





Report 2021/2022



SDG 7

Our Aim in 2021-2022

 Towards Energy Saving, Emissions Reduction and Diversion to Renewable Energy as well as Developing Further Co-operation with Government and Public Enterprises to Sustain Serving the Environment and Surrounding Community.

THE Impact Ranking Scores 2020-2021



SDG 7

AFFORDABLE AND CLEAN ENERGY

AFFORDABLE AND

CLEAN ENERGY

2021-2022 | Report 2 | Page



Our Progress through 2021-2022



Efforts towards Energy Saving and Emissions Reduction

In accordance with **AASTMT strategic plan** and **its Green Energy and Energy Management Policy**, AASTMT's Energy Research Unit and Energy Management Committee put forward several strategies to reduce and rationalize electrical consumption to combat high energy usage and reduce gas emissions as shown in its **Energy Report 2021/2022**.

<u>Green Energy and Energy Management Policy</u> on the AASTMT web page <u>Energy Report 2021/2022 of AASTMT Alexandria Campuses</u> on the AASTMT web page

Calculating and analyzing energy consumption and load demand in AASTMT Alexandria campuses, during period from 2018 till 2022 as shown in Figure 1, it is noticed that the highest consumption was in **2018 with total 12698059 kWatt.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.

Energy Saving and Emissions Reduction Plan on the AASTMT web page

Measures taken for reducing energy usage can be summarized as follows:

- a) 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.
- b) 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.
- c) Online regular monitoring to energy consumption and determine load priorities for efficient energy management
- d) Increasing awareness regarding energy rationalization and conservation plans among AAST staff, students, administrators and technicians through campaigns and initiatives.
- e) Specifying buildings that need restoration and renovation like Building 1- Miami Campus (plan 2023)
- f) Operating Building B in College of Engineering and Technology with full capacity using energy-efficient technologies.
- g) 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.
- h) Installing a solar power station with a capacity of 50 kilowatts in the seventh engineering building.
- i) Installing solar heaters to replace the electric heaters in the College of Pharmacy and will be applied to students' dorms.
- j) Spreading instructions and directions towards energy conservation as per the letter addressed to all AASTMT campuses from AASTMT president on September 2022 as shown in the attached file in this link

Efforts towards Energy Saving and Emissions Reduction on the AASTMT web page



ANALYSIS OF ENERGY CONSUMPTION OF ALEXANDRIA CUMPUS



ALEXANDRIA CAMPUS CONSUMPTION

Figure 1: Energy consumption in AASTMT Alexandria Campuses from 2018 till 2022

Year	Abo Qir	Miami	Ganikliz	Wabor	Total
201 <mark>8</mark>	10335721	2024416	63514	274408	12698059
2019	8816380	184 <mark>90</mark> 14	63515	274409	11003318
2020	7245592	10 <mark>818</mark> 97	63516	274410	8665415
2021	8402135	135 <mark>4732</mark>	49141	339360	10145368
2022	9304497	1482312	50389	420060	11257258
Average	8820865	1558474.2	54348.66667	344610	10778297.87
% reduction		Ale			ISTICE MICHS
2018:2022	-9.977281701	-26.77829063	-20.66473533	53.07862745	-11.34662392

Table 1: Analysis of energy consumption in AASTMT Alexandria Campuses from 2018 till 2022

Moreover, AASTMT took severe actions towards climate change and gas emissions reduction through the following processes;

AASTMT Climate Action Plan: Towards Zero Emissions by 2050.

AASTMT Climate Action Plan on the AASTMT web page

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 on the AASTMT web page

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. 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.

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 2.



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.

Year	kg CO2-e/year	Gross Internal Area (m2)	kg CO2e/m2
2018	1,240,286.5		5.24
2019	1,151,281.2	226 784	4.86
2020	869,471.36	230,784	3.67
2021	1.008.256.2		4.26



Table 2: Calculated kg CO2-e/m² Emissions in AASTMT Alexandria Campuses

Figure 2: Calculated kg CO2-e/m² Emissions in AASTMT Alexandria campuses

In conclusion, AASTMT measures towards energy consumption reduction and clean energy resulted in significant energy savings as well as scoring economic and 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).

Based on the analysis and calculations presented in **2021/2022 Energy Consumption Report in all AASTMT campuses** found in the link below, From Figure 3, it is clear that most of energy consumption in AASTMT branches occurs in Alexandria campuses since they include the highest capacity of buildings, students and staff. Table 3 shows the total energy in GJ and energy density in all AASTMT branches allover EGYPT. It is worth noting that more than 267 GJ were supplied from renewable energy resources which realizes AASTMT goals to divert to clean energy, reduce emissions and sustain serving the Environment.

2021/2022 Energy Consumption Report in all AASTMT campuses on the AASTMT web page





Figure 3: % Energy Consumption in all AASTMT branches in 2021/2022

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

Table 3: 2021/2022 Energy Consumption in all AASTMT campuses

Energy-related Research Projects

AASTMT staff is engaged in many research projects, as shown in Table 4, that cover periods in 2021/2022 and serve renewable energy and energy-efficiency technology to contribute in energy-related innovations and supports diversion to clean affordable energy to everyone.



Table 4. AASTWIT Research Projects covering periods in 2021/2022		
Project	Link	
Med SE(A)CAP integration through uniform adapted assessment and financing methods, mainly targeting buildings in education and health sectors, for sustainable development goals in a smart society/ SEACAP 4 SDG	<u>https://aast.edu/en/scientific-</u> research/projects/project.php?uid=16&proj_id=37	
EU Funded Project/ MAIA TAQA	https://aast.edu/en/scientific- research/projects/project.php?uid=153&proj_id=1	
High Level Renewable and Energy Efficiency Master Courses (HEBA)	https://aast.edu/en/scientific- research/projects/project.php?uid=16&proj_id=5	
Application of renewable energy technologies for green ports: Egyptian ports as a case study	<u>https://aast.edu/en/scientific-</u> research/projects/project.php?uid=16&proj_id=12	
Research on Optimizing the Effect of Loads on Characteristics of Power Electronics Converters for Ren. Energy Applications	<u>https://aast.edu/en/scientific-</u> research/projects/project.php?uid=16&proj_id=13	
Multidimensional Study of Wind Energy Potential in Alamein	https://aast.edu/en/scientific- research/projects/project.php?uid=16&proj_id=15	

Table 4: AASTMT Research Projects covering periods in 2021/2022

Support to Startups and Innovations

AASTMT establishes entities, agreements and initiatives to support energy-related innovations and start-ups.

25 Sep 2022: Launch of "Innovation One-stop-shop (IOSS)" entity

That offers tailor-made services (knowledge, technical assistance, consultancy, and networking opportunities to run a successful innovative RE businees and startups in Egypt.









REGIONE AUTÒNOMA DE SARDIGNA REGIONE AUTONOMA DELLA SARDEGNA





Mobilizing new Areas of Investments And Together Aiming to Increase Quality of life for All

INVITATION IOSS LAUNCH EVENT

Arab Academy for Science, Technology and Maritime Transport - AASTMT Abu-qir, main campus, Alexandria Al-Farsi Hall Date: 25th September time: 10:00 am

Innovation One-Stop Shops

Within the framework of the MAIA-TAQA project "Mobilizing new areas of investment and together to increase the quality of life for all" co-financed by the ENI CBC Med Programme, whose main objectives include the support of education, research, technological development, and innovation, as well as the promotion of economic and social growth, AASTMT, "is inviting you to launch event of its "Innovation one-stop-shop (IOSS)" on 25th of September at Arab Academy for Science, Technology and Maritime Transport Abu-Qir, main campus, Alexandria (AI-Farsi Hall time:10:00 am)

AASTMT's IOSS is an entity that offers several services in the field of innovative RE, all under one roof. There is a lack of such centers aiming at providing start-ups and SMEs with the knowledge, technical assistance, consultancy, and networking opportunities required to run a successful innovative RE business in Egypt.

AASTMT's IOSS will develop tailor-made services for start-ups and SMEs seeking its contribution to their business processes. At the launch event, a voucher call will be announced for SMEs in the RE field to apply for a 20.000 Euros grant. All details will be announced during the event. So, we are looking forward to welcoming you to AASTMT headquarters in Alexandria on Sunday 25th of September.

25 July 2022: Innovation Day 2022

In light of AASTMT support for appreciating the efforts of its students, presenting their high-level ideas and innovations, qualifying their graduates for the requirements of the labor market, and displaying distinguished graduation projects that enhance their ability to achieve sustainable success.

the Innovation Day 2022 on the AASTMT web page





The Entrepreneurship Center at AASTMT

Is keen on supporting innovations and startups in the field of green energy and sustainability, in addition to delivering trainings, workshops and mentorship camps. Table 5 shows Spin-offs supported by AASTMT Entrepreneurship Center.

offs-Spin	Preview	Logo	Link
KNZGlobal	Their main goal of optimizing resource use and maintaining green spaces serves as a road map for developing resilient green infrastructure. Their project uses IoT solutions to provide intelligent waste management for everyone.	کنز KNZ	<u>https://www.facebo ok.com/KNZLLC/</u>
Green Hydrogen	 Selling Green hydrogen for use as Biofuel and other Ecofriendly products. Selling the system used in cultivation of algae. Selling the system used for capturing hydrogen from algae and saving it. Production of Green hydrogen that is a clean energy source instead of fossil fuels and other ecofriendly products. Reducing greenhouse gases & global warming 	CREEAV.	https://linktr.ee/gr een hydrogen?ut m_source=linktre e admin share
Deeb EI	The company is one of the companies using solar energy and in the applications of exploiting clean energy in the field of agriculture, such as lighting, heating, cooling and ventilation in installments renewable system to facilitate the farmers for a period of up to one year.	verall	https://www.faceb ook.com/Deeb2w eb
Gaz Andak	Establishment of biogas units running on food leftovers that produce methane gas used for cooking and an organic fertilizer sold to farmers	مندک احم بینته وفر ماتورته	https://www.faceb ook.com/andkgaz ? rdc=1& rdr

Table 5: Spin-offs supported by AASTMT Entrepreneurship Center.



Agreements with National and International Entities to Support Clean Energy Technology Locally and Regionally

- 15 June 2022: Memorandum of Understanding between AASTMT College of International Transport & Logistics and Engineers Syndicate-Energy Committee and Cairo Engineers Syndicate-Energy Committee in the field of renewable energy and sustainable development.
- 12 Oct. 2021: Memorandum of Understanding (MoU) between AASTMT and Housing and Building National Research Center (HBRC) to foster applied research projects and curriculum and instruction development that are driven by challenges faced in the energy sector
- 21 Feb. 2021: MoU between AASTMT and Regional Center for Renewable Energy and Energy Efficiency (RCREEE) to provide general framework for cooperation between parties governing collaborative efforts on deployment of Renewable Energy principals.

Community Engagement

AASTMT Energy Research Unit is keen on serving the community towards energy efficient systems and clean energy via offering free trainings, workshops and consultancy.

Energy Research Unit on the AASTMT web page

Free Training Courses

- Renewable Energy System
- Solar energy
- Practical fundamental solar energy
- Wind Energy System
- Energy Management and Auditing (EMA)
- Building Management system (BMS)

Free Workshops and Seminars

6 Dec. 2022: "Electrical Energy Efficiency Toward the Achievement of SDGs in Marine Applications: Power Drives, Shore Supply, Digitalization, Sustainability" Workshop.

<u>Electrical Energy Efficiency Toward the Achievement of SDGs in Marine Applications: Power</u> <u>Drives, Shore Supply, Digitalization, Sustainability" Workshop</u> on the AASTMT web page

26 Nov.-13 Dec. 2022: A MAIA-TAQA Certified Course (Online and on Campus) in Resource-efficient solutions for PV Systems Design and Battery Storage

<u>A MAIA-TAQA Certified Course (Online and on Campus) in Resource-efficient solutions for PV</u> <u>Systems Design and Battery Storage</u> on the AASTMT web page



21 Nov. 2022: Marine Renewable Energy Workshop: Workshop about Energy efficiency and renewable energy in marine applications.

Marine Renewable Energy Workshop: Workshop about Energy efficiency and renewable energy in marine applications on the AASTMT web page Marine Renewable Energy Workshop: Workshop about Energy efficiency and renewable energy in marine applications on the AASTMT web page

> 18 Nov. 2022: Green Environment Workshop

Green Environment Workshop on the AASTMT web page

- > 12 Oct. 2022: Workshop about electric vehicle
- **6 June 2022:** Green Hydrogen Current and Future Prospects Workshop
- > 8 March 2022: The Future of Energy and Saving in Egypt workshop
- > 27-28 FEB 2022: Climate Protectors Initiative

<u>Climate Protectors Initiative</u> on the AASTMT web page

10 JAN 2022: "Go Green" workshop

Go Green" workshop on the AASTMT web page

> 26 Oct. 2021: Egyptian Photovoltaic Energy Market Seminar

Free Consultancy

28 Dec. 2022 : A visit to the Industrial Technical Secondary School for Drinking Water and Sanitation in Alexandria to rationalize energy consumption and increase energy saving.

This was established as one of the outcomes of the UN Project Sustainable Energy Access & Climate Action Plans (SEACAP 4SDG) 2021-2023.



<u>A visit to the Industrial Technical Secondary School for Drinking Water and Sanitation</u> on the AASTMT web page

4 Nov. 2022: AASTMT Visit to Alexandria Drinking Water company to discuss the joint work between both entities and improve energy efficiency in the company.





AASTMT Visit to Alexandria Drinking Water company on the AASTMT web page

9 Feb 2022: Visit and Preparation of development plan, for AbuKir National Hospital, to rationalize energy consumption, increase energy saving and improve its efficiency. This was established as one of the outcomes of the UN Project Sustainable Energy Access & Climate Action Plans (SEACAP 4SDG).





Engage Students in Energy-related Projects, Trips and Seminars

> NOV 06, 2022: Visit to "The Arab Renewable Energy Company Organization (ARECO)"



> 26-Oct-2021: Egyptian Photovoltaic Energy Market Seminar



Samples of 2022/2023 Graduation Projects of Electrical and Control Eng. Department.

PV- based Electric Scooter charging Stall



Smart PV-based Recirculating Aquaculture System (RAS)





Events

AAST is keen on promoting green energy and energy saving awareness not only among all its campuses, but beyond its walls as well, via campaigns, initiatives and even competitions!!

November 2022: Visit of the IOSS center to AASTMT and the AASTMT Energy Research Unit participated in this pilot site visit.

Visit of the IOSS center on linkedin

> 13 September 2022: Initiative Towards a Green and Sustainable Future

With the participation of the Academy's sustainable development team, AASTMT hosted this initiative where 7 schools attended. The aim of the initiative was to open avenues of cooperation between the academy and schools to educate students and educational institutions towards the goals of sustainable development. The participants visited the solar power plant at the Faculty of Engineering, which is the largest plant in Egypt on the roof of an educational building, and visited the renewable energy lab to explain the methods of producing energy from sustainable means such as wind and green hydrogen. Measuring vital indicators of climate and water and how to purify and desalinate water. The visit also included a visit to the Aquaculture Center, where modern farming methods, with use limited water resources and recycled waste, were explained.

Initiative Towards a Green and Sustainable Future on the AASTMT web page

18 July 2022: "World Environment Day 2022" organized by AASTMT within its role in sustainable development and environmental protection.

World Environment Day 2022 on the AASTMT web page

3-4 July 2022: IEEE YESIST12 Prelim 2022 hosted by College of Engineering and Technology (AASTMT) where competitors come from all over Egypt (undergraduates, graduates and postgraduates) to compete upon tracks that serve different sustainable development goals.

IEEE YESIST12 Prelim 2022 on the AASTMT web page

> 15 March 2022: AASTIANS Go Green Initiative: "Arab Youth Green Venture" project

AASTIANS Go Green Initiative: "Arab Youth Green Venture" project on Dostor newspaper page AASTIANS Go Green Initiative: "Arab Youth Green Venture" project on Al Masry AlYoum news

This initiative started, from the headquarters of the Academy at the Smart Village, in 2020 till present exhibiting a series of awareness and activities events with AAST and the community. This initiative is part of the Academy's social responsibility and in line with the cooperation agreement signed with His Excellency Major General Mahmoud Shaarawy, the Minister of Local Development, and His Excellency Professor Dr. Ismail Abdel Ghaffar Ismail, the President of the Arab Academy for Science, Technology, and Maritime Transport, regarding the planning and implementation of the **"Always Green Academy" campaign**.

The day included various activities, such as the opening of an exhibition showcasing environmental protection projects and activities by distinguished students and graduates of the Academy. A sports marathon was launched as well with the slogan "AASTIANS Go Green," involving the participation of officials, employees, and students, creating an enthusiastic atmosphere.

This day was organized within the framework of the Arab Academy for Science, Technology, and Maritime Transport's participation in the environmental initiative "Prepare for Green," launched by the Ministry of Environment under the patronage of President El-Sisi, as part of the National Sustainable Development Strategy "Egypt 2030.

27-28 Feb 2022: Climate Protectors Initiative organized by AASTMT headquarters in Abikir Campus.

<u>Climate Protectors Initiative</u> on the AASTMT web page

41 students from different Academy`s branches participated in the event. The main purpose of the initiative was to:

- Raise youth awareness about the importance of climate change issues and its impacts on the various sustainable development goals related to the environment (SDG 6, 7, 13, 15).
- Learn some skills to reduce carbon footprint by changing some habits such as (reducing waste, reusing waste, reducing the use of plastic and non-biodegradable materials, as well as planting roofs and balconies).
- Identifying jobs and green opportunities for work and development. To produce students Initiatives and ideas that contribute to their communities` response to climate change

In the framework of COP 27 which will be held in Sharm in November 2022, the Arab Academy for Science, Technology, and Maritime Transport (AASTMT) organize the Climate Protectors Initiative at **Abou Kir Campus**, Alexandria, Egypt.

This event seeks to

- Raise the awareness of young people, to be involved in taking an active role in their local communities. Practice some skills for reducing the carbon footprint of participants in their daily life by changing some habit. Exemplify green opportunities for work and Climutopia development. Help the Participants to develop ideas, initiatives and projects that support and **CLEAN WATER** 6 enhance the adaptation and resilience of local AND SANITATION communities to climate change. 15 LIFE ON LAND CLIMATE ACTION 27 - 28February 2022 10 TESPORT
- 10 Jan 2022: "Prepare for Green" symposium within the frame of the national strategy for sustainable development "EGYPT 2030" and the initiative of AASTMT to raise environmental awareness within its headquarters.

Prepare for Green" symposium on the AASTMT web page

20 July 2021: BE POSITIVE Campaign organized by the ENERGY UNIT in AASTMT to give awareness on the importance of reducing energy use in concern of realizing and activating sustainable developments goals.

Ø

Environment Day Initiative

Your role in activating sustainable development goals (Sdgs), with respect to energy and water preservation, is quite important ! Participate with us in consumption conservation on the Environment Day taking place on 20/6/2021 by following these instructions:

 Switch off lights and conditioners in empty rooms and offices.
 Use lights and conditioners only when mandatory.
 Adjust the conditioner reference temperature to not less than room temperature (25°C)

4. Preserve water use and don't waste it in vain

Be Positive

Do you know that saving 1m³ of water daily can save energy use for water desalination and sewage water treatment by 3.5 kW and save carbon dioxide emissions by almost 3kg. Positive

Be

nerg esear Unit

ive Gree

Water is life! Treat it right...

15 February 2021: Announcing the foundation of NET ZERO Emission Community to spread green energy awareness and encourages energy conservation initiatives.

