Arab Academy
For Science, Technology & Maritime Transport
Research & Innovation Center

الأكاديمية العربية للعلوم والتكنولوجيا والنقل البحري
Arab Academy for Science, Technology & Maritime Transport

AASTMT Campuses
Carbon Footprint Report 2024/2025
Finding Analysis and Recommendations









President's Message



The Arab Academy for Science, Technology and Maritime Transport (AASTMT) recognizes that climate change represents one of the most pressing global challenges of our time, carrying far-reaching environmental, economic, and social consequences. As a leading regional institution in higher education, training, and applied research, AASTMT acknowledges its responsibility to actively contribute to global and regional efforts aimed at climate change mitigation, adaptation, and resilience-building—particularly within the Arab region, which faces heightened vulnerability to climate-related risks.

The Academy's commitment extends beyond policy declarations to tangible actions that integrate environmental responsibility, social impact, and economic efficiency into its core mission. The issuance of AASTMT's Carbon Footprint Report marks a key milestone in this ongoing journey. It demonstrates the Academy's institutional commitment to measuring, monitoring, and managing greenhouse gas emissions across its campuses and facilities. Through transparent reporting and evidence-based planning, AASTMT seeks to enhance energy efficiency, promote the adoption of clean and smart technologies, and systematically reduce its environmental impact, while contributing to national and regional climate objectives.

This report is the result of a collaborative effort involving academic experts, researchers, administrative leaders, and technical teams across the Academy. Each section aligns with relevant SDGs and supports AASTMT's broader sustainability strategy, reinforcing its position as a model institution for climate action, responsible governance, and innovation within the Arab region.

As we look to the future, AASTMT reaffirms its commitment to advancing climate action, strengthening its contribution to the SDGs, and empowering future generations with the knowledge and skills required to lead a low-carbon, resilient, and inclusive future. Together, we remain dedicated to protecting our planet's resources and contributing meaningfully to a more sustainable and prosperous world.

Sincerely,

Prof. Dr. Ismail Abdel Ghafar Ismail Farag
President
Arab Academy for Science, Technology and Maritime Transport

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Acknowledgment

This report reflects the collective effort of the Arab Academy for Science, Technology, and Maritime Transport (AASTMT) in assessing its institutional carbon footprint. We sincerely thank all engineers, researchers, faculty members, administrative staff, and facility management teams whose contributions ensured the accurate collection of data, application of emission factors, and thorough analysis required for this assessment.

We also acknowledge the invaluable contributions of all team members for their expertise, cooperation, and dedication, which were essential to the successful completion of this work.

We further express our appreciation to various academic and administrative departments for facilitating access to records and assisting in the validation of emission factors. The ongoing support of current and former staff members in standardizing data collection systems and maintaining sustainability initiatives has been critical to achieving a comprehensive, transparent, and reliable carbon footprint assessment.

Executive Summary

Overview of the Report's Objectives

This report presents an analysis of Scope 1, Scope 2, and Scope 3 greenhouse gas (GHG) emissions associated with the operational activities of the Arab Academy for Science, Technology and Maritime Transport (AASTMT) across selected campuses: Abu Qir, Misr El-Gedida, Smart Village, and South Valley, For the Financial year 2024-2025. The assessment follows internationally recognized standards, including the **GHG Protocol**, in accordance with the **guidelines of ISO 14064-1**, to ensure transparency, consistency, and accuracy in emissions accounting and reporting.

The primary objectives of this report are to:

- Identify key emission sources, including:
  - Scope 1: Stationary combustion, mobile combustion, and fugitive emissions
  - Scope 2: Purchased Energy.
  - Scope 3: Indirect emissions from purchased goods and services, capital goods, water usage and wastewater, fertilizers, employee and student commuting, waste, business travel, and leased assets.
- Quantify Scope 1, Scope 2, and Scope 3 GHG emissions associated with AASTMT's operations in each of the four campuses.
- Highlight opportunities for emissions reduction, energy efficiency enhancement, and sustainable resource management.

This comprehensive assessment enables AASTMT to better understand its carbon footprint, supports informed decision-making, and strengthens its leadership role in environmental stewardship and climate action within the higher education sector.

Summary of Total GHG Emissions Across AASTMT Campuses

AASTMT – All Reported Campuses Total: 38,253 metric tons CO_2e

- **Scope 1 Emissions**

Total: **2,855** tons CO_2e

- **Scope 2 Emissions**

Total: **10,440** tons CO_2e

- **Scope 3 Emissions**

Total: **24,958** tons CO_2e

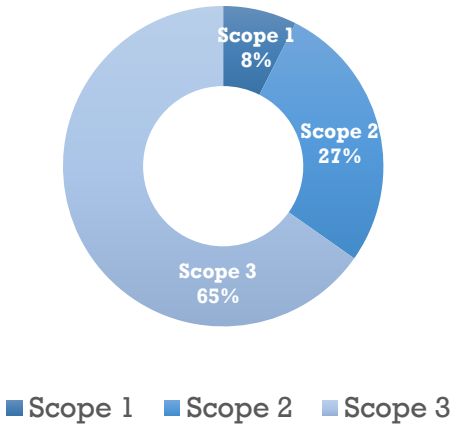


Figure 1 The contribution of each emission scope to the total GHG emissions for four-campuses

A detailed breakdown of emissions by campus and emission scope is presented in **Table 1**.

Table 1 Scopes of Emissions by Campus

Campus	Scope 1 (ton CO_2e)	Scope 2 (ton CO_2e)	Scope 3 (ton CO_2e)	Total Emissions (ton CO_2e)
Abu Qir	2,470	4,361	10,767	17,598
Misr El-Gedida	177	1,391	8,859	10,427
Smart Village	88.9	4,380	3,695	8,164
South Valley	119.2	307.8	1,637	2,064
Total	**2,855**	**10,440**	**24,958**	**38,253**

The contribution of each emission scope to the total GHG emissions at each AASTMT campus is Illustrated in Figure 2.

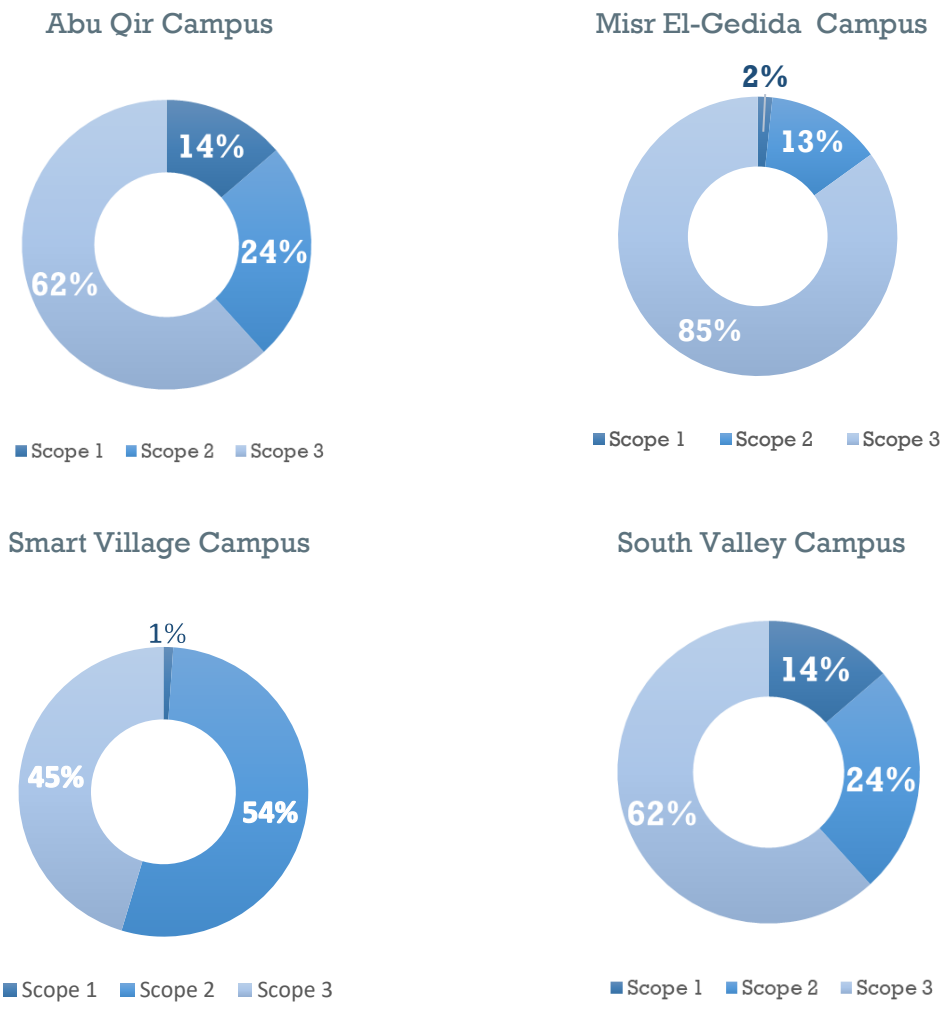


Figure 01 The contribution of each emission scope to the total GHG emissions for each campus

Carbon Performance Evaluation

To evaluate the effectiveness of resource consumption by the AASTMT – four campuses, carbon intensity-based metrics were calculated per student. The four campuses emits 1.73 tCO_2e per student, which is below the global average of 2.67 tCO_2e/student, indicating a relatively efficient emission profile when considering full Scope 1, 2, and 3 accounting.

Comparative Analysis of Carbon Performance Across AASTMT Campuses

Benchmarking the normalized carbon footprint indicators for the four AASTMT campuses—Misr El-Gedida, South Valley, Smart Village, and Abu Qir—against global averages reveals varying levels of performance across key metrics: per student emissions, per employee emissions, and combined per person emissions.

1. Per Student Emissions

All campuses perform better than the global average benchmark of **2.67 tCO_2e/student**, suggesting strong performance in managing emissions related to educational and student-related activities:

- **South Valley** reports the lowest emissions at **0.85 tCO_2e/student**, indicating high carbon efficiency. This is likely due to lower electricity consumption from the national grid, as the campus meets approximately 23% of its energy demand through a PV solar system, along with shorter commuting distances and potentially more efficient infrastructure.
- **Misr El-Gedida** and **Abu Qir** follow with **1.24** and **2.09 tCO_2e/student**, respectively.
- **Smart Village** records **2.2 tCO_2e/student**, still below the global average, but the highest among AASTMT campuses. This may reflect more energy-intensive operations, particularly due to reliance on external cooling systems and long commuting distances. The absence of an institutional vehicle fleet or access to reliable public transportation likely contributes to a heavy dependence on private vehicles, further elevating per student emissions.

Conclusion: All campuses demonstrate favorable carbon performance per student, with **South Valley** setting the best example.

2. Per Employee Emissions

This metric shows greater variability and presents notable challenges, as **all campuses—except Abu Qir, exceed the global benchmark** of **11.73 tCO_2e/employee**.

- **Abu Qir** reports the lowest value at **9.34 tCO_2e/employee**, indicating strong performance. This is likely due to a **favorable staff-to-student ratio**, along with **moderate commuting distances** and **lower reliance on private vehicles**.
- **Misr El-Gedida** records the highest employee emissions at **22.4 tCO_2e/employee**. The **absence of campus-operated buses**, **long commuting distances**, and **high reliance on private cars** among staff contribute significantly to this elevated footprint. Additionally, the **low staff-to-student ratio** results in higher per employee emissions.
- **Smart Village** reports **16.3 tCO_2e/employee**, also exceeding the global average. While there is a **small institutional fleet**, the campus is located at a considerable distance from major residential areas, leading to heavy reliance on private vehicles due to the limited availability of public transportation. The low staff-to-student ratio further inflates per employee emissions.
- **South Valley** records **15.8 tCO_2e/employee**. In addition to a **low staff-to-student ratio**, the figure is influenced by **frequent domestic air travel** for faculty commuting from Cairo to Aswan, which significantly raises the per employee carbon footprint.

Key Contributing Factors Across Campuses:

- **Low staff-to-student ratios**, which inflate per capita emission values.
- **High energy demand of administrative buildings**, especially those with long operating hours and air-conditioning needs.
- **Lack of institutional transportation options**, leading to **high reliance on private vehicles and air travel**.

Conclusion: **Employee-related emissions represent a key challenge**, especially at **Misr El-Gedida Campus**, where commuting patterns and operational intensity are driving high per employee footprints. Mitigation efforts should prioritize **improving institutional transport options**, **enhancing remote work flexibility**, and **optimizing energy efficiency** in administrative buildings.

3. Combined Per Person Emissions

When combining students and staff, all campuses still perform better than the global benchmark of **2.14 tCO_2e/person**, showing the benefits of shared infrastructure and large student populations:

- **South Valley** again leads with **0.8 tCO_2e/person**.
- **Misr El-Gedida** follows at **1.18**, then **Abu Qir** at **1.79**, and **Smart Village** at **1.95 tCO_2e/person**.

Conclusion: The **combined per person footprint is favorable across all campuses**, reinforcing the advantage of economies of scale in larger institutions.

Comparative Analysis of Campus-Level GHG Emission Sources

Scope 1 – Direct Emissions

Table 2 Primary Emission Sources by Campus

Campus	% Contribution to Total Emissions	Main Source(s)	Key Reason(s)
Abu Qir	13.7%	Mobile combustion (79.6%)	Large campus vehicle fleet for transport operations. Diesel used in pool heating contributes to stationary combustion.
Smart Village	1.2%	Fugitive emissions (75% of Scope 1)	Minimal owned vehicles; FM200 fire suppression agents with high GWP cause a significant impact despite small quantities.
South Valley	5.8%	Fugitive emissions (76.6%)	Minor refrigerant leakage from HVAC systems; low use of vehicles and stationary combustion.
Misr El-Gedida	1.7%	Mobile combustion (53%), fugitive emissions (39%)	Very limited fleet; small generators used sparingly; refrigerant leakage contributes modestly.

Insights:

- **Abu Qir** has the highest Scope 1 emissions, mainly due to its large fleet size.
- **Smart Village and Misr El-Gedida** report very low Scope 1 emissions due to minimal use of owned vehicles.
- **South Valley** faces fugitive emissions issues despite having minimal direct combustion activities.

Scope 2 – Indirect Emissions from Purchased Energy

Table 3 Scope 2 Emissions by Campus

Campus	% Contribution to Total Emissions	Main Source(s)	Key Reason(s)
Abu Qir	24.6%	Purchased electricity	High energy use across labs, lecture halls, offices, and HVAC. Limited contribution from on-site solar PV.
Smart Village	53.5%	Purchased electricity and outsourced cooling	Major dependency on chilled water for cooling (71% of Scope 2); high demand for thermal comfort in admin and academic areas.
South Valley	14.9%	Purchased electricity	23% of energy covered by on-site PV. Reduced AC use outside morning hours minimizes load.
Misr El-Gedida	13.3%	Purchased electricity	No on-site generation. Regular use of energy-intensive HVAC and lab equipment drives consumption.

Insights:

- **Smart Village** has the highest Scope 2 emissions share due to heavy reliance on outsourced cooling.
- **South Valley** benefits significantly from **solar PV** and a more efficient AC schedule.
- **Abu Qir and Misr El-Gedida** show potential for solar expansion and HVAC optimization.

Scope 3 – Other Indirect Emissions

Table 4 Primary Scope 3 Emission Sources by Campus

Campus	% Contribution to Total Emissions	Main Source(s)	Key Reason(s)
Abu Qir	61.7%	Commuting (47%), Food (28.7%)	Large student and employee commuting footprint; lack of sustainable food sourcing and transport options.
Smart Village	45.3%	Student commuting (67.3%), Employee commuting (17.8%)	Long travel distances, no campus fleet, and heavy reliance on private transportation.
South Valley	79.3%	Commuting (64.7%), Leased assets (12.2%)	High share of air travel for staff commuting Cairo–Aswan; no on-campus housing increases upstream Scope 3.
Misr El-Gedida	85%	Commuting (83.4%), Waste (12.7%)	No campus fleet; staff/student commuting is the dominant source; waste management is secondary but still significant.

Insights:

- **Misr El-Gedida and South Valley** campuses show extreme dominance of Scope 3 emissions, mainly from commuting and air travel.
- **Smart Village Campus** also has high commuting-related Scope 3 emissions due to a lack of campus transit.
- **Abu Qir Campus's** Scope 3 emissions are more balanced, but food consumption is a major secondary source — providing a unique reduction opportunity through sustainable procurement.

Campus-Level Emission Trends and Strategic Actions

In terms of **Scope 1 efficiency**, Misr El-Gedida and *Smart Village campuses* stand out as the best performers due to their limited direct emissions from mobile combustion and effective control of fugitive emissions. On the other hand, *the Abu Qir campus faces challenges due to its extensive vehicle fleet, while the South Valley campus* is affected by refrigerant leakage. To address these issues, *the Abu Qir campus* could consider electrifying its fleet*, and the South Valley* would benefit from improved refrigerant management strategies.

For **Scope 2 emissions**, the South Valley campus performs best due to its solar PV system, which supplies 23% of its total electricity needs and reduces reliance on the national grid. In contrast, the Smart Village campus faces challenges due to its dependence on energy-intensive outsourced cooling systems. To enhance its performance, it is recommended that the campus prioritize HVAC optimization and improve chilled water system efficiency.

For the Abu Qir and Misr El-Gedida campuses, purchased electricity remains a significant source of emissions. Therefore, it is recommended that both campuses expand their use of solar PV to reduce grid dependency and lower emissions.

Regarding **Scope 3 emissions**, Abu Qir campus demonstrates a relatively balanced emissions profile, whereas Misr El-Gedida and South Valley campuses report the highest indirect emissions. The Misr El-Gedida campus struggles with high commuting emissions due to a lack of institutional transportation, while the South Valley experiences elevated emissions from frequent air travel between Cairo and Aswan. To mitigate these impacts, the introduction of organized campus transport systems, with a focus on environmentally friendly buses, measures to reduce staff air travel, and the promotion of sustainable commuting options and improved waste management—particularly at Misr El-Gedida are strongly advised.

Cross-Cutting Opportunities and Recommendations

Across all AASTMT campuses, several overarching opportunities have been identified that can deliver significant and sustained reductions in greenhouse gas emissions, while enhancing operational sustainability and resource efficiency:

1. Expand Photovoltaic (PV) Integration.

Significant benefits have already been observed at the South Valley campus, where solar PV currently meets 23% of the campus's electricity needs. This success can be scaled across Abu Qir, Misr El-Gedida, and Smart Village, where rooftop space and solar exposure are viable.

Action: Conduct campus-specific PV feasibility assessments, prioritize integration with existing grid infrastructure, and explore net-metering or feed-in tariffs where available.

2. Develop a Green Commuting Program.

Commuting remains the dominant contributor to Scope 3 emissions. A coordinated green transport strategy is essential.

Action:

- **Introduce electric or hybrid shuttle buses** for staff and students, especially in **Misr El-Gedida and Smart Village**, where reliance on private vehicles is highest.
- Install secure **bicycle parking** and create incentive programs for cycling and **carpooling.**
- Establish **digital ride-matching platforms** for students and employees.
- Collaborate with local authorities to **enhance access to public transportation** options where feasible.

3. Advance Sustainable Food and Waste Management.

Food-related emissions and operational waste (solid and liquid) present untapped areas for improvement.

Action:

- **Shift procurement** toward locally sourced, seasonal, and plant-based options in campus cafeterias.
- **Implement waste diversion initiatives** such as composting food scraps and greywater recycling for landscaping use.
- **Launch awareness campaigns** to **reduce food waste**, encourage reusable containers, and phase out single-use plastics.

These cross-campus strategies support emissions reductions while aligning with global best practices in campus sustainability and the ISO 50001 standard for continuous improvement. Implementing them collectively will position AASTMT as a regional leader among institutions of higher education with a focus on low-carbon initiatives.