# Carbon footprint report 2024


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European Stability Mechanism

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# 1. Foreword

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

This 2024 edition marks the ESM's seventh annual carbon footprint report, reaffirming its ongoing commitment to transparency in ESG reporting. The report offers a detailed overview of the organisation's operational carbon emissions for the year 2024, comparing results with those of previous years and referencing 2018 as the baseline.

Deloitte Luxembourg (*Société à Responsabilité Limitée*) supported the preparation of this report by performing independent reviews of the calculations and underlying assumptions, in line with the four-eyes principle.

As in prior years, the carbon footprint estimations are based on a thorough analysis of both internal and external documentation, activity data, and exchanges with external data providers. The report follows the World Resources Institute International Greenhouse Gas Protocol – a Corporate Accounting and Reporting Standard. In addition, the methodology developed in the EcoAct 2020 Homeworking Emissions Whitepaper was applied again this year to provide a dedicated section on emissions related to teleworking.

It is worth noting that during the Covid-19 pandemic, various national and ESM-specific measures were introduced to limit the spread of the virus and safeguard staff health. These changes had a substantial impact on business operations, resulting in a sharp reduction in greenhouse gas emissions in 2020, followed by a slight decline in 2021. As restrictions were lifted and traditional work patterns resumed, emissions related to ESM activities rose sharply in the following years 2024 marks the first year breaking with this trend.

To enhance transparency and accuracy, the ESM has refined several aspects of its carbon footprint methodology in this year's report and introduced a new emissions category, as detailed in Chapter 2.4. Updates to reporting scope and methodology.

The ESM remains committed to publishing an annual carbon footprint report as a means of tracking progress in reducing emissions. In the interest of full transparency, the report is made publicly available.

# 1.1. Overview of environmental practices and commitments

## Staff mobility

- Participation in the European Commission-led sustainable transport initiative "European Mobility Week" organising a Car-Free Day for ESM staff to encourage exploration and consideration of carbon neutral modes of transport for their commutes.
- Installation of four additional new electric car charging stations in 2024, bringing he total to eight charging stations, complemented by two wall mounted electric sockets for electric bikes.

## Building-related energy consumption and technology

- In 2024, ESM obtained the Building Research Establishment Environmental Assessment Methodology (BREEAM) sustainable building certification for the first time. BREEAM is a globally accepted method for assessing, rating, and certifying a building's environmental sustainability.
- 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]
- *SuperDrecksKëscht® fir Betriber*[2] label obtained for the 11th consecutive year for internal waste recycling practices.

## Relationships with providers

- Consideration of ESG criteria within 36% of all tender processes in 2024.
- Printing paper provider is certified with European Union (EU) Ecolabel[3] and Forest Stewardship Council (FSC) label.[4]

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

With an aim to encourage staff to opt for environmentally friendly commute methods and to reduce greenhouse gas emissions, in 2024 the ESM expanded its existing electric car charging stations and electric bike facilities, which include bike charging stations, lockers, and repair units, by installing four additional car charging stations. The ESM also introduced various building efficiency and waste management measures to further reduce its building-related emissions. Since 2019, in line with

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.

3 The EU Ecolabel is a voluntary ecolabel scheme established in 1992 by the European Commission. It is based on a systemic approach that includes a life cycle analysis of the product from its manufacture (including the choice of raw materials) to its disposal or recycling, including its distribution, consumption, and use.

4 The FSC is an environmental label whose purpose is to ensure that the production of wood-based products (mostly paper) comply with procedures that ensure sustainable forest management.

its commitment to the Zero Single-Use Plastics Manifesto by Inspiring More Sustainability, the ESM has progressively replaced single-use materials with reusable or recyclable alternatives.

To cut down on waste, the ESM has reduced its use of plastic food containers. It has also increased the use of cleaning products certified with the EU Ecolabel and Luxembourg's Ministry of Health label. Recognising its strong waste recycling efforts, the ESM has earned the SuperDrecksKëscht® fir Betriber label for the 11th consecutive year in 2024.

Furthermore, the ESM considers environmental criteria in contracts with office suppliers and incorporates sustainability into its procurement activities. As such, the ESM included ESG criteria in 36 % of its public tenders, including for services and products linked to catering, cleaning, security, technical maintenance or staff trainings.

To reduce the environmental footprint of its digital operations, the ESM plans to move from in-house data systems to cloud services that consume less energy by 2025. Cloud computing allows multiple organisations to share infrastructure, making it more efficient and less polluting.

In 2024, the ESM's staff led 'Making a Difference' values group organised two charity auctions of decommissioned IT equipment, encouraging reuse and reducing waste. The proceeds were donated to several charitable causes.

The ESM is also working with the Luxembourg government on the construction of a new shared headquarters, set to be completed by 2029, in a manner that enables climate neutrality of construction and operation. The approach targets high sustainability standards, guided by frameworks such as the German Sustainable Building Council (DGNB),[5] Eco-Management and Audit Scheme (EMAS),[6] the WELL Building Standard Certification[7] as well as EU Taxonomy criteria.

The ESM regularly engages with other EU institutions and agencies in Luxembourg through EcoNet,[8] a platform for sharing ideas and best practices on sustainability. Furthermore, 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 as well as the European Commission's Platform on Sustainable Finance through its observer status. Additionally, it is also involved in the Social Bonds Working Group of the International Capital Market Association.

The ESM also publishes an annual ESG summary report detailing its performance on ESG matters. This report outlines the ESM's internal environmental efforts and its ESG efforts in relation to its investment and funding activities, along with its climate risk management work. The ESM also publicly shares its disclosures under the United Nations-backed Principles for Responsible Investment[9] on an annual basis. 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 activities.

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5 The DGNB is an independent not for -profit association that was founded in 2007 and has developed into Europe's largest network for sustainable buildings.

6 EMAS is a voluntary environmental management tool developed by the European Union which enables organizations to evaluate, report, and improve their environmental performance. Its goal is to drive organisations towards circularity and reduce their impact on the environment.

7 WELL is a performance-based system for measuring, certifying, and monitoring features of the built environment that impact human health and well-being. The certification is administered by the International WELL Building Institute (IWBI).

8 EcoNet is an interinstitutional environmental network made up of eco-management and audit scheme coordinators from various union institutions in Luxembourg.

9 United Nations-backed Principles for Responsible Investment is the world's leading proponent of responsible investment encouraging investors to use responsible investment to enhance returns and better manage risks.

## 1.2. Summary: 2024 carbon footprint performance

The ESM's total greenhouse gas (GHG) emissions for 2024 amounted to 994.8 metric tonnes (t) of carbon dioxide equivalents ($tCO_2e$)[10] on a gross basis, and to 911.5 $tCO_2e$ on a net basis. Compared to 2023, both net and gross emissions have slightly decreased by 6.5% in net terms and 7.7% in gross terms. Compared to the 2018 baseline year, total emissions have declined by 15.9% in net terms and 15.4% in gross terms despite a marked increase in the number of staff over the same period. The decrease in GHG emissions in 2024 compared to 2023 is driven by an overall decrease of emissions across all the three key reporting categories (i.e. mobility, building and teleworking). This overall reduction reflects the effectiveness of various initiatives and strategies aimed at reducing the carbon footprint associated with these areas.

Table 1

Carbon footprint evolution 2018–2024

| | 2018 (baseline) | 2022 | 2023 | 2024 | Variation vs. 2023 | Variation vs. baseline |
|---|---|---|---|---|---|---|
| **Total gross emissions** ($tCO_2e$) | 1,176.6 | 573.5 | 1077.9 | 994.8 | ↓ -7.7% | ↓ -15.4% |
| **Total net emissions** ($tCO_2e$) | 1,084.1 | 501.3 | 974.7 | 911.5 | ↓ -6.5% | ↓ -15.9% |
| **Staff** | 179 | 225 | 230 | 230 | 0% | ↑ +28.5% |
| **Carbon intensity** (net $tCO_2e$/staff member) | 6.1 | 2.2 | 4.2 | 4 | ↓ -6.5 | ↓ -34.6% |

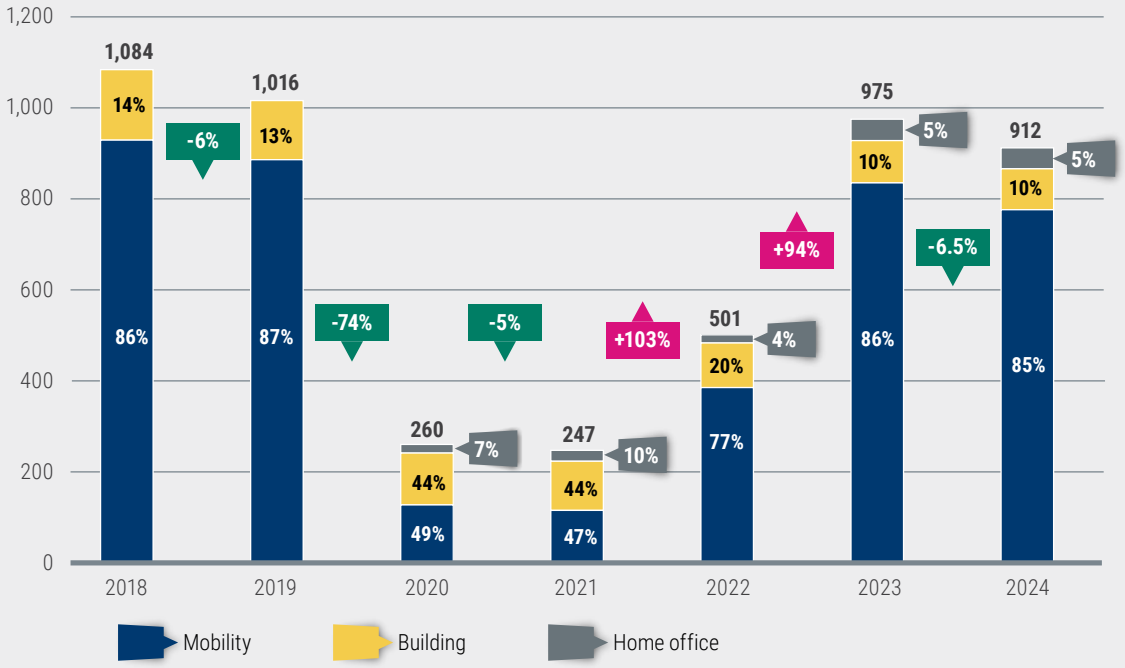
Source: ESM

[10] Carbon dioxide equivalent ($CO_2e$) is the standard unit in carbon accounting to express the impact of different greenhouse gases. Since various gases like methane, nitrous oxide, and fluorinated gases trap heat in the atmosphere at different efficiencies and for different durations, $CO_2e$ converts their effects into an equivalent amount of Carbon Dioxide to provide a common scale for comparison. The Intergovernmental Panel on Climate Change (IPPC) maintains global warming potentials for known GHGs and converts the gases in terms of $CO_2e$.

Figure 1*

Emissions evolution, 2018–2024

(net $tCO_2e$)




Source: ESM

* Throughout this document there may be instances where sums of some figures and graphs may exceed 100% due to the rounding up of numbers.

# 2. Methodology and Scope

## 2.1. Calculation methodology

The ESM reports its GHG emissions in accordance with the International GHG Protocol. The International GHG Protocol, has been 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: Emission factors.

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, and the calculation of each category outlined in the report. The second conducted a thorough autonomous review of the calculations and 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. In general, emissions are quantified in tonnes of $CO_2e$ throughout the report. However, to allow for better readability, kilograms of $CO_2e$ were used for smaller quantities. As per reporting best practice, two categories of emissions are disclosed, gross emissions and net emissions:

- **Gross emissions** include the total GHG emitted from the identified sources without any adjustments for offsets or credits, providing an absolute measure regardless of potential reductions from renewable energy consumption.
- **Net emissions** include emissions from these sources but classify consumption of renewable energy as carbon-neutral, i.e. resulting in zero emissions.

### 2.1.1. Teleworking

Teleworking-related emissions were not based on activity data: the main methodology adopted to estimate these emissions was based on EcoAct Whitepaper methodology. Publicly available statistics and specific assumptions were used to complement the EcoAct Whitepaper methodology and to estimate teleworking-related water and waste emissions. Further information concerning this category has been provided for 2024 calculations. Nonetheless, the overall methodology applied remains consistent with the one used in the ESM's 2023 carbon footprint report.

## 2.2. Reporting period

The reporting period covers 1 January 2024 to 31 December 2024. 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 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.

The ESM uses the operational control approach for its carbon footprint report. 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.[11] For further details on the report's exclusions, see Annex 5: Exclusions.

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 result from an organisation's activities but are released from sources not owned or controlled by that organisation.

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 organisation.
- **Scope 3:** All other indirect emissions that are a consequence of the organisation's activities but occur from sources not owned or controlled by the organisation.

[11] More information can be found in 5. Teleworking-related emissions – Identifying Scope 3 Emission of Corporate Value Chain (Scope 3) Accounting and Reporting Standard by the GHG 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.

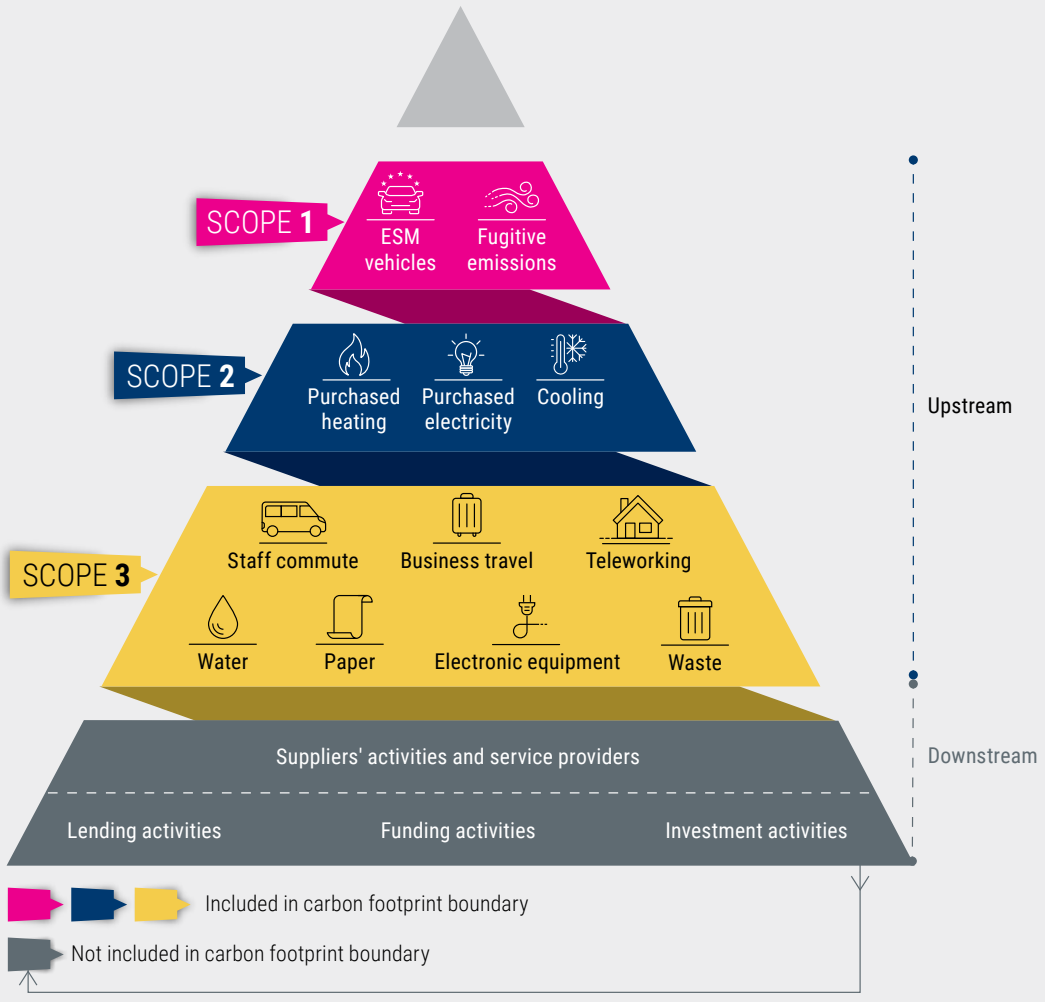
After a mapping exercise, the ESM decided to include the following activities under the ESM carbon footprint:

- **Scope 1:** ESM-leased vehicles and fugitive emissions.
- **Scope 2:** Purchased electricity, heating, and cooling for the ESM premises.
- **Scope 3:** Business travel of ESM staff (via air, rail, and car), commute 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 creation 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 2

**Breakdown of sources of emissions by scope**




Source: ESM

## 2.4. Updates to reporting scope and methodology

To continually improve its carbon footprint reporting efforts, the ESM added business travel by car as a new category to the 2024 scope. This category covers emissions from vehicles rented for business trips as well as personal cars used for work-related travel. To accurately calculate the emissions from business travel by car, data was collected on the kilometres (km) travelled for such purposes in 2024. This information was then combined with specific emission factors provided by DEFRA tailored to the type of fuel and size of the car.

In the pursuit of ongoing enhancement of the reporting methodology, the thresholds for the classification of short and long-haul air travel were changed and aligned with DEFRA's "2024 Government Gas Conversion Factors for Company Reporting - Methodology Paper for Conversion Factors Final Report".[12] Instead of using a numerical threshold as was previously done, the classification now relies on geographic delineations in line with current best practices.

In 2024, another methodology improvement was implemented in the staff commute category. This year, the calculation method for this category was refined by incorporating data on the number of employees registered to use on-site electric or plug-in hybrid vehicle chargers. This enhancement enabled a more accurate determination of the vehicle mix, which was previously based on external statistics for Luxembourg.[13] As a result, there is now a higher proportion of electric and plug-in hybrid vehicles compared to earlier estimates that were based on national averages.

## 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 (kWh) or megawatt-hours (MWh) of electricity consumed, or km travelled by staff.

In general, results included in this report are obtained using primary activity data, interpreted from documented evidence derived, for example, from energy and heating invoices. Some results, however, are estimates based on established methodologies and several underlying assumptions (an overview of data quality and completeness is presented in Annex 4: Data quality and completeness). By default, the ESM sought to use a conservative approach for such assumptions.

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 (IEA) and the United Kingdom government's Department for Environment, Food & Rural Affairs (DEFRA). Annex 3: Emission factors contains further 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 2024 – an average of 230 people.[14] In 2024, the office space rented by the ESM corresponded to 9369.40 m².

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12 Source 2024 Government greenhouse gas conversion factors for company reporting: Methodology paper

13 The source used for the national statistics on vehicles registered in Luxembourg city to reflect the likely vehicle mix was changed to a more updated source for 2024. The source comes from the Automobile Club of Luxembourg.

14 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 results

## 3.1. Total GHG emissions

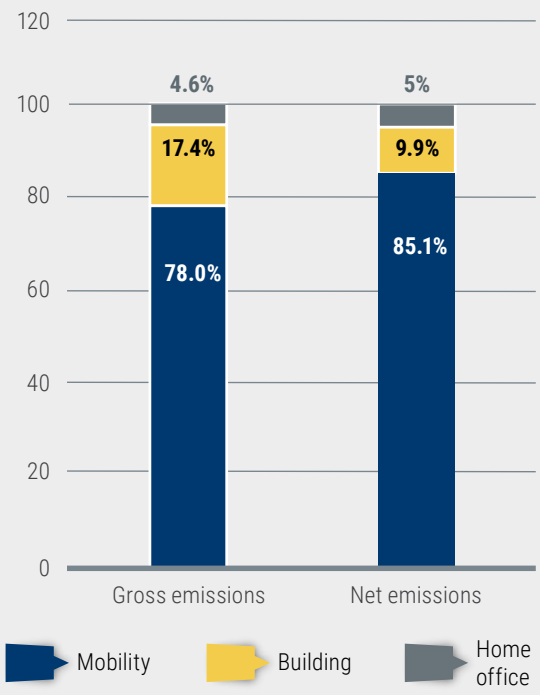
**Total GHG emissions generated by the ESM in 2024 amounted to 994.8 $tCO_2e$ on a gross basis (2023: 1,077.95 $tCO_2e$) and 911.5 $tCO_2e$ on a net basis (2023: 974,66 $tCO_2e$).**

- **Gross emissions decreased by 7.7% and net emissions decreased by 6.5% compared to 2023.**
- **Compared to the 2018 base year, this represents a 15.4% decrease on a gross basis and a 15.9% decrease on a net basis.**

Figure 3

**Composition gross vs net emissions, 2024**

(gross/net $tCO_2e$)



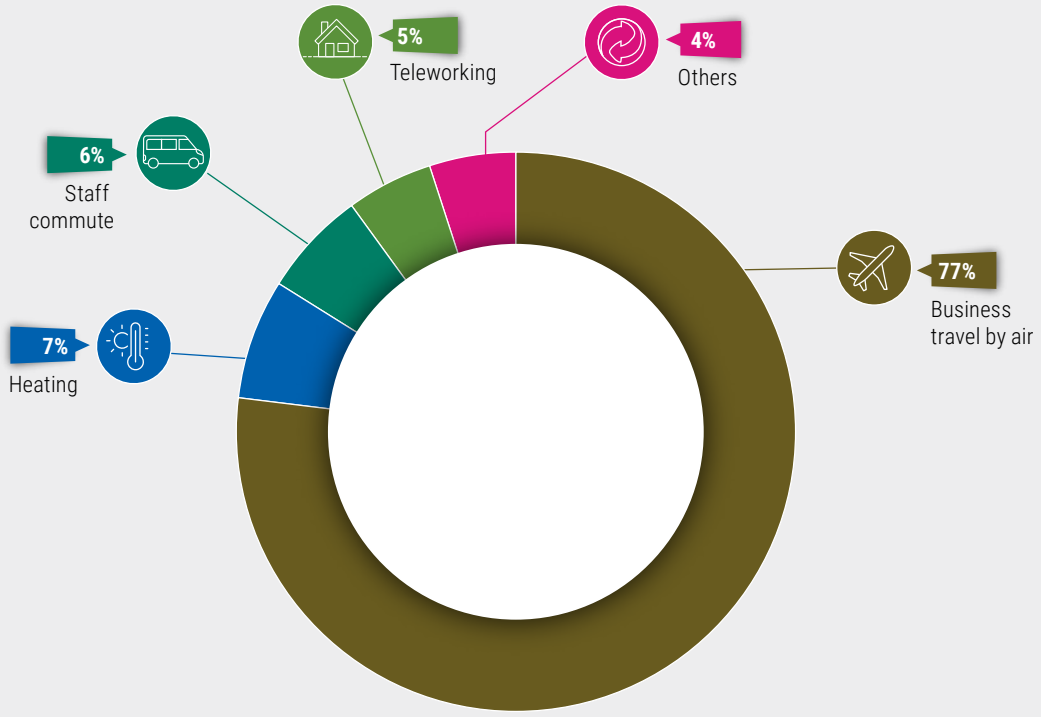

Source: ESM

The breakdown of emissions followed a similar trend as in the previous year. Mobility-related emissions contributed 78% (2023: 77.4%) to total gross emissions and 85.1% (2023: 85.6%) to total net emissions. This was followed by building-related emissions, which accounted for 17.4% (2023: 18.2%) of total gross emissions and 9.9% on a net basis (2023: 9.5%). Lastly, teleworking-related emissions made up 4.6% (2023: 4.4%) of total gross emissions and 5% (2023: 4.9%) of total net emissions.

Figure 4

**Percentage breakdown of net emissions by source, 2024**

(net $tCO_2e$)




Note: 'Others' category includes ESM-leased vehicles (2.24%), electronic-equipment (1.95%), other (0.77%), business travel by car (0.039%), business travel by rail (0.02%), and cooling and electricity (0%).

Source: ESM

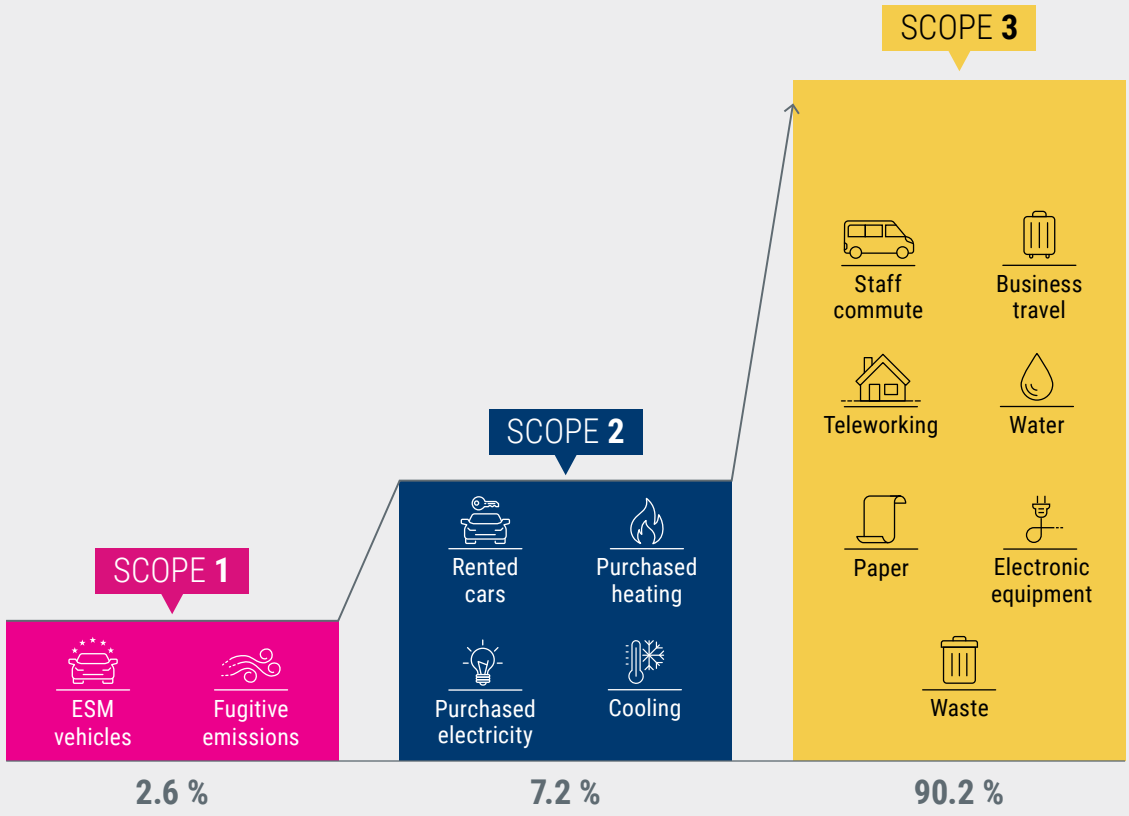
Similarly to previous years, the largest emitting sources in 2024 were:

- Business travel by air: 701.9 $tCO_2e$ (77% of total net emissions; 2023: 749.1 $tCO_2e$).
- Heating: 65.3 $tCO_2e$ (7% of total net emissions; 2023: 61.9 $tCO_2e$).
- Staff commute 50.1 $tCO_2e$ (6% of total net emissions; 2023: 57.6 $tCO_2e$).

Figure 5

**Breakdown of emissions per scope**

(net $tCO_2e$)




Source: ESM

With view to the breakdown of emissions according to the International GHG Protocol it is notable that similarly to previous years:

- Scope 1 emissions accounted for a total of 23.8 $tCO_2e$ on a gross basis (2023: 30.8 $tCO_2e$) and to 23.8 $tCO_2e$ on a net basis (2023: 30.8 $tCO_2e$).
- Scope 2 emissions accounted for a total of 148.5 $tCO_2e$ on a gross basis (2023: 165.2 $tCO_2e$) and to 65.3 $tCO_2e$ on a net basis (2023: 61.9 $tCO_2e$).
- Scope 3 emissions accounted for a total of 822.5. $tCO_2e$ on a gross basis (2023: 881.9 $tCO_2e$) and to 822.5 $tCO_2e$ on a net basis (2023: 881.9 $tCO_2e$).

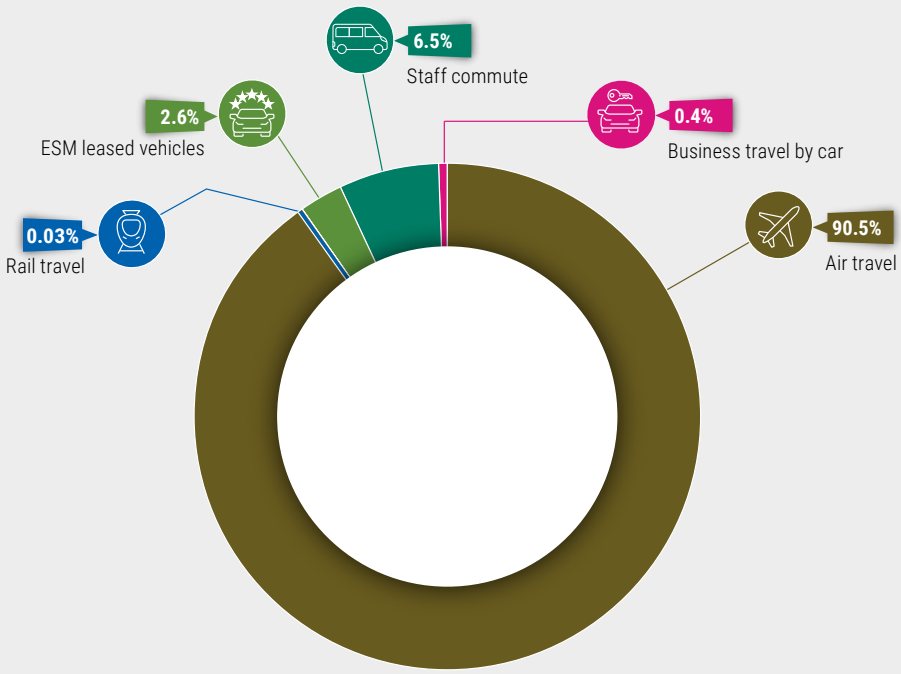
# 3.2. Mobility-related emissions

**Mobility-related emissions represented the largest share of the ESM carbon footprint on both gross/net basis.**

- **They accounted for 78% of total gross emissions (2023: 77.4%) and 85.1% of total net emissions (2023: 85.6%).**
- **Gross/net emissions decreased by 7% compared to 2023.**
- **Compared to the 2018 base year, mobility-related emissions decreased by 16.5% on a gross/net basis.**

Figure 6

**Breakdown of mobility-related emissions by source, 2024**




Source: ESM

In 2024, mobility-related emissions decreased primarily due to reduced air travel. Nevertheless, air travel remained the predominant source of mobility emissions, accounting for 90.5% of overall net emissions in this category, reflecting a 6.3% reduction compared to 2023. Additionally, net emissions from ESM's leased vehicles decreased by 25.7% from the previous year, due to fewer km travelled and the predominant use of plug-in vehicles instead of traditional fuels.

The remaining mobility-related emissions came from other sources, including staff commute, business travel by car, and rail travel, which altogether accounted for 74 $tCO_2e$. While business travel remains the dominant source of emissions, the ESM continues to promote sustainable mobility practices as outlined in the Overview of environmental practices and commitments in the Foreword.

### 3.2.1. Air travel

**Emissions from air travel represented 70.6% (2023: 69.5%) of total gross emissions and 77% (2023: 76.9.%) of total net emissions.**

- **Air travel accounted for 90.5% of total mobility-related emissions (2023: 89.8%).**
- **Gross/net emissions associated with air travel decreased by 6.3% compared to 2023.**
- **Compared to the 2018 base year, gross/net emissions from air travel decreased by 11.3%.**

Figure 7

**Evolution of air travel-related emissions**

(gross/net $tCO_2e$)

| | 1,668,382 km | 701.9 $tCO_2e$ | 3.05 $tCO_2e$ |
|---|---|---|---|
| | **Distance travelled** | **Gross/net emissions** | **Emissions per staff member** |
| **Vs. 2023** | **-15.3%** | **-6.3%** | **-6.3%** |
| **Vs. Baseline** | **-29.5%** | **-11.3%** | **-30.9%** |

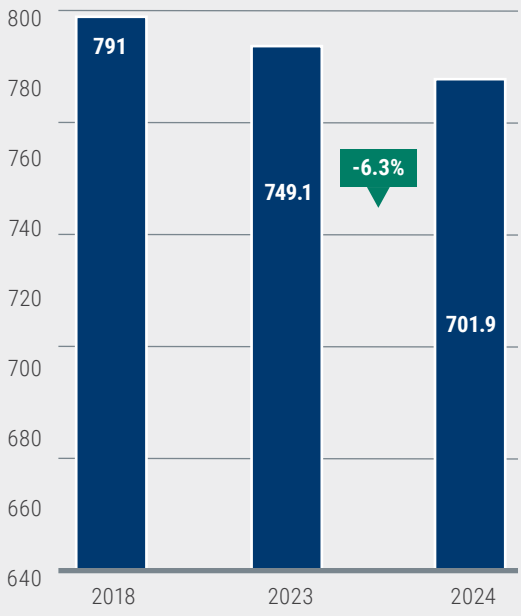
Source: ESM

In 2024, air travel remained the primary contributor to mobility-related emissions. ESM staff collectively covered a total distance of 1,668,382 km by air, reflecting ongoing international engagement. Nevertheless, there was a reduction of 15.3% in km travelled by air compared to 2023, resulting in a 6.3% decrease in emissions.

Figure 8

**Evolution of air travel-related emissions, 2018–2024**

($tCO_2e$)




Source: ESM

Figure 8 illustrates the progression of ESM's air travel-related emissions starting from the baseline year of 2018 through to 2024. Despite the continued increase in post Covid-19 business travel, 2024 broke with this trend and experienced a reduction in emissions, marking an 11.3% decline compared to the 2018 baseline year.

In 2024, the ESM introduced a change in the threshold used to identify long and short-haul flights. In previous years, a threshold of 3,000 km was used. However, this year, following the methodology outlined in DEFRA's "2024 Government Gas Conversion Factors for Company Reporting - Methodology Paper for Conversion Factors Final Report", all flights within the EU were classified as short-haul, while those outside of it were considered long-haul. This change resulted in a slight increase of the calculated emissions.

Apart from this change, the ESM continued to use the same emissions calculation methodology as in previous years. Emissions were calculated based on the fare class and distance travelled, using travel-specific emission factors. These factors reflect the latest available conversion factors, sourced from DEFRA's "Conversion factors 2024". In 2024, there were no significant changes in emission factors.

### 3.2.2. Staff commute

**Emissions from staff commute represented 5% (2023: 5.3%) of total gross emissions and 5.5% (2023: 5.9%) of total net emissions.**

- **Staff commute accounted for 6.5% of total mobility-related emissions in 2024 (2023: 6.9%).**
- **Gross/net emissions from staff mobility decreased by 13% compared to 2023.**
- **Compared to the 2018 base year, gross/net emissions from staff commute decreased by 53.3%.**

Figure 9

**Evolution of staff commute-related emissions**

(gross/net $tCO_2e$)

| | 401,971.7 km | 50.1 $tCO_2e$ | 0.2 $tCO_2e$ |
|---|---|---|---|
| | Distance travelled | Gross/net emissions | Emissions per staff member |
| Vs. 2023 | +8.3% | -13% | -13% |
| Vs. Baseline | -33% | -53.3% | -63.7% |

Source: ESM

In 2024, the total distance travelled by employees commuting to and from the ESM office increased by 8.3% compared to 2023. Despite the increase in distance, the overall emissions associated with staff commute decreased.

While in the past the ESM leveraged national averages on vehicles and fuel types in use in Luxembourg City, in 2024, the approach for the calculation of this category was enhanced by incorporating data on the number of employees registered to use on-site electric or plug in hybrid vehicle chargers. National statistics on vehicles registered in Luxembourg City where therefore only used to reflect the likely fuel type mix[15] for the remaining vehicles.

This change allowed for a more accurate capturing of the vehicle mix and emissions. The incorporation of this data resulted in a higher proportion of electric and plug-in hybrid vehicles compared to previous calculations based on national averages. Combined with a 46.3% decrease in the DEFRA emissions factor for electric vehicles, this has led to a 13% reduction of total emissions from staff commute, despite the increase in total distance travelled.

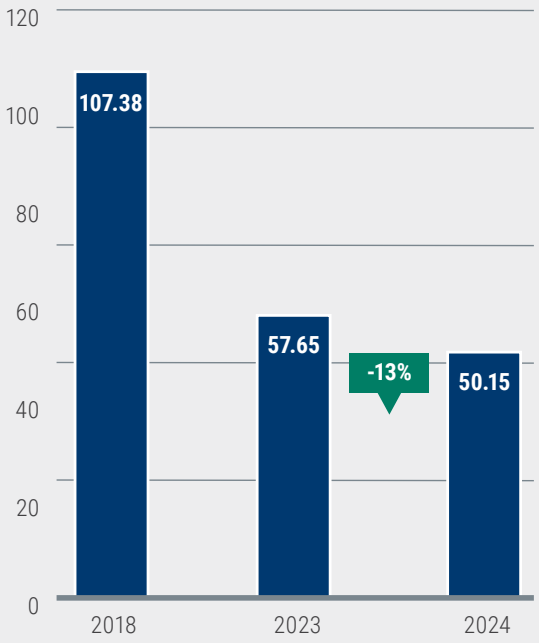
In addition to the parameters on Figure 10, staff commute emissions were calculated by estimating distances based on home-to-office data, adjusted with the parking occupancy rate, and the number of business days. Sector-specific emission factors, differentiated by vehicle type and fuel, were applied to derive accurate estimates.

[15] Source: Automobile Club of Luxembourg published on 14 January 2025.

Figure 10

Evolution of staff commute-related emissions, 2018–2024

(gross/net $tCO_2e$)




Source: ESM

Efforts to encourage more sustainable commute continued as outlined in the Overview of environmental practices and commitments, including expanded access to electric vehicle charging infrastructure. These measures aim to support a gradual shift away from high-emission travel as demonstrated by these emission trends.

### 3.2.3. ESM-leased vehicles

Emissions from leased vehicles accounted for 2.1% of total gross emissions (2023: 2.6%) and 2.2% of total net emissions (2023: 2.8%).

- These emissions represented 2.6% of total mobility-related emissions (2023: 3.3%).
- Gross/net emissions decreased by 25.7% compared to 2023.
- Compared to the 2018 base year, gross/net emissions decreased by 29.7%.

Figure 11

Evolution of leased vehicle-related emissions

| | 165,121 km<br>Distance travelled | 20.5 $tCO_2e$<br>Gross/net emissions | 0.1 $tCO_2e$<br>Emissions per staff member |
|---|---|---|---|
| Vs. 2023 | -13.1% | -25.7% | -25.7% |
| Vs. Baseline | +21.3% | -29.7% | -38% |

Source: ESM

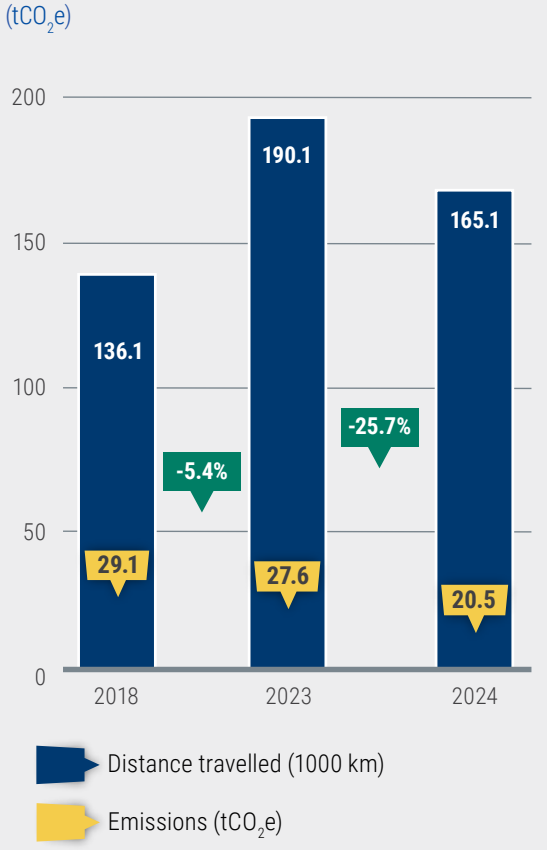
At the end of 2024, the ESM fleet consisted of seven plug-in hybrids vehicles and one diesel van. Reflecting a reduction in km travelled as well as a change in the vehicle fleet composition emissions decreased by 25.7% compared to 2023. In 2024, there has been an increase in the usage of plug-in hybrid vehicles of the ESM fleet, resulting in a decrease of the km travelled using diesel fuels by 67% in 2024 compared to 2023.

Figure 12 illustrates the evolution of emissions related to ESM leased vehicles and km travelled over the years. Even though the distance travelled increased by 21.3% compared to the baseline, emissions decreased by 29.7% due to the changes in the company fleet composition.

Emissions were calculated using the mileage data for each vehicle, multiplied by emission factors based on the vehicle's fuel type, adhering to the methodology employed since 2018. Despite its modest contribution to overall emissions, ESM continues to monitor and manage this category as part of its broader mobility-related footprint.

Figure 12

**Evolution of emissions related to leased vehicles, 2018–2024**




Source: ESM

## 3.2.4. Business travel by car

**This is a new category that was added in 2024 and that accounts for the distance travelled for business purposes with personal car or rented vehicles.**

- **Emissions from business travel by car accounted for 0.3% of total gross emissions and 0.3% of total net emissions.**
- **These emissions represented 0.4% of total mobility-related emissions.**

Figure 13

**Business travel by car emissions**

| 19,960 km | 3.1 $tCO_2e$ | 13.5 $kgCO_2e$ |
|---|---|---|
| Distance travelled | Gross/net emissions | Emissions per staff member |

Source: ESM

Figure 13 provides an overview of the distance travelled in 2024 for business purposes, alongside the corresponding emissions.

As this is a new category calculated for the first time, a baseline comparison is not possible.

Vehicles are categorised based on their size and fuel type. To calculate the emissions, the distance travelled by each vehicle category was multiplied by the relevant emission factor, which was obtained from DEFRA.

### 3.2.5. Rail travel

**Emissions from business travel by rail made up less than 0.02% of total gross emissions (2023: 0.02%) and 0.03% of total net emissions (2023: 0.02%).**

- **Rail travel accounted for 0.03% of total mobility-related emissions in 2024 (2023: 0.02%).**
- **Gross/net emissions increased by 12.4% compared to 2023.**
- **Compared to the 2018 base year, gross/net emissions decreased by 81%.**

Figure 14

Evolution of rail travel-related emissions

| | 52,142 km<br>Distance travelled | 0.2 $tCO_2e$<br>Gross/net emissions | 1 $kgCO_2e$<br>Emissions per staff member |
|---|---|---|---|
| Vs. 2023 | +12.4% | +12.5% | +12.5% |
| Vs. Baseline | -49% | -81% | -85.2% |

Source: ESM

In 2024, emissions from rail travel increased by 12.5% in line with the increase in distance travelled. Rail travel continues to represent a small share of mobility emissions, largely due to feasibility constraints: ESM business travels require air travel due to long distances or limited rail connectivity in Luxembourg.

While rail travel remains a relatively small contributor to emissions, recent trends suggest a growing interest evidenced by a small uptake in the distance travelled of 12.5%. Emissions were calculated using travel distances and corresponding emission factors, as applied consistently across air, rail, and leased vehicle travel.

## 3.3. Building-related emissions

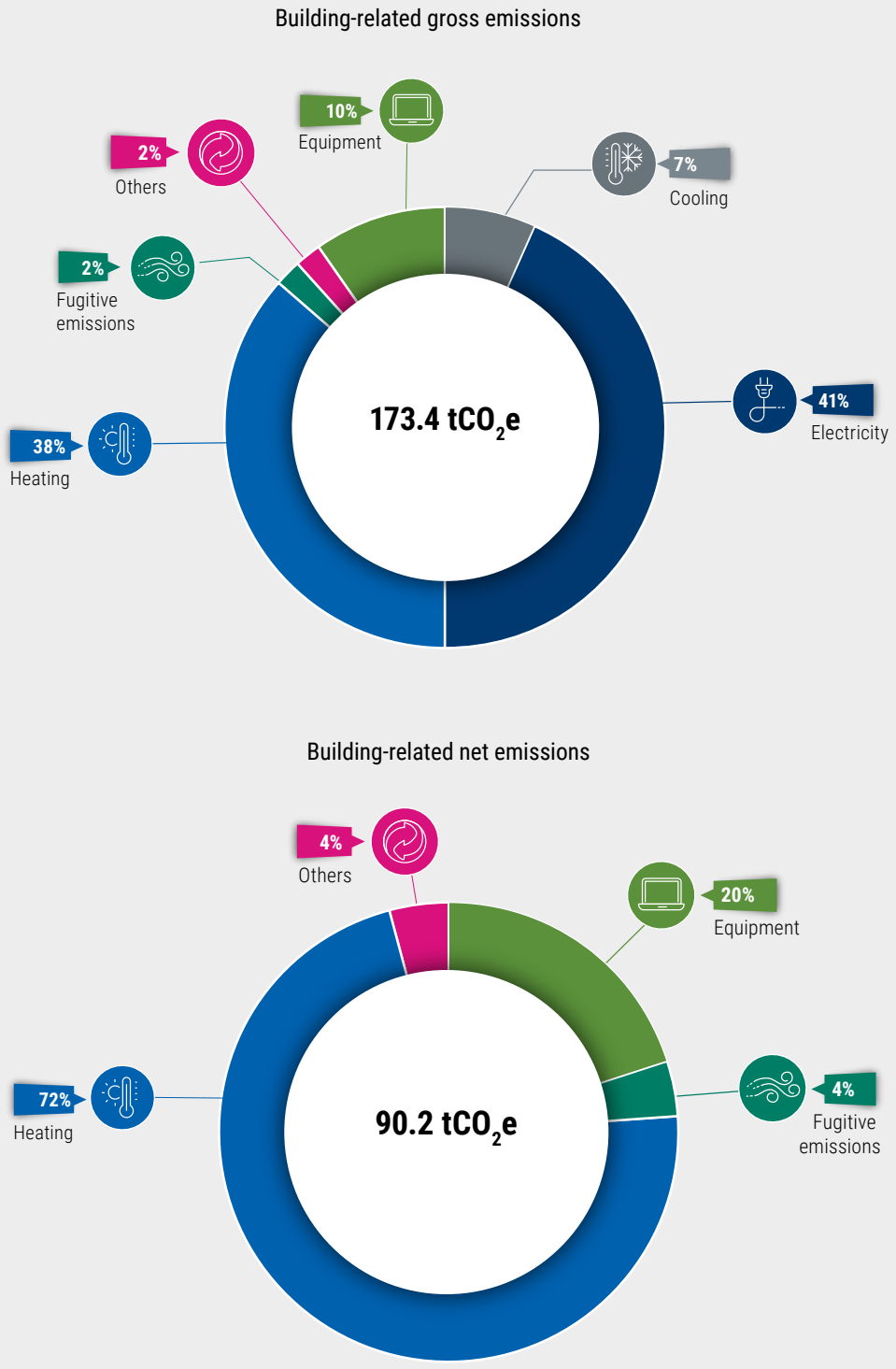
**Building-related emissions make up for 17.4% of total gross emissions (2023: 18.2%) and 9.9% (2023: 9.5%) of total net emissions.**

- **Building-related emissions decreased by 11.5% on a gross basis and decreased by 2.8% on a net basis compared to 2023.**
- **Compared to the 2018 base year, building-related emissions have decreased by 30% on a gross basis, and by 41.9% on a net basis.**

Figure 15

**Breakdown of building-related gross and net emissions, 2024**

(gross $tCO_2e$)




Note: 'Others' category includes paper (gross 1.8%; net 3.4%), water (gross 0.3%; net 0.6%), and waste (gross 0.1%; net 0.2%).

Source: ESM

Figure 15 (first pie chart), displays, in gross terms, the total emissions of the ESM building. Electricity makes up for the largest share of building-related emissions in gross terms, followed by the emissions from heating.

Figure 15 (second pie chart), displays the net emissions. In net terms, emissions resulting from heating account for most of the total building-related emissions. They are followed by electronic equipment, fugitive emissions, and paper and water respectively. The 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[16] or backed by the energy supplier's certification confirming the use of renewable sources, supported by official product labelling.

### 3.3.1. Electricity consumption

**Electricity consumption emissions accounted for 7.1% (2023: 7.2%) of total gross emissions and 0% (2023: 0%) of total net emissions.**

- **Electricity-related emissions account for 40.6% (2023: 39.8%) of total building-related gross emissions and 0% (2023: 0%) of total building-related net emissions.**
- **Electricity-related gross emissions had a 9.8% decrease compared to 2023, and a 23.8% decrease compared to the 2018 base year.**

Figure 16

Electricity-related emissions

| | 959.5 MWh | 70.4 $tCO_2e$ | 7.5 $kgCO_2e$ |
|---|---|---|---|
| | Consumption | Gross emissions | Emissions per $m^2$ |
| Vs. 2023 | ↑ +9.5% | ↓ -9.8% | ↓ -9.8% |
| Vs. Baseline | ↑ +116.9% | ↓ -23.8% | ↓ -31.8% |

Source: ESM

Electricity emissions in gross terms have decreased by 9.8% compared to 2023, and 23.8% compared to the baseline year. Given that most electricity was derived from renewables, evidenced through the purchase of Guarantees of Origin,[17] net emissions amount to 0 $tCO_2e$. Nevertheless, minor net emissions are possible in the event of unexpected power outages as the building is backed by diesel-powered genset.

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

16 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.

17 A small share of electricity consumption (approximately 2%) is not directly covered by Guarantee of Origin cancellations but is sourced from a supplier-certified renewable product with zero emissions reported under official energy labelling. This does not affect the total reported emissions, which remain zero, as the supplier confirms the renewable nature of the entire electricity mix.

## 3.3.2. Heating

**The emissions generated by the heating category represented 6.6% (2023: 5.7%) of total gross emissions and 7.2% (2023: 6.4 %) of total net emissions.**

- **Heating accounts for 37.6% (2023: 31.6%) of total gross building-related emissions and 72.4% (2023: 66.8%) of total net building-related emissions.**
- **Gross/net emissions associated with heating increased by 5.4% compared to 2023 and decreased by 54.8% compared to the 2018 base year.**

Figure 17

Evolution of heating-related emissions

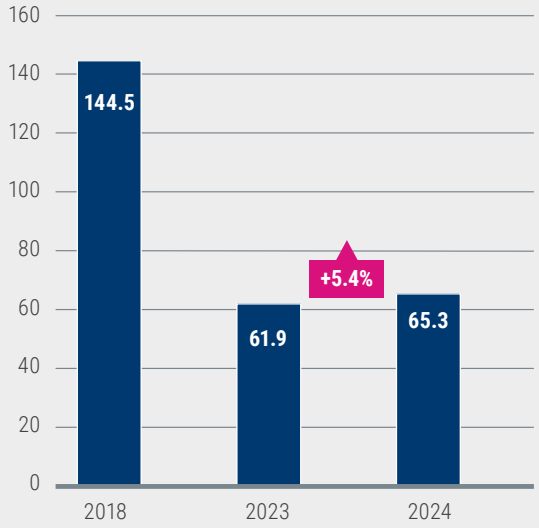
| | 356.9 MWh | 65.3 $tCO_2e$ | 7 $kgCO_2e$ |
|---|---|---|---|
| | Consumption | Gross/net emissions | Emissions per $m^2$ |
| Vs. 2023 | +5.4% | +5.4% | +5.4% |
| Vs. Baseline | -54.6% | -54.8% | -59.6% |

Source: ESM

In 2024, heating represented the largest building-related emission source in net terms (72.4%) and the second largest in gross terms (38%), after electricity, with 41% of the ESM's building-related net emissions. The ESM premises were heated by natural gas. In 2024, consumption reached 356.9 MWh (2023: 338.6 MWh), resulting in a 5.4% increase from 2023.

Figure 18

Evolution of heating-related emissions, 2018–2024 ($tCO_2e$)




Source: ESM

In 2024, 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. Compared to the base year, a decline in emissions of 54.8% can be noted, as illustrated in Figure 18. The reduction in emissions is primarily attributed to the implementation of various emissions-saving measures over the past years. For 2023 and 2024, these include the reduction of office temperatures to 20°C (from 23°C) during winter.

### 3.3.3. Cooling

**The emissions generated by the cooling category represented 1.3% (2023: 2.3%) of total gross emissions and 0% (2023: 0%) of total net emissions.**

- **Cooling accounts for 7.4% (2023: 12.9%) of total gross building-related emissions and 0% (2023: 0%) of total net building-related emissions.**
- **Gross emissions associated with cooling decreased by 49.1% compared to 2023.**

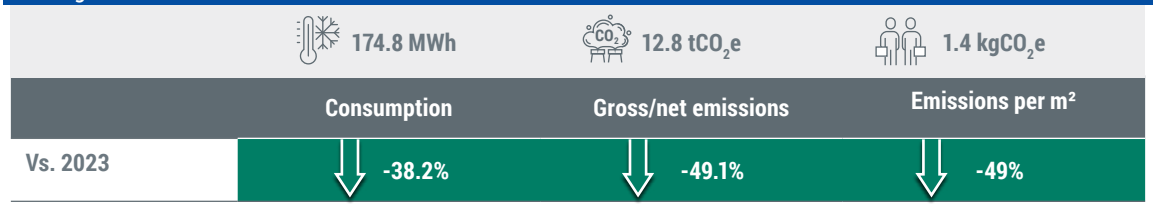
Cooling emissions are those generated by the air conditioning system within the ESM facilities. In the spirit of enhanced transparency and given the evolving nature of data availability, this category was added last year given that reliable data became available.

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 via a supplier statement attesting 100% renewable sourcing. As this category was only introduced in 2023, comparisons with the baseline reporting year are not possible.

Figure 19

Cooling-related emissions




Source: ESM

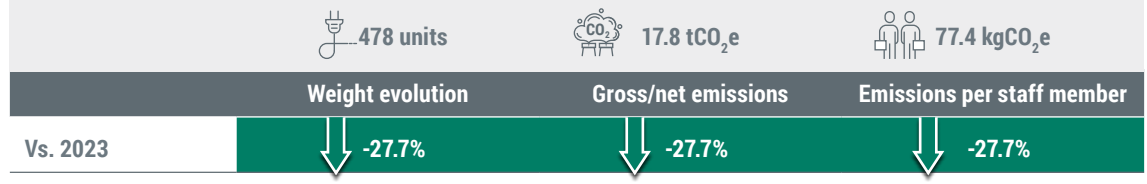
### 3.3.4. Electronic equipment

**The emissions generated by the electronic equipment category represented for 1.8% (2023: 2.3%) of total gross emissions and 2% (2023: 2.5%) of total net emissions.**

- **Electronic equipment accounts for 10.3% of total building-related gross emissions (2023: 12.6%) and 19.8% net emissions (2023: 26.6%).**
- **Gross/net emissions associated with electronic equipment decreased by 27.7% compared to 2023.**

Figure 20

Evolution of electronic equipment-related emissions




Source: ESM

Emissions related to electronic equipment decreased by 27.7% compared to the previous year. In 2024, the total weight of equipment decreased by 27.7% compared to 2023. As this category was only calculated beginning with the 2022 report, a baseline comparison for 2018 is not possible.

To ensure technology equipment is reused, 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 auctions were donated to various charitable causes.

As in the past year, electronic equipment emissions were calculated according to 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. Only the equipment leased and used during the year of reference is taken into consideration, to avoid double counting. 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.

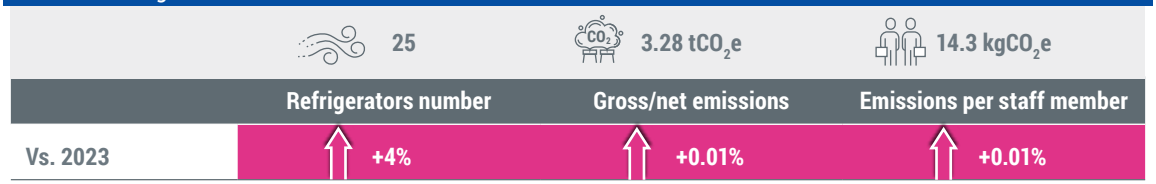
## 3.3.5. Fugitive emissions

**Fugitive emissions accounted for 0.3% of total gross emissions (2023: 0.3%) and 0.4% of total net emissions (2023: 0.3%).**

- **Fugitive emissions account for 1.9% of total building-related gross emissions (2023: 1.7%) and 3.6% net emissions (2023: 3.5%).**
- **Gross/net emissions associated with fugitive emission increased by 0.01% compared to 2023.**
- **The number of refrigerators in use included an extra refrigerator unit compared to 2024. The refrigerator was purchased in November 2024 and therefore the installation-related emissions were also accounted for in the calculations.**

Figure 21

Evolution of fugitive emissions




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 remained "roughly" the same as 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.

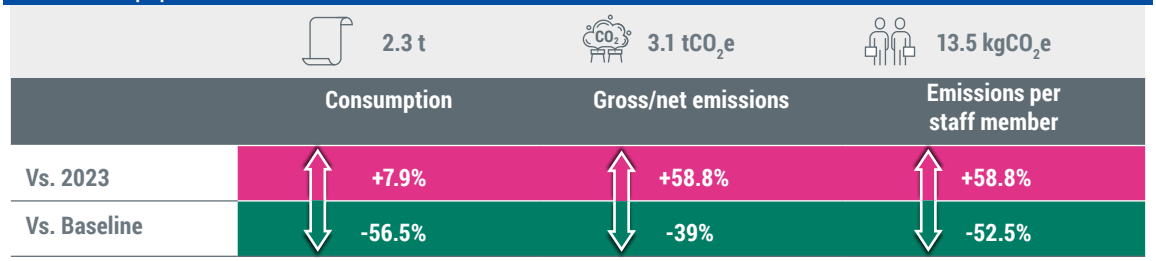
## 3.3.6. Paper

Paper consumption emissions amounted to 0.3% (2023: 0.2%) of total gross emissions and 0.3% (2023: 0.2%) of total net emissions.

- Paper consumption emissions account for 1.8% (2023: 1%) of total gross building-related emissions and 3.4% (2023: 2.1%) of total net building-related emissions.
- Gross/net emissions associated with paper consumption increased by 58.8% compared to 2023 and decreased by 39% compared to the 2018 base year.

Figure 22

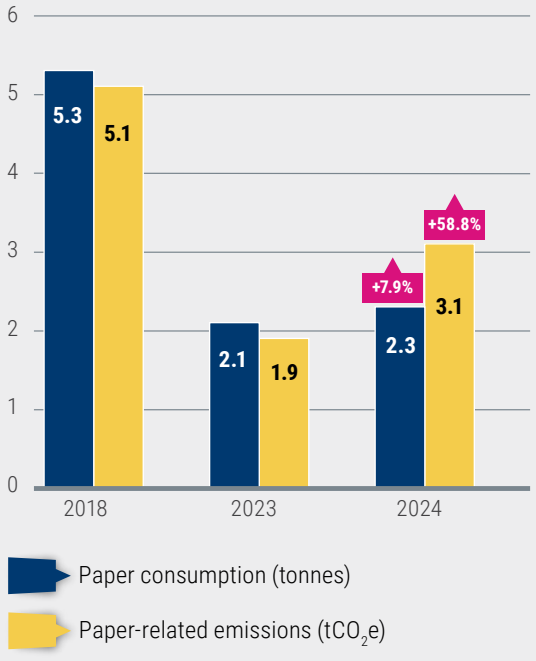
Evolution of paper-related emissions




Source: ESM

Figure 23

Evolution of paper consumption and paper emissions 2018–2024




Source: ESM

The increase registered in 2024 of 58.8% is a result of the increased number of ESM staff returning to the office and the significant increase of the DEFRA 2024 emission factor[18] by 47.1%. Going forward, the ESM will continue to leverage sustainable sources in its paper consumption and has already obtained a provider for recycled materials. In 2024, 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.

[18] Emission factor used for this category: Defra 2024 - Material used - Paper - Paper and board: paper

## 3.3.7. Water

**Water consumption emissions for 2024 amounted to 0.05% (2023: 0.05%) of total gross emissions and 0.06% (2023: 0.06%) of total net emissions.**

- **Water consumption emissions account for 0.3% (2023: 0.3%) of total gross building-related emissions and 0.6% (2023: 0.6%) of total net building-related emissions.**
- **Gross/net emissions associated with water consumptions decreased by 7.4% compared to 2023 and decreased by 89.4% compared to the 2018 base year.**

Figure 24

Evolution of water-related emissions

| | 1,562 $m^3$ | 0.5 $tCO_2e$ | 2.3 $kgCO_2e$ |
|---|---|---|---|
| | Consumption | Gross/net emissions | Emissions per staff member |
| Vs. 2023 | +3.3% | -7.4% | -7% |
| Vs. Baseline | -67.2% | -89.4% | -92% |

Source: ESM

As Figure 24 reveals, there has been a slight increase in water consumption (3.3%) in comparison with 2023. This is due to increased office attendance in 2024. There is however nevertheless a continued downward trend in total emissions each year. The DEFRA emission factor[19] decreased by 10.4%, resulting in a reduction of 7.4% of the total gross emissions for 2024.

## 3.3.8. Waste

**Emissions generated by waste amounted to 0.02% in 2023 (2023: 0.04%) of total gross emissions and 0.02% (2023: 0.04%) of total net emissions.**

- **Waste generated emissions account for 0.10% (2023: 0.20%) of total gross building-related emissions and 0.18% (2023: 0.41 %) of total net building-related emissions.**
- **Gross/net emissions associated with waste consumption decreased by 56.9% compared to 2023 and decreased by 77.9% compared to the 2018 base year.**

Figure 25

Evolution of waste-related emissions

| | 25.8 t | 0.2 $tCO_2e$ | 0.7 $kgCO_2e$ |
|---|---|---|---|
| | Consumption | Gross/net emissions | Emissions per staff member |
| Vs. 2023 | +43.1% | -56.9% | -56.9% |
| Vs. Baseline | -26.24% | -77.9% | -82.8% |

Source: ESM

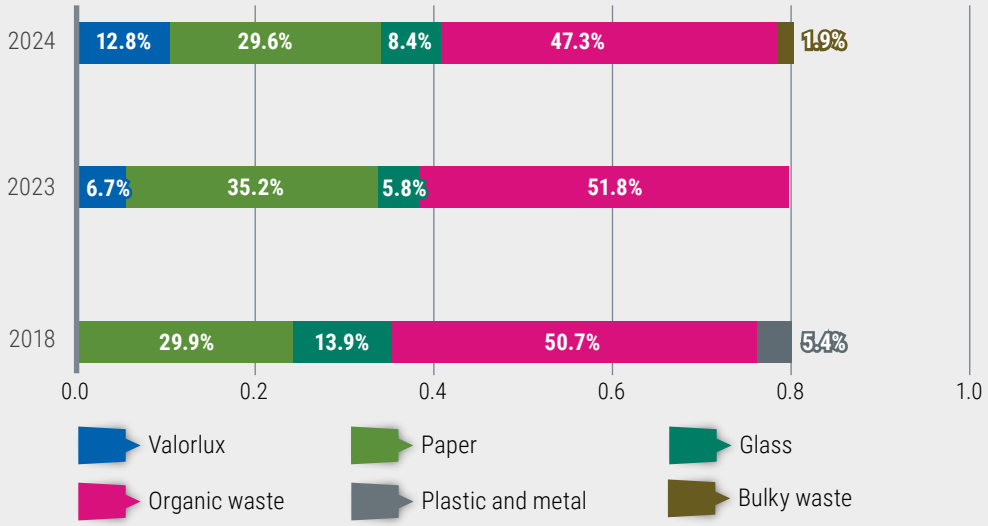
[19] DEFRA emission factor used for the water consumption category for 2024: Defra 2024 - Water supply - kg $CO_2e$ per cubic meter + Defra 2024 - Water treatment - kg $CO_2e$ per cubic meter

Figure 25 shows the percentage change of waste consumption, emissions, and emissions per staff from 2023 to 2024 and versus the base year (2018). Although there was a significant increase in consumption by 43.1% compared to 2023, the emissions continue to decrease significantly. This is mainly due to the decrease in the 2024 DEFRA emission factor[20] by 69.9% compared to 2023.

Figure 26

**Evolution of emissions related to waste generation, 2018–2024**

($tCO_2e$)




Source: ESM

Figure 26 shows the evolution of the breakdown of emissions related to waste generated by ESM operations between the 2018 base year and 2024. This figure shows that throughout the years, organic waste and paper have always represented the largest part of the emissions related to waste.

In 2024, organic waste accounted for 47.3% (2023: 51.8%) of all waste gross/net emissions, followed by paper, which accounts for 29.6% (2023: 35.2%) of all waste gross/net emissions.[21]

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.[22] During annual reviews, the inspectors applied the same control procedures and requirements as the ISO standard.

In 2024, the methodology for calculating this category remained consistent with the one used the previous year. Waste generation data was collected and multiplied by the corresponding emission factors.

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20 DEFRA emission factors used for the Waste category: Defra 2024 – Waste disposal – Plastic: average plastics; Defra 2024 – Waste disposal – Glass; Defra 2024 – Waste disposal; Paper and board: mixed.

21 It should be noted that the paper-related waste figures appearing in this section are different from the paper consumption figures 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.

22 The ISO 14024:2000 Standard sets forth principles, guidelines, and specifies general requirements that apply to all types of product-related environmental declarations and programmes, aimed at developing and utilising environmental labels.

# 3.4. Teleworking-related emissions

**Teleworking-related emissions made up around 4.6% (2023: 4.4%) of total gross emissions and 5.0% (2023: 4.9%) of total ESM net emissions.**

- **Gross and net telework-related emissions decreased by 3.9% compared to 2023.**

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 emission drivers for the category are electricity and heating, while water and waste represented a smaller share in total teleworking gross and net emissions. To calculate teleworking emissions, the EcoAct Whitepaper methodology was used, complemented by publicly available statistics and general assumptions. As such, 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 employees. The publicly available statistics that were used stemmed from the City of Luxembourg and the European Environment Agency. For a comprehensive understanding of emission factors used for the calculation of specific teleworking categories please refer to Annex 3: Emission factors. 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. In 2024 the daily office occupancy rate slightly rose to 65%, compared to 64% in 2023. This was further calibrated based on the following assumptions:

- An eight-hour working day.
- Working days during the calendar year (with a subtraction of days of annual leave that each employee can take during the year).
- For heating: a 66.7% reduction factor to account for home incremental approach, following the EcoAct White Paper Methodology.
- An average of 21% of hourly household water consumption is linked to teleworking[23]
- An average 20% of hourly household waste consumption is linked to waste[24]

## 3.4.1. Teleworking-related heating emissions

**Emissions generated by telework-related heating amounted to 4.4% in 2024 (2023: 4.1%) of total gross emissions and 4.8% (2023: 4.6%) of total net emissions.**

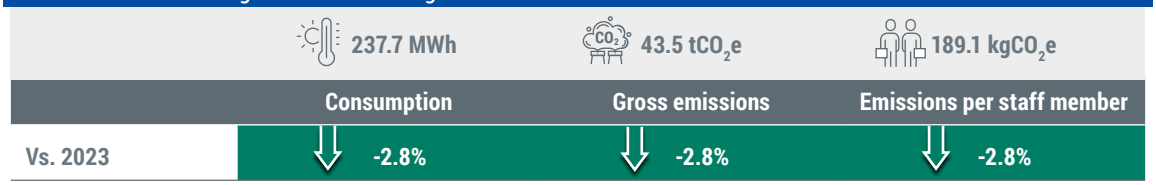
- **Telework-related heating emissions account for 95.5% (2023: 94.5%) of total gross/net teleworking related emissions.**
- **Gross/net emissions associated with teleworking heating emissions decreased by 2.8% compared to 2023 and increased by 271.4% compared to the 2020 base year.**

[23] 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 and 2023.

[24] The assumption on hourly household waste consumption is based on new research conducted by the Recycling Magazine that was conducted in 2020 that linked home working trends to an increase in at home e-waste.

Figure 27

Evolution of teleworking estimated heating-related emissions




Source: ESM

Compared to 2023, this category shows a decrease in heating consumption and related emissions, due to an increased office presence.

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 11,500 kWh per year for domestic gas used for heating and is in use for an average of eight 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.

Additionally, to follow the enhanced version of the EcoAct WhitePaper methodology, and to get the most accurate data, a correction factor of 66.7 % was used to account for employees working in homes that are already heated. This factor was therefore multiplied by the total hours of teleworking of all ESM employees following the formula provided by the EcoAct Whitepaper methodology.[25]

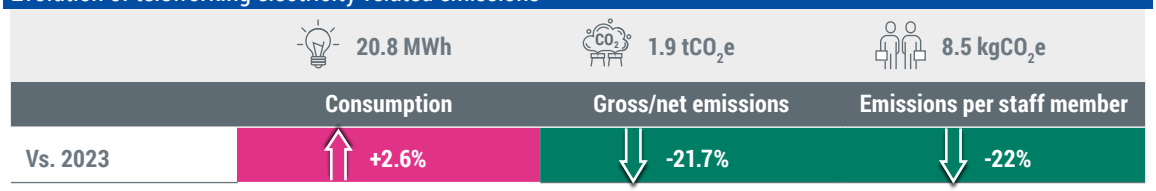
## 3.4.2. Teleworking-related electricity emissions

**Emissions generated by telework-related electricity amounted to 0.2% in 2024 (2023: 0.2%) of total gross emissions and 0.2% (2023: 0.3%) of total net emissions.**

- **Telework-related electricity emissions account for 4.3% (2023: 5.3%) of total gross/net teleworking related emissions.**
- **Gross/net emissions associated with teleworking electricity consumptions decreased by 21.7% compared to 2023 and decreased by 68.8% compared to the 2020 base year.**

Figure 28

Evolution of teleworking electricity-related emissions




Source: ESM

[25] Both the explanation and formula of this correction factor can be found on page 12 of the EcoAct Whitepaper methodology published by EcoAct in 2020.

Figure 28 shows the reduction in teleworking-related electricity emissions in 2024, driven by an increased return to the office and a decrease of 17.6% of the IEA electricity emissions factor.

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 IEA electricity emission factors for Luxembourg and surrounding areas were considered to allow for more accurate estimates. Additionally, the methodology estimates that an average working station consumes 140 watts for electricity and 10 watts 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 that on average ESM staff worked from home.

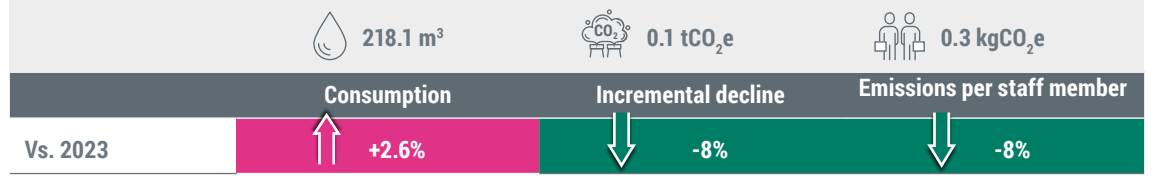
## 3.4.3. Teleworking-related water emissions

**Emissions generated by telework-related water amounted to 0.01% in 2024 (2023: 0.01%) of total ESM gross emissions and 0.01% (2023: 0.01%) of total net emissions.**

- **Telework-related water emissions account for 0.16% (2023: 0.17%) of total gross/net teleworking related emissions.**
- **Gross/net emissions associated with teleworking water consumptions decreased by 8% compared to 2023 and decreased by 83.9% compared to the 2020 base year.**

Figure 29

Evolution of teleworking water-related emissions




Source: ESM

Between 2023 and 2024, gross water-related consumption increased by 2.6% and overall emissions for the category decreased by 8% because of a decrease in 10.4% of the DEFRA water emissions factor.

The water-related emissions from teleworking were estimated using a study by Phyn.[26] These estimates were further refined using official statistics from the City of Luxembourg to ascertain the emissions resulting from water use during teleworking days.

[26] 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 2023.

### 3.4.4. Teleworking-related waste emissions

**Emissions generated by telework-related waste amounted to 0.001% in 2024 (2023: 0.005%) of total gross emissions and 0.002% (2023: 0.005%) of total net emissions.**

- **Telework-related waste emissions account for 0.03% (2023: 0.11%) of total gross/net teleworking related emissions**
- **Gross/net emissions associated with teleworking waste consumptions decreased by 71.5% compared to 2023 and decreased by 81.6% compared to the 2020 base year.**

Figure 30

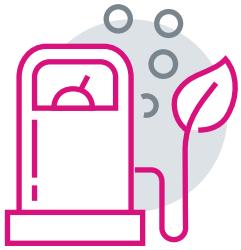
Evolution of teleworking waste-related emissions

| | 2.2 t | 0.01 $tCO_2e$ | 0.06 $kgCO_2e$ |
|---|---|---|---|
| | Consumption | Incremental decline | Emissions per staff member |
| Vs. 2023 | -5.4% | -71.5% | -71.5% |

Source: ESM

In line with the declining trend outlined for other teleworking emission categories, the resulting estimated emissions from teleworking waste also decreased by 71.5%. This substantial decrease is attributed to two key factors: a 69.6% reduction in the 2024 DEFRA emission factor for all waste-related categories and a 5.4% decline in the total waste consumption for 2024.

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.



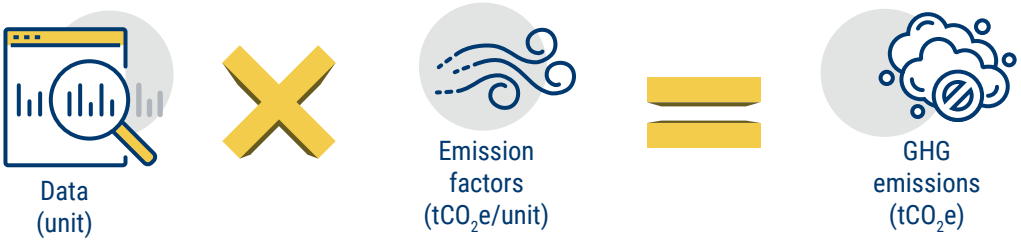
# 4. Annexes

## 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 |
| | | Business travel – car | km | By share of cars per fuel type and distance travelled |
| | | Staff commute | km | By share of cars per fuel type in use in Luxembourg and per fuel type according to internal ESM data provided; 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<br>Purchased cooling | kWh<br>kWh | Annual/monthly<br>Monthly |
| | Scope 3 | Building – Paper | sheets of paper | Annual, by paper size and weight |
| | | Building – Water | $m^3$ | Annual |
| | | Building – Waste | tonnes | 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 | tonnes | 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 2023[27] |
|---|---|---|---|---|---|
| Scope 1 | ESM-leased vehicles | 0.19757 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passengers vehicles – Cars (by market segment) – Dual purpose 4*4 – Diesel | -2.2% |
| | | 0.20695 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by market segment) – Luxury – Diesel | -2.0% |
| | | 0.17751 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by market segment) – MPV – Diesel | 0.5% |
| | | 0.10533 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by market segment) – Dual purpose 4*4 – Plug-in Hybrid | 48.4% |
| | HFC-134a refrigerant emission factor | 1300.00 | kg$CO_2$e per unit | IEA 2023 Estimated – Luxembourg (Total) | 0.0% |
| Scope 2 | Electricity – Luxembourg | 0.0734 | kg $CO_2$e/kWh | IEA 2023 Estimated – Germany (Total) | -17.6% |
| | Electricity – Germany | 0.3288 | kg $CO_2$e/kWh | IEA 2023 – Estimated – France (Total) | N/A |
| | Electricity – France | 0.0413 | kg $CO_2$e/kWh | IEA 2023 – Estimated – Belgium (Total) | N/A |
| | Electricity – Belgium | 0.1396 | kg $CO_2$e/kWh | IEA 2023 Estimated – Luxembourg (Total) | N/A |
| | Cooling | 0.0734 | kg $CO_2$e/kWh | DEFRA 2024 – Fuels –Gaseous fuels – Natural gas (Gross CV) | -17.6% |
| | Heating - gas | 0.1829 | kg $CO_2$e/kWh | IEA 2023 Estimated – Luxembourg (Total) | 0.0% |

[27] 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 2023[27] |
|---|---|---|---|---|---|
| Scope 3 | Business travel – air | 0.18287 | kg $CO_2$e per km per passenger | DEFRA 2024 – Business travel – Air – Economy Short Haul | 0.0% |
| | | 0.20011 | kg $CO_2$e per km per passenger | DEFRA 2024 – Business travel – Air – Economy Long Haul | 0.0% |
| | | 0.2743 | kg $CO_2$e per km per passenger | DEFRA 2024 – Business travel – Air – Business Short Haul | 0.0% |
| | | 0.58028 | kg $CO_2$e per km per passenger | DEFRA 2024 – Business travel – Air – Business Long Haul | 0.0% |
| | | 0.53854 | kg $CO_2$e per km per passenger | DEFRA 2024 – Business travel – Air – International, to/from non-UK – First class | 0.0% |
| | | 0.21542 | kg $CO_2$e per km per passenger | DEFRA 2024 – Business travel – Air – International, to/from non-UK –Premium economy class | 0.0% |
| | Business travel – rail | 0.00446 | kg$CO_2$e per km per passenger | Defra 2023 – Business travel – Rail – International rail | 0.0% |
| | Staff commute | 0.1645 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Average car – Petrol | 0.4% |
| | | 0.16984 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Average car – Diesel | 1.0% |
| | | 0.12607 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – average car – Hybrid | 6.0% |
| | | 0.0936 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – average car – Plug-in Hybrid Electric Vehicle | 42.1% |
| | | 0.04358 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles Cars (by size) – average car – Battery Electric Vehicle | -46.3% |
| | | 0.16691 | kg $CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – average car – Unknown | 0.2% |
| | Business travel – car | 0.1437 | kg$CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Small car – Petrol | N/A |
| | | 0.17726 | kg$CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Medium car – Petrol | N/A |
| | | 0.26885 | kg$CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Large car – Petrol | N/A |
| | | 0.13994 | kg$CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Small car – Diesel | N/A |
| | | 0.16807 | kg$CO_2$e per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Medium car – Diesel | N/A |

| Scope | Source of GHG emissions | Emission factors | Unit | Source of emission factors | Evolution since 2023[27] |
|---|---|---|---|---|---|
| | Business travel – car | 0.20729 | $kgCO_2e$ per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Large car – Diesel | N/A |
| | | 0.11274 | $kgCO_2e$ per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Small car – Hybrid | N/A |
| | | 0.1149 | $kgCO_2e$ per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Medium car – Hybrid | N/A |
| | | 0.15486 | $kgCO_2e$ per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Large car – Hybrid | N/A |
| | | 0.03012 | $kgCO_2e$ per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Small car – Plug-in Hybrid Electric Vehicle | N/A |
| | | 0.10306 | $kgCO_2e$ per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Large car – Plug-in Hybrid Electric Vehicle | N/A |
| | | 0.03937 | $kgCO_2e$ per km per type of car | DEFRA 2024 – Passenger vehicles – Cars (by size) – Small car – Battery Electric Vehicle | N/A |
| | Electronic equipment | 24,865.48 | $kgCO_2e$ per t of electrical item | DEFRA 2024 – Material use – Electrical items – IT6 | 0.0% |
| | Water consumption | 0.33885 | $kgCO_2e$ per $m^3$ | DEFRA 2024 –Water supply – kg $CO_2e$ per cubic meter + DEFRA 2024 – Water treatment – kg $CO_2e$ per cubic meter | -10.4% |
| | Waste produced | 6.41061 | $kgCO_2e$ per tonnes | DEFRA 2024 – Waste disposal – Plastic: average plastics | -69.9% |
| | | 6.41061 | $kgCO_2e$ per tonnes | DEFRA 2023 – Waste disposal – Waste disposal - Glass | -69.9% |
| | | 6.41061 | $kgCO_2e$ per tonnes | DEFRA 2024 – Waste disposal – Paper and board: mixed | -69.9% |
| | Paper consumption | 1339.318 | $kgCO_2e$ per tonnes | DEFRA 2024 – Material used – Paper – Paper and board: paper | 47.1% |

# 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 commute | 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) |
| | | Business travel – car | Inferred from distances travelled with rented vehicles and personal cars used for business purposes. With specification of type of car and fuel when available | ● | |
| **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 |

| | Scope | Source of GHG emissions | Activity | Data quality | Underlying assumptions |
|---|---|---|---|---|---|
| **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 (City of 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, as well as emissions from hotel stays.

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.

# Annex 6: Methodological enhancements

**Enhancement of the teleworking and staff commute methodology for 2023.**

As part of the ESM's ongoing commitment to improving data quality and consistency, it has carried out a methodological review of the teleworking and staff commute categories for the year 2023.

These two categories are closely correlated and it was, therefore, necessary to align the underlying assumptions and methodologies. As a result, certain adjustments were made to enhance the accuracy and representativeness of the data, without altering the overall scope or system boundaries of the carbon footprint report.

To maintain transparency, the table below presents both the originally reported and the updated values for 2023. These revised figures reflect the improved approach and will support year-on-year consistency going forward.

| Staff commute | Distance travelled | Gross/net emissions |
|---|---|---|
| Previous values in 2023 report | 562,551 km | 87.4 $tCO_2e$ |
| Updated values for 2023 | 371,126.9 km | 57.7 $tCO_2e$ |
| **Teleworking** | **Consumption** | **Gross/net emissions** |
| **Heating** | | |
| Previous values in 2023 report | 46.8 MWh | 8.6 $tCO_2e$ |
| Updated values for 2023 | 244.5 MWh | 44.7 $tCO_2e$ |
| **Electricity** | | |
| Previous values in 2023 report | 23.4 MWh | 2.9 $tCO_2e$ |
| Updated values for 2023 | 20.2 MWh | 2.5 $tCO_2e$ |
| **Water** | | |
| Previous values in 2023 report | 245.9 $m^3$ | 0.09 $tCO_2e$ |
| Updated values for 2023 | 212.5 $m^3$ | 0.08 $tCO_2e$ |
| **Waste** | | |
| Previous values in 2023 report | 2.7 t | 0.1 $tCO_2e$ |
| Updated values for 2023 | 2.4 t | 0.05 $tCO_2e$ |

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