AIM
ALFEN
INTEGRATED
MANAGEMENT
SYSTEM

Carbon Footprint Report 2022

GHG emissions resulting from internal operations (verified)

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ALFEN
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1 Introduction

This annual report of Alfen N.V. (hereafter "Alfen" or "the Company") provides an overview of the Carbon dioxide (CO_2) emission inventory for Alfen's activities in 2022. It is part of Alfen's integrated Energy management system and has been prepared in accordance with the requirements of the ISO 50001 standard for Energy Management systems [201], version 3.1 of the CO_2 Performance Ladder [202], the Green House Gas (GHG) protocol [203] and the international standard ISO 14064-1 for greenhouse gases [204]. This report contains all subjects from section 9.3.1 of the ISO 14064-1: 2018, the emission factors (subject "t"), excluded. The emission factors used are included in Appendix B.

Alfen is committed to be a sustainable company without unacceptable risks during the execution of its activities. Therefore, Alfen is constantly looking for opportunities to conduct these activities in both an energy consumption and CO_2 reducing manner as well as in an environmentally friendly manner, hereby striving for continuous improvement therein. This ambition is stated in Alfen's Environmental Management Policy Statement [102].

Periodic reporting on Carbon dioxide emissions and improving the energy performance is part of the Plan-Do-Check-Act (PDCA) cycle. The PDCA cycle is described in the Alfen Integrated Management system (AIM).

The emitting activities covered by the report include all direct emissions in Scope 1 indirect emissions in Scope 2 and indirect emissions related to business travel in Scope 3 which is in line with the CO_2 performance Ladder handbook 3.1. Excluded are the emissions related to the rental of offices in a multi-company building, since this building is not controlled by Alfen, and the energy use is not metered separately. Therefore, this energy use is included under other Scope 3 emissions.

Direct emissions (Scope 1) are emissions emitted by installations that are owed or controlled by Alfen, such as emissions from own gas heating systems and vehicle fleet and equipment with fuel consumption. Indirect emissions are a consequence of the activities of the company but originate from sources that are not owned and not managed by the company. Within Alfen reported indirect emissions are associated with electricity consumption by company facilities and vehicles (Scope 2) and emissions resulting from business travel (Scope 3). The latter concerns category 6 of the Corporate Value Chain (Scope 3) Accounting and reporting standard of the GHG protocol [205].
Figure 1 on the next page shows the Scope diagram of CO_2 emissions that may be related to the company with categorization.

This report discusses the total footprint on reported Scopes (chapter 5), details on CO_2 emissions per function in Scope 1 (chapter 6), Scope 2 (chapter 7) and business travel in Scope 3 (chapter 8), concluding with a trend analysis on the reporting period in chapter 9.
Additionally, this report provides in chapter 10 a brief update on the progress of the CO_2 reduction plan and in chapter 11 the conclusions and follow-up.
An overview of methodology and data quality is provided in chapter 12.

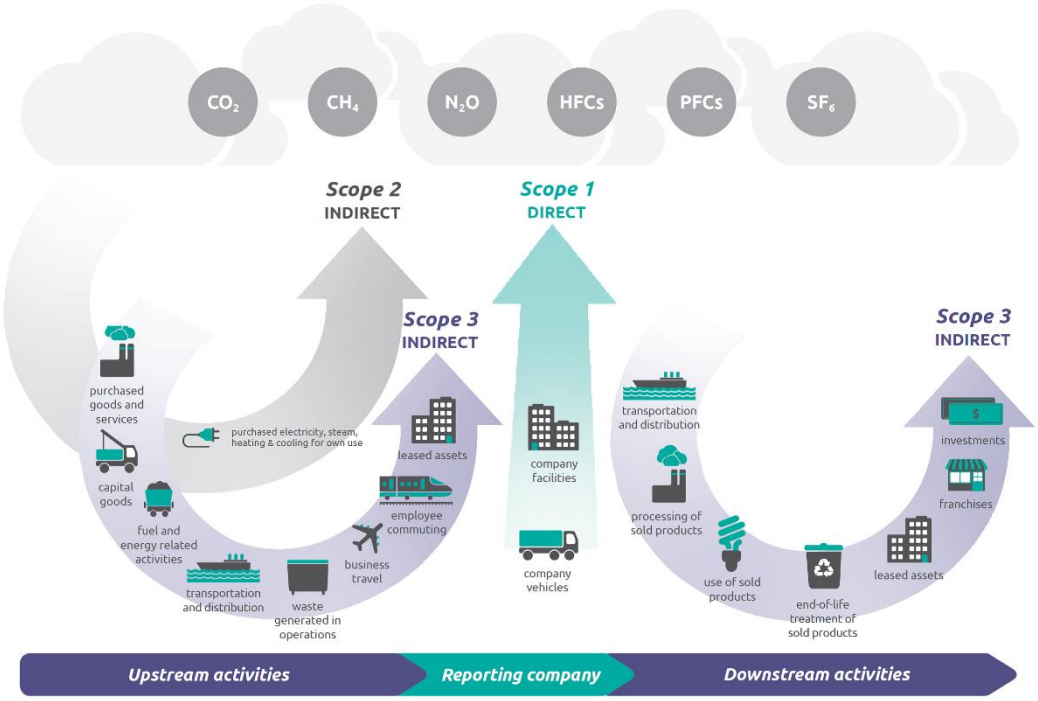

Figure 1 - Carbon Footprint Scope diagram [205]

Not all Scope 3 emissions are discussed in this report. However, the extension of our product portfolio and new CSRD legislation increased the need for additional and more detailed information on the carbon footprint in the value chain. Therefore, Alfen started a re-examination of significant Scope 3 CO_2 emissions. Alfen aims to gain more insight into these CO_2 emissions and wants to report these in the next reporting cycle.

In the Materiality Analysis on Scope 3 emissions [106], the significant categories for CO_2 reduction in the value chain are established and actions and targets are defined in two Value Chain Analyses, for Alfen Charging Equipment [104] and for Alfen Transformer stations [105].

Executive summary - Environmental performance and key highlights

Alfen's vision is a connected, smart, and sustainable energy system for future generations. To deliver this, our mission is to boost the energy transition by engineering, manufacturing, integrating, and connecting high quality energy solutions that are innovative, reliable and smart.

We have full insight into our own carbon footprint and aim to better understand the carbon footprint in the value chain. As part of the assessment of our energy and CO_2 performance, Alfen is certified according to the Energy Management Standard ISO 50001 and reports its carbon footprint according the requirements of the ISO 50001 standard for Energy Management systems [201], version 3.1 of the CO_2 Performance Ladder [202], the Green House Gas (GHG) protocol [203] and the international standard ISO 14064-1 for greenhouse gases [204]. This report contains all subjects from section 9.3.1 of the ISO 14064-1: 2018, excluding the emission factors (subject "t").

In recent years, our business has been growing strongly, and as such, logically our CO_2 emissions would also grow without any further action. To counter this, we have set ourselves the objective to achieve lower or equivalent CO_2 emissions per FTE in the period 2020-2022 in comparison with base year 2019, despite this growth. This objective has been set for both Scope 1, Scope 2 and business travel in Scope 3. Besides this, our general aim is to reduce energy consumption and increase the share of electric/ hybrid vehicles.

In the past period various measures have been taken to reduce our CO_2 footprint. In 2022 we reduced our natural gas heated surface by replacing several gas-heated boilers with electrical boilers, we insulated the roof of the production area and invested in our own PV installation, which is operational since the second half of the year. Also, office employees started with hybrid working (home vs office). In addition, in accordance with our EV policy, the share of electrical vehicles further increased and currently 55% of our fleet consist of fully or hybrid electrical vehicles.

The measures we took resulted in a reduction of the absolute CO_2 emissions compared with base year 2019 for all Scopes, as well as the CO_2 emissions per average FTE, even while the business tripled in revenue growth. Therefore, we have achieved our objectives for the year 2022.

We are committed to continue to further improve our sustainability performance as we transition towards a truly sustainable society for future generations. As such, we committed to set short- and long-term science-based targets in line with global warming limitation targets. We aim to communicate these targets early 2024.

Marco Roeleveld,

CEO of Alfen N.V.

2 Abbreviations & Definitions

2.1 Abbreviations

Abbreviation	Description
AIM	Alfen Integrated Management system
CO_2	Carbon dioxide
COP	Conference Of the Parties
CSRD	Corporate Sustainability Reporting Directive
EV	Electric Vehicle
FTE	Full Time Equivalent
GHG	Green House Gas
HVO	Hydrotreated Vegetable Oil
ISO	International Organization for Standardization
PDCA	Plan-Do-Check-Act
PHEV	Plug-in Hybrid Electric Vehicle.
R&D	Research & Development
SBT	Science Based Targets
Scope 3 BT	Scope 3 Business Travel

Table 1 - Abbreviations

2.2 Definitions

Definition	Description
Carbon footprint	The greenhouse gas emissions associated with the activities of an entity or individual.
Direct emissions	Emissions emitted by installations that are owed or controlled by Alfen.
Indirect emissions	Emissions that are a consequence of Alfen's activities but occur at sources owned or controlled by another company.
Paris Agreement	Legally binding international treaty on climate change was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016.
PDCA steering cycle	An iterative four-step management method used in business for the control and continuous improvement of processes and products.
Science Based Target (SBT)	Clearly defined path to reduce GHG emissions in line with the Paris Agreement goals, limiting global warming to well-below 2°C above pre-industrial levels and pursuing efforts to limit warming to 1.5°C.
Smart Trackers	Software application for CO_2 emission measurements and assessments.
Value chain analysis	Analysis of CO_2 emissions in one of the chains in which the organization is active.

Table 2 - Definitions

3 References

3.1 AIM Documents

Ref.	Document Title	AIM Document Number	Extern Document Number
[101]	Alfen Boundary 2018	AIM-QHSE-GEN-1.00-01-MA-03	
[102]	Environmental Policy Statement	AIM-QHSE-GEN-2.01-01-POL-08	
[103]	QHSE Policy Statement	AIM-QHSE-GEN-2.02-02-POL-01	
[104]	Corporate value chain analysis Alfen Charging Equipment	AIM-QHSE-GEN-0.00-01-MA-03	
[105]	Corporate value chain analysis Alfen Transformer Stations	AIM-QHSE-GEN-0.00-01-MA-02	
[106]	Materiality Analysis CO_2 Performance Ladder/ "Materialiteitsanalyse CO_2-Prestatieladder"	AIM-QHSE-GEN-0.00-01-MA-01	

Table 3 - AIM Documents

3.2 External Documents

Ref.	Document Title	Alfen Document Number	Extern Document Number
[201]	Energy management systems – Requirements with guidance for use		EN ISO 50001: 2018
[202]	Handbook CO_2 Performance Ladder		Version 3.1
[203]	GHG Protocol		2011
[204]	Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals		ISO 14064-1: 2018
[205]	GHG Protocol - Corporate Value Chain (Scope 3) Accounting and Reporting Standard		2011
[206]	"Praktijkverbruik"		Travelcard: www.werkelijkverbruik.nl

Table 4 - External Documents

4 The organization

Alfen is a fast-growing company in the energy sector whose main activity is the design, production and supply of products and services related to the electricity grid, including smart grid solutions, charging equipment for electrical vehicles and energy storage systems.

Alfen sells products and services in more than 25 countries across Europe and also beyond Europe. The production facilities are located in the Netherlands, Belgium and Finland. In 2022 an average of 787 employees work within Alfen.

4.1 Organizational boundaries

Alfen's organizational boundary [101] has been determined according to the principle of Operational Control, as specified in the GHG protocol [203]. This means that the company reports the emissions from operations over which it has financial or operational control.

Using this approach, this Carbon Footprint Report includes emissions from the following operations:

- Alfen N.V., which covers:
    - Alfen B.V., Almere
    - Alfen ICU B.V., Almere
    - Alfen Projects B.V., Almere
    - Alfen BVBA, Gent
    - Alfen International B.V.
    - Alfen Elkamo Oy

There are no projects with award advantage, therefore no information about projects is included in this carbon footprint report.

Organizational changes
The Company grew from 683 FTEs at 31 December 2021 to 893 FTEs at 31 December 2022.

There is no change in the legal boundaries compared with the period 2019-2021.

4.2 Reporting organization

Alfen N.V.
Hefbrugweg 28
1332 AP Almere

Tel.: ++31 36 54 93 400
E-mail: qhse@alfen.com

4.3 Responsible person

The responsible person for the Carbon Footprint Report 2022 is Mr. M. Roeleveld, CEO of Alfen N.V.

4.4 Reporting period

The reporting period covers January 01, 2022 until December 31, 2022, with base year 2019.

4.5 Verification

The figures and conversion factors used for the CO_2 footprint calculation have been verified by an external party.

5 Carbon footprint 2022

The carbon footprint of Alfen includes all emissions in Scope 1, Scope 2 and business travel in Scope 3. The latter concerns Scope 3 CO_2 emissions in category 6 of the Corporate Value Chain Accounting and reporting Standard [205].

Alfen's total emissions in 2022 are equivalent to 1,121 tCO_2e. A breakdown is given in Figure 2.

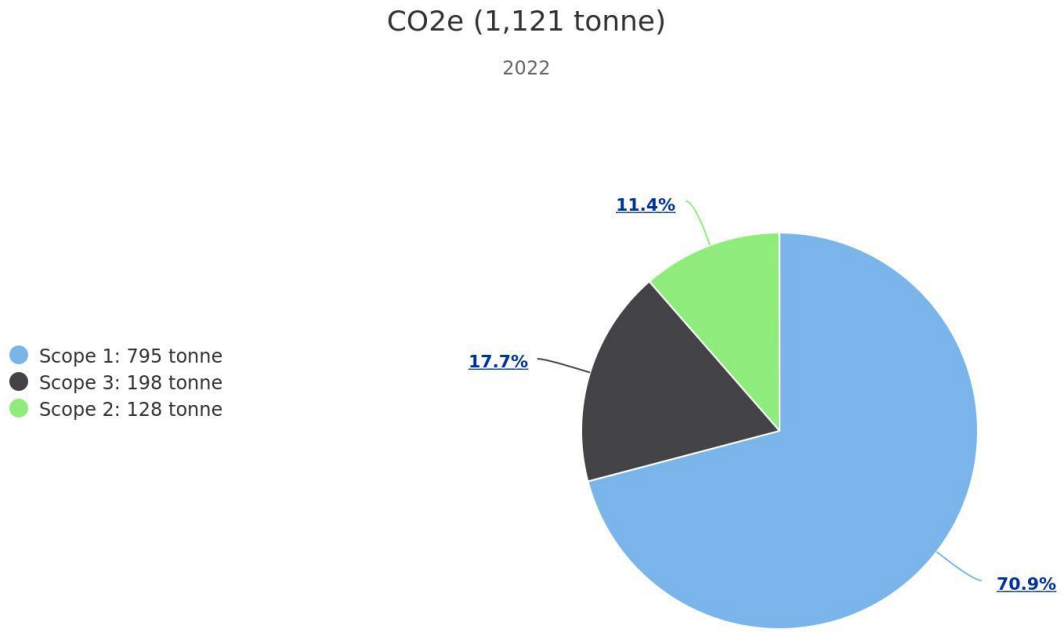

Figure 2 - Alfen Carbon Footprint 2022

In GHG reporting, often a total value for the Scope 1 and 2 emissions is used. In 2022 these emissions are equivalent to 923 tCO_2e.

Since 2018 there has been an increasing growth of the business, number of production sites and number of employees. This also resulted in growth of the total CO_2 emissions. This is visualized in Figure 3 - Alfen Carbon Footprint 2019-2022Figure 3.

As a result of the COVID-19 pandemic and related measures, in 2020 and 2021 a break in this trend is observed. This is mainly related to the changes in mobility as a result of working from home and restrictions for (international) travel.

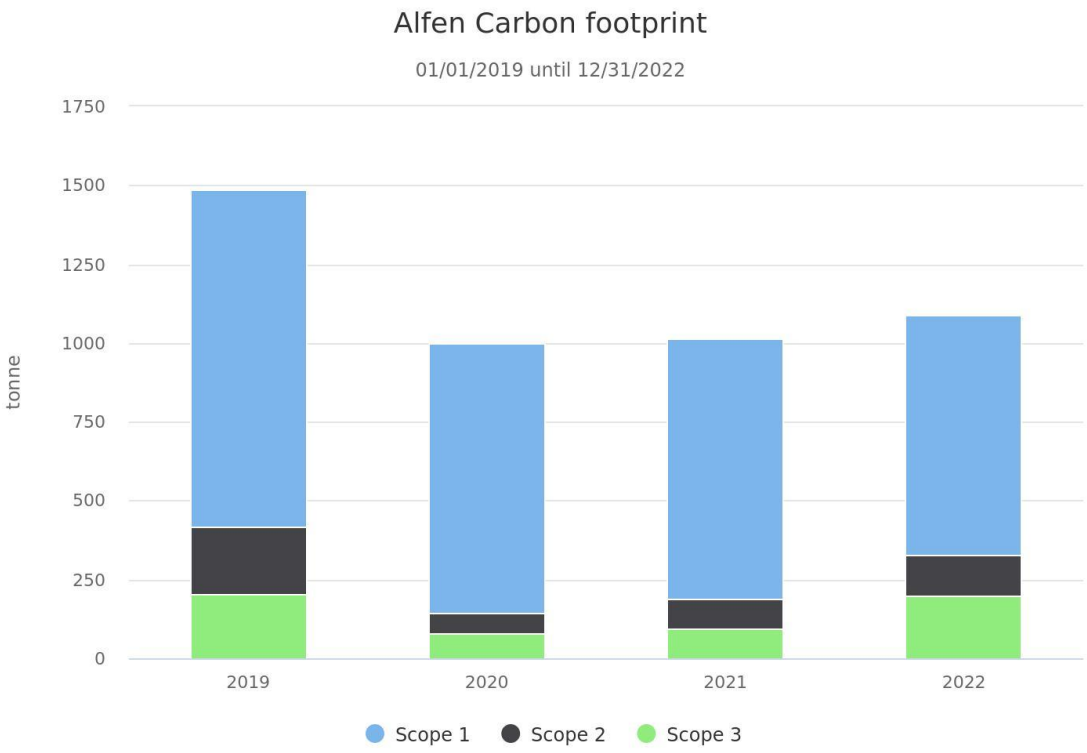

Figure 3 - Alfen Carbon Footprint 2019-2022

Comparison of the carbon footprint in 2022 with the footprint in base year 2019 shows a 25% decrease. Over the same period, the business revenue tripled.
Figure 10 in chapter 8 shows the trend in CO_2 emissions related to category since base year 2019.

6 Scope 1 - Direct CO_2 Emissions

The direct emissions in Scope 1 are a product of fuel powered lease cars (company-owned vehicles), heating, refrigerant leaks, stationary equipment and the use of self-generated electricity.

In 2022, direct emissions accounted for 795 tonnes of the CO_2 emitted by Alfen, a quantity of 71% of the total carbon emissions. This is a 26% decrease in comparison with base year 2019 and also a decrease compared to 2021. Main reason for the decrease is due to the lower natural gas consumption for heating.

A breakdown is given in Figure 4 and the different functions are successively explained in more detail in the following sections. Chapter 9 provides information on the trend in recent years.

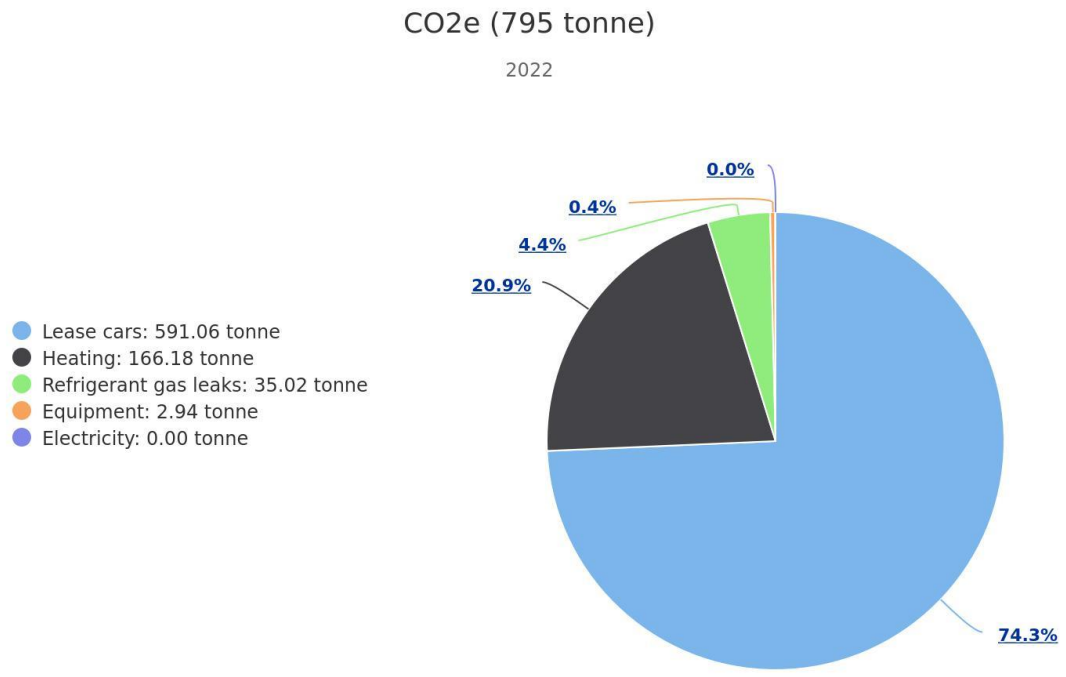

Figure 4 - Breakdown of Scope 1 CO_2 emissions 2022

6.1 Lease cars (vehicle fleet)

The vehicle fleet, consisting of lease cars and vans, accounts for the majority (74%) of all Alfen net emissions, contributing 591 tCO_2e in Scope 1. A share of 82% to 90% relates to the vans. Electricity usage for lease cars (123 tCO_2e) is part of Scope 2.
An analysis of the emissions from all lease cars is included in section 7.1.

6.1.1 Amount of lease cars

The Alfen vehicle fleet (including Belgium and Finland) consists of 139 vehicles by the end of 2022. Table 5 gives an overview of the vehicle fleet since 2018.

Alfen's general aim is to increase the share of electric/ hybrid vehicles. At the end of 2022, the majority of the vehicle fleet is electrically powered (68 vehicles in total of which 2 vans). The total number of fully electrical (EV) and petrol-powered hybrid electrical vehicles (PHEV) increased to 77 vehicles. This corresponds with 55% of the total vehicle fleet.

Amount of vehicles	2018	2019	2020	2021	2022
Vehicles diesel	65	69	63	53	46
Vehicles EV	10	22	38	51	68
Vehicles petrol	2	11	12	14	16
Vehicles PHEV petrol	10	10	11	9	9
Total	**87**	**112**	**124**	**127**	**139**

Table 5 - Amount of vehicles

6.1.2 Fuel consumption lease cars

New passenger lease cars are preferably electrical and eventually hybrid vehicles, but most of the company vans are still diesel-powered vehicles. Due to the expansion of the service geography and the increase in service density, combined with the radius of action of loaded vans and the unavailability of vehicle charging points in the service area, diesel consumption for vans cannot be reduced yet. However, the total fuel consumption for lease-cars is decreasing from 268,000 liters in base year 2019 to 190,000 liters in 2022.

6.2 Heating

Sources for heating is Scope 1 are natural gas for all locations in the Netherlands and Belgium and fuel oil used in Finland. District heating (4 tCO_2e) is part of in Scope 2. Electricity usage for lease cars (123 tCO_2e) is part of Scope 2.

In 2022 heating contributed 21% of the Carbon footprint in Scope 1 and constitutes of 166 tonnes of the total CO_2 emissions. This is a decrease of 23 tCO_2e compared with base year 2019.

Building-related emissions are influenced by building surface to be heated and the outside temperatures. Since 2019, the building area has increased. The outdoor temperatures were slightly higher than in base year 2019. The reduction could be achieved by replacing the natural gas-fired boilers with electrical boilers and disconnecting heaters in the warehouse and workshop area. These spaces are now considered to be outdoor area. Only workplaces are heated via infrared.

6.3 Fugitive emissions from refrigerants

In 2022, during the renovation of the roof, a pipe of an air conditioner was damaged, which resulted in a leakage of 35 tons of CO_2e of refrigerant.

6.4 Equipment

Diesel fuel consumption by equipment, like stationary vehicles and forklifts, contributed 0.4% of the carbon footprint in Scope 1 and constitutes of just 3 tonnes of total CO_2 emissions.

Carbon emissions related to equipment reduced since 2021 due to the switch to 100% Hydrotreated Vegetable Oil (HVO100). HVO100 is a vegetable diesel that reduces carbon dioxide emissions from diesel consumption by 89% compared with regular diesel. Thanks to this switch nearly 28 tonnes CO_2 emissions were prevented in 2022.

6.5 Self-generated electricity (building related)

Mid 2022 the new solar panels were commissioned. With these panels, 17 percent of the gross annual electricity consumption is self-generated. The emission contributes zero tonnes CO_2e.
Purchased electricity is part of Scope 2.

7 Scope 2 - Indirect emissions

Alfen's indirect emissions in Scope 2 are a product of emissions resulting from electrically powered lease cars (company-owned vehicles), district heating and electricity consumption (building related).

In 2022 the emissions in Scope 2 contribute 128 tCO_2e, a quantity of 11% of the total carbon dioxide emissions. This is a decrease of 40% in comparison with base year 2019, but an increase from 2020. Main reason for the decrease is the switch to renewable energy (wind energy) in Finland. The increase is related to the increase in number of electrically powered lease cars.

Figure 5 gives a breakdown of Scope 2 emissions in 2022. The different topics are explained in the subsequent sections. Chapter 9 gives the trend over the past years.

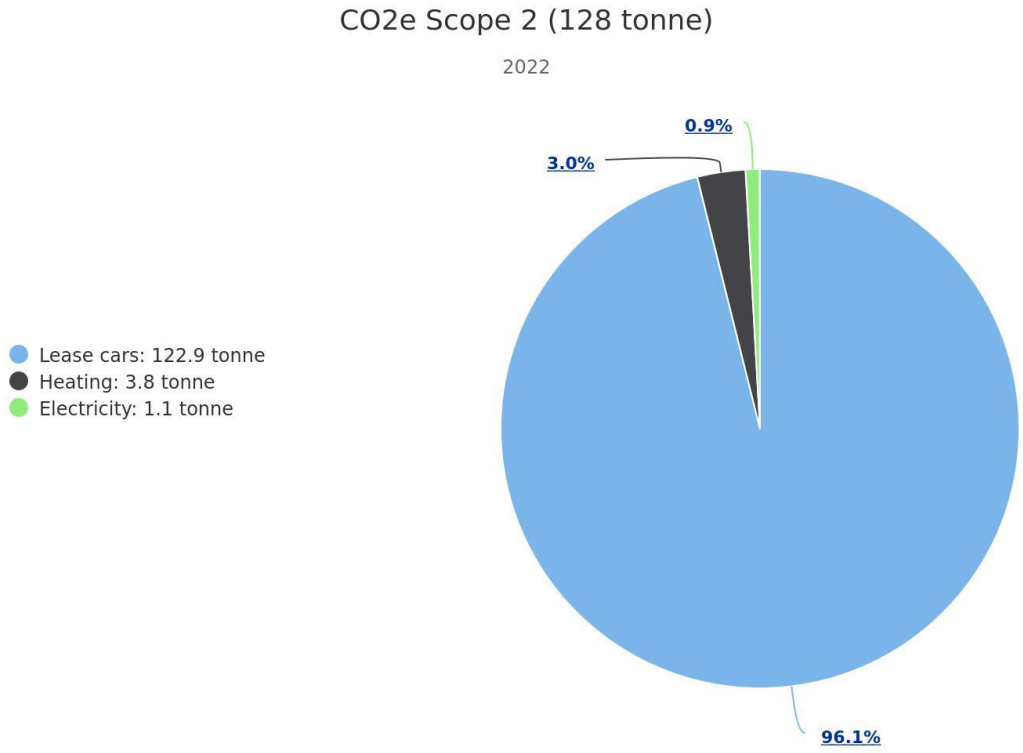

Figure 5 - Breakdown Scope 2 CO_2 emissions 2022

7.1 Electricity usage lease cars

Scope 2 emissions from lease cars relate to EV-charging of electrical and plug-in hybrid electric vehicles at Alfen's "green" charging points and public and home charging points, where the source of the energy is unknown. These emissions account for 96% of the Scope 2 emissions.

In 2022 31 new vehicles are leased, with an average emission of 89 grams CO_2/ km according to actual emission data [206].

Due to the increase in the number of electrical vehicles, the CO_2 emissions of lease cars in Scope 2 increases.

In 2022, a majority of 55% of the electricity is obtained from Alfen charging points, 18% from home charging and 26% from public charging. Combined with the 55% share of EV cars this makes 30% of the use by lease cars CO_2 emission-free.
Table 6 gives information on the CO_2 emission per electricity source for EV-charging in 2022.

EV-charging	CO_2 emission (tonne)	
Public charging	74	(60%)
Home charging	49	(40%)
Own charging points	0	(0%)
Total	**123**	

Table 6 - EV-charging 2022

Lease cars have always been the largest contributor to Alfen's CO_2 emissions but looking at the emissions per lease car for the total vehicle fleet, fuel and electrically powered, a decrease from 8,1 to 5,1 tonne CO_2e is visible as result of the increase in the share of EV-vehicles. This is visualized in Figure 6.

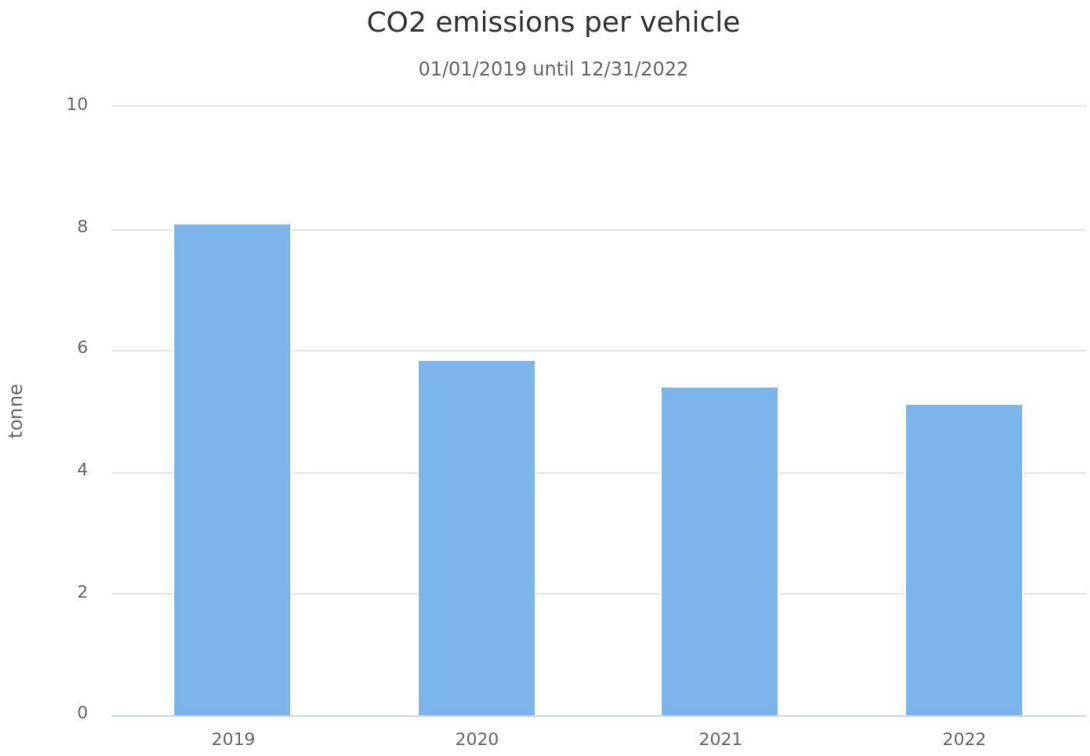

Figure 6 - CO_2 emissions per vehicle

7.2 District heating

The small share of heating in Scope 2 is related to district heating in Finland.
The consumption in 2022 is in line with the consumption in the period 2019-2021 and contributes 4 tonnes CO_2e.

7.3 Purchased electricity (building related)

Most of the electricity used by Alfen is purchased. When buying or renting buildings or office spaces, green electricity is purchased where possible. Self-generated electricity is part of Scope 1.

In 2022, 99,8% of the Scope 2 electricity used originated from renewable sources covered by green Guarantees of Origin. The emission contributes 1 tonnes CO_2e. This is related to new offices in Germany, for which it was not yet possible to purchase green electricity.
In 2019 42% of purchased electricity was renewable.

8 Scope 3 - Indirect emissions for business travel

Reported CO_2 emissions in Scope 3 are related to category 6 of the Corporate Value Chain Accounting and reporting Standard [205].

Business travel is an unavoidable part of Alfen operations and is a product of air travel, use of private cars for business travel and public transportation.

In 2022 emissions for business travel in Scope 3 contributed 198 tCO_2e, a quantity of 18% of the total carbon dioxide emissions. This is a decrease of 2% in comparison with base year 2019, but a significant increase from 2021.
Main reason for the re-increase is the recoup of mobility after the COVID-19 measures in 2020 and 2021 and is mainly related to the use of own vehicles and public transport for business travel. A further explanation is given in the subsequent sections.

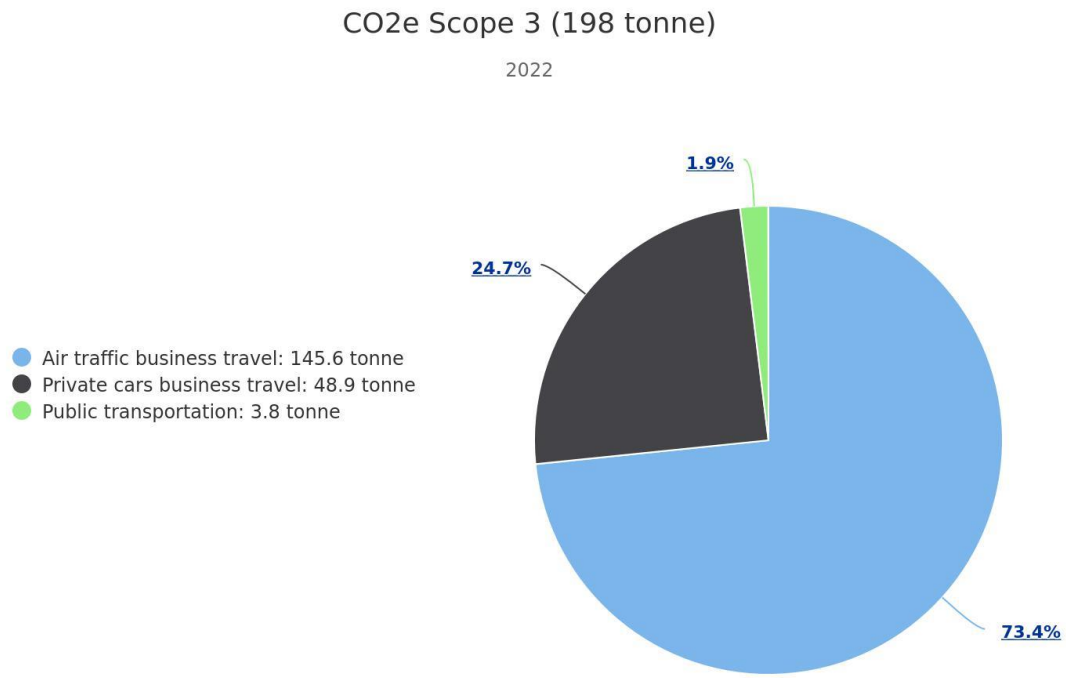

Figure 7 - Breakdown Scope 3 business travel CO_2 emissions 2022

8.1 Air travel

Within Alfen flights are the largest contributor to Scope 3 CO_2 emissions. In 2022 total air travel emission contribute 13% of the total CO_2 emission and 73% of the emission in Scope 3. The emission is in line with base year 2019. Due to the COVID-19 measures emissions were significant lower in 2020 and 2021. CO_2 emissions related to air travel are visualized in Figure 8.

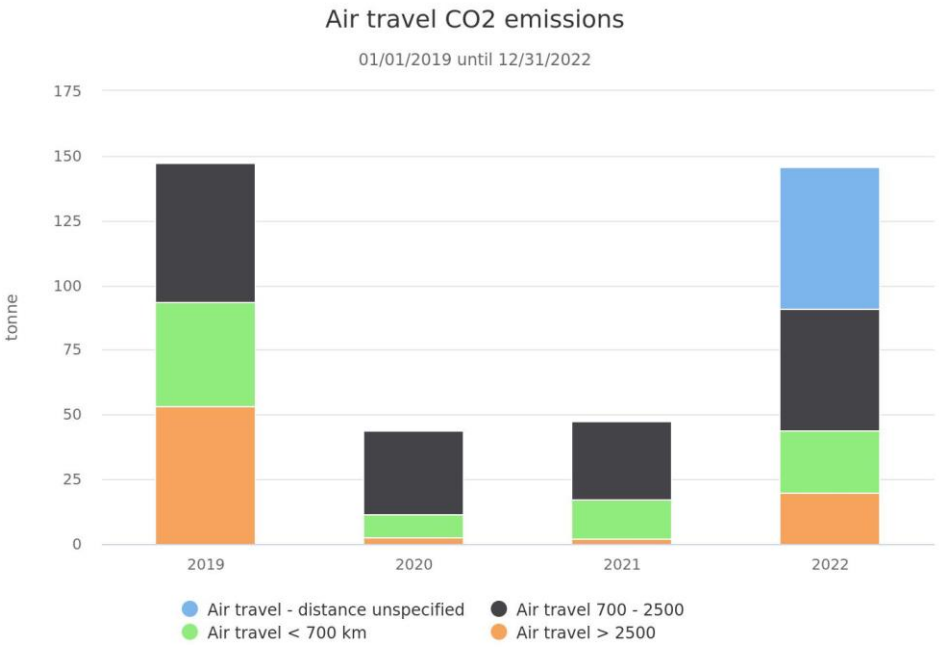

Figure 8 - Air travel CO_2 emissions

8.2 Private cars for business travel

Private cars for business travel include distance declarations and fuels declarations for rental cars.

In 2022 the emissions from personal cars for business travel account for 4% of overall emissions and 25% in Scope 3. It is a decrease compared with base year 2019. Due to the COVID-19 measures emissions were significant lower in 2020 and 2021.

8.3 Public transportation

Emissions for public transport for business travel are calculated on the basis of a general value and are therefore not specified by type of transport.

In 2022, Alfen employees travelled more than 256,000 passenger kilometers, more than doubling compared with 2019. Due to the COVID-19 measures emissions were significant lower in 2020 and 2021.

9 Trend over the years

Figure 9 shows the trend of all emissions per FTE for all emissions in Scope 1, Scope 2 and business travel in Scope 3 since base year 2019. Figure 10 shows the trend by function.

In comparison with 2019 the most notable changes are:

Emission per FTE:

- Reduction of total emissions per FTE with 56% and also a reduction per Scope.

Building related emissions:

- Electricity, reduction related to the switch to or choice for renewable energy for all (new) buildings;
- Heating, slight decrease due to energy reduction measures and despite the increase in number of buildings.

Mobility related emission:

- Air travel, re-increase after a period of lower emissions related to COVID-related measures;
- Lease cars, reduction fuel use and increase EV electricity consumption due to the switch to electric vehicles.

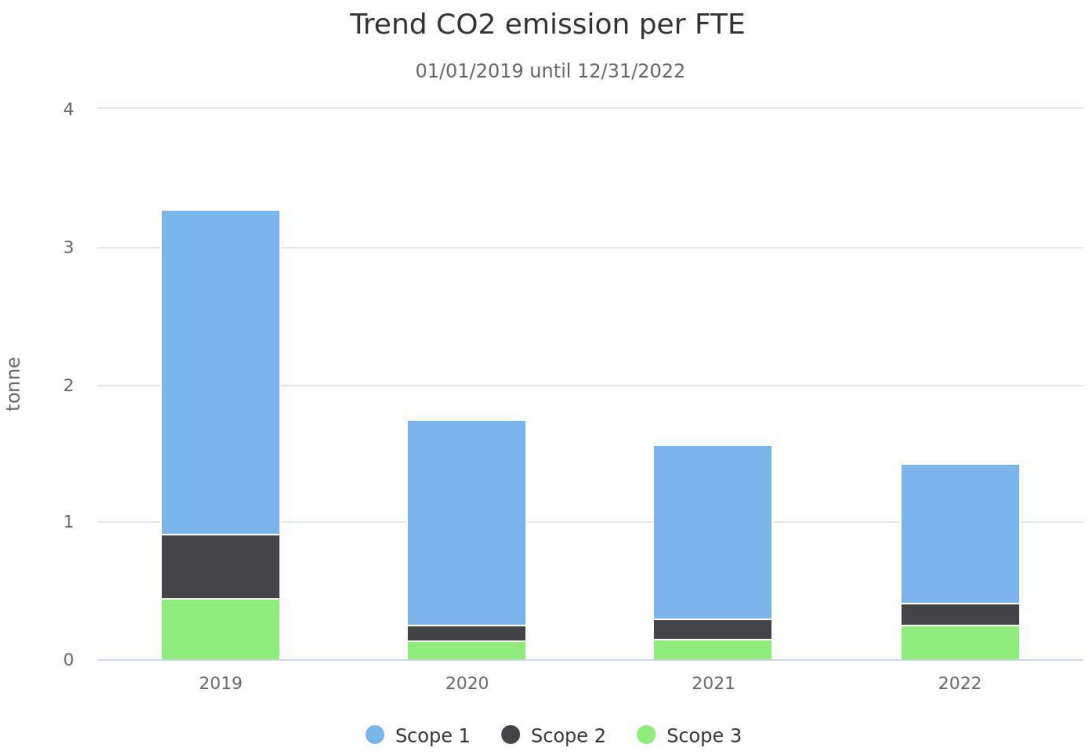

Figure 9 - Trend CO_2 emissions per FTE

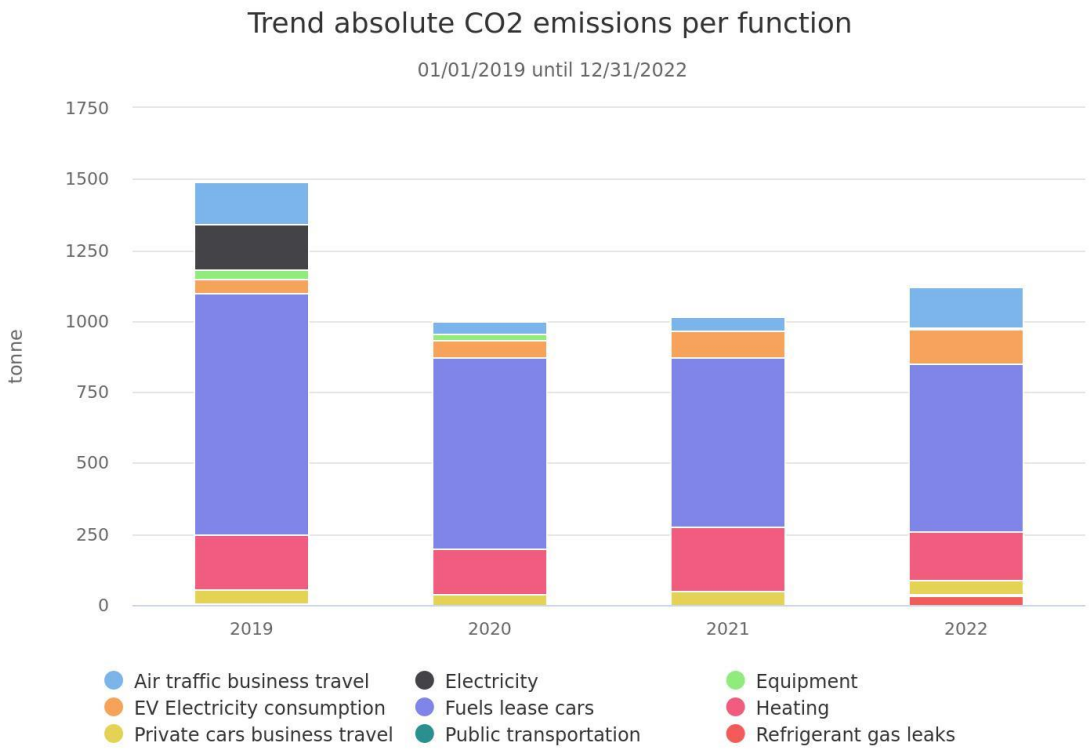

Figure 10 - Trend CO_2 emissions per function

10 Reduction targets and progress

This chapter provides an update on the progress of the reduction targets in Scope 1, Scope 2 and business travel (BT) in Scope 3.

10.1 Reduction targets

Alfen aims to sustain and further improve its energy efficiency, in line with its reduction objectives. These objectives are reviewed annually to ensure they remain relevant and challenging.

For 2022 the objective is to achieve lower or equivalent CO_2 emissions per FTE in comparison with base year 2019, despite the expected growth of the company in personnel, production quantities and production area. This objective has been set for both Scope 1, Scope 2 and business travel in Scope 3. Besides this, Alfen's general aim is to reduce energy consumption and increase the share of electric/ hybrid vehicles.

The performance indicators are expressed as a reduction in the ratio of carbon dioxide emissions relative to average FTE and are based on the year 2019 and historical results and planned actions. The KPIs are included in Table 7.

Parameter/ KPI	2019	Target 2022
CO_2e Scope 1/ FTE (tonne)	2.31	+ 0%
CO_2e Scope 2/ FTE (tonne)	0.46	+ 0%
CO_2e Scope 3 BT/ FTE (tonne)	0.44	+ 0%
CO_2e Scope 1+2+3 BT/ FTE (tonne)	3.21	+ 0%

Table 7 - Objectives 2022

10.2 Progress CO_2 emission reduction

The emission intensity per FTE reduced with 56% from 3.21 tonnes CO_2e/ FTE in 2019 to 1.42 tonnes CO_2e/ FTE in 2022. This means the objective has been met. The objective for the emission per Scope has also been met with a reduction of 56% for Scope 1, 65% for Scope 2 and 42% for Scope 3 business travel emissions. The results are shown in Table 8.

Most important factors contributing to the positive results towards the reductions targets for 2022 are the purchase of green electricity in Finland and new buildings in The Netherlands and the switch to biofuel (HVO100) in earlier years. In 2022 it concerned reduction in gas consumption due to the reduction of the gas-heated building surface.

Carbon emission (tonne CO_2e)	2019		2022		Realization 2022 <-> 2019
Scope 1	1.073	(72%)	795	(71%)	-26%
Scope 2	214	(14%)	128	(11%)	-40%
Scope 3 BT	202	(14%)	198	(18%)	-2%
Total Scope 1,2,3 BT	**1,489**		**1,121**		**-25%**
Total Scope 1+2 (acc GHG protocol)	**1,286**		**923**		**-28%**
Emission CO_2/ FTE Scope 1	2.31		1.01		-56%
Emission CO_2/FTE Scope 2	0.46		0.16		-65%
Emission CO_2/ FTE Scope 3 BT	0.44		0.25		-42%
Emission CO_2/FTE Scope 1,2,3 BT	**3.21**		**1.42**		-56%

Table 8 - Realization 2022

10.3 Progress share electric vehicles

If 2018 is compared with 2022, an increase is noticed in the percentage of electric/ hybrid vehicles from 23% in 2018 to 55% in 2022 which is in line with Alfen's EV Policy. This switch reduced the use of fuels but increased the use of electricity for electric vehicles.

11 Conclusions and follow-up

For the period 2020-2022 the objective is to achieve lower or equivalent CO_2 emissions per FTE in comparison with base year 2019, despite the expected growth of the company in personnel, production quantities and production area. This objective has been set for Scope 1, Scope 2 and business travel in Scope 3. This corresponds to an emission of 3.21 tCO_2e/ FTE in total and 2.31 tCO_2e/ FTE in Scope 1, 0.46 tCO_2e/ FTE in Scope 2 and 0.44 tCO_2e/ FTE for business travel in Scope 3.
Besides this, Alfen's general aim is to reduce energy consumption and increase the share of electric/ hybrid vehicles.

Based on the results presented in chapter 10, the conclusion is that the objective has been met with an amount of 1.42 tCO_2e/ FTE in total, which corresponds to a reduction of 56% compared to base year 2019. The objective has also been met per Scope. This is related to the efforts to reduce energy for buildings and mobility, like the purchase of green electricity in Finland and new buildings in The Netherlands, the switch to biofuel (HVO100), the reduction of natural gas heated area and the increase of the share of electric powered vehicles.

In 2022 the emission was 1,121 tonnes CO_2e. This is a reduction of 25% compared to base year 2019, despite tripling of business revenue growth.

Other Scope 3 emissions
Not all Scope 3 emissions are discussed in this report. However, the extension of our product portfolio and new CSRD legislation increased the need for additional and more detailed information on the carbon footprint in the value chain. Therefore, Alfen started a re-examination of significant Scope 3 CO_2 emissions. Alfen aims to gain more insight into these CO_2 emissions and wants to report these in the next reporting cycle.

Follow-up
Alfen N.V. has committed to set near term and long-term Science based targets in line with global warming limitation targets. These targets will be communicated early 2024.

Interim objective for 2023 are:

- Reduction of the total energy consumption per square meter building surface;
- Reduction of the CO_2 emission per FTE in Scope 1, Scope 2 and Business travel in Scope 3, compared to 2019;
- Setting near term and long-term objectives as per SBTi before 2024.

Existing actions and new defined actions to achieve these objectives are presented in Appendix C. This Appendix also gives an overview of the status of all defined actions. Actions are based on current knowledge and can be adapted to upcoming SBTi objectives.

12 Additional information

This chapter provides information on the used methodology, the calculation method, changes in the calculation and quality of data.

12.1 Methodology

Alfen is certified according to the Energy Management standard ISO 50001 and reports CO_2 emissions in line with the Dutch CO_2 Performance Ladder handbook 3.1. An energy and CO_2 management system requires continuous improvement in insight, communication and operational management cooperation, and energy and CO_2 reduction measures.

To calculate the CO_2 emissions inventory, Alfen identified all relevant carbon dioxide emission sources, collected activity data from the relevant business units. For the registration and calculation, the software application Smart Trackers, a program for CO_2 measurements and assessments, is used.

The quantification of CO_2 emissions in Scope 1 is based on the available activity data for fuels consumed, including natural gas. Scope 2 CO_2 emissions are primarily calculated from metered electricity consumption figures, including EV charging. CO_2 emissions from business travel in Scope 3 are mainly calculated from activity data from declarations, such as passenger miles, vehicle type and fuel type. Since 2020 the new declaration system is used from which these data can be directly derived. Data are complemented with information of cost declarations.

12.2 Calculation method

The application Smart Trackers uses emission factors from the publicly available website www.co2emissiefactoren.nl (version Jan-2022), which is recommended by Handbook 3.1 of the CO_2 Performance Ladder. Emission factors used in 2022 are included in Appendix B. The figures and conversion factors for the period 2020-2022 have been verified by an external party.

12.2.1 Changes in calculation method in 2022

In this report two changes are made in the calculation method:

- The emission factors related to petrol and diesel for private cars were rounded to three decimal places instead of one. This affected also figures in 2021;
- Emission factor for flight declarations is based on own flight data available in a new portal, which will be used from reporting year 2023.

12.2.2 Recalculation of base year and historical data

There is no correction of base year data. For 2021 the CO_2 emission in Scope 3 and the total CO_2 emission have been adjusted.

Corrections compared to the financial annual report 2022 are:

Air travel: emission factor for additional flight declarations adjusted, resulting in a lower CO_2 emission for air travel.

12.3 Data quality and completeness

Scope	Emission source	Activity data	Data source	Remarks
1	Natural gas	Primary	Telemetric gas meter readings from energy company and visual readings.	Data main buildings is based on telemetric gas meter readings. For other buildings the measurement of data does not relate to the entire reporting period. To minimize the uncertainty of actual natural gas consumption, a weighted degree-day method was applied in the allocation of the available measurement data to consumption over the reporting period.
	Fuel for stationary vehicles and forklifts	Primary	Supplier invoices	
	Fuel oil for heating FI	Primary	Meter reading	
	Vehicle fleet	Primary / secondary	Reports from lease company, declarations	Mainly primary data supplemented with costs declarations based on average fuel costs.
	Own electricity production solar panels	Primary	Electricity meter readings solar panels.	
2	Purchased electricity (renewable and nonrenewable sources)	Primary	Telemetric electricity meter readings from energy company and visual readings	Mainly based on telemetric electricity meter readings. Visual readings in Belgium.
	Purchased electricity for lease cars (unknown source)	Primary/ secondary	Reports from suppliers electrical charging (fuel cards), declared costs and information home charging (kWh) ICU Connect.	Home charging 2019: €0,23/ kWh, based on average costs own lease cars. From 2020 home charging has been measured.
	Electricity usage for lease cars (own charging points)	Primary/ secondary	ICU Connect and declarations	Mainly primary data supplemented with costs declarations based on average kWh costs.
	District Heating Finland	Primary data	Meter readings from energy company.	
3	Business travel - private cars	Primary/ secondary	Travel expenses declaration system based on distance generated by google maps, fuel type and car type.	Mainly primary data: the use of private cars is calculated by dividing the travel costs by the official rate of €0,19/km in the Netherlands and Belgium and €0,40/km in Finland. This in combination with selection of vehicle type and fuel type. This data is supplemented with costs declarations based on average fuel costs and €2,80/km for taxis, based on national taxi tariffs (www.rijksoverheid.nl).
	Business travel - public transport	Secondary	Travel expenses declaration system	The use of public transport is calculated by dividing the travel costs by the official rate of €0,19/km. In Finland for public transport €0,40/ km is used.
	Business travel - air	Secondary	Overview of the booking agency and travel expenses	Flight distances 2019 are calculated using distance from http://nl.distance.to/. From 2020 information travel company is used. Flight declarations 2023: emission factor is derived from data travel company.

Data source is accurate | Data source is satisfactory, but could be improved | Data source is poor and its improvement is a priority

Table 9 - Overview data quality and completeness

Appendices

Number	Title
Appendix A	Carbon Footprint Alfen 2022 by Scope
Appendix B	Appendix CCO_2 emission factors 2022
Appendix C	Action plan reduction targets 2022-2030

Appendix A Carbon Footprint Alfen 2022 by Scope

Emissions Scope 1

CO_2e (tonne)	2019	2020	2021	2022
Electricity	0	0	0	0
Equipment	30	23	3	3
Heating	189	160	223	166
Lease cars	852	671	598	591
Refrigerant leaks	0	0	0	35
Total Scope 1	**1,073**	**854**	**825**	**795**

Emissions Scope 2

CO_2e (tonne)	2019	2020	2021	2022
Electricity	160	0	0	1
Heating	4	3	4	4
Lease cars	49	60	89	123
Total Scope 2	**214**	**63**	**93**	**128**

Emissions Scope 3

CO_2e (tonne)	2019	2020	2021	2022
Air traffic	147	44	48	146
Private cars	51	36	48	49
Public transportation	4	2	1	4
Total Scope 3	**202**	**82**	**97**	**198**

Appendix B CO_2 emission factors 2022

Function	Gauge	Country	Conversion factor		Source
Electricity	Electricity consumption mix (kWh)	GE	338,66	g/kWh	www.CO2emissionfactors.nl
	Renewable energy - purchased (kWh)	BE, NL, FI	0	g/kWh	www.CO2emissionfactors.nl
	Solar energy - own production (kWh)	NL	0	g/kWh	www.CO2emissionfactors.nl
Refrigerants	Emission refrigerant R410A (kg)	NL	1.924	kg/kg	www.CO2emissionfactors.nl
Lease cars + business travel private cars	Fuels - Petrol (liter)	All	2.784	g/liter	www.CO2emissionfactors.nl
	Fuels - Diesel (liter)	All	3.262	g/liter	www.CO2emissionfactors.nl
Lease cars	EV Electricity consumption own charging points (kWh)	All	0	g/kWh	www.CO2emissionfactors.nl
	EV Electricity consumption home charging (kWh)	All	523	g/kWh	www.CO2emissionfactors.nl
	EV Electricity consumption public charging (kWh)	All	523	g/kWh	www.CO2emissionfactors.nl
Equipment	Diesel usage HVO100 (liter)	NL	314	g/liter	www.CO2emissionfactors.nl
Public transport	General (km)	All	15	g/km	www.CO2emissionfactors.nl
Business travel private cars	Unknown fuel type (km)	All	193	g/km	www.CO2emissionfactors.nl
	Petrol large vehicle (km)	All	218	g/km	www.CO2emissionfactors.nl
	Petrol small vehicle (km)	All	174	g/km	www.CO2emissionfactors.nl
	Petrol medium size vehicle (km)	All	204	g/km	www.CO2emissionfactors.nl
	Diesel large vehicle (km)	All	203	g/km	www.CO2emissionfactors.nl
	Diesel small vehicle (km)	All	166	g/km	www.CO2emissionfactors.nl
	Diesel medium size vehicle (km)	All	180	g/km	www.CO2emissionfactors.nl
	Hybrid vehicle (km)	All	144	g/km	www.CO2emissionfactors.nl
	L.P.G. medium size vehicle (km)	All	152	g/km	www.CO2emissionfactors.nl
	EV puclic charging (km)	All	104	g/km	www.CO2emissionfactors.nl
Heating	Natural gas usage (m^3)	NL, BE	2.085	g/m^3	www.CO2emissionfactors.nl
	Fuel Oil FI (liter)	FI	3.185	g/liter	www.CO2emissionfactors.nl
	District Heating (kWh)	FI	0,0094	kg/kWh	supplier declaration
Air travel	Flight declarations - distance unspecified (EUR)	All	0,904508	kg/EUR	own factor
	700 - 2500 km (km)	All	172	g/km	www.CO2emissionfactors.nl
	< 700 km (km)	All	234	g/km	www.CO2emissionfactors.nl
	> 2500 km (km)	All	157	g/km	www.CO2emissionfactors.nl

Appendix C Action plan reduction targets 2022-2030

No.	Action	Reduction	KPI	Resources	Responsible	Realization date	Priority	Status	Explanation Status
Mobility									
2023.01	In 2025 the share of fully or hybrid electric passenger cars is 90%.	n.a.	Number of (PH)EV/ total number SMTR		HR	2025	High	New	
2023.02	Green public charging	100% (70 tCO_2e)	CO2 public charging	t.b.a.	-	2030	Low	New	
2023.03	Update mobility/ lease policy	n.a.			HR	2023	High	New	
2023.04	Introduce/ update travel policy	n.a.			HR	2023	High	New	
Buildings, tools and equipment									
2020.07	NL Electricity reduction measures lighting and ventilation	± 8 kWh	Electricity use NL	Appr. € 2.300	TD	2021Q4	Medium	on hold	All measures for lighting have been implemented. Action for ventilation has been put on hold: due to COVID-19, maximum ventilation has been maintained.
2021.06	NL: Replacement and reduction heating main office by electrical heating boiler	unknown	Gas use HBW28		TD	2022	Medium	ongoing	Heating offices adjusted. Replacement heating will be extended to all buildings: action 2023.
2021.07	NL: Roof insulation production area HBW28	unknown	-	part roof refurb.	TD/ BI	2022	Medium	closed	The installation is completed in Q2-2022.
2021.09	NL: Installation solar panels main building	285.000 kWh/ year purchase	-	Appr. € 180.000	TD/BI	2022Q3	Medium	closed	The installation is completed in Q2-2022.
2023.05	Replace diesel forklifts by electrical equipment	3 tCO_2e	Diesel use equipment		TD	2027	Medium	New	
2023.06	NL: Self-supporting energy new building HBW 79	n.a.	% self-supporting HBW79		TD/BI	2024	High	New	
2023.07	NL: natural gas free buildings Hefbrugweg/ Vlotbrugweg	189 tCO_2e	Gas use NL 0 m3		TD	2027	High	New	

No.	Action	Reduction	KPI	Resources	Responsible	Realization date	Priority	Status	Explanation Status
Corporate and administration									
2023.08	Set Science based short- and long-term targets for Scope 1 and 2	n.a.			CSRD-team	2023	High	New	
2023.09	Set Science based short- and long-term targets for Scope 3	n.a.			CSRD-team	2023	High	New	
2023.10	Set-up data improvement plan for Scope 3 CO_2 emissions.	n.a.			CSRD-team	2023	High	New	
2023.11	Improve energy monitoring of activities	n.a.			TD	2027	Medium	New	Part of designing production-lines in new buildings and refurbishment