



# CARBON EMISSIONS SUMMARY

2025

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# Net Zero Emissions Target

MMU is dedicated towards attaining carbon neutrality by 2050 with a holistic set of sustainability strategies and initiatives that encompasses campus operations, energy consumption, supply chain, education and awareness that will realise MMU's bold net zero target by 2050.

## Scope of Emissions

**Scope 1** emissions are direct emission of greenhouse gases from sources controlled or owned by MMU.

**What it covers:** Fuel consumption directly generated by university-owned fleet of vehicles and transportation. The data is provided by Facilities Management Division (FMD) in MMU. The fuel combustion (petrol and diesel fuel) has been determined from the invoice records.

**Scope 2** emissions are indirect emissions associated with energy that the university purchases.

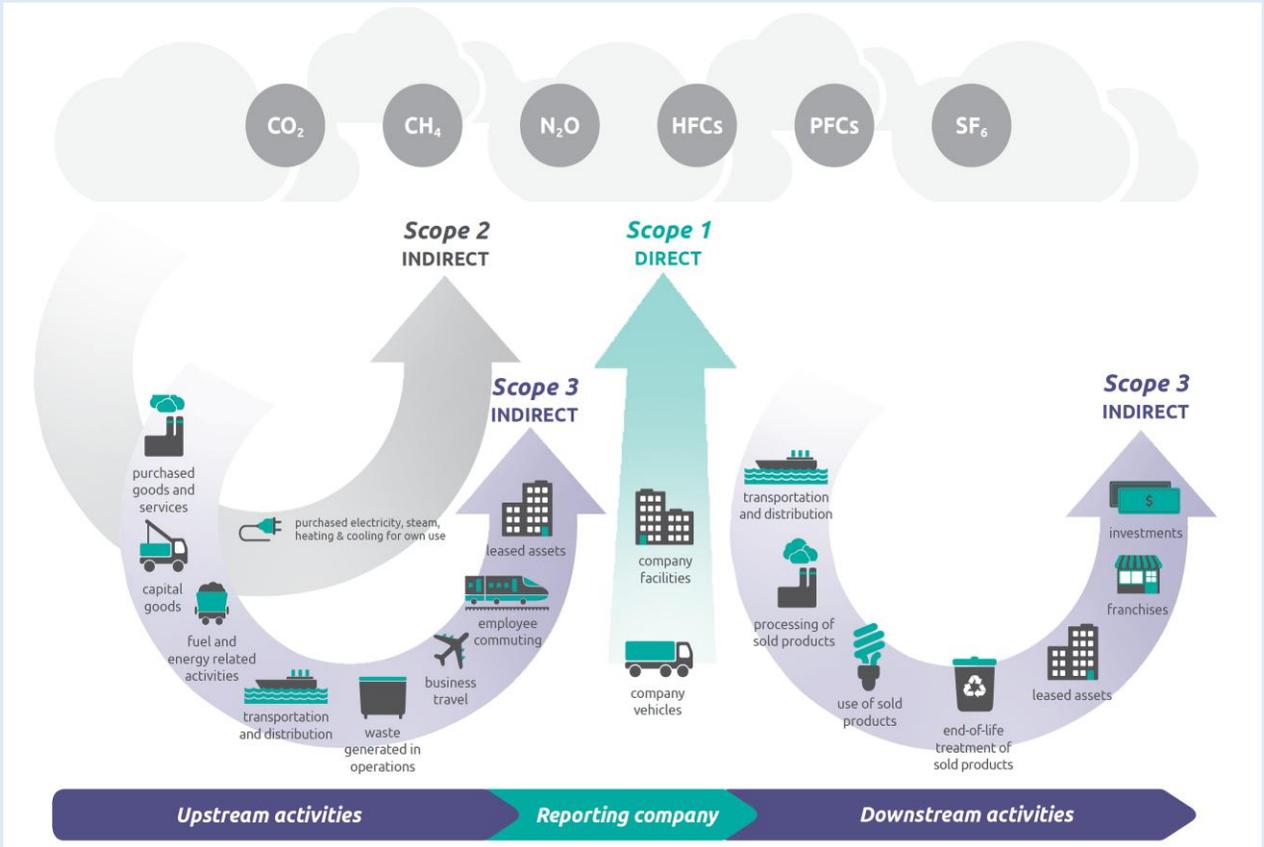
**What it covers:** The amount of electricity consumed in both the MMU Cyberjaya and Melaka campuses. The electricity used is converted into carbon emissions based on the Malaysia Energy Information Hub (MEIH) Grid Emissions Factor for Peninsular Malaysia.

**Scope 3** emissions are indirect emissions occurring in the upstream and downstream value chain of the university, excluding emissions already accounted for in Scope 1 and Scope 2.

**What it covers:** The waste generated from academic, administrative, and support activities within the University's operational control boundary. This includes non-hazardous waste sent to landfill or other treatment facilities managed by third-party contractors. The data is converted into carbon emissions based on the DEFRA Emission Conversion Factors.

Source: WRI/WBCSD Corporate Value Chain (Scope 3) Accounting and Reporting Standard, p. 5.





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## Baseline Year Definition

The baseline year for Scope 1 and Scope 2 emissions is defined as 2019. This year was selected as it represents the last full year of stable operations prior to the COVID-19 pandemic and reflects a representative operational baseline.

The University commenced Scope 3 emissions reporting in 2023, which has been designated as the baseline year as it represents the first year with complete and verifiable waste disposal data under normalised campus operations. Prior to 2023, waste data was incomplete, and campus activities during 2021-2022 were affected by the COVID-19 Movement Control Order (MCO) restrictions, resulting in non-representative operational patterns. As the first full year of operations with complete data coverage, 2023 provides an appropriate and reliable baseline for future performance tracking.



# Method of Calculation

The quantification methods used to calculate greenhouse gases emissions for MMU are based on the World Resources Institute(WRI) and the World Business Council for Sustainable Development (WBCSD) GHG Protocol. All fuel combustion and electricity consumption has been determined from invoices and financial records. Using emission factors, which are unique to each emission source, the raw data has been converted to metric tonnes of CO<sub>2</sub> equivalent emissions (tCO<sub>2</sub>e). This was done to allow for normalised comparison between different types of emissions sources.

The emission factors used in the calculations are based on national industry standards i.e. Malaysia Energy Information Hub (MEIH) Grid Emissions Factor for Peninsular Malaysia and the Department for Environment Food and Rural Affairs (DEFRA) Emissions Factors 2025. The data provided in this report were prepared by the MMU Facilities Management Division. Any questions regarding the methods used to collect and calculate these values can be directed to [sqa@mmu.edu.my](mailto:sqa@mmu.edu.my).

# 2025 Emissions Summary

MMU produced 440.08 tCO<sub>2</sub>e Scope 1, 17,188.90 tCO<sub>2</sub>e Scope 2 and 845.97 tCO<sub>2</sub>e Scope 3 emissions throughout 2025, summing to a total carbon footprint of 18,474.95 tCO<sub>2</sub>e. A summary of MMU’s emissions is shown below in Table 1, including emissions normalized by the campus population i.e., per capita and by gross usable area i.e., per m<sup>2</sup>.

	MMU’s emissions (tCO <sub>2</sub> e)
Scope 1 (tCO <sub>2</sub> e)	440.08
Scope 2 (tCO <sub>2</sub> e)	17,188.90
Scope 3 (tCO <sub>2</sub> e)	845.97
<b>Total tCO<sub>2</sub>e</b>	<b>18,474.95</b>
Per Capita	0.92
Per m <sup>2</sup>	0.05
Gross Usable Area ( m <sup>2</sup> )	368,707.66

Table 1: Summary of MMU’s Scope 1, Scope 2 and Scope 3 carbon emissions in 2025



# Emissions Over Time (2019-2025) for Scope 1 - 3

Figure 1 and Table 2 presents MMU’s year-over-year breakdown of total carbon emissions for Scope 1, Scope 2 and Scope 3.

In 2025, total Scope 1, Scope 2 and Scope 3 carbon emissions increased slightly by 1.41% compared to 2024. Scope 2 emissions increased by 2%, while Scope 1 emissions declined by 6.35%, mainly due to reduced long-distance travel.

Despite the overall increase, the Cyberjaya campus recorded a 1.1% increase in Scope 2 emissions, primarily driven by expanded campus activities, including community and sporting events, programmes for schools and government agencies or external parties, as well as campus refurbishment works.

In contrast, the Melaka campus achieved a 3.1% reduction in Scope 2 emissions, following reduced chiller plant operating hours during non-working days and improved energy-saving awareness among the campus community.

For Scope 3 emissions, waste generation decreased by 6.83% compared to 2024, reflecting the positive impact of initiatives to reduce single-use plastics, enhance waste segregation, and promote recycling awareness across the campus.

Overall, it is noted that even with a marginal increase in student numbers, per capita emissions decreased in 2025, while emissions per gross usable area remained unchanged from 2024.

Year	2019	2020	2021	2022	2023	2024	2025
Scope 1 (tCO <sub>2</sub> e)	338.44	169.93	112.58	349.09	456.76	468.04	440.08
Scope 2 (tCO <sub>2</sub> e)	16,276.88	10,557.30	8,958.11	13,780.11	15,895.05	16,842.11	17,188.90
Scope 3 (tCO <sub>2</sub> e)	NA	NA	NA	NA	571.78	903.72	845.97
<b>Total tCO<sub>2</sub>e</b>	<b>16,615.32</b>	<b>10,727.23</b>	<b>9,070.69</b>	<b>14,129.20</b>	<b>16,921.59</b>	<b>18,213.87</b>	<b>18,474.95</b>
Per Capita	1.19	0.79	0.62	0.88	0.93	0.96	0.92
Per m <sup>2</sup>	0.05	0.03	0.02	0.04	0.05	0.05	0.05
Gross Usable Area (m <sup>2</sup> )	368,707.66	368,707.66	368,707.66	368,707.66	368,707.66	368,707.66	368,707.66

Table 2: Summary of carbon emissions for Scope 1, Scope 2 and Scope 3 in MMU (2019-2025)



# Emissions Over Time (2019-2025)

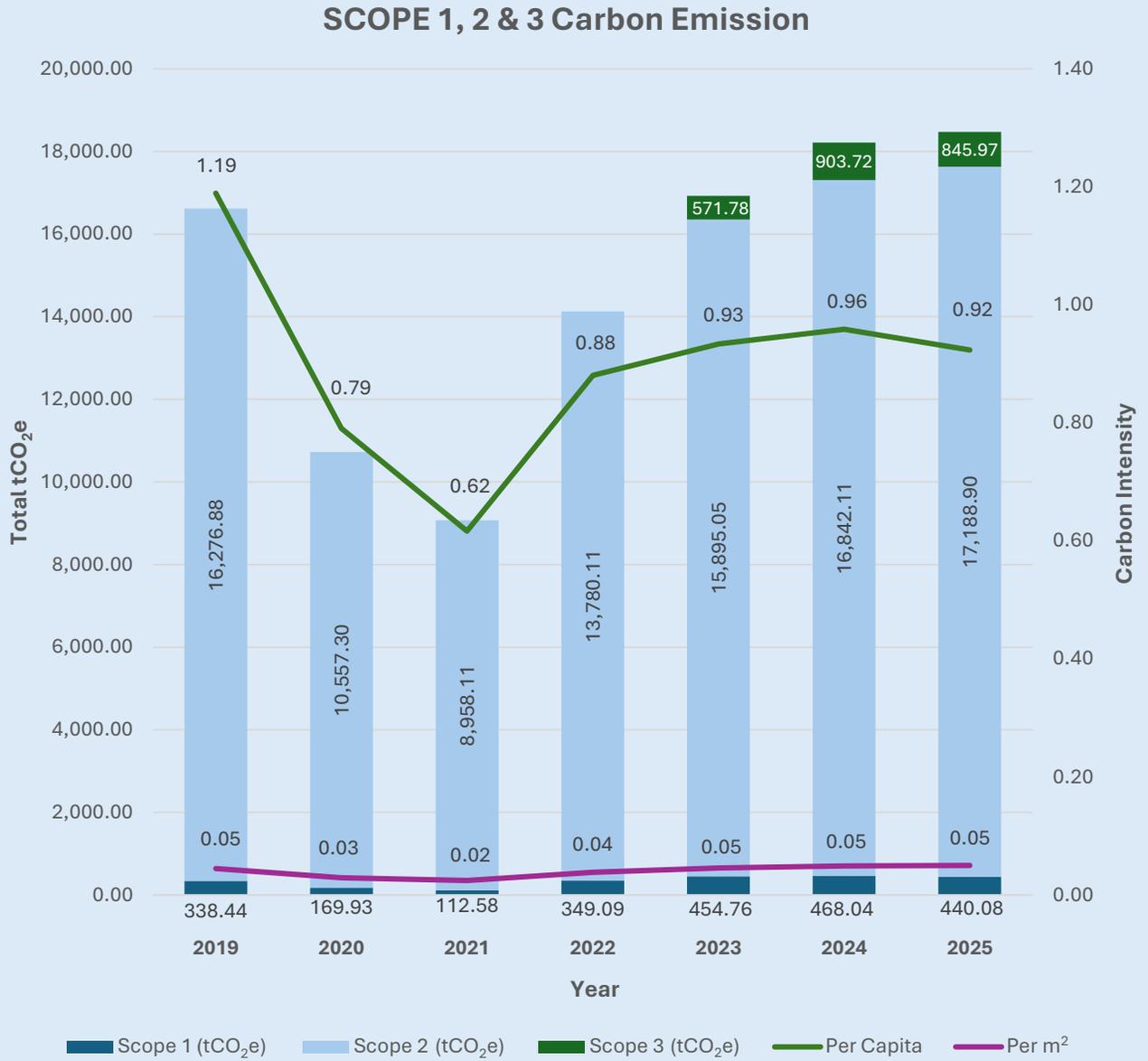


Figure 1: MMU’s total carbon emissions for Scope 1 & 2 (2019-2025) and Scope 3 (2023-2025)



# Emissions by Scope (2019-2025)

## Scope 1: Direct Emissions From Fuel Consumption

**What it covers:** Fuel consumption directly generated by university-owned vehicles. The data is provided by Facilities Management Division (FMD) in MMU. The fuel combustion (petrol and diesel fuel) has been determined from the invoice records.

These emissions are calculated using the Department for Environment Food and Rural Affairs (DEFRA) Emissions Factors. We have calculated our Scope 1 emission from the year 2019 to year 2025 as shown in Table 3 and Figure 2.

Year	2019	2020	2021	2022	2023	2024	2025
<b>Scope 1 (Total tCO<sub>2</sub>e)</b>	<b>338.44</b>	<b>169.93</b>	<b>112.58</b>	<b>349.09</b>	<b>454.76</b>	<b>468.04</b>	<b>440.08</b>
<b>Diesel (Scope 1)</b>	8.65	38.29	15.53	106.05	183.42	208.52	185.13
<b>Petrol (Scope 1)</b>	329.79	131.64	97.05	243.04	271.34	259.52	254.95

Table 3: Summary of carbon emissions for Scope 1 in MMU (2019-2025)

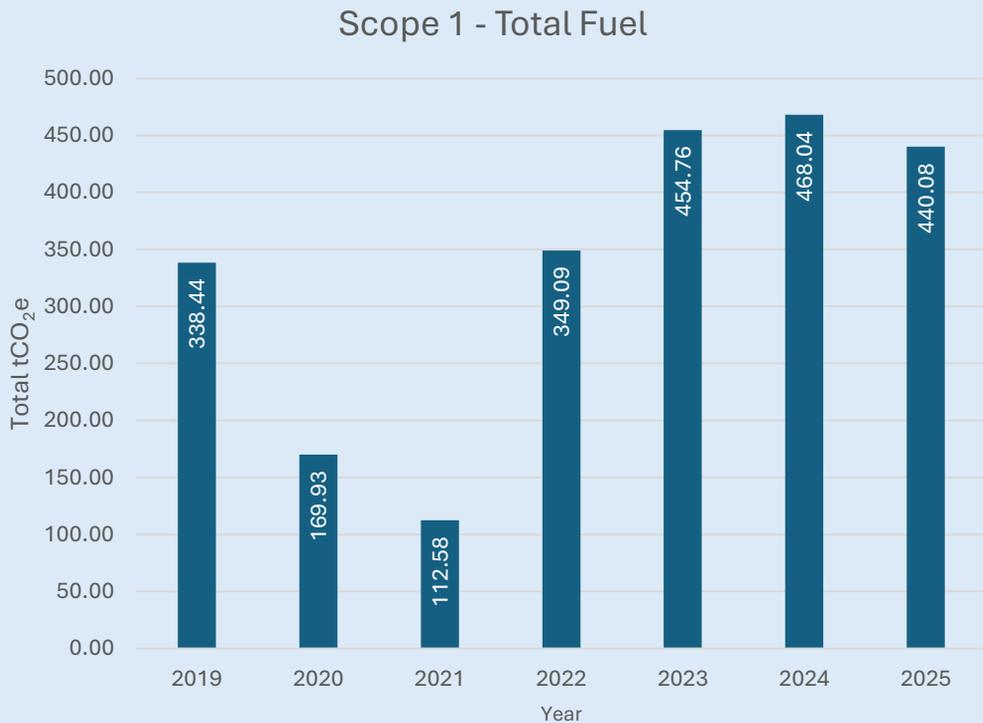


Figure 2: MMU's total carbon emissions for Scope 1 (2019-2025)



## Scope 2: Indirect Emissions From Purchased Electricity

**What it covers:** Scope 2 covers the amount of electricity consumed by both the MMU Cyberjaya and Melaka campuses. The electricity consumed is converted into carbon emissions based on the Malaysia Energy Information Hub (MEIH) Grid Emissions Factor for Peninsular Malaysia.

The data on electricity consumption is mainly collected from utility bills provided by the energy supplier, which is Tenaga Nasional Berhad (TNB). The Facilities Management Division (FMD) recorded these bills which detail monthly electricity consumption.

The Scope 2 emissions were calculated using data obtained from 2019 to 2025. Figure 3 shows the Scope 2 emissions in MMU over time.

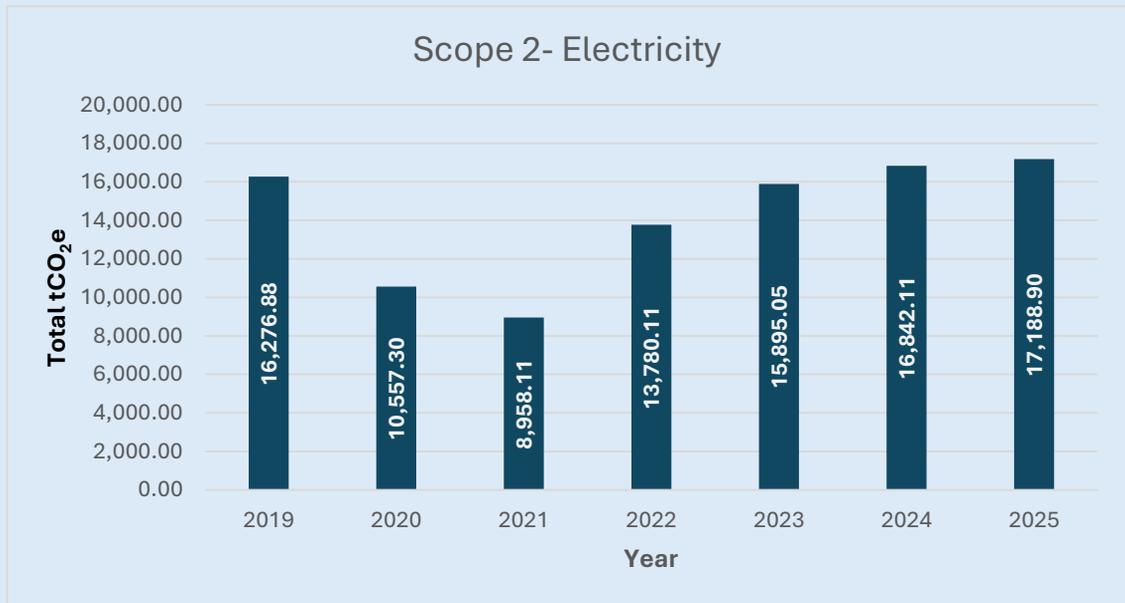


Figure 3: MMU’s total carbon emissions for Scope 2 (2019-2025)



## Scope 3: Indirect Emissions From Waste Generation

**What it covers:** Scope 3 covers the weight of the waste generated from academic, administrative, and support activities within the University’s operational control boundary. This includes non-hazardous waste sent to landfill or other treatment facilities managed by third-party contractors. The data is converted into carbon emissions based on the DEFRA Emission Conversion Factors.

The Scope 3 emissions were calculated using data obtained from 2023 to 2025. Figure 4 shows the Scope 3 emissions in MMU over time.



Figure 4: MMU’s total carbon emissions for Scope 3 – Waste Disposal (2023-2025)



# Moving Forward

MMU is committed to promoting a sustainable and environmentally friendly campus. The strategies listed below to ensure that MMU will achieve net zero emissions by 2050 with the support of students and staff through education, research, community engagement, and operations.

## i. Refurbishment

Refurbishment in MMU such as improving the insulation of rooms and replacing the aging air conditioners with energy-efficient air conditioners, can reduce MMU's carbon footprint and decrease energy consumption.

## ii. Awareness on SDG and ESG

Create awareness in the MMU community in the areas covered by Sustainable Development Goals (SDGs) and Environment, Social, and Governance (ESG) through education, research, community, and operations. For example, transforming energy usage patterns among staff and students. The following are possible initiatives:

- a) Promote energy efficiency and conservation on campus through academic courses and student club and society initiatives, with student-led activities mapped to the SDGs to reinforce sustainability awareness and engagement.
- b) Continue to provide periodic information and updates to staff and students via email to enhance awareness and encourage sustainable practices.

## iii. Alternative Energy Sources and Water Management

MMU is working on the following to enhance air quality, conserve resources, and reduce carbon emissions:

- a) Installing solar PV systems generating 1799.5 kWp in MMU Cyberjaya (1,302.13 kWp) and MMU Melaka (497.37 kWp) with the expected completion in Q2 2026.
- b) Implement rainwater harvesting systems to support non-potable uses such as landscape irrigation and cleaning.
- c) Promote water conservation through water-efficient fixtures and awareness among staff and students.



#### **iv. Waste Reduction and Recycling Initiatives**

MMU shall embrace the following to reduce carbon emissions:

- a) Promote responsible consumption by encouraging staff and students to adopt the 5Rs principles (Reduce, Reuse, Repair/Repurpose, and Recycle) through targeted campaigns and educational programmes.
- b) Strengthen sustainable office practices by reducing resource use, promoting reuse and minimising waste and hazardous material generation.
- c) Engage the campus community through regular awareness campaigns, workshops, and student-led initiatives that promote recycling and waste reduction.

#### **v. Climate Action-Related Research and Teaching**

MMU recognises the significance of advancing research and education related to climate change and sustainability as follows:

- a) Promote climate-related research by encouraging staff and students to participate in research projects that address climate change mitigation, adaptation, and sustainability challenges.
- b) Integrate sustainability and climate action into academic curricula by embedding relevant topics within courses and academic programmes to enhance students' knowledge and competencies in climate-related issues.
- c) Support interdisciplinary collaboration and knowledge sharing through seminars, workshops, and student-led initiatives that promote awareness, innovation, and practical solutions for climate action.

