



Ministry of Energy and Petroleum

State Department for Energy

Supervisory Report on the SE4All staff Undertaking Energy Assessment for Boarding Secondary Schools

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Abbreviations

CEM	Certified Energy Manager
CFL	Compact Fluorescent Lamps
ECM	Energy Conservation Measure
ECR	Energy Conservation Recommendation
EMO	Energy Management Opportunity
EMR	Energy Management Regulations
EPRA	Energy & Petroleum Regulatory Authority
FTL	Fluorescent Tube Light
IPMVP	International Performance Measurement and Verification Protocol
KES	Kenyan Shillings
KPLC	Kenya Power and Lighting Company
kW	Kilo Watt
LED	Light Emitting Diode
Mn	Million
ROI	Return On Investments
SBP	Simple Payback Period

Background

The Ministry of Energy and Petroleum in Kenya in collaboration with the UNEP-CCC developed the first Kenya National Energy Efficient and Conservation Strategy in 2020 and its respective Implementation Plan. The strategy identified five thematic areas including Households, Buildings, Transport, Industry and Agriculture and Utilities.

As part of the implementation plan, a concept note was developed for a nationwide energy efficient lighting project in boarding secondary schools in Kenya. Signify Foundation offered to support pilot phase of the project by retrofitting 100 schools in selected 13 counties.

The major objectives of this pilot phase include

- i. To demonstrate the viability of EE in secondary schools in Kenya
- ii. To establish the baseline for EE in selected schools
- iii. To quantify the type and quantities of light fittings required for EE adoption in 100 schools
- iv. To identify key challenges to adoption of EE for schools

SE4All was one of the main partners in this project. As part of its contribution, 5 staff members were involved in the energy assessment exercise conducted to determine the quantity of lights fittings required and establish the baseline for the project

One of the UNEP CCC Consultant's role was to supervise the SE4All staff members to carry out the energy assessment audits.

1 Introduction

1.1 Background

Supervision can be defined as the act of overseeing the activities and responsibilities of staff which facilitates the ethical and professional practice of the supervisee. The UNEP CCC was a key partner for the pilot roll out of the schools Energy Efficiency project by supporting a Consultant to coordinate, oversee and supervise the project team on this pilot programme.

The pilot phase of the project involves energy audit assessment, training, awareness, development of baseline and implementation of lighting measures.

An Energy Audit is an exercise where data and more detailed information about facility operation is collected and analyzed for evaluation of energy conservation measures. It may also include analysis of the financial implications of implementing the identified energy efficiency measures.

Undertaking Energy audits in schools was a critical step towards tackling rising energy costs and environmental concerns. By systematically evaluating energy consumption patterns and identifying areas of inefficiency, these audits will pave the way for substantial cost savings, environmental conservation, and educational opportunities.

The main objectives of this supervision exercise are to

- i. Assist the staff develop adequate competency on energy auditing
- ii. Identify relevant certifications course that can be recommended in future
- iii. Prepare the staff for future involvement in the wider national roll out of the Energy Efficiency Project
- iv. Support staff in addressing their development needs

A brief training was conducted by the UNEP-CCC Consultant for members of SE4All and the Ministry of Energy to conduct energy assessment in Kenyan Boarding schools. The initial training was specifically geared to supporting the technical aspects of energy assessment in schools

1.2 The Trainees

The SE4All staff members include the following employees with their basic qualifications.

Table 1: List of the Staff Members

	Name	Title and Educational Background
1.	Concepta Atieno Ojwang	<i>Energy Efficiency and Sustainable Cooling Intern</i> , Master's Degree in Energy Economics from the University of Rwanda and a bachelor of Commerce in finance
2.	Anne Kiburi	<i>Senior Energy Specialist at the Energy Transition Office in Kenya</i> , Master's degree in Energy Economics from the University of Nairobi, Certificate in Private Public Partnership - University of Queensland.
3.	Kingslay Nyamwange Ameyia	<i>Sustainable Cooling Investment Consultant</i> MSc. Project Management and a Bachelor of Commerce-Finance degree.
4.	Grace Wambui Kamau	<i>Energy Efficiency and Sustainable Cooling Intern</i> Bachelor's degree in Science in the Management of Agro Ecosystems and Environment from the University of Nairobi
5.	Elizabeth Wangeci Chege	<i>Energy Efficiency & Cooling Specialist</i> Double Stream Masters in Design Sciences; Sustainable & Building Services from the University of Sydney.

1.3 Approach

The approach adopted in the supervision involves training on data collection tool, data integrity checks, data analysis and evaluation of identified measures.

2 Project Methodology

One of the Project partners, Signify Foundation had offered to donate the light fittings for 100 secondary schools in Kenya. However it was important to establish the baseline conditions for the implementation of the pilot roll out.

During the preparation for the energy assessment, the following methodology was highlighted to the participating staff.

2.1 Scope of the Energy Assessment

The scope of this Energy Assessment included the following activities:

- i. Desk study of the historical energy consumption data of the schools
- ii. Interview of School's lead technical personnel on the facility's operations.
- iii. Determining the energy consumed by a different processes
- iv. Determining and quantifying, the viable energy conservation options
- v. Performing Financial analysis to determine the viability of the options

2.2 Approach and methodology

An energy audit in Kenya is conducted according to some minimum guidelines. EPRA issued Energy Management Regulations 2012 to enhance energy efficiency implementation.

The energy assessment exercise was carried out through historical energy data gathering and analysis, study of facility equipment and operation processes to identify energy conservation opportunities, technical and financial data gathering, data analysis, interpretation and preparation of the report.

An Energy audit require the auditors to undertake very specific tasks in order to prepare an Energy Management Project Package that will be implemented with a performance guarantee of the results to be generated by the project. In such context, the evaluation of savings and costs has to be based on extremely reliable data and sources. Each of the energy efficiency measures have to go through financial evaluation for justification.

Measurement and Verification plan has to be prepared in order to structure in advance how the project will be evaluated once implemented.

The process is summarised in the following figure

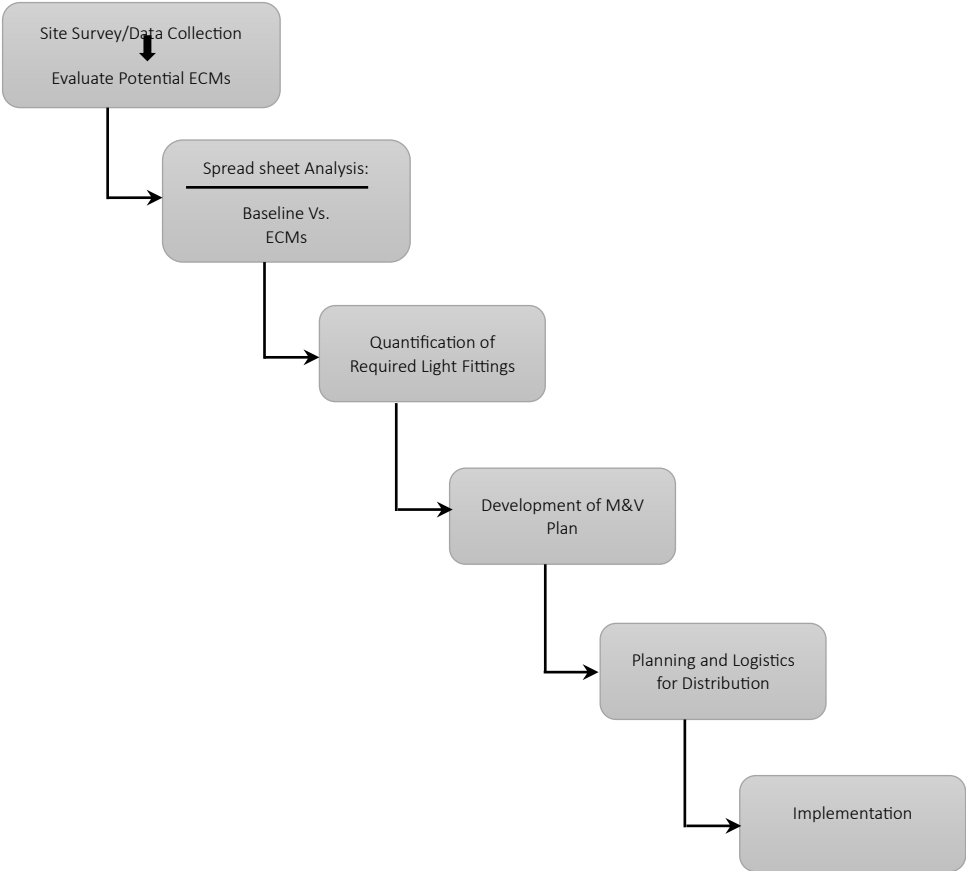


Figure 1: Methodology flow chart

However, the energy assessment had to be customized due to inadequate resources and the urgent need to establish the quantities of the light fittings to be delivered by Signify Foundation.

The following tasks are adopted to achieve the required energy assessment results

2.2.1 Data collection

Data collection will have to be performed in close collaboration with the schools staff who will be present during the site visit. However due to the logistical challenge and constraints in resources, the energy assessment for the schools would not involve any actual measurement of energy consumption.

This data collection procedure will follow the guideline of the general energy audit process which will include:

1. The collection of all the energy bills of the school for a period of three years (if available) on all source of energy used by the school. A copy of each bill will be requested in order to review all the technical and financial data on each one.
2. A review of other information that can be available to support the audit such as a list of equipment in the school etc.
3. Complete visit of the school will be carried out by the staff to confirm the state of the installation. A special attention will be given to the mechanical and electrical appliances in order to confirm that consumption rating of the installed equipment. The site audit will gather all the information about the state of the equipment and its level of operation.
4. There is need to identify the different type of lights like LED, TFL, incandescent, CFL etc
5. A complete survey of all the energy consuming equipment will be done, where the detailed equipment specification will be collected and actual measurement of the energy consumption will be taken on selected equipments. In the case of multiple number of similar equipment (lighting for example), samples will be used to confirm the energy consumption of each equipment.
6. The collection of different usage of the equipment that are in use in the school will include time of usage, level of usage (load factor), maintenance practices and any other elements that could influence the facilities energy consumption.
7. Survey of auxiliary loads like LCD projectors, scanners, computers and kitchen equipment, among others will be undertaken
8. A data collection developed by the consultant will be used for each facility. The application Monkey Survey will be used for data collection. The questionnaire will be filled out on site by the SE4All, MoE and KAM Staff in order to gather the information rapidly and with the maximum efficiency. Complementary questions might be asked based on the answers provided in order to get a better understanding on specific cases as applicable.

2.2.2 Data Analysis

1. A complete analysis of the gathered information will be done for the schools and used in the quantification of the light fittings required, energy saving and CO₂ emissions reductions.

2. The data analysis to aid in the final Energy Assessment report would include
 - a. An analysis of the energy bills. An evaluation of the power factor and any penalties associated with it. Analysis of the usage factor for the school to determine the type of load profile that may be expected.
 - b. The development of a baseline that will include all energy and cost information and will relate them to the different usage of the facility. This baseline will be the initial situation of the school and the starting point for the evaluation of the energy efficiency measures in order to determine the savings that they could generate if implemented.
3. To succeed in this task, the data collection staff would need the collaboration of the school. It was therefore be important that before the actual visit, the team have access to as much background information as is feasible.
4. All the information was to be collected in a pre-developed spreadsheet for each type of equipment to ensure that no information is omitted for any equipment in the facility. The information will be included on an electronic spreadsheet for future reference The collected information will be used for :
 - a. The development of baseline to be used in the evaluation of the savings for each energy efficiency measure
 - b. The development of potential energy efficiency measures

2.2.3 Measures for Improving Energy Efficiency

1. Based on all the information collected and site discussions, the project team would develop the energy efficiency measures for the school under the assignment. For the current pilot roll out , the focus is only on the lighting in the schools. The preparation of standardized templates for measures development and savings evaluation will be an essential tool to ensure timely production of the reports.
2. The following approach will be used for the evaluation of the energy efficiency potential
 - a. Analyze the baseline: As developed in 2.2.1, the energy consumption baseline will be analyzed in order to understand the consumption pattern of the schools. A detailed analysis of all the lighting will be done at the beginning of this task for the school. A review of facility's operational characteristics and all aspects related to the actual energy consumption will be done.
 - b. Identify the energy conservation measures: Based on the baseline information, a list of potential energy efficiency measures for lighting will be done on based on potential energy savings and budget costs.
 - c. Calculate the savings for efficient lighting measures. The savings of the identified lighting measures retained will be thoroughly evaluated using the real detailed energy rate structure applicable to the school.

All detailed cost evaluation will be presented with for all the schools in the final assessment report.

The final list of quantities of lighting will be discussed and agreed with Signify Foundation.

2.2.4 Monitoring and Verification of Results

To ensure that the project is viable and desired benefits are accrued, it is critical to develop a reliable monitoring and verification approach for the identified savings. The consultant is proposing to utilize M&V approaches that are based on the International Performance Measurement and Verification Protocol (IPMVP). IPMVP procedures when implemented will allow school operators quantify energy conservation measure (ECM) performance and energy savings. The procedures also provide for measurement and verification of ECM performance over time to ensure predicted savings are maintained. The IPMVP provides an overview of current best practice techniques available for verifying savings from both traditionally and third-party-financed energy and water efficiency projects.

For this project the main purpose of the IPMVP will be to:

- i. Increase certainty, reliability, and level of savings;
- ii. Reduce transaction costs by providing an international, industry consensus approach and methodologies;
- iii. Reduce financing costs by providing project measurement and verification (M&V) standardization, thereby
- iv. Ensure that the energy efficiency project achieves or exceeds its goals of saving money and improving energy efficiency.

Measurement and Verification Options:

There are four M&V options that can be applied and are defined in the IPMVP. The purpose of defining several M&V options is to allow for variations in the cost and methods for assessing savings.

Table 2: Measurement and Verification Options

M&V Option	How Savings Are Calculated
<p>Option A: Focuses on physical assessment of equipment changes to ensure the installation is to specification. Key performance factors (e.g., lighting wattage) are determined with spot or short-term measurements & operational factors (e.g. lighting operating hours) are stipulated based on analysis of historical data or spot/short-term measurements. Performance factors and proper operation are measured or checked annually</p>	Engineering calculations using spot or short-term measurements, computer simulations, and/or historical data
<p>Option B: Savings determined after project completion by short-term or continuous measurements taken throughout the term of the contract at the device or system level. Performance and operations factors are monitored.</p>	Engineering calculations using metered data
<p>Option C: After project completion, savings determined at the “whole-building” or facility level using current year and historical utility meter (electricity) or sub-meter data.</p>	Analysis of utility meter/ sub-meter data using techniques simple comparison to hourly /monthly regression analysis.
<p>Option D: Savings determined through simulation of facility components and/or the whole facility</p>	Calibrated energy simulation/modeling; calibrated with hourly or

	monthly utility billing data and/or end-use metering
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Since lighting takes over 20% of the energy consumed in schools, it is proposed that the project uses Option C for evaluation of achieved savings.

2.2.5 Preparation of the ‘Comprehensive Energy Audit Report’

The report is the communication tool that the team will utilise to communicate the measures identified in the schools. The report will also include photos of equipment or areas where energy efficiency measures have been identified.

The report will be shared with all key project stakeholders.

The table of content for the Energy Assessment Report to be prepared for the schools is presented below:

- i. Executive Summary
- ii. Brief Description, the operational characteristics and major energy consumers of the facility
 - a. Facility type
 - b. Operational hours
 - c. Production or occupancy level as applicable
- iii. Analysis of annual energy bills of the facility
 - a. Bill listing
 - b. Rate analysis and comment
 - c. Power factor comment
 - d. Usage factor comment
- iv. The energy balance and reconciliation to the bill
- v. The baseline for the energy savings calculation
- vi. Detailed description of the recommended conservation measures, expected annual energy savings, required investment and economic analysis of each individual measure and for the total project
- vii. Other major findings
- viii. Key recommendations
- ix. Conclusion
- x. Appendixes that include:
 - a. Breakdown of selected schools and associated bills energy consumers
 - b. Results of surveys
 - c. List of existing light fittings

3 Post audit Analysis Sessions

The data collection exercise was carried out between 22nd and 27th January covering 70 schools. The team held a two day sessions on 15th and 16th February 2024 at Kawi House, Ministry of Energy Complex to review the findings and undertake detailed analysis. This was focused on determining the number of fittings required for the pilot phase covering 100 schools.

From the discussions during the two days meeting, it was clear that the project team that visited the schools as part of the energy assessment had observed various actions which would inform policy and actionable items for the Ministry of Energy and also Ministry of Education.

There are were findings on the following

- i. Lighting
- ii. Electricity Billing
- iii. Solarization
- iv. Awareness
- v. Cooking and
- vi. Cooling

The data collection exercise had a few gaps. The following limitations were noted for this energy use assessment:

- i. Lack of complete data set for electricity and other energy sources for the period under review
- ii. Assumptions for the operating hours. The hours are assumed to be similar for all the schools
- iii. Limited time to comprehensively cover other uses of energy in a particular school apart from lighting which was the focus of this assessment.

4 Recommendations

From the interaction with the staff and subsequent supervision, the following recommendations are made to ensure the success of the national roll out of the schools EE programme.

- i. The staff to enhance their capacity through short courses like Project Management, Report Writing and Energy Management
- ii. The staff are encouraged to undertake comprehensive certification courses like Certified Energy Manager, Certified Energy Auditor among others that can lead to EPRA licensing
- iii. The Ministry to develop a comprehensive plan for follow-up activities on the pilot. It is likely that all the activities planned for the pilot phase may not be undertaken this year.
- iv. Due to limited resources, the staff were not taken through comprehensive energy auditing measurements using measuring equipment like power analyzers. It is proposed that the staff join the CEEC team when undertaking comprehensive audits in selected 5 schools (CEEC had offered to do this, but they are yet to receive the prerequisite financing from the government.
- v. For staff being sent to collect data from various schools, it may be necessary to pair the team members such that either of the team members has some technical background.
- vi. SE4All need to provide a clear Career development and evaluation for the staff so that they are able to play a bigger role in the nationwide EE project for schools in future
- vii. Develop national collaboration on energy efficiency in schools. This would involve the Ministry of Energy, Education and Public works. They can create a platform to share energy consumption in schools . The agencies can provide a shared but secure platform to access data among the agencies, without duplicating data

5 Conclusion

Overall the supervision of the staff for the phase of the pilot programmes was successfully completed based on including the outcome of results of the energy assessment report. There may have been some challenges at the beginning of the project due to divergent view on implementation modalities, but this was overcome gradually and members had a clear goal to ensure successful implementation. The ministry can build on the momentum created during the pilot roll out and ensure timely implementation of the nationwide EE Project. Thus the pilot will result to more efficient schools and a pool of personnel who can adequately handle data collection, analysis on energy efficiency for future assignments on Kenyan schools.

6 Annexes

6.1 Annexe 1: Programme

	Task	Indicative Dates	Responsible
1.	Data Collection	10 th – 27 th October 2023	TC/MoE/Consultant
2.	Data Analysis	13 th – 18 th November 2023	CEEC/MoE/Consultant
3.	Assessment of Baseline	22 nd November 2023	TC/MoE/Consultant
4.	Shipping of Donation	December 2023	Signify
5.	Distribution of light fittings	January 2024	Signify/ MoE
6.	Retrofitting Exercise	February	MoE/Schools
7.	Development of awareness package	March 2024	MoE/SE4All/Signify
8.	Awareness – Schools	March 2024	MoE/SE4All/Signify
9.	Monitoring and Evaluation	June 2024	MoE/SE4All/Signify
10.	Development of Concept for Nationwide EE Project	July 2024	MoE/CCC

6.2 Annexe 2: Findings of the Energy Assessment

Summary of the Financials Analysis of the Pilot Roll out for 70 schools

Existing Light Fitting	Efficient Type of Light Fitting	Annual Electricity Savings (kWh)	Annual savings (KShs)	CO2 Emission Reductions (Kgs)
Traditional Flourescent Lamps - 36W	LED Flourescent 4FT-16W	272,916.00	8,187,480.00	136,458
Traditional Flourescent Lamps - 58W	LED Flourescent 4FT-16W	110,536.65	3,316,099.50	55,268
	LED Floodlight	-	-	-
Flood Lights - 100/200W	Solar Security flood light - 100W	184,932.00	5,547,960.00	92,466
Traditional Flourescent Lamps - 18W	LED Flourescent 2FT-9W	12,303.90	369,117.00	6,152
Incadescent/CFL	LED Bulb 9W	21,176.10	635,283.00	10,588
Total for electrical		601,865	18,055,940	300,932
Electricity bill		2,477,826	83,536,486	
% saving on electricity bill / cost		24%	22%	

Request to Signify for 100 Schools

Existing Light Fitting	No of Light Fittings
LED Flourescent 4FT-16W	16,980
Solar Security Follo lights	767
LED Flourescent 2FT-9W	1,426
LED Bulb 9W	1,126

6.3 Annexe 3: Minutes



MINUTES FOR SECONDARY SCHOOL LIGHTING PROJECT MEETING HELD ON 16TH FEBRUARY 2024 AT KAWI HOUSE 3RD FLOOR BOARD ROOM

Attendees

NO	Name	Organization
1.	David Mutysia	MoEP
2.	Elizabeth W Chege	SEforALL
3.	Joseph Njuguna	UNEPCCC consultant
4.	Elizabeth Chege	KAM
5.	Erick Otieno	SIGNIFY FOUNDATION
6.	Reuben Kipturgo	MoE
7.	Njeri Gikami	SIGNIFY FOUNDATION
8.	Diana Masika	MoEP
9.	Concepta Ojwang	SEforALL
10.	John Marvin Ayara Recording	MoEP
11.	Ishmael Olum	EPRA
12.	Grace Kamau	SEforALL
13.	Francis Kamau	

Agenda of the Meeting.

1. Preliminaries
2. Presentation of key findings from the energy audits in schools
3. Donation Agreement. /Recommendations
4. AOB

Minutes	Discussion	Action Item
Minute 1: 16th	<ul style="list-style-type: none">• The meeting began at 2:00 PM with a prayer led by Concepta Ojwang, followed by a warm welcome to all attendees. Introductions were made, during	

<p>February 2024</p>	<p>which each participant stated their name and affiliation for the record. Mr. David Mutysia, the chair, called the meeting to order and introduced the agendas. He provided a brief overview of the project's inception and current status, acknowledging the efforts of all stakeholders in the progress achieved thus far. He encouraged members to maintain their commitment and effort until the project's completion.</p>	
<p>Minutes 2: 16th February 2024, Presentation of key findings from the energy audits in schools</p>	<ul style="list-style-type: none"> • Members who conducted energy audits presented their findings to the committee, which were then deliberated upon. Key findings were shared, and the committee proposed recommendations for further action. • The chair reported that out of the 100 schools selected for energy audits, only 70 were visited due to inadequate funding for the process. • During the report presentation, the secretariat members highlighted the complexity of the task and requested more time to complete their assignments. They also encouraged those who had not submitted their data to do so promptly. Additionally, a committee member proposed that data input should remain in its raw form without filtering at the initial stage. • Key findings and recommendations 	
<p>Minute 3: 16th February 2023, Donation Agreement.</p>	<ul style="list-style-type: none"> • The chair emphasized that the donation agreement received from the Signify Foundation raised several questions and contained elements that were not quantifiable. Signify Foundation was urged to designate a representative to collaborate closely with the committee to finalize the agreement for signature. • Additionally, there was a need to streamline the agreement requirements to minimize negative impacts on the ministry in terms of time, funding, and resource allocation. • The committee requested Signify Foundation to handle the shipping of the appliances from the manufacturer to the country and the county offices for distribution to selected schools. • A committee member proposed that Signify Foundation incorporate internal logistic costs for 	

	<p>the appliances upon arrival in the country into their budget for efficient implementation.</p> <ul style="list-style-type: none"> • The chair confirmed that the agreement included provisions for monitoring to ensure proper utilization of the appliances. They also mentioned plans to task the District Commissioner (DC) through a letter to oversee the proper handling of the appliances. • The committee, through the chair, requested Sustainable Energy for All (SEforAll) to receive and sign for the consignment on behalf of the government, which SEforAll gladly agreed to. • The chair stated intentions to write a letter to the Kenya Revenue Authority (KRA) to request tax exemption for the lighting appliances once the import quantities were confirmed, specifically for tax-exempted products. • Regarding product standards, Signify Foundation assured the committee that the appliances had undergone standard checks with the Kenya Bureau of Standards (KEBS). • Elizabeth from SEforAll sought confirmation of an important date with the Ministry of Education to align the implementation process smoothly. An education sector official confirmed that there were no conflicts, as only national exams were scheduled later in the year. • The secretariat received the assignment to complete the data analysis by Wednesday, aiming to share it with the heads of various departments. Additionally, they were instructed to communicate the findings to Signify Foundation to obtain the total number of fittings required. 	
<p>Minutes 3: AOB</p>	<ul style="list-style-type: none"> • Elizabeth from SEforAll proposed scheduling a meeting for the upcoming Fridays to ensure oversight and tracking of the process. • Diana was assigned the responsibility of arranging the forthcoming meeting. • With no further matters to discuss, the chair expressed gratitude to the members for their dedication to attending and supporting the process. As there were no additional agenda items, the meeting adjourned at 4:00 pm. 	

6.4 Annexe 4: Photos

6.5 Annexe 4: Data collection Tool

SCHOOLS ENERGY EFFICIENCY PROJECT

Energy Audit Data Collection Sheet

Background Information

1. Date	
2. Name of Interviewer	
3. Contacts	
4. Email Address	

Table 1

Facility Information						
5. Name of School				6. Total School Population (No of students)		
7. County		8. Sub County		9. Address		
10. Gender of the school						
11. Name of Principal		12. Contact Email		13. Phone Number		
14. Name of Interviewee		15. Position		16. Phone Number		

Table 2

17. Area of School (Acres)	18. Age of Building (Which)	19. Year of Last Major Renovation	20. Kind of Renovation undertaken	21. Any Expected Expansion Y/N	22. Year of the Expected Expansion	23. Type of Classrooms Stone/Timber/Mix	24. Total Size of Generator
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	year was the school started)		Old/New Building				(KVA)

Please check all that apply

Table 3

	Yes	No
25. The School receives monthly bills based on accurate meter readings		
26. Meters are read regularly by School staff		
27. Bills are compared to monthly meter readings on a regular basis		
28. Is there sub metering in the school		
29. Does the School have a full time Electrical Technician		
30. Are there any staff houses connected to the school meter		

Table 4

Annual Utility Consumption										
31. Month	32. Electricity (Kwh)	33. Electricity Cost (Kshs)	34. Diesel for Generator (Litres)	35. Diesel for Generator (Kshs)	36. LPG for cooking/Biogas (Kgs*)	37. Firewood (Kshs)	38. Water (Units)	39. Water Cost (Kshs)		
Jan-22										
Feb-22										
Mar-22										
Apr-22										
May-22										
Jun-22										
Jul-22										
Aug-22										
Sep-22										
Oct-22										
Nov-22										
Dec-22										
Jan-23										
Feb-23										
Mar-23										
Apr-23										
May-23										
Jun-23										
Jul 23										
Aug 23										
Sept-23										

Annual Utility Consumption										
31. Month	32. Electricity (Kwh)	33. Electricity Cost (Kshs)	34. Diesel for Generator (Litres)	35. Diesel for Generator (Kshs)	36. LPG for cooking/Biogas (Kgs*)	37. Firewood (Kshs)	38. Water (Units)	39. Water Cost (Kshs)		
Oct-23										
Nov-23										
Dec-23										
2022/23 Totals										

Table 5

Lighting – Classroom/Hostel only											
40. Area ID (Identifier e.g 4X, 4J, Tana Hostel)	41. Size LXWXH Small Medium Large	42. Lamp Type (ballast or fluorescent)	43. Rating (Watts)	44. Total Number of lamps	45. Number of hours lights are left on each day	46. How are lights controlled? Manual or automatically	47. No of working lights	48. Condition of the wiring Good /Bad /Fair	49. For Hostel –No of beds		

Table 6

Building Data (Except Classrooms/Hostels)										
50. Activity Type (e.g. Library / laboratory/Chapel/ Staff Room/ Dining Hall/ Entertainment Hall/ Store/ IT Rooms Admin Rooms, Reception, etc)	51. Approximate Room Size in Metres LxWxH	52. Lighting Type	53. Rating (Watts)	54. No of working lights	55. Adequacy of lighting Low/Ok	56. Condition of the wiring Good /Bad /Fair	57. Daily Operational Hours (e.g. M-F 8-6, Sat 10- 4, Sun 2- 4))			

Table 7:

Security Lighting							
58. Number – working only	59. Not Working	60. Type(continuous,stand- by,emergency,moveable)	61. Rating	62. Manual /Automatic Control	63. Any solar lighting	64. Number of solar lights	
65. Does the school has enough security lights			Yes		No		
66. If Yes, how many more security lights will be required							
67. What Type of security lights (Solar street lights/pole mounted/ wall mounted)							

Table 8

68. Water Heating			
Type	Rating	Number	Operating Hours/day
Instant showers			
Firewood Boiler			
Solar			

Table 9

PLUG LOADS									
69. Equipment Type	70. Model	71. Size	72. Total Number	73. Wattage	74. Hours of Use per Day	75. Days of Use per Week	76. How is equipment controlled?	77. Description, Observations or Notes	
<i>Water Dispenser</i>									
<i>Computer</i>									
<i>Printer</i>									
<i>Computer Screen</i>									
<i>Refrigerator</i>									
<i>Water Pump</i>									
<i>Oven</i>									
<i>Dough Mixer</i>									
<i>Potato Peeler</i>									
Fan									

Table 10

Environmental conditions			
78. Roofing	Type of roof (iron sheets,tiles,)	Color of roof	Additional comments
79. Windows	Size of windows	No of windows	
80. Doors	Size of doors	Number of doors	
81. Vegetation around the school	Presence of vegetation	Does it offer shading	

Table 11: Kitchen

Kitchen				
82. Type of cooker	83. Size	84. Rating Ltrs Kwh m3/hr	85. Source of Fuel	86. Operating Hours
Improved Cookstove for institution				
Firewood				
Gas cooker				
Electric				

Water Sources/ Harvesting

87. What is the main source of water for the school? (Tick Any)

Water Company		
Borehole		
River		
Water Bowsers		
Rain Water		

88. Average water consumption per month (litres) _____

89. Is there any water harvesting in the school _____

90. what is it used for? _____

91. Ablution Blocks/ Washrooms

Low flush toilets	Waterless urinals	Low flow faucets	Type of taps – Screw/Push/automatic/Sensor

92. Are any capital improvement projects planned? _____

93. If Yes, what are they and how will they affect the energy use in the School?

Awareness

94. Does the school conduct any awareness on better utilization of energy and water?

	No	Yes
Water		
Energy		

95. How are the students involved? Provide details

96. Are there any energy saving stickers used in the school at any location

If yes

Where? _____

Operations and Management

97. Who is in charge of Energy Issues at the school

? _____

98. Is Energy discussed at Board Level _____

99. Please specify where you feel there is room for improvement either in energy efficiency measures or renewable energy technologies:

100. Any other comments/Observations on the school

101. GPS Point	
102. Photo – EG. Admin Block/Classroom /inefficient lights & equipment etc	

Additional information

Photos during the data collection to be included.

