MAX DELBRŪCK CENTER

GREENHOUSE GAS BALANCE 2022

Introduction

The MDC has set itself the goal of contributing to climate protection and making its work as greenhouse gas neutral as possible by 2038[1]. Since 2019, the greenhouse gas emissions caused by the MDC have been accounted for in accordance with the international Greenhouse Gas (GHG) Protocol[2]. The GHG Protocol distinguishes between three scopes:

- Scope 1: Direct emissions (e.g., combustion of natural gas).
- Scope 2: Indirect emissions from external energy sources (e.g., electricity, district heating)
- Scope 3: All other emissions caused directly or indirectly

Scope 3 contains various 14 categories. Relevant to the MDC are:

- Purchased goods and services
- Capital goods (major equipment and buildings)
- Fuel and energy-related emissions (upstream chain emissions)[3]
- Transportation and distribution[4]
- Waste
- Business travel
- Commuting of employees

Consumption data from the above-mentioned areas (including electricity, natural gas, purchased goods, and business travel performed) were provided by the responsible departments of the MDC as well as by the CBB. Based on the consumption data of the Buch and Mitte sites, the associated GHG emissions were calculated using specific emission factors (for Scope1, Scope 2, Scope 3.3 and Scope 3.5) or estimated approximately using common extrapolation methods (for all other categories).

In 2022 the online portal **climatiq data explorer** [5]was used for the first time to estimate emissions in Scope 3.1 and Scope 3.2. In this way, individual commodity groups could be further differentiated and emission factors updated. To calculate the emissions caused by the

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[1] https://www.mdc-berlin.de/media/40792

[2] https://ghgprotocol.org/blog/you-too-can-master-value-chain-emissions

[3] Emissions resulting from the production, processing, transport, storage, and distribution of energy sources.

[4] Data can currently not yet be collected

[5] https://www.climatiq.io/data

waste generated at the MDC, an emission factor for waste incineration published by ITAD was used for the first time[6].

Balance

In 2022, MDC generated 19.099 metric tons of CO_2 equivalents. Each employee thus generated an average of 10.6 metric tons at the workplace. For comparison: In Germany, an average of 10.8 tons was emitted per capita in 2021 (Fig. 1)[7].

Accounting Approach:	Operative control
System boundaries:	Campus Buch, Campus Mitte
Employees	1801
Total GHG emission (t):	**19099**
GHG emission per employee (t):	**10,60**

Fig 1: Greenhouse gas emission at the MDC

A closer look at the distribution of GHG emissions across the individual scopes indicates that Scope 2 accounts for the smallest share (Fig. 2, left). Here, the MDC benefits from the fact that it obtains certified green electricity from a hydropower plant in South Tyrol.

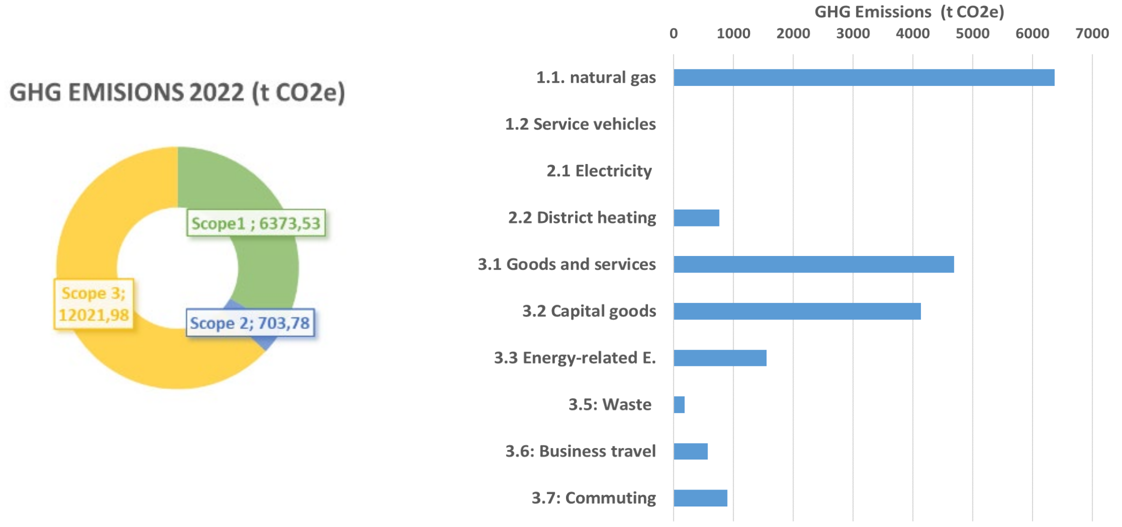

Fig 2: Distribution of GHG emissions

Significant emissions are caused by natural gas combustion (1.1; 3.3), district heating (2.2; 3.3), daily commuting (3.7), and goods and services (3.1) and capital goods (3.2) (Fig. 2, right). A closer look at Scope 3.1 and 3.2. shows that the procurement of life science products

[6] https://www.itad.de/wissen/faktenblaetter/hintergrundinformationen-nach-behg

[7] https://www.bmuv.de/themen/nachhaltigkeit/konsum-und-produkte/nachhaltiger-konsum

and chemicals (2483 t CO2e) as well as laboratory equipment (2470 t CO2e) and IT equipment (1587 t CO2e) are among the largest sources of emissions at MDC.

Comparison with previous years and outlook

As explained in the introduction, more up-to-date calculation methods were introduced in 2022 for Scope 3.1, 3.2 and 3.5. The comparison with the previously used methods shows a significant change in the results (Fig. 3).

GHG balance summary	2019	2020	2021	2022	2022 new
1.1. natural gas	6156	6562	6499	6369	6369
1.2 Service vehicles	12	7	4	5	5
2.1 Electricity	3135	0	0	0	0
2.2 District heating	709	700	900	759	759
3.1 Goods and services	5283	4645	5093	4242	4680
3.2 Capital goods	7764	4401	3784	6745	4136
3.3 Energy-related E.	2163	1594	1624	1555	1555
3.5: Waste	12	9	11	8	181
3.6: Business travel	1514	186	51	571	571
3.7: Commuting	1333	939	925	896	896
GHG-Emission total (t):	**28082**	**19043**	**18891**	**21060**	**19099**

Fig 3: GHG balances in comparison 2019 -2022

To enable a comparison with 2021, data from the old calculation method was used. Both **positive** and **negative** changes can be observed here:

- Electricity (kWh): **- 8.8 %**
- District heating: **- 16 %**
- Plastic products: **- 41 %**
- Detergents: **- 39 %**
- Capital goods: **+ 82 %**
- Business travel: **+ 1000 %**

The decline in consumption of electricity and district heating is presumably a result of the energy-saving measures imposed last year. However, it has not yet been possible to determine whether the changes are weather-related.

Natural gas consumption, on the other hand, is virtually unchanged. The largest share is caused by the combined heat and power plant (CHP) of the MDC energy center in building 31.3, which contributes significantly to the self-sufficient production of electricity, heating and cooling. In 2023, the CHP unit will receive a new engine that could also utilize hydrogen, so that a switch to more climate-friendly fuels would be possible under suitable conditions. Natural gas-fired steam generators will be replaced with electric steam generation as part of the renovation of Animal House 84.1 planned for 2024. This would reduce MDC's natural gas consumption by approximately 20%. In principle, the MDC is striving to significantly reduce the energy consumption of its research buildings in order to enable a conversion of the energy supply to renewable energies in the medium term.

Notably, the significant reduction of 41% in plastic products is encouraging. All employees are called upon to continue to reduce the consumption of plastic products by using resources responsibly.

Last year, the MDC was asked to make investments on a larger scale in order to counteract a possible loss of investment funds. This activity is clearly reflected in the large increase in GHG emissions for capital equipment.

As expected, travel activity increased significantly again after the end of the Corona pandemic - by a factor of 10 compared to the previous year. However, comparing the numbers to 2019 levels, GHG emissions from business travel have decreased by 62% (Figure 4). To further stabilize this trend, all employees are encouraged to continue to use video conferencing for their official business whenever possible, and to travel by train when possible.

Emissions from commuting have been slowly but steadily decreasing in recent years. Compared to 2019, emissions have decreased by 33% (Figure 3). This is due to a decrease in the use of fuel-powered cars or a gradual switch to e-mobiles, as well as the increased use of mobile working.

In order to reduce the emissions caused by work processes even further in the future, every employee is called upon to make an active contribution and to take into account the suggestions described in the "Sustainable Working Checklist" (Fig. 4).

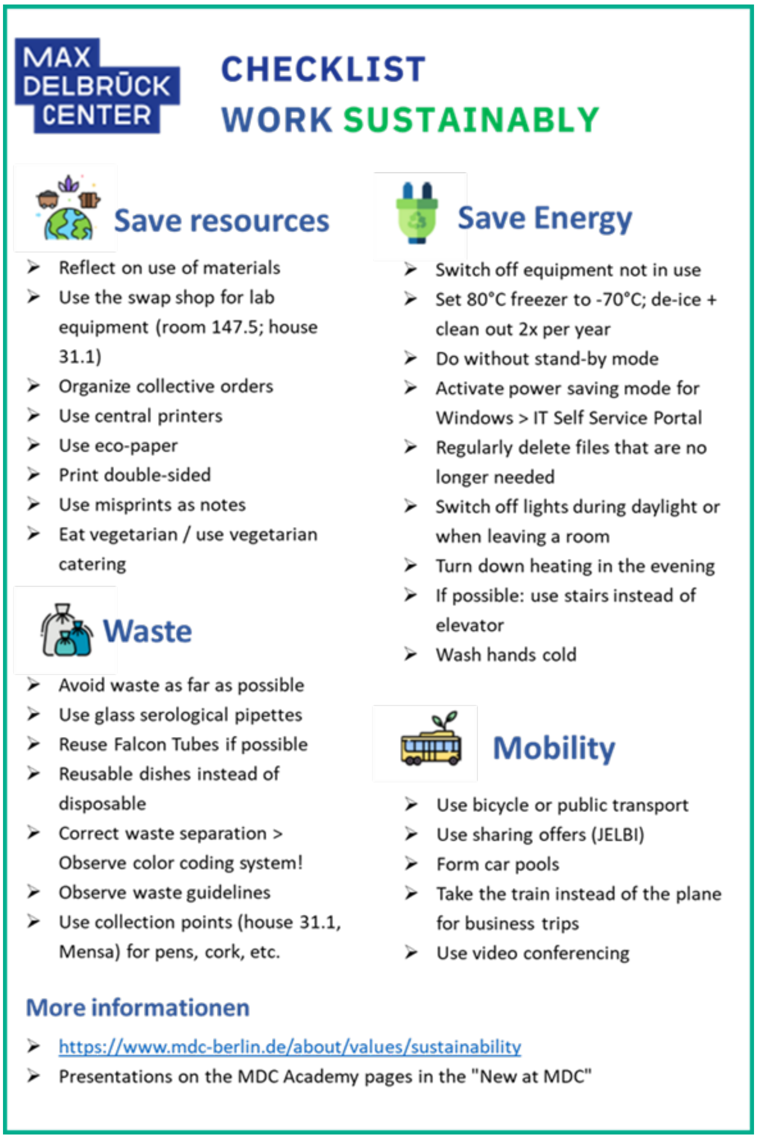

Fig 4: Checklist work sustainable