2024

AASTMT Energy Progress Report (2022-2023):

- 2022/2023 Plan Towards Green Sustainable Energy
- Energy Consumption and Carbon Emissions' 2022/2023 Insights

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1. Report Overview

This report highlights AASTMT's progress towards energy efficiency and carbon emissions reduction in its different campuses during the year 2022/2023. It provides detailed updates on the university's efforts in energy saving, renewable energy employment, and climate resilience. Moreover, it deals with reviewing and updating rationalization plans, analyzing load consumption and percentage of load change between the years 2018-2023 as well as listing emissions insights within this period, to evaluate AAST plan and efforts.

2. Executive Summary

In 2022/2023, AASTMT made significant progress towards energy efficiency, climate action and sustainability goals in its campuses demonstrating a strong commitment to reducing its environmental impact. This report highlights AASTMT plan and key achievements across energy saving, renewable energy adoption and carbon emissions reduction, in 2022/2023. This mirrors AAST continuous sustainability efforts including measures, research and innovation as well as initiatives and campaigns to meet Egypt overall goal to "**Boost the share of power generated by renewable energy resources to 42% by 2040 and reducing green-house gases emissions by 50% by 2040"**.

In 2023, with particularly significant improvements in energy efficiency and waste management, the university successfully reduced its carbon footprint by 4.6% from 2022 and 7.2% from 2021 emissions, bringing the total reduction from 2019, which witnessed highest emissions, to 30%. This puts AASTMT well on track to meet its 30% carbon reduction target by 2025 and continues its progress toward long-term goal of achieving a 50% carbon reduction by 2040.

Another accomplishment in 2022/2023 was the expansion of renewable energy usage, with the university covering almost 24% of its energy needs from solar power, up from 21% in 2021/2022. This progress supports AASTMT long-term target of sourcing 25% of university demand from renewables by 2025 and ultimately 40% by 2040, in alignment with Egypt's national energy plan.

Regarding energy-related efforts among local community, vast number of initiatives and awareness campaigns among AASTMT different institutes have taken place in 2022/2023. Moreover, more renewable energy, climate change and sustainability modules and facilities were integrated to serve undergraduate and postgraduate programs, research objectives and industry needs. Moreover, funded research projects on renewable energy, sustainable transport, and climate resilience have resulted in a number of prototypes and innovations in 2022/2023. In parallel, the university witnessed the involvement of over 7,000 students in energy and climate-related workshops, trainings and sustainability projects over the two years.

By setting clear targets for 2025 and 2040, AASTMT aims to create a sustainable progress and lasting impact in the energy sector and contribute meaningfully to the national and global sustainability movement.

3. Objective

The scope of this report focuses on AASTMT's ongoing continuous efforts towards energy efficiency and saving, carbon footprint reduction as well as increased renewable energy employment within the years **2022 and 2023** to mirror the university's progress towards the interim targets set in the updated **AASTMT Green Energy and Energy Management Policy (2023-2025)**. Moreover, the report provides detailed insights into AASTMT's energy use density, renewable energy usage and carbon emissions level in 2022/2023 to monitor the outcome of AASTMT's energy-related efforts and track its advancements towards its long-term energy-related goal.

4. Measures towards Affordable and Clean Energy

AASTMT accomplishments and measures towards clean and affordable energy, within the period 2022/2023 in accordance to its Energy Policy and Plan, cover the following four main aspects; **Towards: Energy Saving**, **Higher Energy Efficiency**, **Renewable Energy Employment** and **Carbon Emissions Reduction.**

AASTMT 2022/2023 Plan towards Clean Sustainable Energy

4.1.Towards Energy Saving

The introduction of smart building management systems played a critical role in improving energy saving. These systems allowed real-time monitoring and optimization of energy use in major campus buildings, reducing electricity waste and improving operational efficiency. Moreover, engaging staff and students in initiates and awareness campaigns towards energy saving contributed well in serving this goal. In details, these measures include;

- Online regular monitoring to energy consumption and determine load priorities for efficient energy management.

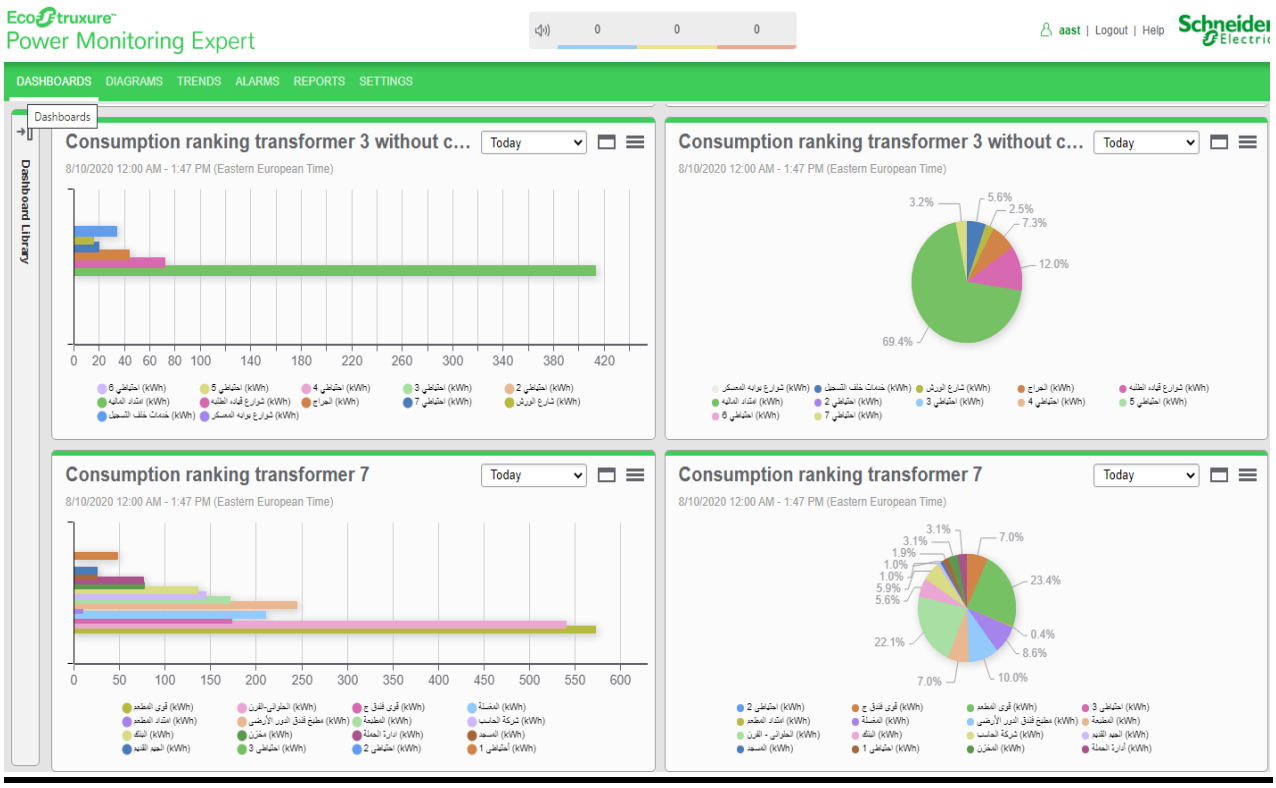


Figure 1. One of the output Monitoring System in AASTMT

- Data from local energy meters in each building are used to track building energy use during different times (day/night, weekdays/weekends, and seasonal variations) to identify periods of high and low demand. The difference between peak energy consumption and off-peak consumption are compared to identify potential overuse or unnecessary use. Hence, buildings of high energy wastage will be selected for internal audits to identify reasons of energy inefficiencies and take suitable measures to reduce and rationalize energy consumption in such places.
- Continuous checking for unnecessary use of energy in high energy wastage buildings where lighting, air conditioners or computers are left on even if the place is unoccupied.
- Spreading instructions and directions towards energy saving and conservation as per the letter addressed to all AASTMT campuses from AASTMT president.

  Letter addressed to all AASTMT institutes from AASTMT president regarding energy saving
- Increasing awareness regarding energy rationalization and conservation plans among AAST staff, students, administrators and technicians through energy-related campaigns, initiatives and seminars as shown in the Events Section found in the following link:

  Energy-related Events

4.2.Towards Higher Energy Efficiency

Besides, the pre-discussed energy saving procedures, different buildings' renovation and upgrading all over Alexandria campus (since it features multiple branches, oldest infrastructure and largest number of staff and students i.e. highest energy consumption and energy wastage) was carried out in 2022/2023 to include energy-efficient technologies. In each Alexandria branch, data from local meters at each building is collected to analyze energy use of this building during different times and identify its subjection to energy wastage or energy inefficiencies. In 2022/2023, buildings with highest wastage were selected for internal audits and the following measures were taken towards these building;

- Completing the replacement of lighting lamps and working with LED lamps as was planned for 2022/2023, where replacement rate rises to more than 95% leading to a significant reduction in electricity consumption.
- Increasing the operating efficiency of air-conditioning systems (energy-efficient HVAC systems)
- Applying motion-sensor lighting in common areas and energy-saving modes for conditioners to increase building efficiencies during unoccupied periods
- Identify older or inefficient equipment, to be replaced
- Regular electrical maintenance procedures.

This contributed in the overall 13.6% reduction in electricity use in 2023 compared to 2018 levels and 2.5% reduction compared to 2022 levels in AASTMT Alexandria campus as will be demonstrated in the insights section later on.

AASTMT 2022/2023 Energy Usage and Emissions Insights

In details, 2022/2023 renovations in different branches for AAST Alexandria campus include;

Abukir campus

- Upgrading lighting in the corridors of the Engineering Building C and D on the second and third floors to LED.
- Upgrading the lighting in all classrooms in Engineering Building C and D (first floor), Building A (ground floor) to LED.
- Upgrading to LED lighting in all bathrooms of the Marine Colleges buildings as well as the entire Marine Building C, besides 8 halls in the Marine D Building.
- Upgrading the lighting for the stairs of Engineering Building A completely to LED.
- Upgrading the lighting in Al-Nadouri Hall on the ground floor of the Marine Examinations Authority building as well as in the Publishing Offices of the College of Computer Engineering on the ground floor to LED.

- Upgrading lighting in 4 classrooms on the fourth floor of the Architectural Engineering Building with 50 LED flashlights.
- Upgrading the lighting in the main Library Building on the first and second floors to LED.
- Upgrading the lighting of the entire Swimming Pool to LED as well as improving the control panel for swimming pool motors.
- Upgrading the lighting in the entire Main Stadium to LED with 14 100-watt flashlights
- Upgrading two offices in the Information and Documentation Building 106 and 105 (lighting + accessories).
- Upgrading of the entire external lighting of the Industry Service Complex (ISC) to LED as well as lighting all its corridors with 60 LED flashlights 60*60.
- Upgrading the entire fourth floor of the Housing Hotel D (lighting + accessories) and installation of external lighting for the Hotel Buildings with LED flashlights.
- Upgrading the external lighting for the Restaurant Building to LED as well as upgrading the lighting to LED in the Hotel Restaurant and on the ground floor with 30 40-watt LED flashlights and 40 18-watt LED spot lights.
- Upgrading the lighting in the Old Gym Building with 30 40-watt LED flashlights and 20 24-watt LED spotlights while the New Gym Entrance lighting was replaced by 20 5-watt spotlights.
- Installing 2 rectifier panels for 2 UPS devices in the Finance Ministry.
- Installing 3 air conditioning panels for server rooms in Housing Buildings A, B, C, D, E and F.
- Installing 2 control panels for Housing A and Housing B water motors.
- Installing a services panel in the Main Stadium and separate panels for all irrigation caissons.
- Installing a control panel for 2 air compressor equipment in the Campaign Building.
- Installing control panels for water engines in Marine Safety Buildings, Industrial Modernization, and Housing.
- Installing disconnection and operation switches for lighting in all the corridors and passages of the College of Engineering buildings on all floors and assembling them on the ground floor to facilitate the disconnection and operation process. The same was executed in Marine Colleges Buildings.
- Renovating electricity, data, and air conditioning outlets in Hall 108 of the College of Computer Engineering building.
- Renovating electricity, data and lighting outlets and installing air conditioning outlets in 4 offices (117, 317, 315, 417) in Building A of the College of Engineering.
- Renovating electricity, data and lighting outlets in 2 offices on the ground floor of the Admission and Registration Building.

- Renovating electricity, data and lighting outlets on the entire fourth floor of the Housing Hotel C and on the entire second floor of the Iskan Hotel building
- Proceeding on Operating Building B in College of Engineering and Technology with full capacity using energy-efficient technologies and energy efficient VRF system for central air-conditioning systems and VSD for local ones in Pharmacy College Building.

- Miami Campus

- Upgrading the lighting in Building B hall on the ground floor with 30 24-watt LED flashlights while in the second and third floors with 60 40-watt LED flashlights
- Upgrading the external lighting to LED in the Administrative Building
- Upgrading 3 offices in the Administrative Building (lighting + signs + accessories + networking work)

- Ganiklis

Complete development of 4 offices and one meeting room (lighting + banners + accessories + networking)

- Wabor elmaei

- Upgrading to LED lighting for Halls 103 and 105 as well as replacing lighting in the entire ground floor corridors with 50 LED flashlights
- Installing four overload voltage control units on the air conditioning motor panel
- Installing a control panel for 2 water motors
- Installing 1 current rectifier board for the UPS device in the Studio.

4.3.Towards Expansion in Renewable Energy Employment

Over the course of 2022 and 2023, AASTMT made significant strides in transitioning to renewable energy sources, with a particular focus on solar power. The university expanded its solar infrastructure by operating 214 kW of photovoltaics and solar panels in 2023 which contributed in increasing AAST renewable energy share supply to 24% of AASTMT total energy needs in 2023. This growth was made possible through further investments in renewable energy infrastructure and improvements in the maintenance and operation of existing solar installations. Moreover, AASTMT has significantly expanded its contributions to renewable energy and climate change through research and projects between 2022 and 2024.

Related measures are listed in details below

- The university fully utilized it photovoltaic infrastructure in 2022 where a solar power station with a capacity of 50 kilowatts is installed in the Seventh Engineering Building in Alexandria campus and another one of 150 kW in Aswan. Both work with net metering system.

Improvements in the maintenance and operation of existing solar installations help to maintain and even improve their output power thus enhancing its energy share in all AASTMT consumption.

- Solar heaters have been installed to replace the electric heaters in students' dorms – Alexandria campus- Abukir branch as planned in 2022, besides the already applied solar heaters in the Pharmacy college.

Figure 2. 150kW solar power station in Aswan campus

Figure 3. Installed Solar Heaters

- Investments in Energy-related LABs intalled in AASTMT different campuses to guarantee continuous maintenance and improvements to assist in consultancy, research and trainings. These Labs include;

➢ **Energy Research Unit LAB in Seventh Engineerring Building - Alexandria Headquarter**

Energy Research Unit LAB

➢ **Energy LAB in Eletrical Energy Engineering Department - Smart village campus**

Eletrical Energy Engineering LAB

➢ **Environmental Monitoring and Climate Change Laboratory - Scientific Research & Innovation Centre**

Environmental Monitoring and Climate Change Laboratory

- Participate in further renewable energy-related research projects and improve the outcomes of already existing ones to serve the industry and community effectively and resourcefully.

A number of renewable energy- related projects, undertaken by AASTMT, have resulted in significant outcomes in 2022/2023. Some examples are listed below.

➢ **MAIA-TAQA Funded Project (2019-2023);**

An important outcome of this project is "The Innovation One Stop Shop (IOSS)" in the Energy research Unit LAB installed and operated in 2022. The IOSS main purpose in the AASTMT, the Egyptian partner of the MAIA-TAQA project, is to support startups and industry with business models. This lab represents the technical part of current facilities for training and consultancy purposes with components and facilities related to Renewable Energy.

MAIA-TAQA-IOSS

Figure 4. IOSS LAB

➢ **Smart Solar-Powered Public Parking System Funded Project;**

This project was funded by Information Technology Industry Development Agency's (ITIDA) and Information Technology Academia Collaboration (ITAC). This was followed by a related project, "Smart Integrated On-Board Battery Charger for Electric Vehicle Applications" (2021-2023).

Smart Charger for Electric Vehicle

As an output of these projects, AASTMT Research and Development Center designed and implemented two prototypes (PV-based Electric Vehicle Charger and Solar Power Smart Parking Meter) in AAST Abukir Campus in 2023 as a startup for more duplicates.

Figure 5. Smart Solar-Powered Parking System

➢ An Environmentally Friendly Electric Car Project

An electric car, that uses water and hydrogen, was invented by a student team from the Institute of Technical and Vocational Studies at AASTMT Industry Service Complex (ISC) in 2023.

AASTMT Electric Car Project

Figure 6. Electric car project by a student team from AASTMT ISC

➢ Monitoring, Assessment and Innovative Treatment Technology to Enhance Groundwater Quality for Irrigation Purposes toward Climate Change Adaptation (TREATMENT) Funded Project

In 2023, a **Renewable, Innovative and Integrated Water Treatment Unit** is designed to use energy harnessed from **solar photovoltaic system** to be used to lift water from a well, and subsequently, the water is directed through the four-stage nano-filter, where it undergoes a rigorous purification process.

The end result is clean, potable water or water suitable for irrigation and cultivation and the PV system, serves as the sustainable energy source for the three-phase pump.

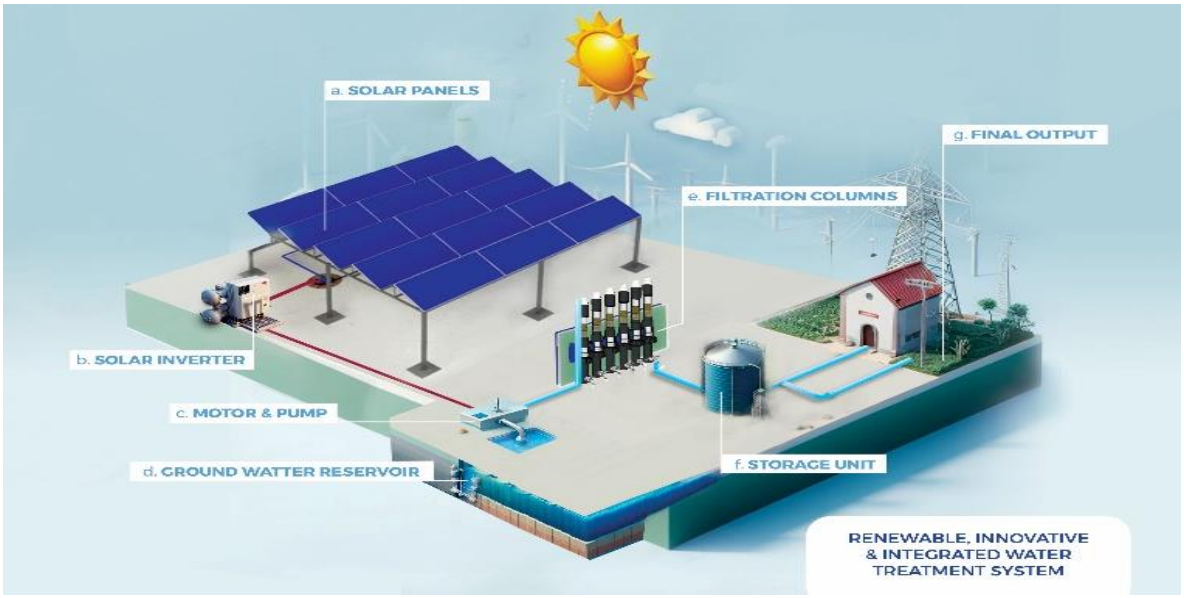


Figure 7. Renewable, Innovative and Integrated Water Treatment Unit

4.4.Towards Carbon Emissions Reduction

All the previous measures towards energy efficiency, saving and renewable energy employment, besides AASTMT efforts towards Zero-Waste, have effectively resulted in total carbon emissions reduction 2023 by 4.6% from 2022, 7.2% from 2021 and notably by 30% from 2019 emissions as will be demonstrated later in this report.

Measures taken by AASTMT in 2022/2023 to contribute to emissions reduction are discussed in details in AASTMT 2022/2023 Progress Report of Carbon emissions and Climate Action.

AASTMT 2022/2023 Emissions Progress Report

These measures are summarized as;

- Conduct regular assessments of carbon emissions to implement strategies for reduction.
- Prioritize renewable energy projects and the exploration of available clean energy sources.
- Implement efficiency measures such as upgrading to LED lighting, enhancing HVAC systems, and incorporating smart building technologies.
- Towards Zero-Waste Strategy, a comprehensive recycling program was implemented that expanded across all campuses, targeting paper, plastic, and electronic waste. By 2023, AASTMT had achieved a 50% waste diversion rate, a significant milestone in reducing the amount of waste sent to landfills.
- In addition to recycling, the university introduced composting facilities in dining areas in 2022. These composting stations allowed for the proper disposal of food waste, diverting approximately 10% of organic waste from landfills in 2023. Combined with increased recycling efforts, this led to a total reduction in landfill waste by 15% compared to 2020 levels.
- The university also made progress in reducing paper consumption by encouraging the use of digital platforms. By 2023, paper usage had decreased by 25% compared to 2020.
- Additionally, AASTMT introduced an electronic waste recycling program, ensuring that all obsolete electronic equipment was disposed of sustainably, further contributing to its zero-waste goals.
- Promote behavioral change among staff and students to reduce energy consumption, foster awareness, and encourage sustainable practices.
- Engage students and faculty in research on climate adaptation, with a focus on vulnerable regions such as the Middle East and North Africa.
- Integrating sustainability topics into 90% of AASTMT undergraduate and postgraduate programs.

5. Energy Consumption and Carbon Emissions Insights

To assess AASTMT's progress in energy efficiency and carbon emissions reductions, it is essential to establish a baseline using data from 2018 to 2021. This period serves as a foundation for future energy consumption and emissions and allows for a clear comparison with data from 2022 and 2023.

5.1. Energy Consumption

AASTMT Energy Research Unit and Energy Management Committee put forward several strategies for regular online monitoring of energy consumption in all AASTMT campuses. Insights of energy consumption was prepared by the head of the Energy Research Unit and the head of the Academy's Energy Management Committee based on the activities of the Maintenance and Electrical Facilities Department and Project Management in Abu Qir and the rationalization plans that were studied with the administration as well as the mechanism for follow-up and measurement of performance indicators (KPI).

5.1.1. Energy consumption in all Alexandria campuses

First, AASTMT energy consumption in Alexandria is analyzed since AASTMT experiences the highest consumption in Alexandria due to its multiple branches and largest number of staff and students. Figure 8 shows the energy consumption in the entire Alexandria Campus within the period (2018-2023)

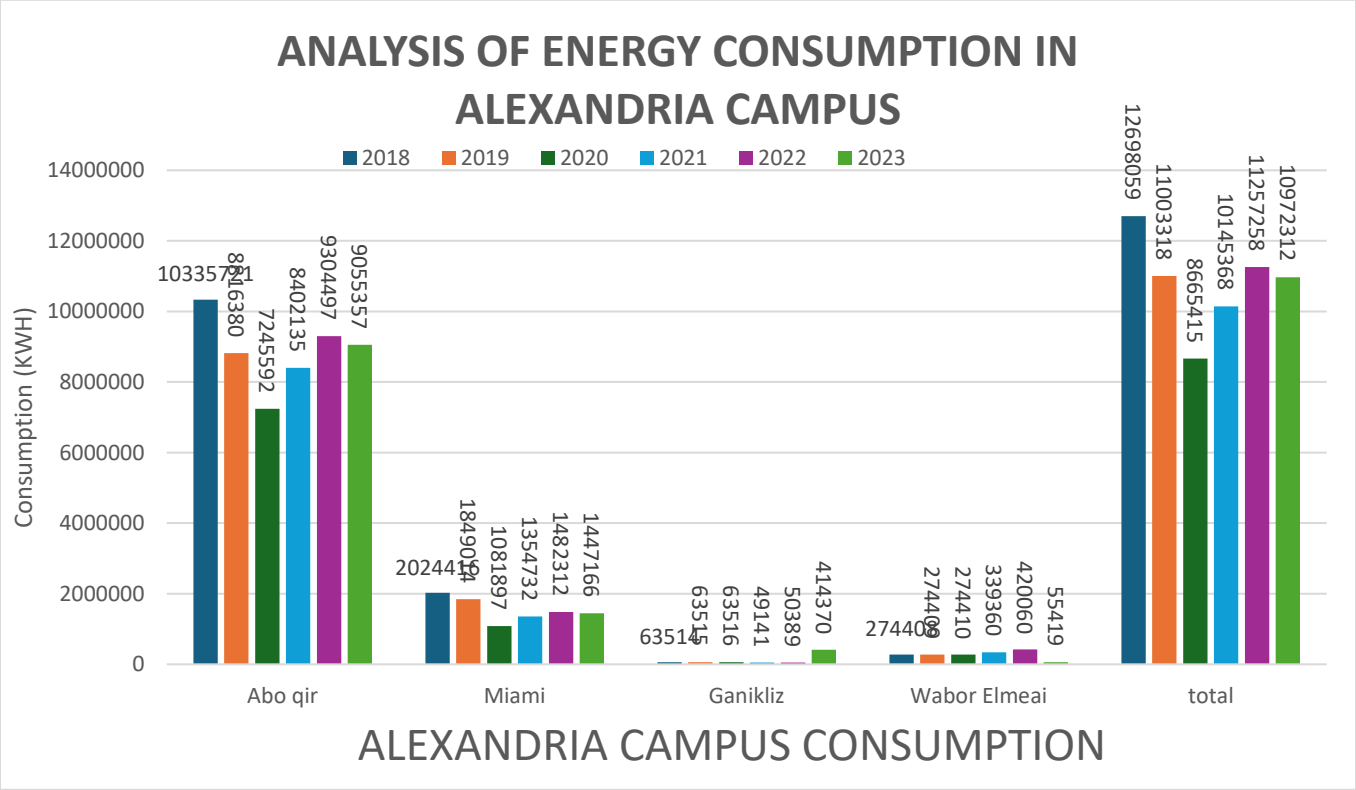


Figure 8. Energy consumption of AASTMT Alexandria campus (2018-2023)

It is clear that the maximum consumption was in 2018 with a full load of 12,698,059 kWh before Covid19, then the lowest load in 2020 during Covid 19, then it gradually increased until all the branches returned to their full load in 2022 with a value 11,257,258 kWh, as well as 2023, with a value of 10,972,312 kWh. Note that despite the return of total operation and the increase in expansions and new buildings, there is a decrease in the total load by 13.59%, in 2023 compared to 2018. Moreover, compared to consumption in 2022, a decrease in energy consumption in 2023 is evident by about 2.5% as shown in Figure 9 which verifies the effectiveness of AASTMT plan and measures towards energy efficiency and saving in AASTMT entire Alexandria campus.

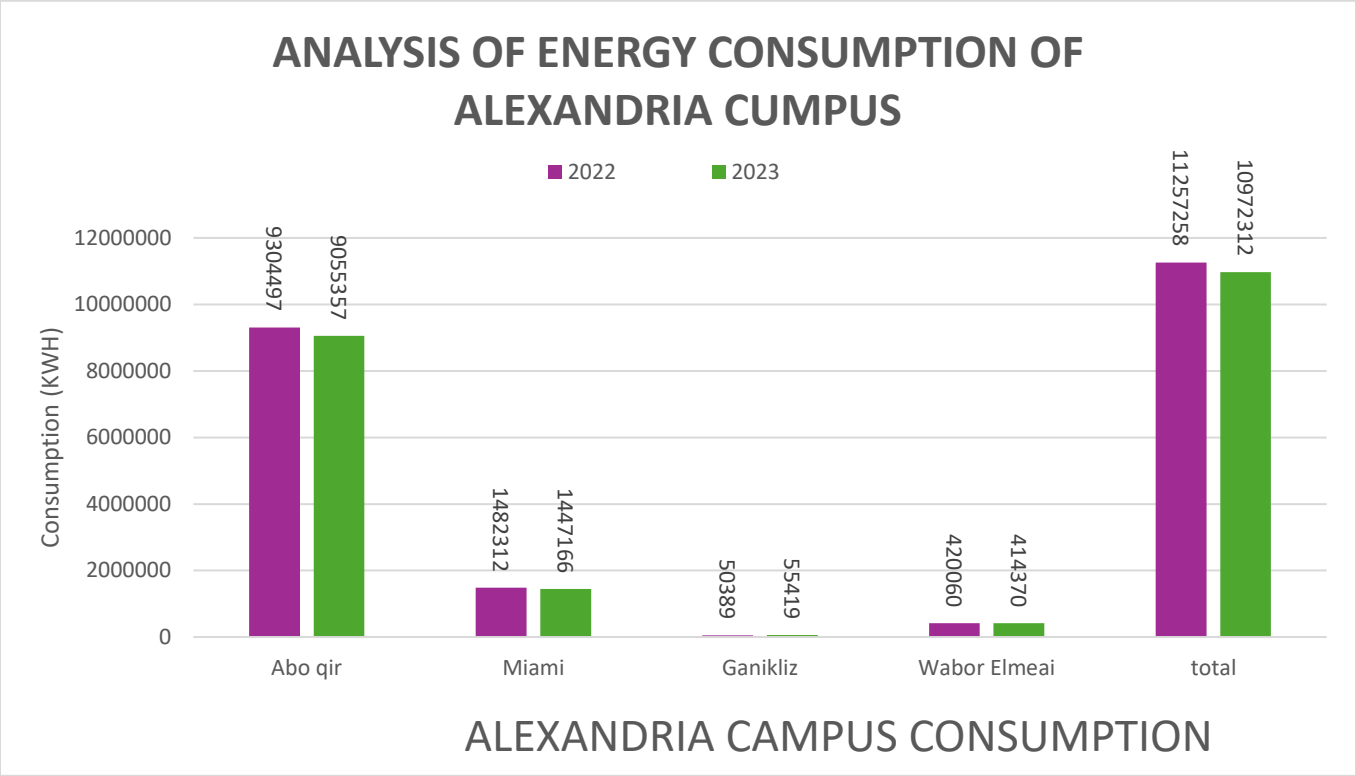


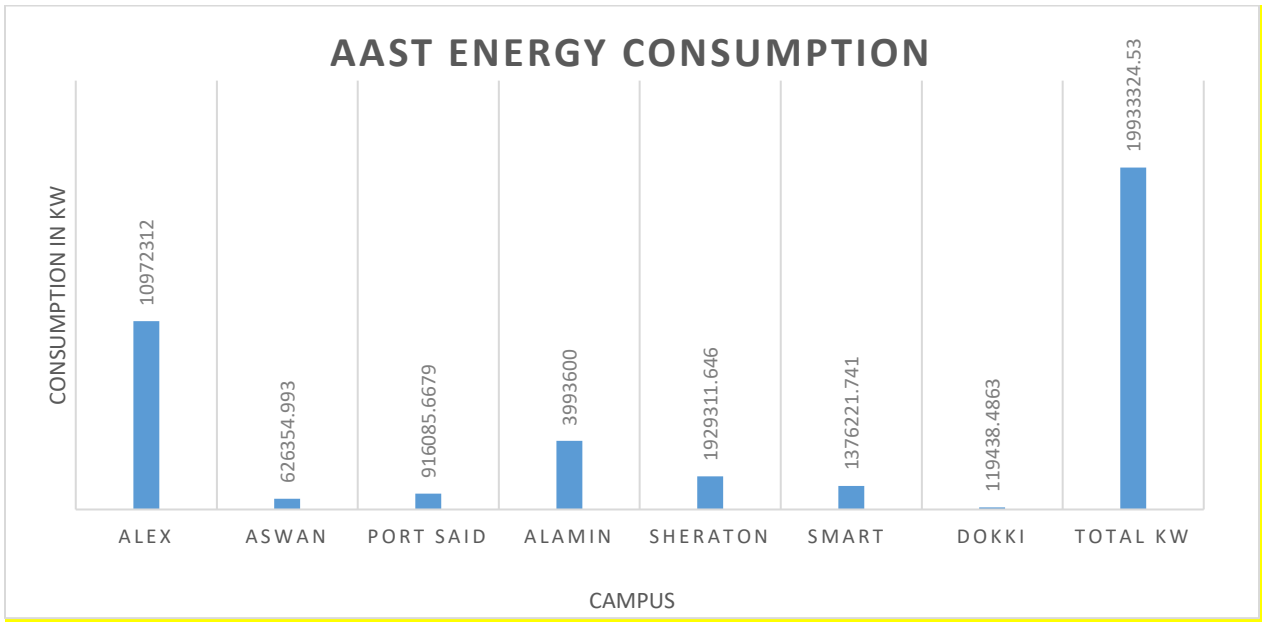
Figure 9. Zoom in energy consumption of AASTMT Alexandria campus (2022-2023)

Thus; summarizing insights of Alexandria campuses in 2022/2023

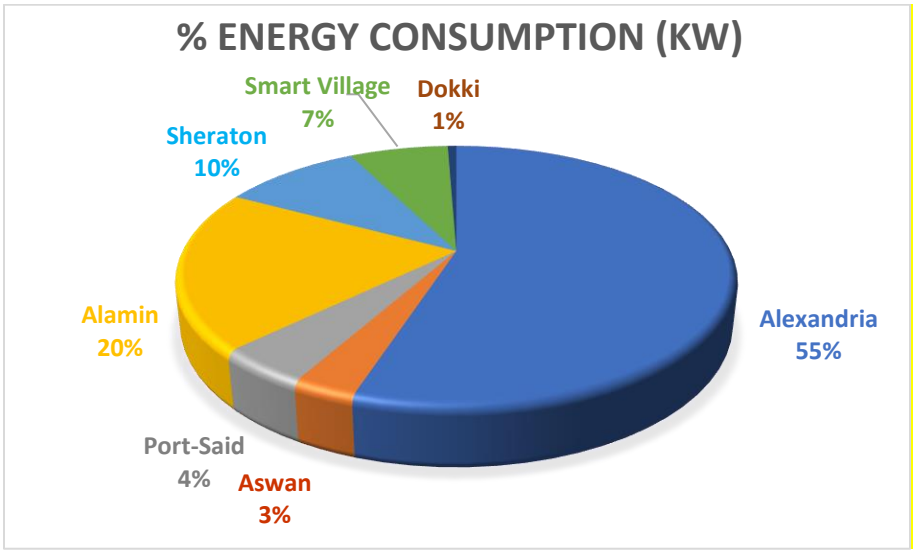
- **Reduction between 2018 and 2023=13.6 %**
- **Total energy used (2022) = 11257258 kwh=40526.137 GJ/2022**
- **Total energy used (2023) = 10972312 kwh=39500.32 GJ/2023**
- **% reduction (2023/2022) = 2.513% reduction**

5.1.2. Energy consumption in all AAST campuses

Regarding Energy consumption in all AAST campuses all over Egypt (Alexandria, Aswan, Port-Said, Alamin, Sheraton, Smart village and Dokki), the figures below demonstrate energy consumption and its % in all AAST campuses respectively for the year 2023.



(a)



(b)

Figure 10. 2023 Energy Consumption in all AAST campuses (a) in kW, (b) in %

Comparing the energy consumption of all AAST campuses for the years 2022 and 2023, as illustrated in Figure 11, it is noted that the average reduction in the all campuses except Alamin Campus is 2.5% while the average reduction all over the campuses including Alamin is around 2%. This is related to the fact that Alamin is a new campus whose capacity increases regularly each year until the full occupation.

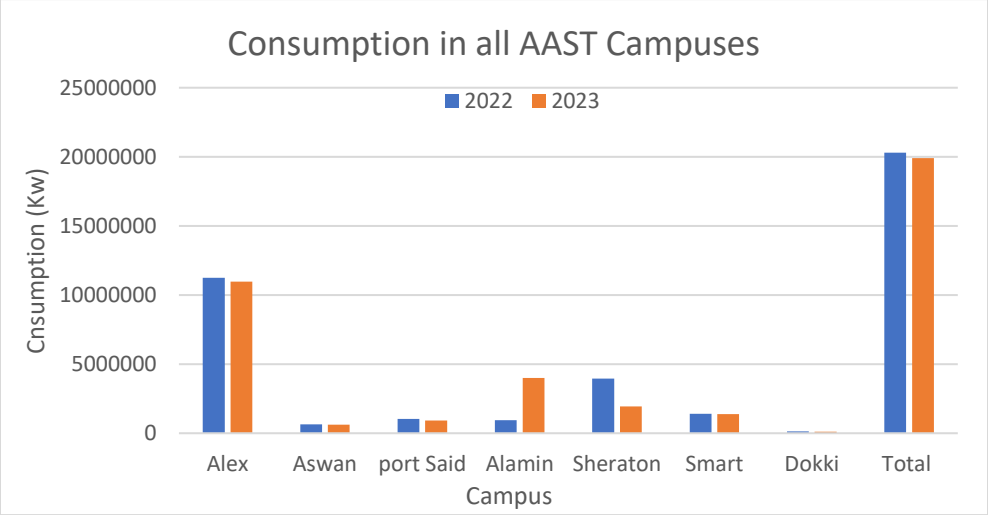


Figure 11. Comparison between 2022 and 2023 energy consumption in all AASTMT campuses

Regarding 2022/2023 AAST energy density, Table1 shows consumption analysis for all AAST campuses allover Egypt and gives the energy density in kWh/m^2 while Table2 shows the entire AAST energy density in GJ/m^2. It is worth noting that 270 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.

Table 1. Analysis of Energy for all AAST campuses in 2022/2023

	Alex	**Aswan**	**Port Said**	**Alamin**	**Sheraton**	**Smart**	**Dokki**	**Total**
Plan (m^2)	3033.3	100000	100000	260000	4571.429	1750	3033.3	
Floor Area (m^2)	14500	42000	42000	208000	32000	1750	14500	735569.7
Consumption (kWh)	10972312	610500.6	916085.7	3993600	1929312	1376222	119438.5	19917470
Energy Density (kWh/m^2)	27.96188	43.1969	21.81156	19.2	42.87359	43.00693	68.25056	27.09612

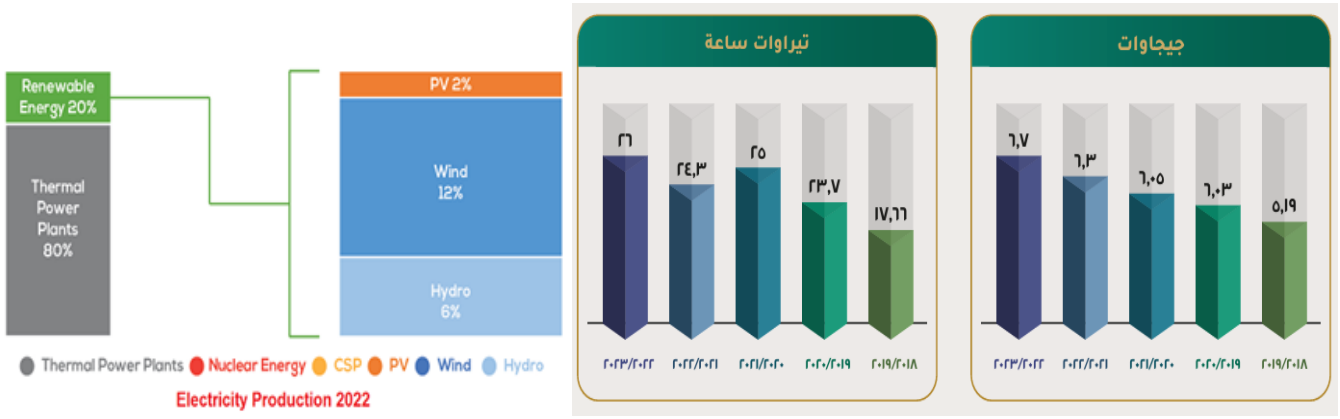
Table 2. Energy Density in GJ/m^2 for the entire AAST in 2022/2023

Total Floor Area (m^2)	**Consumption from grid (kW)**	**Consumption from grid (GJ)**	**Total energy (GJ) (Grid + Renewables)**	**Density (GJ/m^2)**
735569.7	19917470	71702.89	(71702.89+270) 71972.892	0.09784

5.1.3. Renewable Energy Employment in AAST

The AAST energy consumption is supplied mainly from the national grid in addition to solar energy in average 214 kW installed on AASTMT campuses buildings.

Noting that the national grid has 20% renewable energy according to National renewable energy Authority (NREA report 2022), as illustrated in **Error! Reference source not found.**Figure 12(a) , and the national renewable energy share increased by almost 6.3% in 2023 as illustrated in Figure 12 (b). Hence, the renewable energy share in the national grid has increased to more than 21% in 2023. Thus, this contributed, besides the already installed 214 kW solar energy, to increase AASTMT average renewable energy share in supplying its total energy demand to around 24**%** in 2022/2023 which is more than the 21% in 2021/2022.



(a) (b)

Figure 12. Renewable energy in national grid (a) in 2022 (b) Progress from 2018 to 2023 [NREA Report 2023]

5.2. Carbon Footprint

As per Carbon Emissions, calculations were made to evaluate carbon emissions (kg CO^2-e) in Alexandria campus for the years 2018 to 2023 as discussed in details in AASTMT Carbon Emissions Reduction and Sustainability Progress Report (2022-2023).

AASTMT 2022/2023 Emissions Progress Report

Table 3: AASTMT-Alexandria campus- Carbon Emissions from 2018 to 2023 (kg CO^2-e)

Year	Scope 1 (kg CO^2-e)	Scope 2 (kg CO^2-e)	Scope 3 (kg CO^2-e)	Total Emissions (kg CO^2-e)
2018	1,244,230.50	1,240,286.52	98,997,739.78	101,482,256.80
2019	1,374,252.42	1,151,281.20	152,068,847.38	154,594,380.99
2020	972,551.04	869,471.36	87,130,328.87	88,972,351.27
2021	1,561,942.92	1,008,256.20	112,858,633.63	115,428,832.75
2022	1,300,000.00	950,000.00	110,000,000.00	112,250,000.00
2023	1,150,000.00	925,000.00	105,000,000.00	107,075,000.00

Table 3 presents the emissions across Scope 1, Scope 2, and Scope 3, using the Greenhouse Gas Protocol's framework, providing insights into direct and indirect emissions, to identify key areas for improvement.

Scope 1 emissions, which encompass direct emissions from university-controlled sources, include fuel usage for the campus transport fleet and emissions from refrigerant leaks in air conditioning and refrigeration systems. In 2022, AASTMT recorded 1,300,000 kg CO^2-e in Scope 1 emissions, which represents a modest reduction from previous years. This reduction was primarily driven by the electrification of a portion of the university's vehicle fleet, reducing reliance on fossil fuels. Scope 1 emissions decreased further to 1,150,000 kg CO^2-e in 2023 due to continuous efforts to replace fuel-dependent vehicles and improvements in refrigerant management.

Scope 2 emissions arise from indirect emissions due to purchased electricity. In 2022, Scope 2 emissions were 950,000 kg CO^2-e, reflecting a substantial decrease from previous years due to the installation of solar panels and photovoltaics. By 2023, the university reduced Scope 2 emissions further to 925,000 kg CO^2-e.

Scope 3 emissions account for indirect emissions from activities as waste disposal, water usage, and paper consumption. These emissions represented the largest share of AASTMT's carbon footprint, but significant reductions were achieved, with Scope 3 emissions totaling 110,000,000 kg CO^2-e in 2022 decreasing more to 105,000,000 kg CO^2-e in 2023 due to improved waste management and reduced paper consumption.

In summary, the total emissions for 2023 reflect a steady decrease by 4.6% from 2022 emissions and 7.2% from 2021 emissions, while a notable reduction of 30% from 2019 which witnessed the highest emissions rate since 2018. (Note that 2020 was the Covid year, that's why emissions were the lowest). These reductions demonstrate AASTMT's commitment to its long-term goal of 50% carbon reduction by 2040.

6. Progress Towards Targets

AASTMT has made significant progress towards energy sustainability and carbon emissions reduction based on insights from 2022 and 2023. By the end of 2023, the university had reduced its total energy usage by 13.6 % compared to 2018 consumption in AASTMT Alexandria campus and decreased total carbon emissions by 30% compared to 2019 levels.

This reduction was driven by key measure taken by AASTMT in 2022/2023, including continuous infrastructure renovations to adopt energy-efficient technologies, expansion of solar energy employment, besides improvements in waste management and recycling programs as well as related initiatives and awareness campaigns.

Looking ahead, AASTMT remains committed to achieving its long-term sustainability goals, as follows;

- 30% Carbon Reduction by 2025: AASTMT has already succeeded to achieve almost 30% carbon reduction target in 2023 compared to 2019 which experienced highest emissions rate. To maintain this reduction by 2025 and even achieve more, AASTMT plans to continue expanding its renewable energy capacity, with the goal of sourcing 25% of its energy from renewables by 2025. Additional solar power installations and adoption of clean technologies, plays a key role in reducing energy-related emissions.
- 50% Carbon Reduction by 2040: By 2040, AASTMT aims to achieve a 50% reduction in carbon emissions compared to 2019 levels. This will involve further efforts in sustainable transportation, including a huge transition to electric vehicles on campus. Moreover, AASTMT will implement advanced smart grid technologies to optimize energy consumption and storage, as well as increasing energy from renewables to 40% by 2040 for further minimization of carbon emissions. Finally, AASTMT continues to work effectively towards its Zero-Waste Goal by 2040.

7. Conclusion

AASTMT efforts towards energy efficiency and clean energy in 2022/2023 resulted in significant energy savings as well as emissions reduction. Key measures such as the expansion of renewable energy which now provides 24% of the university's energy needs, as well as energy conservation awareness and renovating infrastructure towards energy-efficient technologies, besides adopting efficient recycling programs have helped AASTMT successfully reduce emissions and advance towards its 2040 target.

AASTMT has also established itself as a leader in sustainability education by integrating sustainability topics into 90% of its undergraduate and postgraduate programs. The university’s research projects on renewable energy and climate resilience, along with its community engagement initiatives, further demonstrate its commitment to preparing future climate leaders and advancing global sustainability efforts.

While AASTMT’s sustainability journey is ongoing, the progress made in 2022 and 2023 highlights its determination and capacity to meet its ambitious energy-related sustainability goals, ensuring a lasting and positive impact on both local and global scales.