RioTinto

Verification Report

Verification of the carbon intensity assertion related to aluminum production for the year 2022

Final version

TETRA TECH

Project: 48022TTA-2022

Revision: 0

2023-07-06

Verification of the Carbon Intensity Related to the Production of Aluminum for the Year 2022

Project: 48022TTA-2022
Rev. 0
2023-07-06

PRESENTED TO

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2023-07-06

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Date

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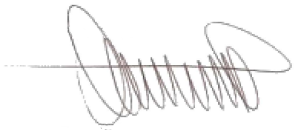

2023-07-06

Roger Fournier, CPA
Lead GHG verifier

Date

REVISIONS

REVISION	DATE	DESCRIPTION	PREPARED BY
A	**JULY 05, 2023**	**REPORT FOR COMMENTS**	**GC/RF/**CQ
0	**JULY 06, 2023**	**FINAL VERSION**	**GC/RF/**CQ

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1.0 INTRODUCTION

Rio Tinto Alcan inc. (Rio Tinto) is a mining group that focuses on finding, mining and processing the Earth's mineral resources. With a view to continuously monitor its carbon footprint, Rio Tinto developed its own standard to evaluate the impact of its production of aluminum (Al) for multiple sites, the certification is named RenewAl™.

Tetra Tech QI Inc. (Tetra Tech) was mandated by Rio Tinto to provide professional services for the verification of the carbon intensity with engagements at a limited level of assurance related to aluminum production in eight (8) of its aluminum smelters: six (6) are located in the provinces of Quebec and British Columbia in Canada (CA), one (1) in New Zealand (NZ) and one (1) in Iceland (IS).

1.1 Roles and Responsibilities

Rio Tinto is responsible for the relevance, consistency, transparency, conservatism, completeness, accuracy and presentation of the Assertion Reports. Our responsibility is to express an opinion based on our verification.

The objective of Tetra Tech QI Inc. (Tetra Tech) was to verify the information contained in the reports in order to issue an opinion with a limited level of assurance following our verification.

1.2 Client and Establishments Verified

The promoter and the address of its head office are as follows:

Rio Tinto Alcan inc.
400-1190 Avenue des Canadiens de Montréal
Montréal (Quebec) H3B 0E3

The facilities subject to this verification are the following:

Table 1-1 – GHG emitters for the voluntary assessment certification RenewAl™

Facility	Municipality/Country
AP60 smelter	Saguenay, Qc, Canada
Arvida smelter	Saguenay, Qc, Canada
Alma smelter	Alma, Qc, Canada
Grande-Baie smelter	Saguenay, Qc, Canada
Laterriere smelter	Saguenay, Qc, Canada
Kitimat smelter	Kitimat-Stikine, BC, Canada
Icelandic smelter (ISAL)	Hafnarfjörður, Iceland
New-Zealand smelter (NZAS)	Tiwai Point, New-Zealand

1.3 VERIFICATION OBJECTIVES

The objective of this verification by Tetra Tech, an independent third party, is to provide Rio Tinto an opinion with a limited level of insurance on the carbon intensity assertion from aluminium production based on the organizational boundaries and the applicable criteria specified in the certification.

A limited level of assurance corresponds to a low and not absolute level of assurance, and thus, does not guarantee, that a verification will be able to detect any material misstatement that may exist. Inaccuracies may arise from fraud or error and are considered material when they exceed the applicable materiality threshold of the declared values. Other activities we engage in include: identify and assess the risk of material misstatements in the application or report, whether due to fraud or error.

1.4 REPORTING PERIOD

The reporting period is January 1st, 2022, to December 31st, 2022.

1.5 VERIFICATION CRITERIA

The verification of the Carbon Intensity Assertions is carried out to confirm its adequacy with the requirements of the GHG Protocol Corporate Accounting and Reporting Standard and Rio Tinto's voluntary certification RenewAl™. The Greenhouse Gas (GHG) emissions are from Scope 1 and 2 as defined by the GHG Protocol Corporate Accounting and Reporting Standard[1] and include all the main significant gases.

This verification is also conducted considering the followings:

- The quantification approach and the methodologies used;
- The data used in the assertion are subject to adequate quality controls and procedures.
- The calculations used are sufficiently accurate and detailed.
- The degree of uncertainty in the assertion report is low and the material discrepancy threshold has not been reached or exceeded.

1.6 LEVEL OF ASSURANCE

This verification of the carbon emission intensity reporting was performed according to a limited level of assurance, as specified by Rio Tinto's inhouse voluntary certification.

1.7 MATERIAL DISCREPANCY THRESHOLD

The materiality threshold established by the *RenewAl™* for GHG emission is 5% of the facility's complete inventory.

1.8 VERIFICATION PERIOD

The verification officially began at the kick-off meeting held on January 11, 2023, by videoconference between Rio Tinto and the Tetra Tech verification team. The verification is considered complete as of the date of the final version of this report.

[1] https://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf

2.0 VERIFICATION BODY

2.1 ACCREDITATION OF THE VERIFICATION BODY

Tetra Tech QI Inc. is an ISO 14065 accredited company by the Standards Council of Canada (SCC) since June 25th, 2015 (https://www.scc.ca/fr/accreditation/gaz-a-effet-de-serre/tetra-tech-qi-inc). Tetra Tech QI Inc. registered with SCC has the following contact information:

Tetra Tech QI inc.
1205-310, Ampère ST
Boucherville (Quebec) J4B 7M6

Some of the relevant sectors of Tetra Tech's ISO 14065 accreditation also includes:

- Group 1, Sector 4 (G1-S4): Mining and Mineral Production;
- Group 1, Sector 5 (G1-S5): Metal Production;

2.2 VERIFICATION ORGANIZATION CHART

Tetra Tech's organizational chart is shown in the following figure:

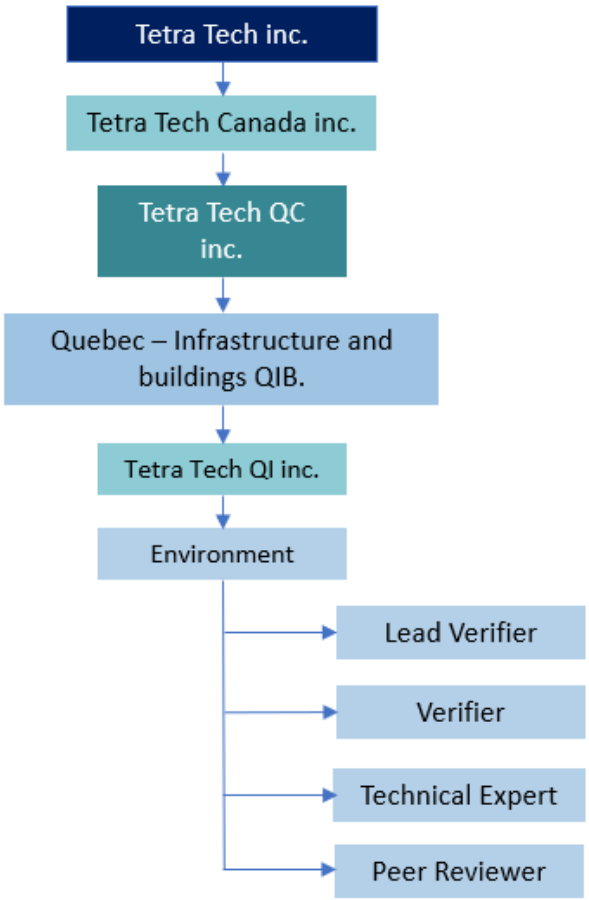


Figure 1 : Tetra Tech's Organization Chart

2.3 IMPARTIALITY AND CONFLICTS OF INTEREST

Tetra Tech QI Inc. has established procedures to demonstrate the independence of the company from the verification. These procedures may be provided upon request.

Tetra Tech has completed its internal impartiality review mechanism, and risks to impartiality have been assessed as low. Therefore, the verification by Tetra Tech of the carbon intensity assertions by Rio Tinto is permitted. An attestation signed by the Tetra Tech representative to the effect that the risk of conflict of interest is low is in **Appendix B**.

Moreover, internal procedures relative to potential sources of conflicts of interest have been established (Tetra Tech, expert, verifiers, lead verifier). The internal review performed by Tetra Tech concluded that there is no conflict of interest between the parties involved in the verification.

3.0 REPORT ASSERTION

This verification covers the carbon intensity due to the activity of six Canadian, one Islandic and one New-Zealander smelters. All data and assumptions for GHG emission and production for each site were compiled in an Excel spreadsheet provided by Rio Tinto entitled: 2022-Rio Tinto Renewal Approach. The official statement confirming the achievement of carbon intensity targets is presented in **Appendix C**.

The quantification reports were prepared by Rio Tinto according to the requirements of local governments:

- QC: *Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere* (Q-2, r. 15);
- BC: *Greenhouse Gas Emission Reporting Regulation* (BC Reg. 249/2015);
- Iceland: *EU ETS Directive*;
- New-Zealand: *Climate Change (Stationary Energy and Industrial Processes) Regulations 2009*, New Zealand Ministry for the Environment (NZMfE).

4.0 METHODOLOGY

The verification was conducted in accordance with ISO 14064-3: 2019 (*Greenhouse gases - Part 3: Specification with guidance for the verification and validation of greenhouse gas statements)* principles with a limited level of assurance.

An opinion with a limited level of assurance is required under the RenewAITM. We have planned and conducted our verification accordingly. As such, our verification covered the procedures that we considered necessary in the circumstances to provide a limited basis for our opinion.

Obtaining a limited assurance on carbon intensity assertions require procedures to obtain verification information to support the quantification of emissions and other statements contained in the assertions. Our processes have been selected based on our professional judgment and our assessment of the risk of material misstatements in GHG assertions.

GHG sources are from:

- Scope 1 (direct) where emissions occur during consumption of fuels including mobile equipment, anode production (where applicable), electrolysis (smelting process including anode consumption & effect), coke calcination (where applicable), and at on-site casthouses; and
- Scope 2 (indirect) where emissions result from the consumption of electricity and steam used within the aluminum production site boundaries.

GHG gases included in the quantification are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), perfluorinated carbon compounds (PFCs) and sulphur hexafluoride (SF_6). This approach is also aligned with the International Aluminum Institute Greenhouse Gas Protocol and local government regulatory requirements.

Global Warming Potentials from the IPCC Fifth Assessment Report (AR5 – 100 year)[2] have been used for all sites which made it possible to evaluate the sites on the same basis.

The work performed by Tetra Tech included the review of following documents and activities:

- Review the Carbon Footprint Assessments and all other documents provided by Rio Tinto;
- Determine of the level of risk of the verification;
- Develop the evidence-gathering plan;
- Develop the verification plan;
- Identify the required actions: request additional information, corrections and/or clarifications;
- Evaluate internal controls, eg. data management and procedures;
- Evaluate the data and their sources;
- Evaluate the Carbon Footprint Assessment according to the requirements of GHG Protocol Corporate Accounting and Reporting Standard; and the certification RenewAl;
- Develop and issuing a limited opinion on the Carbon Intensities Assertion.

4.1 Review of Documents

The following documents have been reviewed as part of this verification:

- ISO 14064-3: 2019 *Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions*;
- Excel spreadsheet for carbon intensities calculation and data collection (2022-Rio Tinto Renewal Approach);
- GHG emissions calculation spreadsheet for each site;
- Verification report with reasonable assurance for Canadian sites for reporting year 2022;
- Verification report for production and GHG emission with reasonable assurance for ISAL plant for reporting year 2022;
- Monthly electricity and combustible consumptions for reporting year 2022 at each site;
- Monthly electricity and combustible consumptions for reporting year 2021 at NZAS plant;
- Monthly aluminum produced for reporting year 2022 at each sites;
- Monthly aluminum produced for reporting year 2021 at NZAS plant;
- Other supporting documents.

4.2 Determination of the Verification Approach

At the beginning of our verification process, we obtained the calculation file from Rio Tinto. Upon receipt, we were able to conduct an initial assessment of risk related to our verification and the sources of emissions involved.

A verification plan was provided to the client. This verification plan sets out, among other things, the level of assurance sought, materiality and various steps in the process.

Our verification plan was not modified during this verification engagement.

Tetra Tech requested and obtained the 2022 GHG emissions report prepared by Rio Tinto.

Our verification was conducted in accordance with ISO 14064-3 "*Specification with guidance for the verification and validation of greenhouse gas statements (2019)*". This standard requires that the verification be planned and performed to obtain either reasonable or limited assurance that the annexed GHG emissions report gives a true and fair view of GHG emissions in all material respects, is free from material misstatement (reasonable) or nothing has come to our attention that cause us to believe that GHG assertion is not in all material respects (limited), appropriately reflects GHG emissions data and information, and, finally, that the materiality threshold has not been met or exceeded.

[2] https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf

An opinion with a limited level of assurance is required under the RenewAl™. We have planned and conducted our verification accordingly. As such, our verification covered the procedures that we considered necessary in the circumstances to provide a limited basis for our opinion.

Obtaining a limited assurance on carbon intensity assertions require procedures to obtain verification information to support the quantification of emissions and other statements contained in the assertions. Our processes have been selected based on our professional judgment and our assessment of the risk of material misstatements in GHG assertions.

4.3 Review of the Documents and Required Actions

Review of the documents relative to the 2022 GHG emissions assertion by Rio Tinto was completed following requests for additional information, clarifications and corrections issued to Rio Tinto by the Verifier. E-mail and telephone exchanges made it possible to complete and clarify certain information necessary for the completion of the mandate. Tetra Tech was able to obtain satisfactory responses to all of its requests for additional information addressed to Rio Tinto.

Of the total data obtained, a few samples were selected for verification purposes. The data supporting the reporting of GHG emissions are historical data. Sample selection was carried out using two methods:

1. Random selection.
2. Systematic selection.

4.4 Assessment of the Quantification According to Regulatory Requirements

4.4.1 Quantification of GHG emissions and total production

Scope 1 sources considered in the quantification reports include all processes and activities capable of emitting GHGs, and no exclusions are to be noted. Scope 2 sources include total electricity consumption based on invoices. More details on the sources are available in the Carbon Intensity Assertion in **Appendix C**.

Total production for each site covers the period specified in the certification and represents only the liquid aluminum produce described as the reference unit in the regulations.

The calculation methods used by Rio Tinto to quantify the GHG emission from the aluminum production and the carbon intensity has been reviewed and are summarized as follows:

- Scope 1 and total production: the methods used are based on those presented in the regulations where Rio Tinto operates the smelters, in Quebec according to the RDOCECA (Q-2, r. 15), in British Columbia with the Greenhouse Gas Emission Reporting Regulation (BC Reg. 249/2015), in New-Zealand with the Climate Change (Stationary Energy and Industrial Processes) Regulations 2009 and finally in Iceland with the EU Emissions Trading System Directive (EU ETS).
- Scope 2: the location-based method is used as the best practices available.
- Carbon intensity: the method used is appropriate and include all sources from scope 1 and 2 and the total productions specific for each site as specified in the RenewAl certification.

Tetra Tech concludes that the calculation methods used are in accordance with their requirements.

4.4.2 Assessment of Data Quality Control Procedures and Calculations

Tetra Tech ensured that Rio Tinto has in place appropriate controls to ensure the quality of the data used to calculate carbon intensities.

4.4.3 Assessment of Information and Data Retention Procedures

Tetra Tech has ensured that Rio Tinto has procedures in place to retain the required information, as well as carbon intensity-related calculations, evaluations, measurements in accordance with local regulation and industry best practices.

4.5 Limitation and Use of the Report

This document (report) is for the exclusive use of the person or entity (customer) that commissioned Tetra Tech to produce it. Its content reflects the assessment of the project as described in the attached assertion report. Therefore, the content of this document cannot be applied to the previous or future situation of the project as described in the attached assessment report. Any statement in this report is based on the date of issuance of this report, the period covered and the regulations for which the verification was conducted.

The conclusion relating to this file have been developed by qualified professionals on the basis of the best available information following recognized procedures. Tetra Tech reserves the right to change its findings if additional information is disclosed. Reproduction, distribution, or use of this document, in whole or in part, in any form, by any person or entity other than the person to whom it was submitted is not permitted without written permission from Tetra Tech. The same applies to the use of the Tetra Tech trademark. The contents of this document do not constitute legal opinions.

5.0 CONCLUSION OF THE VERIFICATION

The Rio Tinto assertion reports have been verified after additional requests for information. Tetra Tech received satisfactory responses to its requests. The carbon intensity for aluminum production activities at eight aluminum smelters during the year 2022 are lower that the threshold of **4 tCO_2-e/t Al** specified by the certification.

Tetra Tech concludes with a limited level of assurance that nothing has come to our attention that cause us to believe that Carbon Intensity Assertion included in **Appendix C** is not prepared in all material respects, in accordance with the requirements of the *GHG Protocol Corporate Accounting and Reporting Standard* and Rio Tinto's voluntary certification RenewAl™.

6.0 FACTS DISCOVERED AFTER THE VERIFICATION

The contents of this report reflect the appreciation of the information available at the time of writing. The content of this document cannot therefore be applied to the previous or future situation of the place studied. Any statements in this report are based on the date of issuance of this report, the period covered and the certification for which the verification was conducted. If one or more facts are discovered after the verification, all relevant stakeholders must be informed. The opinion and the verification report will have to be revised in the light of these facts discovered.

APPENDIX A – VERIFICATION STATEMENT

Montreal, July 06, 2023

Rio Tinto Alcan inc
400-1190 Avenue des Canadiens de Montréal
Montréal (Quebec) H3B 0E3

Tetra Tech was commissioned by Rio Tinto to verify eight (8) carbon intensities assertions for the period of January 1, 2022, to December 31, 2022, related to the production of aluminum in two of the Canadian Provinces Québec, and British Columbia, and in Iceland and New-Zealand.

The purpose of this commission was to verify the information of the attached Carbon Intensities Assertion report named *2022-Rio Tinto Renewal Approach-v5* and transmitted on June 29, 2023, in accordance with the requirements of ISO 14064-3: 2019 and the RenewAl certification, and to provide Rio Tinto Alcan inc. an opinion with a limited level of assurance.

Opinion with a limited level of assurance

1. The report has been prepared in accordance with the GHG Protocol Corporate Accounting and Reporting Standard and Rio Tinto's voluntary certification RenewAl [tm].
2. The quantification approach and the methodologies used are appropriate.
3. The calculations used are sufficiently accurate and detailed.
4. The data used in the Carbon Intensity assertions are subject to adequate controls that allow them to be considered accurate and detailed, avoiding the possibility of material errors.
5. The carbon intensities reported by Rio Tinto sites for the year 2022 are lower than **4 tCO_2-e/t Al** and nothing has come to our attention that cause us to believe that Carbon Intensity Assertion is not prepared in all material respects, in accordance with the requirements of the *GHG Protocol Corporate Accounting and Reporting Standard* and Rio Tinto's voluntary certification RenewAl[TM].
6. The degree of uncertainty in the quantification report is low and the material discrepancy threshold of five percent (5%) has not been reached or exceeded.
7. The statements and information contained in the Verification Report are true and accurate to the best of Tetra Tech's knowledge.

With a limited level of insurance, Tetra Tech's opinion on Rio Tinto Alcan Carbon Intensity Assertion Reports for the year 2022 is shown in the following table:

Table A-1 : Verification opinion of the Carbon Intensity from Rio Tinto Aluminum Smelters

Sites of Smelters	Type of Opinion		
	Unmodified	Modified	Adverse
Canada, QC, Alma	✓		
Canada, QC, Saguenay, AP/60	✓		
Canada, QC, Arvida	✓		
Canada, QC, Grande-Baie	✓		
Canada, QC, Laterrière	✓		
Canada, BC, Kitimat	✓		
Iceland, Hafnarfjörður	✓		
New Zealand, Tiwai Point	✓		

Roger Fournier CPA, CA
Lead GHG Verifier

Georges Côté, P. Eng.
GHG verifier

APPENDIX B – DECLARATION OF ABSENCE OF CONFLICT OF INTEREST

TETRA TECH

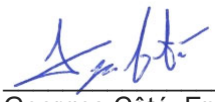
Montreal, June 01, 2023

Objet : Verification of the carbon intensity due to aluminum production for the year 2022
Rio Tinto Alcan inc. (Multiple sites in CA, IS, NZ)
Statement of Absence of Conflict of Interest
Our Reference: 48022TTA-2022 (60ET)

To Whom It May Concern,

Tetra Tech was commissioned by Rio Tinto Alcan inc. to verify its carbon intensities due to aluminum production for the period convering January 1st, 2022 to December 31st, 2022, with regards to the requirements of the ISO 14064-3: 2019 and the certification RenewAl.

Tetra Tech certifies that the requirements are met. No conflicts of interest have been identified between Rio Tinto Alcan inc., Tetra Tech or any member of the verification team. The risk associated with any potential conflict of interest is deemed inexistant or acceptable.



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Project manager / Team leader Environnement
GC/cq

Tetra Tech QI inc.
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APPENDIX C – 2022 CARBON INTENSITY ASSERTION AND QUANTIFICATION

RioTinto

Rio Tinto Aluminum Carbon Intensity Assertion

Scope and Assertion

Rio Tinto Aluminium has taken an operational control approach to consolidate its greenhouse gas (GHG) emissions for the calendar year ended December 31, 2022.

Total scope 1 (direct emissions at the site level) and scope 2 (indirect emissions related to the electricity and steam consumption) CO_2-e emissions from smelting at the following facilities are lower than 4 tCO_2-e/tAl.

Alma
AP60
Arvida
Grande-Baie
ISAL
Kitimat
Laterriere
New Zealand Aluminium Smelter (NZAS)

Scope 1 (direct) tCO_2-e emissions occur during consumption of fuels, anode production (where applicable), electrolysis (smelting process), coke calcination (where applicable), and at on-site casthouses. Scope 2 (indirect) tCO_2-e emissions result from the consumption of electricity and steam used within the aluminium production site boundaries.

Methodology and Assumptions

Our GHG emissions were calculated using the GHG Protocol Corporate Accounting and Reporting Standard, which includes the following greenhouse gases: carbon dioxide, methane, nitrous oxide, perfluorinated carbon compounds and sulphur hexafluoride. This approach is also aligned with the International Aluminium Institute Greenhouse Gas Protocol.

Operations can omit or estimate individual emission sources from their inventories subject to these rules:

– For non-Australian operations: individual sources that can be excluded should be less than 1,000 tCO_2-e. The total of these excluded sources should be less than 5% of the facility's complete inventory.

We applied Global Warming Potentials from the IPCC Fifth Assessment Report (AR5 – 100 year).

Scope 1 GHG emissions

Scope 1 GHG emissions are direct GHG emissions owned or controlled by Rio Tinto. They include fuel use, anode and reductant use, process emissions (on-site emissions).

Scope 1 emission factors are consistent with the IPCC Guidelines for National Greenhouse Gas Inventories (2006), where site specific data is not available.

Inventories have been prepared in accordance with local regulatory requirements; in British Colombia: Greenhouse Gas Emission Reporting Regulation (BC Reg. 249/2015), in Quebec: Regulation respecting mandatory reporting of certain emissions of contaminants into the atmosphere (Q-2, r. 15); and in Iceland: EU ETS Directive. In New Zealand, Climate Change (Stationary Energy and Industrial Processes) Regulations 2009", New Zealand Ministry for the Environment (NZMfE).

As per the guidelines referenced above, here are the details specific to quantification of our aluminium-specific material emissions sources:

1. Carbon consumption: The emissions calculation for the net anode consumption is a mass balance approach with the subtraction of impurities (sulphur and ash) in British Colombia, Quebec and New Zealand, whereas in Iceland we measure the carbon content of the anodes and butts to establish emissions.
2. Baked anode production - carbon volatiles: The emissions from baked carbon anode production include carbon volatiles from baking and emissions from packing coke consumption. Hydrogen content of baked anodes is the default 0.5% of green anode weight. Green anode weight and baked anode weight: average weight per anode based on scale weights. Number of anodes: count of number of baking cycles multiplied by the capacity of the furnaces.

3. Packing coke consumption: Packing coke consumption per tonne of baked anode is based on actual weight based off of inventory reconciliations and scale measurements where available.

4. Perfluorocarbons: For Quebec and British Colombia, calculation uses the Tier 1 IPCC method using slope factors measured on-site within the last 36 months. For Iceland and New Zealand, calculation uses Method 2, the Tier 2 IPCC method using slope factors for prebake cell technology. Anode effects per cell day are based on real potroom data, including number of pots in operation, and number of anode effects occurring in the pots. The anode effect duration is measured for each anode effect and the monthly average is used in the calculation.

5. Natural gas: Consumption is based off of supplier invoices. Emissions factors are taken from each assets local regulatory guidance requirements.

6. Fuel oil: Consumption in New Zealand is based off supplier invoices and emission factors. Emission factors are taken from NZMfE guidance.

Scope 2 GHG emissions

Scope 2 GHG emissions are GHG emissions from the electricity, heat or steam delivered by third-parties (indirect emissions). Scope 2 emission factors are sourced from electricity utility providers. Invoice data is used for consumption. For all smelters reported, location based method is used for quantifying its Scope 2 emissions.