, Pampa Norte	Chile	Green Tax legislation (referencing IPCC factors)
Petroleum - Gulf of Mexico	USA	US EPA GHG reporting program (US GHGRP)
Potash Canada	Canada	Canadian Greenhouse Gas Reporting Program (referencing IPCC factors)
Petroleum - Trinidad	Trinidad	None

## Scope 1 and 2 emissions – Non-operated assets

Our equity share and financial control boundary emissions inventories include several operations which are not under our operational control, as described in our Annual Report 2020.

For these assets, we have worked with the joint venture and partnership operators to obtain emissions data for the FY2020 reporting year wherever possible. In cases where the most recent available information was based on a different reporting period (e.g. calendar year), we have extrapolated the data provided to reflect the months of FY2020 using production volumes sourced from the BHP Operational Review<sup>4</sup>. This approach covered approximately 90 per cent of the emissions reported for all non-operated assets.

For those non-operated assets where we were not able to obtain actual emissions data from either the operator or any publicly available sources, the emissions intensity from a similar operation in BHP's portfolio was applied to the current year's production to calculate an estimate. We will continue to work towards refining this information over coming years.

The non-operated assets' emissions dataset was also used to calculate Scope 3 emissions based on our operational control boundary ('investments' source), as discussed in the Scope 3 emissions section of this document.

The table below summarises the non-operated assets included and the data sources used for each.

Asset(s)	Scope 1 and 2 emissions data sources
<b>Australian Petroleum (North West Shelf, Bass Strait)</b>	Provided by operators for FY2020, noting that data was subject to finalisation for the reporting year.
<b>US Petroleum (Atlantis, Mad Dog)</b>	Provided by operators for CY2019; extrapolated to FY2020 based on total petroleum production.
<b>Tamakaya – Kelar Power Plant</b>	Provided by operators for FY2020.
<b>Antamina</b>	Most recent available data used from the CY2018 Sustainability Report <sup>5</sup> , extrapolated to FY2020 based on total copper production.
<b>Cerrejon</b>	Estimated based on emissions intensity of similar open cut coal mining operation and total coal production.
<b>ROD Algeria</b>	Estimated based on emissions intensity of other petroleum operations and total petroleum production.

<sup>4</sup> BHP Operational Review for the year ended 30 June 2020; 2020; BHP; <https://www.bhp.com/media-and-insights/news-releases/2020/07/bhp-operational-review-for-the-year-ended-30-june-2020/>

<sup>5</sup> Sustainability Report 2018 (page 52); Antamina; <https://www.antamina.com/sustainability-report-2018/>

## Scope 3 emissions categories

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The Scope 3 Standard divides Scope 3 emissions into 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 Scope 3 Standard further categorises Scope 3 emissions into fifteen distinct categories. Where relevant to our organisation, we report Scope 3 emissions for our business according to these categories. Where it enhances relevance and transparency – or where particular emissions sources are deemed critical by key stakeholders or contribute to our risk exposure – we further disaggregate this data as appropriate. For example, we provide a breakdown of emissions in the *'Processing of sold products'* and *'Use of sold products'* categories (categories 10 and 11) according to the major commodities we produce.

## Overlap in calculation boundaries

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The emissions categories defined by the Scope 3 Standard are designed to be mutually exclusive such that for a given company there is no double counting of emissions between categories. However, for BHP (in common with other producers of raw materials) there is a degree of overlap in reporting boundaries due to our involvement at multiple points in the life cycle of the commodities we produce and consume.

The most significant example of this relates to emissions from the processing of our iron ore to steel, reported under the *'Processing of sold products'* emissions category. Steelmaking also consumes metallurgical coal as an input, a portion of which is produced by us and reported under the *'Use of sold products'* category with all other fossil fuels. From FY2020, we have developed a lower-end estimate for the Scope 3 emissions reported for iron ore and metallurgical coal to better reflect the potential degree of double counting involved. The details of this approach, as well as other examples of overlapping calculation boundaries, are noted below for the relevant individual emissions categories.

This and other double counting of emissions in the current Scope 3 inventory for our business is an expected outcome of emissions reporting between the different scopes and is not considered to detract from the overall value of the Scope 3 emissions disclosure. However, this double counting means that the emissions reported under each category should not be added up, as to do so would give an inflated total figure. For this reason, we do not report a total Scope 3 emissions figure.

In general, we take a 'conservative' approach to calculating Scope 3 emissions for each category (as noted below for individual emissions categories), which results in over-reporting, rather than under-reporting, of the total Scope 3 emissions figure. This is the case for our approach to the double counting of emissions; selection of emission factors; and assumptions about product processing routes and end uses.

## FY2020 Scope 3 emissions inventory

The most significant contributions to Scope 3 emissions in our value chain come from the downstream processing and use of our products, in particular from the use of our iron ore and metallurgical coal in steelmaking. In FY2020 emissions associated with the processing of our non-fossil fuel commodities (iron ore to steel; copper concentrate and cathode to copper wire) were estimated to be between 210.8 – 327.8 million tonnes of CO<sub>2</sub>-e. Emissions associated with the use of our fossil fuel commodities (metallurgical and energy coal, oil and gas) were estimated to be between 130.5 – 205 million tonnes of CO<sub>2</sub>-e.

Scope 3 GHG emissions by category	Emissions in BHP's value chain (million tonnes CO <sub>2</sub> -e) <sup>6</sup>		
	FY2020	FY2019	FY2018
<b>Upstream</b>			
1. Purchased goods and services (including capital goods)	16.9	17.3	8.2
2. Capital goods	Not applicable		
3. Fuel and energy related activities	1.3	1.3	1.4
4. Upstream transportation and distribution	3.8	3.6	3.6
5. Waste generated in operations	Not applicable		
6. Business travel	0.1	0.1	0.1
7. Employee commuting	0.2	<0.1	<0.1
8. Upstream leased assets	Not applicable		
<b>Downstream</b>			
9. Downstream transportation and distribution	4.0	4.0	5.0
10. Processing of sold products			
– Iron ore processing	205.6 – 322.6	197.2 – 299.6	201.2 – 317.4
– Copper processing	5.2	5.1	5.2
<b>Total processing of sold products</b>	<b>210.8 – 327.8</b>	<b>202.3 – 304.7</b>	<b>206.4 – 322.6</b>
11. Use of sold products			
– Metallurgical coal	33.7 – 108.2	34.7 – 111.4	35.0 – 112.3
– Energy coal	56.4	67.0	71.0
– Natural gas	20.6	28.3	36.4
– Crude oil and condensates	17.9	23.3	29.6
– Natural gas liquids	1.9	2.8	4.5
<b>Total use of sold products</b>	<b>130.5 – 205.0</b>	<b>156.0 – 232.7</b>	<b>176.5 – 253.8</b>
12. End-of-life treatment of sold products	Not applicable		
13. Downstream leased assets	Not applicable		
14. Franchises	Not applicable		
15. Investments (i.e. BHP's non-operated assets)	3.9	3.1	1.7

The sections that follow describe in more detail the calculation boundaries (including any exclusions of particular emissions sources within a category), methodologies, assumptions and references we have used to calculate an emissions estimate for each relevant Scope 3 category for FY2020. For categories where we have not calculated an emissions figure, the rationale behind why we have concluded that the emissions source is not relevant to our business is provided.

<sup>6</sup> FY2018 data includes Continuing operations and Discontinued operations (Onshore US). FY2019 data includes Discontinued operations (Onshore US) to 31 October 2019 and Continuing operations.

## Scope 3 Standard emissions categories

Category 1: Purchased goods and services (including capital goods)			
<b>Scope 3 Standard category description</b>	Upstream (i.e. cradle-to-gate) emissions from the extraction, production and transportation of goods and services purchased or acquired by the reporting company in the reporting year, where not otherwise included in categories 2 to 8.		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>e)</b>	16.9
<b>Calculation status rationale</b>	This is not a material source of Scope 3 emissions in BHP's value chain. Despite this, these emissions are relevant as they may contribute to the exposure of our business to climate-related risk, and because in some instances we may have the ability to influence our suppliers or other service providers to reduce emissions from their activities. A high-level estimate has been calculated for completeness and transparency.		

### Calculation boundary

This category covers emissions generated upstream of BHP's operations associated with the extraction, production and transportation of goods and services purchased or acquired by BHP during the reporting year.

For BHP, this category includes emissions associated with purchases of capital goods, which are classified as a separate category (category 2) under the Scope 3 Standard. As described in the Scope 3 Guidance, depending on a company's internal procurement processes, purchases of capital goods can be difficult to segregate from this Purchased goods and services category.

Emissions associated with goods and services categorised as relating to fuel and energy related activities, upstream transportation, business travel and employee commuting are not included in this category. These are assigned to separate emissions categories (categories 3, 4, 6 and 7 respectively) as recommended by the Scope 3 Standard.

### Exclusions

None. Emissions associated with all spend on goods and services not directly attributable to another Scope 3 category have been included in this estimate.

### Calculation methodology

The 'spend-based' method as described in the Scope 3 Guidance is used to calculate these emissions, with industry-average emission factors applied based on the economic value of the goods and services.

Spend data is broken down according to BHP's internal taxonomy codes and allocated to the most appropriate product group category available within the *GHG Protocol Quantis Scope 3 Evaluator* tool (Quantis tool). The corresponding emission factors from the Quantis tool are then applied to calculate an overall emissions estimate for this category. A weighted average emission factor is applied for any uncategorised spend.

### Data sources

Annual spend data is extracted from the BHP internal system that tracks all external spend.

Emissions factors are sourced from the Quantis tool.

### References

- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions (v1): Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *GHG Protocol Quantis Scope 3 Evaluator tool*; <https://quantis-suite.com/Scope-3-Evaluator/>

## Category 2: Capital goods

<b>Scope 3 Standard category description</b>	Upstream (i.e. cradle-to-gate) emissions from the extraction, production and transportation of capital goods purchased or acquired by the reporting company in the reporting year.		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, included in the <i>Purchased goods and services</i> category (category 1)	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	Not applicable
<b>Calculation status rationale</b>	As described in the Scope 3 Guidance, depending on a company's internal procurement processes, purchases of capital goods can be difficult to segregate from the <i>Purchased goods and services</i> category. Given all our spend data (which includes purchases of capital goods) has been captured in the calculation methodology for category 1, emissions related to purchases of capital goods are not reported separately here. Instead, for BHP's value chain, the emissions reported under category 1 include emissions associated with purchases of capital goods.		

### Category 3: Fuel and energy related activities

<b>Scope 3 Standard category description</b>	Emissions related to the extraction, production, and transportation of fuels and energy purchased or acquired by the reporting company in the reporting year, not already accounted for in Scope 1 or Scope 2.		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	1.3
<b>Calculation status rationale</b>	Although this is not a material source of Scope 3 emissions in BHP's value chain, consumption of fuels and energy represent a material contribution to our Scope 1 and 2 operating emissions; the associated Scope 3 emissions are therefore also of interest.		

### Calculation boundary

This category covers emissions arising from the extraction, production, and transportation of fuels and energy consumed by the facilities over which BHP has operational control, primarily (i) upstream emissions from the extraction, production, and transportation of fuels (e.g. diesel for haul trucks or natural gas for on-site power generation) we purchase for use at our operations, and (ii) upstream emissions from the extraction, production and transportation of fuel (e.g. coal or natural gas) burned to generate the electricity we purchase from the grid. (Note that emissions from the *combustion* of fuels at our facilities are accounted for as our Scope 1 emissions; similarly, emissions from the *generation* of purchased electricity consumed by BHP are accounted for as our Scope 2 emissions.)

### Overlap in calculation boundaries

BHP owns and operates a number of facilities extracting primary fuels (energy coal, natural gas and petroleum products), and a portion of these fuels may eventually be consumed by us. It is recognised that a portion of the upstream emissions associated with the extraction of the fuels or energy consumed by our facilities (as reported under this *Fuel and energy related activities* Scope 3 category) may therefore also be reported under our Scope 1 and 2 emissions. This is an expected outcome of emissions reporting between the different scopes defined under standard GHG accounting practices and is not considered to detract from the value of the Scope 3 emissions reported for this category.

### Exclusions

Upstream emissions from a small quantity of energy consumed which is reported internally under a mixed 'other' category (representing less than 2 per cent of total energy

consumed) are excluded due to the difficulty in assigning a meaningful Scope 3 emission factor to the variety of energy sources involved (including coal seam gas, hydrogen, LPG, steam, and heat).

### Calculation methodology

The 'average-data' method as described in the Scope 3 Guidance is used to calculate these emissions. Industry-average Scope 3 emission factors for each fuel type or natural gas/electricity source (i.e. grid) are applied to the relevant consumption volumes (on an equity basis) to calculate an overall emissions estimate for this category.

### Data sources

Fuel and energy consumption data is sourced from BHP's internal database, with consumption of each type of fuel and energy being recorded by each of our operations.

For our Australian operations, Scope 3 emission factors are sourced from the most recent *Australian National Greenhouse Accounts Factors* published by the Australian Government Department of the Environment and Energy. For our non-Australian operations, regional Scope 3 emission factors for fuels and energy are not readily available at this stage, so the relevant Australian Scope 3 emission factors are applied as a proxy.

### References

- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions v1.0 – Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *National Greenhouse Accounts Factors – August 2019 (Tables 40 to 44)*; Australian Government Department of the Environment and Energy; 2019; <https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-august-2019>

## Category 4: Upstream transportation and distribution

<b>Scope 3 Standard category description</b>	Emissions from the transportation and distribution of products purchased by the reporting company in the reporting year between a company's tier 1 suppliers and its own operations (in vehicles and facilities not owned or controlled by the reporting company); transportation and distribution services purchased by the reporting company in the reporting year, including inbound logistics, outbound logistics (e.g. of sold products); and transportation and distribution between a company's own facilities (in vehicles and facilities not owned or controlled by the reporting company).		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	3.8
<b>Calculation status rationale</b>	Although this is not a material source of Scope 3 emissions in BHP's value chain, emissions associated with the freight of our products to customers are of increasing interest as a component of our value chain. They may contribute to the exposure of our business to climate-related risk, and in some instances we may have the ability to influence our suppliers or other service providers to reduce emissions from their activities.		

### Calculation boundary

As the Scope 3 Standard categorises Scope 3 emissions as upstream or downstream on the basis of financial transactions, this category includes emissions from the transport of our products where freight costs are covered by BHP (e.g. under Cost and Freight (CFR) or similar terms), as well as purchased transport services for process inputs to our operations.

This category includes emissions from road, rail and marine freight (the latter accounting for over 90 per cent of the total).

### Exclusions

Emissions from the transport of process inputs to BHP's operations where spend data is not available (i.e. transport costs are incorporated into the supplier price). These emissions are likely to be captured under the *Purchased goods and services* category (category 1).

### Calculation methodology

For all marine cargoes other than zinc, RightShip – a leading maritime risk management and environmental assessment organisation equally owned by BHP, Rio Tinto and Cargill – was contracted to develop an accurate Scope 3 emissions estimate based on its certified methodology.

For zinc marine cargoes, as well as road and rail freight, the 'distance-based' method as described in the Scope 3 Guidance is used to calculate these emissions. Emissions are calculated for each cargo by applying the appropriate emission factor to the mass x distance multiplier for the voyage.

For purchased transport services for process inputs to our operations, the spend-based method is used to calculate these emissions, as described in the calculation methodology for the *Purchased goods and services* category.

### Data sources

Product transport data is sourced from BHP's internal system for each commodity, including load and destination ports, cargo weight, and vessel deadweight (for marine vessels) for each individual product cargo.

Where emissions are calculated using RightShip's methodology, emission factors are sourced from RightShip.

Where emissions are calculated using the distance-based method:

- Emissions factors on a mass-distance basis are sourced from the most recent version of Greenhouse Gas Reporting Conversion Factors (published by the UK Government) available at the time of the calculations. For marine cargoes, the vessel deadweight is used to categorise the vessel as a Bulk Carrier or General Cargo vessel, and the appropriate emission factor assigned.
- For marine freight emissions calculations, online tools ([www.ports.com](http://www.ports.com) and [www.marinetraffic.com](http://www.marinetraffic.com)) are used to calculate an estimation of the distance covered based on the load and origin/destination ports.
- For road and rail freight emissions calculations, online tools (driving distance based on Google Maps <https://www.google.com/maps>) or published data on rail operator websites are used to calculate an estimation of the distance covered.

Where emissions are calculated using the spend-based method, data is sourced from the BHP internal system that tracks all external spend, and emission factors are sourced from the Quantis tool, as described for the *Purchased goods and services* category.

## References

- *RightShip Carbon Accounting*; <https://site.rightship.com/sustainability/carbon-accounting/>
- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions v1.0 – Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *Greenhouse Gas Reporting: Conversion Factors 2019* (Freighting goods); UK Government Department for Business, Energy & Industrial Strategy; 2019; <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019>
- *Ports.com*; [www.ports.com](http://www.ports.com)
- *MarineTraffic*; [www.marinetraffic.com](http://www.marinetraffic.com)
- *Google Maps*; <https://www.google.com/maps>
- *GHG Protocol Quantis Scope 3 Evaluator tool*; <https://quantis-suite.com/Scope-3-Evaluator/>

### Category 5: Waste generated in operations

<b>Scope 3 Standard category description</b>	Emissions from third-party disposal and treatment (in facilities not owned or controlled by the reporting company) of waste generated in the reporting company's operations in the reporting year.		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, not calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	Not applicable
<b>Calculation status rationale</b>	This category has been identified as not material to the Scope 3 inventory for our business and an emissions figure is not calculated. BHP's operations do not generate waste resulting in GHG emissions other than minimal quantities of domestic waste. This assessment will be periodically reviewed.		

## Category 6: Business travel

**Scope 3 Standard category description** Emissions from the transportation of employees for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company).

<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	0.1
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**Calculation status rationale** This is not a material source of Scope 3 emissions in BHP's value chain, however a high-level estimate has been calculated for completeness and transparency.

### Calculation boundary

This category covers emissions from all domestic and international flights undertaken by employees for business travel purposes, as well as other purchased business travel services (hotel accommodation and car rental) as identified from annual spend data.

### Exclusions

Emissions from business travel activities for which distance or spend data is not available.

### Calculation methodology

For flights, the distance-based method as described in the Scope 3 Guidance is used to calculate these emissions, with industry average emission factors applied based on whether the flight distance is categorised as being short, medium or long-haul.

For hotel accommodation and car rental, the spend-based method is used to calculate these emissions, as described in the calculation methodology for the *Purchased goods and services* category (category 1).

### Data sources

Flight mileage data is sourced from BHP's corporate travel services provider.

Scope 3 emission factors for flights are sourced from the most recent version of the *Center for Corporate Climate Leadership GHG Emission Factors Hub* (published by the US EPA) available at the time of the calculations.

Hotel and car rental spend data is extracted from the BHP internal system that tracks all external spend.

Emissions factors for hotel and car rental spend are sourced from the Quantis tool, as described for the *Purchased goods and services* category.

### References

- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions (v1): Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *Center for Corporate Climate Leadership GHG Emission Factors Hub, March 2020 (Table 10)*; US EPA; 2020; <https://www.epa.gov/sites/production/files/2020-04/documents/ghg-emission-factors-hub.pdf>
- *GHG Protocol Quantis Scope 3 Evaluator tool*; <https://quantis-suite.com/Scope-3-Evaluator/>

## Category 7: Employee commuting

<b>Scope 3 Standard category description</b>	Emissions from the transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company).		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	0.2
<b>Calculation status rationale</b>	This is not a material source of Scope 3 emissions in BHP's value chain, however a high-level estimate has been calculated for completeness and transparency.		

### Calculation boundary

This category covers emissions from chartered fly-in fly-out (FIFO) flights and mine site bus services utilised by employees for commuting purposes.

### Exclusions

Emissions from employee commuting activities for which spend data is not available.

### Calculation methodology

The spend-based method is used to calculate these emissions, as described in the calculation methodology for the *Purchased goods and services* category (category 1).

### Data sources

Charter flight and bus service spend data is extracted from the BHP internal system that tracks all external spend.

Emissions factors are sourced from the Quantis tool, as described for the *Purchased goods and services* category.

### References

- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions (v1): Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *GHG Protocol Quantis Scope 3 Evaluator tool*; <https://quantis-suite.com/Scope-3-Evaluator/>

### Category 8: Upstream leased assets

<b>Scope 3 Standard category description</b>	Emissions from the operation of assets leased by the reporting company (lessee) in the reporting year and not included in Scope 1 and Scope 2 reported by lessee.		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not relevant, not calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	Not applicable
<b>Calculation status rationale</b>	An emissions figure is not calculated for this category as BHP does not lease upstream assets in the course of normal operations. This assessment will be periodically reviewed.		

## Category 9: Downstream transportation and distribution

<b>Scope 3 Standard category description</b>	Emissions from transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (if not paid for by the reporting company), including retail and storage (in vehicles and facilities not owned or controlled by the reporting company).		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	4.0
<b>Calculation status rationale</b>	Although this is not a material source of Scope 3 emissions in BHP's value chain, emissions associated with the freight of our products to customers are of increasing interest as a component of our value chain, and may contribute to the exposure of our business to climate-related risk.		

### Calculation boundary

As the Scope 3 Standard categorises Scope 3 emissions as upstream or downstream on the basis of financial transactions, this category includes emissions from the transportation and distribution of our products where freight costs are not covered by BHP (e.g. under Free on Board (FOB) or similar terms).

This category includes emissions from road, rail and marine freight (the latter accounting for over 95 per cent of the total).

### Exclusions

None.

### Calculation methodology

The distance-based method is used to calculate these emissions, as described in the calculation methodology for the *Upstream transportation and distribution* category (category 4).

### Assumptions

For some FOB cargoes, destination ports are not known and an assumption is applied based on known product market locations by customer.

### Data sources

Product transport data and emission factors are sourced as described for the *Upstream transportation and distribution* category.

### References

- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions v1.0 – Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *Greenhouse Gas Reporting: Conversion Factors 2019 (Freighting goods)*; UK Government Department for Business, Energy & Industrial Strategy; 2019; <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019>
- *Ports.com*; [www.ports.com](http://www.ports.com)
- *MarineTraffic*; [www.marinetraffic.com](http://www.marinetraffic.com)
- *Google Maps*; <https://www.google.com/maps>

## Category 10: Processing of sold products

<b>Scope 3 Standard category description</b>	Emissions from the processing of intermediate products sold in the reporting year by downstream companies (e.g. manufacturers) subsequent to sale by the reporting company.		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Material, calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	210.8 – 327.8
<b>Calculation status rationale</b>	Along with the <i>Use of sold products</i> category (category 11), this is a material source of Scope 3 emissions in BHP's value chain.		

### Calculation boundary

BHP produces a number of products that undergo third party processing resulting in GHG emissions, the most significant of which are:

- Iron ore, which is processed to steel. This is recognised as being an emissions-intensive process that is technologically difficult to decarbonise; it accounts for over 98 per cent of emissions in this category.
- Copper, which is processed to manufacture wire, sheets and tubes for a variety of end uses.

Emissions from the third party processing of these two products are estimated for this category.

### Overlap in calculation boundaries

For BHP, Scope 3 emissions reporting necessarily requires a degree of overlap in reporting boundaries due to our involvement at multiple points in the lifecycle of the commodities we produce and consume. A significant example of this is that emissions reported under this *Processing of sold products* category include the processing of our iron ore to steel, a third party activity that also consumes metallurgical coal as an input, a portion of which is produced by us. For reporting purposes, we account for Scope 3 emissions from combustion of metallurgical coal with all other fossil fuels under the *Use of sold products* category, such that a portion of emissions from metallurgical coal we produce is accounted for under two categories.

In FY2020, we have refined our estimation approach for this category by calculating higher and lower-end estimates of emissions to reflect the potential impact of this double counting.

The higher emissions figure is based on the assumption that all BHP produced iron ore is processed to steel using both BHP's metallurgical coal and third party metallurgical coal (for the balance of steel produced not covered by BHP's metallurgical coal). The full steelmaking emission factor (including carbon from the metallurgical coal input) is applied to the total quantity of iron ore produced to calculate this estimate.

The lower-end emissions figure reflects that BHP reports the Scope 3 emissions associated with the metallurgical coal it produces under the *Use of sold products* category. The steelmaking emission factor is therefore adjusted to remove the estimated share from metallurgical coal and then applied to the total quantity of iron ore produced to calculate this lower estimate. Details of the factors and estimation approach used are provided in Appendix 1: Processing of sold product calculations of this document.

Similarly, the emission factor used to calculate emissions from the processing of our copper products is for the full lifecycle of the selected copper end-product (copper wire), i.e. it is based on a cradle-to-gate assessment and includes all emissions associated with mining and extracting ore to create copper cathodes – as well as from the subsequent manufacturing to the end-product. This will necessarily include emissions from activities included within BHP's Scope 1 and 2 emissions. The double counting in this case is estimated to represent less than 1 per cent of the total emissions for this category and not considered to detract from the value of the Scope 3 emissions reported for this category.

### Exclusions

In addition to iron ore and copper, BHP also produces nickel, zinc, gold, silver, ethane and uranium oxide which are in some cases processed to meet a range of purposes. The variety of end uses associated with these products means applying a meaningful average emission factor is challenging. In addition, the production volumes for these commodities – and associated emissions – are not significant compared to those for iron ore and copper. As a result, emissions from the downstream processing of these products have been excluded at this stage.

Emissions from the processing and refining of our petroleum products have also been excluded as these emissions are considered not material compared to the emissions from the end-use combustion of these products already reported under the *Use of sold products* category.

These exclusions will be periodically reviewed.

## Calculation methodology

The average-data method as described in the Scope 3 Guidance is used to calculate these emissions, with industry-average emission factors applied to production volumes (on an equity basis) for each commodity to calculate an overall emissions estimate for this category.

Refer to Appendix 1 for additional details of calculations for this *Processing of sold products* category.

## Assumptions

To estimate emissions from the processing of iron ore, all iron ore production is assumed to be processed to steel. To calculate the higher-end estimate, the crude steel emission factor is applied to the volume of crude steel produced from BHP's iron ore. To calculate the lower-end estimate, the crude steel emission factor is apportioned between the iron ore and metallurgical coal inputs based on the average ratio of each input required to produce 1,000 kg of crude steel (using the World Steel Association's data on the integrated blast furnace (BF) and basic oxygen furnace (BOF) route). The iron ore 'portion' of the emission factor (i.e. excluding the emissions associated with the metallurgical coal input) is then applied to the total crude steel estimated to have been produced from BHP's iron ore volumes.

Note that the estimated crude steel produced with BHP's iron ore is significantly higher than with BHP's metallurgical coal (due to higher iron ore production). This lower-end figure therefore does not capture all third party produced metallurgical coal emissions in the steelmaking process.

To estimate emissions from the processing of copper, we apply an emission factor for the processing of copper to copper wire (rather than alternative products such as tubes or sheets), as this is the most emissions-intensive process and therefore the most 'conservative' assumption.

## Data sources

Production volumes are sourced from the BHP Operational Review for the year, with calculations performed on an equity basis.

For iron ore processing, key data sources are:

- An industry-average emission factor is sourced from the most recent Sustainability Indicators report published by the World Steel Association. This emission factor is based on data reported on a voluntary basis by steelmakers. Note that the crude steel produced by these reporting companies represents just over half of global

production, allowing an industry-average emission factor to be calculated based on route-specific CO<sub>2</sub> intensities for the major steelmaking routes (the integrated blast furnace (BF) and basic oxygen furnace (BOF) route; and the electric arc furnace (EAF) route), weighted based on the production share of each technology. As a result, the emission factor may not accurately represent (geographically, technologically or temporally) the actual emissions intensities of our customers' facilities. It is considered, however, to be sufficiently representative of average industry conditions as to provide a meaningful estimation.

- The quantity of steel produced from the input quantity of iron ore is calculated using the 'tonnes of iron ore feedstock/tonne crude steel produced' ratio for the BF/BOF steelmaking route published in the World Steel Association publication *Sustainable Steel: At the core of the green economy*.

For copper processing, emission factors are sourced from the European Copper Institute publication *The Environmental Profile of Copper Products*. This study is based on European operations and hence will be impacted by the local electricity emissions intensity and other factors, however it is considered to provide a reasonable estimation.

## References

- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions v1.0 – Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *BHP Operational Review for the year ended 30 June 2020*; BHP; 2020; <https://www.bhp.com/media-and-insights/news-releases/2020/07/bhp-operational-review-for-the-year-ended-30-june-2020>
- *Sustainability indicators: Data 2003 to 2018 (page 1)*; World Steel Association; 2020; <https://www.worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html>
- *Worldsteel publication - 'Fact Sheet Steel and raw materials (page 1)*; World Steel Association; 2019; [https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact\\_raw%2520materials\\_2019.pdf](https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact_raw%2520materials_2019.pdf)
- *The Environmental Profile of Copper Products – A 'cradle-to-gate' life-cycle assessment for copper tube, sheet and wire produced in Europe (page 7)*; European Copper Institute; 2012; <https://copperalliance.eu/resources/environmental-profile-copper-products-cradle-gate-life-cycle-assessment-copper-tube-sheet-wire-produced-europe/>

## Category 11: Use of sold products

<b>Scope 3 Standard category description</b>	Emissions from the end use of goods and services sold by the reporting company in the reporting year.		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Material, calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	130.5 – 205.0
<b>Calculation status rationale</b>	Along with the <i>Processing of sold products</i> category (category 10), this is a material source of Scope 3 emissions in BHP's value chain.		

### Calculation boundary

BHP produces metallurgical coal, energy coal, natural gas and petroleum products, all of which release GHG emissions when consumed by end users. Emissions from the end use of these products by third parties are estimated for this category.

### Overlap in calculation boundaries

As described under the *Processing of sold products* category, there is an element of double counting across the *Processing of sold products* and *Use of sold products* emissions categories for our iron ore and metallurgical coal products, both of which are used in the same process (steelmaking) further downstream, which inflates the total Scope 3 emissions figure.

In FY2020, we have refined our estimation approach for metallurgical coal Scope 3 emissions by calculating an upper and lower end estimate which reflects the potential impact of this double counting. The higher emissions figure is based on the assumption that all BHP produced metallurgical coal is fully combusted and calculated by applying a fuel combustion emission factor. The lower emissions figure is based on the assumption that 100 per cent of the metallurgical coal produced is used in steelmaking along with our iron ore produced. The emissions intensity of steel production is the basis for calculating Scope 3 emissions for metallurgical coal in the lower end estimate, rather than from a combustion emission factor as in the higher end estimate. Details of the factors and estimation approach used are provided below and in Appendix 1: Processing of sold products calculations of this document.

Emissions reported under this *Use of sold products* category also include downstream emissions from the consumption of the energy coal, natural gas and petroleum products we produce. A small portion of these may be consumed within BHP's own operations, and therefore these emissions may also be included within our Scope 1 and 2 inventories.

### Exclusions

None.

### Calculation methodology

The method recommended in the Scope 3 Guidance for 'direct use-phase' emissions calculations for 'Fuels and feedstocks' is used to calculate these emissions, with industry-average emission factors applied to production volumes (on an equity basis) for each commodity to calculate an overall emissions estimate for this category.

For the lower end estimate emissions from metallurgical coal the average-data method as described in the Scope 3 Guidance is used to calculate these emissions, with industry-average emission factors applied to production volumes (on an equity basis) for metallurgical coal to calculate an overall emissions estimate for this category.

Refer to Appendix 2 for additional details of calculations for this *Use of sold products* category.

### Assumptions

All metallurgical coal (higher end estimate), energy coal, natural gas and petroleum products are assumed to be combusted.

In practice, metallurgical coal is primarily used in steelmaking and a portion of the carbon content remains embedded in the final steel product and is not released to the atmosphere; the quantities involved vary according to the feedstocks, processing technologies and output specifications of the process route used. To develop a lower-end estimate of emissions for metallurgical coal based on use in steelmaking (rather than complete combustion), the crude steel emission factor is apportioned between the iron ore and metallurgical coal inputs based on the average ratio of each input required to produce 1,000 kg of crude steel (using the World Steel Association's data on the integrated blast furnace (BF) and basic oxygen furnace (BOF) route). The metallurgical coal 'portion' of the emission factor is then applied to the total crude steel estimated to have been produced from BHP's total metallurgical coal produced. Please see the *Category 10: Processing of sold products* section of this document for the equivalent iron ore emissions apportionment from steelmaking.

All energy coal is assumed to be bituminous (which has a mid-range energy content among the three sub-categories of

black coal, the others being sub-bituminous coal and anthracite) listed in the *Australian National Greenhouse and Energy Reporting (NGER) Measurement Determination* published by the Australian government (Australian NGER Determination), from which these emission factors are sourced.

All crude oil and condensates are assumed to be refined and combusted as diesel (rather than alternative products such as gasoline) as the most emissions-intensive therefore most conservative assumption. The energy content of the crude oil and condensates volumes is used to estimate the corresponding quantity of diesel which would be produced, assuming that no fuel is 'lost' during the refining process.

Emissions from LPG and ethane volumes are included in emissions reported for 'natural gas liquids' (NGL) production and are assumed to be combusted with the same NGL emission factors. This assumption has minimal impact on estimated emissions due to the small volumes involved.

## Data sources

Production volumes are sourced from the BHP Operational Review for the year, with calculations performed on an equity basis.

Emissions factors are sourced from the Australian NGER Determination published by the Australian government, with

the Scope 1 emission factors given for each fuel applied as the Scope 3 emission factor for the use of BHP's sold products.

Produced crude oil and condensate volumes are converted to tonnes using conversion tools published by Global Tech Australia.

## References

- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions v1.0 – Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *BHP Operational Review for the year ended 30 June 2020*; BHP; 2020; <https://www.bhp.com/media-and-insights/news-releases/2020/07/bhp-operational-review-for-the-year-ended-30-june-2020>
- *National Greenhouse and Energy Reporting (NGER) Measurement Determination 2008 (as amended July 2019) (Schedule 1 Part 1)*; Australian Government; 2019; <https://www.legislation.gov.au/Series/F2008L02309>
- *Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal)*; <http://www.globaltechaustralia.com.au/conversion-tools/>
- *Sustainability indicators: Data 2003 to 2018 (page 1)*; World Steel Association; 2020; <https://www.worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html>
- *Worldsteel publication - 'Fact Sheet Steel and raw materials (page 1)*; World Steel Association; 2019; [https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact\\_raw%2520materials\\_2019.pdf](https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact_raw%2520materials_2019.pdf)

## Category 12: End-of-life treatment of sold products

<b>Scope 3 Standard category description</b>	Emissions from the waste disposal and treatment of products sold by the reporting company in the reporting year at the end of their life.
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<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, not calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	Not applicable
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<b>Calculation status rationale</b>	This category has been identified as not material to the Scope 3 inventory for our business and an emissions figure is not calculated. BHP's products that are not incorporated into the assessment of Scope 3 emissions in the <i>Use of sold products</i> category (category 11) include metals and minerals with minimal emissions at end of life. This assessment will be periodically reviewed.
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### Category 13: Downstream leased assets

<b>Scope 3 Standard category description</b>	Emissions from the operation of assets owned by the reporting company (lessor) and leased to other entities in the reporting year, not included in Scope 1 and Scope 2 reported by lessor.		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not relevant, not calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	Not applicable
<b>Calculation status rationale</b>	An emissions figure is not calculated for this category as BHP does not lease downstream assets in the course of normal operations. This assessment will be periodically reviewed.		

### Category 14: Franchises

<b>Scope 3 Standard category description</b>	Emissions from the operation of franchises in the reporting year, not included in Scope 1 and Scope 2 reported by franchisor.		
<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not relevant, not calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	Not applicable
<b>Calculation status rationale</b>	An emissions figure is not calculated for this category as BHP does not have franchised operations. This assessment will be periodically reviewed.		

## Category 15: Investments

<b>Scope 3 Standard category description</b>	Emissions associated with the operation of the reporting company's investments (including equity and debt investments and project finance) in the reporting year, not already included in Scope 1 or Scope 2.
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<b>Calculation status of FY2020 emissions in BHP's value chain</b>	Not material, calculated	<b>FY2020 emissions in BHP's value chain (million tonnes CO<sub>2</sub>-e)</b>	3.9
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<b>Calculation status rationale</b>	Although this is not a material source of Scope 3 emissions in BHP's value chain, emissions associated with BHP's investments are relevant in that they contribute to the exposure of our business to climate-related risk.
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### Calculation boundary

This category covers the Scope 1 and 2 emissions (on an equity basis) from our assets that are owned (as a joint venture or other ownership structure) but not operated by BHP. The Scope 3 Standard categorises this as a downstream category, as the provision of capital or financing is framed as a service provided by BHP.

Our non-operated assets relevant to the FY2020 reporting year are described in our Annual Report 2020, and includes the Kelar gas-fired power plant in Chile. Additional investments are added, and divestments removed, each year as appropriate.

### Exclusions

None.

### Calculation methodology

The accounting approach for 'equity investments' as described in the Scope 3 Guidance is used to calculate these emissions.

### Data sources

As described in the Scope 1 and 2 emissions – Non-operated assets section.

### References

- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions v1.0 – Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *BHP Operational Review for the year ended 30 June 2020*; BHP; 2020; <https://www.bhp.com/media-and-insights/news-releases/2020/07/bhp-operational-review-for-the-year-ended-30-june-2020>
- *Sustainability Report 2018 (page 52)*; Antamina; 2018; (<https://www.antamina.com/sustainability-report-2018/>)

# Glossary<sup>7</sup>

<b>Activity data</b>	A quantitative measure of a level of activity that results in greenhouse gas emissions. Activity data is multiplied by an energy factor and/or an emission factor to derive the energy consumption and greenhouse gas emissions associated with a process or an operation. Examples of activity data include kilowatt-hours of electricity used, quantity of fuel used, output of a process, hours equipment is operated, distance travelled and floor area of a building.
<b>Assets</b>	Assets are a set of one or more geographically proximate operations (including open-cut mines, underground mines, and onshore and offshore oil and gas production and production facilities). Assets include our operated and non-operated assets.
<b>Capital goods</b>	Final goods that have an extended life and are used by the company to manufacture a product, provide a service, or sell, store, and deliver merchandise. In financial accounting, capital goods are treated as fixed assets or plant, property and equipment (PP&E). Examples of capital goods include equipment, machinery, buildings, facilities, and vehicles.
<b>CO<sub>2</sub> equivalent (CO<sub>2</sub>-e)</b>	The universal unit of measurement to indicate the global warming potential (GWP) of each greenhouse gas, expressed in terms of the GWP of one unit of carbon dioxide. It is used to evaluate releasing (or avoiding releasing) different greenhouse gases against a common basis.
<b>Continuing operations</b>	Assets/operations/entities that are owned and/or operated by BHP, excluding major assets/operations/entities classified as Discontinued Operations.
<b>Cradle-to-gate</b>	All emissions that occur in the lifecycle of purchased products, up to the point of receipt by the reporting company (excluding emissions from sources that are owned or controlled by the reporting company).
<b>Direct emissions</b>	Emissions from sources that are owned or controlled by the reporting company.
<b>Direct use-phase emissions</b>	Emissions that occur directly (i.e. the Scope 1 and Scope 2 emissions of the end users) from the use of the following sold products over their expected lifetime: products that directly consume energy (fuels or electricity) during use (e.g. vehicles); fuels and feedstocks (e.g. combustion of petroleum products, natural gas, coal, biofuels, and crude oil); and GHGs and products that contain or form GHGs that are emitted during use (e.g. refrigeration and air-conditioning equipment). See also the definition for “indirect use-phase emissions” below.
<b>Downstream emissions</b>	Indirect GHG emissions from sold goods and services. Downstream emissions also include emissions from products that are distributed but not sold (i.e. without receiving payment).
<b>Emission factor</b>	A factor that converts activity data into greenhouse gas emissions data (e.g. kg CO <sub>2</sub> -e emitted per GJ of fuel consumed, kg CO <sub>2</sub> -e emitted per KWh of electricity used).

<sup>7</sup> Definitions provided are based on GHG Protocol: A Corporate Accounting and Reporting Standard and the Scope 3 Standard.

<b>Energy</b>	Energy means all forms of energy products where ‘energy products’ means combustible fuels, heat, renewable energy, electricity, or any other form of energy from operations that are owned or controlled by BHP. The primary sources of energy consumption come from fuel consumed by haul trucks at our operated assets, as well as purchased electricity used at our operated assets.
<b>Energy content factor</b>	The energy content of a fuel is an inherent chemical property that is a function of the number and types of chemical bonds in the fuel.
<b>Equity share approach</b>	A consolidation approach whereby a company accounts for greenhouse gas emissions from operations according to its share of equity in the operation. The equity share reflects economic interest, which is the extent of rights a company has to the risks and rewards flowing from an operation. Also see the definition for ‘Operational control approach’.
<b>Financial control approach</b>	<p>A consolidation approach whereby a company reports greenhouse gas emissions based on the accounting treatment in the company’s consolidated financial statements, as follows:</p> <ul style="list-style-type: none"> <li>• 100 per cent for operations accounted for as subsidiaries, regardless of equity interest owned; and</li> <li>• for operations accounted for as a joint operation, the company’s interest in the operation.</li> </ul> <p>It does not report greenhouse gas emissions from operations that are accounted for using the equity method in the company’s financial statements.</p>
<b>Fugitive emissions</b>	Emissions that are not physically controlled but result from the intentional or unintentional releases of greenhouse gas emissions.
<b>GHG (Greenhouse gas)</b>	For BHP reporting purposes, these are the aggregate anthropogenic carbon dioxide equivalent emissions of carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrous oxide (N <sub>2</sub> O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF <sub>6</sub> ).
<b>Global warming potential (GWP)</b>	A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given greenhouse gas relative to one unit of CO <sub>2</sub> . BHP currently uses GWP from the Intergovernmental Panel on Climate Change (IPCC) Assessment Report 4 (AR4) based on a 100-year timeframe.
<b>Grid</b>	A system of power transmission and distribution (T&D) lines under the control of a coordinating entity or “grid operator,” which transfers electrical energy generated by power plants to energy users—also called a “power grid.”
<b>Indirect emissions</b>	Emissions that are a consequence of the activities of the reporting company, but occur at sources owned or controlled by another company.
<b>Indirect use-phase emissions</b>	Emissions from the use of sold products over their expected lifetime that indirectly consume energy (fuels or electricity) during use (e.g. apparel (requires washing and drying), food (requires cooking and refrigeration)). See also the definition for “direct use-phase emissions” above.
<b>IPCC</b>	Intergovernmental Panel on Climate Change.
<b>Lifecycle</b>	Consecutive and interlinked stages of a product system, from raw material acquisition or generation of natural resources to end of life.

<b>Location-based method (for reporting)</b>	Scope 2 greenhouse gas emissions based on average energy generation emission factors for defined geographic locations, including local, subnational, or national boundaries (i.e. grid factors). In the case of a direct line transfer, the location-based emissions are equivalent to the market-based emissions.
<b>Market-based method (for reporting)</b>	Scope 2 greenhouse gas emissions based on the generators (and therefore the generation fuel mix from which the reporter contractually purchases electricity and/or is directly provided electricity via a direct line transfer).
<b>Materiality</b>	Concept that individual or the aggregation of errors, omissions and misrepresentations could affect the greenhouse gas inventory and could influence the intended users' decisions.
<b>Onshore US</b>	BHP's petroleum asset (divested in year ended 30 June 2019) in four US shale areas (Eagle Ford, Permian, Haynesville and Fayetteville), where we produced oil, condensate, gas and natural gas liquids.
<b>Operational boundaries</b>	The boundaries that determine the direct and indirect emissions associated with operations owned or controlled by the reporting company.
<b>Operational control approach</b>	A consolidation approach whereby a company accounts for 100 per cent of the greenhouse gas emissions over which it has operational control (a company is considered to have operational control over an operation if it or one of its subsidiaries has the full authority to introduce and implement its operating policies at the operation). It does not account for greenhouse gas emissions from operations in which it owns an interest but does not have operational control. Also see the definition for 'Equity share approach'.
<b>Operations</b>	Open-cut mines, underground mines, onshore and offshore oil and gas production and processing facilities.
<b>Organisational boundaries</b>	The boundaries that determine the operations owned or controlled by the reporting company, depending on the consolidation approach taken (equity or control approach).
<b>Power purchase agreement (PPA)</b>	A type of contract that allows a consumer, typically large industrial or commercial entities, to form an agreement with a specific energy generating unit. The contract itself specifies the commercial terms including delivery, price, payment, etc. In many markets, these contracts secure a long-term stream of revenue for an energy project. In order for the consumer to say they are buying the electricity of the specific generator, attributes shall be contractually transferred to the consumer with the electricity.
<b>Primary data</b>	Data from specific activities within a company's value chain.
<b>Process</b>	A set of interrelated or interacting activities that transforms or transports a product.
<b>Proxy data</b>	Data from a similar process or activity that is used as a stand-in for the given process or activity without being customised to be more representative of the given process or activity.
<b>Residual mix</b>	The mix of energy generation resources and associated attributes such as greenhouse gas emissions in a defined geographic boundary left after contractual instruments have been claimed/retired/cancelled. The residual mix can provide an emission factor for companies without contractual instruments to use in a market-based method calculation. A residual mix is currently unavailable to account for voluntary purchases and this may result in double counting between electricity consumers.
<b>Scope 1 greenhouse gas emissions</b>	Scope 1 greenhouse gas emissions are direct emissions from operations that are owned or controlled by BHP, primarily emissions from fuel consumed by haul trucks at our operated assets, as well as fugitive methane emissions from coal

	mining and petroleum production at our operated assets. Scope 1 refers to direct greenhouse gas emissions from operated assets.
<b>Scope 2 greenhouse gas emissions</b>	Scope 2 greenhouse gas emissions are indirect emissions from the generation of purchased or acquired electricity, steam, heat or cooling that is consumed by operations that are owned or controlled by BHP. Our Scope 2 emissions have been calculated using the market-based method using supplier specific emission factors unless otherwise specified.
<b>Scope 3 greenhouse gas emissions</b>	Scope 3 greenhouse gas emissions are all other indirect emissions (not included in Scope 2) that occur in BHP's value chain, primarily emissions resulting from our customers using the fossil fuel commodities and processing the non-fossil fuel commodities we sell, as well as upstream emissions associated with the extraction, production and transportation of the goods, services, fuels and energy we purchase for use at our operations; emissions resulting from the transportation and distribution of our products; and operational emissions (on an equity basis) from our non-operated joint ventures.
<b>Scope 3 category</b>	One of the 15 types of Scope 3 emissions defined by the Scope 3 Standard.
<b>Secondary data</b>	Data that is not from specific activities within a company's value chain.
<b>Upstream emissions</b>	Indirect GHG emissions from purchased or acquired goods and services.
<b>Value chain</b>	Refers to all of the upstream and downstream activities associated with the operations of the reporting company, including the use of sold products by consumers and the end-of-life treatment of sold products after consumer use.

## References

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- *Center for Corporate Climate Leadership GHG Emission Factors Hub, March 2020 (Table 10)*; US EPA; 2020; <https://www.epa.gov/sites/production/files/2020-04/documents/ghg-emission-factors-hub.pdf>
- *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures (June 2017)*; Task Force on Climate-related Financial Disclosures; 2017; <https://www.fsb-tcfd.org/publications/final-recommendations-report/>
- *GHG Protocol Corporate Accounting and Reporting Standard*; WRI/WBCSD; 2004; <http://ghgprotocol.org/corporate-standard>
- *GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2011; <http://ghgprotocol.org/standards/scope-3-standard>
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- *GHG Protocol Technical Guidance for Calculating Scope 3 Emissions (v1): Supplement to the Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2013; <https://ghgprotocol.org/scope-3-technical-calculation-guidance>
- *Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal)*; <http://www.globaltechaustralia.com.au/conversion-tools/>
- *Google Maps*; <https://www.google.com/maps>
- *Greenhouse Gas Reporting: Conversion Factors 2019 (Freighting goods)*; UK Government Department for Business, Energy & Industrial Strategy; 2019; <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2019>
- *MarineTraffic*; [www.marinetraffic.com](http://www.marinetraffic.com)
- *National Greenhouse Accounts Factors – August 2019 (Tables 40 to 44)*; Australian Government Department of the Environment and Energy; 2019; <https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-august-2019>
- *National Greenhouse and Energy Reporting (NGER) Measurement Determination 2008 (as amended July 2019) (Schedule 1 Part 1)*; Australian Government; 2019; <https://www.legislation.gov.au/Series/F2008L02309>
- *Ports.com*; [www.ports.com](http://www.ports.com)
- *RightShip Carbon Accounting*; <https://site.rightship.com/sustainability/carbon-accounting/>
- *Sustainability Indicators 2003–2018 (page 1)*; World Steel Association; 2018; <https://www.worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html>
- *Sustainability Report 2018 (page 52)*; Antamina; (<https://www.antamina.com/sustainability-report-2018/>)
- *The Environmental Profile of Copper Products – A 'cradle-to-gate' life-cycle assessment for copper tube, sheet and wire produced in Europe (page 7)*; European Copper Institute; 2012; <https://copperalliance.eu/resources/environmental-profile-copper-products-cradle-gate-life-cycle-assessment-copper-tube-sheet-wire-produced-europe/>
- *Worldsteel publication - 'Fact Sheet Steel and raw materials, 2019 (page 1)*; World Steel Association; 2019; [https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact\\_raw%2520materials\\_2019.pdf](https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact_raw%2520materials_2019.pdf)

# Appendix

## Appendix 1: Processing of sold products calculations

Item	Quantity	Units	Comment
<b>Processing iron ore to steel – Upper estimate</b>			
FY2020 iron ore production	238,895,900	tonnes	<p><i>Reference sources</i></p> <ul style="list-style-type: none"> <li>BHP Operational Review for the year ended 30 June 2020.</li> </ul> <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Assumed that production volumes approximate sales volumes; small year-end inventory volumes will be smoothed out over year-on-year calculations.</li> </ul>
Conversion factor	1.37	tonnes iron ore feedstock per tonne crude steel	<p><i>Reference sources</i></p> <ul style="list-style-type: none"> <li>Worldsteel publication - 'Fact Sheet Steel and raw materials, 2019 (page 1); World Steel Association; 2019; <a href="https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact_raw%2520materials_2019.pdf">https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact_raw%2520materials_2019.pdf</a>.</li> </ul> <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Conversion factor used is for the integrated blast furnace (BF) and basic oxygen furnace (BOF) steelmaking route.</li> </ul>
Crude steel produced	174,376,569	tonnes	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Assumed that all iron ore sold is converted to crude steel.</li> </ul>
Emissions factor	1.85	tonnes of CO <sub>2</sub> per tonne crude steel cast	<p><i>Reference sources</i></p> <ul style="list-style-type: none"> <li>Sustainability Indicators 2003–2018 (page 1); World Steel Association; 2018; <a href="https://www.worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html">https://www.worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html</a>.</li> </ul>
FY2020 emissions	322,596,653	tonnes CO <sub>2</sub> -e	
<b>Processing iron ore to steel – Lower estimate</b>			
FY2020 iron ore production	238,895,900	tonnes	<p><i>Reference sources</i></p> <ul style="list-style-type: none"> <li>BHP Operational Review for the year ended 30 June 2020.</li> </ul> <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Assumed that production volumes approximate sales volumes; small year-end inventory volumes will be smoothed out over year-on-year calculations.</li> </ul>
Conversion factor	1.37	tonnes iron ore feedstock per tonne crude steel	<p><i>Reference sources</i></p> <ul style="list-style-type: none"> <li>Worldsteel publication - 'Fact Sheet Steel and raw materials, 2019 (page 1); World Steel Association; 2019; <a href="https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact_raw%2520materials_2019.pdf">https://www.worldsteel.org/en/dam/jcr:16ad9bcd-dbf5-449f-b42c-b220952767bf/fact_raw%2520materials_2019.pdf</a>.</li> </ul> <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Conversion factor used is for the integrated blast furnace (BF) and basic oxygen furnace (BOF) steelmaking route.</li> </ul>
Crude steel produced	174,376,569	tonnes	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Assumed that all iron ore sold is converted to crude steel.</li> </ul>
Emissions factor	1.2	tonnes of CO <sub>2</sub> per tonne crude steel cast	<p><i>Reference sources</i></p> <ul style="list-style-type: none"> <li>Sustainability Indicators 2003–2018 (page 1); World Steel Association; 2018; <a href="https://www.worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html">https://www.worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html</a>.</li> </ul> <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Assumed that all iron ore sold is converted to crude steel.</li> <li>Apportionment of crude steel processing emissions based on 1,370kg iron ore and 780kg of metallurgical coal used to produce 1000kg crude steel (see reference), such that the iron ore 'contribution' is 1,370 divided by (1,370 + 780) to give 63.7% and remaining metallurgical coal 'contribution' of 36.3%.</li> </ul>

## Appendix

Item	Quantity	Units	Comment
			<ul style="list-style-type: none"> <li>Representative lower end emission factor for steel excluding the metallurgical coal component: Iron ore share (63.7%) multiplied by steel processing emission factor (1.85 tCO<sub>2</sub>-e/tonne of crude steel).</li> </ul>
FY2020 emissions	205,561,588	tonnes CO <sub>2</sub> -e	
<b>Manufacturing copper to copper wire</b>			
FY2020 copper production	1,220,348	tonnes	<p><i>Reference sources</i></p> <ul style="list-style-type: none"> <li>BHP Operational Review for the year ended 30 June 2020.</li> </ul> <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Assumed that production volumes approximate sales volumes; small year-end inventory volumes will be smoothed out over year-on-year calculations.</li> </ul>
Conversion factor	1.0	tonnes copper feedstock per tonne copper end-use product	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Copper end-use products are generally extruded/reshaped forms of the feedstock metal. A one-to-one conversion is therefore assumed.</li> </ul>
Copper end-use product produced	1,220,348	tonnes	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>Assume all copper produced is manufactured into copper wire.</li> </ul>
Emissions factor	4.2	tonnes CO <sub>2</sub> -e per tonne copper wire produced	<p><i>References sources</i></p> <ul style="list-style-type: none"> <li>The Environmental Profile of Copper Products – A ‘cradle-to-gate’ life-cycle assessment for copper tube, sheet and wire produced in Europe (page 7); European Copper Institute; 2012.</li> </ul> <p><i>Assumptions</i></p> <ul style="list-style-type: none"> <li>The life cycle emission factor for the copper wire end-product has been used. Copper wire manufacture primarily uses copper cathode as the raw material while the other end-uses (sheets or tubes) can often include significant quantities of remelted scrap metal, lowering the emission associated with its manufacturing. The choice of this emission factor therefore represents a ‘conservative’ assumption that will provide a high-side estimation of emissions in BHP’s value chain from this process.</li> <li>This emission factor is based on a cradle-to-gate assessment and includes all emissions associated with mining and extracting ore to create copper cathodes, as well as subsequent manufacturing into copper wires. The study notes the dominance of the mining and extraction steps of the copper lifecycle in the total emissions calculated, which BHP already reports within its Scope 1 and 2 emission inventory. Due to this double counting, the choice of this emission factor represents a ‘conservative’ assumption that will provide a high-side estimation of emissions in BHP’s value chain from this process.</li> <li>This study is based on European operations and hence will be impacted by the local electricity emissions intensity and other factors, however it is considered to provide a reasonable estimation.</li> </ul>
FY2020 emissions	5,171,428	tonnes CO <sub>2</sub> -e	
<b>Processing of sold products total</b>			
FY2020 emissions	210.8 - 327.8 million tonnes CO <sub>2</sub> -e		

## Appendix 2: Use of sold products calculations

Commodity	FY2020 production	Production units	FY2020 production (converted)	Converted production units	Energy content (GJ per production unit)	Energy content of sold products (GJ)	Emissions factor (kg CO <sub>2</sub> e per GJ)	Emissions (tonnes CO <sub>2</sub> e)
<b>Crude oil &amp; condensates</b>	41,212,000	barrels	5,621,317	tonnes	45.3	254,645,651	70.2	17,876,125

**Comment***Reference sources*

- Production: BHP Operational Review for the year ended 30 June 2020.
- Conversion factor: Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal).
- Energy content & emission factors: NGER Measurement Determination 2008 (as amended July 2019) (Schedule 1 Part 1); Australian Government; 2019.

*Assumptions*

- All energy produced as crude oil/condensates combusted as diesel for stationary energy purposes.
- Crude oil energy content is applied to convert to the equivalent amount of energy embedded in the refined diesel product, and diesel emission factors applied to calculate the resulting emissions.

<b>Natural gas liquids (NGLs)</b>	7,651,000	barrels	659,516	tonnes	46.5	30,667,503	61.3	1,879,918
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**Comment***Reference sources*

- Production: BHP Operational Review for the year ended 30 June 2020.
- Conversion factor: Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal).
- Energy content & emission factors: NGER Measurement Determination 2008 (as amended July 2019) (Schedule 1 Part 1); Australian Government; 2019.

*Assumptions*

- Includes LPG and ethane combined. There is no breakdown between the two products available, so conservatively assumed that all NGLs are combusted.

<b>Natural gas</b>	359.6	bcf	10,176,680,000	m <sup>3</sup>	0.0393	399,943,524	51.53	20,609,090
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**Comment***Reference sources*

- Production: BHP Operational Review for the year ended 30 June 2020.
- Conversion factor: Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal).
- Energy content & emission factors: NGER Measurement Determination 2008 (as amended July 2019) (Schedule 1 Part 1); Australian Government; 2019.

*Assumptions*

- All natural gas produced is combusted for stationary energy purposes.

<b>Energy coal</b>	23,167,000	tonnes	23,167,000	tonnes	27	625,509,000	90.23	56,439,677
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**Comment***Reference sources*

- Production: BHP Operational Review for the year ended 30 June 2020.
- Conversion factor: Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal).
- Energy content & emission factors: NGER Measurement Determination 2008 (as amended July 2019) (Schedule 1 Part 1); Australian Government; 2019.

*Assumptions*

- All energy coal produced is bituminous and is combusted.

<b>Metallurgical coal – Upper estimate</b>	39,209,400	tonnes	39,209,400	tonnes	30	1,176,282,000	92.02	108,241,470
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## Appendix

Commodity	FY2020 production	Production units	FY2020 production (converted)	Converted production units	Energy content (GJ per production unit)	Energy content of sold products (GJ)	Emissions factor (kg CO <sub>2</sub> e per GJ)	Emissions (tonnes CO <sub>2</sub> e)
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### Comment

#### Reference sources

- Production: BHP Operational Review for the year ended 30 June 2020.
- Conversion factor: Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal).
- Energy content & emission factors: NGER Measurement Determination 2008 (as amended July 2019) (Schedule 1 Part 1); Australian Government; 2019.

#### Assumptions

- All coking coal produced is combusted.

<b>Metallurgical coal – Lower end</b>	39,209,400	tonnes	50,268,462	tonnes crude steel produced	-	-	0.7 tonnes CO <sub>2</sub> /tonne crude steel cast	33,738,321
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### Comment

#### Reference sources

- Sustainability Indicators 2003–2018 (page 1); World Steel Association; 2018; <https://www.worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html>.

#### Assumptions

- Assumed that all metallurgical coal sold is converted to crude steel.
- Conversion of metallurgical coal quantity to final steel quantity is 0.8 tonnes of metallurgical coal feedstock/tonne crude steel produced.
- Representative lower end emission factor for steel excluding the iron ore component: metallurgical coal share (36.3 per cent) multiplied by steel processing emission factor (1.85 tCO<sub>2</sub>e/tonne of crude steel).
- See Appendix 1: Processing of sold products calculations, processing iron ore to steel – lower estimate calculations for emission factor details.

### Use of sold products total

FY2020 emissions	130.5-205.0 million tonnes CO <sub>2</sub> -e
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