

BHP

Scope 1, 2 and 3 GHG emissions calculation methodology 2021

September 2021

About this document

This document describes the calculation boundaries, methodologies, assumptions and key references used in the preparation of BHP's reported inventory of Scope 1, 2 and 3 greenhouse gas (GHG) emissions for FY2021, as published in the BHP Annual Report 2021, BHP Climate Transition Action Plan 2021 and BHP Sustainability Navigators and Databook 2021, available at bhp.com/climate or bhp.com/annualreport.

GHG 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⁽¹⁾. We have also reviewed GHG emissions guidance across a range of other standards in preparing the 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 emissions in relation to our business, meets the disclosure requirements of the Global Reporting Initiative (GRI) standard GRI 305⁽²⁾. 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 the BHP Annual Report 2021, available at bhp.com/annualreport.

Changes from prior year

GHG emissions reporting area	Details of change
Scope 1 and Scope 2 emissions from non-operated assets (including within BHP's Scope 3 inventory)	In FY2021, GHG emissions estimates for all our non-operated assets were developed from data provided directly by the operators of those non-operated assets. In previous years, GHG emissions for the Rhourde Ouled Djemma (ROD) Integrated Development in Algeria and Cerrejón in Colombia (to be divested with effect from 31 December 2020 ⁽³⁾) were estimated based on emissions intensities at comparable facilities under BHP's operational control. Further information on the data provided for each non-operated asset is provided in the 'Scope 1 and Scope 2 emissions - Non-operated assets' section of this document. These changes are intended to improve the accuracy of the GHG emissions estimates, noting that data provided by third-party operators are currently not included in our independent assurance scope at this time. These changes may impact comparability with prior periods.
Scope 3 emissions from purchased goods and services	In FY2021 we have reviewed spend data used for this source in more detail and removed categories which were not associated with the purchase of goods and services. These included intra-company and payroll payments, community and charitable donations, and taxation-related spend where possible, all of which were previously included as uncategorised spend with a weighted emission factor applied. Assignment of emission factors across spend categories has also been improved. These changes are intended to improve the accuracy of the GHG emissions estimate, but may impact comparability with prior periods.
Scope 3 emissions from fuel and energy related activities	In FY2021 we have refined the boundary for this source by excluding natural gas burned for energy at our Petroleum operations as the majority of this natural gas is extracted onsite and therefore included in our Scope 1 emissions. This change is intended to improve the accuracy of the GHG emissions estimate, but may impact comparability with prior periods.
Scope 3 emissions from upstream transportation and distribution	In FY2021 road freight activity included in this category and the <i>Scope 3 emissions from downstream transportation and distribution</i> category has been expanded to include acid, crude, precious metals, and nickel intermediates/products transported. The change is intended to improve completeness of the GHG emissions estimate, but may impact comparability with prior periods.

(1) 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 GHG emissions inventories. These standards are the accounting standard used by the majority of companies that report Scope 1, 2 and 3 emissions.

(2) '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'.

(3) On 28 June 2021 BHP announced its agreement with Glencore to divest its 33.3 per cent interest in Cerrejón with an effective economic date of 31 December 2020. Completion is subject to the satisfaction of customary competition and regulatory requirements and expected to occur in the first half of CY2022.

Scope 3 emissions from processing of sold products

In FY2021 we have updated our approach to estimating GHG emissions from the downstream processing of iron ore and metallurgical coal in steelmaking to improve accuracy.

The revised calculation differs from previous years as follows:

- Eliminated 'double counting' in our reported inventory in relation to GHG emissions from our customers' processing of iron ore and metallurgical coal in steelmaking by allocating GHG emissions between the two and reporting a single total Scope 3 estimated figure for GHG emissions from steelmaking. This approach to improving accuracy is consistent with the GHG Protocol's Scope 3 Standard.
- Improved the accuracy of the emission factor used to estimate Scope 3 emissions by reflecting the blast furnace integrated steelmaking route into which the majority of BHP's steelmaking raw materials portfolio is sold. The improved estimation also considers BHP iron ore product quality and its impact on the amount of ore required to produce steel.

Further detail on the updated approach is provided in the Scope 3 'Processing of sold products' section and Appendix 1 of this document.

Scope 3 emissions from business travel

In FY2021 GHG emissions from business travel have been sourced directly from BHP's third-party corporate travel service provider's carbon emissions report. The methodology expands on the approach used in prior years by accounting for the class of ticket (e.g. economy, first class) and inclusion of radiative forcing (RF) emission factors to estimate air travel emissions. This change is intended to improve the accuracy and completeness of the GHG emissions estimate, but may impact comparability with prior periods.

Scope 3 emissions from downstream transportation and distribution

In FY2021 marine freight emissions calculations have been assigned based on the individual vessels undertaking each journey, including vessel type and deadweight (tonnes) or carrying capacity (20-foot equivalent unit) where available. In previous years, all vessels were assumed to be either a Bulk Carrier or General Cargo vessel type. This change is intended to improve the accuracy of the GHG emissions estimate, but may impact comparability with prior periods. Refer also to the *Scope 3 emissions from upstream transportation and distribution* section above for an additional change.

Scope 3 emissions from use of sold products

GHG emissions from the use of metallurgical coal have been removed from this category and integrated into the *Scope 3 emissions from processing of sold products* category, as described above. This change is intended to eliminate the potential double counting of GHG emissions across the two categories and also report it together with iron ore as both commodities serve as inputs into the steelmaking process.

Further detail on the updated approach is provided in the Scope 3 'Processing of sold products' section and Appendix 1 of this document.

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Greenhouse Gas 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 GHG emissions from the generation of purchased energy consumed by a company (e.g. GHG emissions from electricity BHP buys from the grid for use at our mine sites).

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

Organisational boundary

BHP develops 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 Scope 2 emissions from operations over which BHP (including any one or more subsidiaries in the BHP group of companies) has operational control, but not for GHG emissions from operations in which BHP owns an interest but does not have operational control.
- **Financial control approach:** We account for Scope 1 and Scope 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, BHP's interest in the operation
 - GHG emissions are excluded for operations that are accounted for using the equity method in BHP's financial statements
- **Equity share approach:** We account for BHP's equity share of Scope 1 and Scope 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 Scope 2 **operational control approach** emissions. As such, reported Scope 3 emissions include GHG emissions from our non-operated assets⁽⁴⁾. When considering the different inventories reported under different boundary definitions, it should be noted that non-operated asset GHG emissions are also included under the Scope 1 and Scope 2 financial control and equity share emissions where relevant criteria are met as described above.

(4) Assets that are owned as a joint venture but not operated by BHP. References in this document to a 'joint venture' are used for convenience to collectively describe assets that are not wholly owned by BHP. Such references are not intended to characterise the legal relationship between the owners of the asset.

Energy consumption

Definition

Energy consumed in activities under BHP's operational control (petajoules, terawatt-hours).

Calculation boundary

We account for 100 per cent of energy consumed at operations over which BHP has operational control, but not for energy from operations in which BHP owns an interest but does not have operational control. This includes all fuels and electricity consumed in the operation of vehicles and machinery, onsite heat, steam or electricity generation activities, as a chemical or process feedstock, or any other purpose.

This boundary aligns with the organisation boundary used to report operational GHG emissions, as defined in the 'Organisational boundary' section of this document.

Calculation methodology

BHP's operated assets record energy consumption quantities by fuel type (e.g. diesel, natural gas, metallurgical coal) throughout the year, using sources such as supplier invoices, metering, stockpile changes, and other industry standard practices. All fuel quantities are converted to energy-based units using energy content factors specific to each fuel (e.g. gigajoules per kilolitre for diesel), sourced from appropriate references. Electricity quantities are not required to be converted, as consumption is recorded in energy-based units by definition. These quantities are recorded in BHP's internal system and subject to review and approval processes prior to finalisation.

Operated assets already reporting under mandatory local regulatory programs are required to use the same energy content factors for reporting fuels under BHP's operational control boundary. This ensures that a single energy consumption inventory is maintained for consistency and efficiency. Local regulatory programs are applicable to the majority of BHP's operated assets, as listed in the 'Scope 1 emissions – Operated assets' section of this document.

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

Scope 1 emissions – Operated assets

Definition

GHG emissions released from activities under BHP's operational control (million tonnes carbon dioxide-equivalent [MtCO₂-e]).

Calculation boundary

We account for GHG emissions arising from our activities under three organisational boundaries, as described in the 'Organisational boundary' section of this document – operational control, financial control and equity share.

For BHP operated assets included in each of these organisational boundaries, we account for all carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), nitrogen trifluoride (NF₃) and hydrofluorocarbon (HFC) emissions i.e. all relevant GHG emissions listed under the United Nations Framework Convention on Climate Change and the Kyoto Protocol (perfluorocarbon emissions, largely associated with the aluminium sector, are excluded as they are not considered relevant to our activities). All GHGs are expressed in CO₂-e quantities based on global warming potentials (GWP) sourced from the Intergovernmental Panel on Climate Change (IPCC) (refer to the Glossary for a definition of GWP factors). BHP currently uses GWP from the IPCC Assessment Report 5 (AR5) across all operated assets with the exception of Minerals Americas, which is using AR4 and will transition to AR5 in FY2022.

Scope 1 emissions are calculated for all relevant sources including:

- combustion of fossil fuels for energy
- use of fossil fuels as a feedstock to a chemical process producing GHGs as a by-product (e.g. the process to produce nickel matte at our Kalgoorlie smelter)
- 'fugitive' release of GHGs from extraction of natural resources, such as methane drainage from coal mines or oil production facilities

Calculation methodology

BHP's operated assets record Scope 1 emissions by source throughout the year, using methodologies and emission factors appropriate to each source as follows:

- GHG emissions from combustion of fossil fuels for energy: These GHG emissions are calculated by multiplying the quantity of fuel consumed by the applicable emission factor for the fuel (e.g. tonnes CO₂-e/kilolitre diesel), sourced from appropriate references or, in some cases, from fuel sampling and analysis.
- GHG emissions from use of fossil fuels as a feedstock to a chemical process: These GHG emissions are calculated using 'carbon balance' methodologies sourced from appropriate references, involving estimation of the total carbon content of inputs to the process and total carbon content of products and by-products from the process. The difference in carbon content is assumed to be converted to CO₂ through the process. Methodologies and carbon contents for inputs and products are sourced from appropriate references.
- 'Fugitive' emissions from extraction of natural resources: These GHG emissions are either metered directly (e.g. at gas flare points on offshore oil and gas platforms) or calculated using source-specific methodologies and emission factors based on the specific characteristics of the resource (e.g. region-specific factors published in the Australian NGER (Measurement) Determination for average tonnes CO₂-e/tonne run-of-mine coal from open cut coal mines).

- GHG emissions from immaterial sources: In instances where calculation of GHG emissions is overly onerous given the immateriality of the source to the facility's total emissions, it may be estimated using a simplified approach for efficiency.

Scope 1 emissions for facilities already reporting under 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 GHG emissions inventory is maintained for consistency and efficiency. Local regulatory programs are applicable to the majority of BHP's Scope 1 emissions inventory within our operational control boundary, as listed in the table below.

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

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

Asset	Location	Local regulations
BMA, BMC, NSW Energy Coal, Olympic Dam, Nickel West, WAIO, Petroleum – Australia	Australia	NGER scheme
Escondida, Pampa Norte	Chile	Green Tax legislation (referencing IPCC factors)
Petroleum – Gulf of Mexico	USA	US EPA GHGRP (US GHGRP)
Potash Canada	Canada	Canadian GHGRP (referencing IPCC factors)
Petroleum – Trinidad	Trinidad	None

Scope 2 emissions – Operated assets

Definition

GHG emissions associated with the third-party generation of electricity consumed in activities under BHP's operational control (MtCO₂-e).

Calculation boundary

We account for GHG emissions arising from our activities under three organisational boundaries, as described in the 'Organisational boundary' section of this document – operational control, financial control and equity share.

For BHP operated assets included in each of these organisational boundaries, we calculate Scope 2 emissions from all electricity supplied.

Calculation methodology

Scope 2 emission factors are expressed as the quantity of GHGs released per unit of electricity generated (e.g. tonnes CO₂-e/megawatt-hour) based on the mix of fuels used in the generation process. BHP's operated facilities record Scope 2 emissions throughout the year by multiplying applicable Scope 2 emission factors by the electricity quantities provided.

Two reporting methods are used for these calculations as recommended by the GHG Protocol Scope 2 Guidance – the market-based method and the location-based method. 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 emissions based on the generators (and therefore the generation fuel mix) from which the reporting company contractually purchases electricity and/or is directly provided electricity via a direct line transfer.
- **Location-based reporting:** Scope 2 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 GHG emissions are equivalent to the market-based GHG emissions.

For market-based reporting, electricity emission factors are sourced directly from the supplier where available. In some instances, 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 location-based emission factor for electricity is used instead, as published in local regulations or industry frameworks.

Residual mix emission factors, to account for grid electricity emissions remaining after removal of quantities directly contracted between parties, are currently unavailable. This may result in double counting of low emissions or renewable electricity contributions across grid-supplied consumers.

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.

Scope 1 and Scope 2 emissions – Non-operated assets

Definition

GHG emissions released directly (Scope 1) and associated with the third-party generation of electricity consumed (Scope 2) at operations in which BHP owns an interest but does not have operational control (MtCO₂-e).

Calculation boundary and methodology

Our equity share and financial control boundary emissions inventories include several operations which are not under our operational control, as described in the BHP Annual Report 2021, available at bhp.com/annualreport.

For these non-operated assets (or interests), we have worked with the relevant operators to obtain GHG emissions data for the FY2021 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 FY2021 using production volumes sourced from the BHP Operational Review for the year.

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

The following table summarises the non-operated assets included, and the data sources used for each. While we have endeavoured to include all our investments with associated GHG emissions, some relevant non-operated interests may not have been identified due to our lack of access to underlying information.

Asset(s) ⁽⁵⁾	Scope 1 and Scope 2 emissions data sources
Australian Petroleum (North West Shelf, Bass Strait)	Provided by operators for FY2021, noting that data remained subject to finalisation for the reporting year
US Petroleum (Atlantis, Mad Dog)	Provided by operators for CY2020; extrapolated to FY2021 based on total petroleum production
Tamakaya – Kelar Power Plant	Provided by the operator for FY2021
Antamina	Provided by the operator for CY2020; extrapolated to FY2021 based on total copper production.
Cerrejón	Provided by the operator for CY2020; extrapolated to FY2021 based on total coal production. Scope 1 and Scope 2 emissions from Cerrejón are only accounted for H1FY2021 due to the effective economic date of 31 December 2020 for sale of BHP's interest in Cerrejón ⁽⁶⁾
ROD Algeria	Provided by operators for FY2021
Solgold Plc	FY2020 GHG emissions levels from annual report published by the operator, assumed to continue at same level in FY2021 (exploration phase, no production)

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; ghgprotocol.org/scope-3-technical-calculation-guidance
- BHP Operational Review for the year ended 30 June 2021; bhp.com/media-and-insights/news-releases/2021/07/bhp-operational-review-for-the-year-ended-30-june-2021/
- Solgold Annual Report 2020; 2020; Solgold Plc; solgold.com.au/wp-content/uploads/2020/09/SolGold-AR20-PDF_FINAL.pdf

Operational GHG emissions (including carbon offsets)

Although we prioritise GHG emission reduction projects, we acknowledge a role for high-quality carbon offsets in a temporary or transitional capacity while abatement options are being studied, as well as for 'hard to abate' GHG emissions with limited or no current technological solutions. In this context, we have taken the decision to retire a quantity of high-quality carbon offsets in FY2021 equivalent to the net increase in our total Scope 1 and Scope 2 emissions from FY2020 to FY2021.

In FY2021, we have calculated an additional operational GHG emissions total for the reporting year which reflects contributions from the retirement of a quantity of carbon offsets. This figure has been calculated by subtracting the number of carbon offsets retired (with each carbon offset representing 1 tonne of CO₂-e reduced or removed from the atmosphere) from the total GHG emissions reported under our operational control boundary for the year.

We do not intend to establish a consistent or ongoing approach to the use of carbon offsets towards delivery of our operational GHG emissions targets and, as such, this carbon offset retirement is not integrated into the FY2021 Scope 1 and Scope 2 emissions totals used to assess performance against these targets. Instead, we may retire offsets as a viable low-cost abatement option during some reporting periods in the short term while we pursue material decarbonisation opportunities with medium- to long-term implementation timeframes. Further detail on our approach to carbon offset use (including information on the projects from which retired carbon offsets were sourced) is provided at bhp.com/offsets-2021 and in the BHP Annual Report 2021, BHP Climate Transition Action Plan 2021 and/or the BHP Climate Change Report 2020 available at bhp.com/climate or bhp.com/annualreport.

(5) Samarco is excluded as operations recommenced in FY2021 and Samarco has not yet published their latest data. Prior year data cannot be extrapolated as it will not reflect Samarco becoming operational in FY2021.

(6) On 28 June 2021, BHP announced its agreement with Glencore to divest its 33.3 per cent interest in Cerrejón with an effective economic date of 31 December 2020. Completion is subject to the satisfaction of customary competition and regulatory requirements and expected to occur in the first half of CY2022.

Operational GHG emissions (Scope 1 and Scope 2) targets

Currently, we have short and medium-term operational GHG emissions reduction targets in place to support achievement of our long-term goal to achieve net zero⁽⁷⁾ operational GHG emissions by 2050.

Operational GHG emissions – short-term target

Our current short-term target is to maintain our total operational GHG emissions (Scope 1 and Scope 2 from our operated assets) at or below FY2017 levels⁽⁸⁾ by FY2022, while we continue to grow our business. While our FY2021 operational GHG emissions are currently higher than FY2017 levels, our asset-level GHG emissions forecasts indicate we are on track to meet our FY2022 target, due particularly to securing the supply of renewable energy for some of our operated assets.

The FY2017 baseline is reviewed annually and adjusted for any material acquisitions and divestments based on the Scope 1 and Scope 2 GHG emissions for the acquired or divested operation in the baseline year. This is required to retain comparability between the baseline year's GHG emissions and future years' GHG emissions. To date, the FY2017 baseline has had one adjustment applied to remove GHG emissions associated with the Onshore US assets, divested in FY2019.

Operational GHG emissions – medium-term target

Our medium-term target is to reduce operational GHG emissions (Scope 1 and Scope 2 from our operated assets) by at least 30 per cent from FY2020 levels⁽⁹⁾ by FY2030. The target year of FY2030 provides scope for realising significant decarbonisation opportunities, while establishing a trajectory to meet our 2050 net zero operational GHG emissions goal.

The baseline year of FY2020 represents the most recently completed operating year (at the time the target was set) from which to measure our performance to FY2030. The FY2020 baseline is reviewed annually and will be adjusted for any material acquisitions and divestments based on the Scope 1 and Scope 2 GHG emissions levels for the acquired or divested operation in the baseline year. This is required to retain comparability between the baseline year's GHG emissions and future years' GHG emissions. There have been no adjustments made to the FY2020 baseline to date.

Note that we do not expect our operational GHG emissions to decrease in a straight-line trajectory from FY2020 to FY2030. This is because the abatement opportunities we are prioritising involve a range of implementation timelines. As such, the timing of resulting GHG emissions intensity reductions may be distributed unevenly across the target period.

Scope 3 emissions categories

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 15 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 GHG emissions sources are deemed critical by key stakeholders or contribute to our risk exposure – we further disaggregate this data as appropriate. For example, in our ESG Standards and Databook 2021 (available at bhp.com/climate) we provide a breakdown of GHG emissions in the *Processing of sold products* and *Use of sold products* categories (categories 10 and 11) according to the major commodities we produce.

Scope 3 goals and targets

For details regarding our Scope 3 goals and targets, please refer to BHP's Climate Transition Action Plan 2021 available at bhp.com/climate.

(7) Net zero includes the use of carbon offsets as required.

(8) FY2017 baseline will be adjusted for any material acquisitions and divestments based on emissions at the time of the transaction. Carbon offsets will be used as required.

(9) FY2020 baseline will be adjusted for any material acquisitions and divestments based on emissions at the time of the transaction. Carbon offsets will be used as required.

Overlap in calculation boundaries

The GHG 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 GHG 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. As a result, some double counting may be inherent due to our position in the value chain and may inflate the total Scope 3 emissions figure reported. This and other double counting of GHG emissions in our current reported Scope 3 inventory is an expected outcome of GHG emissions reporting between the different scopes and is not considered to detract from the overall value of the Scope 3 emissions disclosure.

Note that from FY2021 we have updated our approach to estimating GHG emissions from the processing of iron ore and metallurgical coal in steelmaking, reported under the Scope 3 *Processing of sold products* category. This removes a previously

significant degree of potential double counting of GHG emissions from metallurgical coal across this category and the Scope 3 *Use of sold products* category. The details of this updated approach, as well as other examples of overlapping calculation boundaries, are noted below for the relevant individual GHG emissions categories. A total Scope 3 emissions figure for the Scope 3 emissions inventory has also been reported this year due to the removal of this previously significant double counting of GHG emissions between processing of iron ore and metallurgical coal (noting that a degree of overlap in reporting boundaries still occurs, due to our involvement at multiple points in the life cycle of the commodities we produce and consume, as discussed above).

The sections that follow describe in more detail the calculation boundaries (including any exclusions of particular GHG emissions sources within a category), methodologies, assumptions and references we have used to calculate a GHG emissions estimate for each relevant Scope 3 category for FY2021. For categories where we have not calculated a GHG emissions figure, the rationale behind why we have concluded that the GHG emissions source is not relevant to our business or appropriate to include is provided.

Scope 3 emissions by category	GHG emissions in BHP's value chain (MtCO ₂ -e) ⁽¹⁾		
	FY2021	FY2020	FY2019
Upstream			
1. Purchased goods and services (including capital goods)	8.9	8.8	8.7
2. Capital goods		Not applicable	
3. Fuel and energy related activities	1.1	1.2	1.2
4. Upstream transportation and distribution	3.8	3.8	3.6
5. Waste generated in operations		Not applicable	
6. Business travel	0.1	0.1	0.2
7. Employee commuting	0.4	0.2	0.2
8. Upstream leased assets		Not applicable	
Downstream			
9. Downstream transportation and distribution	3.8	4.0	4.0
10. Processing of sold products			
– GHG emissions from steelmaking	300.5	292.9	283.7
» Iron ore processing to crude steel	260.7	252.8	242.4
» Metallurgical coal processing to crude steel	39.8	40.1	41.3
– Copper processing	5.0	5.2	5.1
Total processing of sold products	305.5	298.1	288.8
11. Use of sold products			
– Energy coal	38.3	56.4	67.0
– Natural gas	19.5	20.6	28.3
– Crude oil and condensates	16.8	17.9	23.3
– Natural gas liquids	1.8	1.9	2.8
Total use of sold products	76.4	96.8	121.4
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)⁽²⁾	2.5	2.6	3.1
Total Scope 3 emissions	402.5	415.7	431.1

(1) FY2019 data includes Discontinued operations (Onshore US) to 31 October 2019 and Continuing operations. Data in italics indicates that data has been adjusted since it was previously reported.

(2) FY2021 Scope 1 and Scope 2 emissions (on an equity basis) from Cerrejón are only accounted for H1FY2021 due to the effective economic date of 31 December 2020 for sale of BHP's interest in Cerrejón. On 28 June 2021, BHP announced its agreement with Glencore to divest its 33.3 per cent interest in Cerrejón. Completion is subject to the satisfaction of customary competition and regulatory requirements and expected to occur in the first half of CY2022.

Scope 3 Standard emissions categories

Category 1: Purchased goods and services (including capital goods)			
Scope 3 Standard category description	Upstream (i.e. cradle-to-gate) GHG 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.		
Calculation status of FY2021 GHG emissions in BHP's value chain	Not material, calculated	FY2021 GHG emissions in BHP's value chain (MtCO₂-e)	8.9
Calculation status rationale	This is not a material source of Scope 3 emissions in BHP's value chain. Despite this, these GHG 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 GHG emissions from their activities. A high-level estimate has been calculated for completeness and transparency.		

Calculation boundary

This category covers GHG 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.

All spend recorded in BHP's internal system for the purchase of goods and services is included in the calculation boundary for this source. Spend which is not associated with the purchase of goods and services is excluded, including intra-company payments, internal payroll, community and charitable donations, and expenses associated with regulatory compliance and taxation.

For BHP, this category includes GHG 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 category.

GHG 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 GHG emissions categories (categories 3, 4, 6 and 7 respectively) as recommended by the Scope 3 Standard. Accommodation related spend has been previously reported under the *Business travel* category, however, has been moved to the *Purchased goods and services* category this year.

Exclusions

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

Category 2: Capital goods			
Scope 3 Standard category description	Upstream (i.e. cradle-to-gate) GHG emissions from the extraction, production and transportation of capital goods purchased or acquired by the reporting company in the reporting year.		
Calculation status of FY2021 GHG emissions in BHP's value chain	Not material, included in the <i>Purchased goods and services</i> category (category 1)	FY2021 GHG emissions in BHP's value chain (MtCO₂-e)	Not applicable
Calculation status rationale	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 our spend data (which includes purchases of capital goods) has been captured in the calculation methodology for category 1, GHG emissions related to purchases of capital goods are not reported separately here. Instead, for BHP's value chain, the GHG emissions reported under category 1 include GHG emissions associated with purchases of capital goods.		

Calculation methodology

The 'spend-based' method as described in the Scope 3 Guidance is used to calculate these GHG 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 GHG emissions estimate for this category. A weighted average emission factor is applied for any remaining uncategorised spend.

Data sources

Annual spend data is extracted from the BHP internal system that tracks 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; ghgprotocol.org/scope-3-technical-calculation-guidance
- GHG Protocol Quantis Scope 3 Evaluator tool; quantis-suite.com/Scope-3-Evaluator/

Category 3: Fuel and energy-related activities

Scope 3 Standard category description	GHG 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.		
Calculation status of FY2021 GHG emissions in BHP's value chain	Not material, calculated	FY2021 GHG emissions in BHP's value chain (MtCO₂-e)	1.1
Calculation status rationale	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 Scope 2 operating emissions; the associated Scope 3 emissions are therefore also of interest.		

Calculation boundary

This category covers GHG 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 onsite 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.

Upstream emissions associated with natural gas burned for energy at our Petroleum operations are excluded from this category as the majority of the natural gas is extracted onsite and therefore included in our Scope 1 emissions.

Note that GHG emissions from the *combustion* of fuels at our facilities are accounted for as our Scope 1 emissions; similarly, GHG 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 other 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 Scope 2 emissions. This is an expected outcome of GHG 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). Refer also to the 'Calculation boundary' section.

Calculation methodology

The 'average-data' method as described in the Scope 3 Guidance is used to calculate these GHG 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 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; ghgprotocol.org/scope-3-technical-calculation-guidance
- National Greenhouse Accounts Factors – August 2021 (Tables 42 to 46); Australian Government Department of Industry, Science, Energy and Resources; 2021; industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-2021

Category 4: Upstream transportation and distribution

Scope 3 Standard category description	GHG 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).		
Calculation status of FY2021 GHG emissions in BHP's value chain	Not material, calculated	FY2021 GHG emissions in BHP's value chain (MtCO₂-e)	3.8
Calculation status rationale	Although this is not a material source of Scope 3 emissions in BHP's value chain, GHG 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 opportunities to influence our suppliers or other service providers to reduce GHG 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 GHG 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 GHG emissions from road, rail and marine freight, where the latter makes up the majority of emissions.

Exclusions

GHG 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 freight cargoes, 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.

BHP requests reporting of fuel consumption values from vessel owners. All fuel consumption values reported to BHP by vessel owners are reviewed to seek to identify missing data and anomalies. If:

- vessel owners have reported load port to discharge port(s) fuel consumption values to BHP that appear (to the extent that can be reasonably determined) complete and consistent, the reported values are used to generate CO₂-e values using fuel emission factors from the British Standards Institution (BSI) EN 16258 standard (or other applicable standards, where appropriate). Laden legs are included for all voyages, whereas ballast legs are also included for vessels under consecutive voyage or time charter
- fuel consumption values are not available, are incomplete or feature anomalies, data is used from a range of publicly and privately available sources, including vessel size, type, cargo quantity and mass, distance travelled, design energy efficiency as estimated by RightShip and historical energy efficiency, to make assumptions and produce estimations of fuel consumption values or CO₂-e values. If fuel consumption values have been estimated, these are subsequently converted into CO₂-e values using fuel emission factors from the BSI EN 16258 standard (or other applicable standards, where appropriate)

Where the cargo in respect of which the estimated GHG emissions data is provided does not utilise the full cargo capacity of a vessel and the unused capacity is utilised and paid for by one or more other entities, GHG emissions estimates are calculated pro rata to the relevant cargo's utilisation of the vessel's total cargo carrying capacity.

For road and rail freight, the 'distance-based' method as described in the Scope 3 Guidance is used to calculate these GHG emissions. GHG emissions are calculated for each cargo by applying the appropriate emission factor to the mass x distance multiplier (e.g. tonne.km) for the voyage.

For purchased transport services for process inputs to our operations, the spend-based method is used to calculate these GHG 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. For each individual product cargo, data includes loading and destination locations and cargo weight (both used for the mass x distance multiplier).

For road and rail freight GHG emissions calculations, online tools (driving distance based on Google Maps [google.com/maps](https://www.google.com/maps)) or published data on rail operator websites are used to estimate the distance covered. 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 freight GHG emissions, sea route distance and emission factors are sourced directly from RightShip.

Where GHG emissions are calculated using the spend-based method, data is sourced from the BHP internal system that tracks 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://www.rightship.com/products/sustainability-products/#CarbonAccounting>
- 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 2021 (Freighting goods); UK Government Department for Business, Energy & Industrial Strategy; June 2021; [gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021](https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021)
- Google Maps [google.com/maps](https://www.google.com/maps)
- GHG Protocol Quantis Scope 3 Evaluator tool; [quantis-suite.com/Scope-3-Evaluator/](https://www.quantis-suite.com/Scope-3-Evaluator/)

Category 5: Waste generated in operations

Scope 3 Standard category description	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.		
Calculation status of FY2021 emissions in BHP's value chain	Not material, not calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	Not applicable
Calculation status rationale	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).		
Calculation status of FY2021 emissions in BHP's value chain	Not material, calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	0.1
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 (car hire etc.) identified from annual spend data.

Exclusions

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

Calculation methodology

Emissions from flights undertaken by employees for business travel are sourced directly from BHP's third-party corporate travel service provider's FY2021 emissions report.

The calculation methodology applied in the report (as stated by the provider) aligns with the latest UK Department for Environment, Food and Rural Affairs (DEFRA) standards for air travel. DEFRA standards consider the distances travelled for domestic, short and long-haul flights in each class of travel (ranging from economy to first-class). Calculations include radiative forcing (RF), a measure of the additional environmental impact of aviation including impacts from emissions of nitrous oxide and water vapour at high altitudes. Scope 3 emissions including RF are determined by multiplying the distance (km) travelled by the appropriate emission factor.

For purchased business travel services, the spend-based method is used to calculate associated emissions, as described in the calculation methodology for the *Purchased goods and services* category (category 1).

Data sources

Emissions from flights undertaken by employees for business travel are sourced directly from BHP's third-party corporate travel service provider's carbon emissions report (see the 'Calculation methodology' section).

Purchased business travel service spend data is extracted from the BHP internal system that tracks external spend.

Emissions factors for business travel 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; ghgprotocol.org/scope-3-technical-calculation-guidance
- GHG Protocol Quantis Scope 3 Evaluator tool; quantis-suite.com/Scope-3-Evaluator/

Category 7: Employee commuting

Scope 3 Standard category description	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).		
Calculation status of FY2021 emissions in BHP's value chain	Not material, calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	0.4
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 chartered fly-in fly-out (FIFO) flights and ground transport services (bus and car fleet services etc.) 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 ground transport spend data is extracted from the BHP internal system that tracks 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; ghgprotocol.org/scope-3-technical-calculation-guidance
- GHG Protocol Quantis Scope 3 Evaluator tool; quantis-suite.com/Scope-3-Evaluator/

Category 8: Upstream leased assets

Scope 3 Standard category description	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.		
Calculation status of FY2021 emissions in BHP's value chain	Not relevant, not calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	Not applicable
Calculation status rationale	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

Scope 3 Standard category description	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).		
Calculation status of FY2021 emissions in BHP's value chain	Not material, calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	3.8
Calculation status rationale	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, where the latter makes up the majority of emissions.

Exclusions

None.

Calculation methodology

For all marine, road and rail freight cargoes, the 'distance-based' method as described in the GHG Protocol Technical Guidance for Calculating Scope 3 Emissions (Scope 3 Guidance) is used to calculate estimated GHG emissions figures. BHP uses data from a range of publicly and privately available data sources, including vessel size, type, cargo, distance travelled or expected to be travelled (noting that BHP is not always aware of the precise discharge port(s) for these cargoes). Where this data is not available, is incomplete or features anomalies, BHP uses reasonable assumptions (for example, an assumption regarding the most likely discharge port) as the basis for its estimations. Emissions are calculated for each cargo by applying the appropriate emission factors from a globally recognised standard (the UK Department for Business, Energy & Industrial Strategy's Greenhouse Gas Reporting: Conversion Factors [Freighting goods]) to the mass of BHP cargo x distance multiplier for the voyage (tonnes.km).

Data sources

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

- 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 type and deadweight (tonnes) or carrying capacity (20-foot equivalent unit or m³) is used to assign the appropriate emission factor. Each vessel was identified in online search tools ([vesseltracking.net](https://www.vesseltracking.net) and [marinetraffic.com](https://www.marinetraffic.com)) to identify the vessel type (e.g. bulk carrier, chemical tanker etc.) and carrying capacity where available. For liquified natural gas (LNG) and liquified petroleum gas (LPG) tankers, carrying capacities were not readily available in the public domain, so the largest vessel size was assumed from the options provided in the emission factor reference source (200,000+ m³ for LNG tankers and 50,000m³+ for LPG tankers).
- For marine freight emissions calculations, online tools ([ports.com](https://www.ports.com) and [marinetraffic.com](https://www.marinetraffic.com)) are used to estimate 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 [google.com/maps](https://www.google.com/maps)) or published data on rail operator websites are used to calculate an estimation of the distance covered.

Assumptions

For some FOB cargoes, destination ports are not known and an assumption is applied based on known product market locations by customer (where the end-customer is known) or based on recent market locations for the commodity.

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; ghgprotocol.org/scope-3-technical-calculation-guidance
- Greenhouse Gas Reporting: Conversion Factors 2021 (Freighting goods); UK Government Department for Business, Energy & Industrial Strategy; June 2021; gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021
- [ports.com](https://www.ports.com)
- Marine traffic: [marinetraffic.com](https://www.marinetraffic.com)
- Vessel tracking: [vesseltracking.net](https://www.vesseltracking.net)
- Google Maps: [google.com/maps](https://www.google.com/maps)

Category 10: Processing of sold products

Scope 3 Standard category description	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.		
Calculation status of FY2021 emissions in BHP's value chain	Material, calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	305.5
Calculation status rationale	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 (by our customers) 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
- metallurgical coal, which is used in the processing of iron ore to steel as a reductant in the chemical reactions, internal structural component and as an energy source
- copper, which is processed to manufacture wire, sheets and tubes for a variety of end uses

Emissions from the third-party processing of these three 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. In this Scope 3 category, 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 Scope 2 emissions. The double counting in this case is estimated to represent less than 2 per cent of the total emissions for this category and is not considered to detract from the value of the Scope 3 emissions reported for this category.

Exclusions

In addition to iron ore, metallurgical coal 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, metallurgical coal 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 reported under the Scope 3 *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.

Carbon emissions relating to steelmaking from processing BHP raw materials are estimated using global average emissions intensity factor tonnes CO₂ per tonne of crude steel for the blast furnace-basic oxygen furnace (BF-BOF) process route sourced from the International Energy Agency (IEA).

The emissions intensity factor is applied to an equivalent crude steel production volume related to the processing of BHP's iron ore and metallurgical portfolio in crude steelmaking. The crude steel equivalent production volume is calculated based on FY2021 iron ore equity production and the average percentage iron (Fe) content in BHP's products, converted to equivalent crude steel quantity using the average content of crude steel from the IEA Iron and Steel CCS Study (April 2013).

The majority of BHP's steelmaking raw materials portfolio (iron ore and metallurgical coal) is sold into and processed through the blast furnace integrated steelmaking route. To resolve the double counting between the iron ore and metallurgical coal inputs into the steelmaking process, BHP estimates the total steelmaking emissions in the processing of our iron ore quantities in steelmaking. The contribution of BHP's metallurgical coal production and required third-party metallurgical coal to total steelmaking emissions is allocated based on the global average mass input into the process sourced from the World Steel Association (WSA).

Refer to Appendix 1 for additional details of calculations for this Scope 3 *Processing of sold products* category, including the mass balance applied.

Assumptions

To estimate emissions from the processing of iron ore, all iron (Fe) content in produced iron ore is assumed to be processed to crude steel via the BF-BOF route. The crude steel equivalent produced is assumed to be attributable to iron ore only and not scrap steel.

The total emissions from steelmaking are apportioned between the iron ore and BHP's metallurgical coal inputs by applying the average ratio of each input required to produce 1,000 kg of crude steel using the WSA's data on the integrated furnace BF-BOF route to the crude steel emission factor. The metallurgical coal portion of the emission factor is applied to emissions from the crude steel equivalent volume produced from BHP's metallurgical coal production. Emissions from third-party metallurgical coal necessary to process BHP's iron ore quantities not covered by BHP's metallurgical coal are included in the emissions allocated to iron ore.

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 a more emissions-intensive process and therefore a more 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 and metallurgical coal processing, key data sources are:

- An industry-average emission factor for the BF-BOF is sourced from the IEA Iron and Steel Technology Roadmap (Oct 2020). 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 crude steel equivalent produced from the input quantity of iron ore is calculated using a conversion factor based on the average iron (Fe) content of BHP iron ore product and the average content of crude steel from IEA Iron and Steel CCS Study (April 2013).
- The global average input mass ratio of metallurgical coal vs iron ore to the BF-BOF steelmaking route is sourced from the Worldsteel publication - *Fact sheet Steel and raw materials*, 2019.

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; ghgprotocol.org/scope-3-technical-calculation-guidance
- BHP Operational Review for the year ended 30 June 2021; BHP; 2021; bhp.com/media-and-insights/news-releases/2021/07/bhp-operational-review-for-the-year-ended-30-june-2021/
- Fact sheet Steel and raw materials, 2019, p.1; World Steel Association; 2019; worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html
- Iron and Steel CCS Study; IEA; 2013; ieaghg.org/publications/technical-reports/reports-list/9-technical-reports/1001-2013-04-iron-and-steel-ccs-study-techno-economics-integrated-steel-mill
- Iron and Steel Technology Roadmap, pg. 43; IEA; 2020; iea.blob.core.windows.net/assets/eb0c8ec1-3665-4959-97d0-187ceca189a8/Iron_and_Steel_Technology_Roadmap.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

Scope 3 Standard category description	Emissions from the end use of goods and services sold by the reporting company in the reporting year.		
Calculation status of FY2021 emissions in BHP's value chain	Material, calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	76.4
Calculation status rationale	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 energy coal, natural gas and other 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. Metallurgical coal is excluded from this category and included in the Scope 3 *Processing of sold products* category to remove the potential double counting of emissions across the two categories, and also to report it together with iron ore, as both commodities serve as inputs into the steelmaking process.

Overlap in calculation boundaries

Emissions reported under this *Use of sold products* category include downstream emissions from the consumption of the energy coal, natural gas and other 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 Scope 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.

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

Assumptions

All energy coal, natural gas and other petroleum products are assumed to be combusted.

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 NGER Measurement Determination published by the Australian government, 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 a more 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; ghgprotocol.org/scope-3-technical-calculation-guidance
- BHP Operational Review for the year ended 30 June 2021; BHP; 2021; bhp.com/media-and-insights/news-releases/2021/07/bhp-operational-review-for-the-year-ended-30-june-2021/
- NGER Measurement Determination 2008 (as amended July 2020) (Schedule 1 Part 1); Australian Government; 2020; legislation.gov.au/Series/F2008L02309
- Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal); globaltechaustralia.com.au/conversion-tools/

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

Scope 3 Standard category description	Emissions from the waste disposal and treatment of products sold by the reporting company in the reporting year at the end of their life.		
Calculation status of FY2021 emissions in BHP's value chain	Not material, not calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	Not applicable
Calculation status rationale	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.		

Category 13: Downstream leased assets

Scope 3 Standard category description	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.		
Calculation status of FY2021 emissions in BHP's value chain	Not relevant, not calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	Not applicable
Calculation status rationale	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

Scope 3 Standard category description	Emissions from the operation of franchises in the reporting year, not included in Scope 1 and Scope 2 reported by franchisor.		
Calculation status of FY2021 emissions in BHP's value chain	Not relevant, not calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	Not applicable
Calculation status rationale	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

Scope 3 Standard category description	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.		
Calculation status of FY2021 emissions in BHP's value chain	Not material, calculated	FY2021 emissions in BHP's value chain (MtCO₂-e)	2.5
Calculation status rationale	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.		

Calculation boundary

This category covers the Scope 1 and Scope 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 FY2021 reporting year are described in the BHP Annual Report 2021 available bhp.com/annualreport and include the Kelar gas-fired power plant in Chile. Additional investments are added, and divestments removed each year as applicable.

Exclusions

Inclusions and exclusions are described in the 'Scope 1 and Scope 2 emissions – Non-operated assets' section.

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 Scope 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; ghgprotocol.org/scope-3-technical-calculation-guidance
- BHP Operational Review for the year ended 30 June 2021; BHP; 2021; bhp.com/media-and-insights/news-releases/2021/07/bhp-operational-review-for-the-year-ended-30-june-2021/
- Solgold Annual Report 2020; 2020; Solgold Plc; solgold.com.au/wp-content/uploads/2020/09/SolGold-AR20-PDF_FINAL.pdf

Glossary⁽¹⁰⁾

Activity data	A quantitative measure of a level of activity that results in GHG emissions. Activity data is multiplied by an energy factor and/or an emission factor to derive the energy consumption and GHG emissions associated with a process or an operation. Examples of activity data include kilowatt-hours (kWh) of electricity used, quantity of fuel used, output of a process, hours equipment is operated, distance travelled and floor area of a building.
Assets	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 processing facilities). Assets include our operated and non-operated assets.
Capital goods	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.
Carbon offsets	The central purpose of a carbon offset for an organisation is to substitute for internal GHG emission reductions. Offsets may be generated through projects in which GHG emissions are avoided, reduced, removed from the atmosphere or permanently stored (sequestration). Carbon offsets are generally created and independently verified in accordance with either a voluntary program or under a regulatory program. The purchaser of a carbon offset can 'retire' or 'surrender' it to claim the underlying reduction towards their own GHG emissions reduction targets or goals or to meet legal obligations.
CO₂ equivalent (CO₂-e)	The universal unit of measurement to indicate the global warming potential (GWP) of each GHG, expressed in terms of the GWP of one unit of carbon dioxide (CO ₂). It is used to evaluate releasing (or avoiding releasing) different GHGs against a common basis.
Continuing operations	Assets/operations/entities that are owned and/or operated by BHP, excluding major assets/operations/entities classified as Discontinued operations.
Cradle-to-gate	All GHG emissions that occur in the lifecycle of purchased products, up to the point of receipt by the reporting company (excluding GHG emissions from sources that are owned or controlled by the reporting company).
Direct emissions	Emissions from sources that are owned or controlled by the reporting company.
Direct use-phase emissions	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'.
Discontinued operations	Major assets/operations/entities that have either been disposed of or are classified as held for sale in accordance with IFRS 5/AASB 5 <i>Non-current Assets Held for Sale and Discontinued Operations</i> .
Downstream emissions	Indirect GHG emissions from sold goods and services. Downstream emissions also include emissions from products that are distributed but not sold (i.e. distributed without receiving payment).
Emission factor	A factor that converts activity data into GHG emissions data (e.g. kg CO ₂ -e emitted per gigajoule (GJ) of fuel consumed, kilogram (kg) CO ₂ -e emitted per kWh of electricity used).
Energy	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.

(10) Definitions provided are based on Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, the Scope 3 Standard and BHP's own definitions.

Energy content factor	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.
Equity share approach	A consolidation approach whereby a company accounts for GHG 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'.
Financial control approach	<p>A consolidation approach whereby a company reports GHG emissions based on the accounting treatment in the company's consolidated financial statements, as follows:</p> <ul style="list-style-type: none"> • 100 per cent for operations accounted for as subsidiaries, regardless of equity interest owned; and • for operations accounted for as a joint operation, the company's interest in the operation <p>It does not report GHG emissions from operations that are accounted for using the equity method in the company's financial statements.</p>
Fugitive emissions	Emissions that are not physically controlled but result from the intentional or unintentional releases of greenhouse gases.
GHG (greenhouse gas) emissions	For BHP reporting purposes, these are the aggregate anthropogenic carbon dioxide equivalent (CO ₂ -e) emissions of carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF ₆). Nitrogen trifluoride (NF ₃) GHG emissions are currently not relevant for BHP reporting purposes.
Global warming potential (GWP)	A factor describing the radiative forcing impact (degree of harm to the atmosphere) of one unit of a given GHG relative to one unit of CO ₂ . BHP currently uses GWP from the Intergovernmental Panel on Climate Change (IPCC) Assessment Report 5 (AR5) across all operated assets with the exception of Minerals Americas, which is using AR4 and will transition to AR5 in FY2022.
Grid	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'.
Indirect emissions	Emissions that are a consequence of the activities of the reporting company, but occur at sources owned or controlled by another company.
Indirect use-phase emissions	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'.
IPCC (Intergovernmental Panel on Climate Change)	The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change.
Lifecycle	Consecutive and interlinked stages of a product system, from raw material acquisition or generation of natural resources to end of life.
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.
Market-based reporting	Scope 2 GHG emissions based on the generators (and therefore the generation fuel mix from which the reporting company contractually purchases electricity and/or is directly provided electricity via a direct line transfer).
Materiality	Concept that individual or the aggregation of errors, omissions and/or misstatements are of sufficient significance as could meaningfully affect the GHG inventory and could influence the intended users' decisions.

Onshore US	BHP's petroleum asset (divested in the 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.
Operational boundaries	The boundaries that determine the direct and indirect emissions associated with operations owned or controlled by the reporting company.
Operational control approach	A consolidation approach whereby a company accounts for 100 per cent of the GHG 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 GHG emissions from operations in which it owns an interest but does not have operational control. Refer also to the definition for 'Equity share approach'.
Operations	Open-cut mines, underground mines, onshore and offshore oil and gas production and processing facilities.
Organisational boundaries	The boundaries that determine the operations owned or controlled by the reporting company, depending on the consolidation approach taken (equity or control approach).
Power purchase agreement (PPA)	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.
Proxy data	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.
Residual mix	The mix of energy generation resources and associated attributes such as GHG 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.
Scope 1 emissions	Scope 1 emissions are direct GHG emissions from operations that are owned or controlled by the reporting company. For BHP, these are primarily emissions from fuel consumed by haul trucks at our operated assets, as well as fugitive methane emissions from coal and petroleum production at our operated assets.
Scope 2 emissions	Scope 2 emissions are indirect GHG emissions from the generation of purchased or acquired electricity, steam, heat or cooling that is consumed by operations that are owned or controlled by the reporting company. BHP's Scope 2 emissions have been calculated using the market-based method using supplier specific emission factors unless otherwise specified.
Scope 3 emissions	Scope 3 emissions are all other indirect GHG emissions (not included in Scope 2) that occur in the reporting company's value chain. For BHP, these are primarily emissions resulting from our customers using and processing the 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 GHG emissions (on an equity basis) from our non-operated joint ventures.
Scope 3 category	One of the 15 types of Scope 3 emissions defined by the Scope 3 Standard.
Scope 3 Guidance	Greenhouse Gas Protocol Technical Guidance for Calculating Scope 3 Emissions.
Scope 3 Standard	The Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.

Secondary data

Data that is not from specific activities within a company's value chain.

Upstream emissions

Indirect GHG emissions from purchased or acquired goods and services.

Value chain

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. Emissions in BHP's value chain refers to BHP's reported Scope 3 emissions inventory (see also the definition for 'Scope 3 emissions').

References

- *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures (June 2017)*; Task Force on Climate-related Financial Disclosures; 2017; [fsb-tcfd.org/publications/final-recommendations-report/](https://www.fsb-tcfd.org/publications/final-recommendations-report/)
- *GHG Protocol Corporate Accounting and Reporting Standard*; WRI/WBCSD; 2004; [ghgprotocol.org/corporate-standard](https://www.ghgprotocol.org/corporate-standard)
- *GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard*; WRI/WBCSD; 2011; [ghgprotocol.org/standards/scope-3-standard](https://www.ghgprotocol.org/standards/scope-3-standard)
- *GHG Protocol Quantis Scope 3 Evaluator tool*; [quantis-suite.com/Scope-3-Evaluator/](https://www.quantis-suite.com/Scope-3-Evaluator/)
- *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; [ghgprotocol.org/scope-3-technical-calculation-guidance](https://www.ghgprotocol.org/scope-3-technical-calculation-guidance)
- *Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal)*; globaltechaustralia.com.au/conversion-tools/
- *Google Maps*; [google.com/maps](https://www.google.com/maps)
- *Greenhouse Gas Reporting: Conversion Factors 2021 (Freighting goods)*; UK Government Department for Business, Energy & Industrial Strategy; 2021; [gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021](https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021)
- *Iron and Steel CCS Study*; IEA; 2013; [ieaghg.org/publications/technical-reports/reports-list/9-technical-reports/1001-2013-04-iron-and-steel-ccs-study-techno-economics-integrated-steel-mill](https://www.ieaghg.org/publications/technical-reports/reports-list/9-technical-reports/1001-2013-04-iron-and-steel-ccs-study-techno-economics-integrated-steel-mill)
- *Iron and Steel Technology Roadmap*; IEA; 2020; [iea.blob.core.windows.net/assets/eb0c8ec1-3665-4959-97d0-187ceca189a8/Iron_and_Steel_Technology_Roadmap.pdf](https://www.iea.blob.core.windows.net/assets/eb0c8ec1-3665-4959-97d0-187ceca189a8/Iron_and_Steel_Technology_Roadmap.pdf)
- *MarineTraffic*; [marinetraffic.com](https://www.marinetraffic.com)
- *National Greenhouse Accounts Factors – August 2021 (Tables 42 to 46)*; Australian Government Department of the Environment and Energy; 2021; [industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-2021](https://www.industry.gov.au/data-and-publications/national-greenhouse-accounts-factors-2021)
- *National Greenhouse and Energy Reporting (NGER) Measurement Determination 2008 (as amended July 2020) (Schedule 1 Part 1)*; Australian Government; 2020; [legislation.gov.au/Series/F2008L02309](https://www.legislation.gov.au/Series/F2008L02309)
- *Ports.com*; [ports.com](https://www.ports.com)
- *RightShip Carbon Accounting*; <https://www.rightship.com/products/sustainability-products/#CarbonAccounting>
- *Sustainability Indicators 2003–2018 (page 1)*; World Steel Association; 2018; [worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html](https://www.worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html)
- *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; [copperalliance.eu/resources/environmental-profile-copper-products-cradle-gate-life-cycle-assessment-copper-tube-sheet-wire-produced-europe/](https://www.copperalliance.eu/resources/environmental-profile-copper-products-cradle-gate-life-cycle-assessment-copper-tube-sheet-wire-produced-europe/)

Appendix

Appendix 1: Processing of sold products calculations

Item	Quantity	Units	Comment
Processing iron ore to steel			
FY2021 iron ore production	225,752,216	dry metric tonnes	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Assumed that production volumes approximate sales volumes; small year-end inventory volumes will be smoothed out over year-on-year calculations. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> BHP Operational Review for the year ended 30 June 2021
Crude steel equivalent	136,601,356	tonnes	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Assumed that all iron ore sold is processed in crude steelmaking together with BHP's metallurgical coal and third-party metallurgical coal.⁽¹¹⁾ Crude steel produced is attributable to iron ore only (not scrap steel). Conversion factor is calculated based on the average iron (Fe) content of BHP iron ore product and the average content of crude steel from IEA Iron and Steel CCS Study (April 2013). <p><i>Reference sources</i></p> <ul style="list-style-type: none"> IEA Iron and Steel CCS Study (April 2013), pg. A3-16 ieaghg.org/publications/technical-reports/reports-list/9-technical-reports/1001-2013-04-iron-and-steel-ccs-study-techno-economics-integrated-steel-mill
Emissions factor	2.20	tonnes of CO ₂ per tonne crude steel cast	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Global average emissions intensity for the BF-BOF processing route. Assumes all Samarco production goes via the BF-BOF Route. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> IEA Iron and Steel Technology Roadmap (Oct 2020), pg. 43. iea.blob.core.windows.net/assets/eb0c8ec1-3665-4959-97d0-187ceca189a8/Iron and Steel Technology Roadmap.pdf.html
FY2021 emissions	260.7	Million tonnes CO ₂ -e (MtCO ₂ -e)	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Iron ore allocation includes Scope 3 emissions from third-party metallurgical coal necessary to process BHP's iron ore and is calculated based on the difference between total steelmaking emissions of 300.5 MtCO₂-e and BHP's metallurgical coal share of 39.8 MtCO₂-e. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> Worldsteel publication - <i>Fact sheet Steel and raw materials</i>, 2019, p.1 worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html
Processing of metallurgical coal to steel			
FY2021 metallurgical coal production	38,876,800	metric tonnes	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Assumed that production volumes approximate sales volumes; small year-end inventory volumes will be smoothed out over year-on-year calculations. BMA produces a small amount of energy coal. This is included in the production figure. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> BHP Operational Review for the year ended 30 June 2021
Crude steel equivalent	49,842,051	tonnes	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Assumed that all metallurgical coal sold is processed in crude steelmaking together with BHP's iron ore. Crude steel produced is attributable to iron ore only (not scrap steel). Conversion factor is based on the average input mass ratio of metallurgical coal of 0.78 tonnes per tonne of crude steel to the BF-BOF steelmaking route. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> Worldsteel publication - <i>Fact sheet Steel and raw materials</i>, 2019, p.1 worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html

(11) BHP produces more iron ore than metallurgical coal. Therefore, additional third-party metallurgical coal is required to process BHP's iron ore globally.

Item	Quantity	Units	Comment
Emissions factor	2.20	tonnes of CO ₂ per tonne crude steel cast	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Global average emissions intensity for the BF-BOF processing route. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> IEA Iron and Steel Technology Roadmap (Oct 2020), pg. 43. iea.blob.core.windows.net/assets/eb0c8ec1-3665-4959-97d0-187ceca189a8/Iron_and_Steel_Technology_Roadmap.pdf.html
FY2021 emissions	39.8	MtCO ₂ -e	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Emissions is allocated based on the ratio of metallurgical vs iron ore to the BF-BOF steelmaking route i.e. 36.3 per cent. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> Worldsteel publication - <i>Fact sheet Steel and raw materials</i>, 2019, p.1 worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html
Manufacturing copper to copper wire			
FY2021 copper production	1,181,715	tonnes	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Assumed that production volumes approximate sales volumes; small year-end inventory volumes will be smoothed out over year-on-year calculations. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> BHP Operational Review for the year ended 30 June 2021
Conversion factor	1.0	tonnes copper feedstock per tonne copper end-use product	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Copper end-use products are generally extruded/reshaped forms of the feedstock metal. A one-to-one conversion is therefore assumed.
Copper end-use product produced	1,181,715	tonnes	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> Assume all copper produced is manufactured into copper wire.
Emissions factor	4.2	tonnes CO ₂ -e per tonne copper wire produced	<p><i>Assumptions</i></p> <ul style="list-style-type: none"> The lifecycle 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. 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 Scope 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. 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. <p><i>References sources</i></p> <ul style="list-style-type: none"> 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
FY2021 emissions	5.0	MtCO ₂ -e	
Processing of sold products total			
FY2021 emissions	305.5	MtCO ₂ -e	

Appendix 2: Use of sold products calculations

Commodity	FY2021 production	Production units	FY2021 production (converted)	Converted production units	Energy content (GJ per production unit)	Energy content of sold products (GJ)	Emissions factor (kg CO ₂ -e per GJ)	Emissions (tonnes CO ₂ -e)
Energy coal⁽¹²⁾	15,711,000	tonnes	15,711,000	tonnes	27	424,197,000	90.24	38,279,537
Comment								
<i>Assumptions</i>								
<ul style="list-style-type: none"> All energy coal produced is bituminous and is combusted. 								
<i>Reference sources</i>								
<ul style="list-style-type: none"> Production: BHP Operational Review for the year ended 30 June 2021 Conversion factor: Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal) Energy content and emission factors: NGER Measurement Determination 2008 (as amended July 2020) (Schedule 1 Part 1); Australian Government; 2020 								
Natural gas	340.6	bcf	9,638,980,000	m ³	0.0393	378,811,914	51.53	19,520,178
Comment								
<i>Assumptions</i>								
<ul style="list-style-type: none"> All natural gas produced is combusted for stationary energy purposes. 								
<i>Reference sources</i>								
<ul style="list-style-type: none"> Production: BHP Operational Review for the year ended 30 June 2021 Conversion factor: Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal) Energy content and emission factors: NGER Measurement Determination 2008 (as amended July 2020) (Schedule 1 Part 1); Australian Government; 2020 								
Crude oil and condensates	38,729,000	barrels	5,282,636	tonnes	45.3	239,303,393	70.2	16,799,098
Comment								
<i>Assumptions</i>								
<ul style="list-style-type: none"> 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. 								
<i>Reference sources</i>								
<ul style="list-style-type: none"> Production: BHP Operational Review for the year ended 30 June 2021 Conversion factor: Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal) Energy content and emission factors: NGER Measurement Determination 2008 (as amended July 2020) (Schedule 1 Part 1); Australian Government; 2020 								
Natural gas liquids (NGLs)	7,313,000	barrels	630,381	tonnes	46.5	29,312,698	61.3	1,796,282
Comment								
<i>Assumptions</i>								
<ul style="list-style-type: none"> Includes LPG and ethane combined. There is no breakdown between the two products available, so conservatively assumed that all NGLs are combusted. 								
<i>Reference sources</i>								
<ul style="list-style-type: none"> Production: BHP Operational Review for the year ended 30 June 2021 Conversion factor: Global Tech Australia – Conversion tables (Table 2 – Petroleum and coal) Energy content and emission factors: NGER Measurement Determination 2008 (as amended July 2020) (Schedule 1 Part 1); Australian Government; 2020 								
Use of sold products total								
FY2021 emissions	76.4 MtCO ₂ -e							

(12) FY2021 Scope 1 and Scope 2 emissions (on an equity basis) from Cerrejón are only accounted for H1FY2021 due to the effective economic date of 31 December 2020 for sale of BHP's interest in Cerrejón. On 28 June 2021, BHP announced its agreement with Glencore to divest its 33.3 per cent interest in Cerrejón. Completion is subject to the satisfaction of customary competition and regulatory requirements and expected to occur in the first half of CY2022.

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