

SCOPE 3 GREENHOUSE GAS (GHG) EMISSIONS METHODOLOGY

We calculate our Scope 3 emissions in accordance with the methodologies in the World Resources Institute Greenhouse Gas Protocol *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*. Detail on the specific methodologies used for each Scope 3 category is listed below. The most material emissions are from Category 10 and Category 11, which account for over 92 per cent of our Scope 3 inventory.

Accounting for Scope 1, Scope 2 and Scope 3 emissions leads to an inevitable overlap in reporting boundaries. The most significant examples of double counting within our inventories are:

- Use of sold products: emissions from the use of energy coal supplied to Eskom is also included in our Scope 2 emissions; and post-mining emissions for coal are calculated as part of our Scope 1 inventory
- Processing of sold products: could include raw materials that are produced by South32 and accounted for elsewhere in our inventories (e.g. coal used in manganese alloy production)

Emissions are accounted for on an equity-shared basis for categories 1, 2, 4, 10, 11 and 15 and on a 100 per cent basis for categories 3, 6 and 7.

Category	Inclusions	Exclusions	Rationale	Data sources	Calculation method
1. Purchased goods and services.	Emissions from upstream production and transport of purchased goods and services.	Spend associated with activities reported under other Scope 3 categories. (e.g. capital goods, fuel consumption, transportation and business travel).	Not considered as material but included for completeness.	Spend data extracted from the internal system. Emission factors were sourced from the Quantis Scope 3 Evaluator Tool.	Spend-based method from the GHG Protocol Scope 3 Guidance.
2. Capital goods.	Emissions from upstream production and transport of capital goods.	None.	Not considered as material but included for completeness.	Spend data extracted from the internal system. Emission factors were sourced from the Quantis Scope 3 Evaluator Tool.	Spend-based method from the GHG Protocol Scope 3 Guidance.
3. Fuel and energy related activities.	Upstream emissions of purchased fuels and electricity (incl transmission and distribution losses).	None.	Scope 1 and 2 emissions from fuel and energy are material; hence Scope 3 for this category is of interest.	Fuel and energy consumption data extracted from internal databases. Factors were sourced from the Australian National Greenhouse Accounts.	Average data method from the GHG Protocol Scope 3 Guidance.
4. Upstream transportation and distribution.	Emissions from third party shipping of raw materials and sold products where South32 pays for the costs.	Container shipments, road and rail transport provided by third parties.	Shipping is outsourced and contributes to our risk exposure.	Spend data extracted from the internal system. Emission factors were sourced from the Quantis Scope 3 Evaluator Tool.	Spend-based method from the GHG Protocol Scope 3 Guidance.
5. Waste generated in operations.	Not calculated.	Not calculated.	Not considered as material – most waste does not produce GHG.	Not calculated.	Not calculated.
6. Business travel.	Emissions from air and rail travel for business purposes and charter flights that were flown without passengers.	Business travel for which distance data is not available (e.g. car hire).	Not considered as material but included for completeness.	Air and rail travel data from our corporate travel provider, which was categorised by distance into Domestic, Short Haul and Long Haul. Transport emission factors were sourced from DEFRA (UK). The air travel factors used do not include radiative forcing.	Distance-based method from the GHG Protocol Scope 3 Guidance.
7. Commuting employees.	Charter flights for fly-in, fly-out workers.	All other commuting employees for which data is unavailable.	Not considered as material but included for completeness.	Air travel data from our charter flight providers, which was categorised by distance into Domestic, Short Haul and Long Haul. Transport emission factors were sourced from DEFRA (UK). The air travel factors used do not include radiative forcing.	Distance-based method from the GHG Protocol Scope 3 Guidance.

Category	Inclusions	Exclusions	Rationale	Data sources	Calculation method
8. Upstream leased assets.	Not calculated.	Not calculated.	Our only leased assets are office buildings, which are not considered as a material source of emissions.	Not calculated.	Not calculated.
9. Downstream transportation and distribution.	Not calculated.	Not calculated.	Data on destination of vessels is not currently collected.	Not calculated.	Not calculated.
10. Processing of sold products.	Processing of manganese ore into manganese alloy, alumina into aluminium ingot, and aluminium ingot into aluminium sheet.	Processing of nickel, silver, lead and zinc due to lower production volumes and a large range of possible downstream uses.	Considered to be one of the most material sources of South32's Scope 3 emissions.	<p>Sales volumes were sourced from our publicly available Operational Reports.</p> <p>For manganese processing, factors were sourced from the International Manganese Institute's 'Lifecycle Assessment of Global Manganese Alloy Production' report.</p> <p>For processing of alumina into aluminium ingot, factors were sourced from the International Aluminium Institute's 'Life Cycle Inventory Data and Environmental Metrics' report.</p> <p>For processing of aluminium ingot into aluminium sheet, factors were sourced from the European Aluminium Association's 'Environmental Profile Report'.</p>	Average data method from the GHG Protocol Scope 3 Guidance.
11. Use of sold products.	Combustion of metallurgical coal and energy coal.	None.	Considered to be one of the most material sources of South32's Scope 3 emissions.	<p>Sales volumes were sourced from our publicly available Operational Reports.</p> <p>Factors were sourced from the Australian National Greenhouse Accounts.</p>	Calculation method for direct use-phase emissions from fuels and feedstocks.
12. End-of-life treatment of sold products.	Not calculated.	Not calculated.	<p>Not considered as material as our metals and minerals products have minimal end-of-life emissions.</p> <p>Difficult to model given there are many possible end uses of our products with multiple end-of-life treatment options.</p>	Not calculated.	Not calculated.
13. Downstream leased assets.	N/A	N/A	South32 does not have downstream leased assets.	N/A	N/A
14. Franchises.	N/A	N/A	South32 does not have franchised operations.	N/A	N/A
15. Investments.	Non-operated Joint Ventures (Brazil Aluminium).	None.	Contributes to South32's climate change risk exposure.	Scope 1 and 2 emissions data sourced from our Brazil Aluminium joint venture. Data was only available on a calendar year basis, as such the data covers Jan – Dec 2017	Proportional Scope 1 and Scope 2 emissions of equity investments.