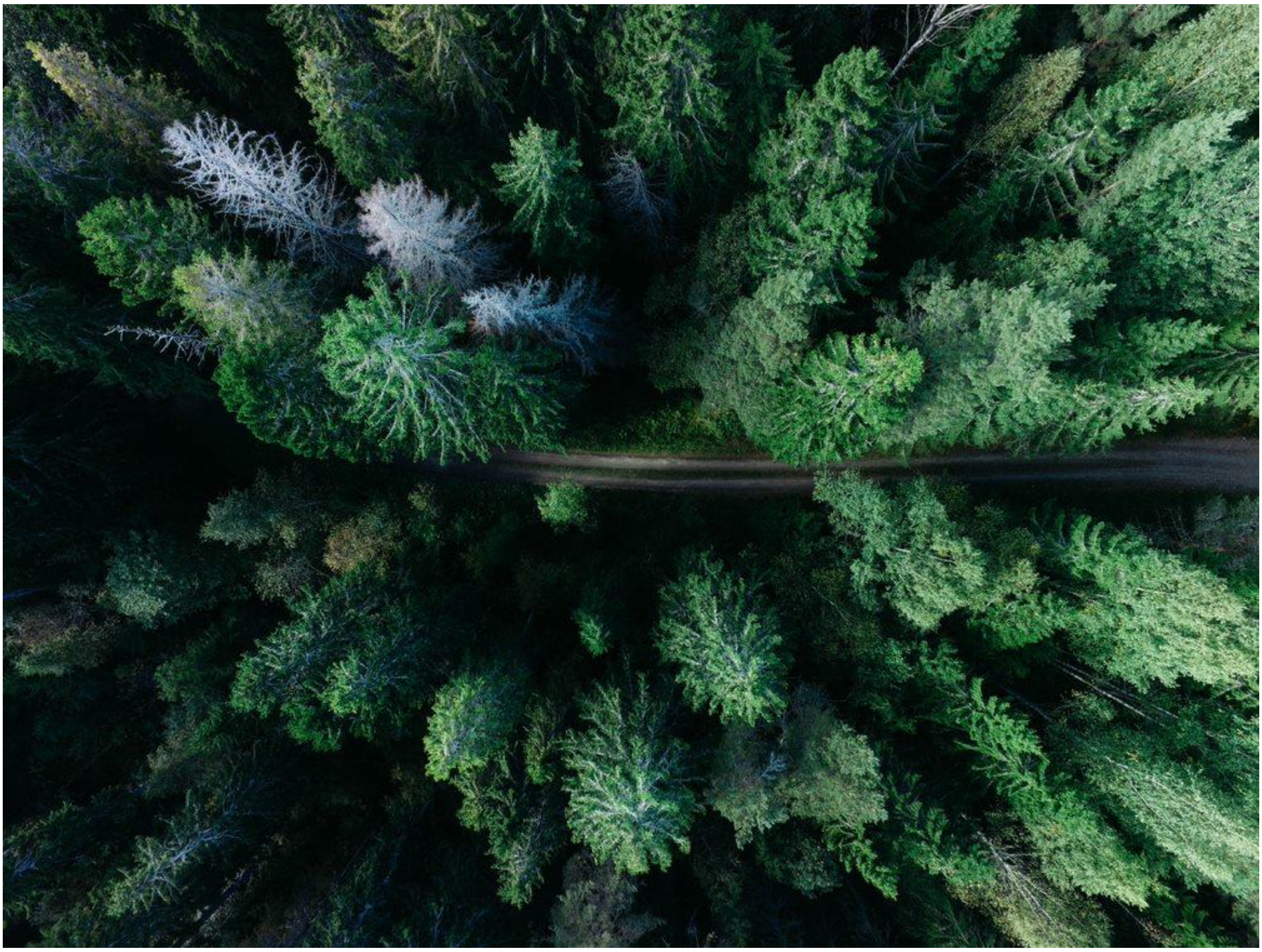

PROJECT REPORT

Corporate Carbon Footprint 2023

Final Version

Saudi Arabian Packaging Industry (SAPIN) K.S.A.

SGS

INSTITUT FRESENIUS

Report version : 1.0
Report date : 6 December 2024
Order number : 6972598

AUTHORS

Author

Adriana Rodríguez Coto
Sustainability Consultant

SGS Institut Fresenius GmbH
Heidenkampsweg 99
20097 Hamburg

p: +49 (0) 170 224 29 50
e: adriana.rodriguezcoto@sgs.com

Quality control

Martin Langsfeld
Sustainability Consultant

SGS Institut Fresenius GmbH
Heidenkampsweg 99
20097 Hamburg

p: +49 (0) 1522 281 46 30
e: martin.langsfeld@sgs.com

Intended for internal use.

CONTENT

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

AE or UAE	United Arab Emirates
CCF	Corporate Carbon Footprint
CO_2e	Carbon dioxide equivalent
EF	Emission factor
GHG	Greenhouse gas
GWP	Global warming potential
IPCC	Intergovernmental Panel on Climate Change
LCA	Life Cycle Assessment
SA	Saudi Arabia
SAPIN	Saudi Arabia Packaging Industry

1 SUMMARY

Saudi Arabian Packaging Industry WLL (SAPIN) is a leading metal and plastic packaging supplier to the food, paint, industrial and aerosol industry. The company is also actively committed to sustainable growth in harmony with the environment. Amongst others, SAPIN plans to address climate protection more strategically. The first step is the calculation of a Corporate Carbon Footprint (CCF) at company level to establish the status-quo.

This CCF was determined for the reporting year 2023 (01.01-31.12.), which will then be the base year for future calculations. The carbon footprint covers 3 manufacturing facilities in Saudi Arabia and 1 in Dubai. The calculation was based on the GHG protocol standard and considers all Scope 1 (direct emissions) and Scope 2 (indirect emissions from energy use) emission sources for the entire company (four sites), with the recommendation to add Scope 3 in the upcoming years.

The emissions were calculated based on primary data from the following sources:

Scope 1:

- Generated heat
- Fossil fuels for company owned and leased vehicles
- Loss of cooling agents

Scope 2:

- Purchased electricity

The CCF for SAPIN, calculated for the year 2023, amounts to a total of **18,352 t CO_2e**. Of these emissions, 26% (**4,847 t CO_2e**) stem from Scope 1 and 74% (**13,504 t CO_2e**) from Scope 2 sources (Figure 1).

In terms of the country of origin of the total emissions, 97% of greenhouse gases produced come from the 3 Saudi Arabia locations (17,728 t CO_2e) and 3% from the United Arab Emirates site (624 t CO_2e).

The emissions breakdown shows that electricity is the largest contributor to the CCF, making up 74% of total emissions. Loss of refrigerants and heat production each account for 12%, while fuels contribute only 2%. This distribution clearly indicates that the majority of emissions are tied to electricity use, with smaller but still significant contributions from loss of refrigerants and heat processes. The minimal role of fuels in the overall emissions highlights their relatively lower impact in this context.

A detailed description of the results can be found in the Results chapter starting on page 9 of this report.

2 BACKGROUND OF THE PROJECT

The need for this project stems from an increasing demand by customers for greater sustainability awareness in the products and services they purchase. As environmental concerns continue to grow, many customers are actively seeking ways to better understand the environmental impact of their choices. To address this, Saudi Arabia Packaging Industries (SAPIN) is starting with the quantification of emissions, a critical first step that will allow them to identify areas where potential reduction measures can be implemented. This aligns with their commitment to sustainability and will help them get in line with recognized frameworks like EcoVadis, which assesses and promotes corporate sustainability practices. Additionally, it is anticipated that customers will likely request more specific data in the future, such as the Product Carbon Footprint (PCF), as they aim to make more informed, environmentally conscious decisions. This project lays the groundwork not only for meeting these current needs but also for anticipating future customer demands related to sustainability and emissions reduction.

Additionally, a detailed analysis of this CCF, will serve as a foundational tool for identifying potential reduction measures in the future. It will provide a clear benchmark for tracking progress and ensuring continuous improvement toward a more sustainable operation.

Finally, results of the calculations will be shared with SAPIN's customers who have expressed interest in sustainability awareness. Understanding the growing importance of environmental responsibility, SAPIN is committed to providing transparent and actionable data regarding the sustainability impact of their products or services. By communicating these results, they aim to help their customers make informed decisions, align with their sustainability goals, and foster a deeper understanding of the environmental implications of their choices, supporting them on their journey toward a more sustainable future.

3 GOAL AND SCOPE

3.1 Goal

Goal of the study was to calculate direct and indirect GHG emissions within Scope 1 and 2 produced by the operational activities of all 4 Saudi Arabia Packaging Industry locations in the fiscal year 2023. Three of these sites are located in Saudi Arabia, namely SAPIN-1, SAPIN-2 and SAPIN-3 and one is located in the United Arab Emirates, SAPIN-4.

The calculation serves to map the status quo of GHG emissions for global activities and to analyze the main drivers of the CCF. The year 2023 is defined as the base year for now, as it is the first year for which SAPIN is having its CCF calculated.

The target group of the Corporate Carbon Footprint is primarily the management and its own employees. The results will also be used for external communication with customers and other stakeholders.

3.2 Scope

Organizational boundaries
The boundaries of the organization were determined according to the operational control approach. The following reporting units were considered:

Saudi Arabia

- SAPIN – 1
- SAPIN – 2
- SAPIN – 3

United Arab Emirates

- SAPIN – 4

System boundaries
The Carbon Footprint includes all relevant Scope 1 and Scope 2 emissions. The following emission sources have been identified:

Scope	Emission sources considered
Scope 1	• Heat and power generation on site (heating systems, CHPs, PV systems, etc.) • Fuel consumption of own vehicles • Refrigerant losses
Scope 2	• Purchased electricity

Table 1: Emission sources considered for the calculation.

Base Year
The year 2023 is defined as the base year, because it is the first year of calculation of SAPIN's CCF.

Methodology

Underlying standards
The chosen methodology for the creation of the CCF is based on the requirements of the GHG Protocol (Greenhouse Gas Protocol 2004). However, the study does not conform to this standard.

Data collection
For the preparation of the Carbon Footprint, SAPIN collected primary data on energy and fuel consumption as well as refill quantities of refrigerants with the help of a questionnaire prepared by SGS. The data submitted has also been checked for plausibility by SGS. Checking the correctness of the raw data was not part of the project.

Modelling and impact assessment
The emissions were partially calculated with openLCA - a professional life cycle assessment software - based on existing datasets from the ecoinvent database (ecoinvent 2023) and the impact assessment method IPCC 2021 100a (Intergovernmental Panel on Climate Change 2021). In some cases, the UK Government GHG Conversion Factors for Company Reporting (2024) were used to calculate the emissions.

For the estimation of scope 2 emissions from purchased electricity from grid the market-based approach was chosen. In the case of the sites located in Saudi Arabia, the local country mix was used for the assessment of electricity as no info on a supplier-specific emission factor nor residual mix for Saudi Arabia was available. Only for the United Arab Emirates a supplier-specific emission factor could be applied. Values according to the location based approach are also reported separately.

In order to assess the climate impact of refrigerant losses, the global warming potentials (GWPs) of the IPCC 2021 100a method and UK Government GHG Conversion Factors for Company Reporting (2024) were used.

Reporting of the data

The data contained in this report represents values rounded off to the closest whole number. This applies to both the absolute values in t CO_2e and the percentages. As a disclaimer, it is important to mention that it might happen that when checking the figures, some numbers won’t add up as expected, and this will be due to this rounding up or down of the values. This difference, however, is not significant and should not be consider an issue.

Data Quality

Overall, the data quality gathered by SAPIN was complete and sufficient for the objectives of this calculation. Its quality can be rated as very good.

4 RESULTS

4.1 Total results

For the year 2023, the Company's total greenhouse gas emissions amounted to **18,352** metric tons of carbon dioxide equivalent (t CO_2e). Of these emissions, approximately 26% (**4,847** t CO_2e) originated from Scope 1 sources, while 74% (**13,504** t CO_2e) stemmed from Scope 2 sources (Figure 1).

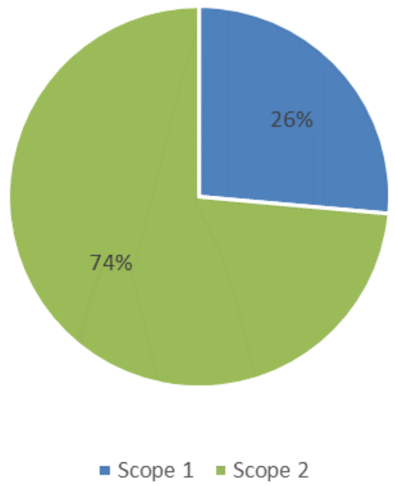

Figure 1: Overall results CCF 2023 per Scope

When examining the geographical distribution of these emissions, the Saudi Arabian locations contributed to 97% of the total greenhouse gas production (17,728 t CO_2e), while the single location in the United Arab Emirates accounted for 3% of the total emissions (624 t CO_2e) (Figure 2).

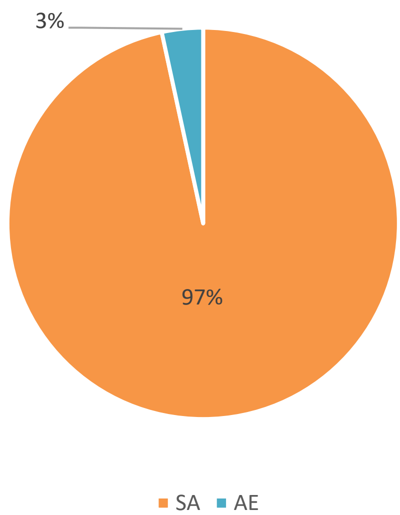

Figure 2: Overall results CCF 2023 per country

The emissions produced by each country per Scope look very different between the two countries. Of the emissions produced by the 3 locations in Saudi Arabia, 75% correspond to Scope 2 emissions and only 25% come from Scope 1 sources, whereas in the UAE, the emissions stemming from Scope 1 sources amount to most of the total emissions with a 65% and the emissions coming from Scope 2 sources amount to 35% (Figures 3 and 4).

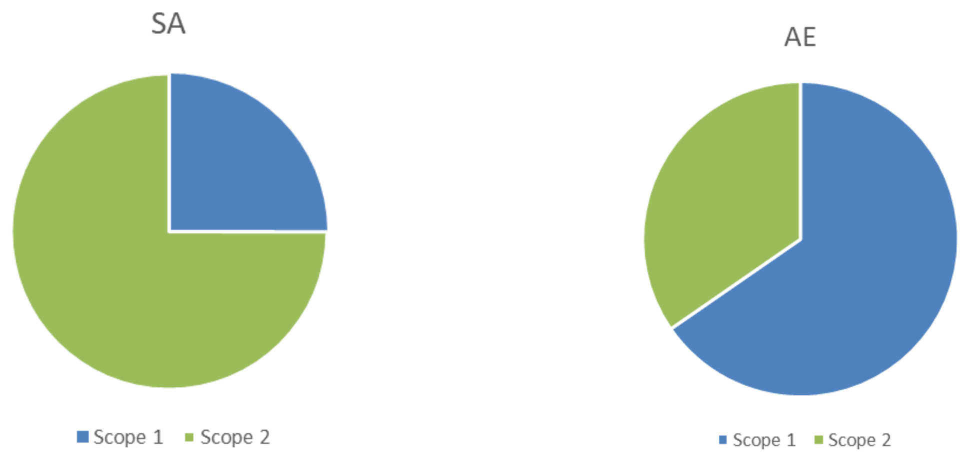

Figure 3 and 4: Emissions per scope for the Saudi Arabian and UAE locations

An analysis of emission sources reveal that the production of purchased electricity is the predominant driver of the carbon footprint, constituting 74% of the emissions, 13,504 t CO_2e. Refrigerant losses and heat production on site follow as the second and third most significant emission sources with 12% each (2,280 t CO_2e and 2,230 t CO_2e respectively). Finally, the impact of the consumption of fuels for vehicles is minimal, comprising only 2% of the total emissions (338 t CO_2e) (Figure 5).

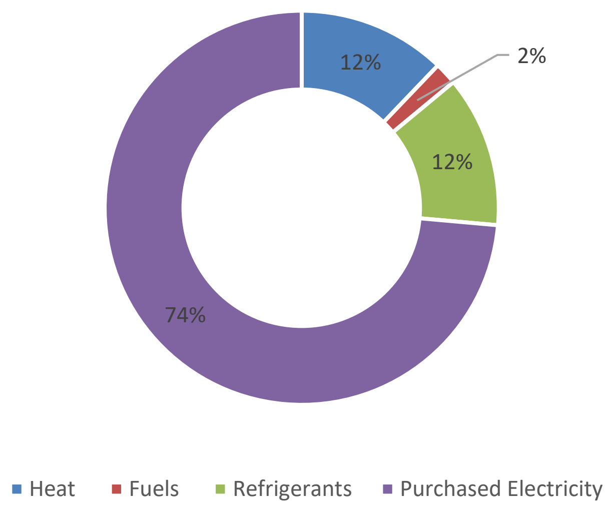

Figure 4: Total emissions CCF 2023 by source

A further breakdown of the emission sources per country clearly show the weight that the emissions from electricity have on the total emissions for the locations in Saudi Arabia, with a total of 13,288 t CO2e, as opposed to only 216 t CO2e for the location in UAE (Figure 6). As mentioned above, the emissions for electricity in Saudi Arabia were calculated using the EF for the country mix, since no EF specific for the electricity suppliers was available for those locations. On the other hand, the supplier-specific EF was available for the location in the UAE, so the emissions calculated for the electricity at this location are market based. Using the location-based approach (using the country mix emission factor and not counting green electricity (i.e. from I-RECs) as scope 2 carbon neutral), the emissions from purchased electricity amount to a total of 13,551 t CO_2e for both locations, with 263 t CO_2e from the UAE location. The difference to the market-based approach is only small (47 t CO_2e), this is mainly as the supplier specific emission factor for the UAE site is higher than the country mix from the database. For a more realistic and precise estimation the report refers to the market-based values for scope 2 emissions. This allows to account for transitions based on a change in supplier or product in future calculations.

The total emissions produced by the loss of refrigerants was 1,888 tCO_2e for the locations in SA and 391 t CO_2e for the AE location, which basically translates to 75% of the total emissions coming from refrigerant losses being produced in SA and 25% in the UAE. Refrigerant gases have high GWPs, sometimes equivalent to thousands of kg of CO_2 per kg of gas, which means that the loss of even small amounts of refrigerants will have an important impact on the total emissions of the CCF.

Regarding the consumption of fuels, the amount of emissions produced by either country can be considered negligible, being that even when adding both countries, they represent only 2% of the total CCF emissions for SAPIN as a whole (338 t CO_2e) (Figure 6).

Finally, only the SA locations have emissions stemming from heat production and they represent 12% of the total GHG emissions, corresponding to 2,230 t CO_2e.

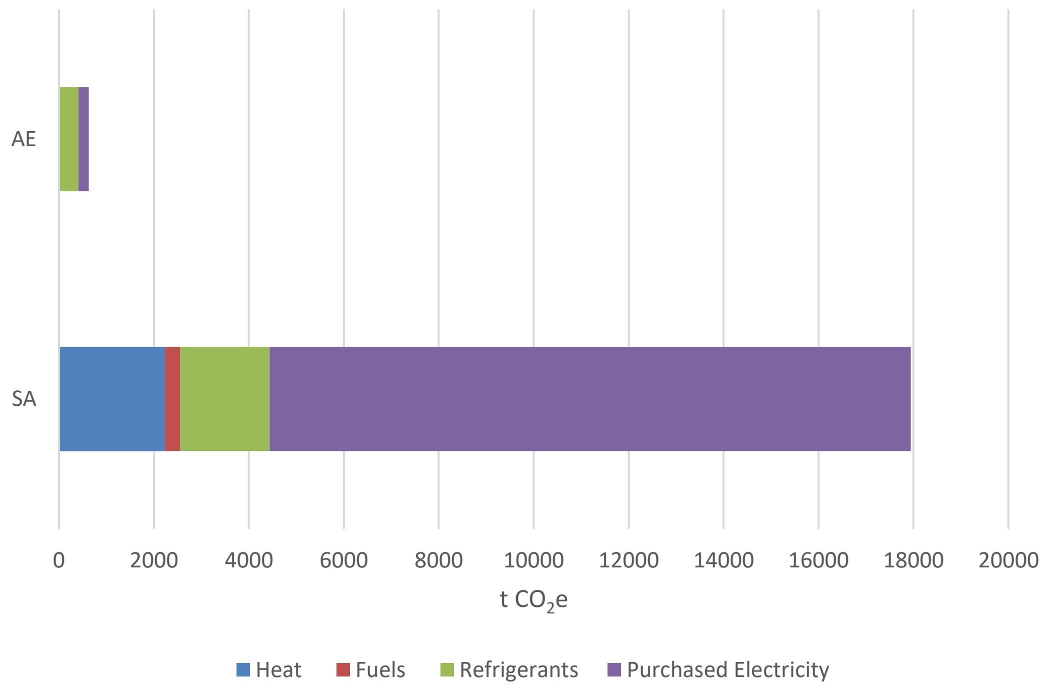

Figure 5: Breakdown of emissions per source and country

4.2 Results per reporting unit

According to the calculation, the location producing most of the GHG emissions for SAPIN in 2023, was SAPIN-3 with a total of 8,510 t CO_2e, with most of those emissions coming from Scope 2 sources with 6,681 t CO2e (Figure 7). For this location, the second contributor to the emissions is the loss of refrigerants with 1,534 t CO_2e (representing the most emissions coming from the loss of refrigerants for any location), the third contributor of emissions in SAPIN-3 is the use of fuels, with 221 t CO_2e and lastly, a very small amount of emissions stemming from heat production, with 74 t CO2e (Figure 8).

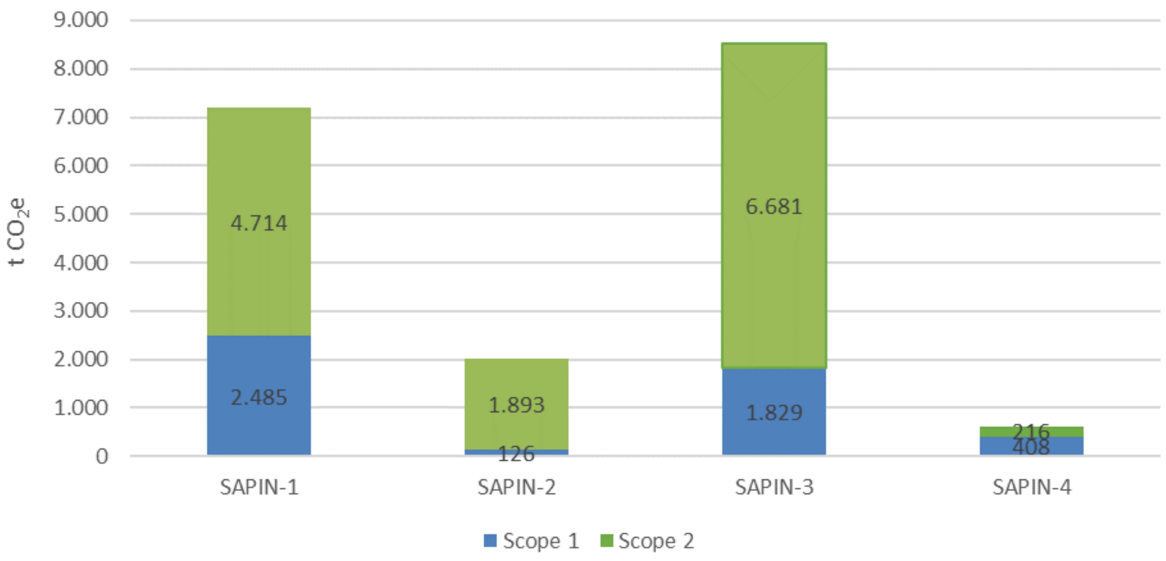

Figure 6: Scope 1 and 2 emissions per reporting unit

SAPIN-1 has the second largest amount of emissions, a total of 7,199 t CO_2e, with the majority of the emissions also due to Scope 2 sources with 4,714 t CO_2e (Figure 7). For this location, the second most important source of emissions is the production of heat, with 2,124 t CO_2e, followed by much smaller contributions from refrigerant losses at 262 t CO_2e and fuels at 98 t CO_2e (Figure 8).

In the third position of contributions to the overall CCF is SAPIN-2, with much less emissions than the previous 2 sites, for a total of 2.019 t CO_2e. In this location we see again a marked majority of emissions stemming from Scope 2 sources with 1,893 t CO_2e, then 92 t CO_2e coming from the loss of cooling agents and the rest from consumption of fuels, at 31 t CO_2e (Figure 8).

The only location in the UAE, produced the least amount of emissions of all 4 sites and behaved opposite to the ones in Saudi Arabia, with most of its emissions stemming from Scope 1 sources, with 408 t CO2e, 391 t CO_2e of which come from the loss of cooling agents and 16 t CO_2e from the consumption of fuels. Lastly 216 t CO_2e stem from the use of electricity (Figure 8).

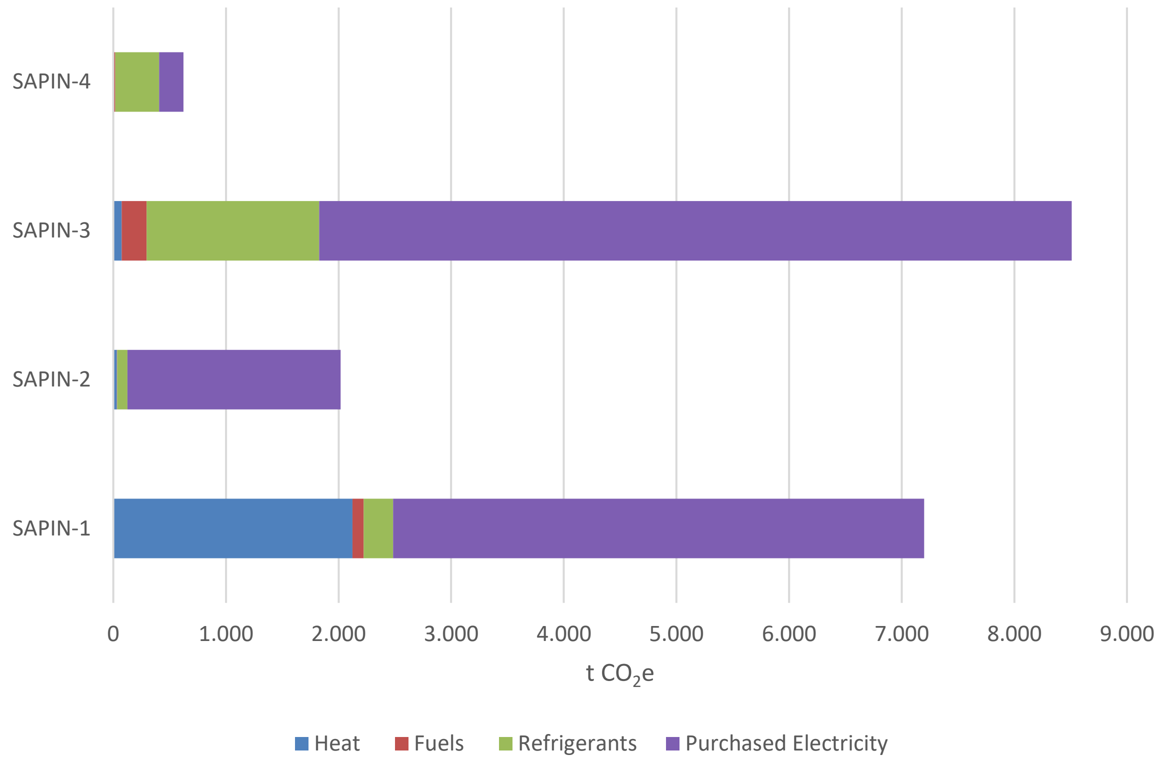

Figure 7: Emission sources per reporting unit

Regarding the use of electricity at the SAPIN-4 location, it is important to mention that the emissions reported correspond only to a portion of the total consumption of electricity for 2023 (342,807 kWh). SAPIN–4 purchased 300,000 kWh of electricity from renewable sources, which are backed-up by the redemption of I-REC Certificates, which are international recognized certificates that allow companies to track and report their use of electricity from renewable sources, which are carbon neutral. This location also reports the production of 612,710 kWh of electricity with a Photovoltaic assembly on their property, which overall represents just under 50% of all the electricity used at the site.

4.3 Tabular overview of the results

Country	Reporting unit	Scope 1 [t CO_2e]	Scope 2 [t CO_2e]	Total [t CO_2e]
Saudi Arabia	SAPIN – 1	2,485	4,714	7,199
	SAPIN – 2	126	1893	2,019
	SAPIN – 3	1,829	6,681	8,510
United Arab Emirates	SAPIN – 4	408	216	624
Total		4,847	13,504	18,352

Table 2: Overview of absolute results per reporting unit

5 POTENTIAL FOR EMISSIONS REDUCTION IN THE FUTURE

Overall, the results of the calculation of SAPIN's CCF show potential to reduce their carbon emissions, by using cleaner energy sources, more efficient cooling technologies, and sustainable heat-producing practices to address the largest sources of emissions.

With the aim to reduce these emissions, several strategies could be implemented across the key areas:

1. Electricity: Since electricity is the main contributor to the CCF, changes on this area would have a big impact in the reduction of the total GHG emissions. Taking steps towards the transition to renewable electricity sources and improving energy efficiency through better machinery, lighting, and automation could lower electricity consumption. The expansion of their photovoltaic systems in the SAPIN-4 location and the implementation of similar initiatives at the other locations would also have a big impact in the lowering of the emissions.

2. Refrigerants: Upgrading to low GWP refrigerants, such as natural refrigerants or newer synthetic alternatives with lower environmental impact, could significantly reduce emissions from cooling systems. Regular maintenance to prevent leaks would also help minimize refrigerant loss.

3. Heat Production: Implementing more energy-efficient heating technologies or utilizing heat recovery systems, could reduce the need for additional fuel-based heat production. Electrification of heat production could also decrease emissions if powered by renewable energy.

4. Fuels: Even though the emissions coming from fuels are the smallest part of the CCF, it still has potential to be lowered. This could be achieved by optimizing transportation logistics to minimize fuel use, transitioning to electric or hybrid vehicles or using biofuels for any necessary combustion processes.

Overall, focusing on energy optimization, transitioning to cleaner technologies, and reducing reliance on fossil fuels would be key to lowering emissions across these areas.

6 BIBLIOGRAPHY

ecoinvent. *LCA database version 3.10,* www.ecoinvent.org, 2023.

DEFRA. UK Government GHG Conversion Factors for Company Reporting. 2024.

Greenhouse Gas Protocol. "A Corporate Accounting and Reporting Standard." 2004.

Intergovernmental Panel on Climate Change. "IPCC 2021 100a." www.ipcc.ch, 2021.

openLCA 2.2.0, www.openlca.org, 2024