

2020

CARBON FOOTPRINT REPORT

EUROPEAN STABILITY MECHANISM

JULY 2021



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Executive Summary

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

This 2021 publication is the third in a continuing series. The report provides a comprehensive account of the ESM's carbon footprint arising from its operations in Luxembourg City covering the full year of 2020. It also compares the 2020 performance against the ESM's 2019 as well as its 2018 base year performance.

The report takes into account the outbreak of the Covid-19 pandemic, which unfolded at the beginning of 2020 and brought about major changes in the ESM's day-to-day operations and environmental performance. This year's report therefore also includes specific sub-sections focusing on teleworking-related emissions within Chapter 2.2: *Building-related emissions*; as well as Chapter 2.3: *Impact of Covid-19 and new ways of working*.¹

As in previous years, the carbon footprint calculations 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 in accordance with the *International Greenhouse Gas Protocol – a Corporate Accounting and Reporting Standard*. Furthermore, teleworking emissions were estimated set out by EcoAct in their *2020 Homeworking emissions Whitepaper*².

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.

¹ Please note that in July 2021, the ESM published the first version of the 2020 Carbon Footprint Report. To ensure the highest level of confidence in its carbon footprint data, calculations for 2020 carbon emissions were reassessed during the preparation of the 2021 Carbon Footprint Report. This resulted in an update of several 2020 carbon footprint figures, with the aim of ensuring comparability from one year to another. The present report contains the reviewed 2020 carbon footprint figures and results and replaces the one published in July 2021.

² <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.



Foreword

During the Covid-19 pandemic, numerous measures were implemented to contain the spread of the virus. These measures significantly altered the ESM's operations, which ultimately led to a significant decrease in greenhouse gas (GHG) emissions.

As such, global travel restrictions led to a significant decline in business travel. Furthermore, the ESM introduced social distancing measures throughout its premises as of 16 March 2020. Although the ESM largely maintained energy requirements for the ESM premises to keep buildings operational, attendance was severely restricted, with remote working becoming the default approach. This working mode continued in 2021.

The ESM is committed to monitoring the emission sources related to these new working patterns and to finding solutions to mitigate them. To effectively understand the impact of teleworking, the ESM added to this report sub-sections on teleworking-related emissions and a section further analysing and contextualising the impact of teleworking (Chapter 2.3).



Overall 2020 carbon footprint performance

As with previous years, the ESM continued to implement measures seeking to strengthen its environmental practices and commitments. The ESM implemented these measures as part of a cross-divisional effort to improve environmental practices throughout the institution.

During 2020, for example, the ESM increasingly replaced non-recyclable plastic materials with sustainable alternatives in line with the ESM's 2019 pledge under the Zero Single-Use Plastic Manifesto, an initiative by Inspiring More Sustainability – Luxembourg's leading sustainability network. Furthermore, in October 2020, the Luxembourg government awarded the ESM its certificate on the sound treatment of energy sources and the recycling of waste for the eighth consecutive year. The ESM also held its annual staff charity auction of decommissioned information technology (IT) equipment, allowing for the reuse and extension of the lifecycle of IT equipment. The ESM 'Making a Difference' values group steers this initiative, and the auction proceeds are donated to charitable causes.

The ESM also introduced several mobility initiatives in 2020 to decrease its mobility-related emissions. The ESM added an e-car charging station on its premises and replaced several ESM-leased vehicles with hybrid-electric cars.

On the policy side, the ESM updated its Code of Conduct, expanding its environmental and social commitments. With regard to its environmental practices, the ESM Code of Conduct now states that the ESM will "continuously monitor, communicate and limit further its environmental impact." On the social dimension, the ESM reinforced its commitments to providing a safe and healthy work environment. This revision became particularly relevant during the Covid-19 pandemic.

Lastly, throughout 2020, the ESM engaged in various environmental communication and awareness-raising activities. These included internal and external events as well as meetings with inter-institutional collaboration networks, information sessions, and the publication of newsletter articles. As part of these efforts, the ESM staff also exchanged information and ideas on sustainability and environmental best practices with peer institutions through the EcoNet working group, a platform for EU institutions and agencies present in Luxembourg.



Table 1
ESM carbon footprint evolution, 2018–2020
(gross and net)

	2020	2019	2018 (Baseline)	Variation vs. 2019	Variation vs. baseline
Total gross emissions (tCO ₂ e)	310.9	1,091	1,177	↓ 71.5%	↓ 73.6%
Total net emissions (tCO ₂ e)	260	1,016	1,084	↓ 74.4%	↓ 76%
Staff	203	186	179	↑ 9.1%	↑ 13.4%
Carbon intensity per staff member ³ (tCO ₂ e/staff member)	1.3	5.5	6.1	↓ 76.7%	↓ 78.9%

Source: ESM

The ESM's total GHG emissions for 2020 amounted to 310.9 metric tons (t) of CO₂e⁴ (tCO₂e) on a gross basis and 260 tCO₂e on a net basis⁵, which represents an overall emission decrease of 71.5% on a gross basis and 74.4% on a net basis with respect to 2019. ESM staff numbers increased by 9.1% during this period. As expected in light of the Covid-19 pandemic, GHG emissions significantly decreased in 2020, with building-related emissions declining by 19.7% on a gross basis and 12% on a net basis and mobility-related emissions declining by 86% on a gross and net basis. The magnitude of the decrease in building-related emissions was less significant as the ESM kept its premises operational throughout the pandemic.

The breakdown of emissions between mobility-related and building-related activities changed significantly compared to 2019 results both on a gross and net basis. Building-related emissions took up a larger share of total emissions on a gross basis, whilst on a net basis, mobility-related emissions remained the largest contributor. In 2020, 41% of gross emissions were related to staff mobility (2019: 81.2%), while 53% (2019: 18.8%) stemmed from building use. On a net basis, emissions relating to mobility accounted for 49% (2019: 87.2%), while emissions relating to building use for 43.9% (2019: 12.8%). Estimated teleworking-related emissions accounted for 6% of total gross emissions in 2020 and 7.1% of total net emissions.

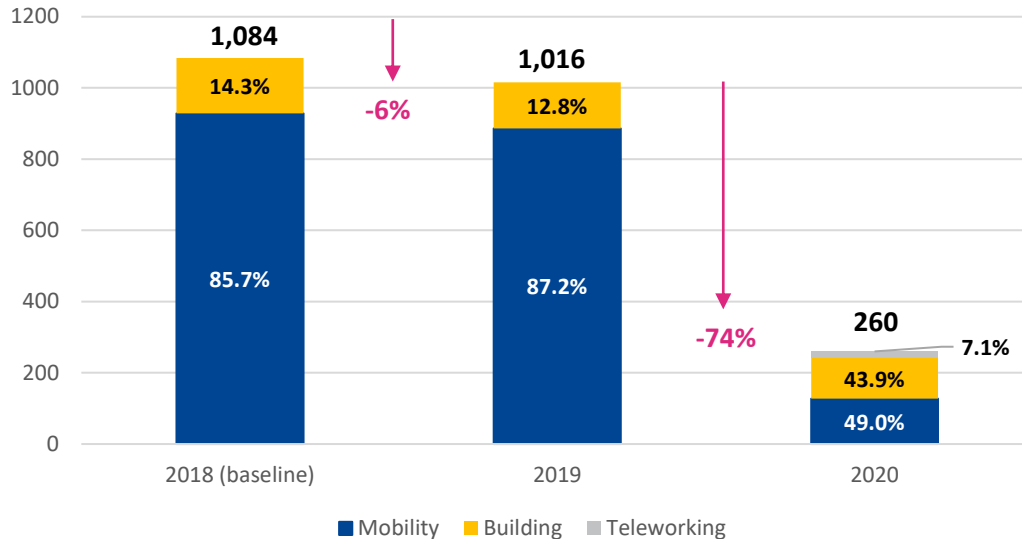
³ Carbon intensity is calculated by dividing the total net emissions per total number of ESM staff members.

⁴ CO₂e is the shorthand for carbon dioxide equivalents. It is the standard unit in carbon accounting to quantify greenhouse gas emissions. It converts the impact of each of the six greenhouse gases covered by the Kyoto Protocol — carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆) — into a common unit of tonnes of CO₂e based on their Global Warming Potential (GWP). CO₂e is calculated by multiplying the emissions of each of the six greenhouse gases by its 100 year GWP.

⁵ In line with reporting best practices, two emissions totals are disclosed – gross emissions and net emissions. “Net” emissions: classify consumption from renewable energy or purchased services that were directly offset as zero emitting. “Gross” emissions: include emissions from these sources, calculated on the basis of national averages.



Figure 1
ESM emissions evolution, 2018–2020
(net tCO₂e)



Source: ESM

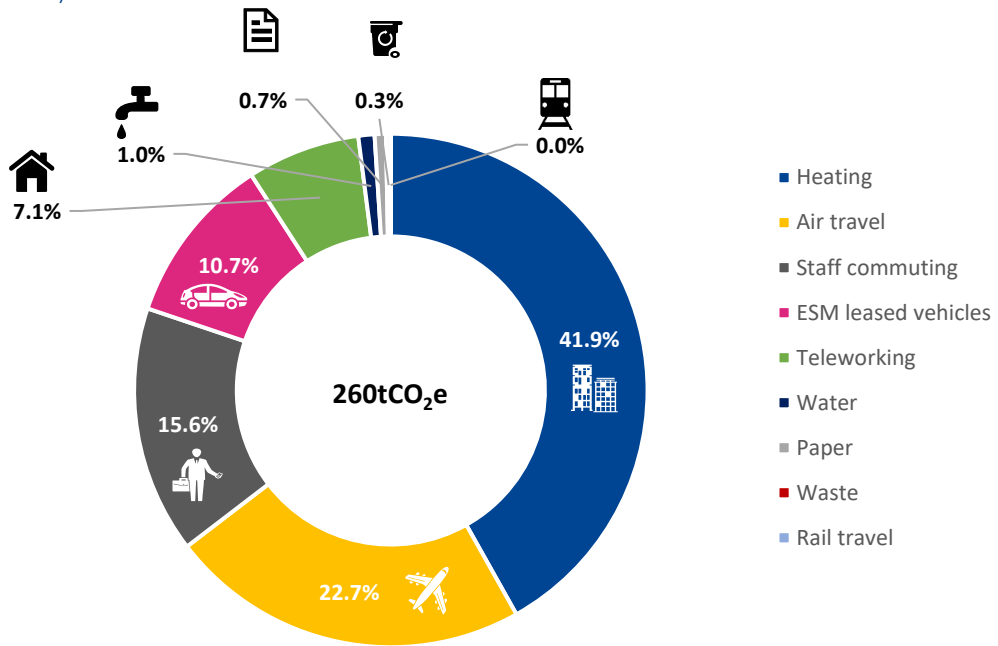
In 2020, the main contributors to emissions included business travel and staff commutes to work. However, due to the Covid-19 pandemic, business travel decreased considerably compared to 2019 and heating became the largest contributor to ESM emissions with 35% of total gross emissions (2019: 11%) and 41.9% of total net emissions (2019: 11.8%).

Even though business travel by air took place only for the first three months of 2020, it still represented the highest share of mobility-related emissions, amounting to 46.4% in 2020 (2019: 83.1%). Air travel represented 19% (2019: 67.4%) of total gross emissions and 22.7% of total net emissions (2019: 72.5%). Other mobility-related activities represented a smaller but still significant share. Staff commuting to work was estimated to represent 13% (2019: 10.6%) and 15.6% (2019: 11.4%) of total gross and net emissions respectively. The use of ESM-leased vehicles in 2020 represented 8.9% (2019: 3.1%) and 10.7% (2019: 3.3%) of total emissions on a gross and net basis respectively, while emissions related to business travel by train were less than 1% (2019: less than 1%).

For building-related emissions, as stated above, the heating of the ESM premises contributed the most to ESM's total emissions. Electricity-related emissions accounted for 16.4% of total ESM emissions on a gross basis (2019: 6.9%), but for 0% on a net basis since the ESM purchased electricity entirely from renewable sources. Other sources of emissions such as the consumption of paper, water, and waste represented a far smaller share of the ESM carbon footprint, collectively producing 1.7% of total gross emissions (2019: 1%) and 2% of total net emissions (2019: 1%).



Figure 2
Total emissions by source, 2020
(net tCO₂e)



Source: ESM



1 Methodology

1.1 Methodology used to calculate ESM's carbon footprint

The ESM reports its GHG emissions in accordance with the *International Greenhouse Gas Protocol - a Corporate Accounting and Reporting Standard*⁶ revised edition.

The International GHG Protocol was 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 accounting, reporting, and quantifying of GHG emissions.

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

Emission calculations in relation to teleworking were not based on activity data but rather estimated according to the following methodology and assumptions. Teleworking-related heating and electricity emissions were estimated based on the methodology and assumptions set out by EcoAct in their *2020 Homeworking emissions Whitepaper*⁷. Teleworking-related water and waste emissions were estimated through publicly available data points and assumptions from official statistics⁸ such as Eurostat and Statec.lu. Based on the trends observed in this data and the EcoAct Whitepaper⁹ methodology, the assumption was taken that household water consumption and waste production increased by 20% due to the time spent teleworking. In addition, emission factors for Luxembourg and surrounding areas were leveraged where appropriate in order to achieve more precise estimations (see Chapter 1.4: Data collection and calculation).

The present report uses the terms “carbon footprint”, “GHG emissions” and “carbon accounting”

⁶ World Business Council for Sustainable Development & World Resources Institute, *The Greenhouse Gas Protocol – A Corporate Accounting and Reporting Standard*, revised edition, 2004.

⁷ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.

⁸ Publicly available data from Statec.lu was used for the estimations of emissions stemming from staff teleworking in Luxembourg. For the estimations of emissions stemming from staff teleworking in France, Belgium and Germany, publicly available data from Eurostat was used.

⁹ The general assumptions taken by the EcoAct Whitepaper on the prorated impact on household energy and heating consumptions reflect the trends observed in publicly available data on household water consumption and waste production. As such the assumption was taken that there was a general increase of 20% for both water and waste due to teleworking.



synonymously and interchangeably as they refer to the GHG inventory of the ESM.

The calculations are performed with the assistance of KPMG Luxembourg Société Coopérative and KPMG in the Netherlands conducted a two-pairs-of-eyes review of the calculations and assumptions. As per reporting best practice, two emission totals are disclosed – gross emissions and net emissions.

- “Net” emissions: classify consumption from renewable energy or purchased services that are directly offset as zero emissions and are considered carbon neutral.
- “Gross” emissions: include emissions from these sources, calculated on the basis of national averages.

1.2 Reporting period

The reporting period covers 1 January 2020 to 31 December 2020. With regard to the analysis of trends, the base year is set at 2018 given that is the earliest year for which all required data is available and validated. The emissions calculated for the base year will serve as a benchmark for further reports.

1.3 Reporting scope

According to the International GHG Protocol, the first step in a carbon footprint assessment is for an organisation to select one of two approaches for consolidating GHG emissions, by defining the **organisational boundaries** for reporting purposes. Given that organisations can be set up as various legal entities, they can exercise different types and degrees of control over their operations.

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

1. the reporting entities can choose to report either the emissions from operations over which they have financial or operational control (control approach); or
2. the emissions from operations according to their share of equity within the operation (equity share approach).

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 (see Figure 2). This covers ESM operations in Luxembourg city. The office space in Brussels and the disaster recovery site are excluded; the impact of these facilities is expected to be non-material given their



relatively small size and infrequent use¹⁰ For further information on the report's exclusions, please see Annex 5.

For the calculation of certain ratios, the ESM factors in the number of permanent staff members employed in 2020 – an average of 203 persons (2019: 186). In 2020, the office space rented by the ESM remained the same as at the end of 2019.

According to the International GHG Protocol, the second step consists of setting up **operational boundaries** to distinguish between direct and indirect emissions. Direct emissions are defined as emissions originating from sources owned or controlled by the reporting entity. Indirect emissions are generated as a consequence of the reporting entities' activities but originate from sources owned or controlled by another entity.

The direct and indirect emissions are split into three scopes:

- **Scope 1:** All direct GHG emissions from sources that are owned or controlled by the reporting entities;
- **Scope 2:** Indirect GHG emissions from the purchase of electricity, heat, steam, or cooling; and
- **Scope 3:** Other indirect emissions.

The International GHG Protocol requires entities to report a minimum of Scope 1 and 2 emissions, while reporting on Scope 3 emissions is optional.

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

- **Scope 1:** ESM-leased vehicles;
- **Scope 2:** Electricity and heating purchased for the ESM premises; and
- **Scope 3:** Business travel of ESM staff, commuting of staff to work, paper and water consumption, waste generated at ESM premises, and teleworking-related emissions.

In light of the teleworking environment, and in line with the above definition of Scope 3 elements, the ESM added the following activities to Scope 3 in 2020:

- Estimated teleworking-related emissions: Teleworking calculations include the incremental increase in electricity, heating, water, and waste consumed by ESM staff while working from home. Teleworking-related heating and electricity were introduced according to the EcoAct

¹⁰ The Brussels office was used for six days during the first three months of 2020 and only eight ESM staff members worked from the disaster recovery site during three days in March 2020, to ensure business continuity and a smooth transition from office presence to a teleworking scenario in the context of the Covid-19 pandemic.

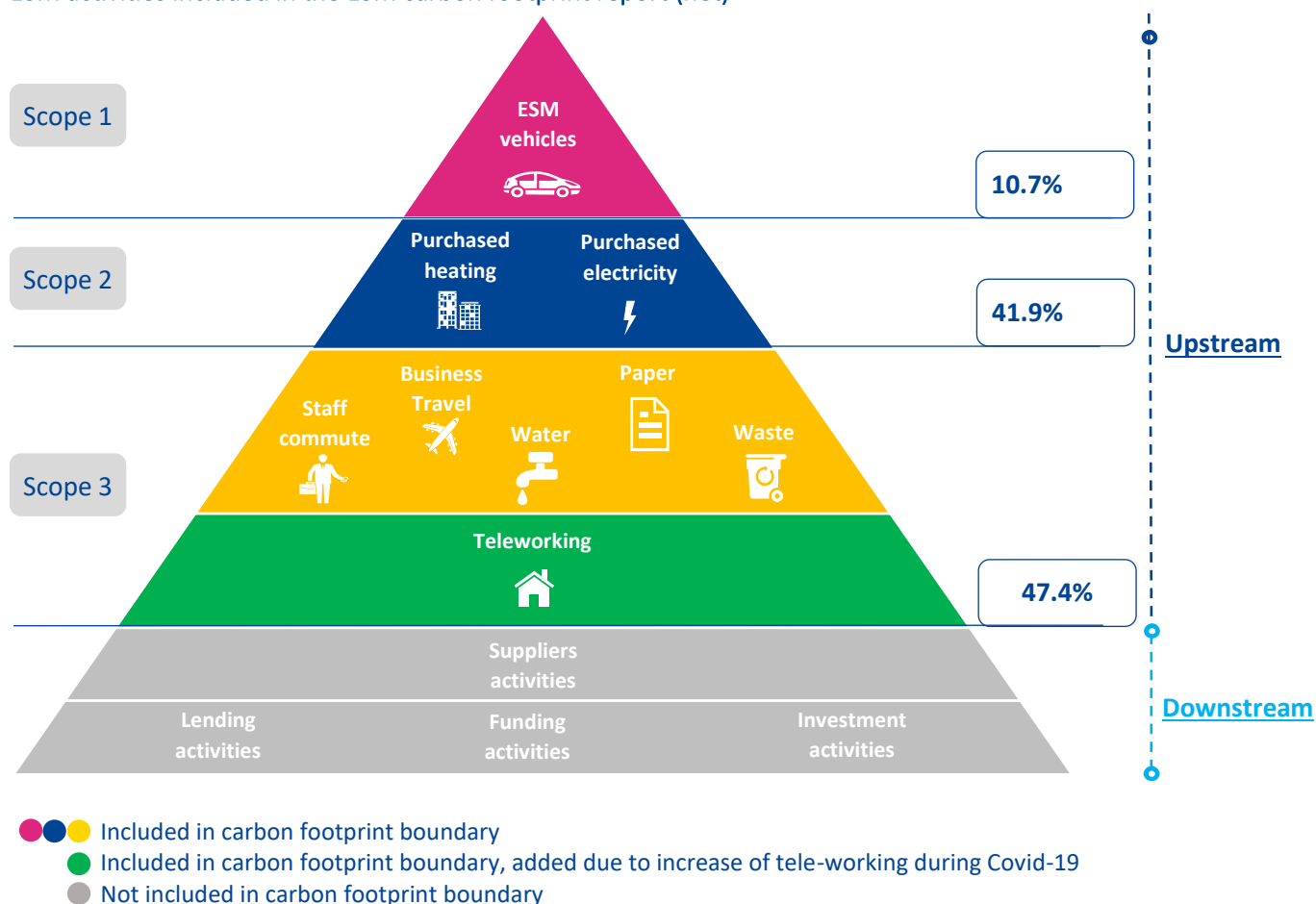


Whitepaper methodology. Teleworking-related water and waste emissions were estimated based on national statistics (Statec.lu and Eurostat) to substantiate the underlying assumptions of the calculations.

- Furthermore, with the objective of having a more precise breakdown of emission sources related to waste, hazardous waste generated at ESM premises was added to Scope 3.

The GHG emissions sources are also categorised from the life cycle perspective into: upstream emissions (resulting from the processing and production of a product up to the point of sale), or downstream emissions (occurring after the sale of a product, through its distribution, storage, use, and end-of-life). See Figure 2 for a diagram of what ESM activities are included in the 2020 ESM carbon footprint report. From a life-cycle perspective, the emissions the ESM includes in scope are all upstream. Currently, the institution does not assess the carbon footprint of its lending, or investment activities.

Figure 3
ESM activities included in the ESM carbon footprint report (net)



Source: ESM



1.4 Data collection and calculation

To estimate GHG emissions, organisations need to collect data that quantifies activities resulting in GHG emissions. Such activity data can, for instance, include kilowatt-hours of electricity consumed or kilometres travelled by staff.

For most of the report, the ESM uses primary activity data, interpreting it in light of documented evidence, such as energy or heating invoices. However, distance travelled by staff commuting to work and resulting emissions are estimated based on several underlying assumptions, such as the type of car or fuel used, as described in Annex 4. This information helps to determine which emission factor to apply to convert the activity data into GHG emissions.

The ESM estimated the teleworking-related emissions for electricity and heating by following the methodology developed by the EcoAct *Homeworking emissions Whitepaper*.¹¹ For emissions related to water consumed and waste produced from teleworking, the ESM used national statistics (Statec.lu and Eurostat) to substantiate the underlying assumptions of the calculations. To ensure comparability and consistency in ESM's carbon emissions, the same emission factors were used to calculate building-related emissions as well as estimated teleworking-related emissions.

For the purposes of this report, the emission factors are derived from established sources, such as the UK government's Department for Environment, Food & Rural Affairs (Defra), ADEME Bilan GES, and the International Energy Agency (IEA).¹²

¹¹ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.

¹² Refer to Annex 3 for further information on emission factors.



2 Carbon footprint results

- Total GHG emissions generated by the ESM in 2020 amounted to 310.9 tCO₂e on a gross basis (2019: 1,091 tCO₂e) and 260 tCO₂e on a net basis (2019: 1,016 tCO₂e).
- These results represented a decrease of 71.5% on a gross basis and 74.4% on a net basis versus 2019. Compared to the baseline year (2018), they represent a decrease of 73.6% on a gross basis and 76% on a net basis.
- The stark decrease in 2020 emissions compared to previous years is mostly linked to the Covid-19 pandemic, which significantly altered ESM operations.

The analysis of emission sources confirmed that on a net basis, staff mobility-related emissions remained the largest contributor to total emissions, while on a gross basis, building-related emissions represented the largest source of total emissions. Mobility-related emissions amounted to 41% of total gross emissions (2019: 81.2%) and 49% of total net emissions (2019: 87.2%). Building-related emissions accounted for 53% of the ESM’s overall emissions on a gross basis (2019: 18.8%) and 43.9% on a net basis (2019: 12.8%). Estimated teleworking-related emissions amounted to 6% of total gross emissions and 7.1% of total net emissions.

Figure 4
Total gross vs net emissions, 2020
(gross/net tCO₂e)

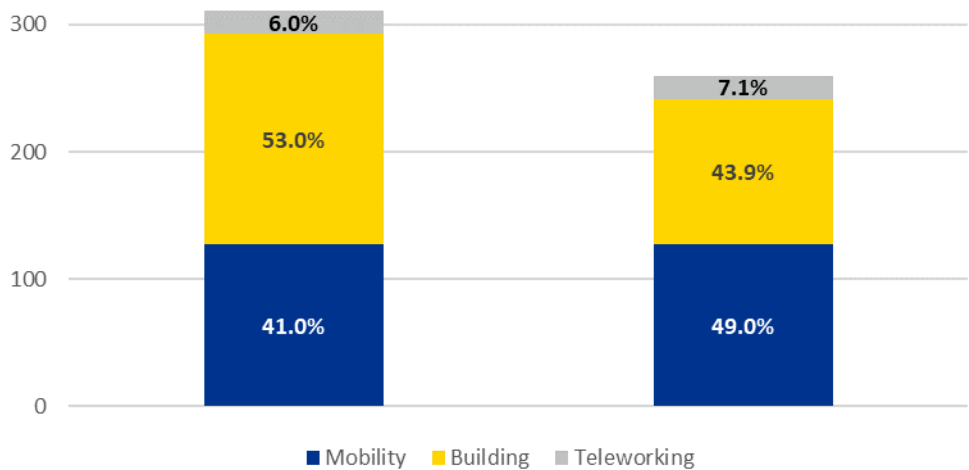
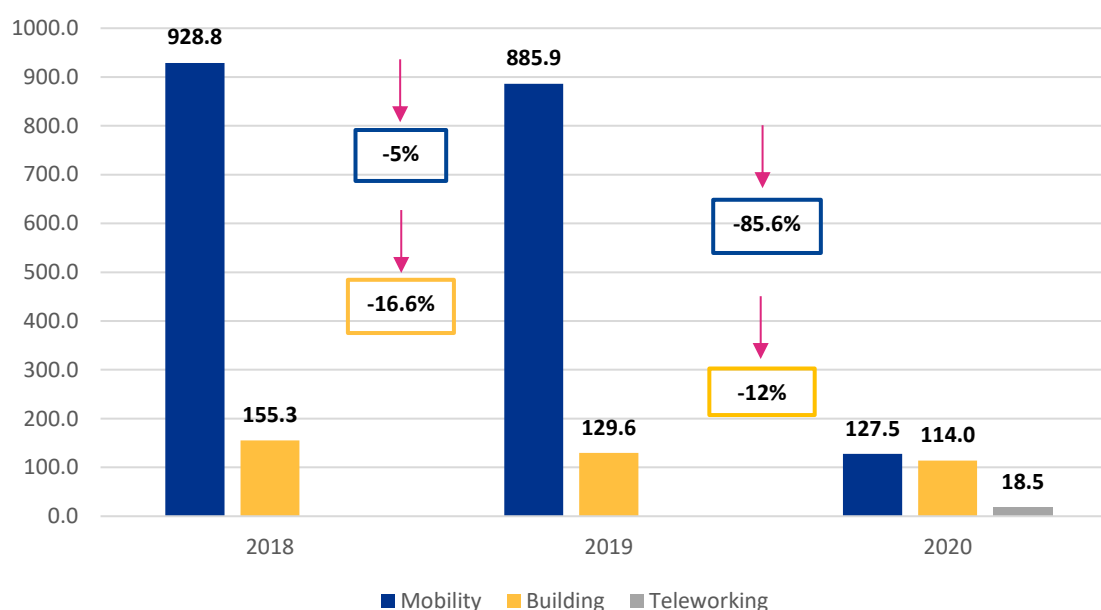


Figure 5

Breakdown between mobility-, building- and teleworking-related emissions, 2020 (gross/net tCO₂e)



Source: ESM

Differently from the pre-pandemic years, in 2020 heating was the highest emitting activity, responsible for 108.8 tCO₂e on a gross/net basis and representing 35% of total gross emissions (2019: 11%) and the 41.9% of total net emissions (2019: 11.8%).

The second largest contributor differed depending on whether the information is reported on a net or gross approach. The second-largest contributor on a net basis was air travel, contributing 59.1 tCO₂e or 22.7% of total net emissions, a 92% decrease from 2019 (2019: 735.8 tCO₂e)

On a gross basis, the second-largest contributor to overall emissions was electricity, responsible for the emissions of 50.9 tCO₂e (2019: 75.7 tCO₂e) and covering 16.4% of overall gross emissions. However, the electricity delivered to the ESM premises is derived entirely from renewable sources, as confirmed by a green Guarantee of Origin, therefore there are no emissions associated to this activity on a net basis.

The third-largest contributor on both a net and gross basis was staff commuting, responsible for 40.5 tCO₂e (2019: 115.9 tCO₂e) on a gross/net basis, covering 13% of overall gross emissions (2020: 10.6%) and 15.6% of overall net emissions (2020: 11.4%). This represents a decrease of 65.1% from the previous year, stemming from an increase in teleworking due to Covid-19.

Looking at the breakdown between Scopes 1, 2, and 3 as defined by the International GHG Protocol, the ESM's 2020 carbon footprint results revealed that Scope 3 accounted for the largest part of emissions with 47.5% of total net emissions (2019: 84.9%). This result is common for financial sector

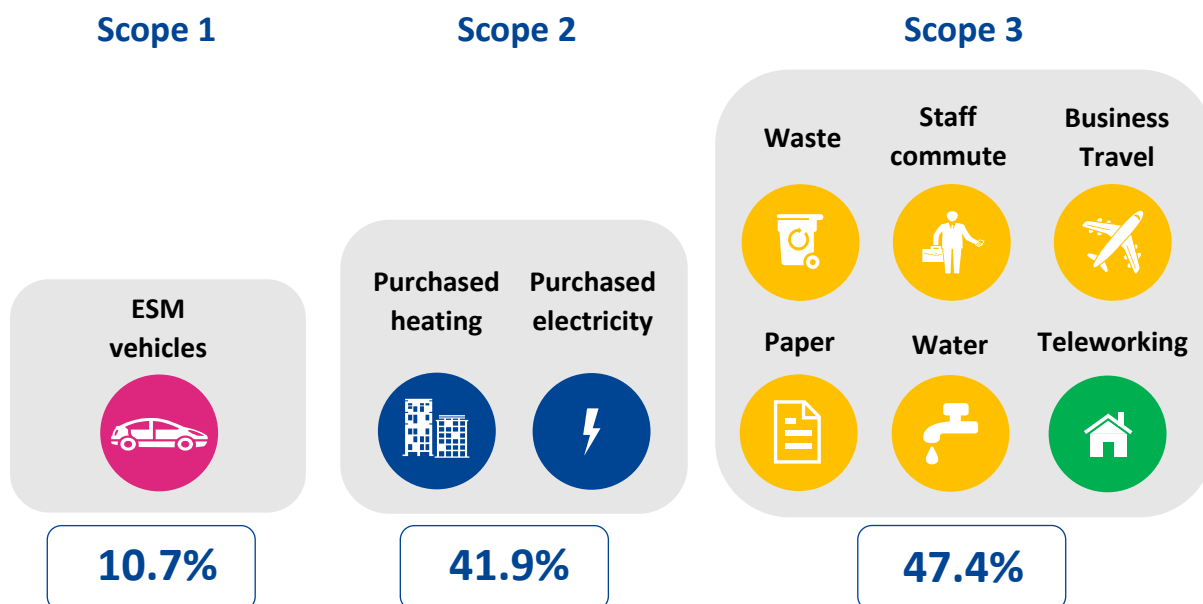


entities, where the largest source of emissions is usually derived from business travel and staff commuting. Nevertheless, in relative terms, the share of Scope 3 emissions declined by 44.1% reflecting the shift in working and travel patterns due to the Covid-19 pandemic.

Figure 6

Breakdown of ESM emissions per scope

(net)



Source: ESM

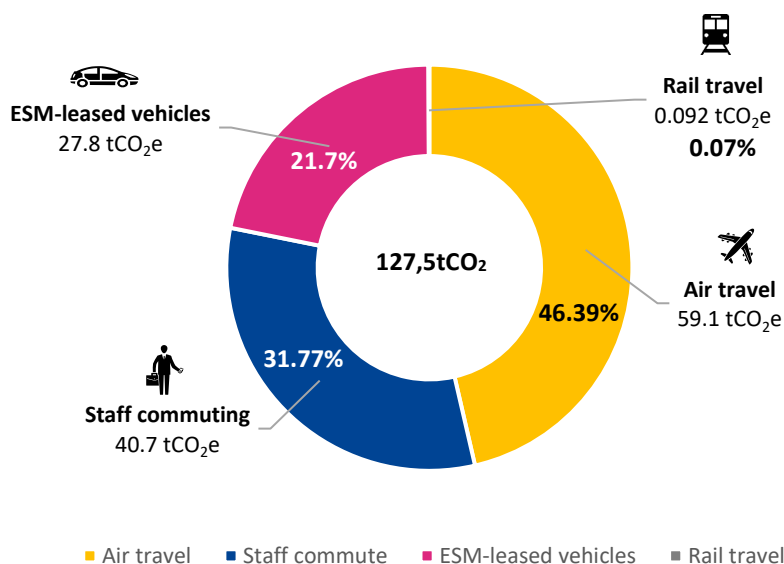
2.1 Mobility-related emissions

- ➔ *Mobility-related emissions represented the largest share of the ESM carbon footprint in 2020 on a net basis only.*
- ➔ *They amounted to 127.5 tCO₂e on a gross/net basis (2019: 885.9 tCO₂e), accounting for 41% of total gross emissions (2019: 81.2%) and 49% of total net emissions (2019: 87.2%).*
- ➔ *Mobility-related emissions decreased by 85.6% on a gross and net basis versus 2019.*

Staff mobility, including both business travel and staff commute, represented the largest share of total emissions on a net basis. Air travel, which took place during the first three months of the year, was responsible for the major portion of staff mobility-related emissions, accounting for 46.4% of mobility-related gross and net emissions. Staff commute followed, representing 31.8% of mobility-related gross and net emissions. The remaining share of mobility-related emissions was linked to the use of ESM-leased vehicles (including the ESM minivan used for group travel), accounting for 21.7% of gross and

net mobility-related emissions. The emissions linked to business travel by rail were very limited in 2020 with only 0.07% of gross and net emissions.

Figure 7
Breakdown of mobility-related emissions by source, 2020
(gross/net tCO₂e)



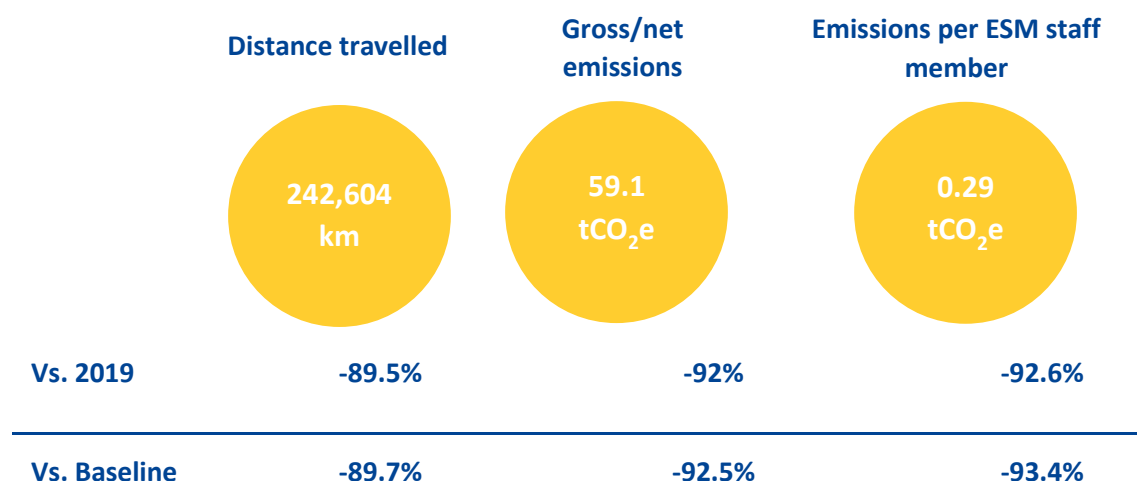
Source: ESM

Due to the Covid-19 pandemic, business travel was severely restricted during 2020. However, given the nature of the ESM mandate, and despite the Covid-19 pandemic, business travel remained an unavoidable activity and was conducted, on limited occasions, in line with national and international health and safety recommendations.

2.1.1 Air travel

- ➔ *Air travel represented the largest source of ESM gross and net emissions, accounting for 19% of the overall gross emissions (2019: 67.4%) and 22.7% of the overall net emissions (2019: 72.5%). Air travel also amounted to 46.4% of mobility-related emissions on a gross and net basis (2019: 83.1%).*
- ➔ *Gross and net emissions resulting from air travel decreased to 59.1 tCO₂e in 2020 from 735.8 tCO₂e in 2019, a reduction of 92% due to the limited business travel activity during the Covid-19 pandemic.*





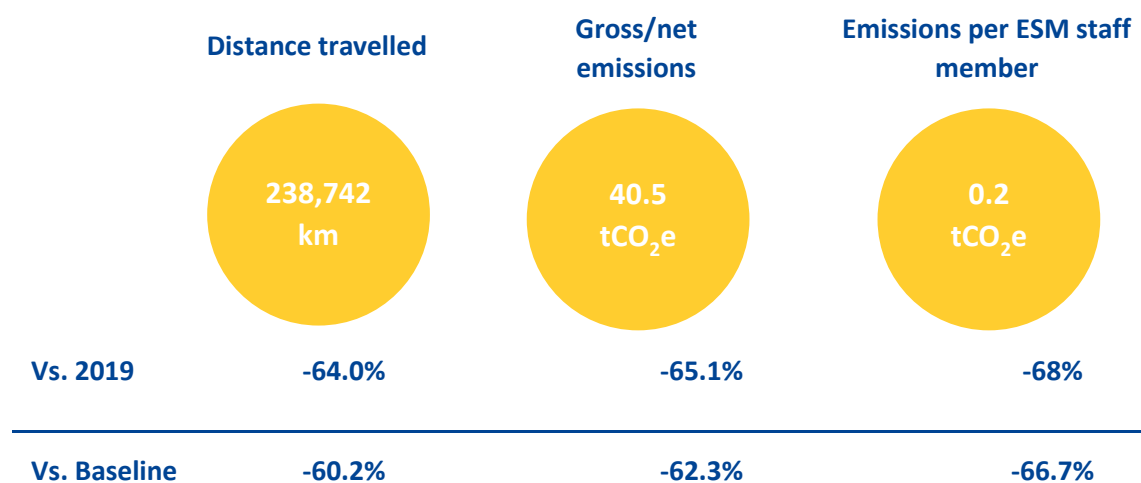
Distance travelled by air amounted to a total of around 242,604 kilometres, an 89.5% reduction from the 2.32 million kilometres registered in 2019. The resulting emissions totalled 59.1 tCO₂e, or 0.29 tCO₂e per ESM staff member in 2020. Overall, business travel by air reached 46.4% of gross and net mobility-related emissions (2019: 83.1%), a reduction of 92% over 2019 air travel emissions. This drop largely reflected the impact of the Covid-19 pandemic on travel.

In 2020, the ESM maintained the same calculation methodology as the one used in 2019 and in 2018, in which the emissions associated with each leg of an individual flight are calculated based on the business class and distance travelled.

2.1.2 Staff commuting

- ➔ *Staff commute emissions amounted to 13% of total ESM gross emissions (2019: 10.6%) and 15.6% of total net emissions (2019: 11.4%). With a view to mobility-related emissions, staff commuting totalled 31.8% on a gross and net basis (2019: 13.1%).*
- ➔ *Gross and net emissions associated with staff commuting decreased to 40.5 tCO₂e in 2020 from 115.9 tCO₂e in 2019, or by 65.1% due to the significant increase in teleworking.*





In 2020, ESM staff commuted around 239,000 kilometres by car, representing an average 1,176 kilometres per ESM staff member. The commute of ESM staff to work represented 31.8% of mobility-related emissions (2019: 13.1%). The total distance commuted by staff decreased 64.0% over 2019, leading to a 65.1% decrease in related emissions, or 40.5 tCO₂e (2019: 115.9 tCO₂e) on a gross and net basis (i.e. 0.2 tCO₂e per staff member).

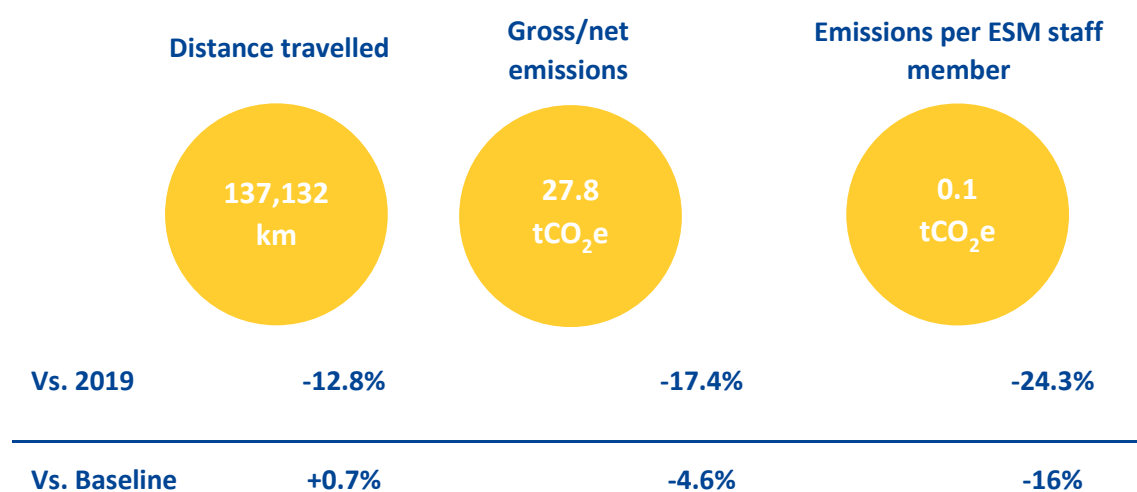
Starting from 2019, the ESM consolidated its methodology for the calculation of emissions resulting from staff commute, relying on a conservative approach assuming most ESM staff commute by car. As such, in 2020, the distances from the respective home addresses to the office were calibrated by the average occupancy rate of ESM parking spaces and number of business days.¹³ In addition, the ESM leveraged national statistics on vehicles in use in Luxembourg broken down by type of fuel. Supplementing these figures during the pandemic, desk reservation tool statistics were factored in to provide a more accurate representation of office presence.¹⁴

To further encourage green modes of transport, during 2020, the ESM installed an additional e-car charging station on its premises. The ESM now has four e-car charging stations in total.

¹⁴ In the early stages of the pandemic, the desk reservation tool was used on a best-effort basis as there were other means of registering staff attendance at ESM premise.

2.1.3 ESM-leased vehicles

- *The emissions generated by ESM vehicles represented 8.9% of total ESM gross emissions (2019: 3.1%) and 10.7% of total net emissions (2019: 3.3%). ESM-leased vehicles represented 21.8% of mobility-related emissions on a gross and net basis.*
- *Gross and net emissions resulting from the use of ESM-leased vehicles decreased to 27.8 tCO₂e in 2020 from 33.6 tCO₂e in 2019, declining by 17.4% compared to 2019.*



The ESM leased and operated eight vehicles¹⁵ including a minivan used to drive staff members to business events in and outside of Luxembourg. Two hybrid cars were added to the fleet in 2020.

The aggregated distance travelled by the ESM-leased vehicles in 2020 amounted to 137,131.6 kilometres for a 12.8% decline compared to 2019 (2019: 157,171.7 kilometres).

The emissions generated by the use of ESM-leased vehicles amounted to 27.8 tCO₂e, or 0.1 tCO₂e per staff member, a 17.4% decline compared to the previous year (2019: 33.6 tCO₂e). The share of emissions associated with the use of ESM-leased cars out of mobility-related emissions amounted to 21.8% (2019: 3.8%).

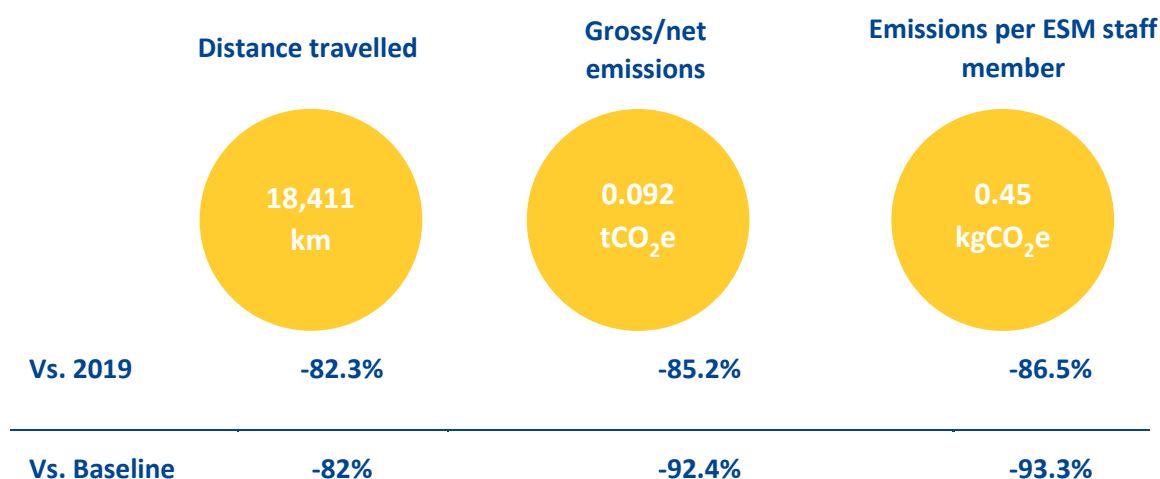
In 2020, the ESM maintained the same methodology for calculating emissions resulting from the use of leased cars: the mileage travelled by each car was multiplied by the appropriate emission factor for the car's type of fuel to obtain the total CO₂ equivalent for the year.

¹⁵ During the year of 2020, ESM changed its car leasing provider, however the total amount of leased cars remained at a total of eight during the entire year.

Opportunities to introduce environmentally friendly alternatives are continuously assessed in line with market developments.

2.1.4 Rail travel

- *ESM business travel by rail represented less than 1% of total ESM gross and net emissions (2019: less than 1%) and less than 1% of the mobility-related emissions (2019: less than 1%).*
- *Gross and net emissions generated by rail travel decreased to 0.092 tCO₂e in 2020 from 0.62 tCO₂e in 2019, an 85.2% drop versus 2019.*



Business travel by rail represented a marginal share of staff mobility in 2020 of 0.07% (2019: 0.1%). The year 2020 experienced an 82.3% decrease in the total distance travelled by train due to the impact of Covid-19 which led to a decline in the use of public transport (2019: 103,778 kilometres). The associated emissions dropped by almost 85.2% from 2019 to 0.092 tCO₂e (2019: 0.6 tCO₂e), or 0.45 kgCO₂e, respectively, per staff member.

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.

2.2 Building-related emissions

- ➔ *Building-related emissions amounted to 164.9 tCO₂e on a gross basis (2019: 205.3 tCO₂e) and 114.0 tCO₂e on a net basis in 2020 (2019: 129.6 tCO₂e).*
- ➔ *This represented 53% of total ESM carbon footprint emissions on a gross basis (2019: 18.8%) and 43.9% on a net basis (2019: 12.8%).*
- ➔ *Gross and net building-related emissions decreased by 19.7% and 12%, respectively, versus 2019.*
- ➔ *Estimated teleworking emissions amounted to 18.5 tCO₂e on a gross and net basis.*

The main source of building-related emissions remained heating, which contributed 66% of total gross building-related emissions (2019: 58.2%) and 95.5% of total net building-related emissions (2019: 92.2%).

On a gross basis, electricity represented the second-largest source of building-related emissions with a share of 30.9% (2019: 37%). However, as the ESM purchased 100% of its electricity from renewable energy sources (hydropower), covered by green Guarantees of Origin, electricity consumption was reported as zero emissions on a net basis.

The remaining sources of emissions represented a smaller share of 3.1% of total gross building-related emissions and 4.5% on a net basis. The method of calculation of all building-related emissions followed the same approach as in 2019. That is to say, consumption data was multiplied by the appropriate emission factor to obtain the annual carbon footprint.



Figure 8

Breakdown of building-related emissions by source, 2020

(gross tCO₂e)

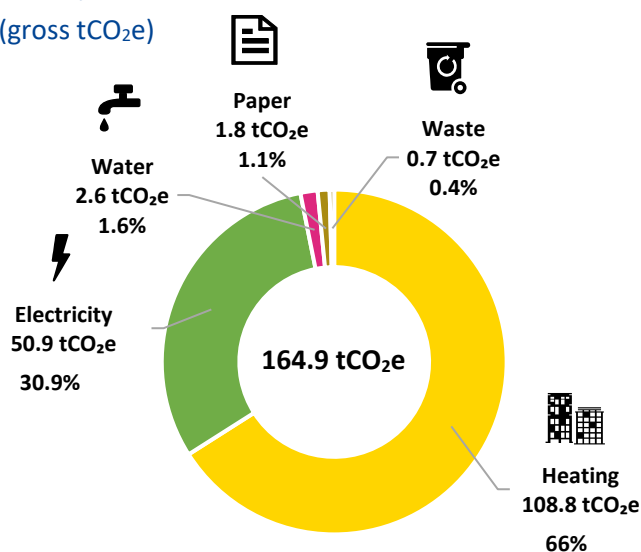
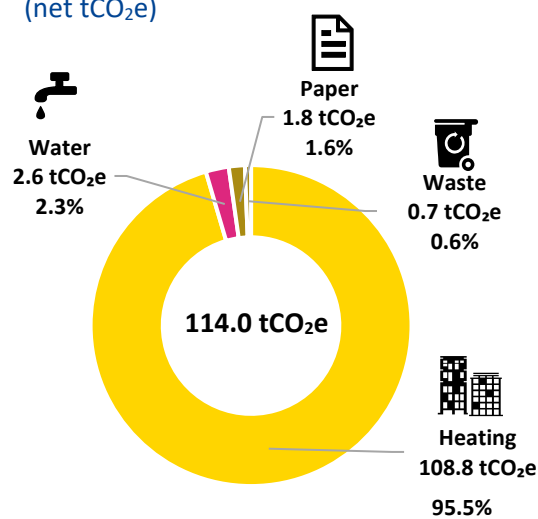


Figure 9

Breakdown of building-related emissions by source, 2020

(net tCO₂e)



Source: ESM

Estimate of teleworking-related emissions

- ➔ *Teleworking emissions were calculated factoring in estimated values for electricity, heating, water, and waste consumed by staff while working from home.*
- ➔ *Estimated teleworking emissions amounted to 18.5 tCO₂e on a gross and net basis in 2020.*
- ➔ *This represented 6% of total ESM carbon footprint emissions on a gross basis and 7.1% on a net basis.*
- ➔ *As it is expected that teleworking will continue in the coming years, the ESM is committed to developing a more refined data collection approach and to monitoring the emission sources related to these new working practices.*

Annual teleworking emissions were calculated factoring in the estimated incremental increase in electricity, heating, water, and waste generated by teleworking¹⁶. The following assumptions were used to calculate the estimated teleworking emissions:

- Working days in 2020
- Working hours per day
- Average office occupancy rate (January to mid-March)

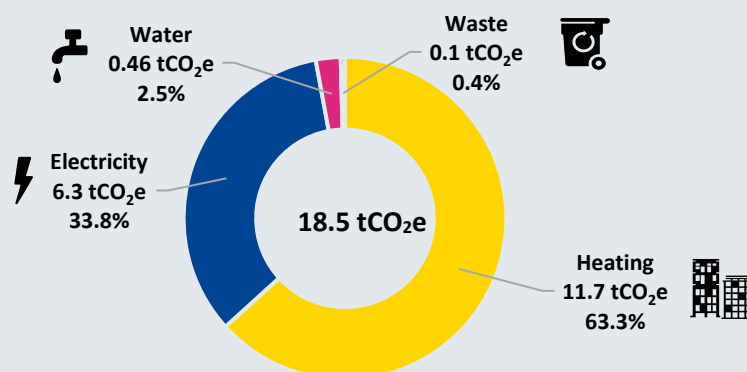
¹⁶ To estimate teleworking-related emissions, the methodology outlined in the EcoAct Whitepaper was used for electricity and heating and publicly available data was used to estimate water and waste emissions (for more detail see section 1.1: Methodology used to calculate ESM's carbon footprint).

- Average office occupancy rate (mid-March to December) factoring in teleworking

Furthermore, official statistics were used to approximate heating sources, water consumption, and waste generation. Based on these assumptions, the main source of teleworking-related emissions was heating, which was estimated to contribute 63.3% of total gross and net teleworking-related emissions. On a gross and net basis, electricity represented the second-largest source of teleworking-related emissions with a share of 33.8%. The remaining sources of emissions represented a less significant share for the ESM teleworking carbon footprint of 2.9% of total gross and net teleworking-related emissions.

Figure 10

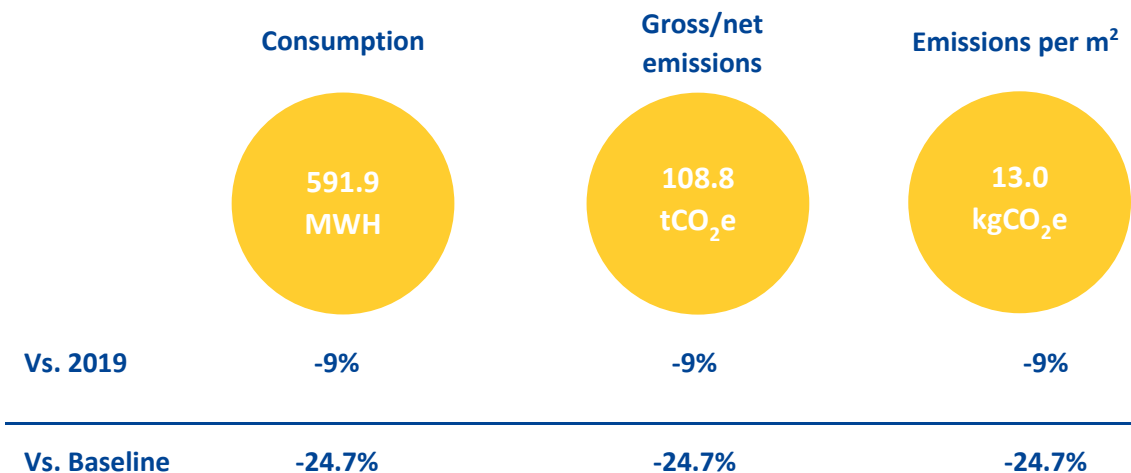
Breakdown of teleworking emissions by source, 2020
(gross/net tCO₂e)



Source: ESM

2.2.1 Heating

- ➔ Heating represented the largest emitting ESM activity overall in 2020 with a 35% share of total gross emissions (2019: 11%) and 41.9% of total net emissions (2019: 11.8%). Heating accounted for 66% of ESM gross building-related emissions (2019: 58.2%) and 95.5% of net building-related emissions (2019: 92.2%).
- ➔ The ESM consumed 591.9 MWh in heating in 2020 (2019: 650.1 MWh).
- ➔ Heating-related gross and net emissions decreased by 9% versus 2019.

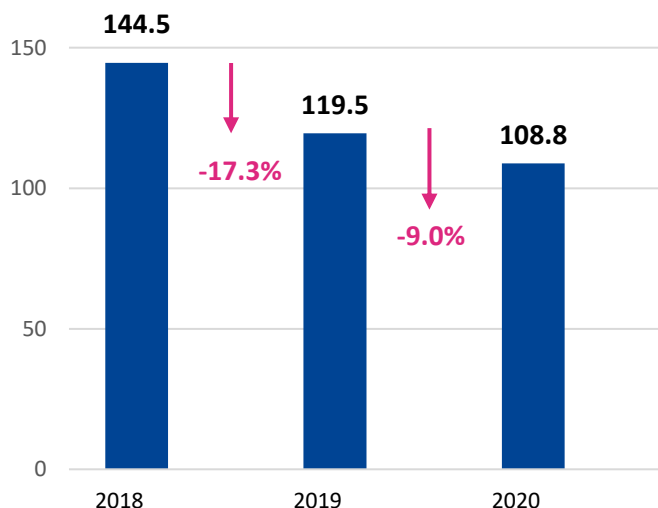


In 2020, heating the ESM premises remained the highest-emitting building-related activity and the largest contributor to total ESM emissions. The ESM premises were heated by natural gas.

The ESM consumed 591.9 MWh of heating in 2020, a 9% reduction compared with the previous year (2019: 650.1 MWh). The emissions generated followed the same trend, declining to 108.8 tCO₂e in 2020, a 9% decrease over 2019 (2019: 119.5 tCO₂e) and 13 kgCO₂e per square metre.

Figure 11

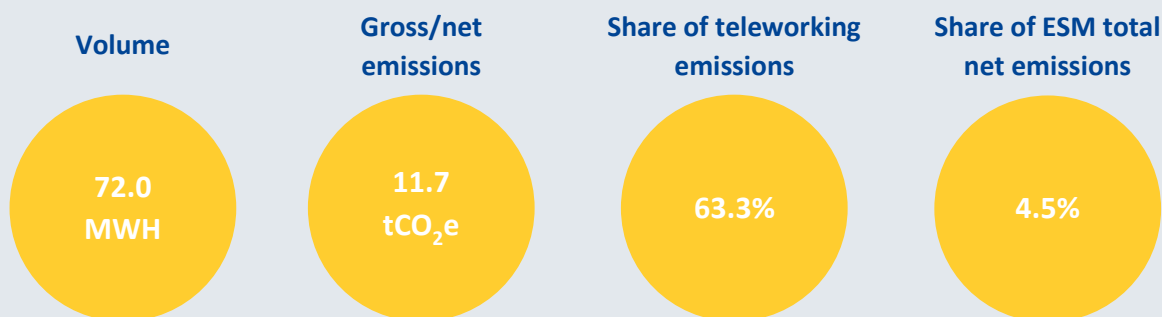
Emissions from heating consumption, 2018–2020
(gross/net tCO₂e)



Source: ESM

Focus on teleworking-related heating emissions

- ➔ *Domestic heating amounted to 72 MWh in 2020.*
- ➔ *Estimated teleworking-related heating emissions represented 3.8% of total gross emissions and 4.5% of total net emissions.*
- ➔ *Teleworking-related heating emissions accounted, however, for 63.3% of ESM gross and net teleworking-related emissions.*



Following the EcoAct Whitepaper¹⁷ methodology, it is assumed that heating season is from October to March of each year. As the ESM enforced its teleworking policy in mid-March 2020, heating-related emissions were estimated for the second half of March as well as from October to December of 2020. In addition, the EcoAct Whitepaper¹⁸ 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 12,000kWh 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 neighboring regions was used factoring in staff’s residential post codes to more accurately reflect the different domestic heating sources used.

The calculations also accounted for the average house and room sizes of teleworkers in each country, and the proportion of homes that have the ability to regulate heating by room, when working from home as opposed to a whole house.

Furthermore, according to the EcoAct’s Whitepaper¹⁹ methodology, it was assumed that the average heating energy source was natural gas.

Accounting for these factors, this analysis has been able to estimate the incremental domestic heating consumption. As such, in 2020, heating was the highest-emitting teleworking-related activity although

¹⁷ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.

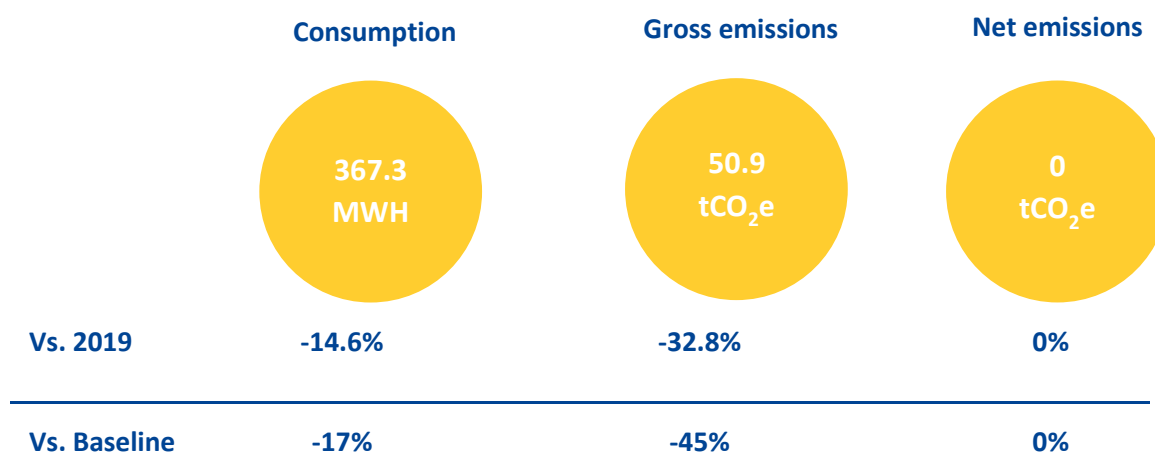
¹⁸ See footnote 17.

¹⁹ See footnote 17.

still only a minor contributor to total ESM emissions. ESM staff consumed 72 MWh of telework-related heating, accounting for 11.7 tCO₂e gross and net emissions and 57.7 kgCO₂e per ESM staff member.

2.2.2 Electricity consumption

- *The ESM consumed 367.3 MWh of electricity in 2020 (2019: 430.2 MWh).*
- *The resulting emissions represented 16.4% (2019: 6.9%) of total ESM gross emissions and 0% on a net basis, as electricity was derived entirely from renewable sources. Electricity-related emissions accounted for 30.9% of the building-related gross emissions (2019: 37%) and were zero on a net basis.*
- *Electricity-related gross emissions amounted to 50.9 tCO₂e, a decrease of 32.8% versus 2019.*



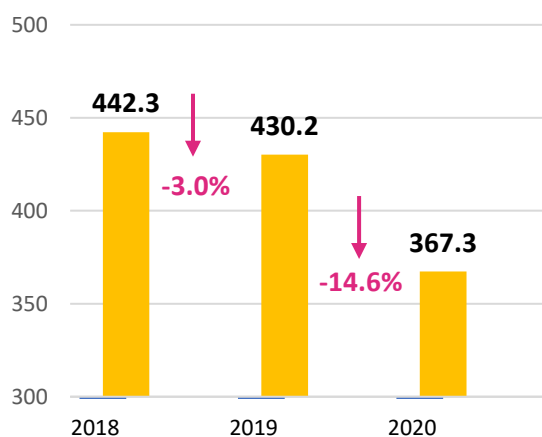
In 2020, ESM's electricity consumption amounted to 367.3 MWh, a decline of 14.6% from the previous year (2019: 430.2 MWh). This reduction in electricity consumption was caused mainly by a lower staff presence at ESM facilities due to the Covid-19 pandemic as well as electricity-reducing measures. The ESM, for example, systematically replaces any non-performing lightbulbs with LED lights, which consume less electricity and have a longer product life-span.

In 2020, the gross electricity-related emissions amounted to 50.9 tCO₂e, dropping 32.8% from 2019 (2019: 75.7 tCO₂e). This represented 30.9% of the gross ESM building-related emissions (2019: 36.9%). Given that the electricity purchased for the ESM premises was derived entirely from renewable sources, the net emissions were considered to be zero.



Figure 12

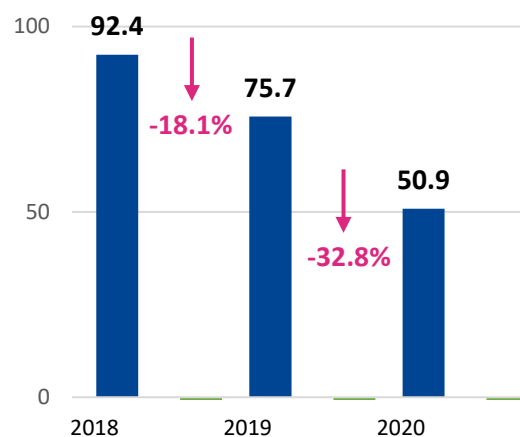
Electricity consumption, 2018–2020 (MWh)



Source: ESM

Figure 13

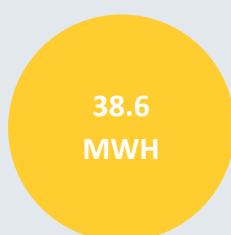
Emissions from electricity consumption, 2018–2020 (gross tCO₂e)



Focus on teleworking-related electricity emissions

- ➔ *Estimated teleworking-related electricity consumption represented more than 38.6 MWh in 2020.*
- ➔ *The resulting emissions represented 2% of total ESM gross emissions and 2.4% on a net basis.*
- ➔ *Electricity-related emissions accounted for 33.8% of the teleworking-related gross and net emissions.*

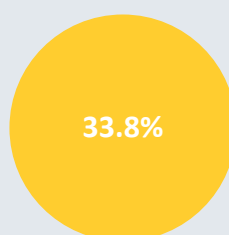
Volume



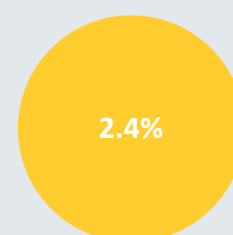
Gross/net emissions



Share of teleworking emissions



Share of ESM total net emissions



In line with the EcoAct Whitepaper²⁰ methodology, the additional daily electricity consumption resulting from an average teleworker's use of home office equipment 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 these emissions, the IEA electricity emission factors for Luxembourg and surrounding areas were factored in to allow for more accurate estimates.

²⁰ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.

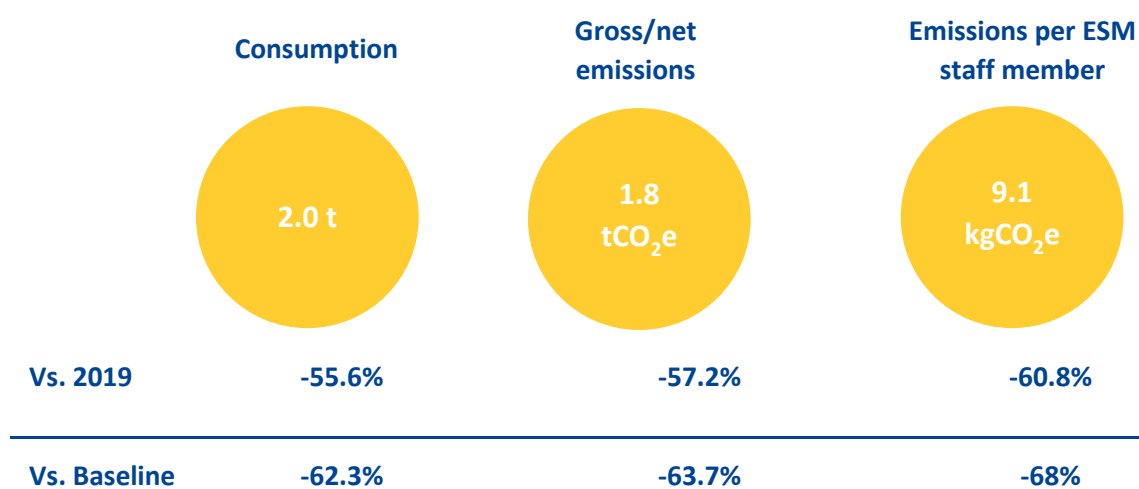
Furthermore, in line with the EcoAct Whitepaper²¹ methodology, it is estimated that an average of 140W was consumed per workstation and 10W for lighting during the 8 hours of use per working day.

It is also assumed that a working day – during which the additional teleworking-related electricity consumption- occurs – is eight hours. This is based on a typical working day from 9:00 to 18:00 – with a one-hour break. 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.

In 2020, teleworking-related electricity use represented more than 38.6 MWh in 2020, a minor 2% share of total ESM gross emissions and 2.4% on a net basis. Teleworking-related electricity accounted however for 33.8% of total teleworking-related gross and net emissions.

2.2.3 Paper consumption

- ➔ *The ESM consumed 2 tonnes of paper in 2020 (2019: 4.5 tonnes).*
- ➔ *The emissions amounted to 0.6% of total ESM gross emissions (2019: 0.4%) and 0.7% of total net emissions (2019: 0.4%). Their share in total building-related emissions represented 1.1% on a gross basis (2019: 2.1%) and 1.6% on a net basis (2019: 3.3%).*
- ➔ *Paper-related gross and net emissions decreased by 57.2% versus 2019.*



²¹ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.

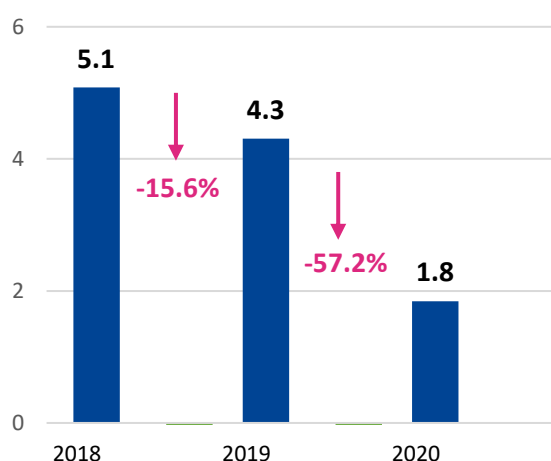


In 2020, the ESM consumed around 2.0 t of paper, 55.6% less than in 2019 (2019: 4.5 t). This represents 9.1 kgCO₂e per staff member. The consumption resulted in a 57.2% reduction in paper-related emissions 1.8 tCO₂e (2019: 4.3 tCO₂e) in 2020 over 2019, driven by a decrease in the volume of paper used and in the related emission factors. Overall, emissions resulting from paper consumption represented 1.1% of total building-related gross emissions (2019: 2.1%) and 1.6% of total building-related net emissions (2019: 3.3%).

The digitalisation of communications as well as the reduced staff office presence due to the Covid-19 pandemic, coupled with awareness-raising campaigns and the technical measures implemented, also contributed to decreasing office paper consumption. Going forward, the ESM will leverage more sustainable sources in its paper consumption and has already obtained such a provider.

Figure 14

Emissions from paper consumption, 2018–2020 (gross/net tCO₂e)

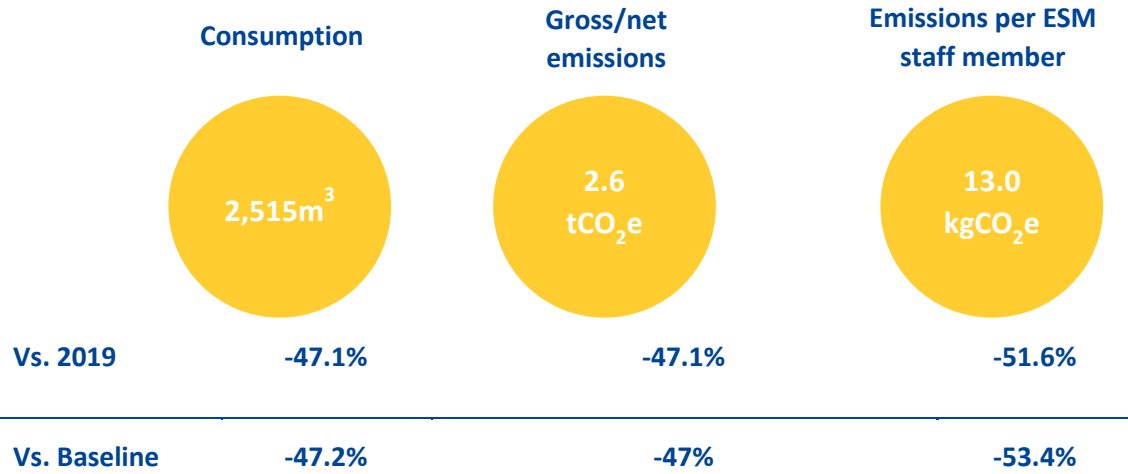


Source: ESM

2.2.4 Water consumption

- ➔ ESM water consumption amounted to 2,515 m³ in 2020 (2019: around 4,700m³).
- ➔ The resulting emissions amounted in 2020 to 0.9% of total gross emissions (2019: 0.5%) and 1% of total net emissions (2019: 0.5%). Their share in total building-related emissions represented 1.6% on a gross basis (2019: 2.4%) and 2.3% on a net basis (2019: 3.9%).
- ➔ Water-related gross and net emissions decreased by 47.1% versus 2019.



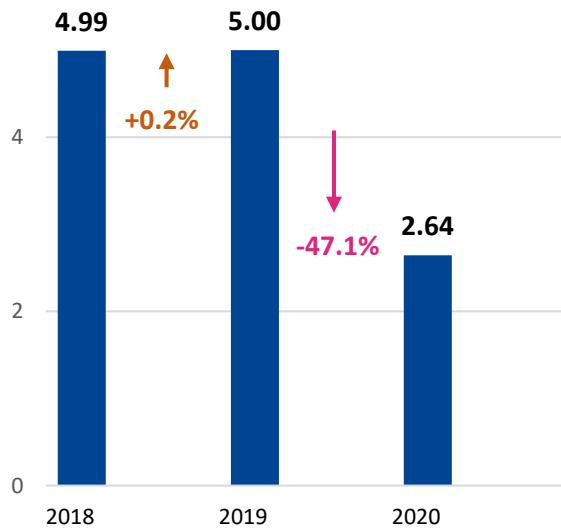


The amount of water consumed by the ESM in 2020 amounted to 2,515 m³, a 47.1% decrease from the previous year (2019: 4,752 m³), explained mainly by the implementation of teleworking measures as well as by the further implementation of water-saving measures.

The gross and net emissions amounted to 2.6 tCO₂e in 2020 and 13.0 kgCO₂e per ESM staff member, a decrease of 47.1% over the previous year's results (2019: 5 tCO₂e).

Figure 15

Emissions from water consumption, 2018-2020
(gross/net tCO₂e)

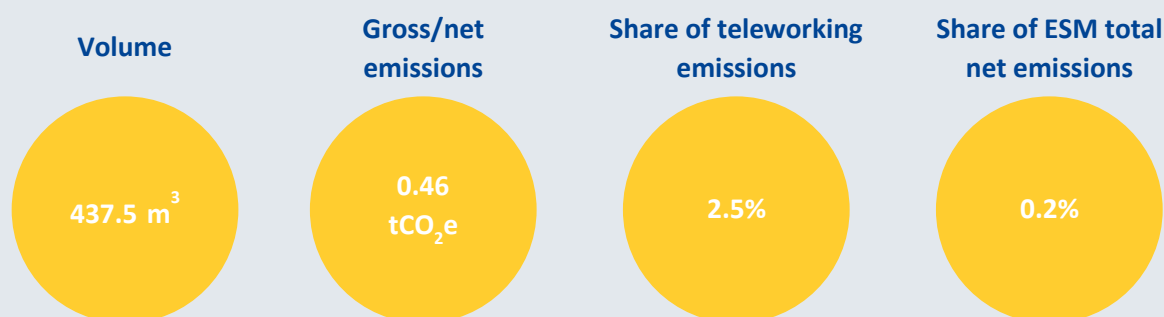


Source: ESM



Focus on teleworking-related water emissions

- ➔ *Estimated teleworking-related water consumption amounted to 437.5 m³ in 2020.*
- ➔ *The resulting emissions represented 0.1% of total ESM gross emissions and 0.2% of total net emissions.*
- ➔ *Water-related emissions accounted for 2.5% of the teleworking-related gross and net emissions.*



The water-related emissions arising from teleworking were estimated based on publicly available official statistics²² and the general assumptions that were taken in the EcoAct Whitepaper methodology²³. On such basis it was estimated that household water consumption increased by 20% in 2020 due to teleworking.

The amount of water ESM staff consumed while teleworking in 2020 was estimated at 437.5 m³. The gross and net emissions amounted to 0.46 tCO₂e and 2.27 kgCO₂e per ESM staff member.

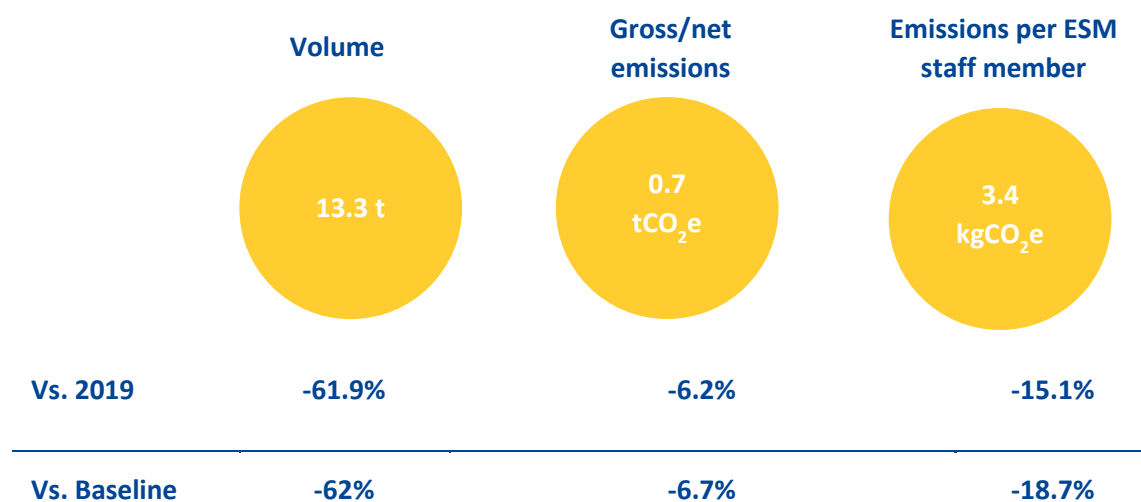
2.2.5 Waste generated

- ➔ *The ESM generated 13.3 t of waste in 2020 (2019: 34.9 t).*
- ➔ *Emissions related to waste generation represented a minor share of the ESM's total carbon footprint at 0.2% of total gross emissions (2019: 0.1%) and 0.3% of total net emissions (2019: 0.1%). The share of waste-related emissions stood at 0.4% of total building-related emissions on a gross basis (2019: 0.4%) and at 0.6% on a net basis (2019: 0.6%).*
- ➔ *Waste-related gross and net emissions decreased by 6.2% versus 2019.*
- ➔ *Hazardous waste was added to the reporting scope in 2020.*

²² To estimate teleworking-related water and waste emissions, publicly available data from Eurostat and Statec.lu was used (for more detail see section 1.1: Methodology used to calculate ESM's carbon footprint).

²³ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.





The waste generated by ESM activities continued to represent a minor source of ESM building-related emissions, accounting for 0.7 tCO₂e gross and net emissions (3.4 kgCO₂e per ESM staff member), 6.2% less than the previous year (2019: 0.745 tCO₂e).

Two different conversion factors were used to calculate the emissions of the different types of waste: Bilan GES (ADEME)²⁴ for hazardous waste and Defra for the remaining waste. This hazardous waste component was added to the scope of this report for the first time this year to present a more accurate figure of ESM's waste-related emissions.

The volume of non-hazardous waste amounted to 12.9 tons while the volume of hazardous waste amounted to 0.4 tons. Regarding non-hazardous waste, a closer look reveals that the main sources remained organic waste (7.1 t), followed by paper (5.5 t), plastics and metal (0.2 t) and finally glass (0.1 t). Hazardous waste was mainly composed of batteries and cabling.

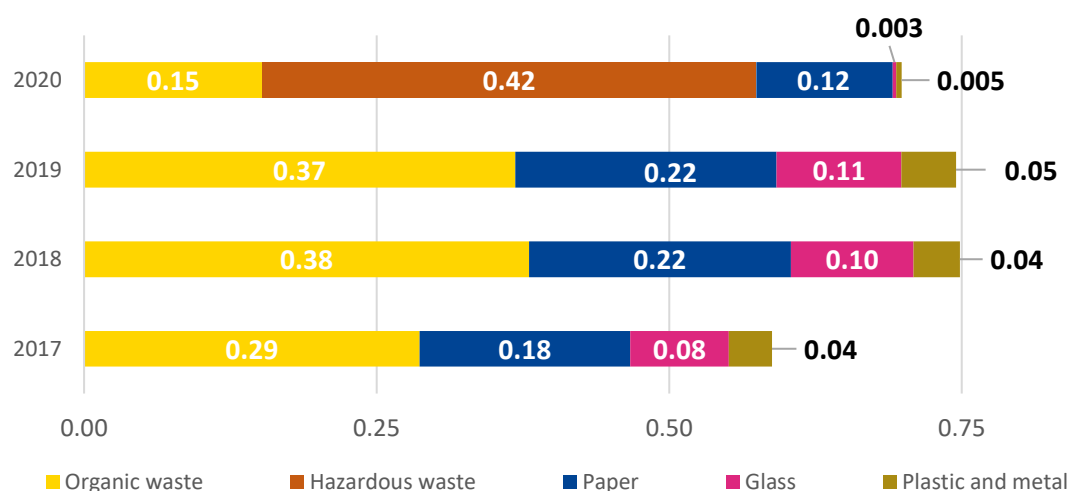
In 2020, the ESM generated less waste than in previous years due to the teleworking measures. However, this was partially offset by the addition of hazardous waste to the scope of this report.

²⁴ Refer to Annex 3 for further information on emission factors.



Figure 16

Emissions from waste generation, 2018-2020 (gross/net tCO₂e)



Source: ESM

The ESM obtained the Luxembourg SuperDrecksKëscht® fir Betriber green label for its internal waste recycling practices for the eighth straight year in 2020. Waste was separated in-house in line with these requirements.²⁵

The SuperDrecksKëscht® fir Betriber label was certified in accordance with the internationally accepted ISO 14024:2000 standard. 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 requirements for ISO 14024.

Furthermore, the ESM held its annual staff charity auction of decommissioned IT equipment, including laptops, mobile phones, and related accessories. This effectively complied with the “three Rs of waste management”; it *recycled* IT equipment by *reusing* and extending the lifecycle of IT equipment, thus *reducing* the purchase of new accessories with hazardous waste such as batteries and cabling. The ESM ‘Making a Difference’ values group steers this initiative and the auction proceeds are donated to charitable causes.

Furthermore, the ESM has committed itself to finding sustainable solutions to disposable plastics. During 2020, the ESM increasingly replaced non-recyclable plastic materials with sustainable alternatives in line with the ESM’s 2019 pledge under the Zero Single-Use Plastic Manifesto, an

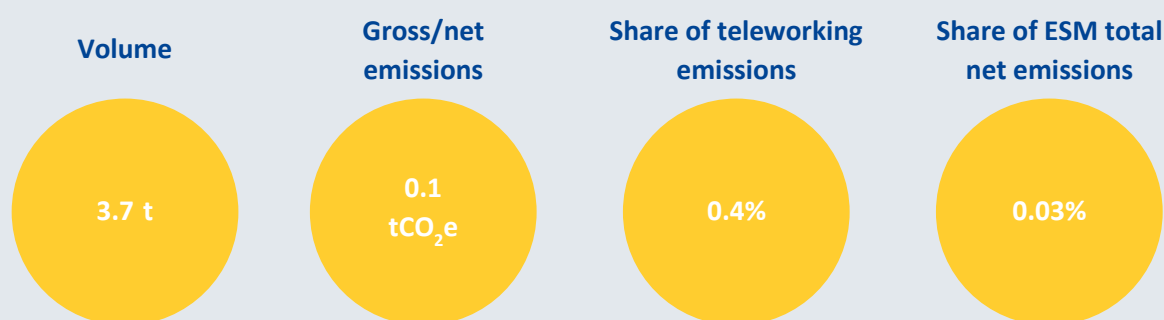
²⁵ For further information on the requirements to obtain the label SuperDrecksKëscht® fir Betriber, refer to the official website: <https://superdreckskescht.com/index.php/en/environmental-policy>.



initiative by the Inspiring More Sustainability (IMS) organisation. Throughout the year, the ESM has gradually replaced plastic cups, non-reusable cutlery, straws, non-reusable plastic bags, or single-use food containers with sustainable alternatives. The ESM successfully replaced the items identified by the IMS but will continue to assess new measures of reducing unrecyclable materials.

Focus on teleworking-related waste emissions

- ➔ *Teleworking-related waste consumption was estimated at 3.7 t in 2020.*
- ➔ *The resulting emissions represented 0.03% of total ESM gross emissions and 0.03% of total ESM net emissions.*
- ➔ *Waste-related emissions accounted for 0.4% of the teleworking-related gross/net emissions.*



The waste-related emissions coming from teleworking were estimated based on the publicly available official statistics and the general assumptions²⁶ that were taken in the EcoAct Whitepaper²⁷ methodology. On such basis, it was estimated that household waste production increased by 20% in 2020 due to teleworking.

The amount of waste consumed by ESM staff during teleworking in 2020 was estimated at 3.7 tons. The gross and net emissions amounted in 2020 to 0.1 tCO₂e and 0.4 kgCO₂e per ESM staff member, accounting for 0.4% of the teleworking-related gross and net emissions.

2.3 Covid-19 impact and new ways of working

The Covid-19 pandemic and the sudden shift to teleworking led, overall, to a significant decrease in total CO₂ emissions. This phenomenon is mainly due to the sharp reduction in mobility-related

²⁶ To estimate teleworking-related water and waste emissions, publicly available data from Eurostat and Statec.lu was used (for more detail see section 1.1: Methodology used to calculate ESM's carbon footprint).

²⁷ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.

emissions.

Business travel was gradually halted in light of the far-reaching Covid-19 restriction measures within and between countries. Furthermore, social distancing measures were introduced throughout the ESM premises as of 16 March 2020.

While there was a significant decrease in mobility-related emissions, building-related emissions decreased to a relatively lesser extent as the ESM premises remained operational.

As Table 2 and Figure 17 illustrate, the savings in staff commute decreased by 75.4 tCO₂ whereas the additional emissions that occurred due to teleworking only amount to 18.5 tCO₂. After weighing these against each other, the final savings due to teleworking are 56.9 tCO₂. This equates to 0.37 tCO₂ saved per staff on staff commutes and an additional 0.09 tCO₂ from teleworking per staff member. Therefore, the savings that occurred from teleworking are four times higher than any additional emissions that were added because of teleworking. This conclusion corresponds to the overall trend observed in the decreases of total carbon emissions in 2020, where mobility-related emissions had the most significant decrease of 85.9% (2020: 124.8 tCO₂; 2019: 885.9 tCO₂).

Table 2

**Savings per staff member
(net)**

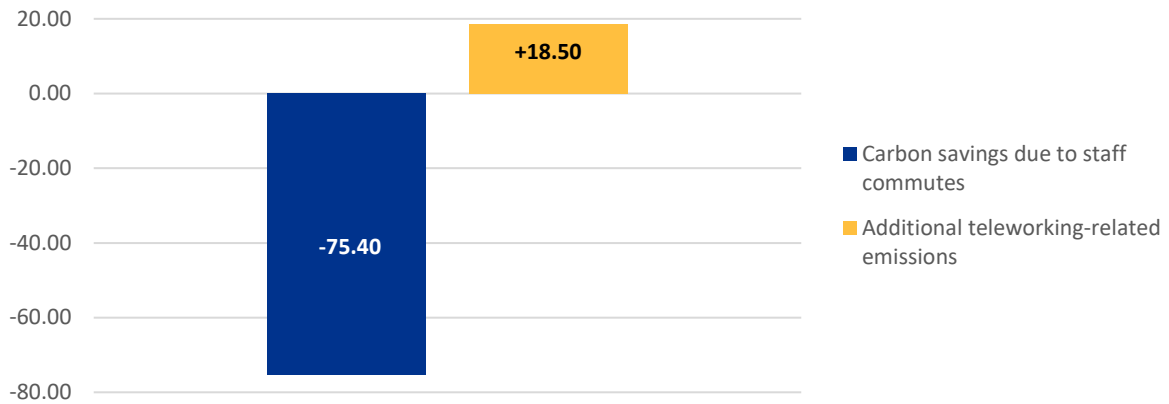
	Staff Commute 2020	Staff Commute 2019	% change	Savings/staff
Total savings per staff	40.5 tCO ₂	115.9 tCO ₂	- 65.1%	- 0.37 tCO ₂

	Building 2020	Building 2019	% change	Savings/staff
Total savings per staff	114.01 tCO ₂	129.57 tCO ₂	- 12.01%	- 0.08tCO ₂

	Teleworking 2020	Teleworking 2019	% change	Additional emissions /staff
Total savings per staff	18.5 tCO ₂	N/A	N/A	+ 0.09tCO ₂

Figure 17

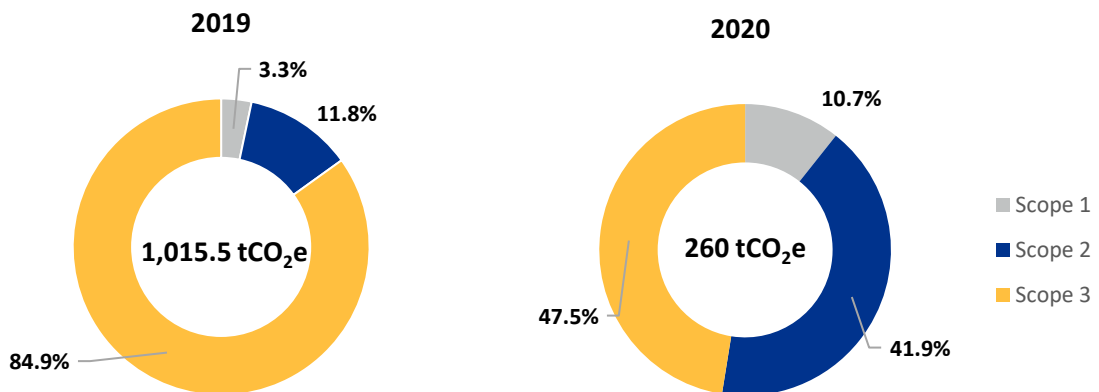
Total carbon savings due to Teleworking in 2020
(gross/net tCO₂e)



As displayed in Figure 18, the weight of Scope 3 emissions fell (2020: 48%; 2019: 85%) while the weight of Scopes 1 and 2 increased. This shift is due to the relatively substantial decreases in all Scope 3 emissions compared to Scope 2 emissions. Scope 2 emissions decreased considerably less because the ESM offices remained operational during the Covid-19 pandemic for business continuity purposes.

Figure 18

Evolution of scope weight between 2019–2020
(net tCO₂e)



As it is expected that teleworking will continue in the coming years, the ESM is committed to developing a more refined data collection approach and to monitoring the emission sources related to these new working practices.



3. 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 By average occupancy of ESM parking spaces By average daily distance travelled by ESM staff to home address By number of business days
Building-related emissions sources			
Scope 2	Purchased electricity	kWh	Monthly
	Purchased heating	kWh	Annual/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
Estimated teleworking-related emissions sources			
Scope 3	Teleworking – Electricity	kWh	Annual, by estimates on EcoAct Whitepaper ²⁸ methodology and ESM desk reservation tool ²⁹
	Teleworking–Heating	kWh	Annual, by estimates on EcoAct Whitepaper ³⁰ methodology and ESM desk reservation tool
	Teleworking–Water	m ³	Annual, by estimates on national statistics ³¹ and ESM desk reservation tool
	Teleworking–Waste	tons	Annual, by estimates on national statistics ³² and ESM desk reservation tool

²⁸ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>

²⁹ In the early stages of the pandemic, the desk reservation tool was used on a best-effort basis as there were other means of registering staff attendance at ESM premise.

³⁰ See footnote 31.

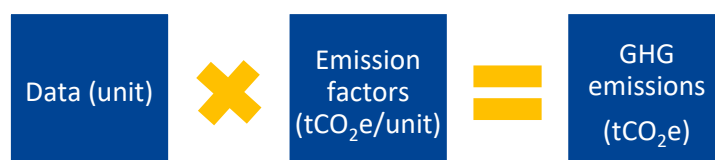
³¹ To estimate teleworking-related water and waste emissions, publicly available data from [Eurostat](#) and [Statec.lu](#) was used (for more detail see section 1.1: Methodology used to calculate ESM's carbon footprint).

³² See footnote 33.



Annex 2: Calculation method

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.

	Emission factors	Unit	Variation vs.2018	Source of emission factors
Mobility-related emissions factors				
ESM-leased vehicles	From 0.07503 to 0.32797	kgCO ₂ e/km per type of car and fuel type	From -7.7% to -2.3%	Defra 2020
Business travel – Air	0.14615 to 0.42385	kgCO ₂ e/passenger km	-2.4% and -1.8%	Defra 2020
Business travel –Rail	0.00597	kgCO ₂ e/passenger km	0.0%	Defra 2020
Staff commuting	From 0.06995 to 0.1743	kgCO ₂ e/km per type of car and fuel type	From -3.6% to +0.7%	Defra 2020
Building- and Teleworking-related emissions factors				
Electricity (Luxembourg)	0.1385	kgCO ₂ e/kWh	21.3%	IEA 2020
Electricity (France)	0.0539	kgCO ₂ e/kWh	N/A	IEA 2020
Electricity (Germany)	0.3499	kgCO ₂ e/kWh	N/A	IEA 2020
Electricity (Belgium)	0.1693	kgCO ₂ e/kWh	N/A	IEA 2020
Heating	0.18387	kgCO ₂ e /kWh (gross CV)	0.0%	Defra 2020
Water	1.052	kgCO ₂ e/m ³	0.0%	Defra 2020, the emission factor is a sum of the watersupply and the water treatment emission factors



Waste	21.3167	kgCO ₂ e/t	-0.2%	Defra 2020
Hazardous waste	From 5.11 to 3143	kgCO ₂ e/t	N/A	Bilan GES (ADEME)
Paper consumption	919.3963	kgCO ₂ e/t	-3.5%	Defra 2020

Annex 4: Data quality and completeness

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 ³³ 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 Statec information Parking occupancy rate registered by the ESM security check
Building-related data quality				
Scope 2	Purchased electricity	Primary data	■	
	Purchased heating	Primary data	■	
	Paper	Primary data	■	Number of sheets printed
	Water	Primary data	■	
	Waste	Primary data	■	
Estimated Teleworking-related data quality				
	Teleworking - Heating	Average heating and estimated hours spent teleworking office	■	Estimates based on EcoAct Whitepaper ³⁴ methodology and ESM desk reservation tool
	Teleworking - Electricity	Average “in use” power load per desk and estimated hours spent teleworking	■	Estimates based on EcoAct Whitepaper ³⁵ methodology and ESM desk reservation tool
	Teleworking - Water	National statistics (Eurostat and Statec) and estimated hours spent teleworking	■	Estimates based on national statistics on daily consumption and ESM desk reservation tool

³³ In the early stages of the pandemic, the desk reservation tool was used on a best-effort basis as there were other means of registering staff attendance at ESM premise.

³⁴ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.

³⁵ See footnote 35.



Teleworking - Waste	National statistics (Eurostat and Statec) and estimated hours spent teleworking	■	Estimates based on national statistics on daily consumption and ESM desk reservation tool
Teleworking - Heating	Average heating and estimated hours spent teleworking office	■	Estimates based on EcoAct Whitepaper ³⁶ methodology and ESM desk reservation tool

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

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 the data centres, the 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 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.

³⁶ <https://info.eco-act.com/en/homeworking-emissions-whitepaper-2020>.



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