AMA ENERGY AUDIT REPORT

ABOUT THE AUDIT

The Energy Audit was conducted for municipal buildings in Accra in collaboration with The C40 Cities Climate Leadership Group as part of Climate Action Implementation (CAI) programme. Reducing energy consumption and associated Greenhouse Gases arising out of the operation of the Accra Metropolitan Assembly's operation is one of the key priorities of the Accra Climate Action Plan (2015-2025)

The purpose is to reduce greenhouse gas emissions from municipal building and promote efficiency and effective use of energy in the city. This initiative involved conducting an energy audit for municipal buildings in Accra and establishing a framework for implementing renewable energy and energy efficiency measures.

The Consultant, DTT Energy Limited worked with officers and stakeholders from the Works, Estate, and Finance departments of AMA to identify AMA operational buildings and categorise them into five main typologies based on their current usage as follows and prepared a Municipal Building Inventory table shown below:

DTT Energy Limited gathered information on key buildings such as type and size of the buildings, energy consumption, equipment details, and building specifications etc.

INVENTORY TABLE

Residences	88
Schools	74
City Markets	11
Health Centres	12
City Hall/Municipal Offices	9

OBJECTIVES OF THE AUDIT

The Energy Audit was conducted for municipal buildings in Accra in collaboration with The C40 Cities Climate Leadership Group as part of Accra Climate Action Implementation (CAI) programme.

To reduce greenhouse gas emissions from municipal buildings and promote efficiency and effective use of energy in the city. This initiative involved conducting an energy audit for municipal buildings in Accra.

The Energy Audit would assist in establishing a framework for implementing renewable energy and energy efficiency measures.

METHODOLOGY FOR BUILDING INVENTORY AND ENERGY AUDIT

The methodology involves three phases:

BUILDING INVENTORY

Performed an inventory of all municipal/metro buildings within the Accra Metropolitan Assembly area to ascertain their number, typologies, etc., and compiled the Municipal Building Inventory Table.

BUILDING SELECTION

Selected 13 buildings representing various building typologies for the energy audit based on the availability of energy data and their capacity to deliver GHG emissions reductions through energy efficiency/ renewable energy measures.

ENERGY AUDIT

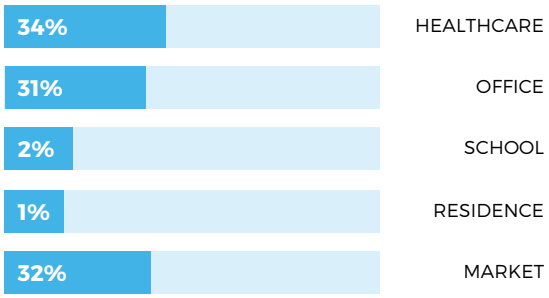
Performed an ASHRAE Level II Energy Audit for selected buildings to identify opportunities for EE and RE interventions to reduce GHG emissions and also performed carbon footprint analysis to identify Scope 1, Scope 2, and Scope 3 emissions arising out of the AMA building stock and emission scenarios for 2030, 2040 and 2050.

Historical Data Collection Analysis → Walkthrough Survey of the building → Review Operational History and Characteristics → Identify Opportunities for Improvement → Cost Analysis of Energy Saving Opportunities

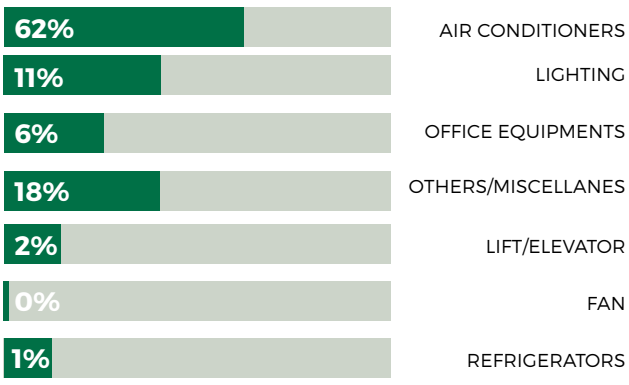
ENERGY AUDIT RESULTS

LOADS		ENERGY (kWh/Year)	PERCENTAGE (%)
1	Office Equipments	248,038.88	18.52%
2	Lighting	299,163.77	22.33%
3	ACs	471,020.75	35.16%
4	Fans	35,419.20	2.64%
5	Refrigerators	92,659.94	6.92%
6	Lift/Elevator	36,809.00	2.75%
7	Others/Miscellaneous	156,394.15	11.68%
Total		1,339,505.69	100.00%

BREAKDOWN OF CARBON DIOXIDE EMISSIONS BY TYPOGRAPHY



AMA HEAD OFFICE - BREAKDOWN OF ESTIMATED ENERGY CONSUMPTION



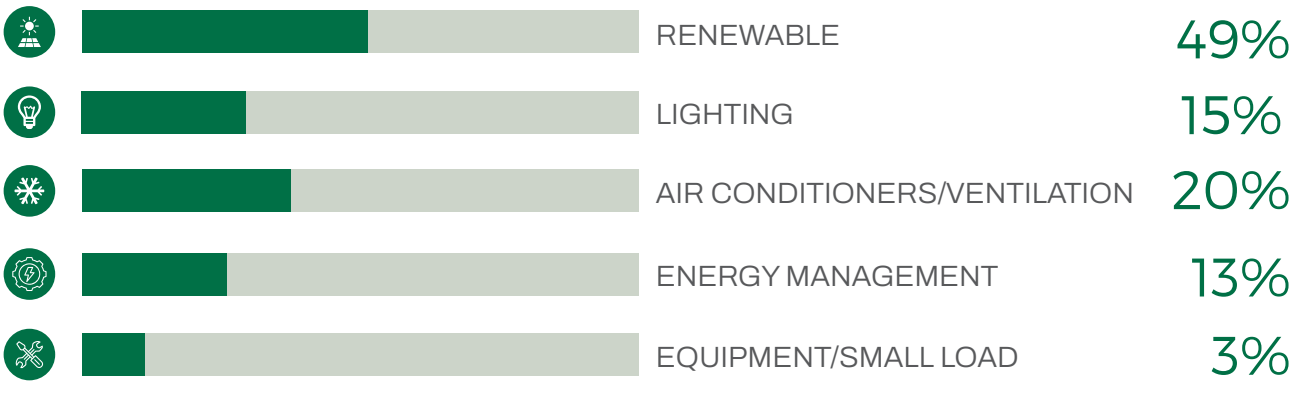
A SUMMARY OF THE ENERGY AUDIT RESULTS FOR THE 13 SITES

SITE	TYPOLOGY	ESTIMATED ANNUAL ENERGY SAVINGS (MWH)	ESTIMATED ANNUAL ENERGY SAVINGS (1,000 GHC)	ESTIMATED INVESTMENT (1,000 GHC)	ESTIMATED ANNUAL CARBON EMISSION (TCO2)
AMA Head Office	Office	232.97	472.93	1313.63	93.19
AMA Former Metro Office	Office	22.92	35.96	220.07	9.17
Ablekuma South Metro Office	Office	15.29	23.99	97.89	6.12
Kaneshie Polyclinic	Health Centre	146.40	229.85	614.43	58.56
Ussher Hospital	Health Centre	102.48	160.78	615.91	41.00
Ussher Maternity Clinic	Health Centre	42.18	66.17	281.48	16.86
Makola Market	Market	177.80	277.37	914.14	71.12
Kaneshie Market	Market	100.91	158.33	574.39	40.36
Kojo Ababio School	School	5.23	8.16	35.25	2.09
Awudome JHS One	School	4.01	7.38	32.93	1.72
Awudome JHS Three	School	6.83	10.72	44.21	2.74
Bungalow 2	Residence	5.39	9.59	26.41	2.16
Bungalow 1	Residence	3.98	7.08	25.67	1.58

SUMMARY OF ENERGY SAVING TECHNOLOGY

ENERGY SAVING TECHNOLOGY	TYPICAL RECOMMENDATIONS
LIGHTING	LED Replacement, Lighting Control
ENERGY MANAGEMENT	Implement EMS, Install Smart Meters, Raise Awareness, Monitor and Report Energy Consumption
AIR CONDITIONERS/ VENTILATION	Replace old ACs, Install efficient fans, Smart AC control, Improved Maintenance
EQUIPMENT/ SMALL LOAD	Timed plugs, replace old inefficient fridges, Replace various small printers with centralized one
RENEWABLE ENERGY	Install Solar PV system

Breakdown of Carbon Dioxide Emissions by Energy Saving Technology



SOME GENERAL OBSERVATIONS

1. Records of energy consumption not kept at most of the sites
2. There appears to be the lack of consistent maintenance of air conditioners which can affect energy consumption
3. Lights and air conditions were operating in some rooms although the rooms were unoccupied
4. Energy Management not functional at most of the sites
5. Some of the air conditioning units appear to be low energy efficient type
6. The facility managers of the facilities visited does not appear to be informed about matters regarding energy management
7. Installing smart meters linked to a monitoring software can provide insight into how energy is used 24 hours a day

KEY RECOMMENDATIONS

Implement Energy-Efficient Air Conditioning Systems

Upgrading to modern, energy efficient models can lead to substantial energy savings while maintaining optimal comfort levels

Upgrade Lighting Systems to LED Technology

LED lighting consumes less energy, have a longer lifespan and reduced maintenance costs

Optimise Refrigeration Practices in Hospitals and Clinics

Ensure fridges are well maintained, temperature settings are correct, and refrigeration units are not overworked or under utilised

Implement an Energy Management Systems (EnMS)

Implementing energy management systems (EMS) will assist to continually improve energy efficiency and reduce carbon emissions

Promote Energy Awareness and Efficiency Practices in all AMA facilities

Implementing energy-saving practices such as turning off lights and fans when not in use, as well as educating stakeholders on the importance of energy conservation and switching of lights and appliances when not in use can lead to significant energy savings

Explore Renewable Energy Solutions

Install solar photovoltaic (PV) systems subject to availability of funds to generate electricity for on-site usage to reduce reliance on grid electricity, lower energy costs and reduce carbon dioxide emissions

ACCRA METROPOLITAN ASSEMBLY

UKaid from the British people

C40 CITIES