GIST Non-Expert Annotation Guidelines

Guideline Structure

- Intro
- Annotations
  - Report-Level
  - Year-Scope-Level
- Recommendations
- Examples for typical errors/difficulties

Intro

- This slidedeck guides you through the manual annotation of **greenhouse gas emissions** in company reports.
- Please read through the **entire document** before starting the annotation.
- In case of unclarities please use the „Comment“ columns in the annotation files

Intro

- You will enter your annotations in an Excel file
- There is one corresponding Excel file for one company report
- We do not prescribe in what particular order you fill in your Excel sheet for one report

Intro

- You will provide two different types of annotations:
  1. **Annotations on report-level**: These are single annotations per report

  2. **Annotations on year-scope level:** These annotations are entered for each combination of Scope and year for one report.

     Important: You do not collect this data from scratch but you will check whether an LLM has extracted these values correctly (see next slides).

→ The ultimate goal is to extract **all values, units and metric names** of all possible combinations of **Scope and Year** from a report.

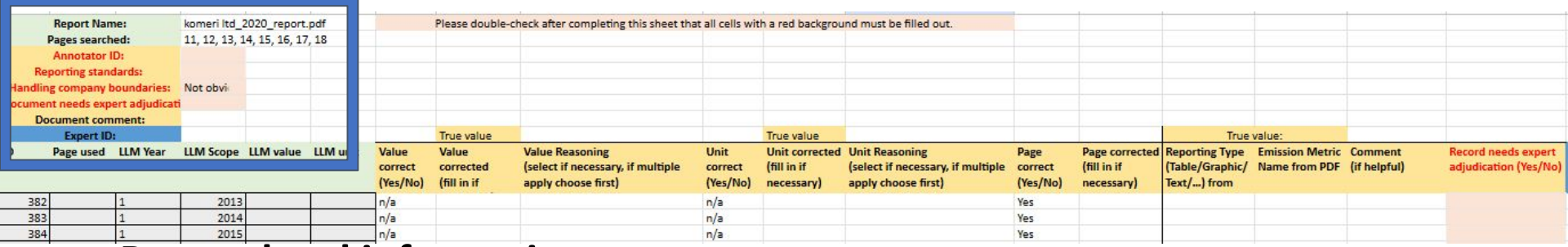
Annotations

Report Name:	komeri ltd_2020_report.pdf					Please double-check after completing this sheet that all cells with a red background must be filled out.												
Pages searched:	11, 12, 13, 14, 15, 16, 17, 18																	
Annotator ID:																		
Reporting standards:																		
Handling company boundaries:	Not obvi																	
Document needs expert adjudicati																		
Document comment:																		
Expert ID:							True value			True value					True value:			
ID	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if	Value Reasoning (select if necessary, if multiple apply choose first)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary, if multiple apply choose first)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)	
382		1	2013			n/a			n/a			Yes						
383		1	2014			n/a			n/a			Yes						
384		1	2015			n/a			n/a			Yes						

- This is how your annotation Excel sheet will look like
- I will now walk you through the structure of the document

Important:

Always make sure that all cells with red background are filled out (even if you receive a file with no LLM data whatsoever)



Report Name:	komeri ltd_2020_report.pdf
Pages searched:	11, 12, 13, 14, 15, 16, 17, 18
Annotator ID:	
Reporting standards:	
Handling company boundaries:	Not obvi
ocument needs expert adjudicati	
Document comment:	
Expert ID:	

Please double-check after completing this sheet that all cells with a red background must be filled out.

	Page used	LLM Year	LLM Scope	LLM value	LLM u	True value			True value					True value:			
						Value correct (Yes/No)	Value corrected (fill in if	Value Reasoning (select if necessary, if multiple apply choose first)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary, if multiple apply choose first)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)
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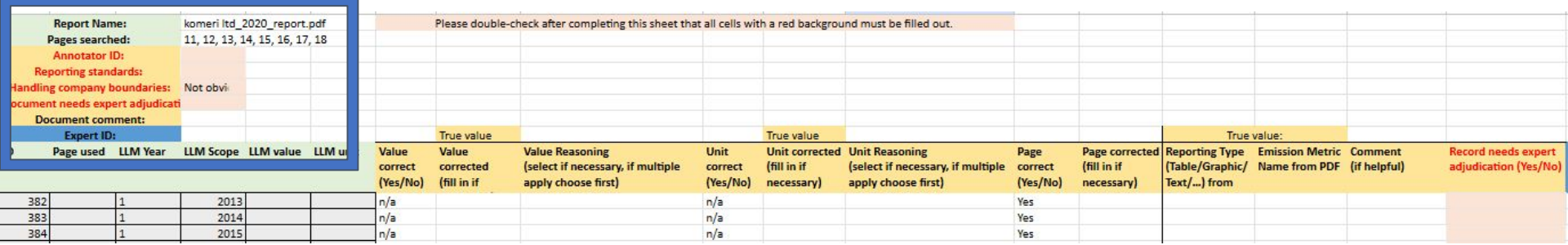
383		1	2014			n/a			n/a			Yes					
384		1	2015			n/a			n/a			Yes					

Report-level information

- **Report name:** the report‘s name (do not change)
- **Pages searched :** a list of pages, which the LLM used to retrieve the emission annotations (do not change)
- **Annotator and Expert ID:** please put in your ID
- **Document needs expert adjudication:** Can be set to “Yes” if the whole company reports seems messy/not feasible to annotate to you.
- **Document comment:** Open field for comment (especially if expert adjudication requested)



Report Name:	komeri ltd_2020_report.pdf
Pages searched:	11, 12, 13, 14, 15, 16, 17, 18
Annotator ID:	
Reporting standards:	
Handling company boundaries:	Not obvi
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Document comment:	
Expert ID:	

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	Page used	LLM Year	LLM Scope	LLM value	LLM u	True value			True value			True value:				
						Value correct (Yes/No)	Value corrected (fill in if	Value Reasoning (select if necessary, if multiple apply choose first)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary, if multiple apply choose first)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)
382		1	2013			n/a			n/a			Yes				
383		1	2014			n/a			n/a			Yes				
384		1	2015			n/a			n/a			Yes				

Report-level information

- **Reporting Standards:**
  - Companies can choose a reporting protocol according to which the report their emissions.
  - **Task: Select the reporting standard once for each report**
  - Valid certificates (see also next slides):

1. GHG Protocol
   - The greenhouse gas protocol: A corporate accounting and reporting standard, revised edition (WRI/WBCSD, 2004)

2. ISO 14064 family
   - ISO 14064-1 greenhouse gases part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals (BSI, 2019a)
   - ISO 14064-2 greenhouse gases part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements (BSI, 2019b)
   - ISO 14064-3 greenhouse gases Part 3: Specification with guidance for the verification and validation of greenhouse gas statements (BSI, 2019c)

3. ISO / TR 14069
   - ISO/TR 14069 Greenhouse gases — Quantification and reporting of greenhouse gas emissions for organizations — Guidance for the application of ISO 14064-1 (BSI, 2013)

4. IPCC
   - 2006 IPCC guidelines for national greenhouse gas inventories (Eggleston et al., 2006a)
   - 2019 Refinement to the 2006 IPCC guidelines for national greenhouse gas inventories (Garg & Weitz, 2019)

Important hint: If “Scope 1/2/3” is used as wording the reporting standard is GHG

Definition of “Scope” and relevant standards

The categorization of emissions into three scopes comes from the Greenhouse Gas Protocol (GHGP). Scope 1 are direct emissions from a company’s operations, Scope 2 refer to the emissions of purchased electricity and Scope 3 cover various emissions that occur along the value chain

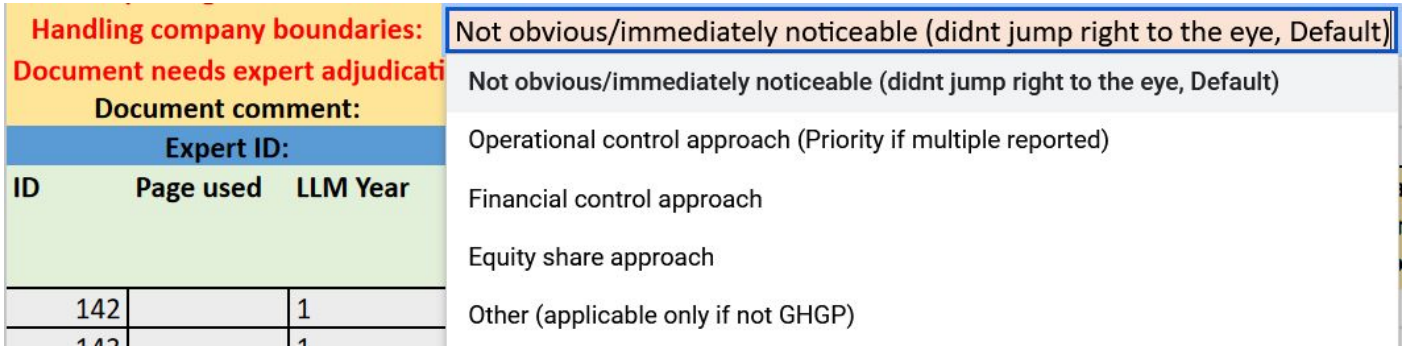
(A) GHGP	(B) ISO/TR 14069	(C) ISO 14064-1
Scope 1 - GHG emissions from sources they own or control. This includes stationary sources, mobile sources, physical or chemical processing and fugitive emissions	**Category 1** - Direct emissions from stationary combustion	Direct emissions
	Category 2 - Direct emissions from mobile combustion	
	Category 3 - Direct process related emissions	
	Category 4 - Direct fugitive emissions	
N/A	**Category 5** - Direct emissions and removals from land use, land use change and forestry (LULUCF)	
Scope 2 - Emissions from generation of acquired and consumed electricity, steam, heat, or cooling (collectively referred to as “electricity”)	**Category 6** - Indirect emissions from imported electricity consumed	Energy indirect emissions
	Category 7 Indirect emissions from (steam, heating, cooling, compressed air) excluding electricity	
Scope 3 - Category 1 Purchased goods and services	**Category 9** - Purchased products	Other indirect emissions
Scope 3 - Category 2 Capital goods	**Category 10** - Capital equipment	
Scope 3 - Category 3 Energy-related activities not included in scope 1 or scope 2 a) Fuel b) Electricity c) T&D Losses d) Electricity pass-through	**Category 8** - Energy-related activities not included in direct and energy indirect	
Scope 3 - Category 4 Upstream transportation and distribution a) Transportation b) Distribution	**Category 12** - Upstream transport and distribution	
Scope 3 - Category 5 Waste generated in operations	**Category 11** - Waste generated from organizational activities	
Scope 3 - Category 6 Business travel	**Category 13** - Business travel	
Scope 3 - Category 7 Employee commuting	**Category 22** - Employee commuting	
Scope 3 - Category 8 Upstream leased assets	**Category 14** - Upstream leased assets	
Scope 3 - Category 9 Downstream transportation and distribution a) Transportation b) Distribution	**Category 17** - Downstream transport and distribution	
Scope 3 - Category 10 Processing of sold products	**Category 18** - Use stage of the product	
Scope 3 - Category 11 Use of sold products a) Direct energy consumed by products b) Fuel and feedstock as products c) Fugitive emissions of product use d) Indirect energy consumed of final products e) Indirect energy of intermediate product		
Scope 3 - Category 12 End-of-life treatment of sold products	**Category 19** - End of life of the product	
Scope 3 - Category 13 Downstream leased assets	**Category 21** - Downstream leased assets	
Scope 3 - Category 14 Franchises	**Category 20** - Downstream franchises	
Scope 3 - Category 15 Investments a) Equity investments b) Project finance and debt c) Total projected lifetime emissions	**Category 15** - Investments	
N/A	**Category 16** - Client and visitor transport	
	Category 23 - Other indirect emissions or removals not included in the other 22 categories	

Definition of “Scope” and relevant standards

As shown on slide 10, the International Standards Organization (ISO) has also developed two methods for GHG accounting. The ISO differentiates between direct emissions (equivalent to Scope 1), electricity [including, steam, heat and cooling] indirect emissions (Scope 2) and other indirect emissions (Scope 3).

If you don’t find references to “Scope” in your annotation task, you can try searching for “direct emissions ” and “indirect emissions”.

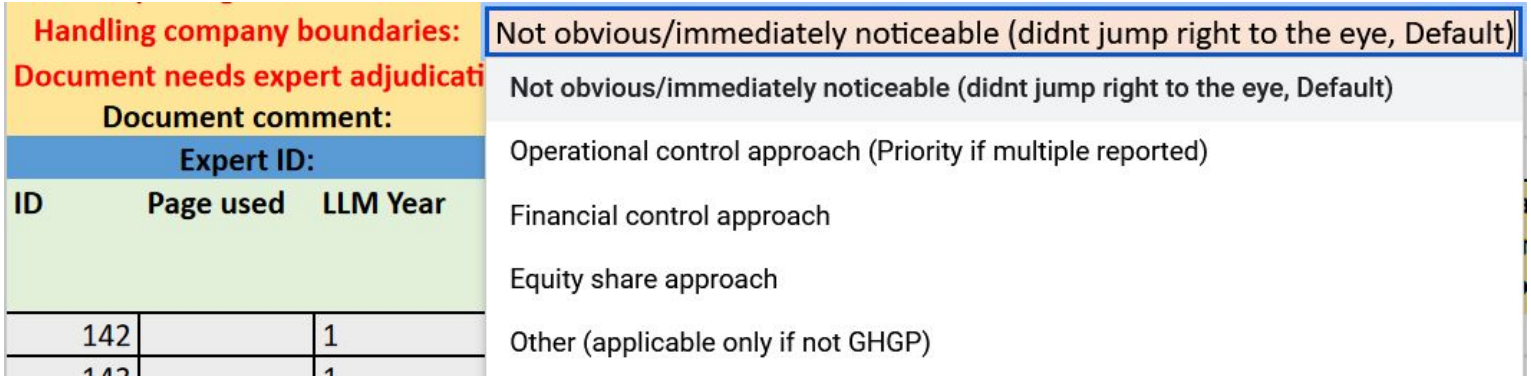
Some companies also use the GRI (Global Reporting Initiative) framework to organize their reports. Emissions are in the heading 305 of the GRI. You can search for GRI 305-1 (Scope 1), GRI 305-2 (Scope 2) and 305-3 (Scope 3) as synonyms



Report level annotation: Company Boundaries

If emissions are reported according to the GHG Protocol, companies can choose between the following three approaches of aggregating their subsidiaries, joint ventures etc.

- Operational control approach: If the parent company has full authority to implement changes in a subsidiary, 100% of the subsidiary's emissions are attributed to the company [expected to be the most common]
- Financial control approach: If the parent company owns majority of voting rights (e.g. shares) in a subsidiary, 100% of the subsidiary's emissions are attributed to the company
- Equity share approach: Emissions of subsidiaries are attributed according to the investment share (e.g. when holding 60% of a subsidiary's shares, the parent company head "owns" 60% of its emissions)



You are NOT required to look specifically for the report's company boundary approach.

- If you do not notice references to any of the approaches on the previous slide, annotate "Not obvious/immediately noticeable"
- If you notice one of the approaches, select it from the menu
- If the company discloses information for multiple approaches, choose the operational control approach if available -> **in this case also use the operational approach for annotating the values of year-scope level annotations**
- If the company does not use GHG Protocol and you find a mention of a different approach, select "Other"

Report Name:					Please double-check after completing this sheet that all cells with a red background must be filled out.													
Pages searched:																		
Annotator ID:																		
Reporting Standards:																		
Document needs expert adjudication:																		
Document comment:																		
Expert ID:																		
ID	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if necessary)	Value Reasoning (select if necessary)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from PDF	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)	
1	16	2013	1	5000	T	n/a			n/a			Yes						
2	16	2014	1	7296	T	n/a			n/a			Yes						
3	16	2015	1	6854	fuels	n/a			n/a			Yes						
4	16	2016	1	4134	T	n/a			n/a			Yes						
5	16	2017	1	7678	T	n/a			n/a			Yes						

LLM input

This is the information extracted by the LLM. It contains:

- **ID:** a row ID
- **Page used:** The page the LLM used to extract the information
- **LLM Scope:** The row‘s respective Scope (for a definition of “Scope” see slide 10)
- **LLM Year:** The row‘s respective year
- **LLM value:** This is the Emission value the LLM has extracted for the Year-scope combination
- **LLM unit:** This is the unit of the value

Expect these columns to be empty in many cases

Important: The values in the green columns (shaded in grey) must never be changed! This is central to the success of our project. In case you change the data accidentally pls reach out to us.

Report Name:
Pages searched:
Annotator ID:
Reporting Standards:
Document needs expert adjudication:
Document comment:
Expert ID:

Please double-check after completing this sheet that all cells with a red background must be filled out.

ID	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if necessary)	Value Reasoning (select if necessary)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from PDF	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)
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2	16	2014	1	7296	T	n/a			n/a			Yes					
3	16	2015	1	6854	fuels	n/a			n/a			Yes					
4	16	2016	1	4134	T	n/a			n/a			Yes					
5	16	2017	1	7678	T	n/a			n/a			Yes					

Scope-year-level annotations

- **Value correct: (Yes/No)** → Binary indicator whether the LLM extracted the correct emission value for the year-scope combination
- **IF NO**
  - **Value corrected:** The corrected emission value (numeric input). If a report does not contain the correct value, enter "n/a" or leave empty.
  - **Value Reasoning:** Categorical variable providing a reason why the LLM extracted wrong information
- **Unit correct: (Yes/No)** → Binary indicator whether the LLM extracted the correct unit for the year-scope combination
- **IF NO**
  - **Unit corrected:** The corrected unit (free text). If a report does not contain the correct value, enter "n/a" or leave empty.
  - **Unit Reasoning:** Categorical variable providing a reason why the LLM extracted wrong information

When is a value correct?

To be a correct value of interest it needs to fulfill the following criteria:

1. It covers the emissions of the whole company (in accounting language “whole company” is sometimes called “consolidated”)
   a. not e.g., just supply chain or just facilities in Bangladesh
2. The emissions are reported according to the operational boundaries of the Scopes (or other valid categorizations like direct / indirect)
   a. no “custom” boundaries like supply chain emissions or total emissions, net emissions etc. are introduced
3. The company reports absolute GHG (mostly CO2 equivalent, sometimes only CO2) emissions
   a. not e.g., SO2 emissions or CO2 emissions per passenger

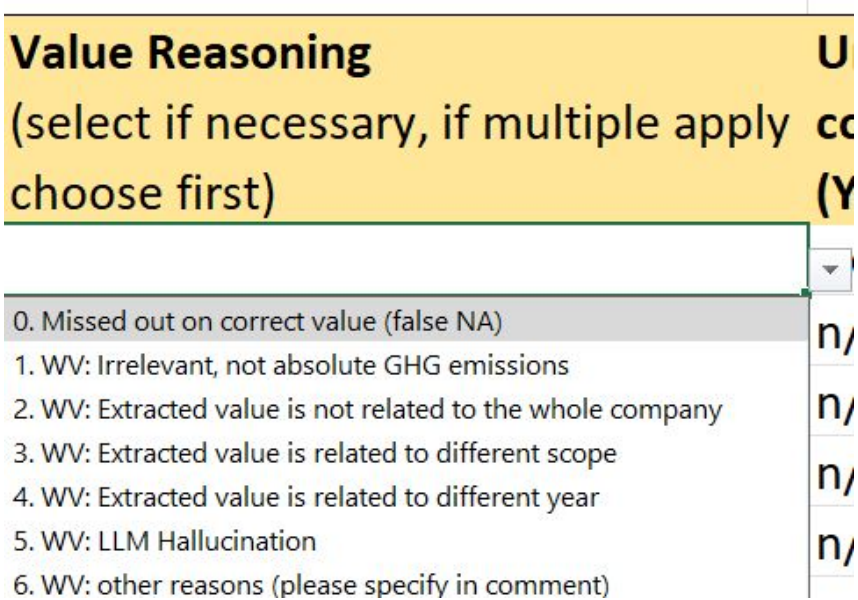
Every single value that does not meet all of these criteria is always to be annotated as wrong! Note that empty cells can be wrong when there is a matching year-scope value in the report that has not been extracted by the LLM

Every wrong value needs to be reasoned why wrong (→ next slide)

Reasoning

The categorical reasoning variables can take the following values:

If more than one reason applies, select the one that comes first in the drop-down menu



WV = "Wrong Value"

Report Name:					Please double-check after completing this sheet that all cells with a red background must be filled out.														
Pages searched:																			
Annotator ID:																			
Reporting Standards:																			
Document needs expert adjudication:																			
Document comment:																			
Expert ID:																			
ID	Page used	LLM Year	LLM Scope	LLM value	LLM uni		Value correct (Yes/No)	Value corrected (fill in if necessary)	Value Reasoning (select if necessary)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from PDF	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)	
1	16	2013	1	5000	T		n/a			n/a			Yes						
2	16	2014	1	7296	T		n/a			n/a			Yes						
3	16	2015	1	6854	fuels		n/a			n/a			Yes						
4	16	2016	1	4134	T		n/a			n/a			Yes						
5	16	2017	1	7678	T		n/a			n/a			Yes						

- **Page correct:** → **(Yes/No)** → Binary indicator whether the page containing the correct information is equal to the page in the "Page used" column
- **Page corrected: IF NO** → The corrected page (that is the one where you got the correct value)
  - Important: Here we refer to the number shown in your PDF reader, not the page number printed in the report (by the company)
- **Reporting Type:** Categorical variable where the correct emission values were found (Text, table, etc.)
- **Emission Metric Name:** Copy the exact wording of the correct emission metric from the report
- **Comment:** Open text field for your comments (especially for the experts)
- **Expert needed:** → **(Yes/No)** → In case you are uncertain with your annotations check "Yes" in this column. Do not be hesitant to assign an annotation to expert adjudication. The most important goal is to create a high quality dataset and that includes expert annotation.
  - This column must be filled in for every row in the spreadsheet

Finishing the annotation

All cells that are

- shaded in red

  and

- in rows where the LLM extracted values
- for which you find scope-year combinations in the report and for which the LLM did not extract values

must be filled in at the end.

Thus, if the LLM did not extract any values and upon searching you did not find any correct values in the report, just fill in the mandatory (red) cells.

We will now go through an example case for the year-scope-level annotation (Puma 2018)

This is how your annotation Excel sheet could look like

(For this example we just look at 2014-2018 and Scope 1)

Report Name:			komeri ltd_2020_report.pdf			Please double-check after completing this sheet that all cells with a red background must be filled out.													
Pages searched:			11, 12, 13, 14, 15, 16, 17, 18																
Annotator ID:																			
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Handling company boundaries:			Not obvi																
Document needs expert adjudicati																			
Document comment:																			
Expert ID:							True value			True value					True value:				
D	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if	Value Reasoning (select if necessary, if multiple apply choose first)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary, if multiple apply choose first)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)		
382		1	2013			n/a			n/a			Yes							
383		1	2014			n/a			n/a			Yes							
384		1	2015			n/a			n/a			Yes							

Now open the Report for Puma 2018 and search the document for the relevant information …

Tip: You can use the search function with terms like "Scope", or "[direct / indirect] emissions"

Report Name:						Please double-check after completing this sheet that all cells with a red background must be filled out.											
Pages searched:																	
Annotator ID:																	
Reporting Standards:																	
Document needs expert adjudication:																	
Document comment:																	
Expert ID:																	
ID	**Page used**	**LLM Year**	**LLM Scope**	**LLM value**	**LLM unit**	**Value correct (Yes/No)**	**Value corrected** (fill in if necessary)	**Value Reasoning** (select if necessary)	**Unit correct (Yes/No)**	**Unit corrected** (fill in if necessary)	**Unit Reasoning** (select if necessary)	**Page correct (Yes/No)**	**Page corrected** (fill in if necessary)	**Reporting Type** (Table/Graphic/ Text/…) from PDF	**Emission Metric Name** from PDF	**Comment** (if helpful)	**Record needs expert adjudication (Yes/No)**
1	16	2013	1	5000	T	n/a			n/a			Yes					
2	16	2014	1	7296	T	n/a			n/a			Yes					
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5	16	2017	1	7678	T	n/a			n/a			Yes					

Annotator ID:
Reporting Standards:
Document needs expert adjudication:
Document comment:
Expert ID:

ID	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if necessary)	Value Reasoning (select if necessary)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from PDF	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)
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3	16	2015	1	6854	fuels	n/a			n/a			Yes					
4	16	2016	1	4134	T	n/a			n/a			Yes					
5	16	2017	1	7678	T	n/a			n/a			Yes					

T.11 CO_2e EMISSIONS BREAKDOWN BY SOURCE [1-7]

CO_2e Emissions (Absolute Figures)	2018	2017	2016	2015	Variation 2018 / 2017 (in %)	Variation 2018 / 2015 (in %)
Scope 1 - Direct CO_2e emissions fossil fuels (T)	**6,918**	7,678	6,854	7,296	-9.9	-5.2
Car Fleet (T)	4,073	4,134	3,746	4,087	-1.5	-0.4
Heating (T)	2,845	3,545	3,107	3,209	-19.7	-11.3
Scope 2 - Indirect CO_2e emissions electricity & steam (T)	**43,366**	40,029	37,300	35,591	8.3	21.8
Electricity (T)	42,145	38,914	36,046	34,445	8.3	22.4
Steam (T)	1,221	1,115	1,254	1,146	9.5	6.6
Scope 3 - Other indirect CO_2e emissions [T]	**222,315**	208,525	196,896	192,305	6.6	15.6
Business Travel Transportation (T)	15,582	14,394	12,167	10,191	8.3	52.9
B2B Goods Transport (T)	74,182	64,076	48,484	57,085	15.8	29.9
B2C Goods Transport (T)	5,961	6,994	16,223	6,321	-14.8	-5.7
Manufacturing in Tier 1 Suppliers (T)	126,590	123,061	120,023	118,708	2.9	6.6
TOTAL SCOPE 1-3 [T]	**272,599**	256,232	241,049	235,192	6.4	15.9
Annual sales PUMA (in € million)	4,648.3	4,135.9	3,626.7	3,387.4	12.4	37.2
TOTAL CO_2e EMISSIONS RELATIVE TO SALES (in tons CO_2e per € million sales per year)	58.6	62.0	66.5	69.4	-5.3	-15.5

1. PUMA uses own methodology for CO_2 accounting, with reference to the GHG protocol.
2. The consolidation scope follows the operational control approach, including PUMA-owned or operated offices, warehouses, stores and own industrial sites (Argentina).
3. Outsourced Tier 1 production is accounted in the scope 3 emissions, covering CO_2 emissions from all three divisions (Accessories, Apparel, and Footwear).
4. Due to the Kering spin-off we reviewed the scope in our sustainability reporting tool. From this year on, we will apply the "min. 90% rule" for data collection from PUMA entities, covering min. 90% of PUMA's FTE employees worldwide. The residual will be extrapolated.
5. PUMA applies the market-based approach for scope 2, using emission factors by ADEME. In addition to the market-based approach, the location-based approach is used in the CDP questionnaire. Scope 3 emissions factors are based on additional company and industry-specific emission factors.
6. Data includes extrapolations or estimations where no real data could be provided.
7. Methodological changes over the last three years influence results.

We have found this table containing the relevant information.

Now we will enter the annotations row by row

Tip: You do not necessarily have to go through the Excel sheet row by row

Report Name:	puma_2018
Pages searched:	(10,11,12,13,14,15,16,17,18)
Annotator ID:	12345
Reporting Standards:	GHGP
Document needs expert adjudicatio	No
Document comment:	
Expert ID:	

Please double-check after completing this sheet that all cells with a red background must be filled out.

ID	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if necessary)	Value Reasoning (select if necessary)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from PDF	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)
1	16	2014	1	5000	T	No		WV: LLM Hallucination	No		WV: LLM Hallucination	No					No
2	16	2015	1	7296	T	Yes			Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No
3	16	2016	1	6854	fuels	Yes			No	T	WV: Irrelevant, not absolute GHG	Yes		Table	Scope 1 - Direct CO2e emissions fossil		Yes
4	16	2017	1	4134	T	No		WV: Extracted value is not related to	Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No
5	16	2018	1	7678	T	No		WV: Extracted value is related to diff	Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No

T.11 CO_2e EMISSIONS BREAKDOWN BY SOURCE [1-7]

CO_2e Emissions (Absolute Figures)	2018	2017	2016	2015	Variation 2018 / 2017 (in %)	Variation 2018 / 2015 (in %)
Scope 1 - Direct CO_2e emissions fossil fuels (T)	**6,918**	7,678	6,854	7,296	-9.9	-5.2
Car Fleet (T)	4,073	4,134	3,746	4,087	-1.5	-0.4
Heating (T)	2,845	3,545	3,107	3,209	-19.7	-11.3
Scope 2 - Indirect CO_2e emissions electricity & steam (T)	**43,366**	40,029	37,300	35,591	8.3	21.8
Electricity (T)	42,145	38,914	36,046	34,445	8.3	22.4
Steam (T)	1,221	1,115	1,254	1,146	9.5	6.6
Scope 3 - Other indirect CO_2e emissions [T]	**222,315**	208,525	196,896	192,305	6.6	15.6
Business Travel Transportation (T)	15,582	14,394	12,167	10,191	8.3	52.9
B2B Goods Transport (T)	74,182	64,076	48,484	57,085	15.8	29.9
B2C Goods Transport (T)	5,961	6,994	16,223	6,321	-14.8	-5.7
Manufacturing in Tier 1 Suppliers (T)	126,590	123,061	120,023	118,708	2.9	6.6
TOTAL SCOPE 1-3 [T]	**272,599**	256,232	241,049	235,192	6.4	15.9
Annual sales PUMA (in € million)	4,648.3	4,135.9	3,626.7	3,387.4	12.4	37.2
TOTAL CO_2e EMISSIONS RELATIVE TO SALES (in tons CO_2e per € million sales per year)	58.6	62.0	66.5	69.4	-5.3	-15.5

1. PUMA uses own methodology for CO_2 accounting, with reference to the GHG protocol.
2. The consolidation scope follows the operational control approach, including PUMA-owned or operated offices, warehouses, stores and own industrial sites (Argentina).
3. Outsourced Tier 1 production is accounted in the scope 3 emissions, covering CO_2 emissions from all three divisions (Accessories, Apparel, and Footwear).
4. Due to the Kering spin-off we reviewed the scope in our sustainability reporting tool. From this year on, we will apply the "min. 90% rule" for data collection from PUMA entities, covering min. 90% of PUMA's FTE employees worldwide. The residual will be extrapolated.
5. PUMA applies the market-based approach for scope 2, using emission factors by ADEME. In addition to the market-based approach, the location-based approach is used in the CDP questionnaire. Scope 3 emissions factors are based on additional company and industry-specific emission factors.
6. Data includes extrapolations or estimations where no real data could be provided.
7. Methodological changes over the last three years influence results.

Scope 1, Year 2014

The LLM has extracted a value even though 2014 is not part of the report

- Set value, unit and page to incorrect.
- Set the corrected values to n/a or leave empty

- The reason for error is “LLM Hallucination” (both, value and unit)

- Reporting Type and emission metric Name are missing

Report Name:	puma_2018
Pages searched:	(10,11,12,13,14,15,16,17,18)
Annotator ID:	12345
Reporting Standards:	GHGP
Document needs expert adjudicatio	No
Document comment:	
Expert ID:	

Please double-check after completing this sheet that all cells with a red background must be filled out.

ID	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if necessary)	Value Reasoning (select if necessary)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from PDF	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)
1	16	2014	1	5000	T	No		WV: LLM Hallucination	No		WV: LLM Hallucination	No					No
2	16	2015	1	7296	T	Yes			Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No
3	16	2016	1	6854	T	Yes			No		WV: Irrelevant, not absolute GHG	Yes		Table	Scope 1 - Direct CO2e emissions fossil		No
4	16	2017	1	4134	T	No		WV: Extracted value is not related to	Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No
5	16	2018	1	7678	T	No		WV: Extracted value is related to diff	Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No

T.11 CO_2e EMISSIONS BREAKDOWN BY SOURCE [1-7]

CO_2e Emissions (Absolute Figures)	2018	2017	2016	2015	Variation 2018 / 2017 (in %)	Variation 2018 / 2015 (in %)
Scope 1 - Direct CO_2e emissions fossil fuels (T)	**6,918**	7,678	6,854	7,296	-9.9	-5.2
Car Fleet (T)	4,073	4,134	3,746	4,087	-1.5	-0.4
Heating (T)	2,845	3,545	3,107	3,209	-19.7	-11.3
Scope 2 - Indirect CO_2e emissions electricity & steam (T)	**43,366**	40,029	37,300	35,591	8.3	21.8
Electricity (T)	42,145	38,914	36,046	34,445	8.3	22.4
Steam (T)	1,221	1,115	1,254	1,146	9.5	6.6
Scope 3 - Other indirect CO_2e emissions [T]	**222,315**	208,525	196,896	192,305	6.6	15.6
Business Travel Transportation (T)	15,582	14,394	12,167	10,191	8.3	52.9
B2B Goods Transport (T)	74,182	64,076	48,484	57,085	15.8	29.9
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Manufacturing in Tier 1 Suppliers (T)	126,590	123,061	120,023	118,708	2.9	6.6
TOTAL SCOPE 1-3 [T]	**272,599**	256,232	241,049	235,192	6.4	15.9
Annual sales PUMA (in € million)	4,648.3	4,135.9	3,626.7	3,387.4	12.4	37.2
TOTAL CO_2e EMISSIONS RELATIVE TO SALES (in tons CO_2e per € million sales per year)	58.6	62.0	66.5	69.4	-5.3	-15.5

1. PUMA uses own methodology for CO_2 accounting, with reference to the GHG protocol.
2. The consolidation scope follows the operational control approach, including PUMA-owned or operated offices, warehouses, stores and own industrial sites (Argentina).
3. Outsourced Tier 1 production is accounted in the scope 3 emissions, covering CO_2 emissions from all three divisions (Accessories, Apparel, and Footwear).
4. Due to the Kering spin-off we reviewed the scope in our sustainability reporting tool. From this year on, we will apply the "min. 90% rule" for data collection from PUMA entities, covering min. 90% of PUMA's FTE employees worldwide. The residual will be extrapolated.
5. PUMA applies the market-based approach for scope 2, using emission factors by ADEME. In addition to the market-based approach, the location-based approach is used in the CDP questionnaire. Scope 3 emissions factors are based on additional company and industry-specific emission factors.
6. Data includes extrapolations or estimations where no real data could be provided.
7. Methodological changes over the last three years influence results.

Scope 1, Year 2015

- The LLM has extracted the correct value, unit from the correct page (16)

- Set value, unit and page to correct.

- Reporting Type is „table“ (since we found the information in a table)

- Emission Metric Name is “Scope 1- Direct CO2e emissions fossil fuels”

Report Name:	puma_2018
Pages searched:	(10,11,12,13,14,15,16,17,18)
Annotator ID:	12345
Reporting Standards:	GHGP
Document needs expert adjudicatio	No
Document comment:	
Expert ID:	

Please double-check after completing this sheet that all cells with a red background must be filled out.

ID	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if necessary)	Value Reasoning (select if necessary)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from PDF	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)
1	16	2014	1	5000	T	No		WV: LLM Hallucination	No		WV: LLM Hallucination	No					No
3	16	2016	1	6854	fuels	Yes			No	T	WV: Irrelevant, not absolute GHG	Yes		Table	Scope 1 - Direct CO2e emissions fossil		Yes
5	16	2018	1	7678	T	No		WV: Extracted value is related to diff	Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No

T.11 CO_2e EMISSIONS BREAKDOWN BY SOURCE [1-7]

CO_2e Emissions (Absolute Figures)	2018	2017	2016	2015	Variation 2018 / 2017 (in %)	Variation 2018 / 2015 (in %)
Scope 1 - Direct CO_2e emissions fossil fuels (T)	**6,918**	7,678	6,854	7,296	-9.9	-5.2
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3. Outsourced Tier 1 production is accounted in the scope 3 emissions, covering CO_2 emissions from all three divisions (Accessories, Apparel, and Footwear).
4. Due to the Kering spin-off we reviewed the scope in our sustainability reporting tool. From this year on, we will apply the "min. 90% rule" for data collection from PUMA entities, covering min. 90% of PUMA's FTE employees worldwide. The residual will be extrapolated.
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6. Data includes extrapolations or estimations where no real data could be provided.
7. Methodological changes over the last three years influence results.

Scope 1, Year 2016

- The LLM has extracted the correct value and page
- The LLM has extracted the incorrect unit („fuels“)
-

 Corrected Unit is „T“

 Reasoning is: „Irrelevant, not related to emissions”

Report Name:	puma_2018
Pages searched:	(10,11,12,13,14,15,16,17,18)
Annotator ID:	12345
Reporting Standards:	GHGP
Document needs expert adjudicatio	No
Document comment:	
Expert ID:	

Please double-check after completing this sheet that all cells with a red background must be filled out.

ID	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if necessary)	Value Reasoning (select if necessary)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from PDF	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)
1	16	2014	1	5000	T	No		WV: LLM Hallucination	No		WV: LLM Hallucination	No					No
2	16	2015	1	7296	T	Yes			Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No
4	16	2017	1	4134	T	No	7678	WV: Extracted value is not related to	Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No
5	16	2018	1	7678	T	No	6918	WV: Extracted value is related to diff	Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No

T.11 CO_2e EMISSIONS BREAKDOWN BY SOURCE [1-7]

CO_2e Emissions (Absolute Figures)	2018	2017	2016	2015	Variation 2018 / 2017 (in %)	Variation 2018 / 2015 (in %)
Scope 1 - Direct CO_2e emissions fossil fuels (T)	**6,918**	7,678	6,854	7,296	-9.9	-5.2
Car Fleet (T)	4,073	4,134	3,746	4,087	-1.5	-0.4
Heating (T)	2,845	3,545	3,107	3,209	-19.7	-11.3
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Electricity (T)	42,145	38,914	36,046	34,445	8.3	22.4
Steam (T)	1,221	1,115	1,254	1,146	9.5	6.6
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Business Travel Transportation (T)	15,582	14,394	12,167	10,191	8.3	52.9
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Manufacturing in Tier 1 Suppliers (T)	126,590	123,061	120,023	118,708	2.9	6.6
TOTAL SCOPE 1-3 [T]	**272,599**	256,232	241,049	235,192	6.4	15.9
Annual sales PUMA (in € million)	4,648.3	4,135.9	3,626.7	3,387.4	12.4	37.2
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2. The consolidation scope follows the operational control approach, including PUMA-owned or operated offices, warehouses, stores and own industrial sites (Argentina).
3. Outsourced Tier 1 production is accounted in the scope 3 emissions, covering CO_2 emissions from all three divisions (Accessories, Apparel, and Footwear).
4. Due to the Kering spin-off we reviewed the scope in our sustainability reporting tool. From this year on, we will apply the "min. 90% rule" for data collection from PUMA entities, covering min. 90% of PUMA's FTE employees worldwide. The residual will be extrapolated.
5. PUMA applies the market-based approach for scope 2, using emission factors by ADEME. In addition to the market-based approach, the location-based approach is used in the CDP questionnaire. Scope 3 emissions factors are based on additional company and industry-specific emission factors.
6. Data includes extrapolations or estimations where no real data could be provided.
7. Methodological changes over the last three years influence results.

Scope 1, Year 2017

- The LLM has extracted the incorrect value
- The LLM has extracted the correct unit and page

- Corrected Value is 7678
- Reasoning is: „WV: Extracted value is not related to the whole company ”

Report Name:	puma_2018	Please double-check after completing this sheet that all cells with a red background must be filled out.															
Pages searched:	(10,11,12,13,14,15,16,17,18)																
Annotator ID:	12345																
Reporting Standards:	GHGP																
Document needs expert adjudicatio	No																
Document comment:																	
Expert ID:																	
ID	Page used	LLM Year	LLM Scope	LLM value	LLM unit	Value correct (Yes/No)	Value corrected (fill in if necessary)	Value Reasoning (select if necessary)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from PDF	Emission Metric Name from PDF	Comment (if helpful)	Record needs expert adjudication (Yes/No)
1	16	2014	1	5000	T	No		WV: LLM Hallucination	No		WV: LLM Hallucination	No					No
2	16	2015	1	7296	T	Yes			Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No
3	16	2016	1	6854	fuels	Yes			No	T	WV: Irrelevant, not absolute GHG	Yes		Table	Scope 1 - Direct CO2e emissions fossil		Yes
4	16	2017	1	4134	T	No	7678	WV: Extracted value is not related to	Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No
5	16	2018	1	7678	T	No	6918	WV: Extracted value is related to diff	Yes			Yes		Table	Scope 1 - Direct CO2e emissions fossil		No

T.11 CO_2e EMISSIONS BREAKDOWN BY SOURCE [1-7]

CO_2e Emissions (Absolute Figures)	2018	2017	2016	2015	Variation 2018 / 2017 (in %)	Variation 2018 / 2015 (in %)
Scope 1 - Direct CO_2e emissions fossil fuels (T)	**6,918**	7,678	6,854	7,296	-9.9	-5.2
Car Fleet (T)	4,073	4,134	3,746	4,087	-1.5	-0.4
Heating (T)	2,845	3,545	3,107	3,209	-19.7	-11.3
Scope 2 - Indirect CO_2e emissions electricity & steam (T)	**43,366**	40,029	37,300	35,591	8.3	21.8
Electricity (T)	42,145	38,914	36,046	34,445	8.3	22.4
Steam (T)	1,221	1,115	1,254	1,146	9.5	6.6
Scope 3 - Other indirect CO_2e emissions [T]	**222,315**	208,525	196,896	192,305	6.6	15.6
Business Travel Transportation (T)	15,582	14,394	12,167	10,191	8.3	52.9
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Manufacturing in Tier 1 Suppliers (T)	126,590	123,061	120,023	118,708	2.9	6.6
TOTAL SCOPE 1-3 [T]	**272,599**	256,232	241,049	235,192	6.4	15.9
Annual sales PUMA (in € million)	4,648.3	4,135.9	3,626.7	3,387.4	12.4	37.2
TOTAL CO_2e EMISSIONS RELATIVE TO SALES (in tons CO_2e per € million sales per year)	58.6	62.0	66.5	69.4	-5.3	-15.5

1. PUMA uses own methodology for CO_2 accounting, with reference to the GHG protocol.
2. The consolidation scope follows the operational control approach, including PUMA-owned or operated offices, warehouses, stores and own industrial sites (Argentina).
3. Outsourced Tier 1 production is accounted in the scope 3 emissions, covering CO_2 emissions from all three divisions (Accessories, Apparel, and Footwear).
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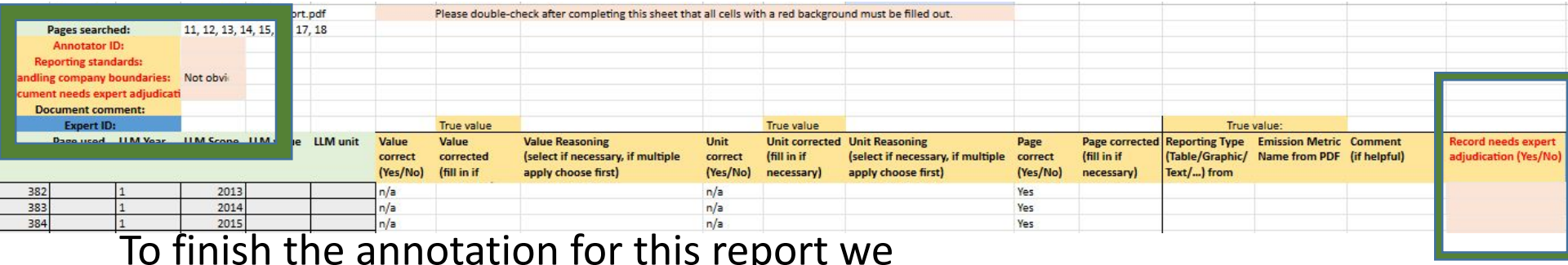
6. Data includes extrapolations or estimations where no real data could be provided.
7. Methodological changes over the last three years influence results.

Scope 1, Year 2018

- The LLM has extracted the incorrect value
- The LLM has extracted the correct unit and page

- Corrected Value is 6918
- Reasoning is: „WV: Extracted value is related to different year ”



Pages searched:	11, 12, 13, 14, 15,
Annotator ID:	
Reporting standards:	
andling company boundaries:	Not obvi
cument needs expert adjudicati	
Document comment:	
Expert ID:	

ort.pdf 17, 18

Please double-check after completing this sheet that all cells with a red background must be filled out.

							True value				True value				True value:			Record needs expert adjudication (Yes/No)
						LLM unit	Value correct (Yes/No)	Value corrected (fill in if	Value Reasoning (select if necessary, if multiple apply choose first)	Unit correct (Yes/No)	Unit corrected (fill in if necessary)	Unit Reasoning (select if necessary, if multiple apply choose first)	Page correct (Yes/No)	Page corrected (fill in if necessary)	Reporting Type (Table/Graphic/ Text/...) from	Emission Metric Name from PDF	Comment (if helpful)	
382		1	2013				n/a			n/a			Yes					
383		1	2014				n/a			n/a			Yes					
384		1	2015				n/a			n/a			Yes					

To finish the annotation for this report we

- put in your annotator ID
- select the reporting standard (GHG bc. Scope was mentioned)
  - Important: Reporting standards to choose from regulate only the reporting about emissions. They are not the same as reporting frameworks such as GRI, TCFD, CDP, CDSB that cover the whole report.
- no mention of company boundaries → we can leave at default
- Select whether an expert needs to adjudicate
  1. the whole document
  2. single rows

→ here we select row 3 to be expert adjudicated bc we are unsure about the unit

Special Case: Scope 2 emissions

- Companies can report their Scope 2 emissions in two different ways: market-based or location-based (or both)
- Thus, for each year you might find two Scope 2 columns (e.g. 2015 Scope 2 m-b and 2015 Scope 2 l-b).

Only Market based

Scope 2 GHG Emissions (Market-based)

	2018 Linde Pro Forma	2019 Linde	2020 Linde	2021 Linde
Scope 2	23,518,000	23,448,000	22,299,000	23,573,000

EN (9): Scope 2 GHG Emissions

Units: Metric Tons CO_2e

Location and Market based

Transparency on greenhouse gas emissions

In selecting and measuring greenhouse gas emissions, we consider recommendations of the Greenhouse Gas (GHG) Protocol. Direct emissions from our own power plants, vehicles, waste incineration plants and production facilities (Scope 1) and indirect emissions from the procurement of electricity, steam and cooling energy (Scope 2) are determined at all environmentally relevant sites.

In line with the GHG Protocol, indirect emissions (Scope 2) are reported according to both the location-based and the market-based methods.

Because we are reporting emission data for the acquired agriculture business for the first time, all Bayer Group emissions are considerably higher year on year.

A 1.6.3/3

Greenhouse Gas Emissions

Million metric tons of CO_2 equivalents	2017	2018
Direct emissions [1,2,3]	2.50	3.90
Indirect emissions [4] according to the location-based method	1.28	1.64
Indirect emissions [4] according to the market-based method [5]	1.13	1.55
Total greenhouse gas emissions according to the market-based method [5]	**3.63**	**5.45**

Special Case: Scope 2 emissions

In your annotation document you will find a row for each year for market- AND location-based annotations.

Background:

- market-based: calculated from contractual information as provided by energy providers
- location-based: calculated from statistical energy mixes in each country of operation

Enter all the information available. The GHG Protocol requires that companies report both market and location based emissions. The only exception is when companies do not operate in any country where electricity purchases include specific information about the suppliers' emissions. In this case, they cannot calculate market-based emissions as relevant information is not available.

If you only find one value for scope 2 and it is not labelled, enter it as location-based because it is the historically prevalent method and it has to be reported in all cases according to the GHG Protocol

LLM Scope	LLM Year
2013	1
2014	1
2015	1
2016	1
2017	1
2018	1
2019	1
2020	1
2021	1
2022	1
2013	2mb
2014	2mb
2015	2mb
2016	2mb
2017	2mb
2018	2mb
2019	2mb
2020	2mb
2021	2mb
2022	2mb
2013	2lb
2014	2lb
2015	2lb
2016	2lb
2017	2lb
2018	2lb
2019	2lb
2020	2lb
2021	2lb
2022	2lb
2013	3
2014	3
2015	3
2016	3
2017	3
2018	3
2019	3
2020	3
2021	3
2022	3

Special Case: Multiple Rows per Scope-Year

- The LLM might extract multiple values per scope-year combination
- In this case, your Excel will have more rows than usually

→ However, just one value can be true.
→ Examine the company report and figure out which value is correct.
→ Then annotate both (or more) rows per scope-year combination
  - The correct value must be annotated as correct
  - The wrong values must be annotated as wrong and corrected

Special Case: Multiple Scope-Year emission values per document

- The report might contain multiple mentions/value per scope-year combination
- In this case, your Excel will not have enough rows if the LLM did not capture the multiple occurences
- You are required to annotate the values in additional rows

→ Flag the missing rows as 0: false NA
→ Add correct value, unit, page + Scope & Year to the grey cells!
(This is the only case in which you are supposed to fill in the grey cells)
→ If you need to add rows to the document, insert “x” in the ID-column
Example: (jetblue 2019)

0	141		3	2022			n/a		n/a			Yes				No	n/a
1	x		2lb	2019		No	25944	0. Missed out on correct value (false	No	tonnes CO2e	0. Missed out on correct value (fa	No	11	Table	Scope 2 GHG emis added row	No	n/a
2	x		2lb	2015		No	25768	0. Missed out on correct value (false	No	tCO2e	0. Missed out on correct value (fa	No	10	Table	Indirect Energy (Scope 2)	No	n/a
3	x		2lb	2016		No	27702	0. Missed out on correct value (false	No	tCO2e	0. Missed out on correct value (fa	No	10	Table	Indirect Energy (Scope 2)	No	n/a
4	x		2lb	2017		No	26521	0. Missed out on correct value (false	No	tCO2e	0. Missed out on correct value (fa	No	10	Table	Indirect Energy (Scope 2)	No	n/a
5	x		2lb	2018		No	26656	0. Missed out on correct value (false	No	tCO2e	0. Missed out on correct value (fa	No	10	Table	Indirect Energy (Scope 2)	No	
6	x		2lb	2019		No	25944	0. Missed out on correct value (false	No	tCO2e	0. Missed out on correct value (fa	No	10	Table	Indirect Energy (Scope 2)	No	
7																	

Remarks/Recommendations

- Use the search function (Ctrl + F)
  - Search for the synonyms of the Scopes (e.g., Scope 1 = “direct emissions”)
  - “GRI 305” can be a helpful search term to lead to emission values in reports that are organized according to the Global Reporting Initiative framework
- No calculations *(annotator non calculat)*
- Only report absolute values. “we reduced emissions by 20%” –> NA
- Appendix tables might be a useful source
- Only use the document at hand *(annotator non googulat)*
- Ignore terms like “ca.” or “around”. Annotate “around 10” as “10”

Examples for typical errors/difficulties

Legend

- Red boxes indicate the emissions values, which you should extract
- Green boxes indicate the unit of measurement, which you should extract
- Violet boxes indicate the years that belong to the emission values
- Blue boxes indicate relevant context that helps you find the right values
- Red text explains the problems
- Green text gives guidance on how to deal with the issues

Outline: Types of entries not corresponding to criteria (see slide 14)

- Emissions reported in variables not related to Scope 1 – 3: **SLIDE 37 (Slide 38)**
- Scope 1 and 2 are reported together: **SLIDE 39**
- Several measurement units (not GHG in tCO2e) for measuring emissions: **SLIDE 40**
- Dissaggreation issues
  - By Greenhouse Gases and Business Operations: **SLIDE 41**
  - By Facilities: **SLIDE 42**
- Consolidated data missing, only disaggregated emissions: **SLIDE 43**
- Doubling of (not-identical) values for same year-scope combinations: **SLIDE 44**

Emissions reported in variables not related to Scope 1 – 3

Problem: In addition to the three scopes of emissions there is another indicator called *Total comprehensive carbon*.

Solution: Ignore the values reported for *Total comprehensive carbon.* Only annotate the values for Scope 1 to 3 (red boxes)

Appendix A

Greenhouse gas emissions

		Fiscal year				
		2020	2019	2018	2017	2016
Corporate facilities emissions (metric tons CO_2e)[1]	**Scope 1**	**47,430**	**52,730**	**57,440**	**47,050**	**34,370**
	Natural gas, diesel, propane[2]	39,340	40,910	42,840	36,210	27,000
	Fleet vehicles	4,270	6,950	11,110	8,300	7,370
	Process emissions[3]	3,830	4,870	3,490	2,540	-
	Scope 2 (market-based)[4]	**0**	**0**	**8,730**	**36,250**	**41,000**
	Electricity	0	0	8,730	36,250	41,000
	Scope 3[5]	**22,550,000**	**24,980,000**	**25,070,000**	**27,330,000**	**29,500,000**
	Business travel[6]	153,000	326,000	337,000	121,000	118,000
	Employee commute[7]	134,000	195,000	183,000	172,000	186,000
Product life cycle emissions (metric tons CO_2e)[8]	Manufacturing (purchased goods and services)	16,100,000	18,900,000	18,500,000	21,100,000	22,800,000
	Product transportation (upstream and downstream)	1,800,000	1,400,000	1,300,000	1,200,000	1,200,000
	Product use (use of sold products)	4,300,000	4,100,000	4,700,000	4,700,000	4,900,000
	End of life treatment	60,000	60,000	50,000	40,000	300,000
Total comprehensive carbon footprint (metric tons CO_2e)[9]		**22,600,000**	**25,100,000**	**25,200,000**	**27,500,000**	**29,500,000**

Scope 1 and 2 are reported together

Don‘t annotate

thyssenkrupp has ambitious targets to reduce greenhouse gas emissions

The Group's greenhouse gas emissions – scope 1 and 2 emissions as per Greenhouse Gas Protocol – amounted to around 23 million tons in the reporting period.

Problem: Emission values for scopes 1 and 2 are summed up and reported together. From this value no disaggregated values for Scope 1 and Scope 2 can be calculated

Solution: Search whether the report provides separate values for Scope 1 and 2 in other places. If this is not the case and you can only find the combined value for Scope 1 + 2, don‘t annotate any value. Set the extracted values to incorrect and enter “n/a” in the corrected cells for Scope 1 and 2.

Different measurement units for scope 1-3 emissions

Don‘t annotate

SCOPE 1* DIRECT CO_2 EMISSIONS

in kg/vehicle

	2019	2018	2010
Direct CO_2 emissions (Scope 1)	338	346	588

* Cars and light commercial vehicles.

Problem: Apart from absolute emissions (i.e. emissions per company and year), there might be other indicators (e.g. emissions per vehicle or per Euro turnover) that equally apply the Scope 1 to 3 framework.

Annotate

SCOPE 1 DIRECT CO_2 EMISSIONS

in million tonnes/year

	2019	2018	2010
Direct CO_2 emissions (Scope 1)	3.77	3.91	4.32
of which cars and light commercial vehicles	3.58	3.74	4.29
of which other divisions	0.19	0.17	0.03

Solution: Make sure that you always extract the Scope 1 to 3 emissions for the entire company in a given year. Ignore all values that divide emissions by another indicator

Disaggregation: Greenhouse Gases and Operations

Problem: There are many types of emission values for different business operations (upstream, midstream, downstream) and Greenhouse Gases (CO2, CH4, Other GHG).

Solution: Make sure to annotate the aggregated Scope 1 emissions covering all gases and business units (red boxes). Note that in this particular table the sum is at the top rather than at the bottom and that there is different shading in the cells, which might make them harder to find at first

equity emissions[a,1]

	2016	2017	2018	2019	2020	SASB[b]	IPIECA[c]
Upstream production net emissions intensity (kilograms CO_2e/boe)[2]							CCE4: C4
Oil intensity	41.9	36.8	37.0	33.3	28.3		
Gas intensity	32.6	35.0	34.7	30.4	26.8		
Flaring intensity	8.7	7.2	6.3	4.7	3.9		
Methane intensity	4.5	3.3	2.8	2.4	2.0		
direct GHG emissions (Scope 1)[d,3,4,5,6]							
direct GHG emissions (Scope 1) (million tonnes CO_2e)[4]	64	63	66	62	54		CCE4: C1/A1
Upstream (million tonnes CO_2e)	**35**	**35**	**37**	**35**	**30**	EM-EP-110a.1	CCE4: C3
CO_2 (million tonnes)	30	31	34	32	27		
CH_4 (million tonnes CH_4)[7]	0.17	0.13	0.12	0.11	0.09		
CH_4 (million tonnes CO_2e)[7]	4.3	3.3	3.0	2.7	2.3		
Other GHG (million tonnes CO_2e)	0.1	0.1	0.1	0.1	0.1		
Midstream (million tonnes CO_2e)	**2**	**2**	**2**	**1**	**1**	EM-MD-110a.1	CCE4: C3
CO_2 (million tonnes)	1	2	2	1	1		
CH_4 (million tonnes CH_4)[7]	<0.01	<0.01	<0.01	<0.01	<0.01		
CH_4 (million tonnes CO_2e)[7]	<0.1	<0.1	<0.1	<0.1	<0.1		
Other GHG (million tonnes CO_2e)	<0.1	<0.1	<0.1	<0.1	<0.1		
Downstream (million tonnes CO_2e)[8]	**21**	**21**	**20**	**19**	**18**	EM-RM-110a.1	CCE4: C3
CO_2 (million tonnes)	21	20	20	19	18		
CH_4 and other GHG (million tonnes CO_2e)	0.1	0.1	0.1	0.1	0.1		
Chemicals (million tonnes CO_2e)[9]	**5**	**5**	**5**	**5**	**4**		CCE4: C3
CO_2 (million tonnes)	5	5	5	5	4		
CH_4 and other GHG (million tonnes CO_2e)	<0.1	<0.1	<0.1	<0.1	<0.1		
Other (million tonnes CO_2e)[10]	**2**	**1**	**2**	**1**	**1**		CCE4: C3
CO_2 (million tonnes)	2	1	2	1	1		
CH_4 and other GHG (million tonnes CO_2e)	<0.1	<0.1	<0.1	<0.1	<0.1		

Indicates restatement of data.

equity emissions table continues on page 48

Disaggregation: Facilities

Problem: The report has different tables, which report Scope 1 - 2 emissions for different parts of the company.

Solution: Make sure to only annotate the values for the whole company - that is the parent company and all subsidiaries (table below). The heading on the table on the right hints that the values are for different corporate facilities. Ignore these values and search for the table with the company-wide emissions

Don't annotate

Fiscal year 2020 energy and carbon footprint (corporate facilities)

The chart below provides a detailed breakdown of fiscal year 2020 energy use, which we used to calculate our greenhouse gas emissions.

Location	Scope 1			Scope 2		
	Total gas (mmBTU)	Renewable biogas (mmBTU)	Scope 1 emissions (metric tons CO_2e)	Electricity (million kWh)	Renewable electricity (million kWh)	Scope 2 emissions (metric tons CO_2e)
Corporate	**825,121**	**218,703**	**319,32**	**689**	**689**	**0**
Cupertino, CA	699,485	218,703	25,549	374	374	0
Elk Grove, CA	10,908	-	580	16	16	0
Austin, TX	11,076	-	588	60	60	0
Other USA	24,818	-	1,322	50	50	0
Cork, Ireland	15,732	-	836	15	15	0
Singapore	538	-	29	14	14	0
China	2,703	-	144	24	24	0
Other international	59,860	-	2,884	136	136	0
Data centers	**501,459**	**500,642**	**71**	**1,700**	**1,700**	**0**
Maiden, NC	500,642	500,642	27	358	358	0
Mesa, AZ	312	-	17	227	227	0
Newark, CA	-	-	-	99	99	0
Prineville, OR	505	-	27	279	279	0
Reno, NV	-	-	-	345	345	0
Viborg, Denmark	-	-	-	13	13	0
Colocation facilities (USA)[1]	N/A	N/A	N/A	293	293	0
Colocation facilities (International)[1]	N/A	N/A	N/A	80	80	0
Other international	N/A	N/A	N/A	7	7	0
Retail stores	**83,230**	**0**	**4,421**	**191**	**191**	**0**
Domestic (USA)	53,309	-	2,831	91	91	0
International	29,921	-	1,590	100	100	0
Total	**1,409,809**	**719,344**	**36,424**	**2,580**	**2,580**	**0**

Dash indicates data are not tracked.
N/A = Gas use at colocation facilities are considered outside of Apple's operational control.
1 We've updated our fiscal year 2016 colocation facilities footprint to reflect more accurately Apple's operational boundaries. Per the WRI Greenhouse Gas Protocol, we've removed electricity use associated with colocation facility cooling and building operations. This energy use, however, is still covered by renewable energy.

Annotate

Appendix A

Greenhouse gas emissions

		Fiscal year				
		2020	2019	2018	2017	2016
Corporate facilities emissions (metric tons CO_2e)[1]	**Scope 1**	**47,430**	**52,730**	**57,440**	**47,050**	**34,370**
	Natural gas, diesel, propane[2]	39,340	40,910	42,840	36,210	27,000
	Fleet vehicles	4,270	6,950	11,110	8,300	7,370
	Process emissions[3]	3,830	4,870	3,490	2,540	-
	Scope 2 (market-based)[4]	**0**	**0**	**8,730**	**36,250**	**41,000**
	Electricity	0	0	8,730	36,250	41,000
	Scope 3[5]	**22,550,000**	**24,980,000**	**25,070,000**	**27,330,000**	**29,500,000**
	Business travel[6]	153,000	326,000	337,000	121,000	118,000
	Employee commute[7]	134,000	195,000	183,000	172,000	186,000
Product life cycle emissions (metric tons CO_2e)[8]	Manufacturing (purchased goods and services)	16,100,000	18,900,000	18,500,000	21,100,000	22,800,000
	Product transportation (upstream and downstream)	1,800,000	1,400,000	1,300,000	1,200,000	1,200,000
	Product use (use of sold products)	4,300,000	4,100,000	4,700,000	4,700,000	4,900,000
	End of life treatment	60,000	60,000	50,000	40,000	300,000
Total comprehensive carbon footprint (metric tons CO_2e)[9]		**22,600,000**	**25,100,000**	**25,200,000**	**27,500,000**	**29,500,000**

Consolidated data missing, only disaggregated emissions

Don‘t annotate

Scope 1, 2 and 3 emissions worldwide for Mercedes-Benz Cars[1, 5]

Scope 3	2020 Specific CO_2 in t/car	2020 Absolute CO_2 in t/million t[4]	2021 Specific CO_2 in t/car	2021 Absolute CO_2 in t/million t[4]
Procured goods and services[6]	8.1	17.0	8.4	17.0
Logistics	1.0[2]	2.1[2]	1.1[2]	2.2[2]
Business travel	0.006	0.012	0.009	0.019
Employee traffic	0.060	0.125	0.053	0.107
Use phase of our products (well-to-tank)	5.6	11.8	6.3[3]	12.7[3]
Use phase of our products (tank-to-wheel)	33.7	70.4	32.2	65.5
Recycling and waste disposal[6]	0.4	0.8	0.4	0.8
Scope 1 and 2				
Manufacture	0.8	0.9[4]	0.7	0.7[4]
Total	**49.7**	**103.2**	**49.1**	**99.2**

1 Values are rounded
2 Forecast value
3 Incl. Green Charging: Contribution per vehicle -0.03 t CO_2
4 Absolute Scope 3 emissions relate to retail sales (2020: 2,087,200; 2021: 2,032,663; unaudited). Absolute Scope 1 and 2 emissions relate to vehicles produced from fully consolidated locations, excluding third-party products (2020: 1,230,733; 2021: 1,132,213; unaudited)
5 For calculation basis see appendix ↗ Calculation and documentation of CO_2 emissions and chapter ↗ Making life cycle assessments, ↗ Calculation of CO_2 emissions
6 See ⊕ Life cycle assessments of our vehicles and internal life cycle assessment studies

Scope 1, 2 and 3 emissions worldwide for Mercedes-Benz Vans[1, 4]

Scope 3	2021 Specific CO_2 in t/van	2021 Absolute CO_2 in t/million t[3]
Procured goods and services[5]	8.6	**3.4**
Logistics	0.9[2]	**0.4**[2]
Business travel	0.007	**0.003**
Employee traffic	0.039	**0.015**
Use phase of our products (well-to-tank)	4.9	**1.9**
Use phase of our products (tank-to-wheel)	47.8	**18.9**
Recycling and waste disposal[5]	0.5	**0.2**
Scope 1 and 2		
Manufacture	0.5	**0.2**[3]
Total	**63.3**	**25.0**

1 Values are rounded
2 Forecast value
3 Absolute Scope 3 emissions relate to retail sales (2021: 394,978; unaudited). Absolute Scope 1 and 2 emissions relate to vehicles produced from fully consolidated locations, excluding third-party products (2021: 336.847; unaudited)

Problem: The report has different tables, which report Scope 1 - 3 emissions for different business units of the company (left table). However, no values for the emissions of the whole company are given

Solution: Don‘t annotate any value as correct. Set the extracted values to incorrect and enter “n/a” in the corrected cells for Scope 1 – 3.

Multiple values for the same scope-year combination for the whole company

CO_2e emissions of KfW Group[1] in tonnes

	2014	2015	2016	2017	2018
Emissions from direct energy consumption (Scope 1)[2]	4,636	5,095	5,260	5,616	5,571
Emissions from indirect energy consumption (Scope 2)[3]	2,073	1,097	1,400	1,368	1,898
Total business travel (Scope 3)[4]	9,446	7,394	7,411	8,208	8,665
Events (Scope 3)[5]	102	102	74	87	101
Total	**16,257**	**13,628**	**14,145**	**15,278**	**16,236**
Per capita	2.6	2.2	2.1	2.1[6]	2.1[6]

[1] Unavoidable CO_2e emissions at the KfW Group have been offset since 2006.

[2] Natural gas, wood pellets and own fleet

[3] Green electricity, district heating, oil and emergency power generators (diesel)

[4] Only flights; short and long-distance rail travel is CO_2e-neutral per se.

[5] Emissions for participants' travel to and from KfW buildings for events

[6] The system limit for surveying employees was changed in 2017, making it impossible to perform direct comparisons with per-capita consumption in previous years.

Location- and market-based CO_2 emissions of KfW Group according to Scope 2 (2017) in tonnes

	Location-based, 2017	Market-based, 2017	Location-based, 2018	Market-based, 2018
Green electricity	5,869	4,636	5,819	4,596
Emergency power generators (diesel)	2,555	2,073	3,577	2,902
Heating oil	8,113	9,446	80	80
District heating	55	102	88	163
Total	**16,592**	**16,257**	**9,564**	**7,732**

Problem: The report contains two tables that contain information about Scope 2 information for the entire company (kfW Group) in 2017 and 2018.
From the tables and the surrounding text it is not possible to determine what is the "correct" value

Solution: If extracted by the LLM both values are to be treated as correct (i.e. there are two rows with identical values scope-year combination). If the LLM did not extract one of the values, the annotator should add a row with the second value and mark it as 0: false NA in the reasoning column.
For **both rows** the annotator should **comment the following: "Doubling: multiple company-level values for scope-year combination"**