Carbon Footprints of Teck Special High Grade Zinc and Continuous Galvanizing Grade Zinc

2022

December 19, 2023
Report version: v.1.0

Teck

About this Report

This report outlines and explains our analysis of the 2022 carbon footprints[1] of Special High Grade (SHG) zinc and Continuous Galvanising Grade (CGG) zinc produced at Teck Resources Limited's (Teck's) Trail Operations in British Columbia. Teck sells multiple grades of CGG zinc, a zinc aluminum alloy, with aluminum content differing between grades.

The analysis conducted in accordance with the methodology set out herein concludes that each tonne of SHG zinc produced by Trail Operations generates **0.94 tonnes of CO_2e**[2] and each tonne of CGG zinc produced by Trail Operations generates between **0.99 - 1.11 tonnes of CO_2e**, depending on the amount of aluminum alloyed with SHG in each CGG grade. The units of analysis for the footprints are one tonne of SHG zinc and one tonne of CGG zinc.

This report includes:

- The carbon footprint methodologies which were used to complete this analysis.
- The scope of emissions included within the boundary of the carbon footprints.
- A summary of the underlying data to support the carbon footprint conclusions.

Methodology

Methodologies

With respect to scope and boundary, Teck has, in accordance with the requirements of the *GHG Protocol Life Cycle Accounting and Reporting Standard* (the GHG Protocol Standard), taken a "cradle-to-gate" approach. Emissions included in the carbon footprints of Trail Operations' SHG and CGG zinc are outlined in Figure 1. The analysis was completed for the 2022 calendar year. The GHG Protocol Standard is used as it is a well-recognized and broadly accepted guidance for greenhouse gas (GHG) accounting for products.

This report uses the methodology outlined herein to calculate the product carbon footprint attributable to the production of SHG and CGG zinc at Trail Operations. The GHG emissions attributable to other products (metal and non-metal) produced at Trail Operations are excluded from the carbon footprint attributable to the production of SHG and CGG zinc.

The methodologies used in this report for the calculation of the SHG zinc carbon footprint are aligned with the methodologies used in the **2021 Carbon Footprint of Teck Special High Grade Zinc report**.

Data Period and GHGs

The analysis presented in this report is based on 100% of the SHG and CGG zinc produced at Trail Operations during the 2022 calendar year. 2022 has been selected as it is the most recent year for which a full data set is available.

The GHG emissions included in this analysis are CO_2, CH_4, N_2O, and SF_6. Other GHGs, including perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs), were not included as they were not applicable or considered immaterial to the carbon footprints. For the Global Warming Potential (GWP) factors, the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report: Climate Change 2014 (AR5) GWP100 factors have been used to align with regulatory reporting requirements and **guidance from the International Zinc Association (IZA)**.

Carbon Footprint Emissions Boundaries

Teck has aligned the footprint boundaries with the requirements in the GHG Protocol Standard . The boundary identifies which emissions along the life cycle are included in the footprints.

The boundary of the footprints is "cradle-to-gate" which begins with the mining of zinc concentrate and concludes with the production of SHG and CGG zinc at the smelter and refinery (see Figure 1). Both SHG and CGG zinc are intermediate products that are sold to customers who further process them to produce a variety of products with different end uses. The "cradle-to-gate" inventory was chosen over a "cradle-to-grave" as, according to the GHG Protocol Standard, "if the function of the final product for which the intermediate product is an input is not known, a cradle-to-gate boundary is defined".

Based on a cradle-to-gate boundary, the following emissions are used to calculate the carbon footprints:

1. Emissions associated with the mining and production of zinc concentrate feeding into the smelting and refining process:

a. Scope 1 and 2 emissions from the mining and production of zinc concentrates at Teck mines. Scope 3 emissions (relative to Teck) from the mining and production of zinc concentrates at non-Teck mines[3]. The designation 'Teck mine' refers to the Red Dog Mine which is indirectly owned by Teck and provides zinc concentrates for Trail Operations, and the designation 'non-Teck mines' refers to mines not owned by Teck that Trail Operations procures zinc concentrate from.

b. Scope 3 emissions associated with the production and transportation of purchased goods and fuels for each of the mines (Teck and non-Teck) from which zinc concentrate is sourced.

1 The term "carbon footprint" is used in this report to reflect the focus on the greenhouse gas impact of the product.

2 Trail produces a minor amount of high grade (HG) zinc that would have the same final cradle-to-gate intensity as the SHG zinc.

3 The Scope 1 and 2 emissions from non-Teck mines are Scope 3 emissions relative to Teck

2. Emissions associated with the transportation of zinc concentrates from the applicable mines to Trail Operations

a. Scope 3 emissions (relative to Teck) associated with the movement (e.g. trucking, rail, and shipping) and handling (e.g. ports) of the zinc-containing concentrates.

3. Emissions associated with the smelting and refining of zinc concentrates at Trail Operations

a. Scope 1 and 2 emissions of Trail Operations (including direct emissions from the operation and indirect emissions from consumed electricity).

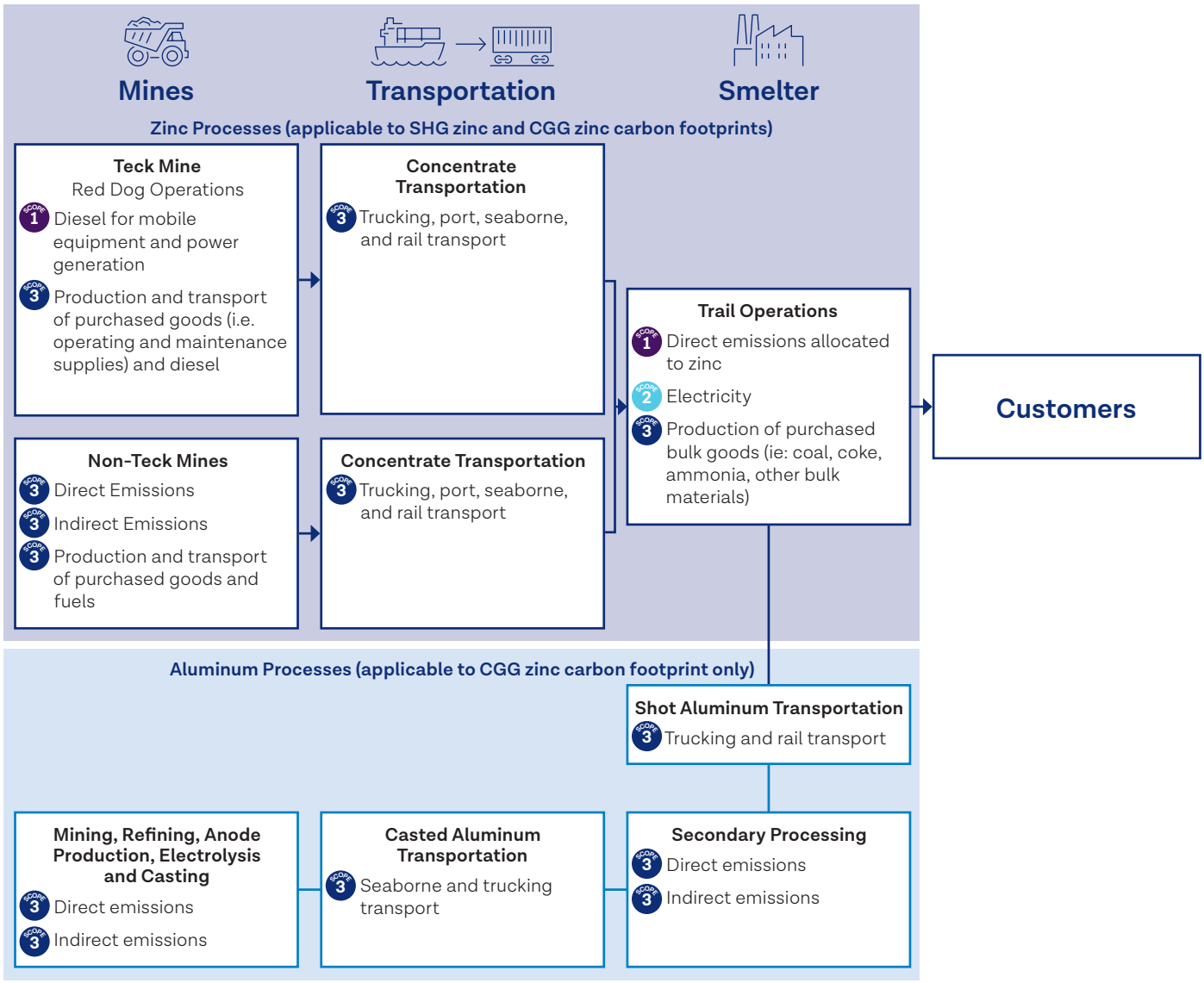
b. Scope 3 emissions associated with the production and transportation of bulk goods

4. Emissions associated with the production and transportation of aluminum used at Trail Operations (applicable to CGG zinc carbon footprint only)

a. Scope 3 emissions (relative to Teck) associated with the mining, smelting, anode production, electrolysis, casting, secondary processing and transportation of the aluminum used for CGG zinc alloying.

In addition to the emissions covered by the SHG zinc boundary (top box in Figure 1) the CGG zinc boundary includes upstream emissions from the aluminum contained in the CGG zinc alloy (bottom box in Figure 1).

Figure 1: System Boundary of Carbon Footprints



In accordance with the GHG Protocol Standard and its guidance that the boundary of a cradle-to-gate partial life cycle inventory should not include product use or end-of-life processes in the inventory results, GHG emissions downstream of Trail Operations are excluded.

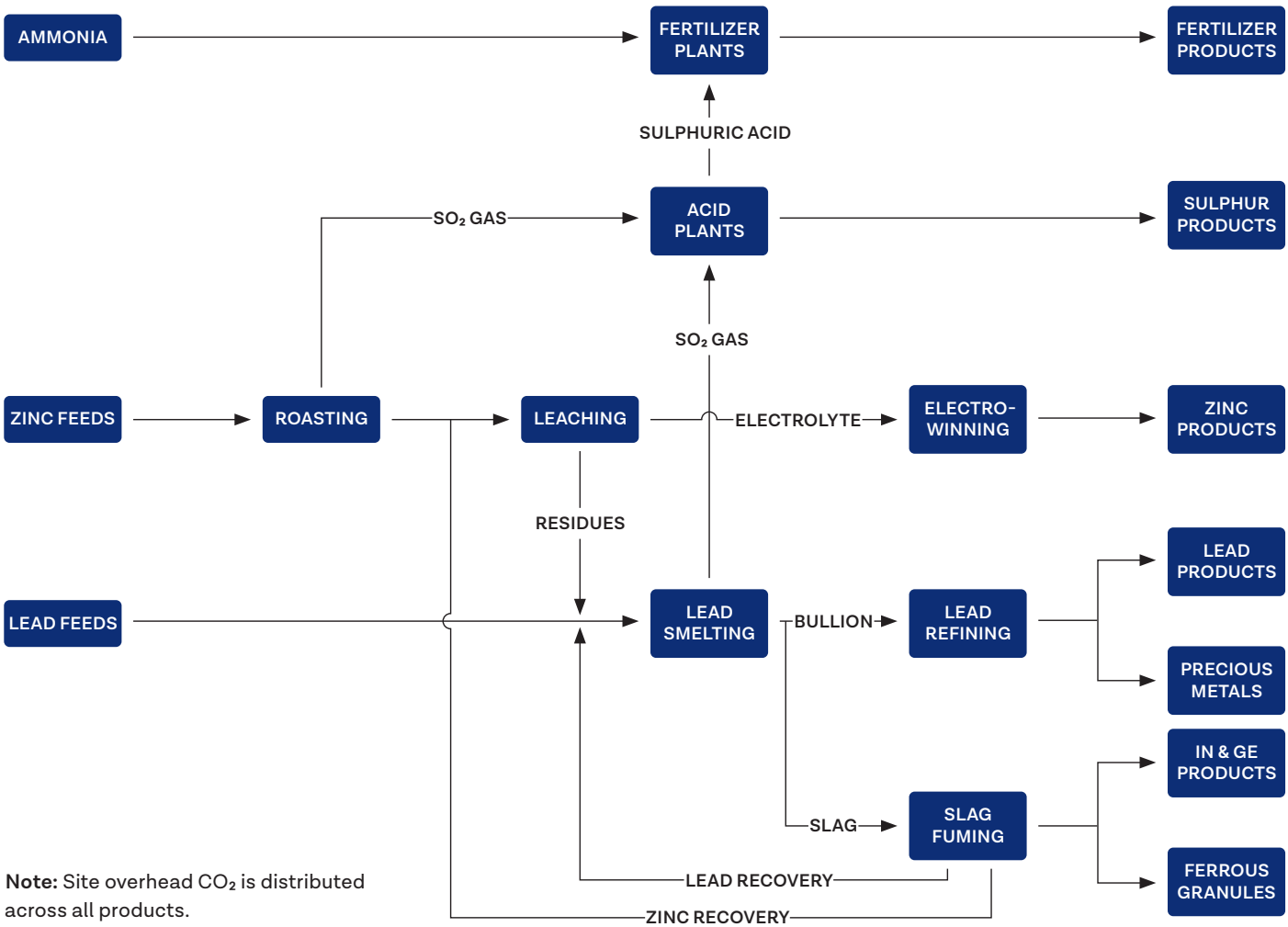
Allocation

Teck's Trail Operations, located in the community of Trail in British Columbia, Canada, is one of the world's largest fully integrated zinc and lead smelting and refining complexes. The metallurgical operations produce refined zinc and lead, a variety of precious and specialty metals, chemicals, and fertilizer products. For integrated facilities like Trail Operations that produce multiple products there is a need to subdivide and then allocate facility emissions to the various products in a manner that avoids double counting and which reflects the emissions required to produce each respective product.

The GHG Protocol Standard recommends that companies consider various techniques, such as process subdivision, to minimize the use of allocation in the product inventory. When allocation becomes unavoidable, the GHG Protocol Standard recommends that companies allocate emissions based on the underlying physical relationships between the product and co-products.

For SHG and CGG Zinc production at Trail Operations, the flow sheet was first subdivided into processes as visualized in Figure 2.

Figure 2: Trail Flow Sheet Subdivision



Note: Site overhead CO_2 is distributed across all products.

After subdivision, the GHG outputs were allocated from each subdivision to the valued products of that subdivision. Allocation was performed using the mass allocation method, as mass best represents the underlying physical relation between products and is long established from Trail Operations' metallurgical accounting processes.

Data Collection & Quality

The GHG Protocol Standard requires "a descriptive statement on the data sources, data quality, and any efforts taken to improve data quality" for significant processes in reporting the footprint.

The significant processes identified in this analysis are:

- Mining (Teck and non-Teck mines);
- Transportation of concentrate from mines to Trail Operations (from Teck and non-Teck mines); and
- Smelting and alloying[4] (Trail Operations).

As required by the GHG Protocol Standard, primary data[5] has been collected for all processes under Teck's ownership. The non-Teck mining source of data is a third-party, GHG and energy intensity data set purchased from Skarn Associates Ltd. (Skarn).

Data collected for the significant processes has been assessed based on the scores Poor, Fair, Good or Very Good for the GHG Protocol Standard Quality Indicators as summarized in Table 1:

Table 1: Data Quality Assessment

Data Quality Indicators[6]	Data Quality Assessment Scoring
Technological representativeness "The degree to which the data reflects the actual technology(ies) used"	All data is specific to the actual technologies used at Teck's facilities. The proxy data used for less material sources was still considered technology-specific. Technological representativeness is considered **very good**.
Temporal representativeness "The degree to which the data reflects the actual time (e.g., year) or age of the activity"	The majority of data used in this analysis is 2022 data. The temporal representativeness for all data is considered **very good**.
Geographical representativeness "The degree to which the data reflects the actual geographic location of the activity (e.g., country or site)"	The majority of data was collected specific to the geographic location of the process in the inventory boundary. Geographical representativeness is considered to be **very good**.
Completeness "The degree to which the data are statistically representative of the relevant activity. Completeness includes the percentage of locations for which data is available and used out of the total number that relate to a specific activity. Completeness also addresses seasonal and other normal fluctuations in data."	Data has been collected for all significant processes through the supply chain. Annual data was collected for these processes to average out seasonal variations. The completeness is considered **very good** for all significant processes.
Reliability "The degree to which the sources, data collection methods and verification procedures used to obtain the data are dependable."	For all data collected for the Teck sites (i.e. Red Dog and Trail Operations), the data has been collected from verified sources and/or measured data and is considered **very good**. The non-Teck mining source of data is a third-party data set (Skarn) of which some data comes from verified sources and some data is based on assumptions (when verified data was not available), of which the reliability is considered **fair**. For CGG alloying, some data came from suppliers and some data was based on assumptions due to availability of data, of which the reliability is considered **fair**.

4 The process of alloying is only applicable to the carbon footprint of CGG zinc.

5 As per the GHG Protocol Standard: "Primary data = Data from specific processes in the studied product's life cycle, Secondary data = Process data that are not from specific processes in the studied product's life cycle.

Proxy data = Data from a similar activity that is used as a stand-in for the given activity. Proxy data can be extrapolated, scaled up, or customized to represent the given activity."

6 Definitions of Data Quality Indicators from **GHG Protocol Standard: Table [8.1]**

Uncertainty

The sources of inventory uncertainty and methodological choices are as follow:

- Analysis from a third party was utilized for non-Teck mines' mining/transportation emissions and presents a source of uncertainty as it applies assumptions to produce emission estimates. Changes or inaccuracies in the assumptions could potentially impact the non-Teck mining and transportation emission estimates in this analysis.

- For the zinc equivalency calculations used for the Teck mining intensity and transportation intensity calculations, a 3-year average of metal prices is used to minimize the impact on price fluctuations to the CO_2e emissions. Teck was limited in the equivalency calculations for non-Teck mines and transportation, as the third-party data set utilized a single year of metal prices for zinc equivalency calculations. Therefore, impact from fluctuations of metal prices could add uncertainty to the result, particularly for the non-Teck mine and transportation emissions.

- For the Global Warming Potential (GWP) factors, the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report: Climate Change 2014 (AR5) GWP100 factors have been used. Changes to the GWP factors could add uncertainty to the CH_4 and N_2O emissions.

- Primary aluminum greenhouse gas intensity data sourced from the International Aluminum Institute was utilized for emission intensities associated with aluminum production used in the CGG zinc carbon footprint. Assumptions used in the data could add uncertainty to the aluminum emission estimates in this analysis.

Results

Detailed results from the analysis carried out by Teck in accordance with the methodology and based on the assumptions set out herein are shown in Tables 2 and 3 below.

The results showed each tonne of SHG zinc produced by Trail Operations generates 0.94 tonnes of CO_2e. For SHG zinc, the life cycle stage with the largest impact on the cradle-to-gate intensity was mining, followed by smelting, and then transportation.

Table 2: 2022 SHG Zinc Emission Intensities Summary

	Emission Intensity: Mining	Emission Intensity: Transportation	Emission Intensity: Trail Smelting	Emission Intensity: Cradle-to-Gate
Scope	**Scope 1 + 2 + 3**	**Scope 3**	**Scope 1 + 2 + 3**	**Total**
% of Total Emissions in Cradle-to-Gate Life Cycle	60%	16%	24%	**100%**
SHG Zinc Intensity (tonne CO_2e/tonne SHG zinc)	0.57	0.15	0.22	**0.94**

As CGG zinc is a zinc aluminum alloy, each grade's carbon footprint was calculated based on the average percentage of SHG zinc and aluminum contained in each CGG zinc grade. The SHG and aluminum carbon intensities were then applied to the respective contents to calculate the carbon footprint of each CGG zinc grade.

The results showed each tonne of CGG zinc produced by Trail Operations generates between 0.99 – 1.11 tonnes of CO_2e, depending on the amount of aluminum alloyed with SHG in each CGG grade (CGG grades ranging from 0.3% to 1% aluminum content). This range covers all grades of CGG zinc produced at Trail Operations in 2022. For CGG zinc, the life cycle stage with the largest impact on the cradle-to-gate intensity was mining, followed by smelting and alloying, and then transportation.

Table 3: 2022 CGG Zinc Emission Intensities Summary

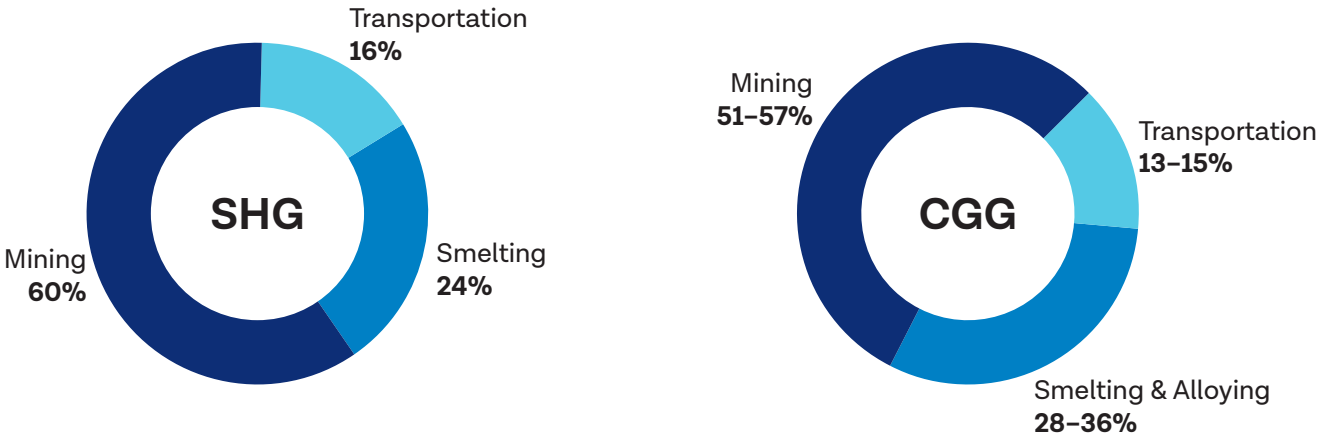
	Emission Intensity: Mining	Emission Intensity: Transportation	Emission Intensity: Trail Smelting & Alloying[7]	Emission Intensity: Cradle-to-Gate
Scope	**Scope 1 + 2 + 3**	**Scope 3**	**Scope 1 + 2 + 3**	**Total**
% of Total Emissions in Cradle-to-Gate Life Cycle	51–57%	13–15%	28–36%	**100%**
CGG Zinc Intensity (tonne CO_2e/tonne CGG zinc)	0.56–0.57	0.15	0.28–0.40	**0.99–1.11**

7 The "Trail Smelting and Alloying" life cycle stage includes the Scope 3 emissions (relative to Teck) associated with the mining, smelting, anode production, electrolysis, casting, secondary processing and transportation of the aluminum used for CGG zinc alloying.

Conclusions

Applying the GHG Protocol Standard's methodology and based on the assumptions set out herein, Teck's Trail Operations in 2022 had a carbon footprint for SHG zinc of 0.94 tonnes CO_2e per tonne SHG zinc and a carbon footprint for CGG zinc of 0.99 – 1.11 tonnes of CO_2e per tonne of CGG zinc, depending on the grade.

Figure 3: Contribution of life cycle stages to the complete carbon footprint of Teck SHG and CGG zinc



Disclaimer

The results presented in this report reflect only the analysis performed by Teck in respect of SHG zinc and CGG zinc produced from its Trail Operations during the calendar year ending December 31, 2022, based on the methodologies set out in this Report. The data collected in accordance with this Report and the results of this Report are each subject to all the assumptions and uncertainties set out in this Report. Changes in methodology or data sources may materially impact the conclusions reached hereunder. The results should not be used as a comparative tool directly against other products as the differences in assumptions and practises may produce incomparable results.

For More Information

For more information on the products Teck produces, readers can visit: https://www.teck.com/products/

Further information on our approach to sustainability and annual GHG emissions reporting is available at: www.teck.com/ responsibility If you have any questions about this report, email us at sustainability@teck.com or contact:

Scott Maloney
Vice President, Environment
Email: Scott.Maloney@teck.com

Chris Adachi
Director, Climate Change
Email: Chris.Adachi@teck.com

Assurance

Independent practitioner's limited assurance report on the Carbon Footprint of Special High-Grade Zinc and Continuous Galvanizing Grade Zinc produced at Teck Resources' Trail Operations

To the Directors and Management of Teck Resources Limited

We have undertaken a limited assurance engagement over the following subject matter; the carbon footprint of Special High Grade (SHG) zinc and all grades of Continuous Galvanizing Grade (CGG) zinc produced in 2022 via Teck Resources Limited (Teck)'s Trail Operations, 0.94 tonnes CO_2e per tonne SHG zinc and a range of 0.99 – 1.11 tonnes of CO_2e per tonne of CGG zinc, dependent on the aluminum alloyed with SHG in each CGG grade (the subject matter) as presented within the 'Carbon Footprints of Teck Special High Grade Zinc and Continuous Galvanizing Grade Zinc' report for the period from January 1, 2022 to December 31, 2022.

Management's responsibility

Management is responsible for the preparation of the subject matter in accordance with the requirements established in the Greenhouse Gas Protocol - Product Life Cycle Accounting and Reporting Standard (the applicable criteria). Management is also responsible for selecting the applicable criteria used. Management is also responsible for such internal controls as management determines necessary to enable the preparation of the subject matter that is free from material misstatement, whether due to fraud or error.

Our responsibility

Our responsibility is to express a limited assurance conclusion on the subject matter based on the evidence we have obtained. We conducted our limited assurance engagement in accordance with International Standard on Assurance Engagements (ISAE) 3000, Assurance Engagements Other Than Audits or Reviews of Historical Financial Information. This standard requires that we plan and perform this engagement to obtain limited assurance about whether the subject matter is free from material misstatement.

A limited assurance engagement involves performing procedures (primarily consisting of making inquiries of management and others within the entity, as appropriate, and applying analytical procedures) and evaluating the evidence obtained. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of users of our report. The procedures are selected based on our professional judgment, which includes identifying areas where the risks of material misstatement, whether due to fraud or error, in preparing the subject matter in accordance with the applicable criteria are likely to arise.

Our engagement included, among others, the following procedures performed:

- Reviewing the suitability of the boundaries that Teck has established;
- Making enquiries of management to obtain an understanding of the overall data management and internal control environment relevant to the management, aggregation and reporting of the subject matter;
- Conducting virtual interviews with individuals on site responsible for the management of activities and emission sources at Trail Operations;
- Analytical reviews and trend analysis of reported data for the subject matter;
- Obtained and inspected a limited sample of underlying documentation to support the subject matter;
- Evaluating the appropriateness of quantification methods and reporting policies used, and the plausibility of estimates made by Teck; and
- Evaluating the presentation of the subject matter in the 'Carbon Footprints of Teck Special High Grade Zinc and Continuous Galvanizing Grade Zinc' Report.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement and, consequently, the level of assurance obtained is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

Our independence and quality control

We have complied with the relevant rules of professional conduct/code of ethics applicable to the practice of public accounting and related to assurance engagements, issued by various professional accounting bodies, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

The firm applies Canadian Standard on Quality Control 1, Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance Engagements, and, accordingly, maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

Significant inherent limitations

Greenhouse gas emissions data, a key input into the subject matter, are subject to inherent limitations given the nature and methods used for determining such data. The selection of different but acceptable measurement techniques can result in materially different measurements. The precision of different measurement techniques may also vary.

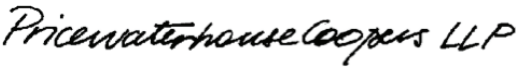
Conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the carbon footprint of Special High Grade zinc and all grades of Continuous Galvanizing Grade zinc produced in 2022 via Teck Resources Limited's Trail Operations, 0.94 tonnes CO_2e per tonne SHG zinc and a range of 0.99 – 1.11 tonnes of CO_2e per tonne of CGG zinc, dependent on the aluminum alloyed with SHG in each CGG grade as presented within the 'Carbon Footprints of Teck Special High Grade Zinc and Continuous Galvanizing Grade Zinc' report for the period from January 1, 2022 to December 31, 2022 is not prepared, in all material respects, in accordance with the applicable criteria.

Purpose of statement and restriction on use of our report

The subject matter has been prepared in accordance with the applicable criteria to report the subject matter to the Board of Directors. As a result, the subject matter may not be suitable for another purpose. Our report is intended solely for the Board and management of Teck.

We acknowledge the disclosure of our report, in full only, by Teck Resources at its discretion, without assuming or accepting any responsibility or liability to any other third party in respect of this report.



Chartered Professional Accountants
Vancouver, British Columbia
December 19, 2023