

SSAB scope 3 calculation report

Gaia Consulting

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Content



1. Introduction and scope of the study
2. Calculation results
3. Disclaimer

Appendix 1: Used calculation methodology for Scope 3 calculations

1. Introduction and scope of the study (1/2)



- The aim of the project was to calculate SSAB's Scope 3 GHG emissions and report the results according to CDP and GRI reporting requirements.
- However, it should be noted that CDP is releasing sector specific questionnaires including steel industry March 2018. Therefore, the sector specific reporting requirements are not yet available. More information can be found here: <https://www.cdp.net/en/companies-discloser/disclosure-in-2018>
- The calculation is conducted according to GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard. All assumptions and methodological differences are recorded.
- It was also agreed with the client, that reporting of biogenic emissions is excluded from the calculation.
- Calculations are based on the data delivered by SSAB for the time period 1.12.2016 – 30.11.2017, except for category 3 (Fuel and energy) and category 5 (Waste generated in operations), the information for the time period of 1.1.2017-31.12.2017 is used*.
- At the beginning of the project, the relevance of the different categories were identified and the calculation was concentrated on the most relevant Scope 3 categories for SSAB.

* Final corrections to energy and waste data were received from Jonas Larsson / SSAB on 1.2.2018 but these were not included in the calculation. It was agreed between SSAB and Gaia that the significance of these corrections will be only checked during the next calculation round.

1. Introduction and scope of the study (2/2)

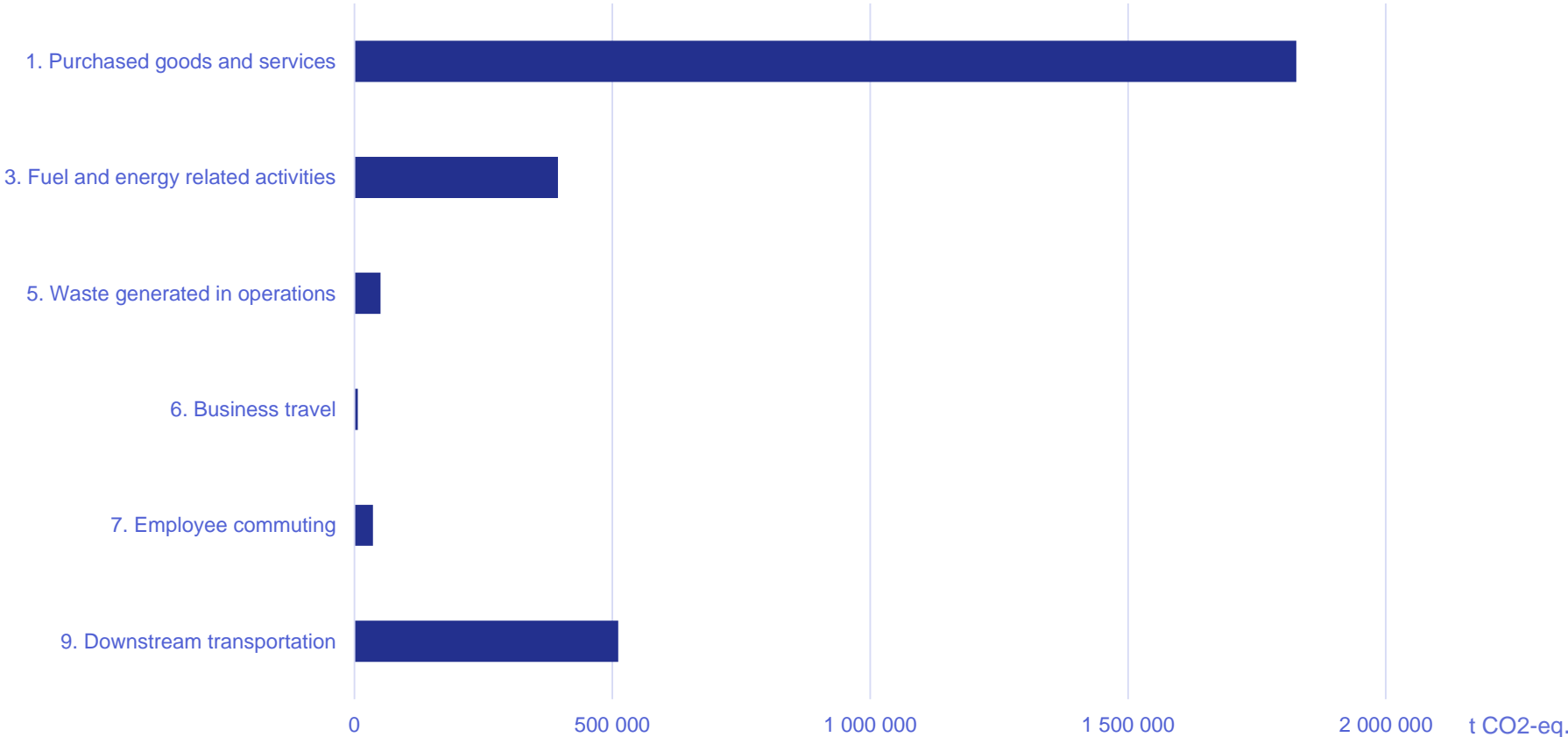


- At the beginning of the project it was agreed that the following Scope 3 categories will be calculated:
 - 1. Purchased goods and services
 - 2. Capital goods
 - 3. Fuel and energy related activities
 - 5. Waste generated in operations
 - 6. Business travel
 - 7. Employee commuting
 - 9. Downstream transportation and distribution
 - 10. Processing of sold products
- However, during the project some changes were made for the scope of the study as follows
 - Category 2 “Capital goods” were integrated into category 1
 - Category 4 “Upstream transportation and distribution” was not conducted due to lack of data.
 - Category 10 “Processing of sold products” was left out due to lack of reliable emissions factors available*

2. Calculation results



Results of scope 3 calculations



2. Calculation results

Category	Evaluation status	Results	Emission calculation methodology
1. Purchased goods and services	Relevant, calculated	1 826 501 tCO2-eq.	<p>This category includes all the upstream emissions of the purchased goods and services by SSAB. Emissions are calculated according to the GHG protocol standards* by combining average data method and spend-based method.</p> <ul style="list-style-type: none"> • For raw material used in production and purchased by SSAB, the average data-method is used. The upstream emissions of purchased raw materials are evaluated based on Ecoinvent 3.3 database. 99% of used raw materials are included into the calculation. • For other purchased goods and services, the spend-based method is used for the approximation of the emissions. Emissions factors from DEFRA** are used for calculations.
2. Capital goods	Included into the category 1	-	Capital goods are included into category 1.
3. Fuel and energy related activities	Relevant, calculated	394 800 tCO2-eq.	<p>This category includes the upstream emissions including transmissions and distribution losses of the electricity and fuels purchased by SSAB. Emissions are calculated according to the GHG protocol standard*, average data method.</p> <ul style="list-style-type: none"> • Transmission and distribution (T&D) losses: country average data used by World Bank database*** (2014) (recommended in GHG protocol) • Emissions factors for electricity: IEA Emission factors**** • Emissions factors for upstream electricity and fuels from DEFRA***** (country specific upstream emissions for electricity and fuel specific emission factors for used fuels)

*Greenhouse gas protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard – version 1, World Resource Institute & WBCSD, 2013.

** 2012 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting, Annex 13 - Indirect emissions from the supply chain, table 13 (2009)

***World Bank database, webpage: https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?order=wbapi_data_value_2009+wbapi_data_value+wbapi_data_value-last&sort=desc

**** IEA CO2 emission from fuel combustion 2017 – Complement. Database purchased from IEA.

*****DEFRA Greenhouse gas reporting: conversion factors 2017 - Full set. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

2. Calculation results

Category	Evaluation status	Results	Emission calculation methodology
4. Upstream transportation and distribution	Relevant, not calculated	-	Upstream transportation is recognized as relevant category for the SSAB's operations. Data collection and calculation practices will be developed in the future in order to be able to report this category. At the moment, part of the category 4 emissions (USA inbound) are reported in category 9.
5. Waste generated in operations	Not relevant, calculated	50 649 tCO ₂ -eq.	This category includes the reported emissions for scope 1 and scope 2 emissions of waste management that occurs during disposal and treatment. <ul style="list-style-type: none"> • Calculated according to the GHG protocol standard*, average data method • Emissions factors for waste treatment are from DEFRA**
6. Business travel	Not relevant, calculated	6 831 tCO ₂ -eq.	This category includes all business travel related air travel emissions. Emission information is delivered by travel agency (distance-based method used).
7. Employee commuting	Not relevant, calculated	35 953 tCO ₂ -eq.	This category is assessed based on estimations agreed with SSAB*** and emission factor for passenger car is derived from DEFRA** (average car, unknown fuel).
8. Upstream leased assets (leased offices)	Not relevant, not calculated	-	This category is not relevant for SSAB's operations, no upstream leased assets.

*Greenhouse gas protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard – version 1, World Resource Institute & WBCSD, 2013.

**DEFRA Greenhouse gas reporting: conversion factors 2017 - Full set. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

*** The total carbon dioxide emissions from employee commuting is assessed by using the following estimations agreed with SSAB: Number of employees: 14 931, average distance: 30 km and number of trips per person during the year: 440.

2. Calculation results

Category	Evaluation status	Results	Emission calculation methodology
9. Downstream transportation and distribution	Relevant, calculated	511 536 t CO2-eq.	All the outbound logistics are reported in this category, although it is noticed that these emissions may also include logistics that are paid by the company (SSAB) and should therefore be included in the Category 4 according to the GHG protocol*. In addition, the category includes USA inbound logistics, which presents a minor part of SSAB's total inbound logistics from tier 1 to SSAB. Otherwise, calculation is conducted according GHG Protocol and emissions factors used are derived from DEFRA**.
10. Processing of sold products.	Relevant, not calculated	-	It is acknowledged that this category is relevant for SSAB, however, at the moment the evaluated emissions caused by processing of sold products have significant uncertainties. Therefore, reliable data collection and calculation practices will need to be developed in order to be able to report this category in future.
11. Use of sold product	Not relevant, not calculated	-	SSAB does not sell any products that would cause use phase emissions.
12. End-of-life treatment of sold products	Not relevant, not calculated	-	Majority of steel is recycled over and over again
13. Downstream leased assets	Not relevant, not calculated	-	No leased assets.
14. Franchises	Not relevant, not calculated	-	SSAB does not have any franchise business.
15. Investments	Not relevant, not calculated	.	Steel producer's main investments are for capital goods.

*Greenhouse gas protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard – version 1, World Resource Institute & WBCSD, 2013.

**DEFRA Greenhouse gas reporting: conversion factors 2017 - Full set. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

3. Disclaimer



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Appendix 1: Used calculation methodology for Scope 3 calculations

Calculation methodology

GHG Protocol Scope 3 Standard

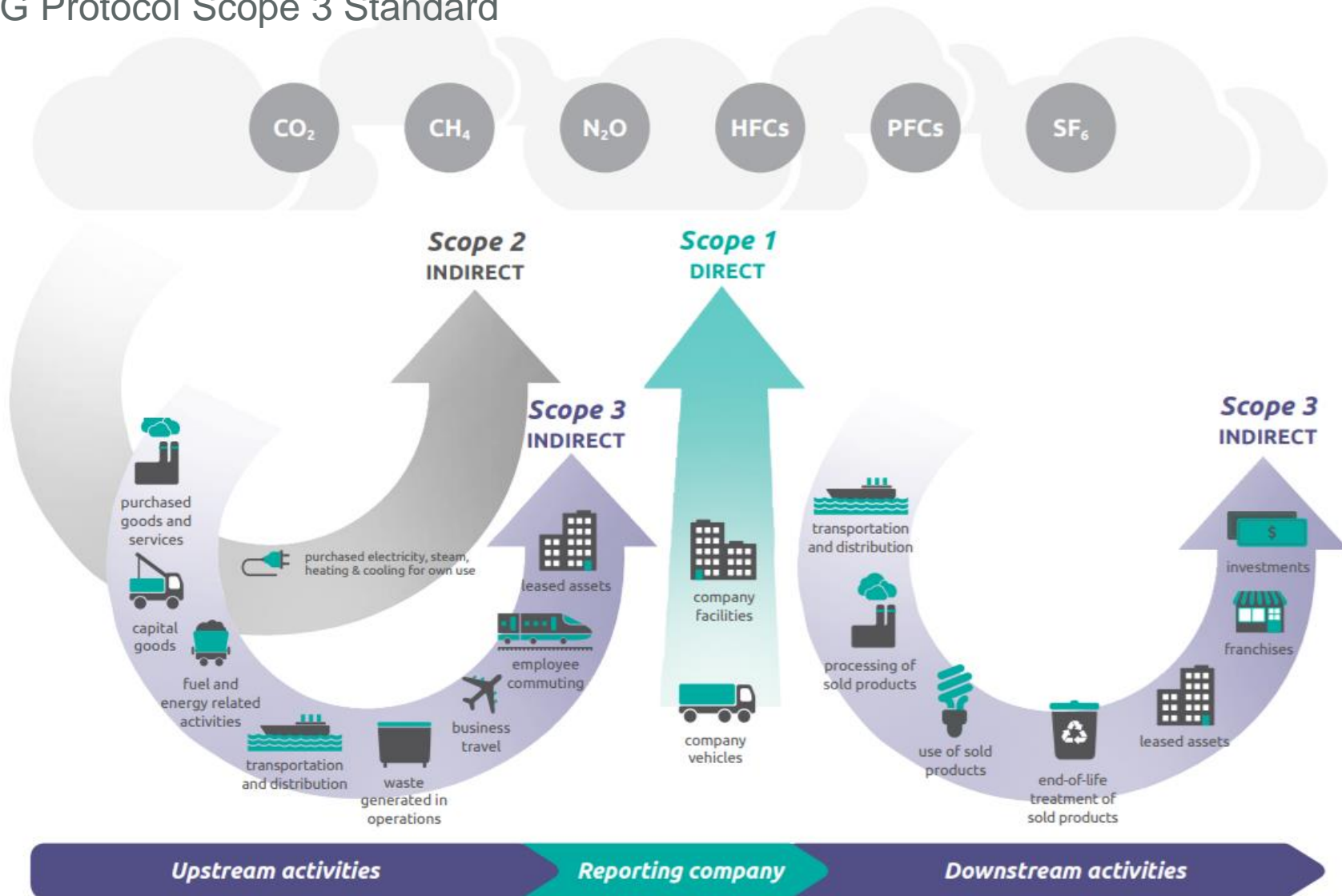
- Greenhouse Gas Protocol (GHG) is the most widely used greenhouse gas accounting standard managed by World Resource Institute (WRI) and World Business Council for Sustainable Development (WBCSD).
- The purpose of the protocol is to provide **comprehensive and standardized framework** for companies, organizations, NGOs and cities to **understand, quantify and manage** their greenhouse gas emissions.

Greenhouse gas protocol is divided in three different scopes (see next page):

- Scope 1: Direct GHG emissions from own operation
- Scope 2: Emissions related to purchased emissions
- **Scope 3: Indirect upstream and downstream emissions**
 - Typically the majority of total emission come from scope 3 sources
 - Consists of 15 categories of scope 3 activities, both upstream and downstream
 - GHG Protocol Scope 3 standard is the only internationally accepted method for companies to account for value chain emissions.

Calculation methodology

GHG Protocol Scope 3 Standard



Scope 3 – category 1

Purchased goods and services



Requirements set in GHG protocol standard for scope 3*	<ul style="list-style-type: none">• All upstream (cradle to grade) emissions of purchased goods and services.
Description of calculation methodology and information sources	<p>This category includes all the upstream emissions of the purchased by SSAB. Emissions are calculated according to the GHG protocol standards by combining average data method and spend-based method.</p> <ul style="list-style-type: none">• For raw material used in production and purchased by SSAB, the average data-method is used. Ecoinvent 3.3 database was used for the evaluation of the upstream emissions of purchased raw materials, coverage of the calculation is 99 mass-% of the reported raw materials.• For the iron ore pellets, the emission factor from LKAB*** was used for the pelletizing and Ecoinvent database was used for the upstream emissions for the iron ore (mining operations).• For other purchased goods and services, the spend-based method is used for the approximation of the emissions. Emissions factors from DEFRA**is used for calculations.
Suggestions for improvement	<ul style="list-style-type: none">• According to GRI standard, also biogenic emissions from scope 3 need to be reported (separately from fossil emissions). However, it was decided together with SSAB to not report biogenic emissions during this reporting period.• Spending based emission evaluation have very high uncertainty and therefore it may be useful to pinpoint the most relevant categories and assess if these categories can be integrated into the calculation by using more reliable emission factors.

*Greenhouse gas protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard – version 1, World Resource Institute & WBCSD, 2013.

** 2012 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting, Annex 13 - Indirect emissions from the supply chain, table 13 (2009)

***<https://www.lkab.com/en/SysSiteAssets/documents/blandat/lkab-value-chain-comparison-methodological-annex.pdf>

Scope 3 – category 3

Fuels and energy related activities



Requirements set in GHG protocol standard for scope 3*	<ul style="list-style-type: none"> Upstream emission of purchased fuels (extraction, production, and transportation of fuels consumed) Upstream emission of purchased electricity (extraction, production, and transportation of fuels consumed in the generation of electricity) Transmission and distribution (T&D) losses
Description of calculation methodology and information sources	<ul style="list-style-type: none"> Amount of electricity and fuel consumption was received from SSAB. Calculated according to the GHG protocol standard*, average data method Transmission and distribution (T&D) losses: country average data used by World Bank database** (2014) (recommended in GHG protocol) Emissions factors for electricity: IEA Emission factors*** Emissions factors for upstream electricity and fuels from DEFRA**** (country specific upstream emissions for electricity and fuel specific emission factors for used fuels)
Suggestions for improvement	<ul style="list-style-type: none"> According to GRI standard, also biogenic emissions from scope 3 need to be reported (separately from fossil emissions). For this, more specific information about the type of electricity used need to be specified). However, it was decided together with SSAB to not report biogenic emissions during this reporting period.

- Please note that final updates to energy and waste data were received from Jonas Larsson / SSAB on 1.2.2018 but these were not included in the calculation. It was agreed between SSAB and Gaia that the significance of these corrections will be checked during the next calculation round.

*Greenhouse gas protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard – version 1, World Resource Institute & WBCSD, 2013.

**World Bank database, accessible via https://data.worldbank.org/indicator/EG.ELC.LOSS.ZS?order=wbapi_data_value_2009+wbapi_data_value+wbapi_data_value-last&sort=desc

*** IEA CO2 emission from fuel combustion 2017 – Complement

****DEFRA Greenhouse gas reporting: conversion factors 2017 - Full set. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

Scope 3 – category 4

Upstream transportation



Requirements set in GHG protocol standard for scope 3*	Transportation and distribution of products purchased by the reporting company in the reporting year between a company's tier 1 suppliers and its own operations as well as transportation and distribution services purchased by the reporting company in the reporting year, including inbound logistics, outbound logistics and transportation and distribution between a company's own facilities.
Description of calculation methodology and information sources	<ul style="list-style-type: none">SSAB's current data gathering practices do not support either collection of inbound logistical data or separation the data according to the paying party. Only USA inbound logistics data was available, which share of the SSAB's total inbound logistics is estimated to be minor. Therefore, all the emissions from logistics are included in category 9. However, the data gathering practices will be developed in the future, so that emissions generated during transportation can be divided into the categories 4 and 9 according to the GHG protocol* guidelines.
Suggestions for improvement	<ul style="list-style-type: none">Develop data gathering practices to include inbound logistics to the calculation. Separate outbound logistics paid by customers from outbound logistics paid by SSAB. This enables to categorize the logistics emissions between the categories 4 and 9 according to the GHG Protocol guidelines.

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**DEFRA Greenhouse gas reporting: conversion factors 2017 - Full set. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

Scope 3 – category 5

Waste generated in operations



Requirements set in GHG protocol standard for scope 3*	<ul style="list-style-type: none">The scope 1 and scope 2 emissions of waste management suppliers that occur during disposal or treatment
Description of calculation methodology and information sources	<ul style="list-style-type: none">Calculated according to the GHG protocol standard*, average data methodAmount of wastes and handling practices was received from SSAB.Emissions factors for waste treatment are derived from DEFRA**In calculation, is assumed that hazardous wastes are combusted and other wastes are landfilled
Suggestions for improvement	<ul style="list-style-type: none">Gathering data from waste companies who are responsible for the waste treatment in order to receive more reliable information regarding the transportation and waste handling practices.

- Please note that final updates to energy and waste data were received from Jonas Larsson / SSAB on 1.2.2018 but these were not included in the calculation. It was agreed between SSAB and Gaia that the significance of these corrections will be checked during the next calculation round.

*Greenhouse gas protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard – version 1, World Resource Institute & WBCSD, 2013.

**DEFRA Greenhouse gas reporting: conversion factors 2017 - Full set. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

Scope 3 – category 6

Business travel



Requirements set in GHG protocol standard for scope 3*	The scope 1 and scope 2 emissions of transportation carriers that occur during use of vehicles (e.g., from energy use)
Description of calculation methodology and information sources	<ul style="list-style-type: none">• Emission information delivered by travel agency (distance-based method used).
Suggestions for improvement	<ul style="list-style-type: none">• Include also emissions from rail, bus and car travel. Optionally, also hotel nights can be included. If not, an estimation about their relevance need to be added.• According to GRI standard, also biogenic emissions from scope 3 need to be reported (separately from fossil emissions). This can be done if share of used biofuels in aviation is available. However, it was decided together with SSAB to not report biogenic emissions during this reporting period.

*Greenhouse gas protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard – version 1, World Resource Institute & WBCSD, 2013.

**DEFRA Greenhouse gas reporting: conversion factors 2017 - Full set. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

Scope 3 – category 7

Employee commuting



Requirements set in GHG protocol standard for scope 3*	The scope 1 and scope 2 emissions of employees and transportation providers that occur during use of vehicles (e.g., from energy use)
Description of calculation methodology and information sources	<ul style="list-style-type: none"> Employee commuting, no specific information was available and therefore calculation instruction from Chemical Sector GHG guidance** was used (Average distance: 30 km, transport mode: passenger car, number of trips annually: 440). Emission factor for passenger car derived from DEFRA*** (average car, unknown fuel)
Suggestions for improvement	<ul style="list-style-type: none"> Use of national statistics to determine the average employee patterns (distances and commuting modes) OR collect data from employees on commuting patterns; distance, transportation modes and number of commuting days by each mode (for example by extrapolating from representative sample (e.g. 25 % of employees) According to GRI standard, also biogenic emissions from scope 3 need to be reported (separately from fossil emissions). This can be done if share of used biofuels in commuting can be used (this is possible to calculate if more detailed information is available on commuting). However, it was decided together with SSAB to not report biogenic emissions during this reporting period.

*Greenhouse gas protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard – version 1, World Resource Institute & WBCSD, 2013.

**WBCSD Chemicals – Guidance for Accounting and Reporting Corporate GHG Emissions in the Chemical Sector Value Chain, 2013.

***DEFRA Greenhouse gas reporting: conversion factors 2017 - Full set. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

Scope 3 – category 9

Downstream transportation



Requirements set in GHG protocol standard for scope 3*	Transportation and distribution of products sold by the reporting company during the reporting year. between the reporting company’s operations and the end consumer (if not paid for by the reporting company), if vehicles and facilities are not owned or controlled by the reporting company.
Description of calculation methodology and information sources	<ul style="list-style-type: none"> • Reporting of this category differs from the GHG protocol guidance, since at the moment, it is not possible to separate logistics paid by customers from logistics paid by SSAB. Therefore, all the outbound logistics emissions are included in this category. In addition, the USA inbound logistics are included in this category, as their share of the total transport emissions is marginal and would not give comprehensive picture of total inbound emissions. • For the calculation, DEFRA** average emissions factors were used. For flight cargo, emission factor for long haul cargo were used as all flights were intercontinental.
Suggestions for improvement	<ul style="list-style-type: none"> • In the future, the data gathering practices will be developed so that the inbound logistics are more comprehensively included into the calculations and logistics paid by customers and logistics paid by SSAB are separated. This enables to categorize the logistics emissions between the categories 4 and 9 according to the GHG Protocol* guidelines.

*Greenhouse gas protocol, Corporate Value Chain (Scope 3) Accounting and Reporting Standard – Supplement to the GHG Protocol Corporate Accounting and Reporting Standard – version 1, World Resource Institute & WBCSD, 2013.

**DEFRA Greenhouse gas reporting: conversion factors 2017 - Full set. Available at: <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2017>

Scope 3: other categories relevant for SSAB's operations



10. Processing of sold products.

Processing of sold products was considered as relevant Scope 3 category. During the project, the following methodologies were studied to determine the emissions caused by the processing sold products:

- Information derived from Ecoinvent (v.3.3) LCI database for average metal working process for steel product manufacturing, which covers the average CO₂-emission generated during average metal processing work. However, these values were considerable high when compared to emissions generated during steel manufacturing. Therefore, it was concluded that too high uncertainties are related to this approach.
- The methodology used in Greenhouse Gas Protocol's scope 3 calculation tool. The methodology is based on spending data, which is converted to the CO₂-emissions. It was concluded that too high uncertainties are related to the methodology.
- Estimation based on energy consumption of Finnish metal products manufacturing industry and production amounts derived from the Statistics Finland. However, the production amounts were only partially reported and therefore this approach was not used.

It was concluded that none of the studied methodology is suitable for estimating the category 10 emissions. However, in the future, one opportunity is to co-operate with customers in order to evaluate energy and fuel consumption related to the processing of SSAB's products. Other option is to identify industry average emissions for the post-processing industry sectors. However, during this study, it was noted that typical database values have high variation and therefore the results have very high uncertainties.

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