



Towards energy saving and emission reduction plan

AASTMT has established many efforts towards energy saving and gases emissions reduction in 2021/2022.

AASTMT Energy Research Unit and Energy Management Committee put forward several strategies for regular online monitoring of energy consumption in all AASTMT campuses as per the "**Total Energy used for all AAST campuses" report in 2021/2022**" and particularly the energy consumption, wastage and saving statistics in AASTMT Alexandria campuses as per **AASTMT energy report 2021/2022 of Alexandria campuses** since they experience more energy usage among AASTMT campuses.

[Total Energy used for all AAST campuses 2021/2022](#)
[ENERGY REPORT AASTMT Alexandria campuses-2022](#)

Figures1 and 2 demonstrate energy consumption and its % in all AAST campuses respectively.

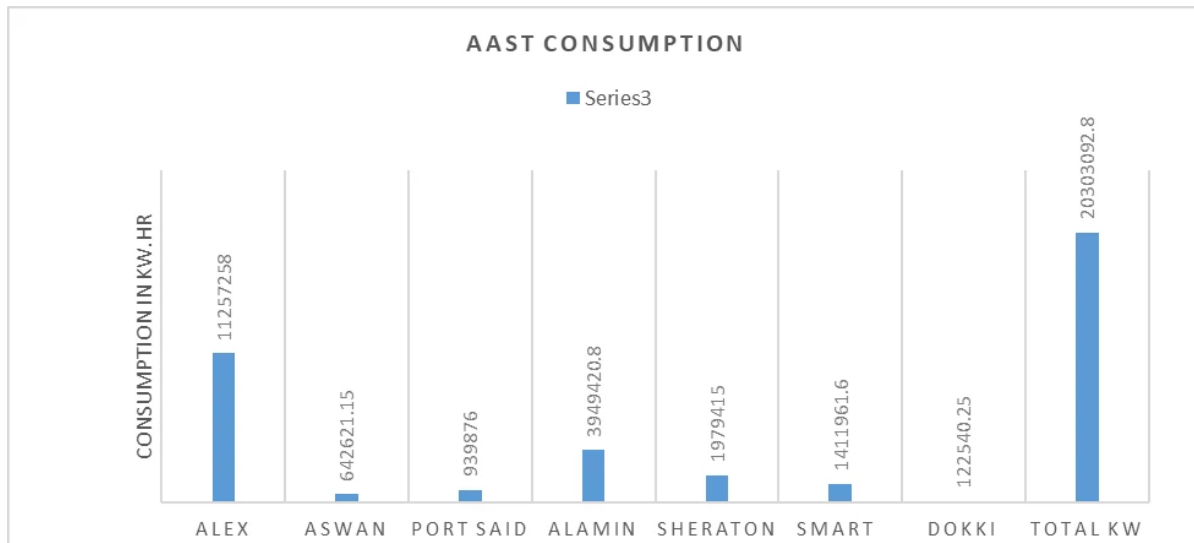


Figure 1: Energy consumption in all AASTMT campuses in 2021/2022

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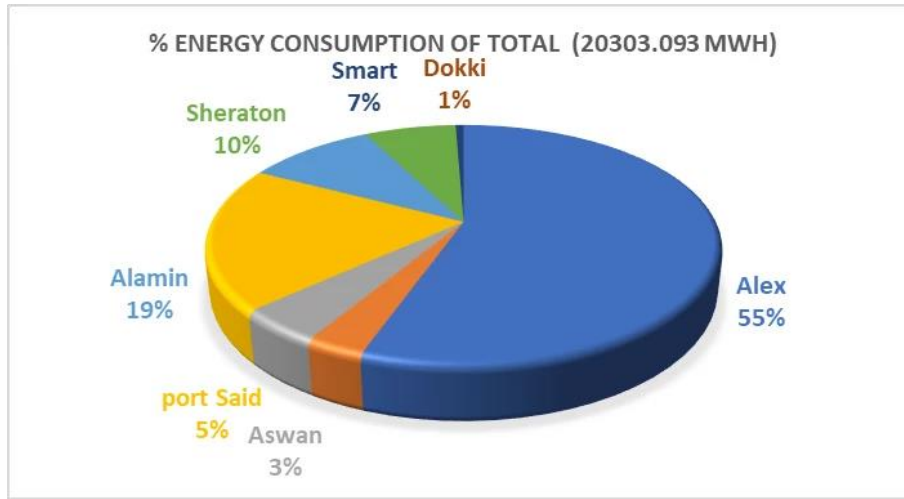


Figure 2: % Energy consumption in all AASTMT campuses in 2021/2022

Since AASTMT Alexandria branches are proven to be of the highest energy consumption, AASTMT took severe actions towards energy saving and emissions reduction in AASTMT Alexandria campuses

AASTMT Efforts Towards Energy Saving

To combat high energy usage, AASTMT's Energy Committee put forward several strategies to reduce and rationalize electrical consumption in AASTMT Alexandria campuses.

Measures for reducing energy consumption can be summarized as:

1. Replacing the light bulbs, spotlights located on the roofs of buildings and in the roads with energy-saving LED lighting to more than 90% replacement and towards 100% replacement in 2023
2. Replacing (100) spotlights for all electric poles and modifying the number of 17 triple poles for LED lighting in front of the entrances of the marine buildings, and the bus station.
3. Online regular monitoring to energy consumption and determine load priorities for efficient energy management
4. Determine building that need restoration and renovation like Building 1- Miami Campus (plan 2023)
5. Operating Building B in College of Engineering and Technology with Full capacity using energy-efficient technologies.
6. Installing energy efficient VRF system for central air-conditioning systems and VSD for local ones in Pharmacy College Building and in College of Engineering and Technology- Building B.
7. A solar power station with a capacity of 50 kilowatts has been installed in the seventh engineering building.

8. Solar heaters have been installed to replace the electric heaters in the College of Pharmacy and will be applied to students' dorms.
9. Spreading instructions and directions towards energy saving and conservation as per the letter addressed to all AASTMT campuses from AASTMT president on September 2022: [letter addressed to all AASTMT campuses from the AASTMT president](#)
10. Increasing awareness regarding energy rationalization and conservation plans among AAST staff, students, administrators and technicians through campaigns and initiatives as shown in the Events Section found in the following link: [Awareness Events](#)

Calculating and analyzing energy consumption and load demand in AASTMT Alexandria campuses during period from 2018 till 2022 as shown in Figure 3, it is noticed that the highest consumption was in **2018 with total 12698059kWatt.hr** before the pandemic year 2020 which witnessed the least consumption due to off-campus period. Then, after returning on-campus, the consumption increased gradually till reaching **11257258 kWatt.hr (40526.137 GJ) in 2022** where campuses were working full capacity. It is clear that despite the full capacity operation, facilities expansions and new building establishment, there is **reduction in energy consumption by about 11.35%** than in 2018 as shown in Table 1 due to the applied energy conservation plan.

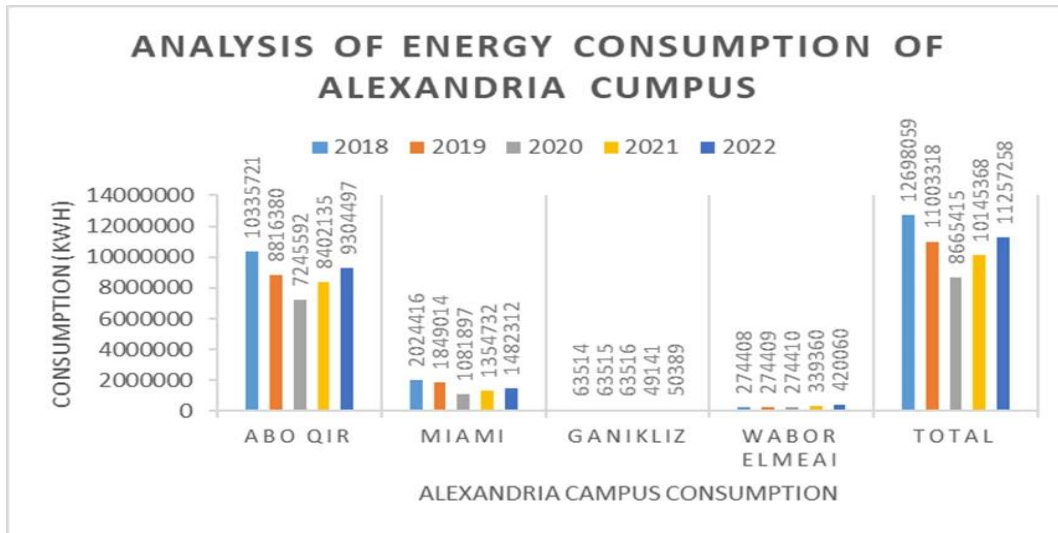


Figure 3: Energy consumption in AASTMT Alexandria Campuses during period from 2018 till 2022

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Table 1: Analysis of Energy consumption in AASTMT Alexandria Campuses during period from 2018 till 2022

Year	Abo Qir	Miami	Ganikliz	Wabor	Total
2018	10335721	2024416	63514	274408	12698059
2019	8816380	1849014	63515	274409	11003318
2020	7245592	1081897	63516	274410	8665415
2021	8402135	1354732	49141	339360	10145368
2022	9304497	1482312	50389	420060	11257258
Average	8820865	1558474.2	54348.66667	344610	10778297.87
% reduction 2018:2022	-9.977281701	-26.77829063	-20.66473533	53.07862745	-11.34662392

AASTMT Action Towards Climate Change and Gas Emissions Reduction

1. [AASTMT CLIMATE ACTION PLAN: Towards Zero Emissions by 2050](#)

2. Carbon Footprint Estimation and Reduction Project in the AASTMT Campus Towards developing a Model for Promoting Sustainable Development Goals (Green Campus)

[Carbon Footprint Estimation and Reduction Project:](#)

This project provides a detailed analysis of energy consumption and resulting carbon emissions in AASTMT. It includes data on energy consumption from various sources, including electricity, natural gas, gasoline, and diesel fuel. The report also highlights various measures that have been implemented to reduce energy consumption and carbon emissions on campus, such as the substitution of conventional lighting fixtures with energy-efficient LED lights, the installation of air conditioning systems that prioritize energy conservation, and the establishment of a solar power station. Overall, the report serves as a valuable resource for understanding the environmental impact of energy consumption in AASTMT and provides a foundation for future efforts to reduce carbon emissions and promote sustainable energy use on campus.

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Project Objectives

1. The primary objective of this project was to estimate the energy consumption and carbon footprint of AASTMT and identify areas for improvement.
2. The project aimed to promote sustainable energy use and reduce carbon emissions on campus.
3. The project sought to raise awareness about the impact of energy consumption on the environment and encourage behavior change among students, staff, and faculty.
4. The project aimed to identify opportunities for reducing energy consumption and carbon emissions in AASTMT, including through energy efficiency measures, renewable energy, and waste reduction.
5. The project aimed to engage stakeholders in the process of energy consumption and carbon footprint estimation and reduction, including students, staff, and faculty.
6. The project aimed to establish a framework for ongoing monitoring and reporting of energy consumption and carbon emissions in AASTMT.
7. The project aimed to contribute to the body of knowledge on energy consumption and carbon footprint estimation and reduction in the higher education sector.
8. The project aimed to support AASTMT's commitment to sustainable development and environmental stewardship through the promotion of sustainable energy use

As per the Carbon Footprint Estimation and Reduction Project,

Calculations were made to evaluate carbon emissions per meter square (kg CO₂-e/m²) in Alexandria campuses for the years 2018 to 2021 as presented by Table 2 and Figure 4. It is clear that there was a decrease in kg CO₂-e/m² in 2020 due to the impacts of the COVID-19 pandemic. However, in 2021 there was a decrease in emissions than that in year 2018 and 2019 due to energy consumption reduction as well as diversion to clean energy.

Table 2: Calculated kg CO₂-e/m² Emissions for Energy Use in Alexandria campuses

Year	kg CO ₂ -e/year	Gross Internal Area (m ²)	kg CO ₂ e/m ²
2018	1,240,286.5	236,784	5.24
2019	1,151,281.2		4.86
2020	869,471.36		3.67
2021	1,008,256.2		4.26

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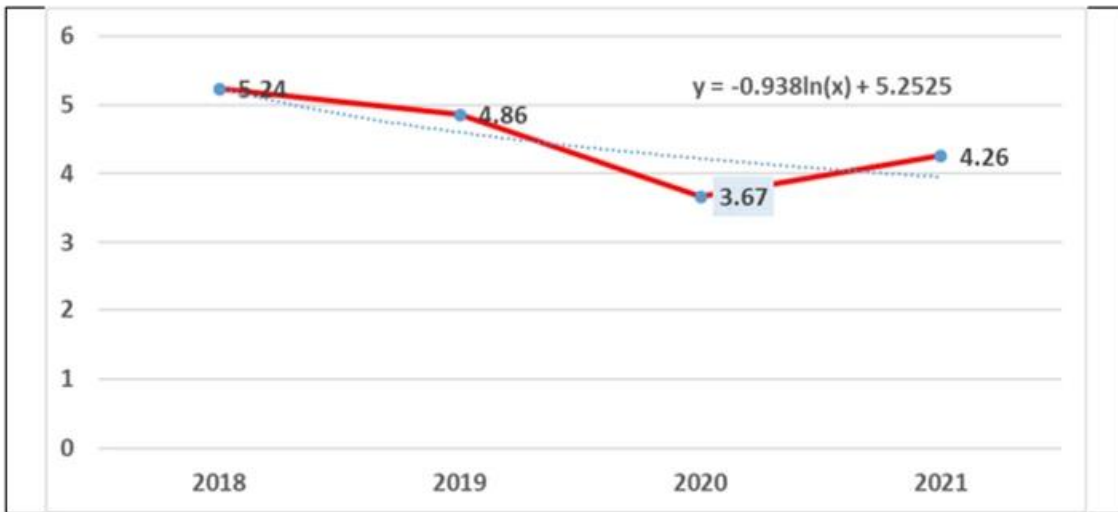


Figure 4: Calculated kg CO₂-e/m² Emissions in Alexandria campuses

In conclusion, AASTMT measures towards energy saving and clean energy resulted in significant energy cost savings, underscoring the economic as well as environmental benefits of such initiatives i.e. almost 11.4 % savings in the energy consumption cost (LE) / in year 2022 and 4.26 (kg CO₂-e/m²) emissions per square meter which is less than in year 2019 and 2018 (There was a significant decrease in energy consumption and kg CO₂-e/m² in 2020 due to the impacts of the COVID-19 pandemic).

Diversion Towards Clean Energy and Renewable Energy Sources

Finally, as per **the 2021/2022 Energy consumption report for all AASTMT branches**, Table 3 shows the total energy in GJ and energy density in all AASTMT branches all over EGYPT. It is worth noting that more than **267 GJ were supplied from renewable energy resources** which reflects AASTMT efforts to divert to clean energy, increase energy efficiency, reduce emissions and sustain serving the Environment.

Total Energy used for all AAST campuses 2021/2022

Table 3: Energy Consumption in GJ/m² for AAST 2021/2022

Total floor area (m ²)	Consumption from grid (kW)	Consumption from grid (GJ)	Total energy (grid + Renewable energy resources)	Density (GJ/m ²)
735569.7	20303093	73091.13	73358.25	0.09973

Prepared by AASTMT Energy Research Unit

2022

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