



# Carbon Emission **Report**

Prepared By :

#### Universiti Malaysia Sabah

www.ums.edu.my



### Overview

This report presents an overview of the total carbon emissions (CO<sub>2</sub> footprint) generated by Universiti Malaysia Sabah (UMS) for the calendar year 2024. The data compilation and calculations are aligned with the methodology set forth by the UI GreenMetric World University Ranking framework, which supports universities in evaluating their environmental sustainability performance.



Universiti Malaysia Sabah (UMS) is dedicated to environmental sustainability and was recognized as an EcoCampus in 2013. Located in ecologically rich Sabah, UMS integrates green practices across campus life and aligns with the UN Sustainable Development Goals (SDGs)—especially Climate Action (SDG 13).

UMS actively monitors and works to reduce its carbon footprint through sustainable energy use, waste management, and eco-friendly transport. These efforts reflect its commitment to building a low-carbon, climate-resilient university community.

### EMISSION DATA AND CALCULATIONS



### Campus and Population Overview

UMS is situated on a sprawling green campus with a total land area of over 5 million square meters, encompassing academic buildings, administrative facilities, residential areas, and preserved natural landscapes.

Description	Value
Total Campus Area	5,098,241 m²
Total Ground Floor Area	211,716 m²
Open Space Area	4,886,525 m²
Total Student Population	23,411
Total Staff Population	2,243
Total Campus Population	25,654

\*\*The open space area is derived by subtracting the total built-up (ground floor) area from the overall campus size.

Open space accounts for 95.8% of the campus land, reflecting UMS's eco-campus design principles that prioritize biodiversity, natural ventilation, and low-density development.







### **Emissions from Electricity** Usage

Electricity consumption represents the primary source of carbon emissions at Universiti Malaysia Sabah (UMS), making it a critical area of focus in the university's sustainability strategy. The majority of power used across the campus is supplied through the Sabah state electricity grid, which is powered by a mixed energy portfolio that still depends heavily on fossil fuels, including coal and natural gas. As a electricity usage significantly result, contributes to the university's overall CO<sub>2</sub> emissions profile.

Given reducing this, electricity consumption offers the greatest potential for immediate and long-term impact on UMS's carbon footprint. Targeted initiatives such as energy-efficient building behavioral management, change campaigns, the adoption of renewable energy sources like solar photovoltaics, and the use of smart energy systems are essential steps in the university's move toward a low-carbon and climate-resilient campus.

#### **Calculation:**

- Total Electricity Consumption: 45,272,765 kWh/year
- Emission Factor: 0.551 tCO<sub>2</sub>/MWh (MGTC, 2016)

 $\frac{45,272,765 \text{ kWh}}{1,000}$  $ightarrow 0.551 = 24,945~{
m tCO_2/year}$ 





#### **Total Emission from** Electricity:24,945 tCO<sub>2</sub>/year

Note: This figure underscores the opportunity to enhance sustainability through energy conservation solar energy integration, and the programs, implementation of efficient building management systems

## **Emissions from Transportation**

Transportation emissions at Universiti Malaysia Sabah (UMS) arise primarily from daily commuting activities involving both students and staff. These emissions are generated through the use of personal vehicles, such as motorcycles and cars, as well as institutional vehicles used for administrative. academic, and operational purposes. Given the campus's size and geographic location, reliance on fossil fueltransportation powered remains substantial, contributing significantly to the university's overall carbon footprint.

Given this, reducing electricity offers the greatest consumption potential for immediate and longterm impact on UMS's carbon footprint. Targeted initiatives such as energy-efficient building management, behavioral change the adoption campaigns, of renewable energy sources like solar photovoltaics, and the use of smart energy systems are essential steps in the university's move toward a low-carbon and climate-resilient campus.

Mode of Transport	Assumptions Used	Total Emissions (tCO <sub>2</sub>
Bus	4 units × 62 km/day × 5 days/week × 2.4 kgCO₂/km × 0.01	30
Car	1,349 units × 2 trips/day × 4 days/week × 2.4 kgCO₂/km × 0.01	259
Motorcycle	71 units × 2 trips/day × 4 days/week × 2.4 kgCO <sub>2</sub> /km × 0.01	17
Total	_	306

While relatively low compared to electricity emissions, transportation remains an important focus area. Promoting public transit, carpooling, and non-motorized mobility (walking, cycling) can help reduce this footprint further.





## Total Carbon Emissions Summary

Universiti Malaysia Sabah (UMS) generates an estimated 25,069 tonnes of CO<sub>2</sub> annually, with electricity consumption accounting for the vast majority of emissions, followed by transportation-related sources.

Emission Source	Emissions (tCO <sub>2</sub> /year)
Electricity	24,945
Transportation	306
Total	25,069 tCO <sub>2</sub> /year

### Per Capita Carbon Footprint

 $\frac{25,069~tCO_2}{25,654~people} = \textbf{0.97}~tCO_2/person/year$ 

UMS's per capita carbon footprint is well below many national and international averages, thanks in part to its open space ratio, promotion of localized and sustainable food options, and minimal industrial activity on campus—factors that align with UMS's commitment to low-impact development and environmental stewardship.





### Recommendations & Future Actions



- Energy Optimization: Retrofit older buildings with energy-efficient lighting and HVAC systems.
- Renewable Energy: Expand solar panel installations across rooftops and parking areas.
- Green Transportation: Invest in electric campus buses and incentivize staff/student use of bicycles.
- Behavioral Campaigns: Enhance energy conservation awareness among the campus community.
- Carbon Offsets: Explore partnerships for tree-planting or carbon credits.



## Conclusion

UMS recorded a total of 25,069 tonnes of CO<sub>2</sub> emissions in 2024, with a strong majority linked to electricity consumption. This baseline data provides critical insight for the university's sustainability strategies going forward. UMS remains committed to lowering its emissions and achieving a more sustainable and resilient campus.



References: Malaysia Green Technology Corporation (MGTC), 2016 CDM Electricity Baseline Study https://www.mgtc.gov.my

www.ums.edu.my