European Stability Mechanism

Carbon footprint report

2023

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Table of Contents

1. Foreword

As an international financial institution with a public mandate, the European Stability Mechanism (ESM) strives to implement environmental, social, and governance (ESG) best practices within its operations.

This 2023 publication, which is our sixth annual carbon footprint report, is a testament to ESM's continued commitment to transparently report on its ESG efforts. It provides a comprehensive account of ESM's operational carbon footprint in the year 2023, comparing the performance against previous years, as well as the 2018 baseline.

The calculations within the report were performed with the assistance of Deloitte Luxembourg (*Société à Responsabilité Limitée*), who conducted two independent reviews of the subsequent calculations and assumptions, following the four eyes principle.

As in previous years, the carbon footprint estimates are based on an extensive review of internal and external documentation and activity data, as well as exchanges with external data providers. The report is prepared per guidelines from the International Greenhouse Gas Protocol – a Corporate Accounting and Reporting Standard. Additionally, using the same methodology applied to the previous reports as set out by EcoAct 2020 Homeworking Emissions Whitepaper, a separate chapter with estimates on teleworking-related emissions has been included in this report.

It is important to note that during the Covid-19 pandemic, numerous national and ESM-specific measures were implemented to contain the spread of the pandemic and ensure the safety of staff. These measures significantly altered the ESM's business operations, leading to a stark fall in the institution's greenhouse gas (GHG) emissions in 2020 and a modest decline in 2021. Following the easing of Covid-19 pandemic-related restrictions and corresponding return to office presence and pre-pandemic mobility practices, including a tour of the ESM Member States Capitals by the ESM management, in light of the appointment of the new managing director, GHG emissions linked to the ESM's activities have increased proportionally over the last reporting years. Moreover, given the objective of generating more transparent and accurate reporting, the ESM has continuously reviewed and updated its carbon footprint methodology and scope. As a result, new emission categories, or expansions in the scope of already reported categories, were added to this year's report. Such additions coupled with a return to pre-pandemic patterns of operation naturally led to an increase in reported GHG emissions. However, compared to these pre-pandemic emission figures, the ESM has maintained its trend of continued reduction of its overall consumption and GHG emissions.

The ESM is committed to producing a carbon footprint report on an annual basis to monitor its progress in decreasing its carbon footprint. In the spirit of transparency, the report is made available to the public.

The ESM has continued implementing measures aimed at strengthening its existing environmental practices.

To further reduce mobility-related carbon emissions, the ESM updated its travel policy to encourage staff to consider the environmental impact of their work-related travel. To facilitate this, information on estimated carbon emissions has been systematically made available to ESM staff when choosing travel options. These efforts were adopted in conjunction with other practical initiatives, such as the addition of four electric car charging stations at the ESM premises. Additionally, the ESM expanded its facilities for electric bikes in May 2024 by installing charging stations, secure lockers, and repair stations, with capacity for 18 bikes and five cargo bikes. This initiative aims to encourage sustainable transportation among employees and reduce carbon emissions.

1.1. Overview of environmental practices and efforts

Staff mobility

- Creation of wall-mounted electric sockets for electric bikes, bike lockets, and a repair station during the course of 2024
- Installation of four new e-charging stations in the car parking area

Building-related energy consumption and technology

- Reduction of office temperatures from 23° to 20° during winter season
- Donation of decommissioned information technology (IT) equipment through two charity auctions to allow for the reuse of IT equipment
- All electricity for the ESM premises sourced from renewable resources covered by Guarantees of Origins[1]
- Switch-off of non-essential devices on the premises

Reducing consumption and waste

- *SuperDrecksKëscht® fir Betriber* label obtained for the 10th consecutive year for internal waste recycling practices
- Replacement of mobile water dispensers with fixed units
- Offer of vegetarian options in the canteen, while concurrently prioritising locally sourced and seasonal productss

Relationships with providers

- Increased consideration of ESG criteria within tender processes

To further reduce its building-related emissions, the ESM introduced various energy efficiency measures in 2023. These include the reduction of office temperatures from 23°C to 20°C during the winter and the turning off of non-essential devices such as ice-cube machines, event-based information screens, gym equipment, and display screens during certain periods. Furthermore, the ESM has installed contactless taps and hand-towel dispensers, as well as waterless bathroom fixtures, to reduce water consumption. It has also replaced traditional towel dispensers with those made entirely from recycled materials.

The ESM has continued replacing non-recyclable plastic materials with sustainable alternatives in line with the ESM's 2019 pledge under the Zero Single-Use Manifesto, an initiative by the Luxembourgish sustainability network Inspiring More Sustainability. Likewise, the ESM was awarded the *SuperDrecksKëscht® fir Betriber*[2] label for the 10th consecutive year for its internal waste recycling

1 Guarantees of Origin are globally standardised assurance programmes created to monitor and authenticate the emissions from renewable resources, enabling producers to credibly assert that their products have low emissions.

2 *SuperDrecksKëscht® fir Betriber* is the "Global Benchmark for Sustainability" certification systems for sustainable buildings and districts.

practices. The institution also implemented several measures to minimise food waste, including more accurate portioning and meal planning in the canteen. Additionally, it has prioritised the use of seasonal, locally sourced, and plant-based food in menu offerings, reducing transportation emissions and supporting local farmers in Luxembourg.

Moreover, ESM adopted eco-friendly packaging for its canteen meals to curtail plastic waste where feasible. Similarly, the institution has expanded its range of Ecolabel-certified and Ministry of Health approved cleaning products for its facilities. The ESM has also incorporated environmental considerations into contracts with office supply providers, and in its procurement policy.

The ESM is working towards decreasing its digital carbon footprint by transitioning its business applications from conventional physical servers to cloud-based solutions by 2025. Cloud computing resources are shared across many organisations, enabling a more efficient use of computing power. Furthermore, to ensure that technology equipment is used to its full capacity, and to reduce consumption and waste, the staff-led ESM 'Making a Difference' values group held two charity auctions of decommissioned IT equipment in 2023. Under the guidance of the values group, the auction's proceeds were donated to various charitable causes.

It is also important to note that the ESM is currently building its new headquarters together with some administrative units of the Luxembourg government. The building project, with expected completion in 2029, will follow an efficient life-cycle cost approach to create a sustainable, high-quality, modern, and flexible working environment. With this objective in mind, the project aims to achieve a *Deutsche Gesellschaft für Nachhaltiges Bauen Platinum*[3] certificate. The project will also conform to a number of official environmental best practice standards, such as WELL building criteria (an international system that measures, monitors, and certifies a series of features to promote occupant wellbeing), the European Union (EU) Taxonomy (a classification system established to clarify which economic activities are environmentally sustainable), as well as the Eco-Management and Audit Scheme.

The ESM also continued to exchange information and ideas on sustainability and environmental best practices with peer institutions through the EcoNet[4] working group, a platform for EU institutions and agencies in Luxembourg. As a public institution, the ESM is also committed to being an active contributor in the journey towards a low-carbon transition in Europe and globally in a wider sense and is, therefore, contributing to the work of the Network of Central Banks and Supervisors for Greening the Financial System (NGFS) via its observer status. The NGFS is a group of central banks and supervisors willing to contribute to the development of environmental and climate risk management in the financial sector and to mobilise mainstream finance to support the transition towards a sustainable economy. Additionally, the ESM continued its participation in the European Commission's Platform on Sustainable Finance as an observer, and as a member of the International Capital Market Association's Social Bonds Working Group.

Finally, in the spirit of increased transparency beyond environmental commitments, the ESM published an ESG summary report in 2023. This report covers not only the ESM's internal environmental efforts, but also its ESG efforts in relation to its investment and funding activities, along with its climate risk management work. Furthermore, in 2023, the ESM submitted its first publicly available transparency report to the United Nations (UN)-backed Principles for Responsible Investment. The report provides insights into how ESG considerations are built into the ESM's operations, particularly in its policy and governance framework, and documents the ESM's responsible investment initiatives.

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3 *Deutsche Gesellschaft für Nachhaltiges Bauen Platinum* is the highest DNGB certification level.

4 ECONOET is an Inter-institutional Environmental Network made up of Eco-Management and Audit Scheme coordinators from various Union institutions in Luxembourg.

1.2. Summary: 2023 carbon footprint performance

Figure 1

ESM carbon footprint evolution 2018–2023

(gross and net)

	2018 (baseline)	2022	2023	Net variation vs. 2022	Variation vs. baseline
Total gross emissions (tCO_2e)	1,176.6	573.5	1071.9	+86.9%	-8.9%
Total net emissions (tCO_2e)	1,084.1	501.3	968.6	+93.2%	-10.7%
Staff	179	225	230	+2.2%	+28.4%
Carbon intensity (Net tCO_2e/staff member)	6.1	2.2	4.2	+89%	-30.5%

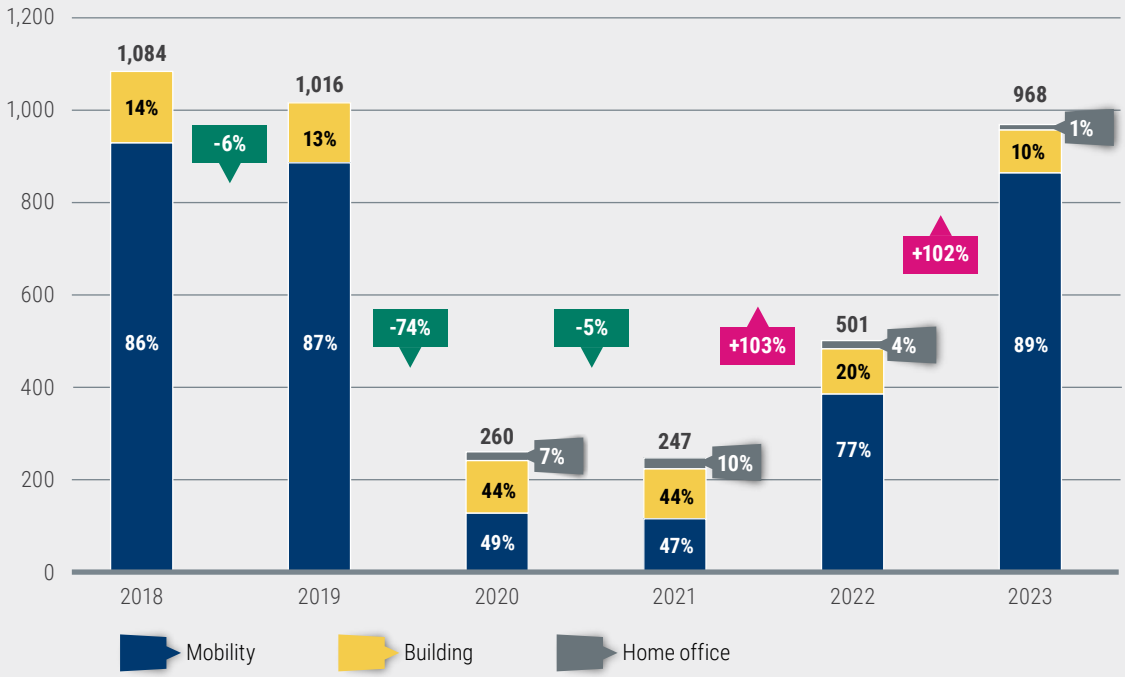
Notes: The percentage changes are calculated relying on the full figures and ratios and not on the rounded-up figures displayed in the report. Carbon intensity is calculated by dividing the total net emissions per total number of ESM staff members.

Source: ESM

Figure 2

ESM emissions evolution, 2018–2023

(net tCO_2e)



Note: Please note that the sums of some figures and graphs may exceed 100% due to the rounding up of numbers.

Source: ESM

The ESM's total GHG emissions for 2023 amounted to 1,071.9 tCO_2e (Carbon dioxide equivalent in metric tons)[5] on a gross basis, and to 968.6 tCO_2e on a net basis. Compared to 2022, both net and gross emissions have nearly doubled. However, compared to the 2018 baseline year, total emissions have declined by 10.7% in net terms and 8.9% in gross terms despite a marked increase in staff numbers over the same period. The increase in GHG emissions in 2023 compared to 2022 is driven by two main factors:

1. **The increase of mobility-related activities.** Emissions related to mobility increased by 124.7% in 2023, following the trend already seen in 2022. In 2022, emissions related to mobility had already significantly increased compared to 2021. This spike was the result of most Covid-19 pandemic-related restrictions being relaxed by mid-2022, both within and outside the ESM and a tour of the ESM Member States Capitals by the ESM management, in light of the appointment of the new managing director. This has lead to an increase in air business travel and staff commuting following years of significant disruption.
2. **The addition of cooling emissions as a new emission category.** Cooling emissions are emissions generated by the air conditioning system within the ESM facilities. In the spirit of enhanced transparency and given the evolving nature of carbon data availability, this category was added to this year's reporting scope in light of reliable data becoming available. The new category accounted for 2.35% of total gross emissions and 0% of net emissions in 2023.
3. **The expansion in the scope of electronic equipment emissions.** Emissions related to electronic equipment increased by 203%, compared to the previous year. Electronic equipment emissions are emissions generated from the use of IT devices by the institution and its employees, including but not limited to computers, mobile phones, mouses, displays, and webcams. The category was first reported on in 2022 and, since then, the ESM has opened the scope significantly by including a wider range of computers in use within its premises and during periods of telework.

[5] CO_2e is the shorthand for carbon dioxide equivalents. It is the standard unit in carbon accounting to quantify greenhouse gas emissions. The Intergovernmental Panel on Climate Change maintains global warming potentials for known GHGs and convert the gases in terms of CO_2e.

2. Methodology & Scope

2.1. Methodology used to calculate ESM's carbon footprint

The ESM reports its GHG emissions in accordance with the International GHG Protocol. The International GHG Protocol, developed through a partnership between the World Resources Institute and the World Business Council for Sustainable Development, and is the most widely recognised international standard in the field of GHG accounting and reporting.

The data used to evaluate the impact of ESM activities is collected in an environmental inventory updated annually to reflect changes in staff numbers, office space and occupancy, and internal activities, as well as best practices and standards. Collecting, assessing, and monitoring this information is key to identifying and planning relevant measures to achieve the ESM's environmental, social, and governance priorities.

Emission factors were taken from several sources, which are further expanded upon in Annex 3 of this report.

The calculations are performed with the assistance of Deloitte Luxembourg (*Société à Responsabilité Limitée*), which also conducted an additional review of the calculations and assumptions, following the four eyes principle. For this reason, the computation of ESM's carbon emissions and their review were independently performed by two distinct teams. The first was responsible for data collection, the calculation of each category outlined in the report, and drafting. The second conducted a thorough autonomous review of the calculations and underlying documentation.

The present report uses the terms "carbon footprint", and "GHG emissions" synonymously and interchangeably as they refer to the GHG inventory of the ESM. As per reporting best practice, two categories of emissions are disclosed, gross emissions and net emissions:

- Net emissions classify consumption from renewable energy as carbon neutral, i.e. resulting in zero emissions.
- Gross emissions include emissions from these sources.

2.1.1. Teleworking

The emissions related to teleworking were not based on activity data: the main methodology adopted to estimate the emissions for the teleworking category was based on the EcoAct Whitepaper methodology.

Publicly available statistics and specific assumptions were used to complement the Eco Act Whitepaper methodology and to estimate teleworking-related water and waste emissions. Further information is provided in Chapter 5. Teleworking-related emissions.

2.2. Reporting period

The reporting period ranges from 1 January 2023 to 31 December 2023. For the analysis of trends, the baseline year is set at 2018 as this was the first year for which all required reporting data was available and validated. The emissions calculated for the baseline year serve as a benchmark for further reports.

2.3. Reporting scope

According to the International GHG Protocol, there are two main steps needed to assess an organisation's carbon footprint:

1. **Set organisational boundaries.**
2. **Set operational boundaries.**

Organisations can be set up as various legal entities and can exercise different types and degrees of control over their operations. **Organisational boundaries** allow an organisation to select an approach for consolidating GHG emissions and consistently apply it to define those businesses and operations that constitute the organisation for accounting and reporting GHG emissions.

Two distinct approaches can be used to determine such organisational boundaries:

1. **The equity share approach**: an organisation accounts for the GHG emissions resulting from its operations according to its share of equity in the operations.
2. **The control approach**: an an organisation accounts for all the GHG emissions resulting from operations over which it has financial or operational control.

In this context, financial control refers to the organisation's ability to direct financial and operating policies with a view of gaining economic benefits from them. Operational control refers to the organisation's authority to introduce and implement operating policies.

For its carbon footprint report, the ESM uses the operational control approach. Under this approach, the ESM accounts for the GHG emissions of the operations over which it has operational control in its headquarters in Luxembourg City. This approach is consistent with the current accounting and reporting practice of many organisations that report on emissions from the facilities they operate, and it is in line with requirements set in both the GHG protocol.[6] For further details on the report's exclusions, see Annex 5.

In setting **operational boundaries**, organisations firstly categorise emissions as direct and indirect and secondly choose the scope of accounting and reporting for indirect emissions. **Direct emissions** are those originating from sources owned or controlled by the reporting entity, whereas **indirect emissions** are generated as a consequence of the reporting entities' activities but occur at sources owned or controlled by another entity.

For GHG accounting and reporting standards, direct and indirect emissions are split into three scopes:

- **Scope 1**: Direct GHG emissions that occur from sources owned or controlled by the reporting organisation.
- **Scope 2**: Indirect GHG emissions from the generation of purchased electricity, heat, steam, or cooling consumed by the reporting company.
- **Scope 3**: All other indirect emissions that are a consequence of the activities of the organisation but occur from sources not owned or controlled by the organisation.

[6] More information can be found in Chapter 5 – Identifying Scope 3 Emission of Corporate Value Chain (Scope 3) Accounting and Reporting Standard by the Greenhouse Gas Protocol.

The International GHG Protocol requires entities to report, at minimum, on Scope 1 and 2, while reporting on Scope 3 is optional. To work towards more transparent and accurate carbon reporting, the ESM continuously reviews and updates its carbon footprint scope and methodology.

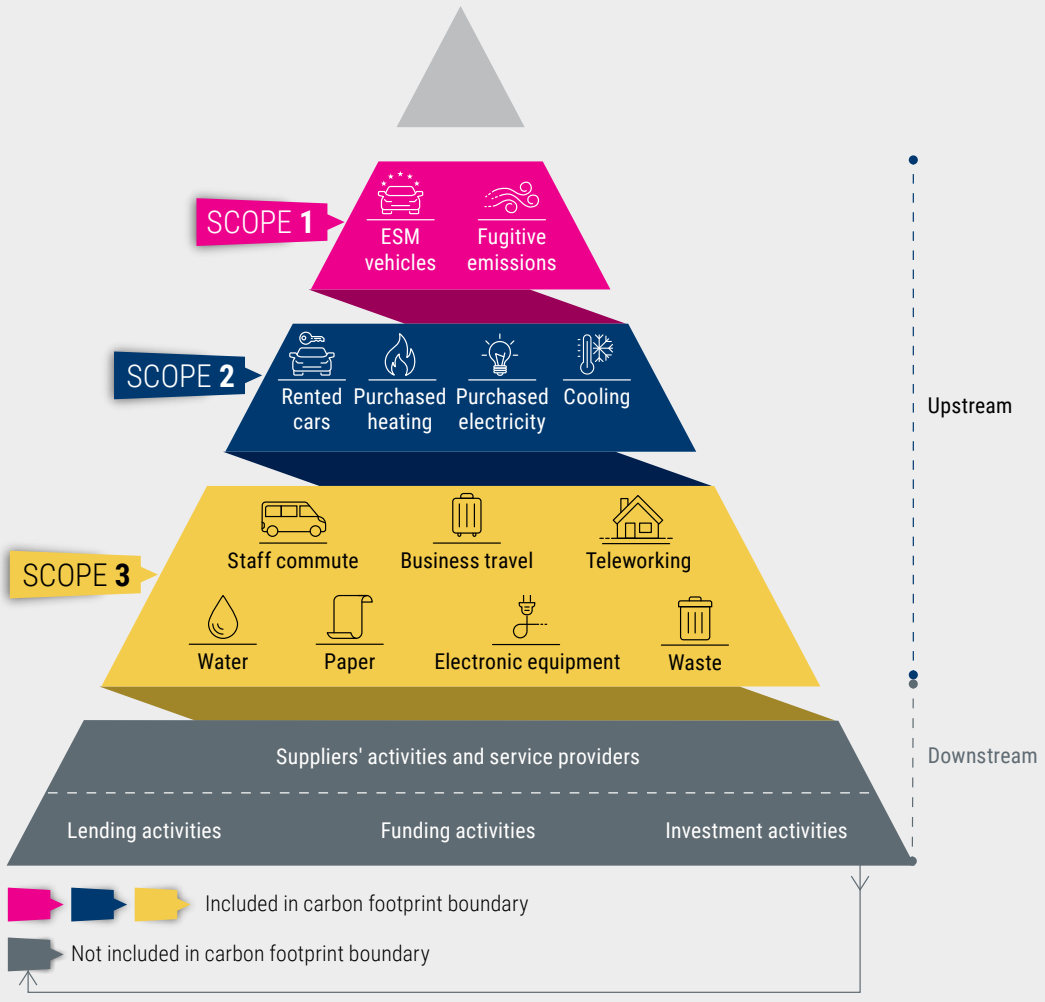
After a mapping exercise, the ESM decided to include the following activities under the ESM carbon footprint:

- **Scope 1**: ESM-leased vehicles and fugitive emissions.
- **Scope 2**: Purchased electricity, heating, and cooling for ESM premises.
- **Scope 3**: Business travel of ESM staff (via air and rail), commuting of staff to work, paper and water consumption, waste generation, emissions linked to electronic equipment, and teleworking-related emissions.

GHG emission sources can also be categorised from a life cycle perspective into **upstream emissions** (resulting from the processing and production of a product up to the point of sale) and **downstream emissions** (occurring after the sale of a product, through its distribution, storage, use, and end-of-life). By transposing this logic to the nature of ESM activities, the emissions the ESM considers to be in its scope are all upstream emissions. Currently, the ESM does not assess the carbon footprint of its lending, funding, or investment activities, given the complexities of retrieving this data.

Figure 3

Breakdown of sources of emissions by scope



Source: ESM

2.4. Updates to reporting scope and methodology

To continually improve its carbon footprint reporting and reduction efforts, the ESM added the cooling (air conditioning) category to the scope for the first time in 2023. Calculated using the GHG Protocol methodology, emissions in this newly included category were determined by quantifying the electricity consumed by cooling systems and applying the appropriate emission factors. Furthermore, the ESM expanded the scope of the electronic equipment category.

2.5. Data collection and calculation

To calculate their carbon footprint, organisations need to collect activity data that quantifies activities resulting in GHG emissions, e.g. kilowatt-hours of electricity consumed, or kilometers travelled by staff.

Most results included in this report are obtained using primary activity data, interpreted from documented evidence derived, for example, from energy and heating invoices. Other results, however, are estimated based on established methodologies and several underlying assumptions (an overview of data quality and completeness is presented in Annex 4 of this report). While the ESM used a conservative approach for such assumptions, they may nevertheless have an impact on the total GHG emissions.

As a last step, the resulting activity data is multiplied by emission factors that are specific to certain sectors, activities, or geographical areas. The emission factors used in this report are retrieved from established sources, such as the International Energy Agency and the United Kingdom government's Department for Environment, Food & Rural Affairs (Defra). Annex 3 of this report contains full information regarding the emission factors used and their specific sources.

For the calculation of certain ratios, the ESM factors in the number of permanent staff members employed full-time in 2023 – an average of 230 people[7] (compared to 225 in 2022). In 2023, the office space rented by the ESM corresponded to 9369.40 m².

[7] The number of staff members relies on a conservative estimate as it does not include temporary staff, interns, and other persons working from the ESM premises on a temporary basis. This may lead to higher per capita emissions.

3. Carbon footprint

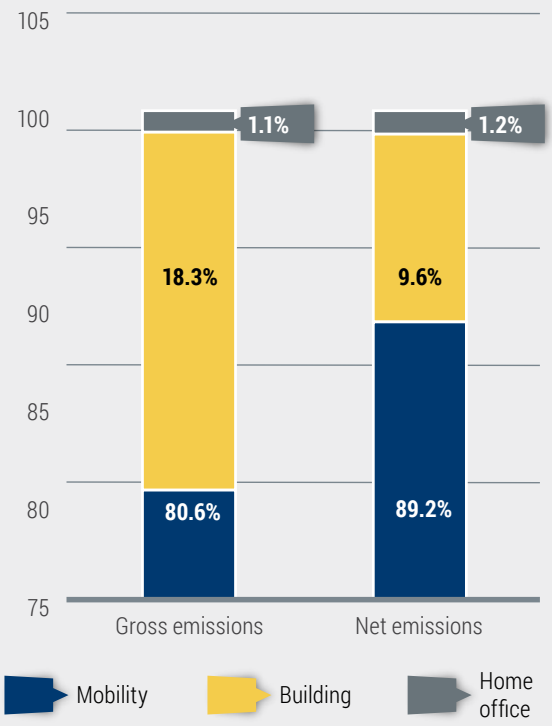
3.1. Total GHG emissions

- **Total GHG emissions generated by the ESM in 2023 amounted to 1,071.9 tCO_2e on a gross basis (2022: 573.5 tCO_2e) and to 968.6 tCO_2e on a net basis (2022: 501.3 tCO_2e).**
- **These results show an increase of 86.9% on a gross basis and 93.2% on a net basis compared to 2022.**
- **Compared to the 2018 base year, they still represent a decrease of 8.9% on a gross basis and of 10.7% on a net basis.**
- **The increase in emissions that occurred in 2023 is mainly due to the increase in mobility-related emissions, in light of a return to pre-pandemic travel patterns as well as the addition of cooling emissions as a new emission category into the report.**

Figure 4

Composition gross vs net emissions, 2023

(gross/net tCO_2e)



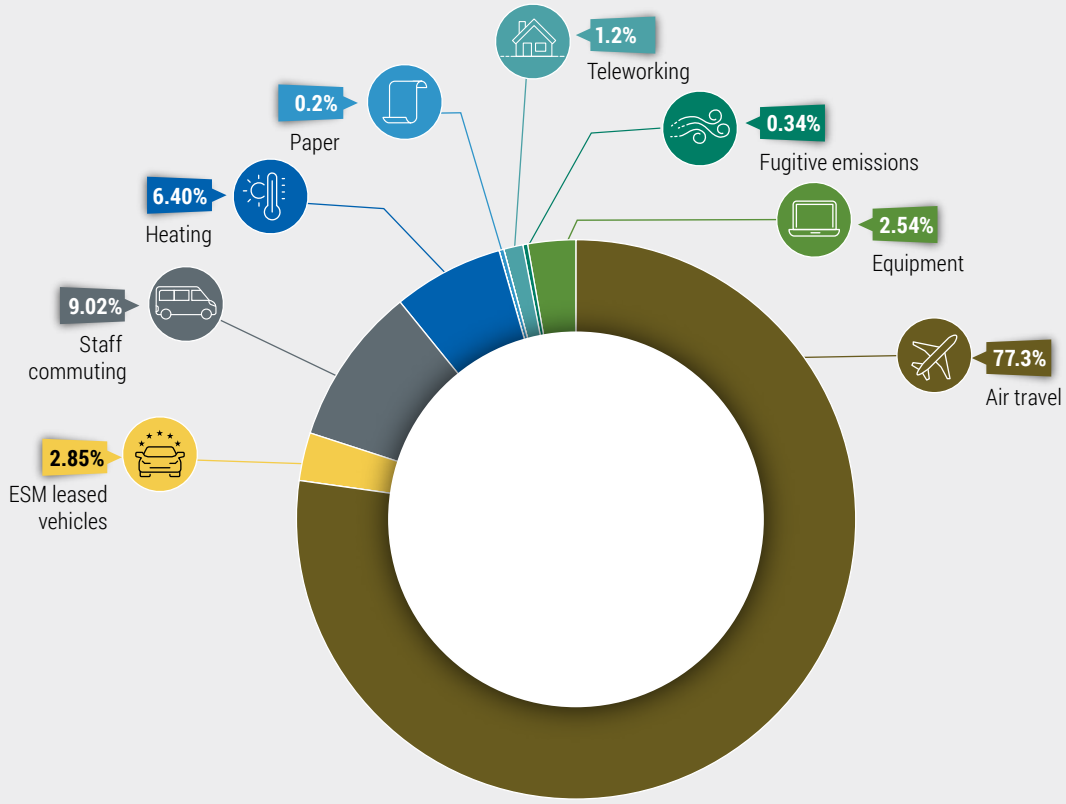
Source: ESM

In line with the developments outlined above, the breakdown of emissions followed a similar trend as in the previous year. Mobility-related emissions contributed 80.6% (2022: 67%) to total gross emissions and 89.2% (2022: 77%) to total net emissions. This was followed by building-related emissions, which accounted for 18.3% (2022: 30%) of total gross emissions and 9.6% on a net basis (2022: 20%). Lastly, teleworking-related emissions made up 1.1% (2022: 3%) of total gross emissions and 1.2% (2022: 4%) of total net emissions. These breakdowns reflect the increase in business travel and staff commuting, showing a slow but steady return to pre-pandemic travel patterns.

Figure 5

Percentage breakdown of net emissions by source, 2023

(net tCO_2e)



Source: ESM

The largest emitting source in 2023 was business travel by air, which contributed to 749.1 tCO_2e (2022: 292.3) of the total net emissions in 2023, showing a 156.3% increase in emissions for the category from 2022. As discussed earlier, the ESM is gradually resuming its pre-pandemic travel patterns, thanks to the full lifting of travel restrictions imposed in 2020 and 2021. Staff commute was the second largest contributor, representing 87.4 tCO_2e or 9% of total net emissions (2022: 71.2 tCO_2e; 14.2%). Heating was the third largest emitting source on a net basis, contributing to 61.9 tCO_2e or 6.4% (2022: 69.5 tCO_2e; 13.9%) of total net emissions.

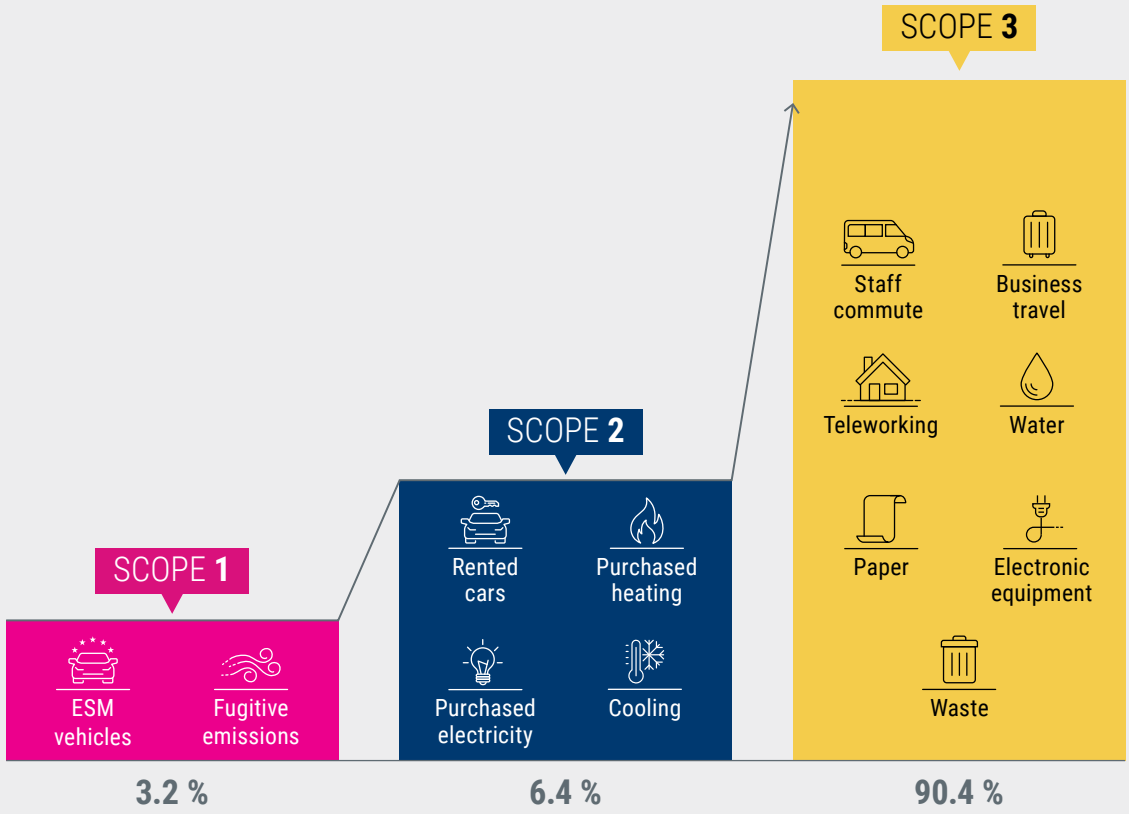
Looking at the breakdown between Scopes 1, 2, and 3 as defined by the International GHG Protocol, the ESM's 2023 carbon footprint shows that Scope 3 emissions represent the highest share of total net emissions, representing 90.4%. The category also represented the highest share in 2022 (78.4%). This result is driven by the rise in emissions related to business travel.

Scope 2 emissions represent 6.4% of total net emissions (2022: 16.6%) and consist of emissions resulting from heating, electricity and cooling of the ESM's premise. Lastly, Scope 1 emissions account for the smallest share, up to 3.2% of total net emissions (2022: 4.9%). Scope 1 emissions are driven by the emissions resulting from the use of ESM-leased vehicles and fugitive emissions.

Figure 6

Breakdown of ESM emissions per scope

(net tCO_2e)



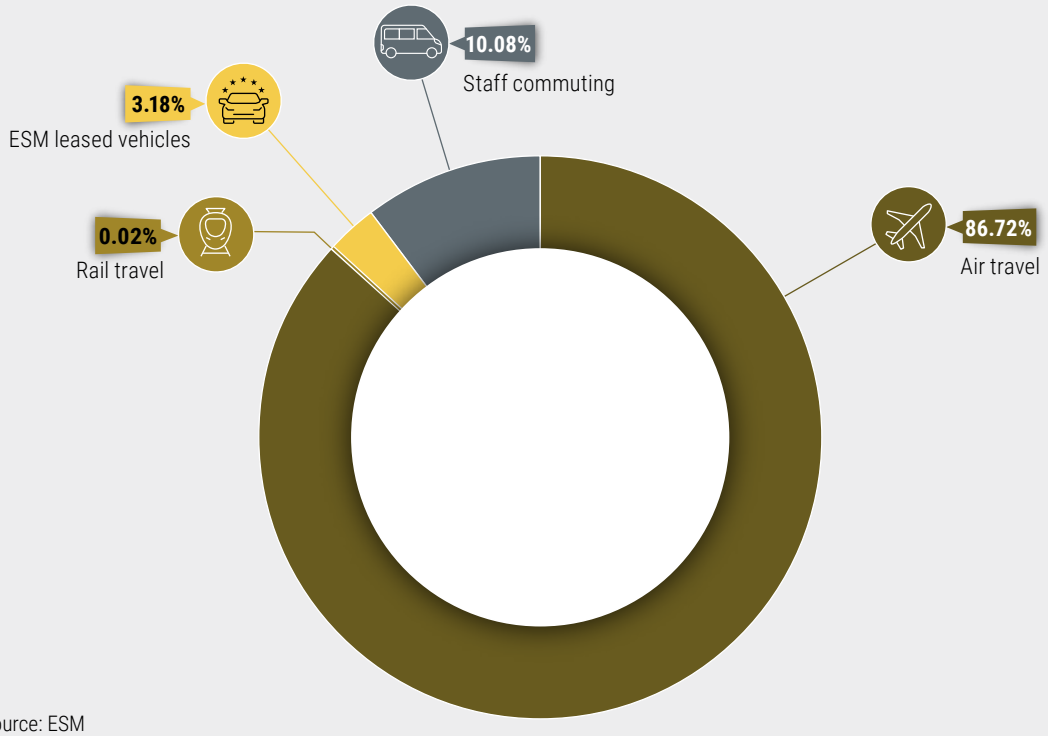
Source: ESM

3.2. Mobility-related emissions

- **Mobility-related emissions represented the largest share of the ESM carbon footprint on both gross/net basis.**
- **Mobility-related emissions make up for 80.6% of total gross emissions (2022: 67.1%) and 89.2% (2022: 76.7%) of total net emissions.**
- **Mobility-related emissions increased by 124.7% on both gross/net basis compared to 2022 following the return to pre-pandemic travel patterns.**
- **Compared to the 2018 base year, mobility emissions decreased by 6.9% on a gross/net basis.**

Figure 7

Breakdown of mobility-related emissions by source, 2023



Source: ESM

Business travel remains an unavoidable part of ESM activities. In 2023, business travel via air returned as the largest mobility-related emission source with 749.1 tCO_2e compared to 292.3 tCO_2e in 2022 on both gross and net basis, representing 87% of total mobility-related gross and net emissions. The remaining 13% of emissions stem from staff commuting, leased vehicles, and rail travel, for an overall total of 115.1 tCO_2e in 2023. However, the ESM encourages staff to be mindful of the environmental impact of their travel. As such, the ESM Travel Policy encourages staff to consider the environmental impact of their business travel operations and to pursue travel arrangements with lower carbon emissions. Furthermore, information on the potential carbon footprint of various travel options is systematically made available to all staff at the time of travel requests.

3.2.1. Air travel

- Emissions resulting from air travel amounted to 69.9% (2022: 51%) of total ESM gross emissions and 77.3% (2022: 58.3%) of total net emissions.
- Air travel represented 86.7% of total mobility-related emissions in 2023 (2022: 76%).
- Gross/net emissions associated with air travel increased by 156.3% compared to 2022 following a return to pre-pandemic travel patterns, and decreased by 5.3% compared to the 2018 base year.

Figure 8

Evolution of air travel-related emissions

(gross/net tCO_2e)

	1,969,849 km Distance travelled	749.1 tCO_2e Gross/net emissions	3.3 tCO_2e Emissions per staff members
Vs. 2022	+101.2%	+156.3%	+154%
Vs. Baseline	-16.8%	-5.3%	-26%

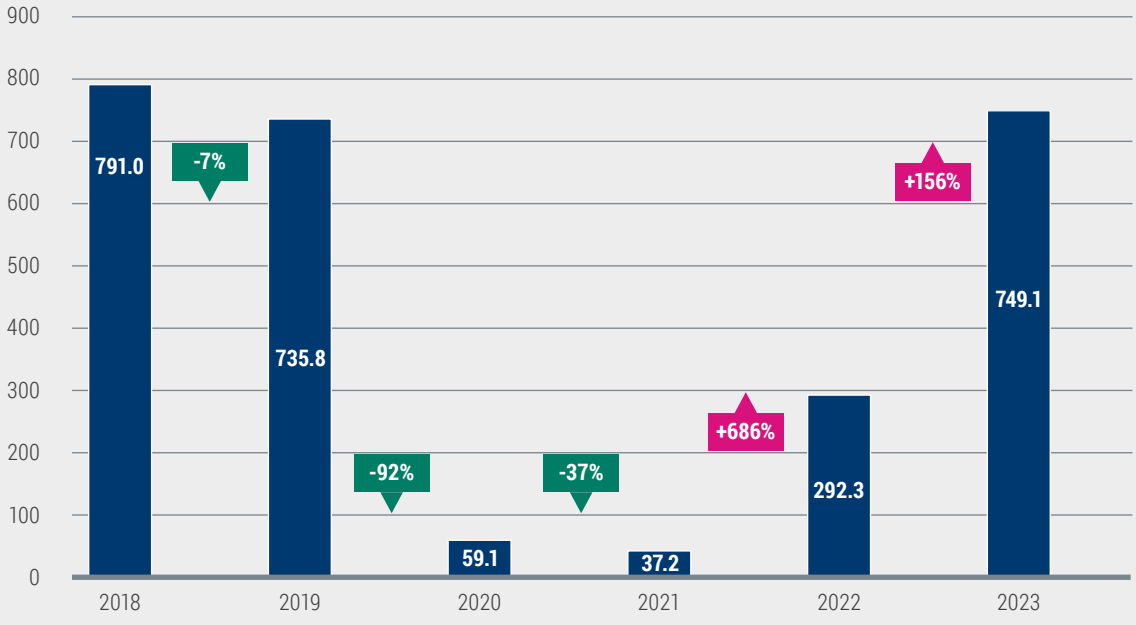
Source: ESM

In 2023, we observed a substantial increase in business travel and related emissions, primarily attributable to the complete lifting of pandemic-related restrictions and the resumption of regular business travel activities. This increased all mobility-related indicators. As such, distance travelled by air amounted to 1,969,849 km in 2023, representing a 101.2% increase (2022: 979,009 km).

Figure 9

Evolution of air travel-related emissions, 2018–2023

(gross/net tCO_2e)



Source: ESM

Figure 9 shows the evolution of ESM air travel-related emissions starting from the 2018 baseline year up to 2023. While the upward trajectory in business travel persisted, a decrease of 5.3% could be noted in comparison to the 2018 baseline year.

In 2023, the ESM maintained the same calculation methodology used in previous years, in which the emissions associated with each flight were calculated based on the fare class and distance travelled and on travel-specific emission factors. Moreover, the emission factors for the category were sourced from Defra, and these factors showed an increase compared to 2022.[8] Information on the emission factors are presented in Annex 3 of this report.

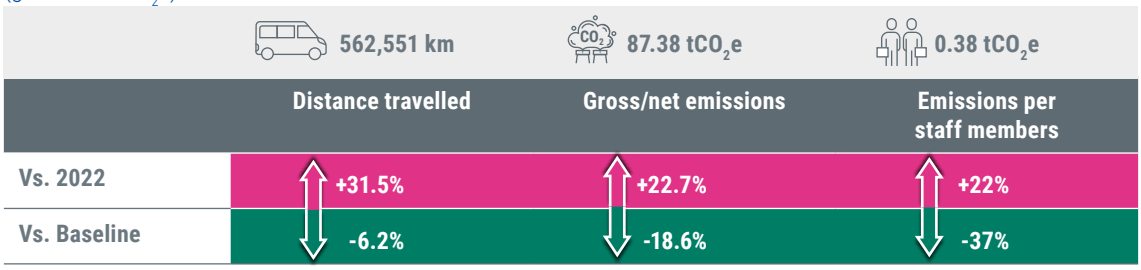
3.2.2. Staff commuting

- **Emissions resulting from staff commute amounted to 8.2% (2022: 12.4%) of total ESM gross emissions and 9.0% (2022: 14.9%) of total net emissions.**
- **Staff commute represented 10.1% of total mobility-related emissions in 2023 (2022: 18.5%).**
- **Gross/net emissions associated with staff commuting increased by 22.7% compared to 2022, and decreased by 18.6% compared to the 2018 base year.**

Figure 10

Evolution of staff commute-related emissions

(gross/net tCO_2e)



Source: ESM

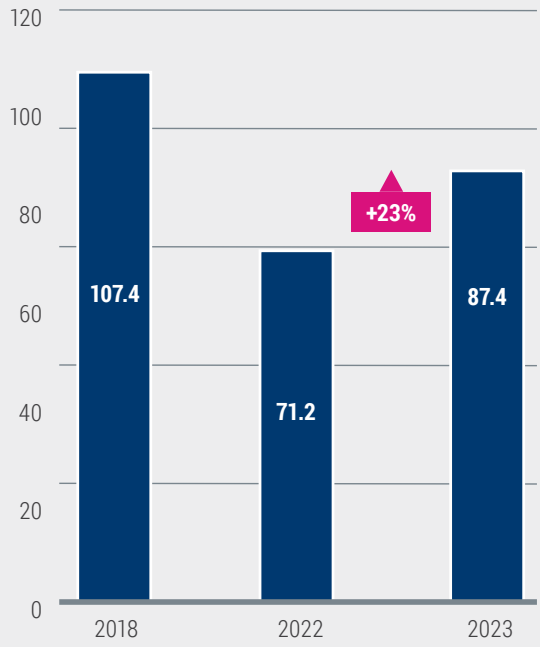
The rise in the overall distance travelled for their commutes to the office by car, and in the related emissions, reflects the lifting of pandemic-related restrictions and the steady return to pre-pandemic office occupancy. This is evidenced by an increased average daily office occupancy rate, which in 2023 rose to 64% (2022: 43.2%), and an increased ESM parking occupancy rate, which amounted to 40% in 2023 (2022: 29%).

[8] More information can be found in the Defra's Methodology Paper for Conversion Factors Final Report

Figure 11

Evolution of staff commute-related emissions, 2018–2023

(gross/net tCO_2e)



Source: ESM

Emissions related to staff commute decreased, however, by 18% compared to the baseline year of 2018. In terms of calculation methodology, the ESM calibrates the distances from staff home addresses to the office with the ESM parking space occupancy rate and the number of business days for the year.[9] In addition, to factor in the different vehicle types owned by ESM staff, the ESM leveraged national statistics on vehicles in use in Luxembourg City. Furthermore, sector-specific emission factors broken down by type of car and fuel were used to estimate emissions from staff commuting.

To encourage the use of electric vehicles, the ESM has added four new e-charging stations in the parking area in addition to the eight stations added in 2022. Additionally, the ESM increased its bike storage to a total capacity of 18 bikes and five cargo bikes, with mounted electric sockets for electric bikes, lockets, and repair stations to incentivise the use of alternative modes of transportation.

3.2.3. ESM-leased vehicles

- **The emissions generated by ESM-leased vehicles represented 2.6% of total ESM gross emissions and 2.7 % of total ESM net emissions.**
- **ESM-leased vehicles represented 3.2% of total mobility-related emissions on both a gross/net basis (2022: 5.5%).**
- **Gross/net emissions resulting from the use of ESM-leased vehicles increased by 30.7% compared to 2022, and decreased by 5.4% compared to the 2018 base year.**

[9] Annex 4 lists the assumptions used to determine the distance travelled by employees to commute to work and calculate the associated carbon emissions.

Figure 12

Evolution of ESM-leased vehicle-related emissions

	190,095 km	27.6 tCO_2e	0.11 tCO_2e
	Distance travelled	Gross/net emissions	Emissions per staff members
Vs. 2022	↑ +19.9%	↑ +30.7%	↑ +22.22%
Vs. Baseline	↑ +39.7%	↓ -5.4%	↓ -16.54%

Source: ESM

In 2023, the ESM leased and operated eight vehicles, including a minivan used to drive staff members to business events in and outside of Luxembourg. In 2023, emissions generated by these vehicles increased by 30.7% compared to 2022. This rise in emissions can be attributed to the relaxation of pandemic-related restrictions and the return to pre-pandemic mobility patterns in 2023.

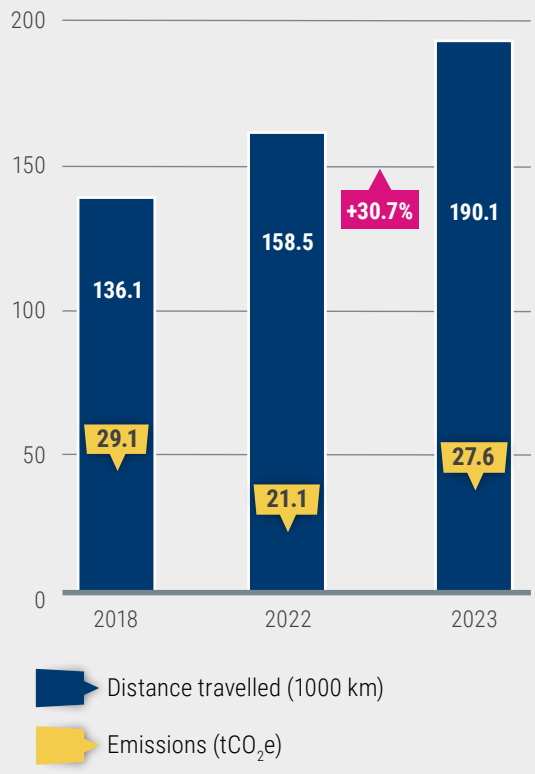
This trend is also illustrated in Figure 13 which shows the evolution of mileage travelled as well as the emissions generated by the use of ESM-leased vehicles between the 2018 baseline year and the current reporting year.

The same methodology has been maintained by the ESM in 2023 to calculate emissions from leased cars. The total CO_2e for the year was obtained by multiplying the mileage travelled by each car with the respective emission factor for its fuel type.

Figure 13

Evolution of ESM-leased vehicle-related emissions, 2018–2023

(gross/net tCO_2e)



Source: ESM

3.2.4. Rail travel

- ESM business travel by rail represented less than 1% of total ESM gross and net emissions and less than 1% of mobility-related emissions.
- Gross/net emissions generated by rail travel increased by 136% compared to 2022 due to a return to pre pandemic travel patterns.
- Gross/net emissions generated by rail travel decreased by 83.1% compared to the 2018 base year.

Figure 14

Evolution of rail travel-related emissions

	46,372 km Distance travelled	0.20 tCO_2e Gross/net emissions	0.90 $kgCO_2e$ Emissions per staff members
Vs. 2022	+136%	+136%	+131%
Vs. Baseline	-54.6%	-83.1%	-86.9%

Source: ESM

In 2023, emissions linked to business travel by rail increased by 136% to 0.207 tCO_2e compared to 2022 (2022: 0.088 tCO_2e). This rise is consistent with the increase in distance travelled, which shows an increase in international rail journeys from Luxembourg to other destinations in Europe.

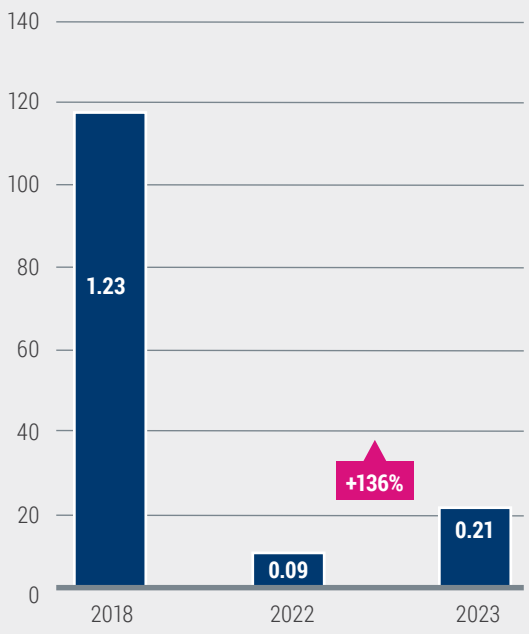
While an increase in rail travel can be noted over the past years, business travel by rail continues to represent a marginal share of staff mobility in 2023. This is mainly because the majority of ESM business travel cannot feasibly be completed by rail travel, either because of distances being too great to be time efficient, or a limitation of rail connections in Luxembourg.

The ESM used the same methodology to estimate emissions resulting from rail travel as that used for business travel by air or by ESM-leased vehicles: distance travelled was multiplied by the appropriate conversion factor to obtain total GHG emissions for the year.

Figure 15

Evolution of rail travel-related emissions, 2018–2023

(gross/net tCO_2e)



Source: ESM

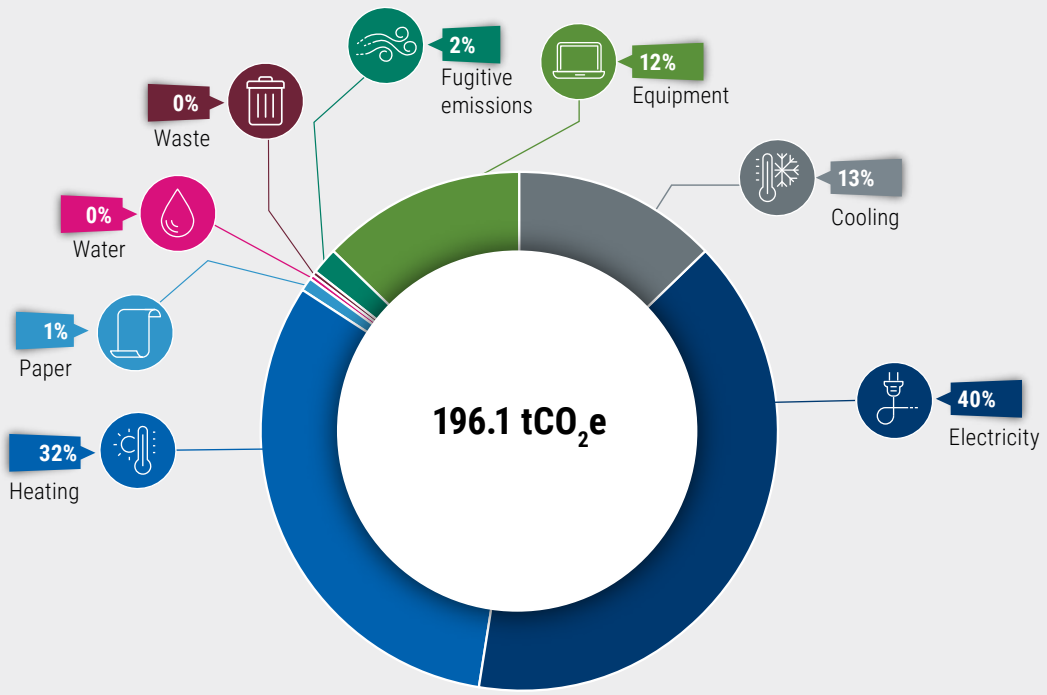
3.3. Building-related emissions

- Building-related emissions make up for 18.3% of total gross emissions (2022: 29.7%) and 9.6% (2022: 19.6%) of total net emissions.
- Building-related emissions increased by 15.1% on a gross basis but decreased by 5.5% on a net basis compared to 2022. Starting in 2023, cooling emissions were added as a new category to the reporting scope.
- Compared to the 2018 base year, building-related emissions have decreased by 20.9% on a gross basis, and by 40.3% on a net basis.

Figure 16

Breakdown of building-related gross emissions, 2023

(gross tCO_2e)

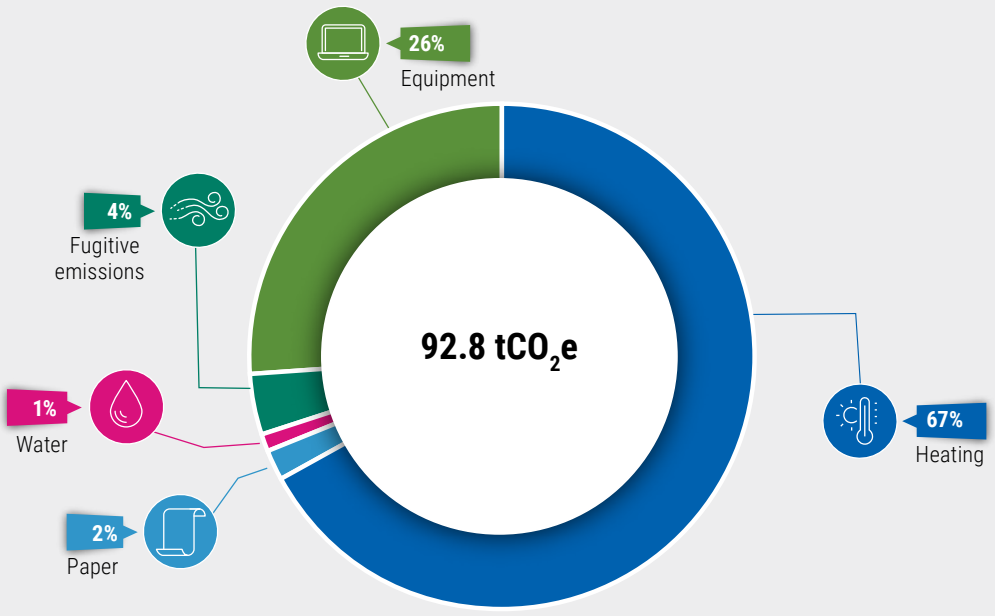


Source: ESM

Figure 17

Breakdown of building-related net emissions, 2023

(net tCO_2e)



Source: ESM

Figure 16 displays, in gross terms, the total emissions coming from ESM's building. Electricity makes up for the largest share of building-related emissions, followed by the emissions from heating.

Figure 17 displays the net emissions. In net terms, emissions resulting from heating account for most total building-related emissions. They are followed by electronic equipment, and fugitive emissions, paper and waste respectively. ESM is actively trying to minimise its net emissions from electricity and cooling, by purchasing all its electricity from renewable energy sources covered by Guarantees of Origin.

3.3.1. Electricity consumption

- **Electricity consumption emissions accounted for 7.3% (2022: 15%) of total ESM gross emissions and 0% (2022: 2.8%) of total net emissions.**
- **Electricity-related emissions account for 39.8% (2022: 50.6%) of total building-related gross emissions and 0% (2022: 14.2%) of total building-related net emissions.**
- **Electricity-related gross emissions had decreased by 9.4% compared to 2022, and 15.5% compared to the 2018 base year, meanwhile electricity-related net emissions decreased by 100% compared to 2022 and remained consistent with the baseline year.**

Figure 18

Evolution of electricity-related emissions

	876.3 MWh	78.1 tCO_2e	9 $kgCO_2e$
	Consumption	Gross emissions	Emissions per m^2
Vs. 2022	↑ +0.6%	↓ -9.4%	↓ -17.9%
Vs. Baseline	↑ +98.1%	↓ -15.5%	↓ -24.4%

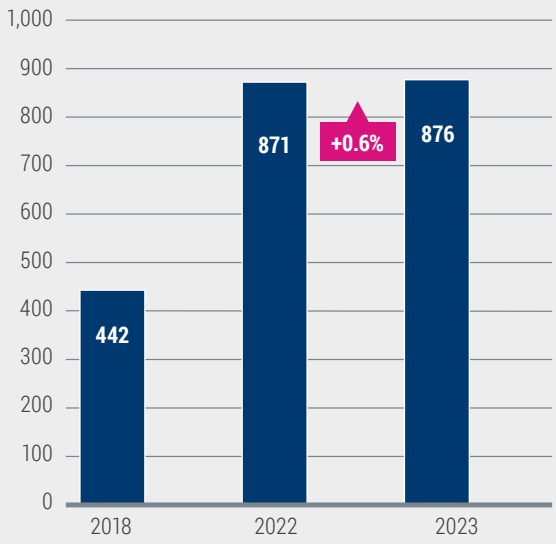
Source: ESM

Electricity emissions in gross terms have decreased 9.4% compared to 2022, and 15.5% compared to the baseline year. Given that almost all electricity was derived from renewables, evidenced through the purchase of Guarantees of Origin, net emissions amounted to 0 tCO_2e. Nevertheless, minor net emissions are possible in the event of unexpected power outages as the current building is backed by diesel-powered genset.

Figure 19

Evolution of electricity consumption, 2018–2023

(gross tCO_2e)

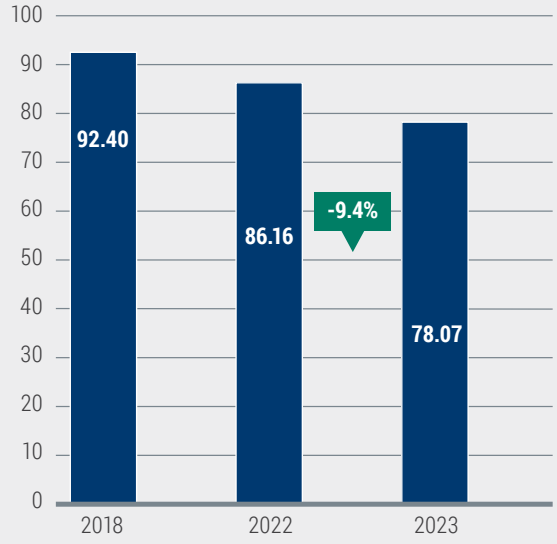


Source: ESM

Figure 20

Evolution of electricity consumption-related emissions, 2018–2023

(gross tCO_2e)



Source: ESM

In 2022, emissions resulting from electricity consumption for ventilation, shared building consumption, and fitness facilities were added to this reporting category.

Already starting in 2022, the following measures were implemented to reduce emissions from electricity: adjustment to the fresh-air-ratio from continuous air exchange, turning off of tower air purifiers in public spaces, switching off of non-essential devices (e.g. displays, ice-cube machines, etc.) and of the machines installed in the gym.

3.3.2. Heating

- The emissions generated by the heating category represented 5.8% (2022: 12.1%) of total ESM gross emissions and 6.4% (2022: 13.9%) of the ESM's total net emissions.
- Heating account for 31.6% (2022: 40.8%) of total gross building-related emissions and 66.8% (2022: 70.7%) of total net building-related emissions.
- Gross/net emissions associated with heating decreased by 10.8% compared to 2022 and decreased by 57.1% compared to the 2018 base year.

Figure 21

Evolution of heating-related emissions

	338.6 MWh	61.9 tCO_2e	6.61 $kgCO_2e$
	Consumption	Gross/net emissions	Emissions per m^2
Vs. 2022	↓ -11.0%	↓ -10.8%	↓ -19.2%
Vs. Baseline	↓ -56.9%	↓ -57.1%	↓ -61.7%

Source: ESM

In 2023, heating continued to represent the largest building-related emission source, with 31.6% of the ESM's building-related gross emissions and 66.8% of net emissions. The ESM premises were heated by natural gas. In 2023, consumption reached 338.6 MWh (2022: 380.6 MWh), resulting in an 11% reduction from 2022.

Compared to the base year, a decline in emissions of 56.9% can be noted, as illustrated in Figure 22.

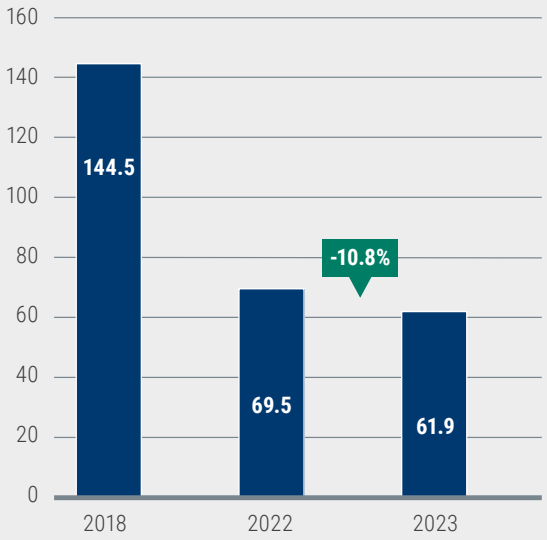
The reduction in emissions is primarily attributed to the implementation of various emissions-saving measures over the past years. For 2023, these include the reduction of office temperatures to 20°C (from 23°C) during winter.

In 2023, the ESM utilised the same methodology to calculate heating emissions as in previous years. This involved using invoices from the heating provider and applying the appropriate emission factors.

Figure 22

Evolution of heating emissions, 2018–2023

(gross/net tCO_2e)



Source: ESM

3.3.3. Cooling

- Cooling represents a new category added to this year's report. In 2023, it represented 2.4% of the ESM's total gross emissions and 0% of the ESM's total net emissions.
- Cooling accounts for 12.9% of total gross building-related emissions and 0% of total net building-related emissions.

Figure 23

Evolution of cooling-related emissons

283 MWh	25.2 tCO_2e	2.7 $kgCO_2e$
Consumption	Gross emissions	Emissions per m^2

Source: ESM

Cooling emissions are emissions generated by the air conditioning system within the ESM facilities. In the spirit of enhanced transparency and given the evolving nature of data availability, this category was added to this year's reporting scope given that reliable data became available.

Emissions in this category were calculated using the International GHG Protocol methodology. Specifically, the emissions were determined by quantifying the electricity consumed by cooling systems and multiplying this by the appropriate emission factors.

The cooling category is powered entirely by renewable energy sources, resulting in a net emission of zero, certified by the purchase of Guarantees of Origin. As this is a new category, comparisons with the previous reporting year and the baseline year are not possible.

3.3.4. Electronic equipment

- Electronic equipment accounted for 2.3% of total gross emissions and 2.5% of total net emissions.
- Electronic equipment accounts for 12.6% of total building-related gross emissions (compared to 4.7% in 2022) and 26.6% net emissions (compared to 8.7% in 2022).
- Electronic equipment increased by 203% compared to 2022 reflecting an expansion in scope.

Figure 24

Evolution of electronic equipment-related emissions

	414	24.6 tCO_2e	107 $kgCO_2e$
	Evolution of electronic equipment units	Gross/net emissions	Emissions per staff members
Vs. 2022	↑ +27%	↑ +203%	↑ +196%

Source: ESM

Emissions related to electronic equipment increased by 203% compared to the previous year. The substantial increase in net and gross emissions is due to an expansion in the number of electronic devices considered in the reporting scope, more specifically in relation to computers used at the ESM office and during periods of telework.

To ensure technology equipment is used to its full capacity, and to reduce consumption and waste, the staff-led ESM 'Making a Difference' Values Group held two staff charity auctions of decommissioned IT equipment during the last reporting year. Under the guidance of the values group, the proceeds from the 2022 auctions were donated to various charitable causes.

As this category was only calculated beginning with the 2022 report, a baseline comparison for 2018 is not possible.

As in the past year, electronic equipment emissions were calculated according to the International GHG Protocol methodology using the total weight of electronics acquired during the reporting year combined with an emission factor from Defra's 'material use' subsection. The methodology for calculating emissions in this category encompasses computers, electronic devices, and mobile phones. Emissions are determined based on the weight of each individual item.

3.3.5. Fugitive emissions

- **Fugitive emissions accounted for 0.3% of total gross emissions (2022: 0.6%) and 0.3% of total net emissions (2022: 0.7%)**
- **Fugitive emissions account for 1.7% of total building-related gross emissions (2022: 2.1%) and 3.5% net emissions (2022: 3.7%).**
- **The number of refrigerators in use remained consistent from 2022.**

Figure 25

Evolution of fugitive emissions

	24	3.28 tCO_2e	14.28 $kgCO_2e$
	Refrigerators number	Gross/net emissions	Emissions per staff members
Vs. 2022	0%	↓ -9%	↓ -11.1%

Source: ESM

The main contributor to total fugitive emissions is a cold room that is operated in the ESM facilities, contributing more than 99.0% of total gross and net fugitive emissions. Fugitive emissions decreased by 9% compared to the previous year.

Since this category was calculated starting from the 2022 report, a comparison against the 2018 baseline year is not possible.

As in the previous year, fugitive emissions were calculated according to the International GHG Protocol methodology using equations from the Intergovernmental Panel on Climate Change guidelines combined with emission factors of the commonly used refrigerant.

3.3.6. Paper consumption

- Paper consumption emissions amounted to 0.2% (2022: 0.3%) of total ESM gross emissions and 0.2% (2022: 0.4%) of total ESM net emissions.
- Paper consumption emissions account for 1% (2022: 1.1%) of total gross building-related emissions and 2.1% (2022: 1.9%) of total net building-related emissions.
- Gross/net emissions associated with paper consumption increased by 3.4% compared to 2022 and decreased by 61.6% compared to the 2018 base year.

Figure 26

Evolution of paper-related emissions

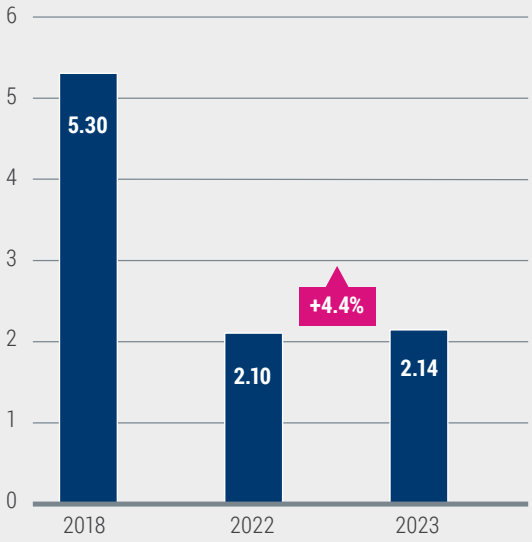
	2.14 t Consumption	1.95 tCO_2e Gross/net emissions	8.49 $kgCO_2e$ Emissions per staff members
Vs. 2022	+4.4%	+3.4%	+2.5%
Vs. Baseline	-59.7%	-61.6%	-70.1%

Source: ESM

Figure 27

Evolution of paper consumption, 2018–2023

(tonnes)

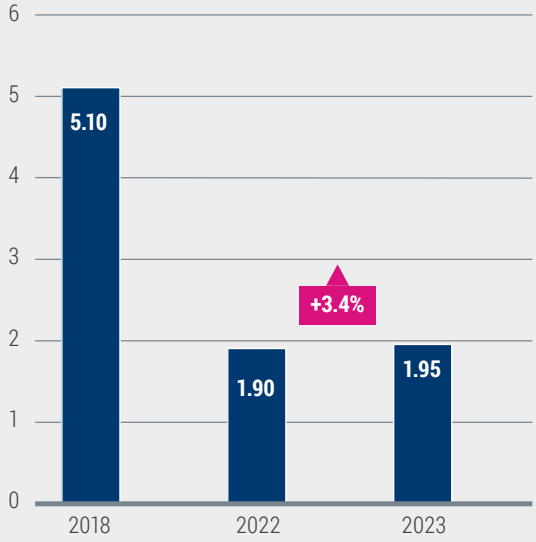


Source: ESM

Figure 28

Evolution of paper-related emissions, 2018–2023

(gross/net tCO_2e)



Source: ESM

As visible in Figures 26 and 27 despite the slight increase in paper consumption and related emissions in 2023, the digitalisation of communications as well as several awareness-raising campaigns contributed to decreasing the ESM paper consumption over the years.

The increase in paper consumption registered in 2023 is most likely a result of the increased number of ESM staff returning to the office.

Going forward, the ESM will continue to leverage sustainable sources in its paper consumption and has already obtained a provider for recycled materials. Since 2021, ESG considerations are being included in contracts with office supply providers, as reflected in the ESM procurement policy. In 2023, the methodology for calculating these emissions remained consistent with the previous year. This involved estimating the total weight of printed sheets of paper using data from ESM's office printers and multiplying it by the relevant emission factor.

3.3.7. Water consumption

- **Water consumption emissions for 2023 amounted to 0.05% (2022: 0.1%) of total ESM gross emissions and 0.06% (2022: 0.1%) of total ESM net emissions.**
- **Water consumption emissions account for 0.29% (2022: 0.4%) of total gross building-related emissions and 0.62% (2022: 0.7%) of total net building-related emissions.**
- **Gross/net emissions associated with water consumptions decreased by 14.8% compared to 2022 and decreased by 88.5% compared to the 2018 base year.**

Figure 29

Evolution of water-related emissions

	1,512 m^3	0.6 tCO_2e	3 $kgCO_2e$
	Consumption	Gross/net emissions	Emissions per staff members
Vs. 2022	⇓ -5.1%	⇓ -14.8%	⇓ -18.0%
Vs. Baseline	⇓ -68.25%	⇓ -88.5%	⇓ -91.1%

Source: ESM

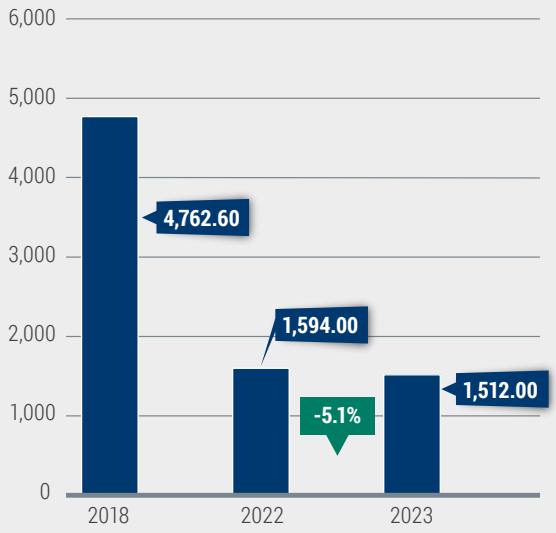
The significant reduction in water consumption and related emissions is mainly driven by the water-saving measures implemented by ESM, that contribute to more efficient water usage and an overall reduction in consumption and emissions for this category.

In 2023, the methodology for calculating this category remained consistent with the one used in previous years. Consumption was multiplied by the corresponding emission factors to calculate the final emissions.

Figure 30

Evolution of water consumption, 2018–2023

(m^3)

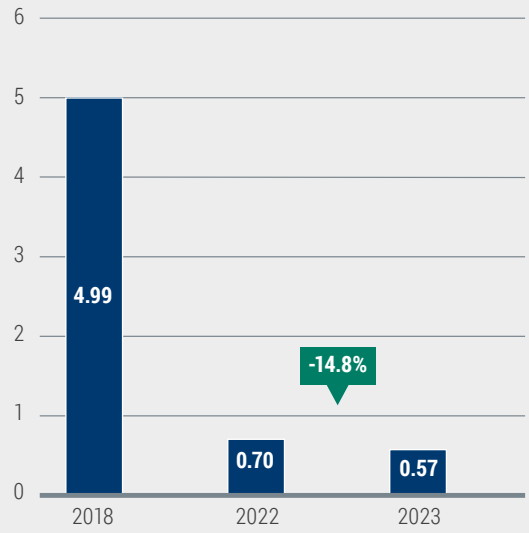


Source: ESM

Figure 31

Evolution of water-related emissions, 2018–2023

(gross/net tCO_2e)



Source: ESM

3.3.8. Waste generated

- Emissions generated by waste amounted to 0.04% in 2023 (2022: 0.08%) of total ESM gross emissions and 0.04% (2022: 0.09%) of total ESM net emissions.
- Waste generated emissions account for 0.20% (2022: 0.28%) of total gross building-related emissions and 0.41% (2022: 0.48%) of total net building-related emissions.
- Gross/net emissions associated with water consumptions decreased by 18.8% compared to 2022 and decreased by 48.7% compared to the 2018 base year.

Figure 32

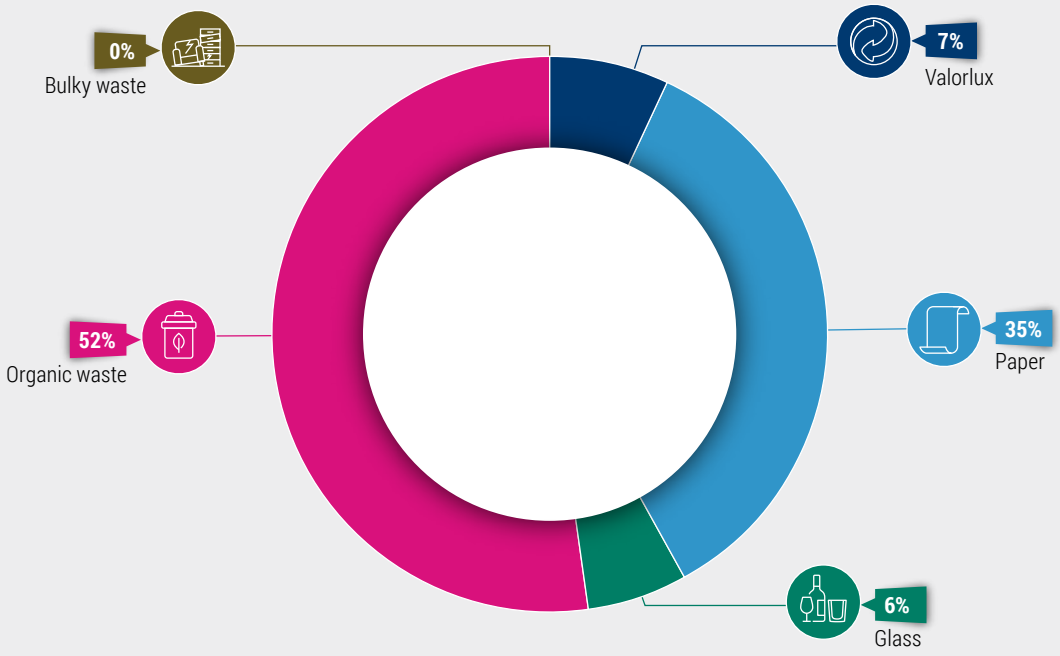
Evolution of waste-related emissions

	18.04 t	0.383 tCO_2e	1.67 $kgCO_2e$
	Consumption	Gross/net emissions	Emissions per staff members
Vs. 2022	+3.8%	-18.8%	+20.0%
Vs. Baseline	-48.5%	-48.7%	-60.1%

Source: ESM

Figure 33

Waste-related emissions by type of waste, 2023



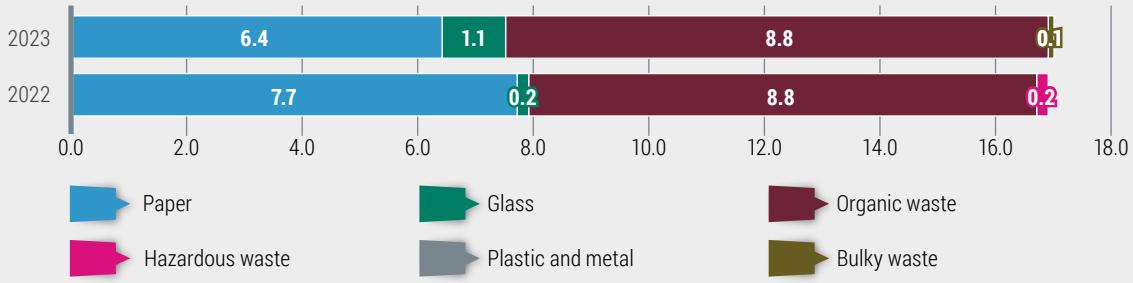
Source: ESM

Looking at the different types of waste, as shown in Figure 33, organic waste still holds the largest, accounting for 52% (2022:51%) of all waste, followed by paper, which accounts for 35% (2022: 45%) of all waste.[10]

Figure 34

Evolution of waste-generated breakdown, 2018–2023

(tonnes)



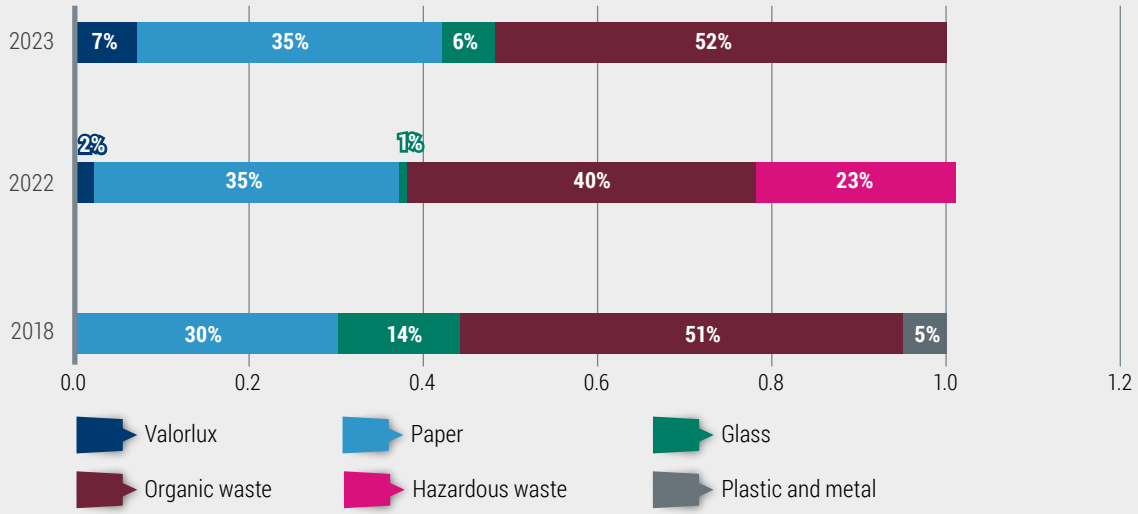
Source: ESM

[10] It should be noted that the paper-related waste figures appearing in this section are different from the paper consumption ones covered in Chapter 4.4. In this section, paper-related waste refers to the amount of waste generated by the ESM in 2022 that was classified as paper. In Chapter 4.4, paper consumption refers to the amount of paper printed by ESM printers during the reporting year.

Figure 35

Evolution of waste-generated emissions, 2018–2023

(gross/net tCo_2e)



Source: ESM

Figures 34 and 35 show the evolution of the breakdown of emissions and weight of waste generated by ESM activities between the 2018 base year and 2023, the current reporting year.

As in previous years, the ESM obtained the Luxembourg *SuperDrecksKëscht® fir Betrieber* green label for its internal waste recycling practices. Waste was separated in-house in line with these requirements.

The *SuperDrecksKëscht® fir Betriber* label was certified in accordance with the internationally accepted ISO 14024:2000 standard[11]. During annual reviews, the inspectors applied the same control procedures and requirements as the ISO standard. ESM waste management is therefore conducted in accordance with the of for ISO 1402.

In 2023, the methodology for calculating this category remained consistent with the one used in the previous year. Waste generation data was collected and multiplied by the corresponding emission factors to calculate the final emissions.

[11] The ISO 14024:2000 Standard sets forth principles, guidelines, and specifies general requirements that apply to all types of product-related environmental declarations and programs, aimed at developing and utilizing environmental labels.

3.4. Teleworking-related emissions

- **Teleworking-related emissions made up for around 1.1% (2022: 3.2%) of total ESM gross emissions and 1.2% (2021: 3.7%) of total ESM net emissions.**
- **Gross and net telework-related emissions decreased by 37.1% compared to 2022.**

As teleworking remained an option for all ESM employees for up to two days per week, the ESM continues to calculate and disclose emissions generated by ESM employees working from home to provide a more accurate estimate of the emissions related to its operations.

The main emissions drivers for the category are electricity and heating, while water and waste represented a smaller share in the total teleworking gross and net emissions. To calculate teleworking emissions, the EcoAct Whitepaper methodology was used. Publicly available statistics and assumptions were used to complement the Eco Act Whitepaper methodology. On this basis, all energy used from office equipment and home heating/cooling that would not have been required in a non-teleworking scenario was taken into consideration. These emissions are referred to as incremental emissions. Emissions associated with teleworking-related water and waste were calculated based on the average annual water consumption per person and the average hourly waste generation, according to the country of residence of the institution's employees. The publicly available statistics that were used stemmed from Ville de Luxembourg and the European Environment Agency.

In addition, the ESM relied on a daily average office occupancy rate based on the data collected through the ESM badging system, which was found to be the most accurate estimation methodology to substantiate these calculations. As a result of the complete release of Covid-19 restrictions, in 2023, the daily office occupancy rate rose to 64% (resulting in a teleworking rate of 36% in 2023), compared to 43.2% in 2022. This was further calibrated based on the following assumptions:

- An eight-hour working day.
- 243 working days during the calendar year.
- An average of 21% of hourly household water consumption is linked to teleworking[12].

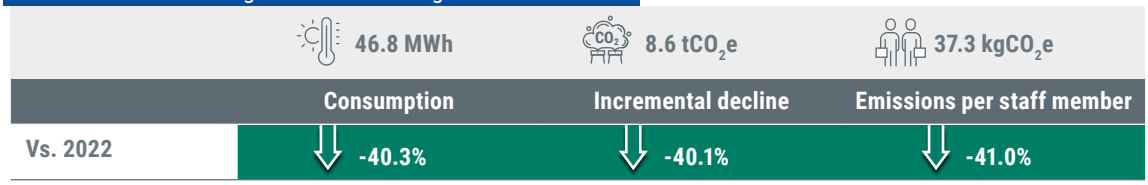
3.4.1. Teleworking-related heating emissions

- **Estimated emissions from telework-related heating accounted for 73.9% of all telework-related emissions (2022: 77.6%).**
- **Estimated telework-related heating consumption dropped by 40.1% compared to 2022.**
- **Estimated emissions from telework-related heating dropped by 26.8% compared to 2020, the first year in which the category has been reported.**

[12] The assumption on hourly household water consumption is based on a study conducted by Phyn, a leak detection, water-monitoring device company. The study covers daily water use in gallons for sink, toilet, shower and washing-machine. The same assumption was used by ESM to calculate teleworking-related water emissions in 2022.

Figure 36

Evolution of teleworking estimated heating-related emissions



Source: ESM

Compared to 2022, the category shows a decrease in consumption of heating and related emissions, due to an increased return to the office.

Following the EcoAct Whitepaper methodology, it is assumed that the heating season is from October to March of each year. In addition, the methodology assumes that heating cannot generally be restricted to a small working area, and thus that time spent at home during the heating season requires the whole heating system to be active. A typical/medium household therefore consumes an estimated 11,500kWh per year for domestic gas used for heating and is in use for an average of 10 hours per day. To account for domestic heating energy consumption, average national data of Luxembourg and its neighbouring countries was used, factoring in staff's residential postcodes to more accurately reflect the different domestic heating sources used.

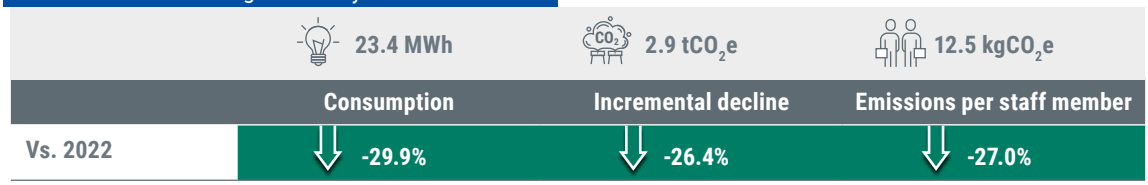
The estimates also considered the average house and room sizes of teleworkers in each country, and the proportion of homes that can regulate heating by room when working from home, as opposed to a whole house.

3.4.2. Teleworking-related electricity emissions

- **Electricity-related emissions accounted for 24.8% of total teleworking-related gross and net emissions (2022: 21.2%).**
- **Estimated teleworking-related electricity emissions dropped by 26.4% compared to 2022.**
- **Estimated emissions from telework-related heating dropped by 53.9% compared to 2020, the first year in which the category has been reported.**

Figure 37

Evolution of teleworking electricity-related emissions



Source: ESM

As shown in the table above, teleworking-related electricity emissions had a reduction between 2022 and 2023 driven by an increased return to the office.

In line with the EcoAct Whitepaper methodology, the additional daily electricity consumption resulting from an average teleworker was calculated based on an average in-use power load per desk. This includes the power consumed for laptops, secondary screens, printers, and lighting. To calculate the emissions resulting from electricity use due to teleworking, the International Energy Agency electricity emission factors for Luxembourg and surrounding areas were taken into account to allow for more accurate estimates. Additionally, the methodology estimates that an average working station consumes 140W for electricity and 10W for lighting during the eight hours of use per working day. With the additional daily energy consumption from home office equipment per teleworker derived, this figure was then multiplied by a country-specific electricity grid emission factor to calculate the average additional emissions per day per staff member when working from home. In addition, this was then multiplied by the number of days per year on average that staff worked from home.

3.4.3. Teleworking-related water emissions

- **Teleworking-related water emissions make up for 0.8% of total teleworking-related gross and net emissions (2022: 0.8%).**
- **Estimated teleworking-related water emissions reduced by 35.1% compared to 2022.**
- **Estimated emissions from telework-related water emissions dropped by 79.8% compared to 2020, the first year in which the category has been reported.**

Figure 38

Evolution of teleworking water-related emissions

	245.9 m^3	0.09 tCO_2e	0.4 $kgCO_2e$
	Consumption	Incremental decline	Emissions per staff member
Vs. 2022	⇓ -27.7%	⇓ -35.1%	⇓ -36.0%

Source: ESM

Between 2022 and 2023, gross/net water-related consumption decreased by 27.7% and overall emissions for the category decreased by 35.1% as a result of a lesser share of teleworking.

The water-related emissions from teleworking were estimated using a study by Phyn. These estimates were further refined using official statistics from the City of Luxembourg to ascertain the emissions resulting from water use during teleworking days.

3.4.4. Teleworking-related waste emissions

- Waste-related emissions accounted for 0.5% of total teleworking-related gross/net emissions (2022: 0.4%).
- Emissions from teleworking-related waste emissions decreased by 13.3% compared to 2022.
- Estimated emissions from telework-related waste emissions dropped by 25.3% compared to 2020, the first year in which the category has been reported.

Figure 39

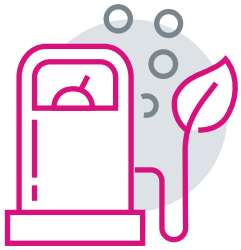
Evolution of teleworking waste-related emissions

	2.7 t	0.1 tCO_2e	0.25 $kgCO_2e$
	Consumption	Incremental decline	Emissions per staff member
Vs. 2022	-13.3%	-13.3%	-14.0%

Source: ESM

In line with the declining trend outlined for other teleworking emission categories, the resulting estimated emissions from teleworking waste also decreased by 13.3%.

The waste-related emissions coming from teleworking were estimated based on the publicly available official statistics on waste generation from the European Environment Agency. These were then combined with specific emission factors to estimate waste-related emissions.



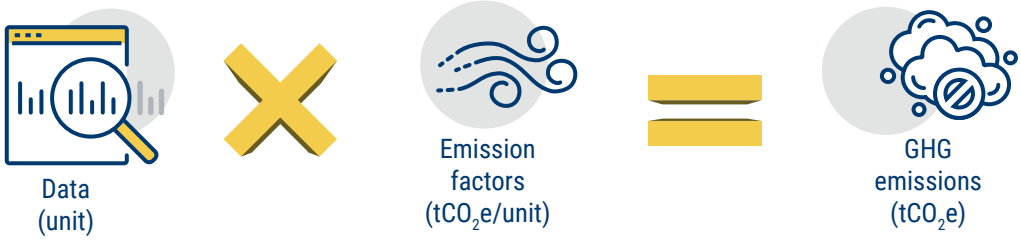
4. Annexes

Annex 1: Emission sources and activity data

	Scope	Source of GHG emissions	Units	Measurement
Mobility-related emissions sources	Scope 1	ESM-leased vehicles	km	Annual by vehicle
	Scope 3	Business travel – Air	km	By flight leg including class and distance
		Business travel – Rail	km	By journey
		Staff commuting	km	By share of cars per fuel type in use in Luxembourg Through parking badging information By average daily distance travelled by ESM staff to home address By number of business days
Building-related emissions sources	Scope 1	Fugitive emissions	No. of items	Annual
	Scope 2	Purchased electricity	kWh	Monthly
		Purchased heating Purchased cooling	kWh kWh	Annual/monthly Monthly
	Scope 3	Building – Paper	sheets of paper	Annual, by paper size and weight
		Building – Water	m^3	Annual
		Building – Waste	tons	Annual, by waste type and volume
		Electronic equipment	weight of items	Annual
Estimated teleworking-related emissions sources	Scope 3	Teleworking – Electricity	kWh	Annual, by estimates on EcoAct Whitepaper methodology and ESM badging system
		Teleworking – Heating	kWh	Annual, by estimates on EcoAct Whitepaper methodology and ESM badging system
		Teleworking – Water	m^3	Annual, by estimates on Luxembourg national statistics and ESM badging system
		Teleworking – Waste	tons	Annual, by estimates by the European Environment Agency and ESM badging system

Annex 2: Calculation methodology

The absolute GHG emissions from ESM internal operations were calculated by applying the emission factors to the respective activity data, and subsequently aggregating the GHG emissions from various sources.



Annex 3: Emission factors

The emission factors are representative values expressing the GHG emission intensity of an activity. They enable the estimation of emissions from various sources.

Scope	Source of GHG emissions	Emission factors	Unit	Source of emission factors	Evolution since 2022[13]
Scope 1	ESM-leased cars	0.20195	kg CO_2e per km per type of car	Defra 2023 – Passengers vehicles – Cars (by market segment) – Dual purpose 4*4 – Diesel	-0.5%
		0.21120	kg CO_2e per km per type of car	Defra 2023 – Passenger vehicles – Cars (by market segment) – Luxury – Diesel	-0.6%
		0.17660	kg CO_2e per km per type of car	Defra 2023 – Passenger vehicles – Cars (by market segment) – MPV -Diesel	-0.7%
		0.07096	kg CO_2e per km per type of car	Defra 2023 – Passenger vehicles – Cars (by market segment) – Dual purpose 4*4 – Plug-in Hybrid	-5.0%
Scope 2	HFC-134a refrigerant emission factor	1,300.00	kgCO_2e per unit	US EPA 2024	-9.1%
	Cooling	0.0891	kg CO_2e/kWh	International Energy Agency 2022 – Luxembourg	N/A
	Electricity	0.0891	kg CO_2e/kWh	International Energy Agency 2022 – Luxembourg	-9.9%
Scope 3	Heating - gas	0.18293	kg CO_2e/kWh	Defra 2023 – Fuels – Gaseous fuels – Natural gas	0.2%
	Business travel – air	0.18287	kg CO_2e per km per passenger	Defra 2023 – Business travel – Air – Economy Short Haul	21.1%
		0.20011	kg CO_2e per km per passenger	Defra 2023 – Business travel – Air – Economy Long Haul	35.3%
		0.27430	kg CO_2e per km per passenger	Defra 2023 – Business travel – Air – Business Short Haul	21.1%
		0.58029	kg CO_2e per km per passenger	Defra 2023 – Business travel – Air – Business Long Haul	35.3%
		0.2154	kg CO_2e per km per passenger	Defra 2023 – Business travel – Air – Premium Class – International Haul	N/A
		0.5385424	kg CO_2e per km per passenger	Defra 2023 – Business travel – Air – First Class – International Haul	N/A
	Business travel – rail	0.00446	kgCO_2e per km per passenger	Defra 2023 – Business travel – Rail – International rail	0.0%

[13] Please note, N/A refers to instances where a different emission category was used last year or a new category was added to the report.

Scope	Source of GHG emissions	Emission factors	Unit	Source of emission factors	Evolution since 2022[13]
	Electronic equipment Staff commute	24,865.48	kgCO_2e per t of electrical item	Defra 2023 – Material use – Electrical items – IT	N/A
		0.16391	kg CO_2e per km per type of car	Defra 2023 – Passenger vehicles – Cars (by size) – Average car – Petrol	N/A
	Electronic equipment	0.16815	kg CO_2e per km per type of car	Defra 2023 – Passenger vehicles – Cars (by market segment) – Average car – Diesel	0.0%
	Staff commute Water consumption Waste produced	0.11898	kg CO_2e per km per type of car	Defra 2023 – Passenger vehicles – Cars (by size) – average car – Hybrid	-3.9%
		0.06588	kg CO_2e per km per type of car	Defra 2023 – Passenger vehicles – Cars (by size) – average car- Plug-in Hybrid Electric Vehicle	-1.6%
		0.081158416	kg CO_2e per km per type of car	Defra 2023 – Passenger vehicles – Cars (by size) – average car- Battery Electric Vehicle	-0.9%
		0.16664	kg CO_2e per km per type of car	Defra 2023 – Passenger vehicles – Cars (by size) – average car- Unknown	-3.7%
		0.37800	kgCO_2e per m3	Defra 2023 – Water supply – kg CO_2e per cubic meter + Defra 2023 - Water treatment - kg CO_2e per cubic meter	N/A
		2,967.00	kgCO_2e per tonnes	Bilan GES – Dechets Plastique PS	-2.8%
	Water consumption	880.00	kgCO_2e per tonnes	Bian GES – Dechets Plastique Moyen	-10.2%
	Waste produced Paper consumption	21.28	kgCO_2e per tonnes	Defra 2023 – Waste disposal – Bulky Waste	N/A
		21.28	kgCO_2e per tonnes	Defra 2023 – Waste disposal – Plastic:average plastics	0.0%
		21.28	kgCO_2e per tonnes	Defra 2023 – Waste disposal – Paper and board:mixed	0.0%
		21.28	kgCO_2e per tonnes	Defra 2023 – Waste disposal – Waste disposal – Glass	0.0%
		21.28	kgCO_2e per tonnes	Defra 2021 – Waste disposal – Municipal waste	N/A
		910.48	kgCO_2e per tonnes	Defra 2023 – Material used – Paper- Paper and board: paper	N/A

Annex 4: Data quality and completeness

★ No change required ● Could be improved ■ Priority for improvement

	Scope	Source of GHG emissions	Activity	Data quality	Underlying assumptions
Mobility-related data quality	Scope 1	ESM-leased vehicles	Inferred from km per vehicles	★	
	Scope 3	Business travel – air	Primary data	★	
		Business travel – rail	Primary data	★	
		Staff commuting	Inferred from number of business days and parking and desk reservation occupational rate, average distance travelled, and staff residential address	●	Share of cars per fuel type in use in Luxembourg in the given year, based on Chamber of Commerce Luxembourg information. Parking occupancy rate registered by the ESM Employee Badge System (parking)
Building-related data quality	Scope 1	Fugitive emissions	Primary data	★	No new refrigeration equipment was installed nor disposed of in 2022
	Scope 2	Purchased electricity	Primary data	★	MWh of electricity consumed
		Purchased heating	Primary data	★	MWh of heating consumed
		Purchased cooling	Primary data	★	MWh of heating consumed
	Scope 3	Paper	Primary data	★	No. of sheets printed
		Water	Primary data	★	m^3 of water consumed
		Waste	Primary data	★	t of waste generated
		Electronic equipment	Primary data	★	No. of items used
Estimated Teleworking-related data quality		Teleworking - heating	Average heating and estimated hours spent teleworking office	●	Estimates based on EcoAct Whitepaper methodology and ESM badging system
		Teleworking - electricity	Average “in use” power load per desk and estimated hours spent teleworking	●	Estimates based on EcoAct Whitepaper methodology and ESM badging system
		Teleworking - water	National statistics (Ville de Luxembourg) and estimated hours spent teleworking	●	Estimates based on national statistics on daily consumption and ESM badging system
		Teleworking - waste	National statistics (European Environment Agency) and estimated hours spent teleworking	●	Estimates based on national statistics on daily consumption and ESM badging system

Annex 5: Exclusions

The ESM's carbon footprint covers the institution's operations within the building, mobility, and telework, but excludes the impact on its funding, investment portfolios, and lending activities.

Furthermore, due to limited data availability or use, this report does not include emissions resulting from data centres, online meetings, the ESM office located in Brussels, or the disaster recovery site. The impact of these elements is expected to be non-material. Nevertheless, additional efforts will be made in subsequent reporting years to better understand their respective emissions contribution.

The ESM used the number of permanent staff members to calculate certain ratios. In some instances, adding the trainees, consultants, and contractors could have resulted in lower ratios (e.g. for paper and water consumption and waste disposal). It was, however, decided to follow a more conservative approach and only use the number of ESM permanent staff members to ensure consistency.

Paper consumption for teleworking was not covered in the emissions calculations, considering that the increase of paper consumption due to teleworking was estimated as non-material. The report also does not take account of those teleworking emissions related to electricity covering potential additional electricity consumption from small home appliances as these were deemed non- material.

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EUROPEAN STABILITY MECHANISM
6a Circuit de la Foire Internationale
L-1347 LUXEMBOURG
Tel: (+352) 260 962 0

investor.relations@esm.europa.eu
www.esm.europa.eu

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