

ENERGY CONSUMPTION IN AASTMT

The energy consumption in AAST is mainly electrical there is no heating, cooling or steam consumption. The HVAC system is the main source of cooling and heating for spaces and it is operated by electrical energy.

The electrical energy source is from the national grid mix in addition to some local renewable energy source with capacity of 200kw. The national grid is mix between conventional and renewable resource. The share of renewable energy in the national grid is about 25% and it will be enhanced to be 42% by 2035.

Based on the analyses of monthly electric bills and the injected power from the PV plant, the consumption of electrical energy and the environmental impact is calculated.

Table 1: Energy consumption among grid mix and local PV generation (2021)

Total consumption from grid (GJ)	local PV (GJ)	Total energy consumption (GJ)	Total clean energy (GJ)	% Green energy
36534.96	267.264	36802.22	9401.004	25.54%

Average Electricity Consumption in (Name of campus) Campus 2018-2021

The energy consumption in kwh for each campus in Alexandria is analysed as shown in Table and the consumption distribution during 2018 to 2021 is illustrated in Figure 1: Consumption analysis/campus/year. The average energy in the period 2018-2021 is calculated. Because of Covid 19 the consumption in 2019 and 2020 are not considered as regular consumption, so to show the effect of energy policy, the percentage reduction in consumption is calculated between 2018 (before Covid19) and 2021 (after Covid19).

Table 2: Average Energy Consumption (GJ)/campus

	Abo kir (GJ)	Miami (GJ)	Ganikliz (GJ)	Wabor Elmia (GJ)
2018	37208.6	7287.898	0	0
2019	31738.97	6656.45	0	0
2020	26084.13	3894.829	228.6576	987.876
2021	30247.69	4877.035	176.9076	1221.696
Average	31319.85	5679.053	202.7826	1104.786
% reduction 2018:2021	-18.7078	-33.0804	-22.6321	23.66896

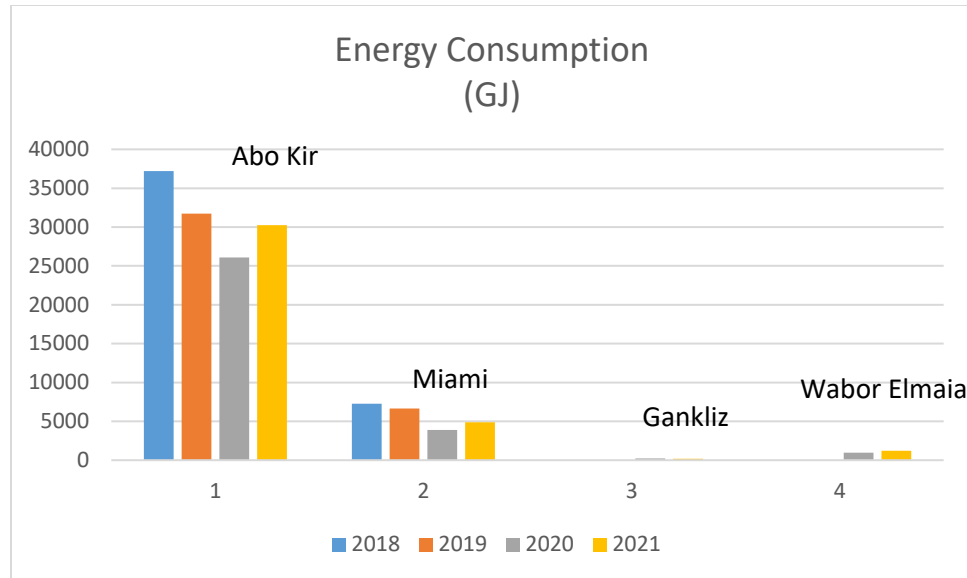


Figure 1: Consumption analysis/ campus/year

It is clear from the analysis of Table that the reduction in Energy in normal condition between 2018 and 2021 is about 18.708 %. An energy management policy is implemented which will lead to energy reduction due to:

- 1- Apply energy conservation procedure
- 2- Use energy efficient components in lighting, pumping, and HVAC
- 3- Make energy monitoring and analysis of load consumption using online monitoring system
- 4- Implement local renewable energy resources and projects.
- 5- Switch all light bulbs to LED lamps (more than 250kw reduction around 75% of lighting)
- 6- Install solar energy to more buildings (200kw PV system)
- 7- Change the HVAC to more environmentally friendly one (Building G and B faculty of engineering and faculty of pharmacy)
- 8- Spread methodology of reducing energy consumption through all campuses and amongst staff and students.
- 9- Initiative for energy conservation for student and staff.
- 10- Organize workshops, seminars and training for the awareness of energy efficient and environmental effect
- 11- Retrofitting of buildings

REDUCTION OF ENERGY CONSUMPTION

Based on the energy management and efficient policy, Table summaries the reduction of energy consumption during 2018-2021. Moreover, the effect of energy management and policy on the consumption and environmental analysis and estimations for the three coming years are summarized in Table . The expected plan of energy reduction till 2023 is 15% reduction due to the energy management policy.

Table 3: % consumption reduction between 2018 and 2021

	Abo kir (GJ)	Miami (GJ)	Ganikliz (GJ)	Wabor Elmia (GJ)
2018	37208.6	7287.898	228.6576	987.876
2021	30247.69	4877.035	176.9076	1221.696
Average Consumption	31319.85	5679.053	202.7826	1104.786
% reduction 2018:2021	-18.7078	-33.0804	-22.6321	23.66896

Table 4: Energy Consumption environmental analysis

Action	KWH/year (Energy)	Yearly Reduction of Co2 (Kg)	Yearly Reduction of SOx (Kg)	Yearly Reduction of NOx (Kg)
Installation of Solar Units (200kw)	222720	355590	154.122	1.91
Transition to LED light lamps of 250kw	600000	4444875	1926.525	23.875
Energy Efficient procedure (reduction around 5%)	511142	908784918.4	393891.13	4881.4
Average energy Consumption from 2018 to 2021	1064069			
Estimated Reductions per year during 2021-2023	15%	2726354755	1181673.39	14644.2