CENTRAL ASIA METALS PLC

Greenhouse Gas Emissions Methodology Report

2023

Contents

Overview

This Methodology Report outlines the approach, assumptions, calculation boundaries and reference sources for disclosing the greenhouse gas ('GHG') emissions of the Central Asia Metals PLC ('CAML') group for the year 2023, alongside a comparative analysis.

This report, in combination with the published data on Scope 1, Scope 2 and Scope 3 emissions in relation to our business, meets the disclosure requirements of the Global Reporting Initiative ('GRI') Universal standard GRI 305: Emissions, and is aligned with the recommendations of the Financial Stability Board's Task Force on Climate-related Financial Disclosures ('TCFD').

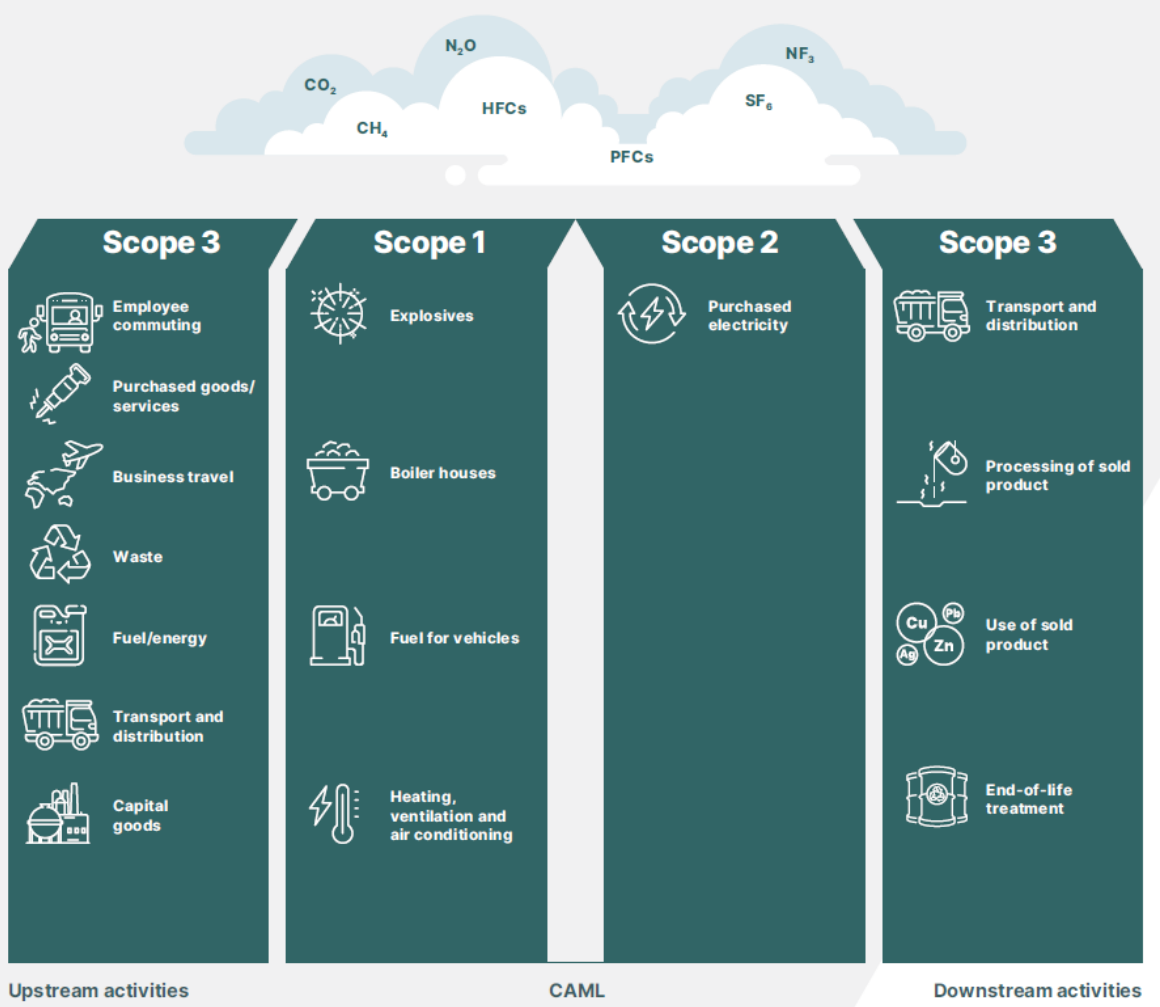
Estimations of GHG emissions follow methodologies in line with the GHG Protocol: A Corporate Accounting and Reporting Standard, enriched with further insights from the GHG Protocol: Scope 2 Guidance, the Corporate Value Chain (Scope 3) Accounting and Reporting Standard, and the Technical Guidance for Calculating Scope 3 Emissions. The GHG Protocol facilitates voluntary GHG emission calculation and reporting for companies, encompassing six key greenhouse gases as identified in the Kyoto Protocol:

- carbon dioxide (CO_2)
- methane (CH_4), nitrous oxide (N_2O)
- hydrofluorocarbons (HFCs)
- perfluorocarbons (PFCs)
- sulphur hexafluoride (SF_6)

For CAML, the relevance of PFCs and SF_6 in the emissions inventory is typically considered non-essential, as these are not predominantly generated in its operations.

For gases other than CO_2, a specific Global Warming Potential ('GWP') is applied to account for their higher warming effect, resulting in a measure known as carbon dioxide equivalent (CO_2e). The GWP is a metric that compares the energy the emissions of 1 tonne of a gas will absorb over a given period, relative to the emissions of 1 tonne of CO_2, thereby providing a unified scale for understanding and reporting the impact of different greenhouse gases.

Our emissions



Organisational boundary

CAML's methodology for estimating GHG emissions encompasses all facilities under its operational control, including emissions from contractors at these sites. However, emissions from CAML's corporate and regional offices, as well as exploration sites, are excluded from the Scope 1 and 2 GHG emissions inventory based on materiality considerations. When assessing Scope 3 GHG emissions, each category is individually evaluated for relevance and inclusion for the Scope 3 GHG emissions inventory. This assessment leads to the omission of leased assets, franchises, and investments, ensuring a focused and relevant emissions reporting.

Scope 1 and Scope 2: methodology overview

Scope 1

Definition

Scope 1 emissions encompass direct GHG emissions originating from CAML's own activities or sources under its operational control.

Calculation boundary

The calculation boundary has been defined on an operational control basis and from sources we own and control.

- Mobile fleet combustion – Emissions arising from combustion as part of working machines and internal transport. These are mine haul trucks, drilling machines, transport vehicles etc. and emit carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) emissions from vehicles.
- Combustion or detonation of explosive materials - The explosives used at Sasa mine are Ammonite explosives containing ammonium nitrate (NH_4NO_3), trinitrotoluene ('TNT') and diesel fuel, releasing CO_2 and NO_x.
- Stationary combustion – Emissions resulting from combustion of fossil fuels, such as coal at our boiler houses in Kounrad.
- Fugitive Emissions - Hydrofluorocarbon (HFC) emissions from refrigeration and air conditioning equipment.

Calculation methodology

For Scope 1 emissions the data is collected from various sources:

Fleet mobile combustion

The combustion from our fleet is calculated by collecting data on the total litres of gasoline and diesel consumed for all our fleet across the operations for both surface and underground ('UG') vehicles, as well as any fuel cards for employees. This figure is then converted into gigajoules (GJ) to calculate the total fossil fuel emissions in metric tonnes of carbon dioxide equivalent (tCO_2e).

Combustion or detonation of explosive materials

The explosives used at Sasa mine are Ammonite explosives which contain ammonium nitrate, TNT and diesel fuel and the detonators use a base charge of Pentaerythritol tetra nitrate ('PETN') as well as a primary charge. The total consumed explosives is converted from tonnes to GJ before calculating the associated emissions in tCO_2e.

Combustion of fossil fuels for energy

The total tonnes of coal used at the boiler house in Kounrad is recorded based on volume of loading into boilers. The recorded value is converted to GJ before being used in emission tCO_2e calculations.

Fugitive emissions

The leakage rate of the type of refrigerator, based on the refrigerant units we have, incorporates a conversion factor to calculate the CO_2 emissions (tCO_2e).

Others
Water treatment plant, immaterial amounts of propane in the laboratory, limestone use around the dumps.

Table 1 - Sources of CAML's Scope 1 emissions

	Kounrad		Sasa		Total	
	2023	2022	2023	2022	2023	2022
	GJ	GJ	GJ	GJ	GJ	GJ
Diesel	8,913	8,050	41,935	39,354	**50,848**	**47,404**
Gasoline	5,403	5,453	-	-	**5,404**	**5,453**
Propane	5	1	-	-	**5**	**1**
Explosives	-	-	2,970	2,933	**2,970**	**2,933**
Coal	247,160	247,154	-	-	**247,160**	**247,154**
Total	**261,481**	**260,658**	**44,905**	**42,287**	**306,387**	**302,945**

Table 2 – Scope 1 emissions

	Kounrad		Sasa		Total	
	2023	2022	2023	2022	2023	2022
	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
Coal	18,090	17,935	**-**	**-**	**18,090**	**17,935**
UG fleet	-	-	3,010	2,837	**3,010**	**2,837**
Surface fleet	1,030	966	116	97	**1,146**	**1,063**
Explosives	-	-	128	126	**128**	**126**
Sewage treatment plant	-	-	77	77	**77**	**77**
Refrigeration	-	-	19	13	**19**	**13**
Total	**19,120**	**18,901**	**3,350**	**3,150**	**22,470**	**22,051**

Scope 2

Definition

Scope 2 emissions involve indirect GHG emissions stemming from purchased energy sources, such as electricity.

Calculation boundary

CAML's emissions include purchased electricity from the grid for its operations.

Calculation methodology

The total electricity consumption (MWh) across the Group is recorded using meter readings across the sites and is checked against the energy suppliers' invoices. The consumption value is converted into GJ to calculate the total CO_2 emissions. Our Scope 2 emissions are calculated using the location-based method.

Table 3 - Energy Sources of CAML's Scope 2 emissions

	Kounrad		Sasa		Total	
	2023	2022	2023	2022	2023	2022
	GJ	GJ	GJ	GJ	GJ	GJ
Electricity	209,820	217,831	159,936	155,669	**369,756**	**373,500**
Total	**209,820**	**217,831**	**159,936**	**155,669**	**369,756**	**373,500**

Table 4 – Scope 2 emissions

	Kounrad		Sasa		Total	
	2023	2022	2023	2022	2023	2022
	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e	tCO_2e
Electricity	35,669	37,031	-	-	**35,669**	**37,031**
Total	**35,669**	**37,031**	**-**	**-**	**35,669**	**37,031**

CAML's Scope 3: methodology and summary

Scope 3

Definition

Indirect GHG emissions that occur in the value chain of a company but are not directly owned or controlled by that company. These encompass all indirect emissions associated with its operations in its upstream and downstream activities.

In 2023, CAML conducted a comprehensive evaluation of Scope 3 emissions across the entire group, encompassing the timeframe from January 1, 2023, to December 31, 2023, as well as the corresponding prior year. This Methodology Report outlines the approach utilised in CAML's inaugural group-wide Scope 3 emissions assessment, serving as the foundation for future Scope 3 accounting. The report specifies organisational and accounting boundaries, methodologies, assumptions, sources, and key references employed, addressing emissions anticipated from CAML's activities. The Scope 3 emissions assessment results presented in this report are part of our ongoing commitment to align with the TCFD recommendations, demonstrating transparency in communicating our strategy for evaluating and managing climate-related risks and opportunities.

Approach

The Methodology Report follows the guidelines set by World Business Council Sustainable Development ('WBCSD') and World Resources Institute ('WRI') Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard[1] (the 'GHG Protocol') as amended. Additionally, it adheres to the Required Greenhouse Gases in Inventories: *Accounting and Reporting Standard Amendment*[2]. The Scope 3 assessment considers the GHG Protocol Technical Guidance for Calculating Scope 3 Emissions[3] (Scope 3 Guidance).

This report's disclosures meet the reporting requirements established by the GHG Protocol. According to the GHG Protocol[1] as amended, the calculation and reporting of an organisation's Scope 3 should follow the principles of relevance, completeness, consistency, transparency, and accuracy. In this Methodology Report, any distinct trade-offs made are highlighted, and the rationale behind them is provided.

Our approach prioritises the principles of completeness and consistency, often providing greater insights and relevance for users of this information. We anticipate ongoing improvements in our Scope 3 disclosure over time, aiming to minimise the need for such trade-offs.

[1] Greenhouse Gas Protocol (2011) https://ghgprotocol.org/sites/default/files/standards/Corporate-Value-Chain-Accounting-Reporing-Standard_041613_2.pdf
[2] Greenhouse Gas Protocol (2013) https://ghgprotocol.org/sites/default/files/2022-12/Required%20gases%20and%20GWP%20values_0.pdf
[3] Greenhouse Gas Protocol (2013) https://ghgprotocol.org/sites/default/files/2023-03/Scope3_Calculation_Guidance_0%5B1%5D.pdf

Inflation and Exchange Rate Adjustment

For all spend-based estimations in the Scope 3 inventory, the emission factors are based on 2012 US dollars. To align with the GHG Protocol Scope 3 Calculation Guidance, these spend values are adjusted to account for market value differences between 2012 and the reporting period. This is done using inflation rates and exchange rates, ensuring the emission factors are applied accurately. The adjustment process involves deflating the spend values for the current year. This deflation uses a ratio of the Chain-Type Price Indexes for Gross Output by Industry[1]. from 2012 compared to the current year. These Price Index values are sourced from the US Bureau of Economic Analysis, with the assumption that all expenditures are subject to inflation in relation to the USD. Exchange rates used in the calculations are obtained from the internal financial department.

Scope 3 summary emissions

CAML's Scope 3 emissions for 2023 and the prior year comparison can be summarised as follows:

Table 5 - Scope 3 emissions summary

Category	Description	GHG emissions	
		2023	2022
		tCO_2e	tCO_2e
Upstream	1. Purchased goods & services	27,115	23,443
	2. Capital goods	11,415	7,863
	3. Fuel & energy related activities	6,382	6,562
	4. Upstream transport and distribution	1,993	1,805
	5. Waste generated in operations	390	395
	6. Business travel	281	262
	7. Employee commuting	240	254
	8. Upstream leased assets*	-	-
Downstream	9. Downstream transport & distribution	16,025	11,948
	10. Processing of sold products	115,647	120,010
	11. Use of sold products	61,223	62,422
	12. End-of-life treatment of sold products	31,412	32,957
	13. Downstream leased assets*	-	-
	14. Franchises*	-	-
	15. Investments*	-	-
Total Scope 3 GHG emissions		**272,123**	**267,921**

* Categories 8,13,14 & 15 show zero emissions as they are either not applicable or material to our operations.

[1] Chain-type price indexes
https://apps.bea.gov/iTable/?reqid=150&step=2&isuri=1&categories=gdpxind#eyJhcHBpZCI6MTUwLCJzdGVwcyI6WzEsMiwzXSwiZGF0YSI6W1siY2F0ZWdvcmllcyIsIkdkcHhJbmQiXSxbIlRhYmxlX0xpc3QiLCIxNiJdXX0=

Scope 3 emissions methodology details

Category 1 - Purchased goods and services

Category 1	
Description	Upstream GHG emissions from the extraction, production, and transportation of good and services purchased or acquired by CAML during the year.
Emissions (tCO_2e)	27,115 (2022: 23,443)
Calculation method	Spend-based approach
Activity data source	CAML accounting software data of all Opex supplier payments (pre-tax) categorised according to industry categories.
Emissions data source	Quantis[1] and the World Input – Output Database GHG evaluator[2].

Boundaries

This category covers emissions upstream of CAML's operations associated with the extraction, production, and transportation of goods and services procured in the reporting year. Emissions related to fuel and energy activities, upstream transportation, business travel, and employee commuting are excluded, fall into separate categories (categories 3, 4, 6, and 7, respectively), as per Scope 3 Standard recommendations.

Calculation method

CAML total operating expenditure ('Opex') in US dollars for the year ended 31 December 2023 was extracted from our accounting software and categorised into industry according to Quantis Scope 3 Evaluator. This Opex spend was then discounted back to a 2012 equivalent spend and this USD figure multiplied by an emissions factor provided by the Quantis[3] and the World Input – Output Database GHG evaluator[4], which is an online tool that provides a tonne of CO_2-eq/$ spend that can be applied to supplier payments.

The adjusted spending for 2012 was multiplied by the respective industry emission factor, initially yielding the total emissions in kilogram CO_2e and then converted to tCO_2e in the summary of emissions.

[1] Quantis (2023) https://quantis-suite.com/Scope-3-Evaluator/
[2] U.S Bureau of Economic Analysis (2023) https://apps.bea.gov/iTable/?reqid=150&step=2&isuri=1&categories=gdpxind
[3] Quantis (2023) https://quantis-suite.com/Scope-3-Evaluator/
[4] U.S Bureau of Economic Analysis (2023) https://apps.bea.gov/iTable/?reqid=150&step=2&isuri=1&categories=gdpxind

Assumptions

Opex Data from at least 98% of our operations was delineated into distinct purchase types based on knowledge and assumptions of invoices. These categories were standard goods, services and a category termed 'mixed'. The 'mixed' label was used for suppliers delivering a diverse array of products or services, such as drilling companies offering both drilling fluids and contractor services. These purchase types were further classified under respective industries, aligning with the classifications by Quantis[1].

Following finalisation of the categorisation process, Opex data was populated labelling each expenditure into a specific category. To maintain data integrity, all industry-related expenditures were amalgamated and then adjusted through a pricing index[2], reconciling 2023 values with those from 2012 to match the emission factor's baseline year. It has been assumed that spend-based emissions factors from the Quantis Scope 3 Evaluator are representative of the organisations, geographies and activities associated

Assumptions were made to relate the procurement system spend classifications, based on an interpretation of the typical activities covered by that classification, to an appropriate emissions factor derived from Quantis.

Inclusion and exclusion

The Opex spend data from CAML's accounting software is accurate, with analysis encompassing 98-100% of expenditures per operation. There were no other notable exclusions in the reporting data.

It is worth noting the Quantis Scope 3 Evaluator tool since calculation has been discontinued and we are actively planning to update our source for emissions factors for the forthcoming year's disclosure.

Category 2 – Capital goods

Category 2	
Description	GHG emissions from capital goods purchased by CAML in the reporting year. Capital goods are final products that have an extended life.
Emissions (tCO_2e)	11,415 (2022: 7,863)
Calculation method	Spend-based approach
Activity data source	CAML accounting software data of all Capex supplier payments (pre-tax), according to industry categories.
Emissions data source	Quantis[1] and the World Input – Output Database GHG evaluator[2].

Boundaries

This category covers emissions upstream of CAML's operations associated with capital goods procured in the reporting year. Similar to category 1 emissions, the emissions related to fuel and energy activities, upstream transportation, business travel, and employee commuting are accounted in separate categories, as per Scope 3 Standard recommendations.

Calculation method

The total Capital expenditure ('Capex') spend in US dollars for the year ended 31 December 2023 was extracted from our accounting software, categorised into industry according to Quantis Scope 3 Evaluator. This Capex spend was then discounted back to a 2012 equivalent spend and this USD figure multiplied by an emissions factor provided by the Quantis[3] and the World Input – Output Database GHG evaluator[4] which is an online tool that provides a t of C02-eq/$ spend that can be applied to supplier payments.

The adjusted spending for 2012 was multiplied by the respective industry emission factor, initially yielding the total emissions in $kgCO_2e$ and then converted to tCO_2e in the summary of emissions.

Assumptions

Capex data from at least 98% of our operations was delineated into distinct purchase types: capital goods.

[1] Quantis (2023) https://quantis-suite.com/Scope-3-Evaluator/
[2] U.S Bureau of Economic Analysis (2023) https://apps.bea.gov/iTable/?reqid=150&step=2&isuri=1&categories=gdpxind
[3] Quantis (2023) https://quantis-suite.com/Scope-3-Evaluator/
[4] U.S Bureau of Economic Analysis (2023) https://apps.bea.gov/iTable/?reqid=150&step=2&isuri=1&categories=gdpxind

Following finalisation of the categorisation process, CAPEX data was populated labelling each expenditure into a specific category. To maintain data integrity, all industry-related expenditures were conglomerated and then adjusted through a pricing index, reconciling 2022 values with those from 2012 to match the emission factor's baseline year. It has been assumed that spend-based emissions factors from the Quantis Scope 3 Evaluator are representative of the organisations, geographies and activities associated.

Inclusion and exclusion

The Capex spend data from CAML's accounting software is accurate, with analysis encompassing 98-100% of expenditures per operation. There were no other notable exclusions in the reporting data.

It is worth noting the Quantis Scope 3 Evaluator tool since calculation has been discontinued. We are aware of tool's phase-out and are actively planning to update our source for emissions factors for the forthcoming year's disclosure acknowledging the tool's phase-out and ensuring continued accuracy and compliance.

Category 3 – Fuel and energy related activities

Category 3	
Description	All emissions related to the production of fuels and energy purchased and consumed by CAML in the reporting year, not already included in Scope 1 or Scope 2. This is the upstream emissions from looking at cradle to gate in terms of transportation, creation and extraction of fuels consumed and transmission & distribution ('T&D') losses. This includes diesel, gasoline, propane, explosives and electricity across our operations.
Emissions (tCO_2e)	6,382 (2022: 6,562)
Calculation method	Actual energy consumed
Activity data source	Meter readings and consumption data of all energy and fuel related data from the environmental team.
Emissions data source	Emissions factors from Ecometrica[1] and Quantis[2] using country specific emission factors using the average-data method.

Boundaries

This category encompasses emissions from the extraction, production, and transportation of fuels and energy used by facilities under CAML's operational control. It includes upstream emissions related to fuels procured (e.g., diesel or natural gas) for on-site operations and emissions from the extraction, production, and transportation of fuel (e.g., coal or natural gas) burned for purchased electricity. Notably, emissions from fuel combustion at our facilities are categorised as scope 1 emissions, while emissions from purchased electricity generation are considered scope 2 emissions.

Calculation method

The volumes of our energy sources were calculated from various sources:

- Litres of diesel and the gasoline from fuel meters readings from our fuel stations.
- kWh of electricity from meter readings across the sites.
- Tonnes of explosives from purchase invoices.
- Litres of propane from purchase invoices

These metrics were then converted into GJ with an emissions factor sourced from the Quantis Scope 3 Evaluator.

[1] Brander, Matthew, et al (2011). https://ecometrica.com/assets/Electricity-specific-emission-factors-for-grid-electricity.pdf

[2] Quantis (2023) https://quantis-suite.com/Scope-3-Evaluator/

Assumptions

We estimated the T&D losses for the electricity procured and utilised at our sites, applying an emission factor, informed by a 2011 study on grid electricity-specific emissions[1].

Inclusion and exclusion

An important distinction arose from our calculations, with the T&D emissions related to North Macedonia being intentionally excluded. This decision stems from the fact that the Sasa mine receives all its energy from renewable energy sources, leading to the decision to omit 8,904tCO_2e.

Category 4 – Upstream transportation and distribution

Category 4	
Description	All emissions from the transportation and distribution of products (excluding fuel and energy products) purchased or acquired by CAML in the reporting year. This is where CAML pays for the transport costs to sell to our customers.
Emissions (tCO_2e)	1,993 (2022: 1,805)
Calculation method	Average-data method
Activity data source	The activity data provided by our sales department of the number of trucks dispatched during the year including the total weight per truck and distance travelled per journey.
Emissions data source	This value was then factored with the specific vehicle emission data provided by the US Environmental Protection Agency[1].

Boundaries

In accordance with the Scope 3 Standard, this category accounts for emissions categorised as upstream based on financial transactions. The emissions cover road, rail, and marine freight.

Calculation method

CAML's sales team provided details of the total sales to each customer made across the Group. Category 4 includes those transportation and distribution costs paid for by our suppliers. Copper, zinc and lead are transported from the operations to the smelter/customer directly via trucks and a departure port. Distances for each journey were estimated based on reasonable assumptions. For each mode of transport, distances were estimated and emissions factors from the US environmental protection agency for the respective transport mode were applied to the freight distance for an emission estimate of each product.

Assumptions

The average-data method used Google Maps to estimate the distance from the operations gate to customers. The data captures the net product mass transported monthly, and discerning the truck types, the latter of which was sourced from our Head of Sales Departments. This data collection process produced the total distance travelled in kilometres and the weight in wet metric tonnes ('wmt') per truck.

The average-data method involved multiplying the mass per journey in wmt by the total distance. This value was then factored with the specific vehicle emission

[1] U.S. Environmental Protection Agency (2023) https://www.epa.gov/climateleadership/ghg-emission-factors-hub

data provided by the US Environmental Protection Agency[1]. These figures detailed emissions as CO_2, CH_4, and N_2O per mile. The concluding step combined these to produce an initial figure in $kgCO_2e$ and was converted to tCO_2e for summary.

Inclusion and exclusion

No exclusions were made from this category, as all sales have been recorded and accounted for. However, the exact distance travelled by each truck and ship has been averaged rather than a precise distance for each journey.

Category 5 – Waste generated in operations

Category 5	
Description	Emissions arising from third-party external disposal and treatment in facilities not controlled by CAML of waste generated in the reporting year.
Emissions (tCO_2e)	390 (2022: 395)
Calculation method	Average-data method
Activity data source	Waste data provided by our environment team to capture waste management practices, which are categorised into hazardous and non-hazardous.
Emissions data source	Emission factors for landfills and incinerators taken from the "UK Government Conversion Factors for Company Reporting"[1]. Recycling emission factors provided by Turner A. et al (2015) study[2].

Boundaries

Emissions associated with third-party treatment primarily pertain to waste materials transported and disposed off-site. The data is divided into two distinct categories: hazardous and non-hazardous. Within those categories, waste has further been classified into those disposed of to landfills and incineration as well as types of materials being recycled.

Calculation method

An average-data method, as outlined by the Scope 3 Guidance[3], was employed. This method utilises emission factors tailored to distinct waste types and their corresponding treatment methods multiplied by tonnage of material. Each waste type is assigned an emission factor aligned with its treatment modality. In instances where emission factors for certain treatments were unavailable, the landfill factor was applied, with results presented in $kgCO_2e$ per tonne of material. Emission factors for landfills and incinerators draw from the UK government conversion factors[1], a tool adopted by both UK-based and international entities for GHG emissions reporting. Conversely, recycling emission factors derive from studies on GHG emission factors for the recycling of source-segregated waste materials producing a similar output in $kgCO_2e$ per tonne of material. It is essential

[1] Department for Energy Security and Net Zero (2023) https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023
[2] Turner A, D. et al (2015) https://www.sciencedirect.com/science/article/pii/S0921344915301245?via%3Dihub
[3] Greenhouse Gas Protocol (2013) https://ghgprotocol.org/sites/default/files/2023-03/Scope3_Calculation_Guidance_0%5B1%5D.pdf

to acknowledge that this reference also offers net emission values in terms of emissions mitigated by reuse, yielding a negative emission output.

Assumptions

It was assumed that all materials and respective quantities were hauled off-site and treated in facilities not owned or controlled by the company. Bulk mineral waste was not included, on the basis that these wastes are not handled off-site.

Distances to the various waste treatment sites were combined for each operation and multiplied by a goods freighting emission factor, meaning that the emissions are based on aggregated transportation estimates. It was assumed that the waste was transported on a heavy goods vehicle.

Inclusion and exclusion

Waste analysis includes common recyclables such as mixed paper, mixed plastic, metals, wood, and tires, as well as unique off-site preparations for reuse. Additional items such as oil-based lubricants, light bulbs, car batteries, keck, geomembrane, and office furniture were also incorporated. However, due to the inherent challenges in categorising all disposals accurately, some assumptions were made during the estimation.

Category 6 – Business travel

Category 6	
Description	Emissions from the transportation of employees for business-related activities during the reporting year in vehicles not owned or operated by CAML.
Emissions (tCO_2e)	281 (2022: 262)
Calculation method	Flight and taxi journeys - Distance-based approach Hotel accommodation – Location-based approach
Activity data source	The activity data provided by our corporate travel service provider includes details on flight trips, distances and car rental days.
Emissions data source	Emissions calculated using industry average emissions factors applied based on flight distance: short, medium, or long-haul.

Boundaries

This category covers emissions from all domestic and international flights undertaken by employees for business travel purposes, as well as other purchased business travel services (taxis, hotels and car rentals) identified from annual spend data. Although these emissions are not considered material, they have been calculated for completeness and accuracy.

Calculation method

Total business travel emissions for flights, taxi journeys and hotel accommodation were derived from our travel booking invoices. For flights, a supplier-specific method with estimations derived from airlines, computes emissions per flight based on variables such as, aircraft type, travelled distance, average seating (economy or business class), and passenger load factors. Taxi journey emissions were estimated using a distance-based approach by means of total miles from start to destination. Hotel accommodation emissions were based on total bookings, with an emission factor applied according to average emissions for the country of stay.

Assumptions

The airlines' computations methodology may vary between suppliers. For example, British Airways[1], EasyJet[2] and Wizz Air[3] provide CO_2 footprint tools to estimate the CO_2 emissions for specific flights. However, for other airlines, we have used the "myclimate" online emission calculator[4] to estimate the flight emissions. Ground transportation emissions are based on factors sourced from the UK

[1] British Airways (2023) https://ba.chooose.today/
[2] EasyJet via South Pole (2023) https://easyjet.southpole.com/
[3] Wizz Air (2023) https://wizzair.chooose.today/
[4] myclimate (2024) https://co2.myclimate.org/en/flight_calculators/new

Department of Transportation, integrating specific vehicle emission factor with travelled distance.

Inclusion and exclusion

Assumptions were made for average distances for journeys and country averages for hotel emissions.

Category 7 – Employee commuting

Category 7	
Description	Emissions from the transportation of employees between their homes and their worksites during the reporting year in vehicles not owned or operated by CAML.
Emissions (tCO_2e)	240 (2022: 254)
Calculation method	Average-data approach
Activity data source	The data provided by our suppliers of transportation includes details on number of coaches and vans transporting employees to work and the distances travelled. Surveys were carried out for the public transport users to collect data on transport methods and travelled distances. The quantity of employees commuting by car and the total number of cars parked at our sites were calculated and used.
Emissions data source	Transport for London ('TFL') emissions disclosure for corporate employees[1] while operations used total emissions from distance travelled and method of transport.

Boundaries

This category encompasses emissions from the transportation of employees between their homes and their worksites during the reporting year 2023, using vehicles not owned or operated by CAML. While these emissions may not be considered material, they have been estimated for completeness and accuracy in reporting.

Calculation method

An average-data approach was employed, estimating the total number of coaches and vans transporting employees to site per month. Additionally, the number of cars parked during shifts over a week was extrapolated over the year to estimate the number of trips annually.

During the analysis phase, an average-data approach was adopted. The activity data (distance in kilometre and number of employees) was multiplied by the respective emission factor for each mode of transportation, reported in $kgCO_2e$ per kilometre with final figures summed as tCO_2e.

While the emission factors for corporate commuters were sourced from the UK government website, those for site-specific employees were derived from internal figures relating to duty cars and coaches.

[1] Transport For London (2023) https://foi.tfl.gov.uk/FOI-2292-2223/FOI-2292.pdf

Assumptions

The total number of car journeys by employees was estimated based on the number of cars parked in the car parks of our sites during the middle of each of the shift patterns and extrapolated over the year.

Inclusion and exclusion

No exclusions from this category were made.

Category 8 – Upstream leased assets

Category 8	
Description	Emissions from the operation of assets leased that are leased by CAML in the reporting year and not included in scope 1 and scope 2 reported by lessee.
Emissions (tCO_2e)	-
Calculation method	N/A – not material
Activity data source	CAML does not have material upstream leased assets and therefore no emissions generated.
Emissions data source	N/A

Boundaries

CAML does not have material upstream leased assets and therefore no emissions generated. It is understood that CAML's emissions relating to its leased assets are quantified in the Scope 1 and 2 inventories.

Calculation method

N/A

Assumptions

N/A

Inclusion and exclusion

N/A

Category 9 – Downstream transportation & distribution

Category 9	
Description	All emissions from transportation and distribution of products sold by the company in the reporting year, between CAML's operations and end consumers, in vehicles and facilities not owned or controlled by the company. This category only includes emissions related to transportation and distribution that occurs after the company pays to produce and distribute its product.
Emissions (tCO_2e)	16,025 (2022: 11,948)
Calculation method	Average-data method
Activity data source	The activity data provided by our sales department of number of trucks dispatched during the year including the total weight per truck and distance travelled per journey.
Emissions data source	This value was then factored with the specific vehicle emission data provided by the US Environmental Protection Agency[1].

Boundaries

In accordance with the Scope 3 Standard, this category accounts for emissions categorised as downstream based on financial transactions. The emissions cover road, rail, and marine freight.

Calculation method

CAML's sales team provided details of the total sales to each customer made across the Group. Category 9 includes those transportation and distribution costs which are paid for by CAML. Copper, zinc and lead are transported from the operations to the smelter/customer directly via trucks and a departure port. These distances were estimated for each journey based on reasonable assumptions. For each mode of transport, distances were estimated and emission factors from the US environmental protection agency for the respective transport mode were applied to the freight distance to estimate emissions for each product.

Assumptions

The average-data method used Google Maps to estimate the distance from the operations gate to customers. The data captured the net product mass transported monthly, and discerning the truck types, the latter of which was sourced from our Head of Sales Departments. This data collection process produced the total distance travelled in kilometres and the weight in wet metric tonnes ('wmt') per truck.

[1] U.S. Environmental Protection Agency (2023) https://www.epa.gov/climateleadership/ghg-emission-factors-hub

During analysis, the average-data method was employed: the mass per journey in wmt was multiplied by the total distance. This value was then factored with the specific vehicle emission data provided by the US Environmental Protection Agency[1]. These figures detailed emissions as CO_2, CH_4, and N_2O per mile. The concluding step aggregated these to produce an initial figure in $kgCO_2e$ and converted to tCO_2e for summary summation.

Inclusion and exclusion

No exclusions from this category were made, as all sales have been recorded and accounted for, however, the exact distance each truck travelled has been averaged rather than a precise distance for each journey.

Category 10 – Processing of sold products

Category 10	
Description	All emissions from processing of sold zinc, lead and silver by third parties, subsequent to sale by CAML. These are products that require further processing after the company sells them, but before use by the end consumer.
Emissions (tCO_2e)	115,647 (2022: 120,010)
Calculation method	Customer-specific emission and average-data method
Activity data source	The activity data provided by our sales department of tonnes of zinc, lead and silver to our customers.
Emissions data source	Customer-specific emission received from customers

Boundaries

This category involves estimating downstream emissions resulting from the processing of CAML's sold products, predominantly in concentrate form. This processing often occurs during the pyrometallurgical phase at smelters.

Calculation method

The activity data consists of the assessing the cumulative commodity output from both the Kounrad operation and Sasa mine, reported in tonnes. For analysis, a hybrid method is employed. Customer-specific emission factors for sales to customers for zinc, lead and silver have been received, with these factors indicating emissions in terms of tonne CO_2 per tonne of commodity. This then been applied using an average-data method for our other customers.

Assumptions

As we produce a final copper product at Kounrad, we have assumed no further emissions arise for the processing our copper.

Inclusion and exclusion

No exclusions from this category were made, as all sales have been recorded and accounted for, however, the customer-specific data provided by our customers were used as a basis for our other sales where data was not available.

Category 11 – Use of sold products

Category 11	
Description	Emissions from the end use of copper, zinc, lead and silver in the reporting year.
Emissions (tCO_2e)	61,223 (2022: 62,422)
Calculation method	Average-data method
Activity data source	The activity data provided by our sales department of total tonnes of copper, zinc, lead and silver to our various customers during the year.
Emissions data source	The International Lead and Zinc Study Group and literature on the lead industry life cycle.

Boundaries

This category is an estimation of the downstream emissions originating from the consumption of sold products beyond the processing stage. These emissions arise as plants and facilities convert the metals into final usable products. For example, the lead concentrate which has been smelted and refined is now cast into commercial-ready form like ingots. These lead ingots then find their way into the hands of manufacturers. For instance, a battery manufacturer will harness this lead to construct both the positive and negative terminals of a lead-based battery.

Calculation method

Average-data method is used as we can provide data on our total tonnes of commodities sold during the year. The emission for each commodity is estimated using industry data and therefore significant assumptions have been applied with an average CO_2 emissions applied to each tonne of our commodities sold.

Assumptions

Due to the lack of precise information regarding the specific uses of our final products, category 11 is based on industry averages. The International Lead and Zinc Study Group[1] points out that batteries account for the dominant share of lead use at 80%, while rolled products contribute 6%. Literature on the lead industry life cycle suggests that producing one battery emits $30kgCO_2e$ and each square metre of lead sheet releases $12kgCO_2e$. Given that a square metre of lead sheet weighs 19.3kg, this means each kilogramme of lead from these sheets is responsible for $0.6218kgCO_2e$ emissions. Furthermore, according to the UN's environmental findings, a typical battery contains 10 kg of lead, which equates to an emission intensity of $3tCO_2e$ per tonne of lead used.

The US Environmental Protection Agency reports that zinc is predominantly utilised for galvanising steel. Consequently, emissions associated with zinc usage have been estimated using an emission factor per unit of product.

Similarly, according to the International Copper Association, copper finds extensive applications in buildings, electrical systems, and transportation. Hence, emissions related to copper usage have been estimated using an emission factor per unit of product.

Inclusions and exclusions

For zinc and lead commodities, the total percent use of sectoral end use totalled 50% and 86% respectively, due to data availability[1]. Silver was excluded due to insignificant output tonnage. All uses of CAML's sold products were based on industry average data and therefore the total emissions is an estimate for category 11.

Category 12 – End-of-Life treatment of sold products

Category 12	
Description	Emissions from the waste disposal and treatment of copper, zinc, lead and silver at the end of their life.
Emissions (tCO_2e)	31,412 (2022: 32,957)
Calculation method	Average-data method
Activity data source	The activity data provided by our sales department of total tonnes of copper, zinc, lead and silver sold during the reporting year.
Emissions data source	• Copper: 1.7 tonnes CO_2e per tonne, as determined by a literature on the carbon footprint of both copper and zinc production. • Zinc: 1.4 tonnes CO_2e per tonne, sourced from the Bureau of International Recycling. • Lead: Intensity data for recycling was referenced from the US Environmental Protection Agency.

Boundaries

Category 12 accounts for downstream emissions associated with the end-of-life treatment of sold products. Navigating this category presents challenges due to complexities in data availability. The analysis predominantly focuses on the recycling of end-use products, as assumptions about products still in circulation or those that may end up in landfills are speculative and outside the scope of this assessment.

Calculation method

N/A

Assumptions

Due to the lack of precise information regarding the end-of life treatment of sold products, Category 12 is based on industry averages. The analytical approach employs the average-data method, aligning the recycling emission factor with the specific recycling rates and then applies this to the commodity output. Recycling intensities are derived using industry data, and an average CO_2 emissions applied to each tonne of our commodities sold.

For the remainder of commodity product not recycled, it is assumed the product is still in circulation, and emissions for landfill are not accounted for.

Inclusion and exclusion

All end-of-life treatment of our commodities is based on industry literature average data, resulting in the total emissions for Category 12 being an estimate.

Category 13 – Downstream leased assets

Category 13	
Description	Emissions from the operation of assets owned and leased to other entities in the reporting year, not included in Scope 1 and Scope 2.
Emissions (tCO_2e)	-
Calculation method	N/A – Not material
Activity data source	CAML does not have downstream leased assets and therefore no emissions generated.
Emissions data source	N/A

Boundaries

The emissions inventory boundary is defined to include all assets by CAML and leased onwards for use by an external entity. CAML has not leased any material assets to other entities. It is understood that CAML's emissions relating to its leased assets are quantified in the Scope 1 and 2 inventories.

Calculation method

N/A

Assumptions

N/A

Inclusion and exclusion

N/A

Category 14 – Franchises

Category 14	
Description	Emissions from operation of franchises in the reporting year not included in Scope 1 and Scope 2.
Emissions (tCO_2e)	-
Calculation method	N/A - Not-material
Activity data source	CAML does not have franchised operations and therefore no emissions generated.
Emissions data source	N/A

Boundaries
CAML does not operate on a franchise model and thus, has no franchisees for which emissions can be attributed.

Calculation method
N/A

Assumptions
N/A

Inclusion and exclusion
N/A

Category 15 – Investments

Category 15	
Description	Emissions associated with investment operations during the reporting year that fall outside of Scope 1 and Scope 2.
Emissions (tCO_2e)	-
Calculation	N/A - Not-material
Activity data source	No significant emissions produced from investments.
Emissions data source	N/A

Boundaries

There are no material emissions arising from our investments during the year ended 31 December 2023.

Calculation method

N/A

Assumptions

N/A

Inclusion and exclusion

The Group hold some investments in exploration companies, however, given limited scope of work at this stage these are immaterial, and the emissions have not been included.

Appendix 1 - Glossary of terms

Activity Data - quantitative information detailing the specific actions, processes, or events that generate or involve the emission of pollutants, energy consumption, or other relevant environmental metrics, often used in environmental assessments and reporting.

Capital Goods – durable and long-lasting assets, such as machinery, equipment, and buildings, used in the production of goods and services by businesses.

Cradle to Gate – a life cycle assessment approach that evaluates the environmental impact of a product or process from raw material extraction (cradle) to the factory gate, excluding subsequent stages like product use and disposal.

Downstream emissions - greenhouse gas emissions produced during the distribution, consumption, and disposal phases of a product's life cycle, after its production and prior to the end of its useful life.

Emissions Factor – a numerical representation of the amount of a specific pollutant released into the atmosphere per unit of activity, such as energy production or industrial processes, providing a standard measure for estimating emissions.

Fleet Mobile Combustion – the burning of fossil fuels, such as gasoline or diesel, by a collection of mobile vehicles, like a fleet of cars, trucks, or other transportation means.

Fugitive Emissions - unintended and uncontrolled releases of gases or vapours from industrial processes, equipment, or infrastructure, often escaping into the atmosphere without passing through a designated emission point.

Greenhouse Gas - A greenhouse gas is any gaseous compound, such as carbon dioxide or methane, that absorbs and emits radiation within the thermal infrared range, contributing to the greenhouse effect and influencing the Earth's climate. Greenhouse gases accounted for in this report are the seven main gases covered by the UNFCCC/Kyoto Protocol as defined in GHG Protocol, as amended: carbon dioxide (CO_2); methane (CH_4); nitrous oxide (N_2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); sulphur hexafluoride (SF_6); and nitrogen trifluoride (NF_3).

GHG Protocol - Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard Supplement to the GHG Protocol Corporate Accounting and Reporting Standard, Copyright of World Resources Institute and World Business Council for Sustainable AA 2021 Scope 3 Methodology Summary Report Development.

Global Reporting Initiative - a non-profit organization that promotes sustainability reporting standards and provides a framework for organizations to transparently communicate their economic, environmental, and social performance to foster global sustainability.

Location-based Scope 2 Emissions - indirect GHG emissions associated with the generation of purchased or acquired electricity, steam, heat, or cooling consumed by an organisation's operations at a specific location. These emissions occur off-site at the location where the energy is generated but are attributed to the organisation based on its consumption.

Scope 1 Emissions - encompasses direct greenhouse gas emissions originating from CAML's own activities or sources under its control. Managing these emissions is essential for organisations committed to reducing their environmental footprint and promoting sustainability.

Scope 2 Emissions - Indirect greenhouse gas emissions stemming from purchased energy sources, such as electricity and heat. Understanding and effectively managing Scope 2 emissions is crucial for organisations seeking to minimise their environmental impact and enhance overall sustainability efforts.

Scope 3 Emissions - Indirect GHG emissions that occur in the value chain of a company but are not directly owned or controlled by that company. These encompass all indirect emissions associated with its operations in its upstream and downstream activities.

Stationary Combustion - the process of burning fuels, typically in industrial facilities or power plants, where the combustion source remains fixed in one location rather than being mobile.

Upstream Emissions - greenhouse gas emissions associated with the extraction, production, and transportation of raw materials or fuels before they reach the point of use or consumption in a specific process or product.

Appendix 2 - Units of measurement

GJ - Gigajoule

kWh – Kilowatt per hour

kg - Kilogrammes

CO_2e – Carbon dioxide equivalent

tCO_2e - Metric tonnes of carbon dioxide equivalent

wmt – Wet metric tonnes

km - Kilometres

t – Tonnes

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