

BHP

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

2023

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About this document

This document describes the calculation boundaries, methodologies, assumptions and key references used in the preparation of BHP’s reported inventory of Scopes 1, 2 and 3 greenhouse gas (GHG) emissions for FY2023, as published in the BHP Annual Report 2023 and the BHP ESG Standards and Databook 2023, both available at bhp.com/climate

GHG emissions for our business are calculated using methodologies consistent with the Greenhouse Gas (GHG) Protocol: A Corporate Accounting and Reporting Standard, with reference to the additional guidance provided in the GHG Protocol: Scope 2 Guidance (An amendment to the GHG Protocol Corporate Standard) (Scope 2 Guidance), GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard (Scope 3 Standard) and GHG Protocol Technical Guidance for Calculating Scope 3 Emissions (Scope 3 Guidance) as appropriate. We have also reviewed GHG emissions guidance across a range of other standards in preparing the disclosures, including Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories, International Standard ISO 14064-1, the Sustainability Accounting Standards Board (SASB) and the recommendations of the Financial Stability Board’s Task Force on Climate-Related Financial Disclosures (TCFD) including its Guidance on Metrics, Targets and Transition Plans.

The GHG Protocol: A Corporate Accounting and Reporting Standard, Scope 2 Guidance, Scope 3 Standard and Scope 3 Guidance are published by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD). They were developed with the aim of providing a standardised approach and set of principles for companies to use in preparing GHG emission inventories.

This document, in combination with the published data on Scopes 1, 2 and Scope 3 emissions in relation to our business, meets the disclosure requirements of the Global Reporting Initiative (GRI) standard GRI 305. Our disclosures are also aligned with the recommendation of the TCFD that organisations disclose “Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas emissions, and the related risks”.

Changes from prior year

GHG emissions reporting area	Details of change
Scope 3 – Category 1 Category 4 Category 6 Category 7	The cumulative impact of inflation over time has the potential to cause reported Scope 3 emissions that are calculated using spend-based factors to be overstated. In FY2023, we updated our spend-based data methodology to account for inflation, impacting Categories 1, 4, 6 and 7 where spend-based data is used. Data for FY2020 to FY2022 has also been recalculated using this new methodology to aid comparability. Adjusting spend-based data for inflation is consistent with the recommendations of the GHG Protocol.
Scope 3 – Category 3	In FY2023, we updated the Scope 3 emission factor used for calculating distillate and gasoline emission after a more accurate factor was published in the National Greenhouse Accounts Factors (2022). This new factor was applied from FY2020 to FY2023, resulting in the restatement of historical data.
Scope 3 targets and goals baselines	For additional transparency to assist tracking our progress, we are disclosing a baseline year of FY2020 for our value chain GHG emission long-term goal, consistent with our operational GHG emission long-term goal of net zero, together with a baseline year of FY2020 for our medium-term goal for steelmaking and CY2008 for our medium-term goal for shipping (the latter for alignment with the International Maritime Organisation).

Greenhouse Gas Protocol emissions Scopes

The GHG Protocol Corporate Accounting and Reporting Standard classifies corporate GHG emissions into three ‘Scopes’.

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

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

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

Organisational boundary

BHP develops Scopes 1 and 2 emissions totals based on the following organisational consolidation approaches to boundaries, consistent with the GHG Protocol Corporate Accounting and Reporting Standard definitions:

- Operational control approach: We account for 100 per cent of Scopes 1 and 2 emissions from operations over which BHP (including any one or more subsidiaries in the BHP group of companies) has operational control, but not for GHG emissions from operations in which BHP owns an interest but does not have operational control. The operational control approach is used for our operational GHG emission reduction medium-term target and long-term goal.
- Financial control approach: We account for Scopes 1 and 2 emissions based on the accounting treatment in BHP’s Consolidated Financial Statements, as follows:
 - 100 per cent for operations accounted for as subsidiaries, regardless of equity interest owned
 - for operations accounted for as a joint operation, BHP’s interest in the operation
 - Investments that are accounted for in BHP’s Consolidated Financial Statements under the equity method as an investment in a joint venture are currently proportionally consolidated in BHP’s reported GHG emission inventory under the Financial Control approach. However, GHG emissions from other investments that are accounted for in BHP’s Consolidated Financial Statements under the equity method are not included in BHP’s reported GHG emission inventory. We intended to review this approach to investments in FY2024.
- Equity share approach: We account for BHP’s equity share of Scopes 1 and 2 emissions for operations in which BHP owns an interest.

About this document continued

Scope 3 emissions are the indirect GHG emissions resulting from activities in our value chain or from our investments outside of our Scopes 1 and 2 operational control approach GHG emissions. We currently use the equity share approach to define the organisational boundary for the downstream portion of our reported Scope 3 emissions inventory. For upstream Scope 3 emission categories, however, the boundary is currently defined on a category-by-category basis due to data limitations. For more information about the boundary approach, refer to the methodology for each Scope 3 category.

When considering the different inventories reported under different boundary definitions, it should be noted that non-operated asset GHG emissions are also included under our Scopes 1 and 2 emissions inventory accounted for using the financial control approach and the equity share approach where relevant criteria are met as described above.

We present GHG emission data inclusive of divestments up to the completion date or effective economic date (as applicable) of the divestment, unless otherwise specified. This applies to Scopes 1, 2, and 3 reported emissions.

Our reported GHG emission inventories for Scope 3 emissions and for Scopes 1 and 2 emissions accounted for using the financial control or equity share approaches are subject to inherent uncertainties arising from reliance on data obtained from third parties, or necessarily estimated or assumed, and may not be accurate or complete.

OZ Minerals

The contribution of the GHG emissions of the acquired OZ Minerals operations and functions is not material to BHP's operational and value chain GHG emission reduction targets and goals for the purposes of baseline adjustments or the FY2023 reported GHG emissions inventory. We plan to incorporate OZ Minerals-related GHG emissions into our GHG emission inventory and adjust the baselines for our targets and goals for FY2024 reporting (in alignment with GHG Protocol guidance). As a result:

- all energy consumption, GHG emissions and other climate-related data, metrics or other information presented in this document, and
- the calculation boundaries, methodologies, assumptions described in this document,

exclude the impact of the acquired OZ Minerals business.

Verification

EY was engaged by BHP to provide reasonable assurance over Scopes 1 and 2 emissions and progress against climate change targets and goals as reported in the BHP Annual Report 2023 and the BHP ESG Standards and Databook 2023.

EY provided limited assurance over Scope 3 emissions reported in the BHP Annual Report 2023 and the BHP ESG Standards and Databook 2023.



For more information refer to the [BHP Annual Report 2023 Operating and Financial Review 6.17 \(Independent limited assurance report\)](#) available at bhp.com/climate

Energy consumption

Definition

Energy consumed in activities under BHP's operational control (petajoules).

Calculation boundary

We account for 100 per cent of energy consumed at operations over which BHP has operational control, but not for energy consumption at operations in which BHP owns an interest but does not have operational control.

This includes all fuels and electricity consumed in the operation of vehicles and machinery, onsite heat, steam or electricity generation activities, as a chemical or process feedstock, or any other purpose.

This aligns with the organisational boundary used to report operational GHG emissions, as described in 'Organisational boundary' under the 'About this document' section of this document.

Calculation methodology

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

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

In the absence of mandatory local regulations, Australia's National Greenhouse and Energy Reporting (NGER) (Measurement) Determination 2008 (as amended in July 2022) has been set as the default source for factors and methodologies for consistency.

Operational energy consumption from renewable sources includes third-party supplied renewable electricity as evidenced by renewable energy certificates or supplier-provided documentation, in line with the Greenhouse Gas Protocol Scope 2 Guidance. FY2023 operational energy consumption from renewable sources includes third-party supplied renewable electricity and a small volume of hydrotreated vegetable oil associated with a trial at Western Australia Iron Ore's Yandi iron ore operations.

The final validation for surrender of the rights to claim renewable energy attributes 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 renewable energy percentage with respect to Escondida and Pampa Norte following the final validation and restate that percentage as part of our annual reporting for FY2024, if required to adjust for any difference.

Scope 1 emissions – operated assets

Definition

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

Calculation boundary

We account for GHG emissions arising from our activities under three organisational boundaries – 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 account for all carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulphur hexafluoride (SF₆), nitrogen trifluoride (NF₃), perfluorocarbon (PFC) emissions and hydrofluorocarbon (HFC) emissions i.e. all relevant GHG emissions listed under the United Nations Framework Convention on Climate Change and the Kyoto Protocol. All GHGs are expressed in CO₂-e quantities based on global warming potentials (GWP) sourced from the Intergovernmental Panel on Climate Change (IPCC).

 For a definition of GWP factors, refer to the Glossary

BHP currently uses GWP from the IPCC Assessment Report 5 (AR5) across all operated assets. NF₃ is a synthetic GHG mainly used in the manufacturing of semi-conductors and is currently not relevant for BHP reporting purposes.

Scope 1 emissions are calculated for all relevant sources including:

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

Calculation methodology

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

- **GHG emissions from combustion of fossil fuels for energy:** These GHG emissions are calculated by multiplying the quantity of fuel consumed by the applicable emission factor for the fuel (e.g. tonnes CO₂-e/kilolitre diesel), sourced from appropriate references or, in some cases, from fuel sampling and analysis.
- **GHG emissions from use of fossil fuels as a feedstock to a chemical process:** These GHG emissions are calculated using 'carbon balance' methodologies sourced from appropriate references, involving estimation of the total carbon content of inputs to the process and total carbon content of products and by-products from the process. The difference in carbon content is assumed to be converted to CO₂ through the process. Methodologies and carbon contents for inputs and products are sourced from appropriate references.

- **'Fugitive' emissions from extraction of natural resources:** These GHG emissions are either metered directly (e.g. gas flow measurements from ventilation or drainage systems installed at underground coal mines) or calculated using source-specific methodologies and emission factors based on the specific characteristics of the resource. The methods used to measure fugitive emissions at BHP operated coal operations are listed below. These methods are periodically reviewed and may change in the future.
- **GHG emissions from immaterial sources:** In instances where the calculation of GHG emissions is overly onerous given the immateriality of the source to the facility's total emissions, it may be estimated using a simplified approach for efficiency.

Scope 1 emissions for facilities already reporting under mandatory local regulatory programs are required to use the same emission factors and methodologies for reporting under BHP's operational control boundary. This ensures that a single GHG emission inventory is maintained for consistency and efficiency. Local regulatory programs are applicable to the majority of BHP's Scope 1 emissions inventory within our operational control boundary, as listed in the table below.

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

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

In FY2023, BHP consumed a small volume of hydrotreated vegetable oil (HVO) associated with a trial at Western Australia Iron Ore's Yandi iron ore operations. As required by the GHG Protocol Corporate Accounting and Reporting Standard, BHP has reported the CO₂ emissions associated with the combustion of biofuels separately from Scope 1 emissions. The CO₂ emission factor for HVO was sourced from the UK Government Conversion Factors for Company Reporting 2022. This factor was chosen as the 2023 NGER (Measurement) Determination does not provide a CO₂ factor for HVO.

Asset	Location	Local regulations
BMA, New South Wales Energy Coal, Olympic Dam, Nickel West, Western Australia Iron Ore	Australia	NGER scheme
Escondida, Pampa Norte	Chile	Green Tax legislation (referencing IPCC factors)
Jansen Potash Project	Canada	Canadian GHGRP (referencing IPCC factors)

In FY2023, GHG emissions covered under emissions-limiting regulation included Scope 1 emissions from BHP's facilities covered by the Safeguard Mechanism administered by the Clean Energy Regulator in Australia, and the distillate and gasoline emissions from turbine boilers at the cathode plant at Escondida covered by the Green Tax legislation in Chile.

Asset	Operation	Type	Measurement method for coal mine fugitive emissions (NGER (Measurement) Determination 2008)
BHP Mitsubishi Alliance (BMA)	Blackwater	Open cut	Method 1 – Default emission factor applied to run of mine coal extraction.
			Gas drainage (flared) Method 1 – Default emission factors applied to measured quantities of gas flared.
	Broadmeadow	Underground	Gas drainage (vented) Method 4 – The direct measurement of emissions released from the drainage of coal mine gas using continuous monitoring of the gas stream.
			Underground ventilation Method 4 – The direct measurement of emissions released from the extraction of coal using continuous and periodic monitoring of the gas stream.
			Post-mining coal handling Method 1 – Default emission factor applied to run of mine coal extraction.
			Caval Ridge Open cut
	Daunia Open cut		
Goonyella Riverside Open cut	Method 2 – Quantities of fugitive emissions contained in coal extracted is calculated based on measured in-situ gas content and composition.		
Peak Downs Open cut			
Saraji Open cut			
New South Wales Energy Coal	Mt Arthur Coal	Open cut	

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 emission reduction (Scopes 1 and 2) target and goal


Our previous short-term operational GHG emission reduction target was achieved in FY2022. Going forward, we have a medium-term target in place to support the achievement of our long-term goal to achieve net zero operational GHG emissions by 2050.


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

We do not expect our operational GHG emissions to decrease in a straight-line trajectory from FY2020 to FY2030, as we expect some temporary increases associated with new and expanded operations. The abatement opportunities we are prioritising involve a range of implementation timelines and the challenge to decarbonise in coming years is anticipated to grow

due to expanding business activity and the current lack of available technology solutions, particularly for diesel displacement. As such, the timing of resulting GHG emissions reductions may be distributed unevenly across the target period.

The baseline year of FY2020 represents the most recently completed operating year (at the time the target was set) from which to measure our performance to FY2030. The FY2020 baseline is reviewed annually and adjusted for any material acquisitions and divestments based on the Scopes 1 and 2 emission levels for the acquired or divested operation in the baseline year, and to reflect progressive refinement of GHG emission reporting methodologies. This is required to retain comparability between the baseline year's GHG emissions and future years' GHG emissions.

 For the 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

 For more information on performance against our operational GHG emission reduction target and goal, refer to the BHP Annual Report 2023 available at bhp.com/climate

Timeframe	Description	Methodology
Scopes 1 and 2		
Medium-term target	Reduce operational GHG emissions by at least 30 per cent from FY2020 levels by FY2030.	<ul style="list-style-type: none"> – Target period: FY2020 to FY2030 – Target type: Absolute – Target percentage reduction: At least 30% – Target setting method: Absolute target measured on a cumulative GHG emission basis against an overall carbon budget. The target percentage reduction was established in FY2020 by applying the same rate of reduction to BHP's GHG emissions as the rate at which the world's GHG emissions would have to contract in order to meet the Paris Agreement goal to hold global average temperature increase to well-below 2°C above pre-industrial levels (known as the 'absolute contraction method'). – Carbon budget for target period: 134.7 MtCO₂-e. This reflects a linear reduction between our adjusted FY2020 baseline and the FY2030 target year. – Boundary: Scopes 1 and 2 – Operational control. – Scope 2 accounting approach: Market-based. A RMF that meets GHG Protocol Scope 2 Guidance definition is currently unavailable in the markets in which 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 emissions 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 for FY2024. – Key adjustments made to baseline and subsequent data: Baseline and performance data has been adjusted for divestment of 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) and for methodology changes (use of IPCC Assessment Report 5 (AR5) Global Warming Potentials and the transition to a facility-specific GHG emission calculation methodology for fugitives at Caval Ridge). See more detail in the 'Baseline and performance data adjustments' table on page 8. – GHG gases included: CO₂, CH₄, N₂O, HFC, PFC, SF₆. – Carbon credits and offsetting: Not planned. Carbon credits may be used as a last resort option if planned abatement projects fail to deliver to the estimated abatement. – Progress: Progress towards this target is expected to be non-linear. For more information, refer to Operational GHG emission reductions, in the BHP Annual Report 2023 Operating and Financial Review 6.12 available at bhp.com/climate.
Long-term goal	Achieve net zero operational GHG emissions by 2050.	<ul style="list-style-type: none"> – Goal period: FY2020 to CY2050 – Goal type: Absolute – Goal setting method: Our long-term goal was developed with the ambition to achieve net zero for our operational GHG emissions by CY2050. Our progress against this goal will be measured on an absolute basis. Any future target(s) we set for the post-FY2030 period will be dependent on a range of factors, including our understanding of technology pathways, growth, policy settings and a deeper understanding of the role of other abatement mechanisms including carbon credits. – Carbon budget for goal period: Refer to our medium-term target above for the period to FY2030. For the remainder of the goal period, we compare our projected performance based on our current understanding of technology solutions to a carbon budget that reflects a hypothetical straight-line trajectory between FY2030 and CY2050 and consider that in our planning to better understand our ability to achieve our net zero goal. – Boundary: Scopes 1 and 2 – Operational control. – Scope 2 accounting approach: Market-based. An RMF that meets GHG Protocol Scope 2 Guidance definition is currently unavailable in the markets in which 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 emissions 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. – Key adjustments made to baseline and subsequent data: Baseline and performance data has been adjusted for divestment of our interest in BMC (sale completed on 3 May 2022) and our Petroleum business (merger with Woodside completed on 1 June 2022) and for methodology changes (use of IPCC Assessment Report 5 (AR5) Global Warming Potentials and the transition to a facility-specific GHG emission calculation methodology for fugitives at Caval Ridge). See more detail in the 'Baseline and performance data adjustments' table on page 8. – GHG gases included: CO₂, CH₄, N₂O, HFC, PFC, SF₆. – Carbon credits and offsetting: Planned. – Progress: Progress towards this goal is expected to be non-linear. For more information, refer to Operational GHG emission reductions, in the BHP Annual Report 2023 Operating and Financial Review 6.12 available at bhp.com/climate.

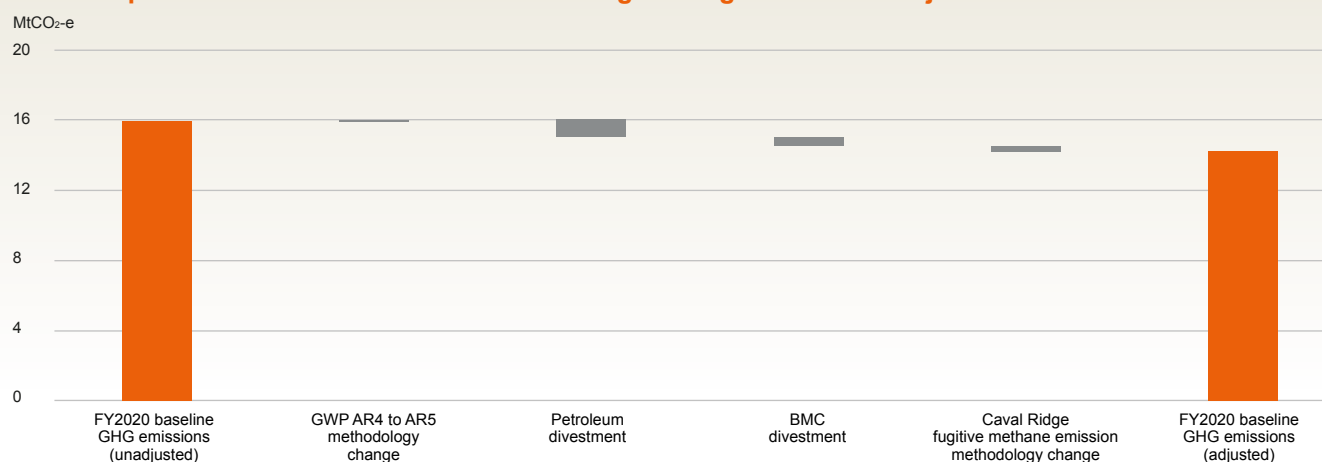
FY2023 reported operational GHG emissions continued

Baseline and performance data adjustments

The following table lists the adjustments made to the FY2020 baseline and, where expressly indicated, to reported operational GHG emissions performance data in subsequent years to aid comparability and for the purposes of target and goal performance assessment.

Adjustment	Adjustment methodology
Divestment: BMC (Applied in FY2022)	BHP's interest in the BMC asset was divested in FY2022 (sale completed 3 May 2022). To retain comparability between the baseline and target and goal performance years, Scopes 1 and 2 emissions from this asset were removed from the FY2020 baseline, and subsequent years of emissions performance, up to the time of the divestment (FY2021 and FY2022).
Divestment: Petroleum business (Applied in FY2022)	BHP's Petroleum business was divested in FY2022 (via a merger with Woodside completed on 1 June 2022). This included operated assets in the Australian Production Unit, Gulf of Mexico Production Unit and Trinidad and Tobago Production Unit, as well as the supporting ancillary activities. To retain comparability between the baseline and target and goal performance years, Scopes 1 and 2 emissions from these assets were removed from the FY2020 baseline, and subsequent years of emissions performance, up to the time of the divestment (FY2021 and FY2022).
Methodology change: Global Warming Potentials (GWPs) (Applied in FY2021 and FY2022)	Leading up to and including FY2020, all BHP operated assets used GWP in their GHG emissions accounting sourced from the IPCC Assessment Report 4 (AR4). In FY2021, all operated assets other than Minerals Americas transitioned to using GWPs from the IPCC Assessment Report 5 (AR5). Minerals Americas continued using AR4 GWPs in FY2021, and then transitioned to AR5 in FY2022. GWP values (tonnes/tonnes CO ₂ -e) relevant to BHP's activities that changed as a result of the transition from AR4 to AR5 were: <ul style="list-style-type: none"> – methane (CH₄) increased from 25 to 28 – nitrous oxide (N₂O) decreased from 298 to 265 – sulphur hexafluoride (SF₆) increased from 22,800 to 23,500 To retain comparability between the baseline and target and goal performance years, total methane, nitrous oxide and sulphur hexafluoride emissions were recalculated using AR5 GWPs. This adjustment was made for the FY2020 baseline for all operated assets, with an additional adjustment for FY2021 for Minerals Americas operated assets only.
Methodology change: Caval Ridge (Applied in FY2022)	Leading up to and including FY2021, the Caval Ridge operation (BMA, Queensland, Australia) calculated fugitive emissions using default factors provided in Australia's NGER (Measurement) Determination 2008 (Method 1 – extraction of coal) for open cut coal mines located in Queensland, Australia. In FY2022, Caval Ridge moved to a facility-specific emissions calculation methodology for these emissions as detailed in the NGER (Measurement) Determination 2008 (Method 2 – extraction of coal). To retain comparability between the baseline and target and goal performance years, fugitive emissions for the Caval Ridge operation were recalculated using the facility-specific method for the FY2020 baseline, and subsequent years of emissions performance up to the year of the transition to Method 2 (FY2020 and FY2021).

FY2020 operational GHG emission reduction target and goal baseline adjustments



References

- Global Warming Potential Values, GHG Protocol, 2016, ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf

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	Provided by the operator for FY2023, noting that data remains subject to finalisation for the reporting year.
Samarco	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.
Solgold Plc	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.

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 GHG emissions, based on the financial transactions of the reporting company:

- Upstream GHG emissions are indirect GHG emissions related to purchased or acquired goods and services.
- Downstream GHG 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

We continue to improve our approach and methodology for GHG emissions estimations. Key refinements to our methodology for Scope 3 this year, in line with the GHG Protocol guidance, were detailed at the beginning of this document and are further described below in the 'FY2023 Scope 3 Standard emission categories' section, in the detailed methodology description for each category.

The 'Value chain GHG emission (Scope 3) targets and goals' and 'FY2023 Scope 3 Standard emission categories' sections below also describe in more detail the calculation boundaries (including any exclusions of particular GHG emissions sources within a category), impact of divestments, methodologies, assumptions and references we have used to calculate a GHG emissions estimate for each relevant Scope 3 category for FY2023. For categories where we have not calculated a GHG emissions figure, the rationale behind why we have concluded that the GHG emissions source is not relevant to our business or appropriate to include is provided.

In the table below, data in italics indicates that data has been adjusted since it was previously reported. In FY2023, we updated the spend-based data methodology to account for inflation.

This new methodology was applied to FY2020 to FY2023 data and impacts Category 1, Category 4, Category 6 and Category 7 where spend-based data is used. For each reporting year, an inflation correction value was applied to the emission factors sourced from the GHG Protocol Quantis Scope 3 Evaluator tool. This has resulted in the restatement of Category 1, which was 10.1 MtCO₂-e in FY2021 and 9.9 MtCO₂-e in FY2022, and Category 4, which was 4.6 MtCO₂-e in FY2022. 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, resulting in restatements. Previously reported data for Category 3 was 1.1 MtCO₂-e for FY2021 and 1.0 MtCO₂-e for FY2022. Category 15 was restated from 2.7 MtCO₂-e for FY2022 due to an increase in GHG emissions reported by Tamakaya Energia SpA (Kelar Power plant).

Scope 3 emissions by category	GHG emissions in BHP's value chain (MtCO ₂ -e)		
	FY2023	FY2022	FY2021
Upstream			
1. Purchased goods and services (including capital goods)	9.1	8.8	9.3
2. Capital goods		Not applicable	
3. Fuel and energy related activities	2.4	2.3	2.3
4. Upstream transportation and distribution	4.4	4.5	4.8
5. Waste generated in operations		Not applicable	
6. Business travel	0.1	0.1	0.1
7. Employee commuting	0.2	0.3	0.4
8. Upstream leased assets		Not applicable	
Downstream			
9. Downstream transportation and distribution	2.8	3.2	3.1
10. Processing of sold products			
– GHG emissions from steelmaking	311.6	305.3	300.5
– <i>Iron ore processing to crude steel</i>	282.9	270.8	260.7
– <i>Metallurgical coal processing to crude steel</i>	28.7	34.5	39.8
– Copper processing	1.1	1.0	1.0
– Nickel processing	0.5	0.3	
Total processing of sold products	313.2	306.7	301.5
11. Use of sold products			
– Energy coal	37.0	37.6	38.3
– Natural gas, Crude oil and condensates, Natural gas liquids	0	35.0	38.1
Total use of sold products	37.0	72.6	76.4
12. End-of-life treatment of sold products		Not applicable	
13. Downstream leased assets		Not applicable	
14. Franchises		Not applicable	
15. Investments (i.e. BHP's non-operated assets)	1.3	2.8	2.7
Total Scope 3 emissions	370.5	401.3	400.6
Total Scope 3 GHG emissions (adjusted for divested operations)	370.5	364.4	360.2

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](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
- 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)
- GHG Protocol Quantis Scope 3 Evaluator tool; Quantis; 2022; [quantis-suite.com/Scope-3-Evaluator/](https://www.quantis-suite.com/Scope-3-Evaluator/)
- Sea Distance Calculator, Ship Traffic Net;2012; [shiptraffic.net/2001/05/sea-distances-calculator.html](https://www.shiptraffic.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
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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
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