

BHP

**Scopes 1, 2 and 3 GHG
emissions calculation
methodology**

2023

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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 – operational control, financial control and equity share, as described in 'Organisational boundary' under the 'About this document' section of this document.

For BHP's 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.

Market-based reporting:

For market-based reporting, electricity emission factors are sourced directly from the supplier where available, as evidenced by Renewable Energy Certificates (RECs) and/or supplier-provided documentation in line with the Greenhouse Gas Protocol Scope 2 Guidance unless otherwise specified.

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.

The final validation for surrender of the rights to claim GHG emission reductions assigned via the Chilean energy market's Renewable Energy Certificate (REC) system is expected to occur by June 2024 with respect to the FY2023 period, following finalisation by the grid coordinator. As a result, we will re-calculate our Scope 2 emission calculations with respect to Escondida and Pampa Norte following the final validation and restate those figures as part of our annual reporting for FY2024, if required to adjust for any differences identified for the reported Scope 2 market-based position for Escondida and Pampa Norte for FY2023.

A residual mix emission factor (RMF) that meets the GHG Protocol Scope 2 Guidance definition is currently unavailable in the markets where we operate to account for grid electricity GHG emissions remaining after removal of quantities directly contracted between parties. This may result in double counting of renewable or other lower GHG emission electricity contributions across grid-supplied consumers. The Australian Government published a RMF at the end of FY2023. We will review the RMF and its impact on our Scope 2 emission accounting in FY2024.

Location-based reporting:

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.

FY2023 reported operational GHG emissions

Refer to the detailed methodology description for Scopes 1 and 2 emissions above for information about the calculation boundaries, approach to divestments, methodologies, assumptions and references we have used to calculate the Scopes 1 and 2 emissions in the table below. Data has been rounded to the nearest 0.1 MtCO₂-e.

Data in italics indicates that data has been adjusted since it was previously reported. Operational GHG emission intensity has been restated due to a change in methodology for calculating copper equivalent production. For FY2021 to FY2023 copper equivalent production has been calculated based on FY2023 average realised product prices, to allow comparison between years. Production figures used are consistent with operational GHG emission reporting boundaries (i.e. BHP operational control) and are taken on a 100 per cent basis. Previously reported operational GHG emission intensity was 2.2 tCO₂-e/t copper equivalent production in FY2021 and 1.5 tCO₂-e/t copper equivalent production in FY2022. FY2021 and FY2022 percentages of Scope 1 emissions covered under a GHG emissions-limiting regulation have been restated upon confirming that GHG emissions from our Jansen Potash Project were not covered under emissions-limiting regulation for those periods. Previously reported percentages were 81 per cent for FY2021 and 78 per cent for FY2022.

Divestments are our interest in BHP Mitsui Coal (BMC) (sale completed on 3 May 2022) and our Petroleum business (merger with Woodside completed on 1 June 2022).

| Year ended 30 June | | | |
|---|------------|-------------|-------------|
| Operational GHG emissions (MtCO ₂ -e) – on a Total operations basis, unless otherwise indicated | | | |
| | 2023 | 2022 | 2021 |
| Scope 1 emissions | 8.0 | 9.2 | 10.1 |
| Scope 2 emissions | 1.8 | 3.1 | 6.2 |
| Total operational GHG emissions | 9.8 | 12.3 | 16.3 |
| Carbon credits retired | 0.0 | 0.0 | 0.3 |
| Total operational GHG emissions minus retired carbon credits | 9.8 | 12.3 | 16.0 |
| Scope 1 emissions adjusted for divestments | 8.0 | 7.9 | 8.8 |
| Scope 2 emissions adjusted for divestments | 1.8 | 3.0 | 6.1 |
| Total operational GHG emissions adjusted for divestments | 9.8 | 11.0 | 14.9 |
| Scope 2 emissions (location-based) | 3.8 | 4.8 | 5.0 |
| Operational GHG emissions intensity (tCO ₂ -e per tonne of copper equivalent production) | 1.3 | 1.6 | 2.0 |
| Scope 1 emissions covered under GHG emissions-limiting regulation (%) | 81% | 71% | 74% |
| Scope 1 emissions from methane (%) | 15% | 18% | 22% |

Operational GHG emissions (including carbon credits)

The use of carbon credits will be governed by BHP's approach to carbon offsetting described at bhp.com/climate.

Although we prioritise internal GHG emission reduction (structural abatement), we acknowledge a role for high-integrity carbon credits 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 and where access to renewable energy is constrained.

BHP is committed to transparently disclosing the carbon credits we use towards meeting our own climate change targets and goals. Carbon credits and offsetting is not planned for our operational GHG emission reduction medium-term target. However, if our planned abatement projects fail to deliver the expected GHG emission reductions, we retain the flexibility to use high-integrity carbon credits to manage our pathway to FY2030.

In FY2021, we made the decision to retire a quantity of high-quality carbon credits, equivalent to the net increase in our total Scopes 1 and 2 emissions from FY2020 to FY2021 (see the BHP ESG Standards and Databook 2023, available at bhp.com/climate). This retirement was not accounted for as progress against our operational GHG emission reduction medium-term target or long-term goal.

We also calculated an additional operational GHG emission total for the FY2021 reporting year that reflected contributions from the retirement of a quantity of carbon credits. This figure was calculated by subtracting the number of carbon credits retired (with each carbon credit 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 did not retire any carbon credits in FY2022 or FY2023, as reflected in the table above at the start of this 'FY2023 reported operational GHG emissions' section.

Looking beyond FY2030, we may purchase and retire high-integrity carbon credits to offset operational GHG emissions that we have determined cannot be entirely avoided due to technological, physical or financial constraints. These carbon credits may be used to offset GHG emissions and support achievement of our long-term goal. For example, carbon credits may be used to offset fugitive methane emissions considered hard-to-abate.

Our individual operated assets may also be subject to regulated GHG emission thresholds and regional carbon pricing (including GHG emission trading schemes). In cases where our direct GHG emission reductions are not able to meet the requirements specified for these schemes, we may purchase and retire eligible carbon credits to meet our compliance obligations. We do not intend to account for these carbon credits in order to reach our medium-term target.

Operational GHG emissions and energy intensity (copper equivalent)

BHP's energy and GHG emissions intensity with respect to our commodity production is presented on a copper equivalent production basis. The conversion of production data to copper equivalent production is applied so that BHP can present an intensity metric that can include the range of commodities produced by the business.

In FY2023, we changed our methodology for calculating copper equivalent production. Copper equivalent production has been calculated based on FY2023 averaged realised product prices for all years included in FY2023 reporting, to allow for comparison between years.

Production figures used are consistent with energy and GHG emissions reporting boundaries (i.e. BHP operational control) and are taken on a 100 per cent basis where BHP has operational control.

Scopes 1 and 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).

Non-operated assets (or interests) refers to 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.

Calculation boundary and methodology

Our equity share and/or financial control boundary GHG emission inventories include several operations or projects that are not under our operational control, as described in the table opposite.

 Refer to 'Organisational boundary' under the 'About this document' section of this document for a description of our approach

For these non-operated assets (or interests), we have worked with the relevant operators to obtain GHG emission data for the FY2023 reporting year where possible. In cases where the most recent available information was based on a different reporting period (e.g. calendar year), we have used the data provided to estimate FY2023 emissions based on a review of operational conditions and activities across the reporting periods, as detailed in the table opposite.

The non-operated assets/interests' GHG emissions dataset was also used to calculate Scope 3 emissions based on an equity boundary (investments source), as discussed in Scope 3, Category 15 Investments.

The following table summarises the non-operated assets, 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. Refer to previous years' versions of this methodology document for emission data sources relevant to historical years (and divestments).

| Asset(s) | Scopes 1 and 2 emission data sources |
|--|---|
| Tamakaya Energia SpA – Kelar Power Plant | <p>Provided by the operator for FY2023, noting that data remains subject to finalisation for the reporting year and includes:</p> <ul style="list-style-type: none"> GHG emissions associated with Kelar Power Plant generation that was sold to the grid GHG emissions associated with spot power purchases under Scope 2 updates to data that was provisional for the FY2022 reporting year. |
| Antamina | <p>Provided by the operator for FY2023, noting that data remains subject to finalisation for the reporting year.</p> |
| Samarco | <p>Production recommenced in January 2021. Provided by the operator for CY2022, and assumed to continue at the same level for the full FY2023 reporting year, noting that data remains subject to finalisation for the reporting year.</p> |
| Solgold Plc | <p>Exploration phase; no production. Based on FY2022 GHG emission levels from the Annual Report published by the operator, and assumed to continue at same level for the full FY2023 reporting year.</p> |

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
- Solgold Annual Report 2022; Solgold Plc; 2022; SolGold-Annual-Report-2022.pdf (wp-solgold-2021.s3.eu-west-2.amazonaws.com/media/2022/10/SolGold-Annual-Report-2022.pdf)

Scope 3 emissions

Scope 3 emission 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 emission 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 2023 (available at bhp.com/climate) we provide a breakdown of GHG emissions in the Category 10 Processing of sold products and Category 11 Use of sold products categories according to the major commodities we produce.

Comparing progress in Scope 3 emission reduction between years should consider the role that divestments played in the reduction of GHG emissions. Data excludes divestments from the completion date or effective economic date (as applicable) of the divestment. Divestments reflected in the table below include the merger of our Petroleum business with Woodside (completed on 1 June 2022), divestment of our interest in the ROD Integrated Development (completed in April 2022), divestment of our interest in BMC (completed on 3 May 2022) and divestment of our interest in Cerrejón (with an effective economic date of 31 December 2020). The most material changes between years occurred in Category 11 and Category 15. To further aid in comparability between years, we disclose total Scope 3 emissions adjusted for divestments. Only associated downstream Scope 3 emissions from Category 11 Use of sold products and Category 15 Investments' have been removed to generate this illustrative total, noting that

other categories have not been adjusted for divestments due to complexity of underlying data.

Overlap in Scope 3 calculation boundaries

The GHG emission categories defined by the Scope 3 Standard are designed to be mutually exclusive so 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 emission figure reported. However, the potential for double counting is likely to have been substantially reduced following the divestment of the Petroleum business in FY2022. Some 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.

FY2023 reported Scope 3 emissions continued

Value chain GHG emission (Scope 3) reduction targets and goals

For definition of the terms used to express our GHG emission reduction targets and goals, including 'target', 'goal', 'net zero' and 'carbon neutral' refer to the Glossary later in this document. The target or goal baseline (if applicable) is reviewed annually and adjusted to reflect any progressive refinement of Scope 3 emission reporting methodologies.

 **The use of carbon credits will be governed by BHP's approach to carbon offsetting described at bhp.com/climate**

 **For more information on performance against our value chain GHG emission reduction targets and goals, refer to the BHP Annual Report 2023 available at bhp.com/climate**

| Timeframe | Description | Methodology |
|---|--|---|
| Scope 3, Category 10, Processing and use of sold iron ore and metallurgical coal | | |
| Medium-term goal | Steelmaking: Support industry to develop technologies and pathways capable of 30 per cent emission intensity reduction in integrated steelmaking, with widespread adoption expected post-2030. | <ul style="list-style-type: none"> – Goal period: FY2020 to CY2030 – Goal type/Goal percentage reduction: Not applicable – Goal setting method: Qualitative. Tracked based on the financial value (US\$) we commit in collaborative partnerships and venture capital investments with the aim to support industry to develop technologies and pathways capable of reduction in GHG emissions intensity in integrated steelmaking of at least 30%. – Progress: Refer to Value chain GHG emission reductions, in the BHP Annual Report 2023 Operating and Financial Review 6.12 available at bhp.com/climate. |
| Scope 3, Category 4, Maritime transport | | |
| Medium-term goal | Shipping: Support 40 per cent emission intensity reduction of BHP-chartered shipping of BHP products. | <ul style="list-style-type: none"> – Goal period: CY2008-CY2030 – Goal type: Intensity – Goal percentage reduction: 40% – Goal setting method: Set as a point in time, i.e. with the specific date of 'by CY2030' for our goal to support a 40% GHG emissions intensity reduction of BHP-chartered shipping of BHP products, while reflecting the challenges and uncertainty and our inability (as BHP alone) to ensure Scope 3 emission reductions. As a result, the goal is not based on a trajectory and does not imply a specific carbon budget, and so Scope 3 emissions may fluctuate (with some increases and/ or non-linear decreases) during the period before the goal date. – Boundary: GHG emissions from maritime transportation not owned or operated by BHP, but chartered and paid for by BHP, where the transportation was of products sold by BHP. In some cases, the goal's boundary may differ from required reporting boundaries. – Calculation method: Average gCO₂-e per deadweight tonne per nautical mile (gCO₂-e/dwt/nm), weighted based on International Maritime Organisation (IMO) defined vessel size ranges utilised by BHP during the time period, using a well-to-wake CO₂-e emission factor from British Standards Institution EN 16258 standard. – Baseline method: IMO 2008 average gCO₂ per deadweight tonne per nautical mile, weighted based on IMO-defined vessel size ranges utilised by BHP during the baseline period (excluding for commodities no longer in BHP's portfolio), using IMO's CO₂ emission factor subsequently converted to a well-to-wake CO₂-e emission factor from British Standards Institution EN 16258 standard. CY2008 was selected as the baseline year for this goal to align with the base year for the IMO's 2030 emissions intensity goal and its corresponding reasoning and strategy. – Key adjustments made to baseline and subsequent data: We are reviewing our approach to baseline adjustments for material acquisitions and divestments for our Scope 3 targets and goals and may calculate and report adjusted baselines in future reports. – GHG gases included: CO₂, CH₄, N₂O – Carbon credits and offsetting: Not planned but will be periodically reassessed. – Progress: Refer to Value chain GHG emission reductions, in the BHP Annual Report 2023 Operating and Financial Review 6.12 available at bhp.com/climate. |

| Timeframe | Description | Methodology |
|--|--|--|
| Scope 3 | | |
| Long-term goal | Pursue the long-term goal of net zero Scope 3 GHG emissions by 2050. Achievement of this goal is uncertain, particularly given the challenges of a net zero pathway for our customers in steelmaking, and we cannot ensure the outcome alone. | <ul style="list-style-type: none"> – Goal period: FY2020-CY2050 – Goal type: Absolute – Goal setting method: Set as a point in time, i.e. with the specific date of 'by CY2050' to reach the goal of net zero Scope 3 GHG emissions, while reflecting the challenges and uncertainty and our inability (as BHP alone) to ensure Scope 3 emission reductions. As a result, the goal is not based on a trajectory and does not imply a specific carbon budget, and so Scope 3 emissions may fluctuate (with some increases and/or non-linear decreases) during the period before the goal date. – Boundary: Total reported Scope 3 emissions are estimated on an equity basis for downstream GHG emissions. For the upstream GHG emissions component, the boundary is defined on a category-by-category basis due to data limitations. – Key adjustments made to baseline and subsequent data: Baseline and performance data has been restated where methodology changes have been made to previously reported GHG emissions, but has not been adjusted for our divestments (except to exclude data from the date of the divestment). We are reviewing our approach to baseline adjustments for material acquisitions and divestments for our Scope 3 targets and goals and may calculate and include adjusted baselines in future reports. – GHG gases included: Gases currently included in Scope 3 emission measurement are defined by the available data which differs by Scope 3 category. We intend to continue to improve our GHG emission calculations over time to encompass specific greenhouse gases as data becomes available. – Carbon credits and offsetting: Not planned, but will be periodically reassessed. – Progress: Refer to Value chain GHG emission reductions, in the BHP Annual Report 2023 Operating and Financial Review 6.12 available at bhp.com/climate. |
| Scope 3, Category 1, 3, 6 and 7 (subset) | | |
| Long-term target | Suppliers: Target net zero by 2050 for the operational GHG emissions of our direct suppliers. Ability to achieve the target is subject to the widespread availability of carbon neutral solutions to meet our requirements, including low/zero GHG emission technologies, fuels, goods and services. | <ul style="list-style-type: none"> – Target period: FY2020 to CY2050 – Target type: Absolute – Target setting method: Set as a point in time, i.e. with the specific date of 'by CY2050' to reach the target of net zero for the operational GHG emissions of our direct suppliers, while reflecting the challenges and uncertainty and our inability (as BHP alone) to ensure Scope 3 emission reductions. As a result, the target is not based on a trajectory and does not imply a specific carbon budget, and Scope 3 emissions may fluctuate (with some increases and/or non-linear decreases) during the period before the target date. – Boundary: Scopes 1 and 2 emissions of our direct suppliers included in BHP's reported Scope 3 reporting categories of purchased goods and services (including capital goods), fuel- and energy-related activities, business travel and employee commuting. In some cases, the target's boundary may differ from required reporting boundaries. – Key adjustments made to baseline and subsequent data: Baseline and performance data has been restated where methodology changes have been made to previously reported GHG emissions, but has not been adjusted for our divestments. We are reviewing our approach to baseline adjustments for material acquisitions and divestments for our Scope 3 targets and goals and may calculate and include adjusted baselines in future reports. – GHG gases included: Gases currently included in Scope 3 emission measurement are defined by the available data, which differs by Scope 3 category. We intend to continue to improve our GHG emission calculations over time to encompass specific greenhouse gases as data becomes available. – Carbon credits and offsetting: Not planned but will be periodically reassessed. – Progress: Refer to Value chain GHG emission reductions, in the BHP Annual Report 2023 Operating and Financial Review 6.12 available at bhp.com/climate. |
| Scope 3, Category 4 and 9, Maritime transport | | |
| Long-term target | Shipping: Target net zero by 2050 for the GHG emissions from all shipping of BHP products. Ability to achieve the target is subject to the widespread availability of carbon neutral solutions to meet our requirements, including low/zero GHG emission technologies, fuels, goods and services. | <ul style="list-style-type: none"> – Target period: FY2020-CY2050 – Target type: Absolute – Target setting method: Set as a point in time, i.e. with the specific date of 'by CY2050' to reach the target of net zero GHG emissions from all shipping of BHP products, while reflecting the challenges and uncertainty and our inability (as BHP alone) to ensure Scope 3 emission reductions. As a result, the target is not based on a trajectory and does not imply a specific carbon budget, and Scope 3 emissions may fluctuate (with some increases and/or non-linear decreases) during the period before the target date. – Boundary: GHG emissions from maritime transportation not owned or operated by BHP where the transportation is of BHP products. May be BHP-chartered or third party-chartered. Excludes transportation of products purchased by BHP. In some cases, the target's boundary may differ from required reporting boundaries. – Key adjustments made to baseline and subsequent data: No adjustments have been made for methodology changes or our divestments. We are reviewing our approach to baseline adjustments for material acquisitions and divestments for our Scope 3 targets and goals and may calculate and include adjusted baselines in future reports. – GHG gases included: CO₂, CH₄, N₂O – Carbon credits and offsetting: not planned but will be periodically reassessed. – Progress: Refer to Value chain GHG emission reductions, in the BHP Annual Report 2023 Operating and Financial Review 6.12 available at bhp.com/climate. |

FY2023 reported Scope 3 emissions continued

FY2023 Scope 3 Standard emission 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 FY2023 GHG emissions in BHP's value chain | Material, calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) | 9.1 |
| Calculation status rationale | From a quantitative perspective, this is not a materially large source of Scope 3 emissions for BHP on a whole-of-Group basis. However, Scope 3 emissions from this category are considered a material part of our non-ferrous metals (copper and nickel) value chains. In addition, we set a Scope 3 2050 procurement target in CY2021 that covers some of the emissions in this category. We therefore consider this category material and relevant as emissions in this category may contribute to the exposure of our business to climate-related risk. | | |

Calculation boundary

This category covers GHG emissions generated upstream of BHP's operations associated with the extraction and/or production of goods and services purchased or acquired by BHP during the reporting year. The transport of goods and services to BHP may be included in this category when we do not have a reliable way to estimate it separately.

All spend recorded in BHP's internal system for the purchase of goods and services, excluding spend on categories that do not have attributable emissions, is included in the calculation boundary for this source. Spend that 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 (where discernible), business travel and employee commuting are not included in this category. These are assigned to separate GHG emission categories (Categories 3, 4, 6 and 7 respectively) as recommended by the Scope 3 Standard.

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.

Calculation methodology

GHG emission estimates for 'high-spend goods' from select categories (including explosives, grinding media, conveyor belts, tyres, and select bulk materials) are developed using industry average, quantity-based emission factors or emission factors sourced directly from suppliers. This accounted for 2 per cent of Scope 3 emissions reported under this category. For 'high-spend goods' from select categories, we also estimated the emissions associated with the transport of those goods to BHP, which we reported under the Scope 3 'Upstream transport and logistics' category.

For remaining purchased goods and services (i.e. other than select 'high-spend goods'), we use the 'spend-based' method, as described in the Scope 3 Guidance, 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). For each reporting year, an inflation correction value (calculated using consumer price index data from the US Bureau of Labor Statistics) is applied to the emission factors sourced from the GHG Protocol Quantis Scope 3 Evaluator tool. Adjusted-for-inflation emission factors 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.

Emission factors for spend-based categories are sourced from the Quantis tool and adjusted for inflation using consumer price index data from the US Bureau of Labor Statistics.

Annual invoice data is extracted from BHP internal systems for specific vendors and specific material categories to calculate the quantity-method.

Emission factors for quantity-based categories are sourced from industry-average Life-Cycle Analysis (LCA) databases (EconInvent and AusLCA) or supplier-specific LCA reports.

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; 2022; quantis-suite.com/Scope-3-Evaluator/
- US Bureau of Labor Statistics <https://www.bls.gov/cpi/data.htm>

| 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 FY2023 GHG emissions in BHP's value chain | Material, included in the 'Purchased goods and services' category (Category 1) | FY2023 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 'Purchased goods and services' 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. | | |

| 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 FY2023 GHG emissions in BHP's value chain | Material, calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) | 2.4 |
| Calculation status rationale | From a quantitative perspective, this is not a materially large source of Scope 3 emissions for BHP on a whole-of-Group basis. However, we set a Scope 3 2050 procurement target in 2021 that covers some of the emissions in this category. We therefore consider this category material. Additionally, consumption of fuels and energy represent a material contribution to our Scopes 1 and 2 operating emissions; the associated Scope 3 emissions are therefore relevant. | | |

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.

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.

Exclusions

Upstream emissions from a small quantity of energy consumed that is reported internally under a mixed other category (representing less than 2 per cent of total energy consumed) are excluded. This is 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). For more information, refer to the Calculation boundary section above.

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 GHG emission 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 Climate Change, Energy, the Environment and Water available at the time of the calculations.

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.

In FY2023, we updated the emission factor used for calculating distillate and gasoline emissions in Category 3 after a more accurate emission factor was published in the National Greenhouse Accounts Factors (2022). This new emission factor was applied to FY2020 to FY2023 data.

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 2022 (Tables 1 to 7); Australian Government Department of Climate Change, Energy, Environment and Water; 2023; www.dceew.gov.au/sites/default/files/documents/national-greenhouse-accounts-factors-2022.pdf

FY2023 reported Scope 3 emissions continued

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 FY2023 GHG emissions in BHP's value chain | Material, calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) 4.4 |
| Calculation status rationale | From a quantitative perspective, this is not a materially large source of Scope 3 emissions for BHP on a whole-of-Group basis. However, GHG 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. We have also established a 2030 goal and 2050 target for the maritime portion of this category of Scope 3 emissions. Therefore, we consider this category material and relevant. | |

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, DNV's Veracity – a data platform used to collate, validate and report vessel GHG emissions under regulatory and voluntary schemes – was used to develop a Scope 3 emission estimate based on its accredited verification methodology.

BHP requests reporting of fuel consumption values from vessel owners. All fuel consumption values reported to BHP by vessel owners are systematically assessed 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 emissions estimates using fuel emission factors from the British Standards Institution (BSI) EN 16258 standard.

Where fuel consumption values are unavailable, incomplete or appear anomalous, vessel-specific and voyage-specific data is sourced from a range of publicly and privately available sources to generate fuel consumption estimates instead, applying assumptions where required. Estimated fuel consumption values are then converted into emissions using fuel emission factors from the BSI EN 16258 standard as above. In some cases, an additional assumption is applied to appropriately account for BHP's share of GHG emissions associated with the 'unused' carrying capacity of partially loaded container ships.

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.

For 'high-spend goods' that were moved to quantity-based emission factors in FY2022 (as discussed in the 'Purchased goods and services' section of this document), emissions for transport of goods to our operations are estimated for each product based on the distance travelled via sea and road. BHP is not always aware of the precise discharge port(s) for these cargoes. Where required, BHP uses reasonable assumptions (for example, an assumption regarding the most likely discharge port) to estimate distance

travelled. Emissions are then calculated by applying the emission factors for container shipping and Heavy Goods Vehicles (HGV) sourced from the most recent version of Greenhouse Gas Reporting Conversion Factors (published by the UK Government) available at the time of the calculations.

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.

For road and rail freight GHG emission 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. Emission factors on a mass x 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 geolocational positions, distances and speed are calculated by DNV's Veracity platform.

Where GHG emissions are calculated using the spend-based method, data is sourced from the BHP internal system that tracks external spend. Emission factors are sourced from the Quantis tool and adjusted for inflation using consumer price index data from the US Bureau of Labor Statistics, as described for the 'Purchased goods and services' category.

For 'high-spend goods' (as discussed in the 'Purchased goods and services' category), distance travelled is estimated using Google Maps and Sea Distance Calculator. Emission factors 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.

References

- Veracity; DNV; 2023; dnv.com/data-platform/index.html
- DCS verification; DNV; 2023; dnv.com/maritime/insights/topics/dcs/index.html
- 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
- BS EN 16258; BSI; British Standards Institution (BSI);2012; knowledge.bsigroup.com/products/methodology-for-calculation-and-declaration-of-energy-consumption-and-ghg-emissions-of-transport-services-freight-and-passengers/standard
- Greenhouse Gas Reporting: Conversion Factors 2022 (Freighting goods); UK Government Department for Business, Energy & Industrial Strategy; June 2022; gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022
- Google Maps; [google.com/maps](https://www.google.com/maps)
- GHG Protocol Quantis Scope 3 Evaluator tool; Quantis; 2022; quantis-suite.com/Scope-3-Evaluator/
- Sea Distance Calculator, Ship Traffic Net;2012; [shiptraff.net/2001/05/sea-distances-calculator.html](https://www.shiptraff.net/2001/05/sea-distances-calculator.html)
- US Bureau of Labor Statistics <https://www.bls.gov/cpi/data.htm>

| 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 FY2023 GHG emissions in BHP's value chain | Not material, not calculated | FY2023 GHG 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. Spend associated with waste related utility services would be captured as part of reporting for Category 1 Purchased goods and services (including capital goods). 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 FY2023 GHG emissions in BHP's value chain | Material, calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) | 0.1 |
| Calculation status rationale | From a quantitative perspective, this is not a materially large source of Scope 3 emissions for BHP on a whole-of-Group basis. However, we set a Scope 3 2050 procurement target in 2021 that covers some of the emissions in this category. We therefore consider this category material and a high-level estimate has been calculated for transparency. | | |

Calculation boundary

This category covers emissions from domestic and international flights undertaken by employees for business travel purposes, as well as other purchased business travel services (e.g. car hire) 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 FY2023 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.

Emission factors for business travel spend are sourced from the Quantis tool and adjusted for inflation using consumer price index data from the US Bureau of Labor Statistics, 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;2022; quantis-suite.com/Scope-3-Evaluator/
- US Bureau of Labor Statistics <https://www.bls.gov/cpi/data.htm>

FY2023 reported Scope 3 emissions continued

| 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 FY2023 GHG emissions in BHP's value chain | Material, calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) | 0.2 |
| Calculation status rationale | From a quantitative perspective, this is not a materially large source of Scope 3 emissions for BHP on a whole-of-Group basis. However, we set a Scope 3 2050 procurement target in 2021 that covers some of the emissions in this category. We therefore consider this category material and a high-level estimate has been calculated for transparency. | | |

Calculation boundary

This category covers emissions from chartered fly-in fly-out (FIFO) flights and ground transport services (e.g. bus and car fleet services) utilised by employees for commuting purposes.

Exclusions

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

Calculation methodology

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

Data sources

Charter flight and ground transport spend data is extracted from the BHP internal system that tracks external spend.

Emission factors are sourced from the Quantis tool and adjusted for inflation using consumer price index data from the US Bureau of Labor Statistics, 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; 2022; quantis-suite.com/Scope-3-Evaluator/
- US Bureau of Labor Statistics <https://www.bls.gov/cpi/data.htm>

| 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 Scopes 1 and 2 reported by lessee. | | |
| Calculation status of FY2023 GHG emissions in BHP's value chain | Not relevant, not calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) | Not applicable |
| Calculation status rationale | An emissions figure is not calculated for this category as, under BHP's selection of the operational control approach to boundaries, emissions from any upstream leased assets we control are included in our Scope 1 emissions inventory. 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 FY2023 GHG emissions in BHP's value chain | Material, calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) | 2.8 |
| Calculation status rationale | From a quantitative perspective, this is not a materially large source of Scope 3 emissions for BHP on a whole-of-Group basis. However, GHG 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. We have also established a 2030 goal and 2050 target for the maritime portion of this category of Scope 3 emissions. Therefore, we consider this category material and relevant. | | |

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), Ex Works (EXW) 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 freight cargoes, DNV's Veracity – a data platform used to collate, validate and report vessel GHG emissions under regulatory and voluntary schemes – was used to develop a Scope 3 emission estimate based on its accredited verification methodology.

Where fuel consumption values are unavailable, incomplete or appear anomalous, vessel-specific and voyage-specific data is used from a range of publicly and privately available sources. DNV uses these sources to make assumptions and produce estimations of fuel consumption values. Estimated fuel consumption values are then converted into CO₂-e using fuel emission factors from the BSI EN 16258 standard.

For all 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 emission figures. BHP uses data from a range of publicly and privately available data sources, including vehicle type, cargo, distance travelled or expected to be travelled – noting that BHP is not always aware of the precise discharge location(s). Where required, BHP uses reasonable assumptions (for example, an assumption regarding the most likely discharge location) as the basis for estimations. Emissions are calculated 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 each trip (tonnes.km).

Data sources

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

For road and rail freight categories, emission factors on a mass x 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. 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. Vehicle types are assigned with internal knowledge of typically used vehicles and loading for each commodity and location.

For marine freight cargoes, sea route geolocational positions, distances and speed are calculated by DNV's Veracity platform.

Assumptions

For some FOB cargoes, destination ports are not known and DNV's Veracity uses AIS (i.e. publicly reported geolocational tracking data) to derive the first destination port within the intended destination country.

References

- Veracity; DNV; 2023; [dnv.com/data-platform/index.html](https://www.dnv.com/data-platform/index.html)
- DCS verification; DNV; 2023; [dnv.com/maritime/insights/topics/dcs/index.html](https://www.dnv.com/maritime/insights/topics/dcs/index.html)
- 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](https://www.ghgprotocol.org/scope-3-technical-calculation-guidance)
- BS EN 16258; BSI; British Standards Institution (BSI);2012; [knowledge.bsigroup.com/products/methodology-for-calculation-and-declaration-of-energy-consumption-and-ghg-emissions-of-transport-services-freight-and-passengers/standard](https://www.knowledge.bsigroup.com/products/methodology-for-calculation-and-declaration-of-energy-consumption-and-ghg-emissions-of-transport-services-freight-and-passengers/standard)
- Greenhouse Gas Reporting: Conversion Factors 2022 (Freighting goods); UK Government Department for Business, Energy & Industrial Strategy; June 2022; [gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022](https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022)
- Google Maps; [google.com/maps](https://www.google.com/maps)

FY2023 reported Scope 3 emissions continued

| 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 FY2023 GHG emissions in BHP's value chain | Material, calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) | 313.2 |
| Calculation status rationale | Along with the Use of sold products 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 assumed (for the purposes of estimated downstream Scope 3 emissions) to be processed into steel. This is recognised as being an emissions-intensive process that is technologically difficult to decarbonise.
- metallurgical coal, which is assumed to be used in the processing of iron ore to steel as a reductant in the chemical reactions, an internal structural component and as an energy source.
- copper, which we split into two product segments for the purposes of estimated downstream Scope 3 emissions: (1) copper concentrates that are processed into cathodes by third parties; and (2) our own copper cathodes, which are assumed to be processed into copper semi-fabricated products.
- nickel, which we split into four product segments based on sales data, for the purposes of estimated downstream Scope 3 emissions: (1) our nickel intermediates that go to third-party refiners; (2) nickel metal that goes into stainless steel and alloys production; (3) nickel metal that goes into nickel sulphate (NiSO₄) for battery value chains; and (4) BHP's NiSO₄ that goes directly into battery precursor material production.

Overlap in calculation boundaries

We have endeavoured to develop our emission calculation methodologies for copper and nickel to a level of granularity that allows us to remove the double counting of our Scopes 1 and 2 emissions. However, for BHP, Scope 3 emission reporting necessarily requires 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.

Exclusions

In addition to iron ore, metallurgical coal, copper and nickel, BHP also produces zinc, molybdenum, gold, silver, cobalt, 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 their associated emissions) are not significant compared to those for iron ore, metallurgical coal, copper and nickel. As a result, emissions from the downstream processing of these products have been excluded at this stage. This exclusion 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.

Steelmaking (iron ore and metallurgical coal processing)

Carbon emissions relating to steelmaking from processing BHP raw materials are estimated using the global average emissions intensity factor of 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 emission 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 FY2023 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 for iron ore and metallurgical coal processing, including the mass balance applied.

Copper processing:

To estimate emissions from the processing of both copper concentrates and copper cathodes, we apply industry-wide average emission factors to the production volumes of the respective products. These are sourced from recent studies conducted by the International Copper Association (ICA) and the Copper Council.

Nickel processing:

For nickel products, we apply industry average emission factors for each product segment to the production volumes for each segment as defined above, sourced from LCA analysis done by the Nickel Institute (2021), or from third party analysis, including CRU and BloombergNEF. Production volumes are allocated to each product segment based on internal sales information. There is a small differential between production volumes and sales volumes resulting from inventory movements. For more information, refer to the Data sources section below.

Assumptions

Steelmaking (iron ore and metallurgical coal processing)

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.

Copper processing

All copper cathode is assumed to be manufactured into semi-fabricated products. As copper semi-fabricated products are generally extruded/reshaped forms of the feedstock metal, a one-to-one mass conversion factor is assumed.

All copper concentrate is assumed to be processed into copper cathode.

For more information, refer to the Data sources section below.

Nickel processing

For nickel products going into stainless steel production, we assume a nickel content of 8 per cent in series 304 (SAE 304) stainless steel.

For NiSO₄ going into precursor cathode active material production (PCAM), we assumed the nickel content and manufacturing emissions intensity of the NCM 811 type cathode material used for lithium-ion batteries (nickel:cobalt:manganese at a ratio of 8:1:1).

For nickel products going into NiSO₄ production, we assume a powder dissolution process specific to battery supply chains.

For more information, refer to the Data sources section below.

Data sources

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

Steelmaking (iron ore and metallurgical coal processing)

- 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. However, it is considered 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*.

Copper processing

- Concentrate to cathode refining by third parties: An industry average emission factor is sourced from the 2022 ICA Global Copper Decarbonization Roadmap (GCDR) Compendium.
- Cathode to semi-fabricated copper products: An indicative industry average emission factor has been developed by dividing the total 2021 global emissions from this activity (as calculated by the ICA) by the total 2021 global production of semi-fabricated copper production (sourced from the Copper Council).

Nickel processing

- Nickel intermediates to third party refiners: Assumed the global industry average emission factor of conversion of nickel concentrates to nickel metal sourced from the Nickel Institute's LCA analysis. Only emissions associated with the primary extraction and refining portions of the overall process are used.
- Nickel metal going into stainless steel and alloys: ISSF industry-average emission factor for stainless steel (SS), and average 8 per cent Ni content in series 304 SS sourced from the Nickel Institute. We were not able to source emission factors for conversion to alloys so have generalised those volumes into the stainless steel category.
- Nickel metal going into NiSO₄ for the battery sector: China grid emissions intensity factors and process inputs assumptions from the CRU Market Analysis Group are used in estimation of emissions from the powder dissolution process. Nickel content of NiSO₄ for batteries is based on BHP's FY2023 product assay.
- NiSO₄ going directly into battery PCAM: NMC811 precursor manufacturing emissions are sourced from BloombergNEF, with assumed nickel content (mass ratio) of NMC811 precursor active material sourced from IDTechX.

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 2023; BHP; 2023; bhp.com/-/media/documents/media/reports-and-presentations/2023/230720_bhpoperationalreviewfortheyearended30june2023.pdf
- Fact sheet Steel and raw materials; World Steel Association; 2019; worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html
- Iron and Steel CCS Study; IEA; 2013; ieahghg.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
- Semis Production and Demand; Copper Council; 2021; coppercouncil.org/wp-content/uploads/2021/10/Semis-Production-and-Demand.xlsx
- Nickel life cycle data; Nickel Institute; 2022; nickelinstitute.org/en/policy/nickel-life-cycle-management/nickel-life-cycle-data/
- Stainless Steel: the Role of Nickel; Nickel Institute; 2022; nickelinstitute.org/en/about-nickel-and-its-applications/stainless-steel/

FY2023 reported Scope 3 emissions continued

| 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 FY2023 GHG emissions in BHP's value chain | Material, calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) | 37.0 |
| Calculation status rationale | Along with the 'Processing of sold products' category (Category 10), this is a material source of Scope 3 emissions in BHP's value chain. | | |

Calculation boundary

BHP produces energy coal which releases GHG emissions when consumed by third party end users. These emissions 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 to report it together with iron ore, as both commodities serve as inputs into the steelmaking process.

BHP has historically marketed a small portion of BMA products against energy coal indexes. In FY2023, this portion was approximately 3.5 per cent, down from 6 per cent in FY2022. For purposes of enhancing the transparency and accuracy of our Scope 3 emission reporting, for FY2023 we have once again estimated the energy coal component of BMA production based on the percentage of BMA product marketed as energy coal and associated GHG emissions under this 'Use of Sold Products' category.

Overlap in calculation boundaries


There is a possibility that a small portion of our sold energy coal could be used to generate electricity consumed within BHP's own operations. Therefore, these emissions may also be included within our Scopes 1 and 2 inventories (as Scope 2 emissions).

Exclusions

None.

Calculation methodology

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

 For more information on the calculations for this 'Use of sold products' category, refer to Appendix 2

Assumptions

All energy coal is 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.

Data sources

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

Emission 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.

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 2023; BHP; 2023; bhp.com/-/media/documents/media/reports-and-presentations/2023/230720_bhpoperationalreviewfortheyearended30june2023.pdf
- NGER Measurement Determination 2008 (as amended July 2022) (Schedule 1 Part 1); Australian Government; 2022; legislation.gov.au/Series/F2008L02309

| 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 FY2023 GHG emissions in BHP's value chain | Not material, not calculated | FY2023 GHG 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 'Use of sold products' 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 Scopes 1 and 2 reported by lessor. | | |
| Calculation status of FY2023 GHG emissions in BHP's value chain | Not relevant, not calculated | FY2023 GHG 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 Scopes 1 and 2 reported by franchisor. | | |
| Calculation status of FY2023 GHG emissions in BHP's value chain | Not relevant, not calculated | FY2023 GHG 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 FY2023 GHG emissions in BHP's value chain | Not material, calculated | FY2023 GHG emissions in BHP's value chain (MtCO₂-e) | 1.3 |
| 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 Scopes 1 and 2 emissions (on an equity basis) from our assets that are owned (as a joint venture or other ownership structure) but not operated by BHP. The Scope 3 Standard categorises this as a downstream category, as the provision of capital or financing is framed as a service provided by BHP.

Our non-operated assets relevant to the FY2023 reporting year are described in the Scopes 1 and 2 emissions – non-operated assets section of this document.

Additional investments are added and divestments are removed each year as applicable.

Emissions from Tamakaya Energía SpA (Kelar Power Plant) that are additional to the emissions reported under Scope 2 for Escondida and Pampa Norte under the operational control boundary are reported in this category.

Exclusions

Inclusions and exclusions are described in the Scopes 1 and 2 emissions – non-operated assets section of this document.

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 Scopes 1 and 2 emissions – non-operated assets section of this document.

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
- Solgold Annual Report 2022; Solgold Plc; 2022; SolGold-Annual-Report-2022.pdf (wp-solgold-2021.s3.eu-west-2.amazonaws.com/media/2022/10/SolGold-Annual-Report-2022.pdf)

Glossary

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

| Term | Definition |
|--|--|
| Activity data | A quantitative measure of a level of activity that results in greenhouse gas (GHG) emissions. Activity data is multiplied by an energy and/or emissions factor to derive the energy consumption and GHG emissions associated with a process or an operation. Examples of activity data include kilowatt-hours of electricity used, quantity of fuel used, output of a process, hours equipment is operated, distance travelled and floor area of a building. |
| Assets | Assets are a set of one or more geographically proximate operations (including open-cut mines and underground mines). Assets include our operated and non-operated assets. |
| Carbon credit | The reduction or removal of carbon dioxide, or the equivalent amount of a different greenhouse gas, using a process that measures, tracks, and captures greenhouse gases to compensate for an entity's GHG emissions emitted elsewhere. Credits may be generated through projects in which GHG emissions are avoided, reduced, removed from the atmosphere or permanently stored (sequestration). Carbon credits are generally created and independently verified in accordance with either a voluntary program or under a regulatory program. The purchaser of a carbon credit can 'retire' or 'surrender' it to claim the underlying reduction towards their own GHG emission reduction targets or goals or to meet legal obligations, which is also referred to as carbon offsetting, or offsetting. |
| 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 neutral | Carbon neutral includes all those GHG emissions as defined for BHP reporting purposes. |
| 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. |
| 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 Scopes 1 and 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). Also see the definition for Indirect use-phase emissions. |
| 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. |
| 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 | A consolidation approach whereby a company reports GHG emissions based on the accounting treatment in the company's consolidated financial statements, as follows: <ul style="list-style-type: none"> – 100 per cent for operations accounted for as subsidiaries, regardless of equity interest owned; – for operations accounted for as a joint operation, the company's interest in the operation <p>It does not report GHG emissions from operations that are accounted for using the equity method in the company's financial statements.</p> <p>Refer to the 'Organisational boundary' section earlier in this document for an explanation of certain departures from this approach that currently apply to BHP's reported GHG emissions inventory under the Financial Control approach.</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 greenhouse gas relative to one unit of CO ₂ . BHP currently uses GWP from the Intergovernmental Panel on Climate Change (IPCC) Assessment Report 5 (AR5) based on 100-year timeframe. |
| Goal (in respect of greenhouse gas emissions) | An ambition to seek an outcome for which there is no current pathway(s), but for which efforts will be pursued towards addressing that challenge, subject to certain assumptions or conditions. |
| 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. |

| Term | Definition |
|---|--|
| 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)). Also see 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. |
| Life cycle | 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 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 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). |
| Material | 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. |
| Net zero (for a BHP GHG reduction goal, target or pathway, or similar) | Net zero includes the use of carbon credits as governed by BHP's approach to carbon credits and offsetting described at bhp.com/climate . |
| Nickel intermediates | Includes BHP nickel concentrates, matte, residue and mixed sulphides. |
| Offsetting (in relation to GHG emissions) | The use of carbon credits. Refer further to the definition of carbon credit |
| 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 and processing facilities. |
| Operational GHG emissions | Our operational GHG emissions are the Scopes 1 and 2 emissions from our operated assets. |
| 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). |
| Proxy | 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. |
| 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 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 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. |
| Upstream emissions | Indirect GHG emissions from purchased or acquired goods and services. |
| Value chain | Refers to all 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). |

Units of measurement

| | |
|-------------------------|---------------------------|
| CO₂-e | Carbon dioxide equivalent |
| Mt | Million tonnes |
| dwt | Deadweight tonnage |
| nm | Nautical mile |

Appendix

Appendix 1: Processing of sold products (steelmaking) calculations

| Item | Quantity | Units | Comment |
|--|-------------|--|---|
| Processing iron ore to steel | | | |
| FY2023 iron ore production (on equity basis) | 247,022,850 | wet 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 2023; BHP; 2023; bhp.com/-/media/documents/media/reports-and-presentations/2023/230720_bhpoperationalreviewfortheyearended30june2023.pdf |
| Crude steel equivalent | 141,616,606 | 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. BHP produces more iron ore than metallurgical coal. Therefore, additional third-party metallurgical coal is required to process BHP's iron ore globally. – 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). A minor portion of the average Fe content is estimated using 9-month data. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> – IEA Iron and Steel CCS Study (April 2013), pg. A3-16 iea.org/publications/technical-reports/reports-list/9-technical-reports/1001-2013-04-iron-and-steel-ccs-study-techno-economics-integrated-steel-mill |
| Emission factor | 2.2 | 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 iron ore production (including from non-operated assets) goes via the BF-BOF route. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> – IEA Iron and Steel Technology Roadmap (October 2020), pg. 43. iea.blob.core.windows.net/assets/eb0c8ec1-3665-4959-97d0-187ceca189a8/Iron_and_Steel_Technology_Roadmap.pdf.html |
| FY2023 emissions | 282.9 | 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 311.6 MtCO₂-e and BHP's metallurgical coal share of 28.7 MtCO₂-e. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> – Worldsteel publication – Fact sheet Steel and raw materials, 2019, p.1 worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html |
| Processing of metallurgical coal to steel | | | |
| FY2023 metallurgical coal production | 28,004,300 | 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 product that is marketed as energy coal. This has been estimated based on share of sales percentage and excluded from the metallurgical coal production figure. <p><i>Reference sources</i></p> <ul style="list-style-type: none"> – BHP Operational Review for the year ended 30 June 2023; BHP; 2023; bhp.com/-/media/documents/media/reports-and-presentations/2023/230720_bhpoperationalreviewfortheyearended30june2023.pdf |
| Crude steel equivalent | 35,902,949 | 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 – Fact sheet Steel and raw materials, 2019, p.1 worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html |
| Emission factor | 2.2 | 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 (October 2020), pg. 43. iea.blob.core.windows.net/assets/eb0c8ec1-3665-4959-97d0-187ceca189a8/Iron_and_Steel_Technology_Roadmap.pdf.html |

Appendix continued

| Item | Quantity | Units | Comment |
|------------------|----------|----------------------|--|
| FY2023 emissions | 28.7 | MtCO ₂ -e | <p><i>Assumptions</i></p> <ul style="list-style-type: none"> Emissions are 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 – Fact sheet Steel and raw materials, 2019, p.1 worldsteel.org/steel-by-topic/sustainability/sustainability-indicators.html |

Steelmaking (iron ore and metallurgical coal processing) total

| | |
|------------------|----------------------------|
| FY2023 emissions | 311.6 MtCO ₂ -e |
|------------------|----------------------------|

Appendix 2: Use of sold products calculations

| Commodity | FY2023 production | Production units | FY2023 production (converted) | Converted production units | Energy content (GJ per production unit) | Energy content of sold products (GJ) | Emission factor (kg CO ₂ -e per GJ) | Emissions (tonnes CO ₂ -e) |
|-------------|-------------------|------------------|-------------------------------|----------------------------|---|--------------------------------------|--|---------------------------------------|
| Energy coal | 15,187,700 | tonnes | 15,187,700 | tonnes | 27.0 | 410,067,900 | 90.24 | 37,004,527 |

Comment

Assumptions

- All energy coal produced is bituminous and is combusted.
- Approximately 3.5% of BMA's production is estimated to be marketed as energy coal, and is added to our total energy coal production volume, and excluded from the metallurgical coal production volume.

Reference sources

- Production: BHP Operational Review for the year ended 30 June 2023; BHP; 2023; bhp.com/-/media/documents/media/reports-and-presentations/2023/230720_bhpoperationalreviewfortheyearended30june2023.pdf
- Energy content and emission factors: NGER Measurement Determination 2008 (as amended July 2022) (Schedule 1 Part 1); Australian Government; 2022

Use of sold products total

| | |
|------------------|---------------------------|
| FY2023 emissions | 37.0 MtCO ₂ -e |
|------------------|---------------------------|