ECREEE
Towards Sustainable Energy

2023

REGIONAL
PROGRESS REPORT
ON RENEWABLE ENERGY, ENERGY EFFICIENCY AND ENERGY ACCESS IN ECOWAS REGION

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MAPS
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ABBREVIATIONS

ADEME	French Environment and Energy Management Agency.
AFREC	African Energy Commission
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
CEB	Benin Electric Community.
CEMG	Clean Energy Mini-Grids
DNE	Direction Nationale de l'Énergie
ECOWAS	Economic Community of West African States
ECOWREX	ECOWAS Observatory for Renewable Energy and Energy Efficiency
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
EE	Energy Efficiency
EEEP	ECOWAS Energy Efficiency Policy
EIS	Energy Information System
EREP	ECOWAS Renewable Energy Policy
ESEF	ECOWAS Sustainable Energy Forum
EU	European Union
EUR	EURO
GIZ	Gesellschaft für Internationale Zusammenarbeit
GOGLA	Global Off-Grid Lighting Association
GW/ GWh	Gigawatt / Gigawatt hour
HH	Household
ICS	Improved Cook-Stoves
IRENA	International Renewable Energy Agency
LED	Light Emitting Diode
LMSH	Large and Medium Scale Hydropower
LPG	Liquefied Petroleum Gas
MPEER	Ministère du Pétrole, de l'Énergie et des Énergies Renouvelables
MLS	Multi-Light Systems
MW/ MWh	Megawatt / Megawatt hour
NEEAPs	National Energy Efficiency Action Plans
NREAPs	National Renewable Energy Action Plans
RE	Renewable Energy
SDG	Sustainable Development Goals
SECAPs	Sustainable Energy Country Action Plans
SEforALL	Sustainable Energy for ALL
SEKs	Solar energy kits
SHS	Solar Home Systems

SL	Solar Lanterns
SWH	Solar Water Heaters
WAPP	West African Power Pool the specialized agency of ECOWAS
UNIDO	United Nations Industrial Development Organization

FOREWORD

Access to sustainable and reliable energy remains a fundamental pillar for economic growth, social development, and environmental sustainability in the ECOWAS region. While significant progress has been made in expanding electricity access, deploying off-grid infrastructure solutions, and promoting renewable energy, critical gaps persist that hinder the achievement of regional and global energy goals. This report presents an in-depth analysis of the current state of energy access, renewable energy deployment, and energy efficiency in ECOWAS Member States, providing key insights into progress made, challenges encountered, and opportunities for accelerated action.

While some countries have made notable strides in renewable energy including off-grid electrification, others remain far behind, necessitating targeted interventions and strategic investments. The rapid growth of Solar Systems and mini-grid installations underscores the potential of decentralized energy solutions in bridging the access gap. Also, Energy efficiency must be prioritized as it can drive inclusive sustainable energy growth. However, achieving universal energy access by 2030 will require enhanced policy support, regulatory reforms, and increased financial commitments.

Beyond electricity access, the report sheds light on the pressing issue of clean cooking solutions, which remain inaccessible to a vast majority of the population. The adoption of clean cooking technologies, such as improved cookstoves, biogas, and solar cookers, is still at a nascent stage, with progress varying widely among Member States. To address this, there is an urgent need for coordinated efforts that promotes innovation, affordability, and widespread adoption of these solutions. Similarly, the expansion of renewable energy capacity, particularly solar, wind, and small-scale hydro, is critical to meeting the region's ambitious energy transition targets.

By presenting a detailed assessment of the current landscape, it provides a solid foundation for informed decision-making and strategic planning. As the region moves toward achieving its energy goals, collaboration, knowledge sharing, and steadfast commitment will be essential to ensuring that no one is left behind in the energy transition

Mr. Jean Francis SEMPORE
Executive Director ECREEE

DEFINITIONS

Electricity access: The share of households with electricity supplied by electricity grid (national grid and mini grids) or households with electricity supplied by stand-alone renewable energy systems. Conventional stand-alone systems such as diesel or petrol generators contribute also to provide access to electricity, but these are not considered in this report.

Energy-efficient building: An energy-efficient building is defined as a building that is designed and built in a way that minimizes demand for and consumption of energy/electricity for cooling. Buildings considered are old and new public buildings with a total useful area over 500 m2 having at least one energy audit conducted.

Household: A household is defined as a person or group of persons who normally live and feed together and recognize a particular person as the head

Improved cook-stove: An improved cook-stove is characterized by having a particular feature that reduces the amount of wood, charcoal, animal or crop residue used by the cook-stove. Their use in developing countries is been promoted based on two main advantages: reducing the negative health impacts associated with exposure to toxic smoke from traditional stoves (women and children are generally more affected) and reducing the pressure placed on local forests

Losses in electricity supply : losses during electricity supply refers to the amounts of electricity injected into the transmission and distribution grids that are not paid by users. Total losses have two components: technical and non-technical. Technical losses occur naturally and consist mainly of power dissipation in electricity system components such as transmission and distribution lines, transformers, and measurement systems. Non-technical losses are caused by actions external to the power system and consist primarily of electricity theft, non-payment by customers, and errors in accounting and record keeping. These three categories of losses are sometimes referred to as commercial, non-payment and administrative losses respectively, although their definitions vary in the literature.

Small Hydropower Plants : according to the ECOWAS Hydropower Program, small hydro plants are defined as hydropower plants with installed capacity between 1 and 30MW.

Medium and Large-Scale Hydropower: According to the ECOWAS Hydropower Program, medium scale hydropower has capacities between 30MW-100MW, while large hydropower plants are above 100 MW.

On-grid lights : On-grid lights are defined as lights connected to the national grid or mini-grids. .

Penetration rate of efficient lights : penetration rate of efficient light is defined as the number of efficient lights sold or installed as a share of the total number of lights (efficient + inefficient) sold or installed.

RE mini-grid, hybrid mini-grid (or Clean Energy Mini Grid - CEMG): it is defined as a mini-grid where at least 10% of the total installed capacity is RE-based.

Stand-alone renewable energy systems: they are defined as off-grid RE systems for lighting and powering electric appliances. These should provide at the minimum, electricity services such as lighting and phone charging (tier 1 of the SEforALL multi-tier framework for access to electricity).

Solar lanterns : Solar lanterns are typically packaged as a simple, one-light lantern with one LED light, an embedded 0.5–3.0 Watt-peak (Wp) solar panel, and an internal rechargeable lithium-ion (Li-ion) battery. Some models include USB charging for mobile phones.

Multi-light systems : Multi-light systems include up to three or four LED lights with a standalone solar panel rated up to 10 Wp and a rechargeable Li-ion battery with most models including USB charging for mobile phones.

Solar home systems (SHS) : Solar home systems (SHS) have a solar panel rated from 11 Wp to usually up to 350 Wp and provide multiple electricity functions, such as lighting and powering a wide range of appliances such as TVs and fans. SHS are offered plug-and-play (PnP) or based on open-market components. In this report, SHS refers to both plug-and-play and component-based systems unless specified.

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Finally, we express our profound appreciation to the Federal Ministry for Economic Cooperation and Development (BMZ) through Gesellschaft für Internationale Zusammenarbeit (GIZ) and UNIDO for theirs technical and financial support.

EXECUTIVE SUMMARY

In 2022, the rate of access to grid-connected electricity in the ECOWAS region stood at 57.4%, equivalent to 243.5 million people, the majority of whom (74%) reside in urban areas. This figure remains well below the regional target of 90% by 2030, as set by the SEforALL agenda. Significant disparities persist across countries: Cabo Verde, Ghana, and Côte d'Ivoire have the highest access rates (92%, 89%, and 85% respectively), while Liberia, Burkina Faso, Sierra Leone, Guinea-Bissau, and Niger report rates below 30%.

With regard to off-grid electricity access, 637 solar mini-grids were identified in the region in 2023, providing electricity to approximately 3,065,925 people. These installations are mainly concentrated in Senegal (181 mini-grids, 28%), Nigeria (135, 21%), and Benin (99, 16%). In parallel, the adoption of solar home systems has grown significantly over the past five years, with the number of users increasing from 9.8 million in 2019 to 21.8 million in 2023. If this trend continues, close to 10% of the ECOWAS population could benefit from these off-grid solutions by 2030.

Access to clean cooking technologies remains a major challenge in the region. In 2022, only 23% of households, approximately 98 million people used clean cooking solutions. Ten ECOWAS countries recorded access rates below 10%, indicating a critical situation. In contrast, notable progress was observed in Cabo Verde (81%), Côte d'Ivoire (41.6%), Senegal (38.8%), Ghana (28.7%), and Nigeria (26.6%).

Moreover, 14% of households, around 56 million people use improved cookstoves, with Ghana leading at 25%, followed by Burkina Faso at 23%. Approximately 195,000 people used solar cookers in 2023, with Senegal accounting for 83.5% of this user base. Additionally, 112,000 people use biogas for cooking, primarily in Senegal (57,000 users, or 51%) and Burkina Faso (47,000 users, or 42%).

In 2023, the total grid-connected installed electricity generation capacity in the ECOWAS region reached 28,188.1 MW. However, renewable energy capacity, excluding large and medium hydropower stood at only 1,254.1 MW, far below the 7,606 MW target for 2030. Hydropower dominates the renewable mix at 6,086.1 MW (86.2%), followed by solar PV (785 MW, 11.1%) and wind energy (185.9 MW, 2.6%).

Renewables account for 25.2% of total installed capacity in the regional electricity mix, well below the 48% target of the ECOWAS Renewable Energy Policy (EREP) by 2030. When excluding large and medium hydropower, the share of renewable sources (small hydro, solar, wind, and bioenergy) drops to just 4.4%, compared to the 19% target.

Nigeria, Ghana, Côte d'Ivoire, and Guinea alone account for nearly 80% of the region's installed renewable energy capacity, with 2,123.8 MW, 1,716.8 MW, 909 MW, and 818 MW, respectively.
As of 2023, the total installed capacity of solar mini-grids in the ECOWAS region reached 37.4 MW, about 20% of Africa's total (193.6 MW). Despite this progress, the figure remains well below the 2030 regional target of 3,115 MW. Mali (7.5 MW), Nigeria (7.3 MW), Sierra Leone (4.2 MW), and Niger (3.4 MW) are leading in this segment.

Solar home systems (SHS) continue to expand rapidly across the region, reaching 133.7 MW of installed capacity, 40% of the continent's total. Between 2014 and 2023, SHS capacity grew significantly from 2.3 MW to 133.7 MW. Nigeria remains the largest market, accounting for 62% of total installed capacity (83 MW), followed by Côte d'Ivoire (9.8 MW) and Benin (8.2 MW).
In terms of productive solar applications, solar cookers account for 2.1 MW of installed capacity (21% of the African total), while solar-powered water pumps represent 3.6 MW (27% of Africa's total installed capacity).

Biogas production in the region is estimated at 11,961,000 m^3, representing 16.47% of the continental output. Three countries dominate production: Ghana (38%), Burkina Faso (34%), and Senegal (22%).

In 2023, total electricity generation in the ECOWAS region reached 96,057 GWh, marking a 7.4% increase from 2022 (88,966 GWh). Renewable energy sources contributed 30% of total electricity production (28,489 GWh). Excluding large and medium hydropower, renewable electricity generation stood at 2,124 GWh (2.2% of the total). Ghana (9,335 GWh), Nigeria (9,119 GWh), Guinea (3,329 GWh), and Côte d'Ivoire (3,234 GWh) accounted for 88% of the region's renewable electricity generation.

Nigeria and Senegal lead residential solar water heater installations with 4,836 and 2,447 units respectively. In the public sector, Senegal has the highest number of installed units (200), followed by Burkina Faso (181) and Guinea-Bissau (25). In the commercial and industrial sectors, Liberia recorded 45 installations.
In 2022, the average weighted technical electricity loss in the ECOWAS region was estimated at 9.1%, based on data from 15 utilities covering 73% of electricity users. The highest technical losses were recorded in Liberia (LEC – 15%) and Guinea-Bissau (EAGB – 13.5%), while Nigeria (IKEJA – 3.6%) and Côte d'Ivoire (CIE – 4.4%) had the lowest.

Total electricity losses, including both technical and non-technical losses, reached 21.3% across 21 utilities covering 88% of users. Non-technical losses (NTL) remain a significant challenge, particularly in Nigeria and Guinea-Bissau, where 7 of 9 Nigerian utilities reported NTL rates above 30%. The highest rates were observed at KAEDCO (65.8%), YEDC (61.9%), and JOS (56.0%).

Since 2018, the region has experienced a strong uptake of efficient lighting technologies. Sales of LED lamps increased by 66% between 2018 and 2023, reaching 878,000 units, 83% of which were sold in Nigeria. Similarly, sales of energy-efficient appliances doubled during the same period, from 437,000 in 2018 to 878,000 in 2023, with Nigeria accounting for 72% of total sales.

Industrial energy efficiency remains underdeveloped in the region. However, progress has been made in Ghana and Nigeria. Ghana is recognized as a regional leader, while Nigeria launched implementation of ISO 50001 in 2015 through a GIZ-supported initiative in Lagos, in collaboration with the Federal Ministry of Industry. To date, nine Nigerian industries have received certification, and eleven additional companies are in the process of being certified.

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100% ELECTRIC

INTRODUCTION

The commitment of the ECOWAS energy ministers to advancing the goals of Sustainable Energy for All (SEforALL) has been unwavering and was clearly demonstrated in October 2012 when they mandated the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) to lead the SEforALL initiative in the region. Subsequently, in July 2013, the ECOWAS Heads of State adopted the ECOWAS Renewable Energy Policy (EREP) and the ECOWAS Energy Efficiency Policy (EEEP), thereby paving the way for achieving key regional objectives, as outlined in Table 1.

Table 1: Main targets for ECOWAS region contained in EREP and EEEP

RENEWABLE ENERGY	2020	2030
Installed renewable energy capacity (excl. medium and large hydropower)	2,425 MW	7,606 MW
Renewable energy power generation (excl. medium and large hydropower)	8,350 GWh	29,229 GWh
Renewable energy in electricity mix (excl. medium and large hydropower)	10%	19%
Renewable energy in electricity mix (incl. medium and large hydropower)	35%	48%
Share of (rural) population served with off-grid renewable energy systems	22%	25%
Ethanol as share of petrol consumption	5%	15%
Biodiesel as share of diesel and fuel-oil consumption	5%	10%
Improved cookstoves penetration	100%	100%
Use of modern fuel alternatives for cooking e.g. liquefied petroleum gas (LPG)	36%	41%

RENEWABLE ENERGY	2020	2030
Solar water heaters		
• Residential homes – new detached house price exceeding 75,000 Euros (EUR)	At least 1 per house	At least 1 per house
• Social institutions	25%	50%
• Agro-food industries	10%	25%
• Hotels	10%	25%
ENERGY EFFICIENCY	2020	2030
Implement energy efficiency measures that free up 2,000 MW of power generation capacity	Measures implemented	Not specified for 2030
Distribution losses in 2020 (Reduce average losses in electricity distribution from the current levels of 15 - 40% to the world standard levels of below 10%, by 2020)	10%	Not specified for 2030
Penetration rate of efficient bulbs	100%	100%
Achieve universal access to safe, clean, affordable, efficient and sustainable cooking for the entire population of ECOWAS, by 2030	100%	100%
Develop and adopt region-wide standards and labels for major energy equipment before the end of 2020;	100%	Not specified for 2030
Develop and adopt region-wide efficiency standards for buildings (e.g. building codes)	Not specified for 2020	100%
Create instruments for financing sustainable energy, including carbon finance, at the short term, and in the longer term, establish a regional fund for the development and implementation of sustainable energy projects.	Not specified for 2020	100%

Source: EREP, EEEP

Following the adoption of these regional sustainable energy policies, ECREEE has supported ECOWAS member states in developing their National Renewable Energy Action Plans (NREAP), National Energy Efficiency Action Plans (NEEAP), and their SEforALL National Action Agendas. The national goals of each member state, as described in the national sustainable energy action plans, are closely aligned with the regional targets defined in the EREP and EEEP. The formulation

of the national action plans for sustainable energy follows templates approved by the member states, ensuring a coherent approach. Furthermore, the regional monitoring and reporting framework, approved during the ECOWAS Sustainable Energy Workshop in Dakar in April 2016, and later adopted during the 11th meeting of the ECOWAS Energy Ministers in Conakry, Guinea, in December 2016, serves as a guideline for tracking the progress made in each member state in the field of sustainable energy.

In line with this resolution, all member states were mandated to designate national focal points responsible for compiling and submitting annual national monitoring reports to ECREEE. These reports present the progress made towards achieving the goals set out in the NREAPs, NEEAPs, and respective SEforALL action agendas, as well as a summary of the key activities undertaken in the previous year to advance these objectives.

This sustainable energy data management framework for the ECOWAS region has been consolidated in ECREEE's 2023-2027 Strategic Plan, which draws its foundation from the ECOWAS Vision 2050 and the ECOWAS 4x4 Management Objectives. The operationalization of this Strategic Plan revolves around three regional programs (Renewable Energy, Energy Efficiency, Cross-Cutting) and three regional initiatives (ECOWAS Renewable Energy and Energy Efficiency Observatories, Annual Report on Progress in Renewable Energy and Energy Efficiency in West Africa, ECOWAS Sustainable Energy Forum).

This document is fully aligned with ECREEE's 2023-2027 Strategic Plan and represents a significant contribution to achieving ECOWAS's Sustainable Energy objectives.


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SECTION A-A
MASTER SUITE

1 | OBJECTIVES

This report aims to provide an assessment of the progress made in the areas of energy access, renewable energy, and energy efficiency in the ECOWAS region during the year 2023.

Specifically, the report focuses on the following points:

- The status of energy access, including access to electricity and clean cooking solutions;
- Distribution losses within the electricity network;
- The contribution of various renewable energy sources to the electricity mix, clean mini-grids, and standalone systems;
- The development of renewable energy projects.
- Renewable energy applications beyond electricity generation;
- The energy efficiency policy implementation status

2 METHODOLOGICAL APPROACH

A participatory approach was used for data collection, processing, and analysis in the preparation of this regional report.

2.1 Data Collection and Processing

Data were collected from all 15 ECOWAS member states using the national monitoring report template (Annex 1). The data includes information on grid-connected electricity access, installed renewable energy capacities for electricity generation, Clean Energy Mini-Grids (CEMG), installed solar water heaters, clean cooking solutions, electricity losses, and related energy data, including efficient lighting, efficient electrical appliancesand energy efficiency in buildings and industries. Demographic and economic indicators were sourced from national statistical institutes and/or regional and international institutions.

In each ECOWAS member state, data consolidation was carried out by the national focal institution responsible for energy data management, based on the existing national energy information system. This also includes data provided by the following institutions:

- National Statistical Institutes;
- National Electricity Companies;
- National Agencies responsible for Renewable Energy, Energy Efficiency, and Rural Electrification;
- National Regulatory Authorities for the energy or electricity sector.

"The annual regional progress report on renewable energy (RE) and energy efficiency (EE) is the result of the compilation of national data through an internal review and quality assurance process by ECREEE. This regional report was validated by all ECOWAS Member States during the regional workshop held with national focal points on 23 November 2024 in Abidjan, Côte d'Ivoire, as a precursor to the 2024 edition of the ECOWAS Sustainable Energy Forum (ESEF). It was subsequently validated by the national data focal points of each country during the regional workshop held from 24 to 26 March 2025 in Cotonou, Benin.

2.2. Data Analysis

The data analysis was based on a descriptive approach, presenting results at both the national and regional levels. Regional indicators were calculated through the aggregation of weighted averages.

At the regional level, a comparison of the 2023 indicator values with the 2030 targets, as defined in the ECOWAS Renewable Energy Policy (EREP) and Energy Efficiency Policy (EEEP), is proposed.

At the national level, the National Renewable Energy Action Plans (NREAP) and National Energy Efficiency Action Plans (NEEAP) serve as reference frameworks where applicable.

In terms of energy efficiency, this report relies on data related to electricity distribution losses for the year 2023. It also includes sales statistics for efficient lighting devices and energy-efficient appliances, regularly published by Global Lighting, a World Bank platform, and GOGLA. For energy efficiency in buildings, in addition to the information provided by various countries, this report integrates construction data supplied by the Nubian Vault. Association. As for energy efficiency in industries, only the available data from the countries were used.

3 ENERGY ACCESS, RENEWABLE ENERGY AND ENERGY EFFICIENCY STATUS IN THE ECOWAS REGION

3.1. Energy access

Access to energy is based on electricity access and use of modern cooking solutions. Electricity access is considered as connections either to the electrical grid (national grid and mini-grids)[1] or to stand-alone renewable energy systems. The indicators used to monitor electricity access include share of households connected to electrical grid, share of households connected to renewable energy mini-grids[2] and share of households served by stand-alone renewable energy systems. Access to modern cooking solutions is measured according to share of households using efficient cookstoves and alternative cooking fuels.

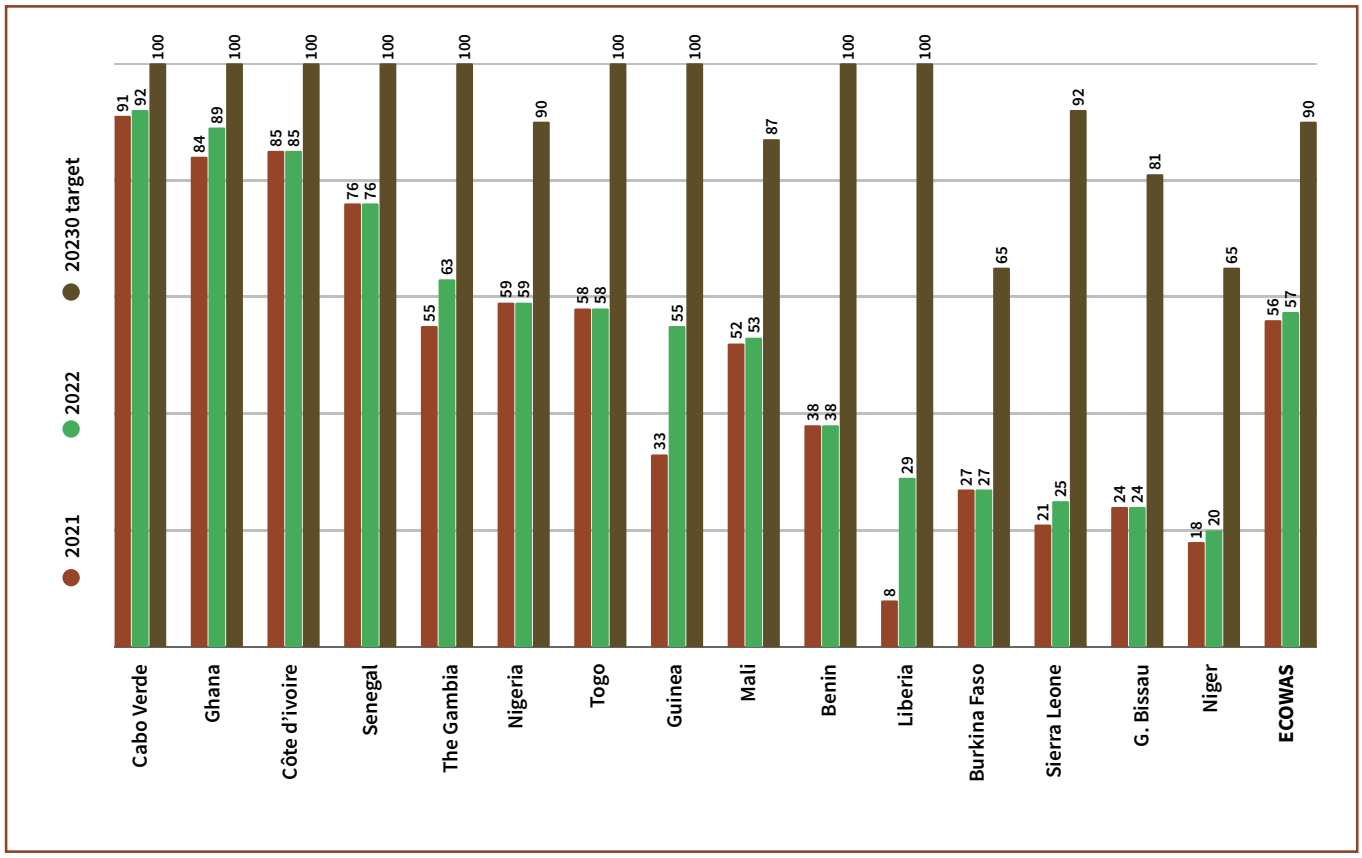
3.1.1. Access to Grid Connected electricity

In 2022, the On Grid electricity access rate for the ECOWAS region is 57.4%, representing 243.5 million people, the majority of whom live in urban areas (74%). This rate indicates that significant efforts are still required in the region to achieve the regional On Grid electricity access target of 90%[3] by 2030, as defined in the SEforALL agenda.

There is a significant disparity in electricity access rates among ECOWAS countries. Cabo Verde, Ghana, and Côte d'Ivoire have the highest rates, with respective rates of 92%, 89%, and 85%. Liberia, Burkina Faso, Sierra Leone, Guinea-Bissau, and Niger have electricity access rates of less than 30%.

[1]Isolated grids or mini-grids refer to electrical grids not connected to the national grid. The term does not consider the origin of the energy and includes all conventional and renewable energy sources.
[2]In this report, renewable energy mini-grids, hybrid mini-grids and CEMGs use the same definition
[3]From Vision to Coordinated Action: Consolidation of the SE4ALL Action Agendas, the National Renewable Energy Action Plans, and the National Energy Efficiency Action Plans in the ECOWAS Region, Page54

Figure 1: Percentage (%) of households connected to an on grid electricity in 2021-2022



Source :ECOWAS Energy Information System (SIE-ECOWAS) 2022

3.1.2. Access to Off-Grid Electricity

3.1.2.1. Access to solar mini grids

In the ECOWAS region, a total of 637 solar mini grids have been identified, serving an estimated population of 3,065,925 people in 2023. Senegal, Nigeria, and Benin lead in the number of installations, with 181; 135; and 99 mini-grids, respectively.

Table 2: Number of Existing and Operational Clean Energy Mini-Grids in 2023

Country	Existing Solar Mini-Grids 2023	Number of Households Connected to Solar Mini Grid	Number of Population Served By Solar Mini Grid
Benin	99	3,601	18,725
Burkina Faso*	36	9,168	57,758
Cabo-Verde	7	411	1849,5
Cote d'Ivoire	29	3,182	16,228
The Gambia*	1	2,175	17,400
Ghana	5	5,248	20,992
Guinea	6	12,103	70,197
Guinea Bissau*	2	13,502	81,012
Liberia	17	12,130	60,650
Mali	45	295,114	1,800,195
Niger*	13	20,737	138,938
Nigeria	135	120,000	600,000
Senegal*	181	1,067	8,856
Sierra Leone*	57	23,250	137,175
Togo	4	6,536	35,948
ECOWAS	**637**	**528,224**	**3,065,925**

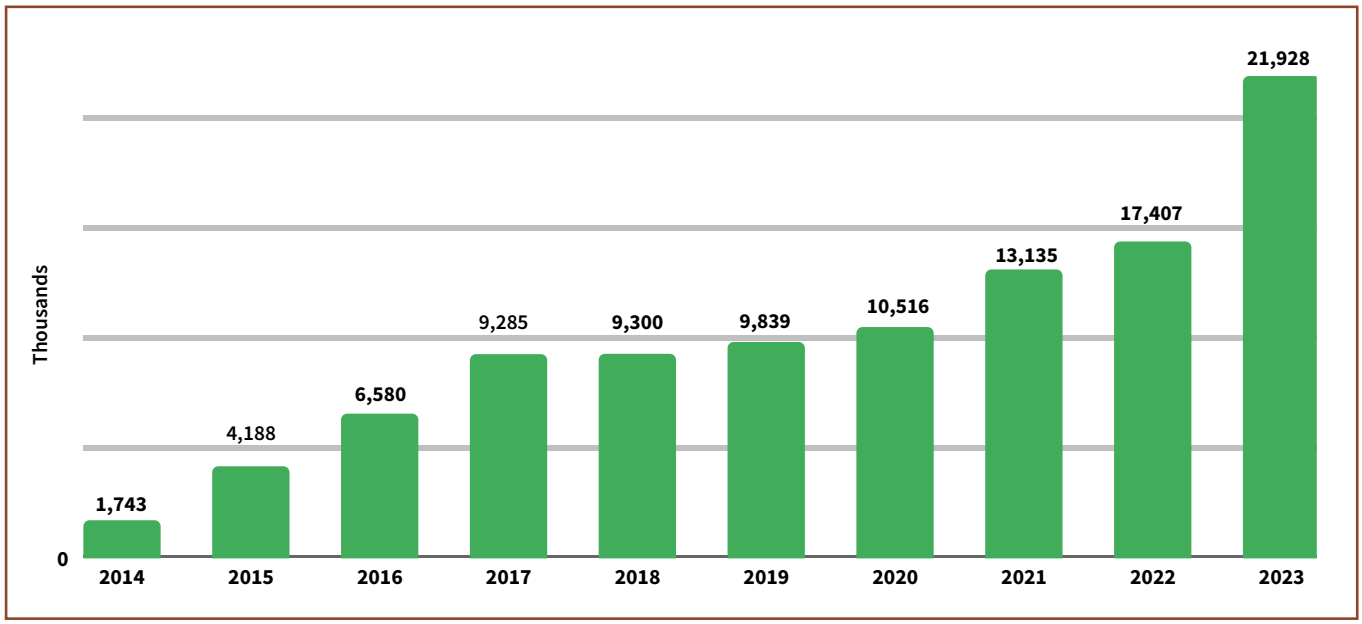
Source : Rapports de suivi nationaux 2023 (basés sur les rapports 2023 des services publics et des régulateurs de l'électricité) ; données du Rapport d'avancement régional sur les énergies renouvelables, l'efficacité énergétique et l'accès à l'énergie dans la région de la CEDEAO, CEREEC, 2023.

3.1.2.2. Access to Solar Home System

In 2023, a total of 21,828,000 people in the ECOWAS region, representing approximately 5% of the total population had access to Solar Home Systems. Notably, over the past five years, the number of users has more than doubled, increasing from 9,839,000 in 2019 to 21,828,000 in 2023.

"Projections suggest that by 2030, nearly 10% of the region's total population could be served by Solar Home Systems. This rapid growth calls for heightened attention from regional authorities to implement appropriate policies that will support sustainable development and drive economic growth in the region.

Figure 2: Evolution of Number of people served by Solar Home System in the region



Source : IRENA 2023

In 2023, the countries leading in the number of people served by Solar Home Systems are Nigeria, Benin, Senegal, Côte d'Ivoire, and Burkina Faso. These countries have respectively 13,817,000, 1,257,000, 1,146,000, 1,082,000, and 969,000 residents benefiting from this technology.

Table 3: Evolution of Number of people served by Solar Home System between 2014 and 2023 by county

Country	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Benin	0	143	213	311	255	482	666	874	1,089	1,257
Burkina Faso	516	1,002	1,008	1,653	1,378	1,476	991	1,169	1,119	969
Cabo Verde	0	0	73	95	102	39	26	11	0	0
Cote d Ivoire	0	144	261	352	372	564	842	987	1,087	1,082
Gambia	0	0	152	209	266	177	149	93	33	25
Ghana	67	133	292	509	518	475	426	419	410	376
Guinea	0	0	126	171	221	200	315	366	491	485
Guinea Bissau	6	8	137	180	205	104	80	148	114	142
Liberia	0	55	158	194	181	143	286	378	427	393
Mali	9	291	500	839	690	705	578	615	536	473
Niger	39	39	145	157	200	168	251	236	244	215
Nigeria	726	1,529	2,209	2,600	2,864	3,179	3,843	5,423	9,283	13,817
Senegal	380	744	917	1,411	1,426	1,500	1,142	1,172	1,147	1,146
Sierra Leone	0	100	315	479	448	398	508	624	648	598
Togo	0	0	74	125	174	229	413	620	779	950

Source : IRENA 2023

3.1.3. Access to Modern Cooking Energy

Access to modern cooking is assessed in terms of household penetration rates for modern cooking fuels and integrated storage systems. These indicators reflect the prevailing living conditions in a typical household.

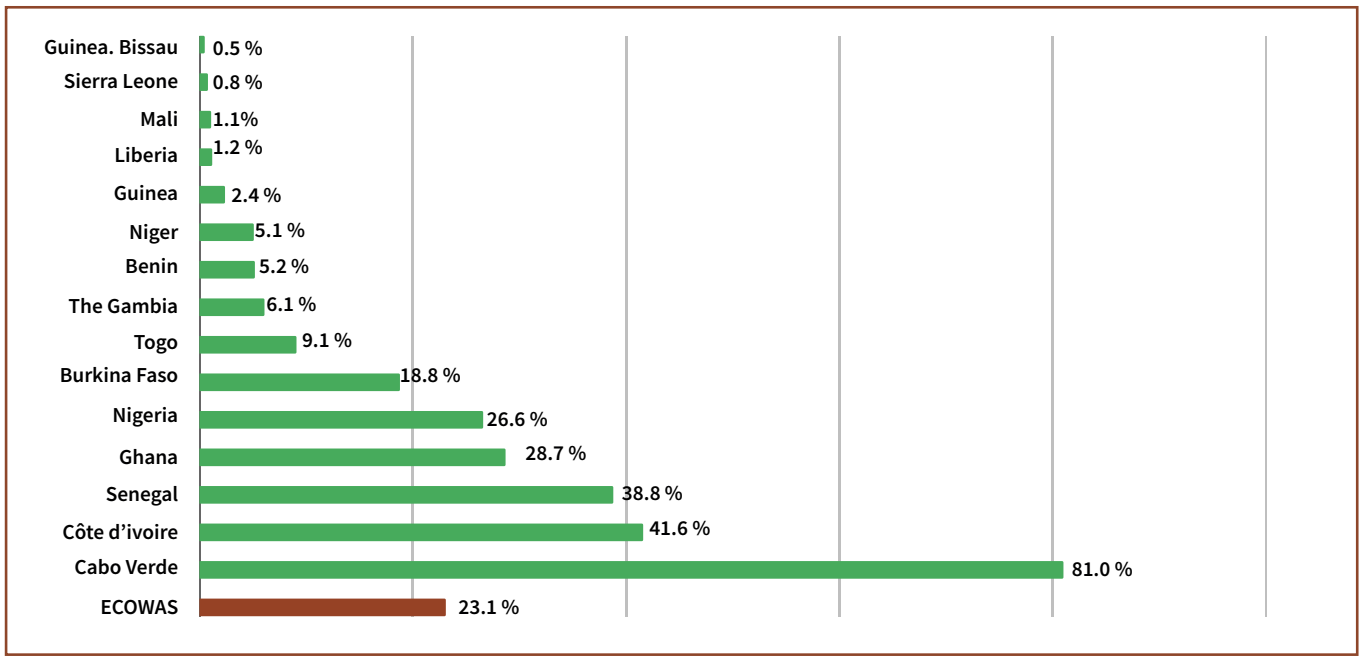
3.1.3.1. Share of Households Using Modern Cooking Fuels

In 2022, 23% of households in the ECOWAS region used clean cooking solutions, corresponding to an estimated population of 98 million people. Ten out of the fifteen countries in the region reported access rates to modern cooking energy and technologies below 10%.

Nigeria and Ghana exhibit similar adoption ratios of modern cooking energy and technologies, with respective rates of 26.6% and 28.7%. Similarly, Senegal and Côte d'Ivoire show comparable rates of 38.8% and 41.6%. Cabo Verde stands out with the highest rate in the region, reaching 81%.

> **These findings highlight a concerning situation in the ECOWAS region, where access levels to clean cooking technologies fall significantly below the global average. Strengthening efforts to promote clean cooking solutions, such as improved cookstoves, modern liquid fuels (LPG), and biofuels, is crucial. These measures will not only address the energy needs of households but also help reduce greenhouse gas emissions and health risks associated with the use of polluting fuels.**

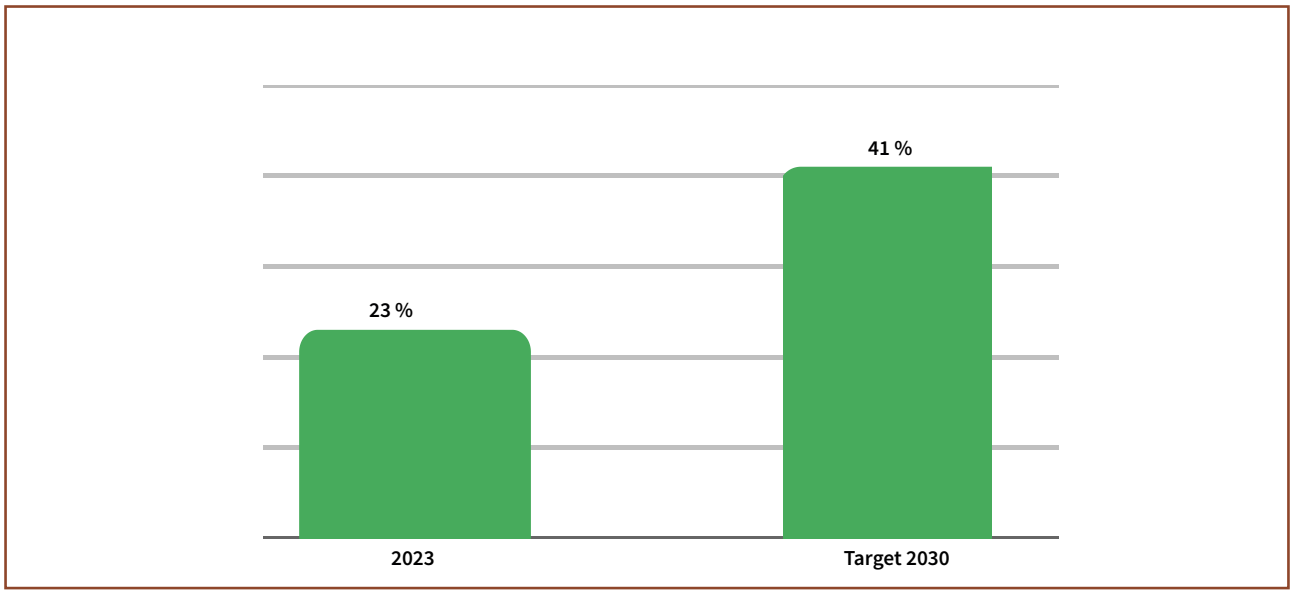
Figure 3: Clean Cooking Energy and technology in ECOWAS Region until 2022



Sources: Energy data from household characteristics in National Survey released by National Institute of Statistics[4]

[6]The DHS Program - Data

Figure 4: Percentage of ECOWAS Households Using Modern Cooking Fuels

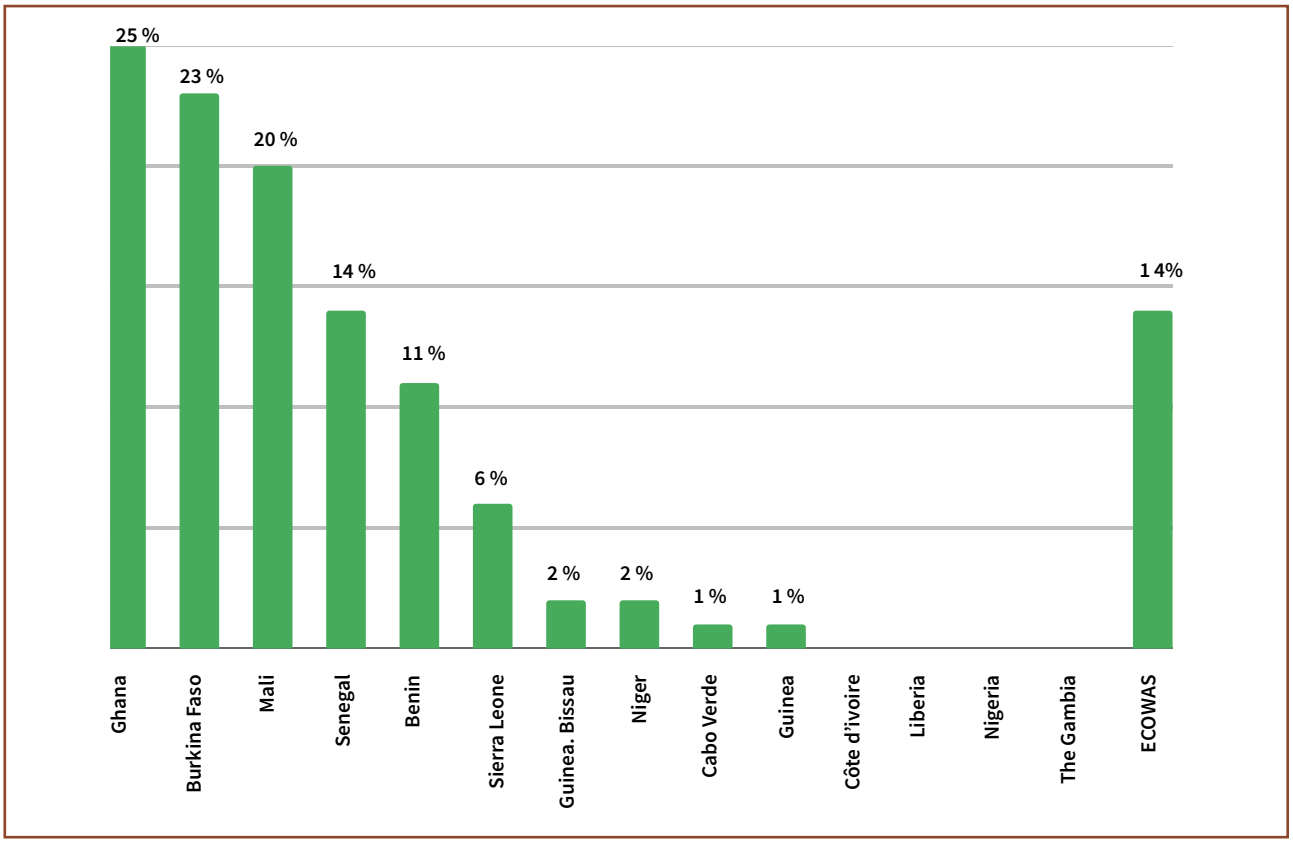


Source: ECOWAS countries' NREAP & NEEAP and national monitoring reports 2022 (based on the 2022 reports from utilities and electricity regulators)

3.1.3.2. Access to improved cookstovess

On average, 14% of households use improved cookstoves, corresponding to an estimated population of **56 million people**. Ghana leads with a share of 25%, followed by Burkina Faso (23%) (Figure 8).

Figure 5: Percentage of households in ECOWAS using improved cookstoves



Source : ECOWAS countries NREAP & NEEAP and national monitoring reports 2023 (based on 2023 reports from utilities and electricity regulators)

3.1.3.3. Access to Solar Cookers and Biagas

In 2023, the number of people with access to solar cookers in the ECOWAS region is estimated at 195,000, with Senegal alone accounting for 83.5% of this total.

Additionally, an estimated 112,000 people use biogas for cooking, including 57,000 in Senegal (51%) and 47,000 in Burkina Faso (42%).

Table 4: Number of people served by solar cooker and using Biogas by country in 2023

Country	Number of people served by solar cookers	Number of people using biogas For cooking and Electricity
Benin	0	1,000
Burkina Faso	5,000	47,000
Cabo Verde	0	0
Cote d Ivoire	0	0
Gambia	0	0
Ghana	0	0
Guinea	9,000	0
Guinea Bissau	0	0
Liberia	0	0
Mali	12,000	4,000
Niger	0	0
Nigeria	6,000	3,000
Senegal	163,000	57,000
Sierra Leone	0	0
Togo	0	0
ECOWAS	**195,000**	**112,000**

Source : IRENA 2023

3.1.4. Summary of Energy Access Progress (2023 Status)

Following the analysis of the energy access data collected and based on the results, below is a summary of the ECOWAS progress against the policy objectives:

i. On Grid Electricity Access :

100 %

Target : phase-out by 2030.

~57.4%

Achievement: of household with Access to Electricity Grid.

ii. Access to Off Grid:

104.3 millions

Target: inhabitants by 2030.

25 millions

Regional achievement: inhabitants in 2023

iii. Access to Clean Cooking :

41 %

Target: by 2030.

23.1 %

Regional achievement: in 2023.

3.2. Renewable Energy

3.2.1. Grid Connected capacity installed

The ECOWAS Renewable Energy Policy (EREP), adopted in 2013, advocates for universal access to sustainable energy services in the region by 2030.
The specific goals of the EREP for grid-connected renewable energy installations are as follows:

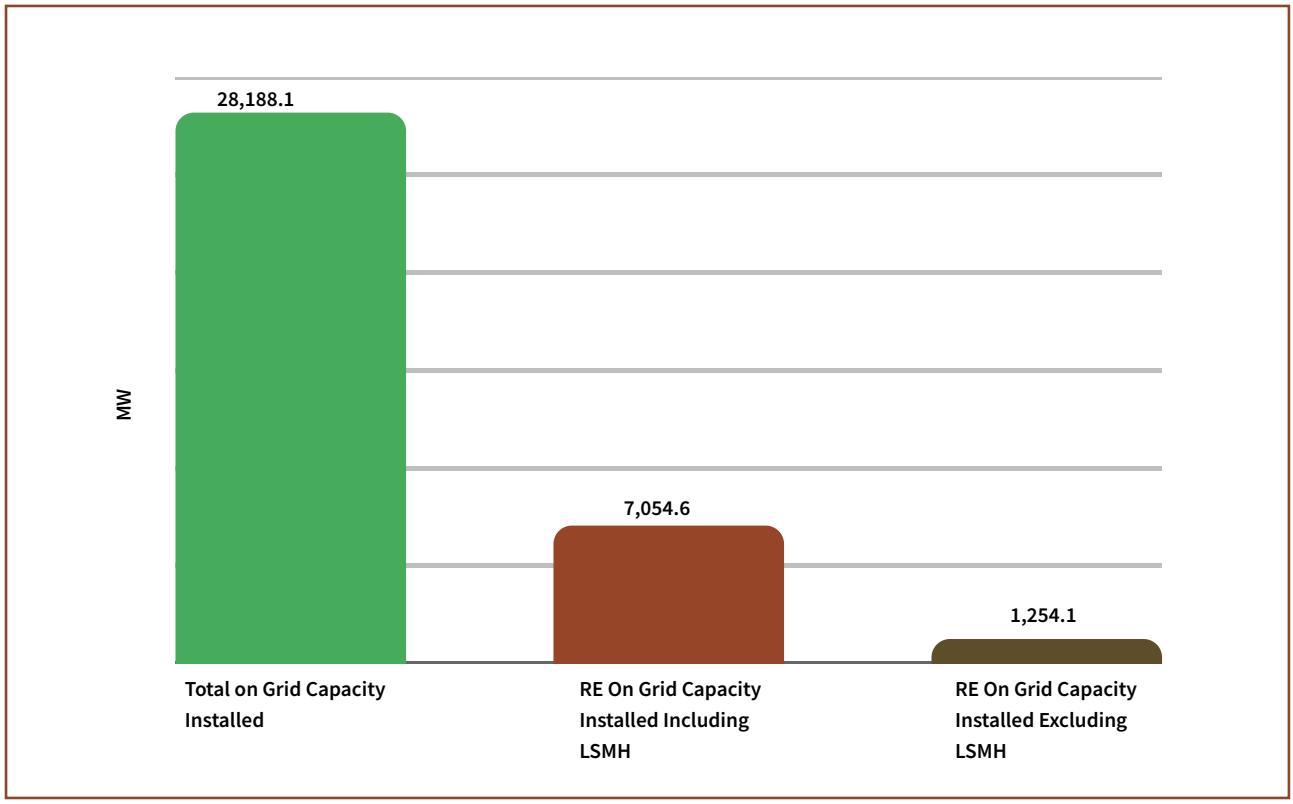
Increase the share of renewable energy in the overall electricity mix, including Large and Medium Hydropower Plants, to 35% by 2020 and 48% by 2030;

Increase the share of renewable energy in the overall energy mix, excluding Large and Medium Hydropower Plants, to 10% by 2020 and 19% by 2030.

These objectives translate into installed capacities of renewable energy based on solar energy, wind energy, bioenergy, and small hydropower of 2,424 MW by 2020 and 7,606 MW by 2030.

In 2023, the total grid-connected installed capacity in the ECOWAS region stands at 28,188.1 MW. The installed capacity of renewable energy, excluding Large and Medium hydropower, reaches 1,254.1 MW, significantly the 2020 target and still quite far from the projected target of 7,606 MW for 2030.

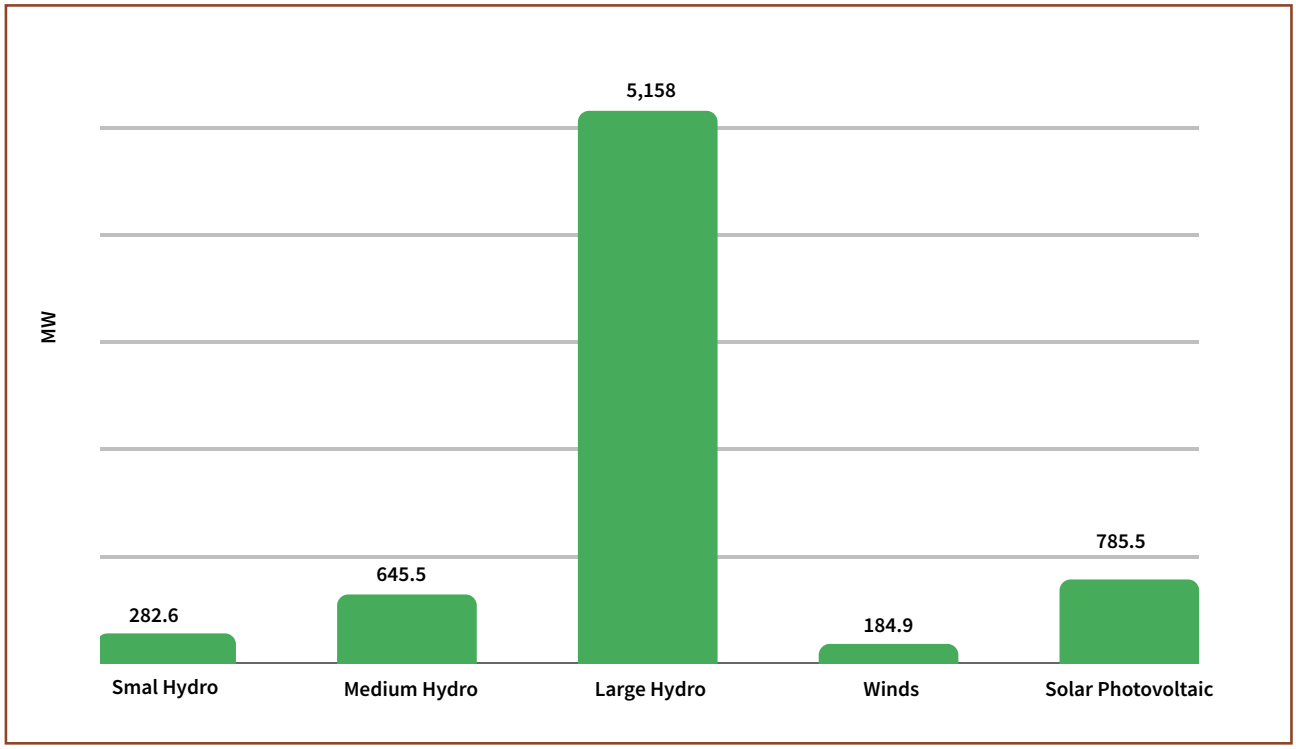
Figure 6: Total on-grid installed capacity in 2023



Source: ECOWAS Countries national monitoring reports 2023 (based on the 2023 utility and electricity regulator reports), EREP. LMH = Large and Medium Hydropower

In 2023, hydropower alone accounts for 86.2% of the total installed renewable energy capacity, amounting to 6,086.1 MW. Solar photovoltaic contributes 11.1% with a capacity of 785 MW, while wind energy represents 2.6% with 185.9 MW installed.

Figure 7: On-grid renewable energy installed capacity by technology in 2023

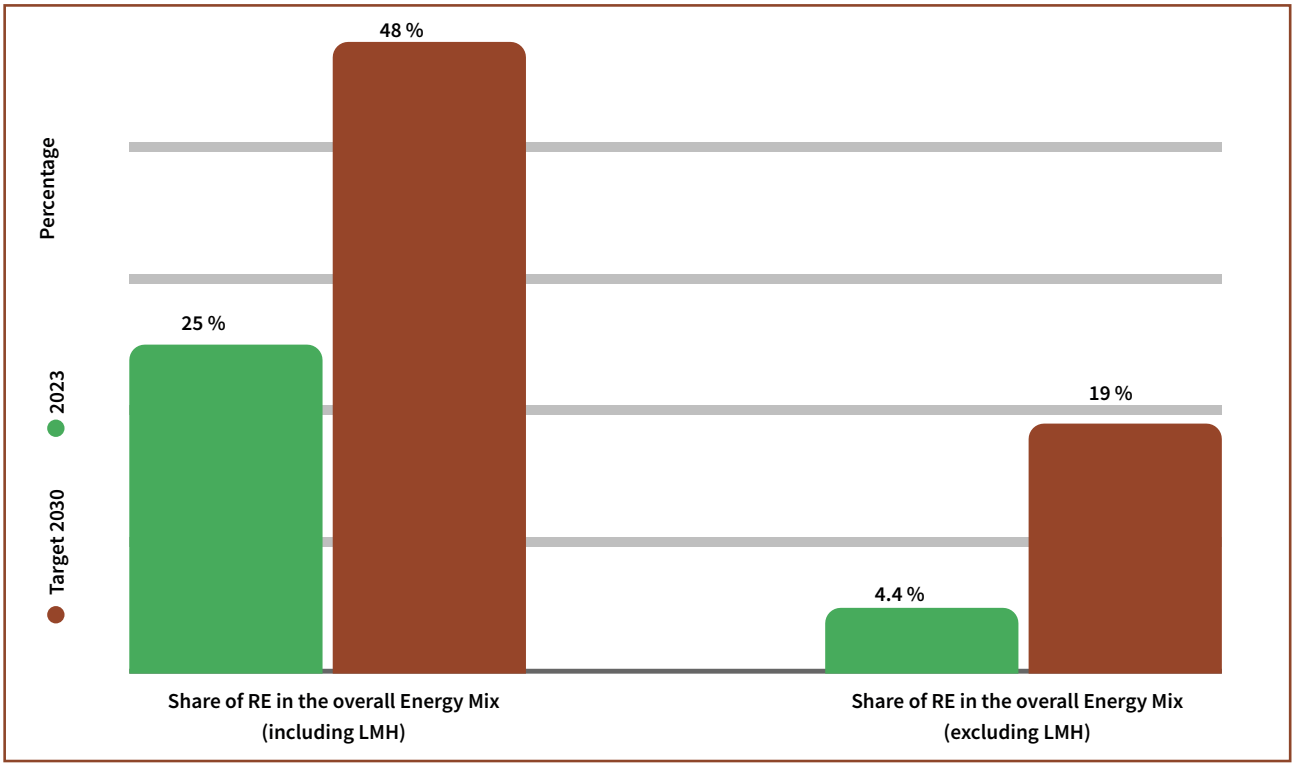


Source: ECOWAS Countries national monitoring reports 2023 (based on the 2023 utility and electricity regulator reports), EREP. LMH = Large and Medium Hydropower

In 2023, the share of installed renewable energy capacity in the overall electricity mix of the region amounted to 25.2%, with the target set in the EREP being 48% by 2030 (figure 10). Specifically, the share of renewable energy sources, including small hydropower, solar photovoltaic energy, wind energy, and bioenergy, in the overall electricity mix is 4.4% in 2023, whereas the target set in the EREP for 2030 was 19%.

> **ECOWAS Member States will need to intensify their efforts to develop renewable energy solutions from photovoltaic energy, wind energy, and bioenergy in order to reach the target of 19% by 2030.**

Figure 8: Share of on grid RE installed capacity in the overall Electricity Mix in 2023



Source: ECOWAS Countries national monitoring reports 2023 (based on the 2023 utility and electricity regulator reports), EREP. LMH = Large and Medium Hydropower

At the level of Member States, Nigeria, Ghana, Cote d'Ivoire and Guinea have the largest installed renewable energy capacities, with 2,123.8 MW, 1,716.8 MW, 909 MW and 818 MW respectively. Collectively, these three countries account for more than two-thirds (80%) of the total installed renewable energy capacity in the region.

Table 5 : On-grid installed Capacity by Country in 2023

Country	Total On Grid Capacity Installed	Renewable Energy Capacity Installed				
		Smal Hydro	Medium Hydro	Large Hydro	Winds	Solar Photovoltaic
Benin	182	0	0	0	0	25
Burkina Faso*	539.8	31.2	0	0	0	158.5
Cabo Verde*	208.1	0	0	0	26,9	16,2
Cote d'Ivoire	3007	25	30	824	0	30
Gambia*	145.7	0	0	0	0	0
Ghana	5,257.9	0.0	0	1,584	0	132.8
Guinea	1067.2	53	75	690	0	0
Guinea Bissau	24	0	0	0	0	0
Liberia*	133	0	88	0	0	0
Mali*	1,212.7	60	291	0	0	50
Niger*	485.6	0	0	0	0	37
Nigeria*	13,652.8	105,8	79	1,939	0	0
Senegal	1,759.3	0	0	121	159	245
Sierra Leone*	183.2	6	50	0	0	21
Togo	329.78	1.6	32.5	0	0	70

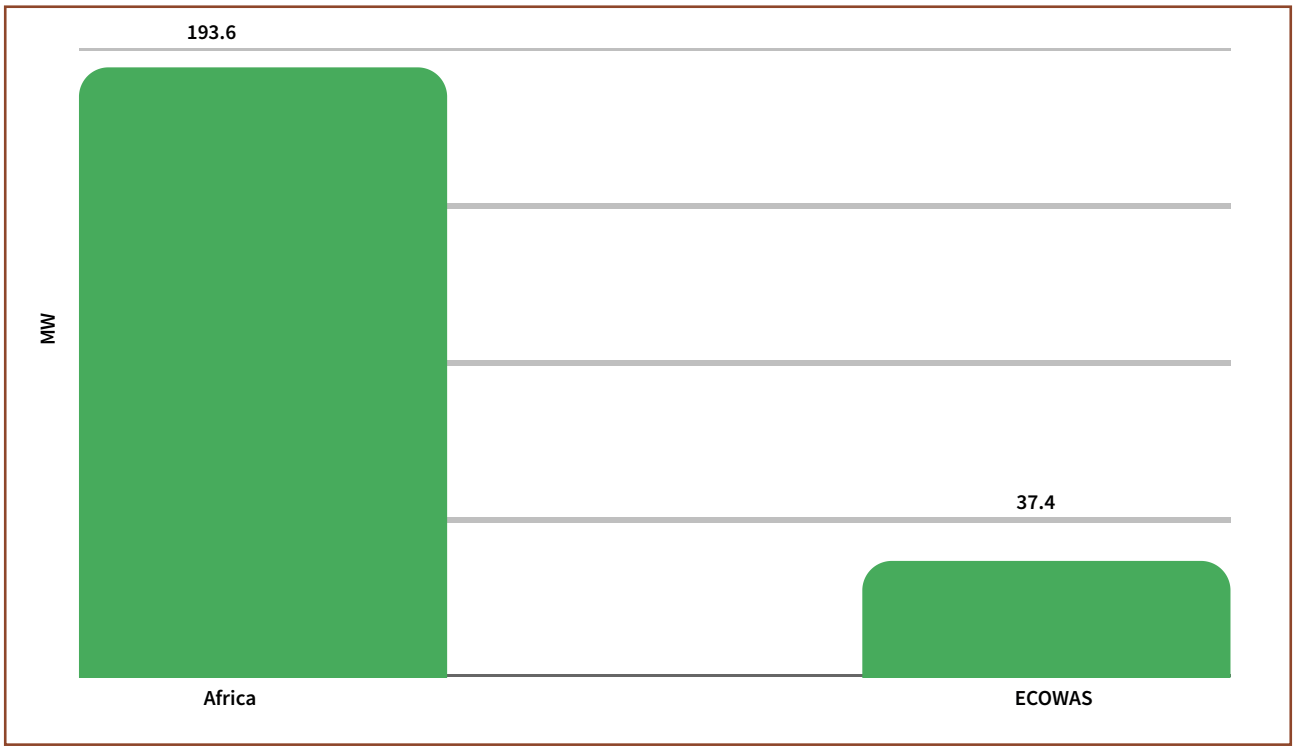
Source: ECOWAS Countries national monitoring reports 2023 (based on the 2023 utility and electricity regulator reports), EREP. LMH = Large and Medium Hydropower

3.2.2. Off Grid Capacity Installed

3.2.2.1. Solar Mini Grid Capacity Installed

The total installed capacity of Solar Mini Grids in the ECOWAS region stands at 37.4 MW, representing approximately 20% of Africa's total capacity of 193.6 MW. However, this figure remains significantly below the regional target of 3,115 MW by 2030. Consequently, substantial efforts will be required in the coming years to accelerate the deployment of Solar Mini Grids, particularly for rural electrification.

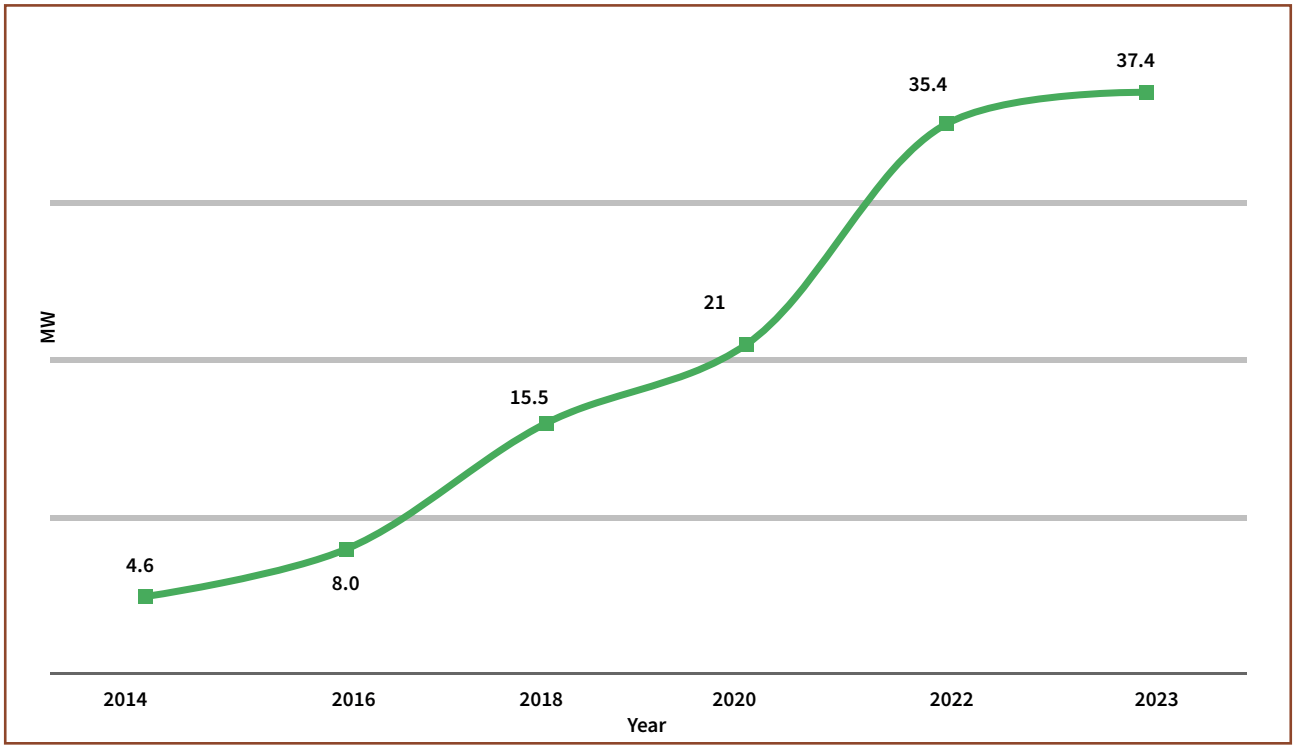
Figure 9: Solar mini grid capacity installed in 2023



Source : IRENA 2023

Over the past ten years, the total installed capacity of Solar Mini Grids has increased from 4.6 MW in 2014 to 37.4 MW in 2023, reflecting an average annual growth rate of 26.22 %

Figure10 : Évolution de la capacité des mini-réseaux solaires installés dans la région de 2014 à 2023



Source : IRENA 2023

"Mali, Nigeria, Sierra Leone, and Niger are the regional leaders in terms of installed Solar Mini Grid capacity, with respective capacities of 7.5 MW, 7.3 MW, 4.2 MW, and 3.4 MW.

Table 6: Evolution of Solar Mini-Grid Capacity installed from 2014 to 2023 by country

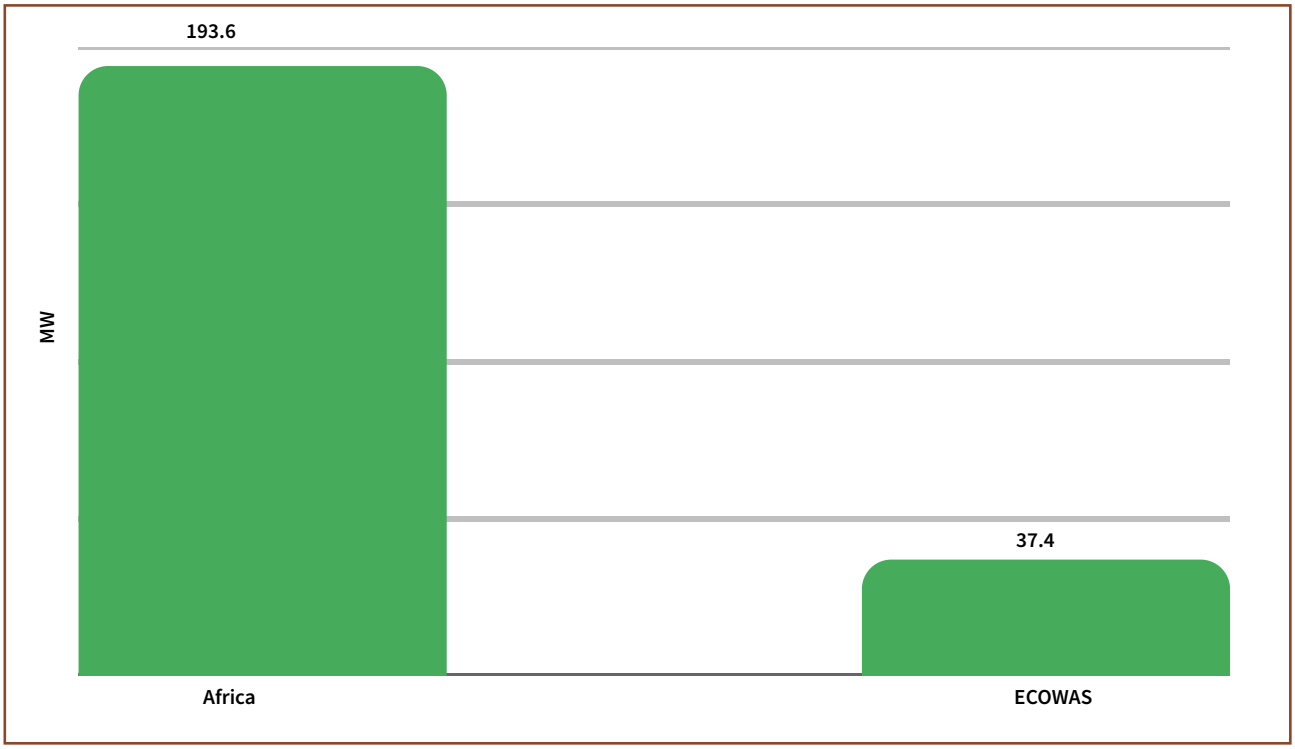
Country	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Benin	0.0	0.1	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6
Burkina Faso	0.2	0.2	0.2	0.3	0.3	0.9	0.9	0.9	0.9	0.9
Cabo Verde	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Cote d Ivoire	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Gambia	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Ghana	0.0	0.3	0.3	0.6	0.8	0.8	0.8	0.8	0.8	0.8
Guinea	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Guinea Bissau	0.0	0.0	0.3	0.3	0.9	0.9	0.9	0.9	0.9	0.9
Liberia	0.0	0.0	0.0	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Mali	3.9	4.8	4.9	6.2	6.6	6.9	7.1	7.4	7.5	7.5
Niger	0.0	0.0	0.0	0.1	0.1	0.1	0.5	0.5	0.5	3.4
Nigeria	0.4	1.2	1.5	3.3	3.6	4.5	5.9	7.2	7.3	7.3
Senegal	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.0	1.1	1.1
Sierra Leone	0.0	0.0	0.0	0.2	0.2	1.4	2.7	4.2	4.2	4.2
Togo	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.7	0.7	0.7

Source : IRENA 2023

3.2.2.2. Solar Home System Capacity Installed

The total installed capacity of Solar Home Systems in the ECOWAS region stands at 133.7 MW, representing 40% of the total installed capacity in Africa.

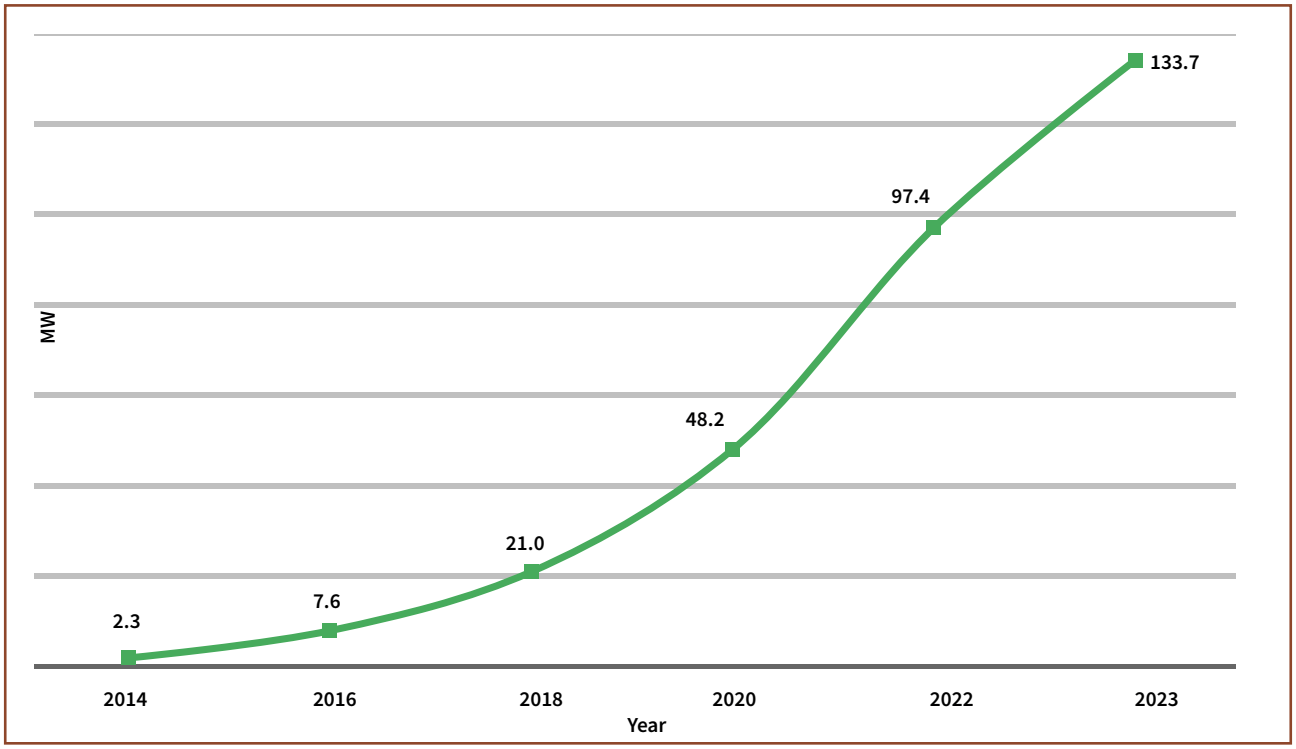
Figure 11: Solar Home System capacity installed in 2023 in the region



Source : IRENA 2023

Over the past ten years, this capacity has increased from 2.3 MW in 2014 to 133.4 MW in 2023, reflecting an average annual growth rate of 57.01%. This rapid growth is particularly evident since 2020, where the installed capacity nearly tripled, rising from 48.2 MW in 2020 to 133.7 MW in 2023.

Figure 12: Evolution of Solar Home System capacity installed between 2014 and 2023 in the region



Source : IRENA 2023

"Nigeria is by far the leader with an installed capacity of 83 MW, representing 62% of the total, followed by Côte d'Ivoire (9.8 MW), Benin (8.2 MW), and Togo (6.4 MW).

Table 7: Evolution of Solar Home System capacity installed between 2014 and 2023 by country

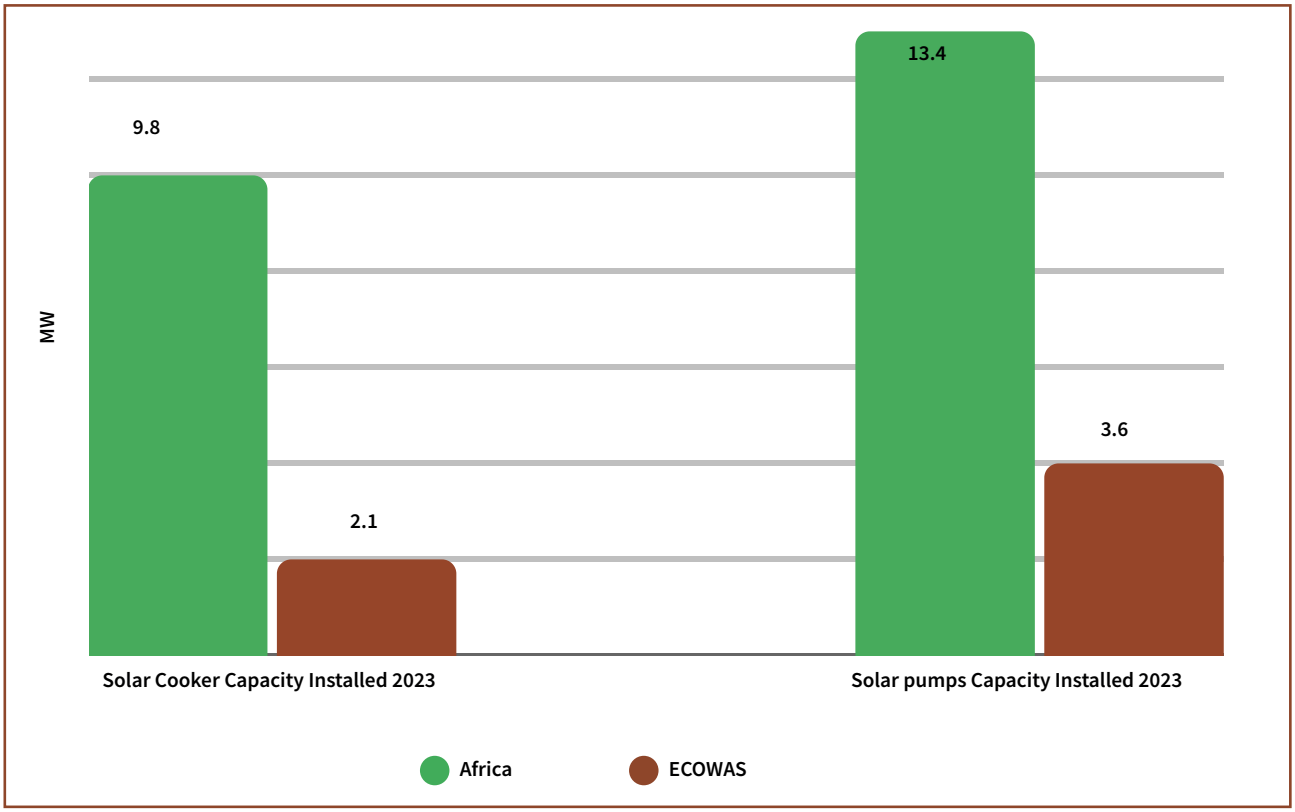
Country	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Benin	0.0	0.1	0.2	0.4	0.6	1.7	2.7	3.9	6.3	8.2
Burkina Faso	0.4	0.6	0.8	1.0	1.1	1.6	2.1	2.9	3.5	3.6
Cabo Verde	0.0	0.0	0.2	0.3	0.4	0.3	0.3	0.2	0.0	0.0
Cote d Ivoire	0.0	0.1	0.2	0.8	1.8	3.9	6.1	7.5	8.7	9.8
Gambia	0.0	0.0	0.2	0.4	0.4	0.4	0.4	0.4	0.2	0.1
Ghana	0.1	0.2	0.5	0.9	1.2	2.0	2.6	2.8	3.2	3.0
Guinea	0.0	0.0	0.2	0.4	0.6	1.2	1.8	2.2	3.3	4.0
Guinea Bissau	0.1	0.2	0.4	0.6	0.6	0.6	0.6	0.8	0.6	0.8
Liberia	0.0	0.0	0.2	0.4	0.5	1.0	1.8	2.1	2.8	3.0
Mali	0.1	0.3	0.6	1.1	1.2	1.9	2.0	2.7	3.1	3.2
Niger	0.0	0.0	0.2	0.4	0.4	0.5	0.7	0.6	1.0	1.1
Nigeria	1.4	2.3	3.2	6.2	9.6	13.1	18.4	26.6	51.8	83.0
Senegal	0.1	0.3	0.6	1.1	1.4	2.5	3.0	4.0	4.4	4.3
Sierra Leone	0.0	0.1	0.3	0.6	0.6	1.3	2.1	2.7	3.0	3.2
Togo	0.0	0.0	0.0	0.5	0.8	1.7	3.4	5.2	5.7	6.4

Source : IRENA 2023

3.2.2.3. Solar Cooker and Solar pumps capacity installed

The total installed capacity of solar cookers in the region is 2.1 MW, representing 21% of the total installed capacity in Africa, which is 9.8 MW. As for solar pumps, the total installed capacity in the region is estimated at 3.6 MW, representing 27% of the total installed capacity in Africa, which stands at 13.4 MW.

Figure 13: Solar cooker and Solar pumps capacity installed in 2023 in the region

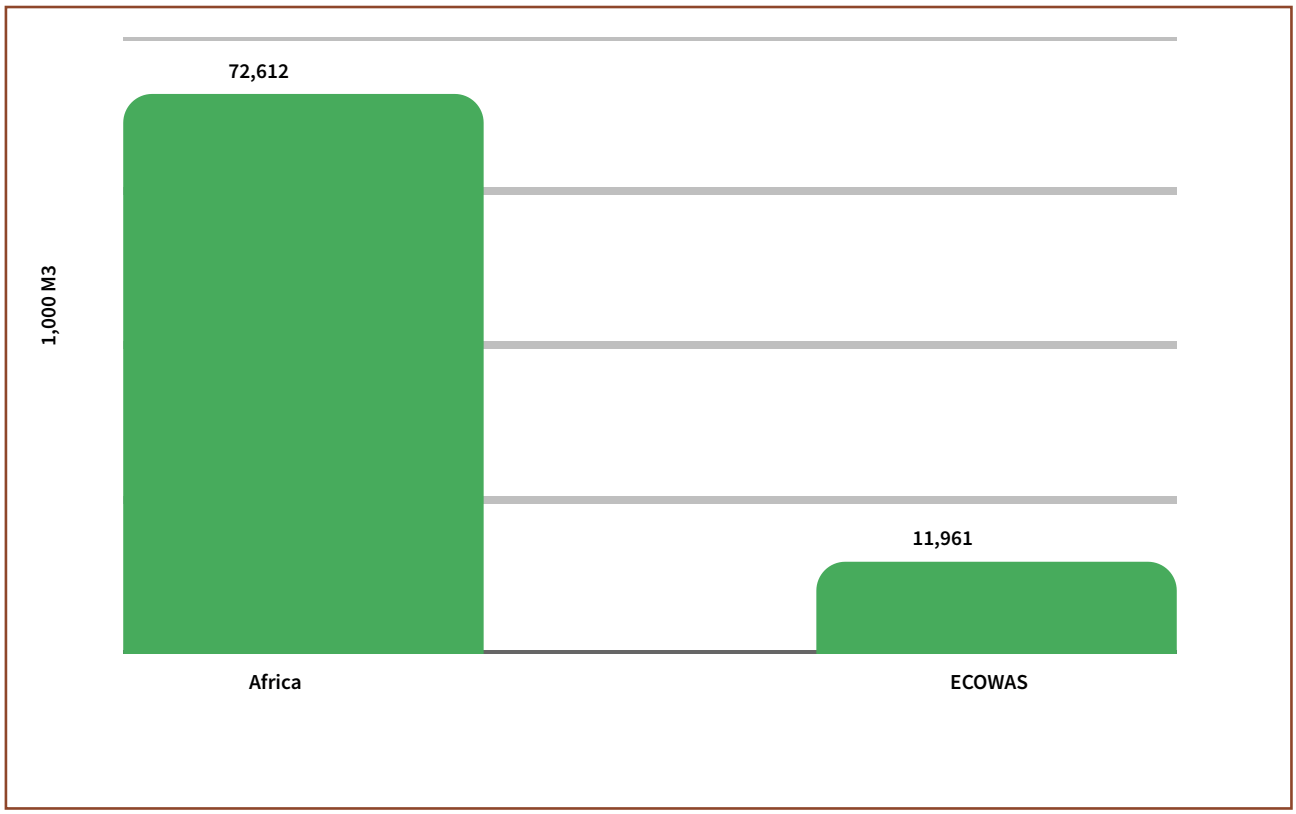


Source : IRENA 2023

3.2.2.4. Biogas Production

The total biogas production in the ECOWAS region is 11,961.000 m^3, representing 16.47% of the total in Africa, which is estimated at 72,612.000 m^3.

Figure 14: Biogas production in the region in 2023



Source : IRENA 2023

"Ghana, Burkina Faso, and Senegal are the regional leaders, representing 38%, 34%, and 22% of the regional total, respectively. The biogas produced in the region is used for various purposes. In fact, 58.6% has been used for cooking, 37.5% in industry, 2.2% for commercial and public services, and 1.7% for off-grid electricity.

Table 8: Biogas production in 2023 by type of usage by country

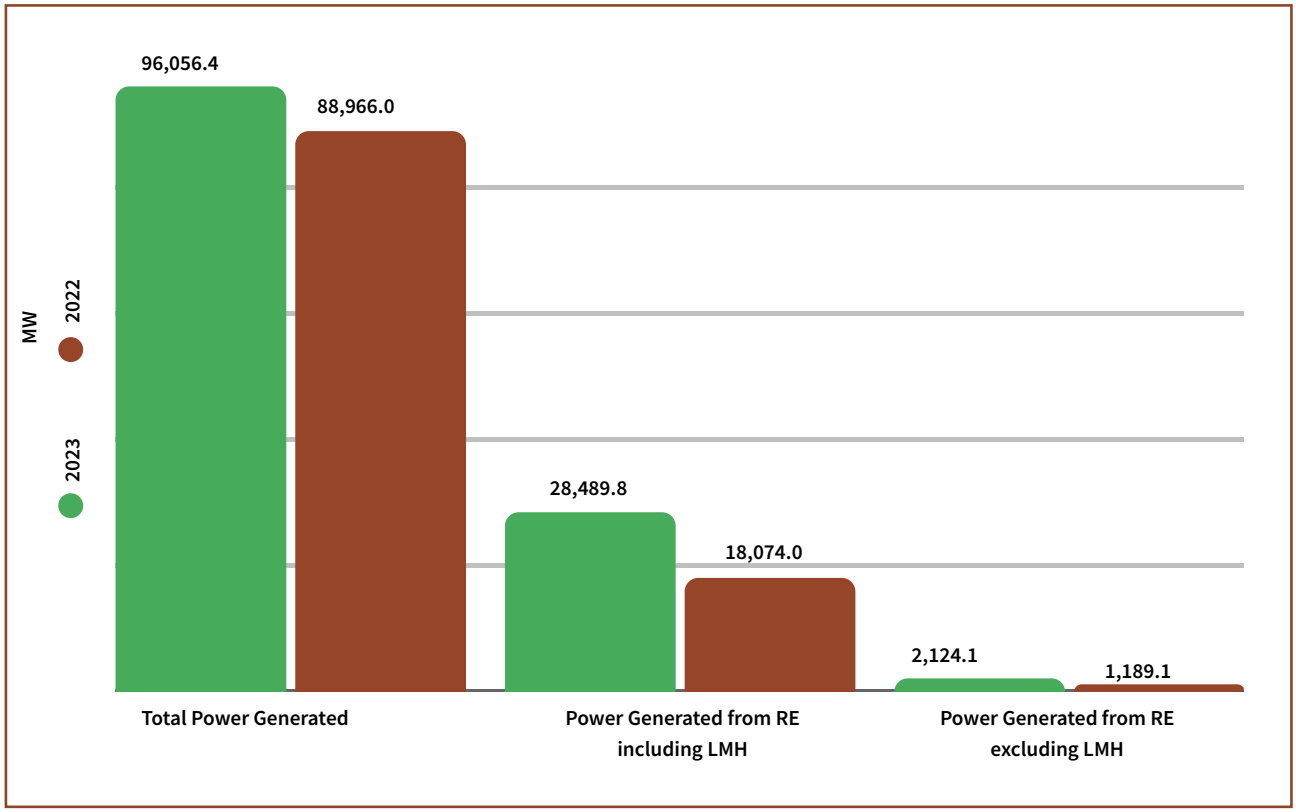
Country	Total	cooking	off-grid electricity	industry	commercial and public services
Benin					
Burkina Faso	4,072	4,072			
Cabo Verde					
Cote d Ivoire					
Gambia					
Ghana	4,534	22	72	4,228	211
Guinea	498	449			49
Guinea Bissau					
Liberia					
Mali					
Niger	227	197	22	0	6
Nigeria					
Senegal	2,630	2,265	110	256	
Sierra Leone					2
Togo					
ECOWAS	**11,961**	**7,005**	**204**	**4,484**	**268**

Source : IRENA 2023

3.2.3. Production Electricity Production from Renewable Energy

At the regional level, total electricity production reached 96,057 GWh in 2023, compared to 88,966 GWh in 2022, reflecting an increase of 7.4%. Total electricity generation from renewable energy sources amounted to 28,489 GWh, representing 30% of the total electricity produced in 2023. The contribution of small hydropower, photovoltaic energy, wind energy, and bioenergy to renewable electricity generation was 2,124 GWh (2.2%).

Figure 15: On grid Electricity Generation



Source: ECOWAS Countries national monitoring reports 2023 (based on the 2023 utility and electricity regulator reports), EREP

At the Member State level, Ghana, Nigeria, Guinea, and Côte d'Ivoire recorded the highest renewable energy-based electricity production in 2023, with 9,335 GWh, 9,119 GWh, 3,329 GWh, and 3,234 GWh, respectively. Collectively, these four countries accounted for 88% of the region's total electricity production from renewable sources.

Table 9: On grid Electricity Generation by Country in 2023

Country	Total Power Generated	Power Generated From RE excluding LMH	Power Generated From RE including LMH
Benin	609.9	33.6	33.6
Burkina Faso*	1,491.3	175.9	175.9
Cabo Verde*	538.2	98.5	98.5
Cote d'Ivoire	13,343.2	108.0	3,224.1
Gambia*	427.1	0.0	0.0
Ghana	24,264.4	148.3	9,334.8
Guinea	3,627.8	8.8	3,329.1
Guinea Bis-sau*	225.5	0.0	0.0
Liberia*	283.7	0.0	128.3
Mali*	4,885.6	220.3	1,289.0
Niger*	346.1	23.8	23.8
Nigeria	36,672.0	454.3	9,118.5
Senegal	8,393.9	745.7	1,379.1
Sierra Leone*	282.5	22.8	228.2
Togo	665.2	84.1	127.0

Source : Rapports nationaux de suivi 2023 des pays de la CEDEAO (sur la base des rapports 2023 des services publics et des régulateurs de l'électricité), EREP.

3.2.4. Solar Water Heaters

Solar water heaters, used to meet domestic, commercial, and industrial needs, represent a critical tool for reducing electricity demand in West Africa. However, statistics on solar water heaters are lacking in many countries, making it difficult to conduct a comprehensive analysis of their penetration in the region. Countries such as Benin, Burkina Faso, Guinea-Bissau, Mali, and Senegal

have provided data on solar water heaters installed in public institutions. The International Energy Agency (IEA), through its ‘‘Programme de chauffage et de refroidissement solaires’’ ((SHC), has published information on solar water heaters used in households in Burkina Faso, Ghana, Nigeria, and Senegal.

Nigeria and Senegal lead the region in terms of solar water heaters installed in households, with 4,836 and 2,447 units, respectively. They are followed by Cabo Verde (984), Ghana (342), and Burkina Faso (296). Regarding solar water heaters in public institutions, Senegal has 200, followed by Burkina Faso with 181 units, Guinea-Bissau with 25 units, Benin with 20 units, and Mali with 17 units. Additionally, 45 solar water heaters are installed in SMEs, hotels, and industries in Liberia.

Table 10: Number of Existing Solar Water Heaters By Country in 2023

Country	Number of SWH in HH[5]	Number of SWH in Public Institution	Number of SWH in Private Sector
Benin	s/o	20	1
Burkina Faso	296	181	s/o
Cabo Verde	984	s/o	s/o
Cote d'Ivoire	s/o	s/o	s/o
The Gambia	s/o	s/o	1
Ghana	342	s/o	s/o
Guinea	s/o	s/o	s/o
Guinea Bissau	s/o	25	s/o
Liberia	s/o	s/o	45
Mali	s/o	17	s/o
Niger	s/o	s/o	s/o
Nigeria	4,836	s/o	s/o
Senegal	2,447	200	s/o
Sierra Leone	s/o	s/o	s/o

Source: Rapports nationaux de suivi 2023 des pays de la CEDEAO (basés sur les rapports 2023 des services publics et des régulateurs de l’électricité), EREP, Solar Heat World Wide, edition 2023, page 66 à 71, , Solar-Heat-Worldwide-20231.pdf (iea-shc.org)

5Solar Heat World Wide, édition 2023A page 66 à 71, Solar-Heat-Worldwide-20231.pdf (iea-shc.org)

3.2.5. Summary of Renewable Energy access Progress (2023 Status)

iv. iRenewable energy penetration (excl. medium and large hydropower) :

Target : by 2030 .

7,606 MW

Achievement: in 2023, .

~ 1,254.1 MW

vi. Renewable energy in the electricity mix (excluding medium- and large-scale hydropower):

Target : by 2030 .

19 %

Regional achievement in 2023.

4.4 %

viii. Mini solar grid Installed capacity

Target : by 2030 .

3,115 MW

Regional achievement in 2023.

37.4 MW

v. Electricity generation from renewable energy sources (excluding medium and large-scale hydropower):

Target : by 2030 .

29,229 GWh

Regional achievement in 2023.

2,124.1 GWh

vii. Renewable energy in the electricity mix (including medium and large-scale hydropower)

Target : by 2030 .

48 %

Regional achievement in 2023.

25 %

ix. Solar water heaters

Target: in residential by 2030.

50 %

Regional Achievement: in 2023.

-1 %

3.3. Energy Efficiency in the Region

Energy efficiency is a cornerstone of both regional and national energy policies. Efficiency measures aim to free up 2,000 MW[6] of electricity production capacity, thereby reducing the need for additional investments in production infrastructure and mitigating the environmental impact of current energy practices. Each country has set specific energy efficiency targets in its National Energy Efficiency Action Plan for (NEEAP), aligned with regional ambitions, to promote a sustainable environment and empower member states. The following section provides information on the state of indicators, measures, and actions related to energy efficiency in the region. It addresses the following issues: electricity distribution losses, high-efficiency lighting, efficient refrigerators, effective air conditioning systems, energy-efficient buildings, and energy efficiency in the industrial sector.

3.3.1. Hight Performance Electricity Distribution in the Region

In 2022, the weighted average of technical losses was estimated at 9.1% in the ECOWAS region. This average can be considered representative of the regional context regarding electrical technical losses. The estimation accounts for the varying maturity levels of utilities in the process of detecting and reducing technical losses.

The companies LEC in Liberia and EAGB in Guinea-Bissau have the highest technical loss rates, at 15% and 13.5%, respectively. In contrast, IKEJA in Nigeria and CIE in Côte d'Ivoire report the lowest technical loss rates in the region, at 3.6% and 4.4%, respectively.

Across the ECOWAS region's electricity sector, the weighted average of combined technical and non-technical losses reaches 21.3%, calculated from a representative sample of 21 distribution utilities covering 88% of total customer connections among the region's 25 utilities..

The companies with the highest rates of non-technical electricity losses are found in Nigeria and Guinea-Bissau. In Nigeria, except for EKEDC and IKEJA, the seven other companies have non-technical loss rates above 30%, with companies such as KAEDCO, YEDC, and JOS having the highest rates, at 65.8%, 61.9%, and 56.0%, respectively.

[8] *ECOWAS Energy Efficiency Policy, ECREEE, Page 5*

Table 11: 2022 Electricity Non-technical Losses and Total Losses

Company	Country	Total Losses 2022	Technical Losses 2022	Non Technical Losses 2022
SONABEL	Burkina Faso	11.1%	10.9%	0.2%
CIE	Côte d'Ivoire	8.7%	4.4%	4.3%
SENELEC	Senegal	17.4%	11.6%	5.8%
CEET	Togo	16.1%	9.0%	7.1%
EDM-SA	Mali	17.7%	9.1%	8.5%
NAWEC	Gambia	22.7%	10.9%	11.8%
SBEE	Benin	22.2%	9.6%	12.6%
EKEDC	Nigeria	24.5%	11.2%	13.3%
IKEJA	Nigeria	19.6%	3.6%	16.0%
ELEKTRA	Cabo Verde	20,3	9.1	21.8
NEDCO	Ghana	28.4%	10.9%	17.5%
ECG	Ghana	28.4%	9.8%	18.6%
EDSA	Sierra Leone	39.0%	13.5%	25.5%
EDG	Guinea	41.0%	9.1%	31.9%
PHED	Nigeria	43.3%	9.1%	34.2%
IBADAN	Nigeria	48.8%	12.0%	36.8%
LEC	Liberia	56.3%	15.0%	41.3%
ENUGU	Nigeria	51.4%	10.0%	41.4%
KANO	Nigeria	53.7%	11.8%	41.9%
EAGB	Guinea Bissau	59.0%	13.5%	45.5%
JOS	Nigeria	65.1%	9.1%	56.0%
YEDC	Nigeria	71.0%	9.1%	61.9%
KAEDCO	Nigeria	74.9%	9.1%	65.8%
Weighted average ECOWAS 2022			**21.3%**	

Source: Technical assistance in the improvement of the operational performance of utilities, GIZ ProCEM2-2024

3.3.2. Energy-Efficient Lighting

One of the strategic goals of the ECOWAS Energy Efficiency Policy (EEEP) is to phase out incandescent lamps by 2030 in order to promote the adoption of more efficient lighting solutions, such as LEDs[7], in the region. This report aims to assess the penetration rate of efficient lighting, both in the private and public sectors, within the member countries. However, national energy information systems currently do not allow for a precise assessment of LED lamp penetration, making it challenging to evaluate this EEEP objective. Therefore, sales statistics of Solar Lanterns (SL) and Multi-Light Systems (MLS) regularly published by GOGLA[8] , Global Lighting[9] an initiative of the World Bank, Clean Lighting Coalition[10] and Efficiency For Access[11], will be used to analyze the dynamics of LED adoption in the relevant countries.

West Africa has recently witnessed remarkable growth in the sales of Solar Energy Kits for domestic use.
These kits consist of solar lanterns, MLS, and Solar Home Systems (SHS).

[7] *ECOWAS Energy Efficiency Policy, ECREEE, Page 40*
[8] *Reports & Publications | GOGLA*
[9] *http://www.lightingglobal.org/0*
[10] *https://efficiencyforaccess.org*
[11] *https://efficiencyforaccess.org*

Table 12: Types of Solar Lanterns and Multi-light Systems Sold in the West African Market in 2022[12]

Product Category	Definition	Power Range (Wc)	Indicative Price Range ($)	Multi-Tier Framework Level	Example
Solar Lanterns	Single light only	0 -1.49	$4 - 40	Enables Tier 0 (or partial Tier 1) Electricity Access for an individual person	
	Single light & mobile charging	1.5 - 2.99	$6 - 51		
Multi-light systems	Multiple light & mobile charging	3 - 10.99	$37 - 208	Enables Tier 1 Electricity Access for at least one person and up to a full household	

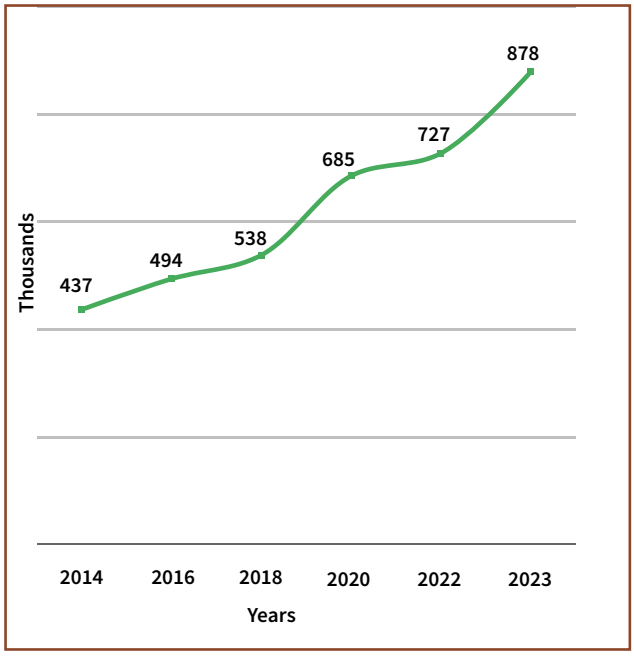
Source: Off-Grid Solar Market Trends Report 2022: Outlook, World Bank, Page 59, document de la Banque mondiale.

[10] World Bank Document

Between 2018 and 2023, sales of Solar Lanterns (LS) and Solar Home Systems (SEM) in the region saw a significant increase, with sales volumes multiplying by 2, rising from 437,000 units in 2018 to 878,000 in 2023. Nigeria stands out in this trend, accounting for 83% of total LS and SEM sales in West Africa in 2023, which is approximately 570,000 units. With the exception of Niger, Guinea-Bissau, Gambia, and Cabo Verde, for which we could not obtain statistics, the LS and SEM market is well established across other ECOWAS countries.

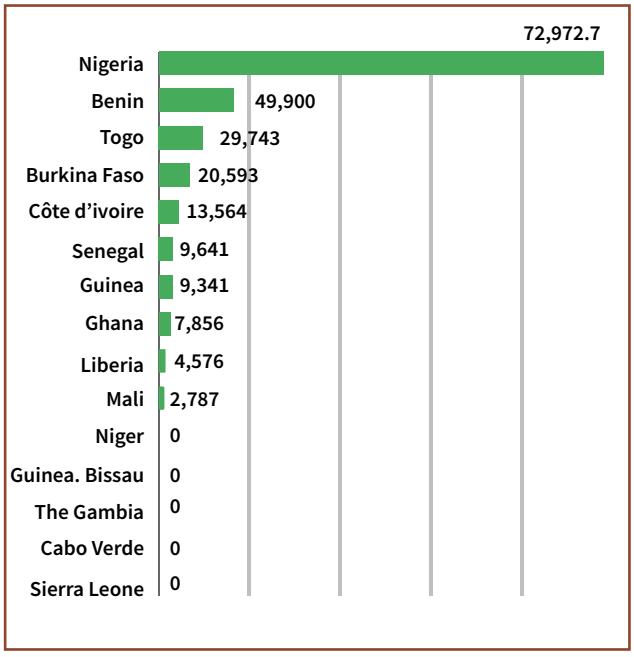
It should be noted that these figures only refer to LS and SEM sales by companies affiliated with GOGLA that provided their sales statistics. Additionally, given the presence of the informal sector in ECOWAS economies, it is likely that data on LS and SEM sales by companies operating informally are not included. These elements collectively indicate the growth in the use of efficient household lighting in the region (Figures 16 & 17).

Figure 16: Sales Volumes of Solar Lanterns and Solar Energy Systems in West Africa (2018 to 2022)



Source: Off-Grid Solar Market Trends Report 2023: State of the Sector, Global Lighting, World Bank, Page 41
, document de la Banque mondiale.

Figure 17: Sales Volumes of Solar Lanterns and Solar Energy Systems by Country in 2022



Source: Off-Grid Solar Market Trends Report 2023: State of the Sector, Global Lighting, World Bank, Page 41
, document de la Banque mondiale.

The market for solar lamps (SL) and solar home systems (SHS) is experiencing remarkable growth within the ECOWAS region. However, with the exception of Burkina Faso and Nigeria, which each host one and two SL and SHS assembly companies respectively, the other countries in the region rely entirely on imports to source these products. Implementing a policy to encourage the establishment of local companies dedicated to the manufacturing of SL and SHS could not only enhance industrial autonomy but also stimulate job creation within the member states.

Regarding installed efficient public lighting, Côte d'Ivoire stands out with a fleet of 61,700 units, followed by Ghana with 20,330 units, Cabo Verde with 10,067 units, Guinea with 6,659 units, and Burkina Faso with 2,400 units. In contrast, only Senegal and Togo have provided specific data on installed solar street lights. In 2023, Senegal had 57,076, while Togo had 30,004.

Table 13: Current Number of Efficient Public Lights and Solar Street Lights

Country	Number of Installed Efficient Public Lights	Number of Installed Solar Street Lights
Burkina Faso	2,400	
Cote d'Ivoire	61,700	
Cabo Verde	100,067	
Ghana	20,330	
Guinea	6,659	
Senegal		57,076
Togo		30,004

Source: 2023 National Monitoring Reports of ECOWAS Countries (based on 2023 reports from public utilities and electricity regulators)

3.3.3. Energy-Efficiency Appliances

The promotion of high-efficiency electrical appliances, such as refrigerators and air conditioners, has been addressed at the regional level. However, penetration rates for these appliances, particularly air conditioners and refrigerators, were not reported by most countries in 2023. This gap may be attributed to the lack of baseline data or insufficient data collection and reporting by national customs agencies, both for imports and exports. Furthermore, national household

[15] https://efficiencyforaccess.org/publications

surveys generally include few or no questions regarding the use of energy-efficient appliances. Similar to the approach taken for efficient lighting, we will examine the penetration of household appliances through sales statistics provided by companies affiliated with GOGLA and published by Global Lighting.

Indeed, the various high-efficiency household appliances available on the market in Africa in general, and West Africa in particular, are segmented as follows:

Table 14: Main Segments of Appliances for Domestic and Productive Use

Catategories	Indicative Price Range (in $)	Examples	Comments
Televisions	$34 - 325		The majority of televisions sold as part of solar lighting system kits operate on direct current (DC), although models that run on alternating current (AC) can also be used with DC-AC solar inverters.
Fans	$14 - 65		Fans improve household comfort, especially during hot seasons.
Refrigeration units (up to 300L capacity)	$72 - 1817		They are used not only by households but also by small businesses in rural and isolated communities.
Radios f	Variable		Other, smaller appliances include radios for households and multi-port phone chargers for small businesses
Solar Water Pumps (up to 2 kW)	$107 - 7630		Solar water pumps improve irrigation and extend the growing season for smallholder farmers in rural areas.

Source : Off-Grid Solar Market Trends Report 2023 : Outlook, World Bank, Page 59, document de la Banque mondiale.

Tableau14 : Principaux segments des appareils à usage domestique et productif

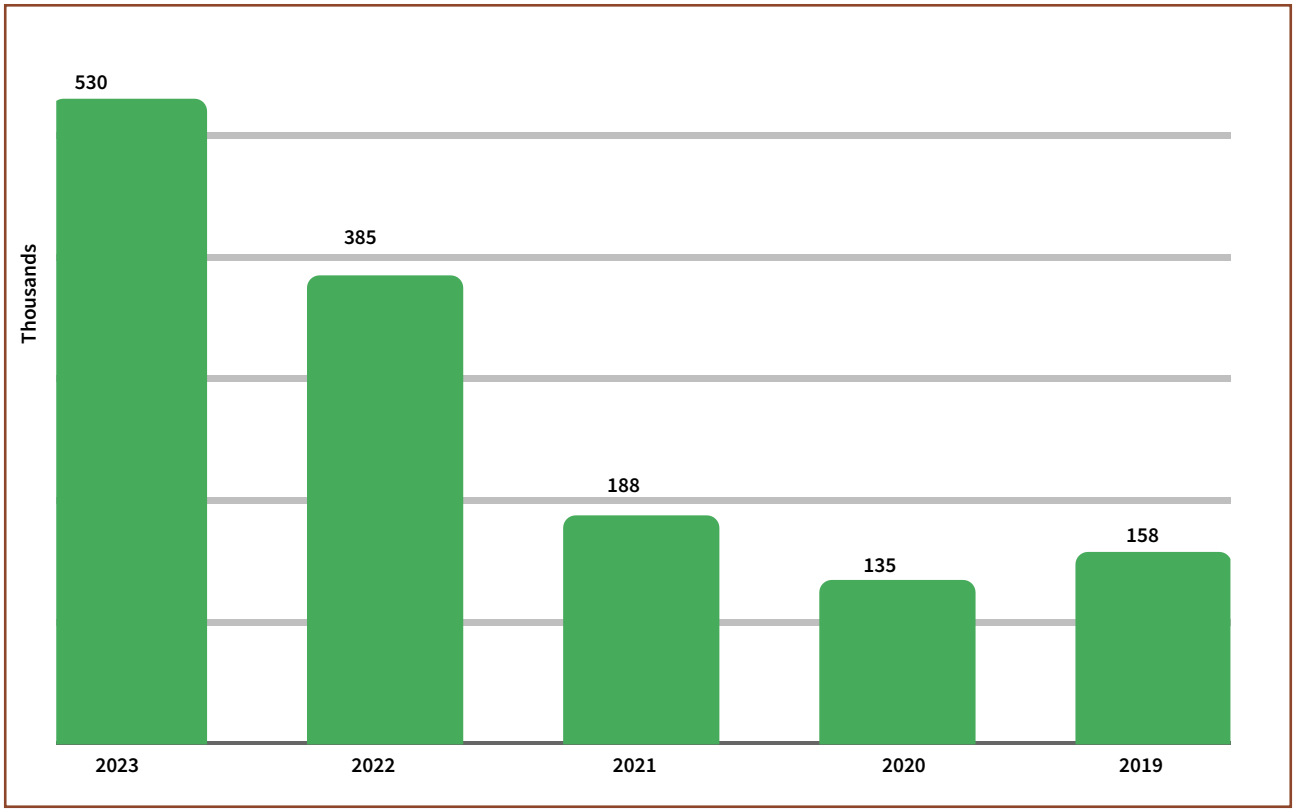
Catategories	Indicative Price Range (in $)	Examples	Comments
Refrigeration Storage Solutions (capacity greater than 300 L)	$3,456 - 150K+		Solar-powered refrigeration storage solutions enable large-scale preservation of agricultural products, meats, and dairy products, and are primarily intended for small businesses.
Agri-food Processing Equipment	$660 - 1,310		The most common application in agri-food processing is the solar-powered grain mill, due to the significance of the maize value chain in sub-Saharan African markets.

Source : Off-Grid Solar Market Trends Report 2022 : Outlook, Banque mondiale, page 59, document de la Banque mondiale.

Similar to the sales of efficient lighting products, the analysis of the evolution of sales of high-efficiency appliances in the region shows an increasing trend from 2019 to 2023. Sales of these appliances rose from 158,000 units in 2019 to 188,000 units in 2021.

". In 2022, sales more than doubled, reaching 385,000 units compared to 188,000 units in 2021. From 2022 to 2023, sales rose by 27% from 385,000 units to 530,000 units. Nigeria has emerged as the leading contributor, accounting for 72% of the total sales of high-efficiency appliances in the region.

Figure 18: Sales of High-Efficiency Appliances in ECOWAS Countries



Source: Off-Grid Solar Market Trends Report 2023: State of the Sector, Global Lighting, World Bank, Page 41 World Bank Document

"Ghana is the only country to have provided information on air conditioners, refrigerators, and other inefficient electrical appliances that have been removed and replaced in the country. In 2022, a total of 2,374 inefficient air conditioners were withdrawn from both the public and private sectors. As for refrigerators and other inefficient electrical appliances, 716 and 3,498 units, respectively, were removed and replaced during the same year.

Table 15: Air Conditioners, Refrigerators, and Other Inefficient Electrical Appliances Removed in 2022

	Ghana	
	2021	2022
Number of Inefficient Air Conditioners Removed from the Public Sector	747	1,813
Number of Inefficient Air Conditioners Removed from the Private Sector	660	561
Number of Inefficient Refrigerators Removed	677	716
Number of Other Inefficient Electrical Appliances Removed	3,098	3,498

Source: 2022 National Monitoring Reports of ECOWAS Countries (based on 2022 reports from public utilities and electricity regulators)

3.3.4. Energy Efficiency in Buildings

The adoption of regional standards and labels and their implementation, and the development of energy-efficient building codes are some of the major objectives of the ECOWAS Energy Efficiency Program (PEEC). The ECOWAS Ministers of Energy approved the Regional Directive on Building Energy Efficiency (EEB) during their eleventh meeting in Guinea in 2016. Some ECOWAS member states are already implementing activities aimed at promoting energy efficiency in buildings.

COTE D'IVOIRE

In Côte d'Ivoire, a decree was approved in 2016 that sets out the terms, conditions, and obligations for implementing energy controls in buildings. This introduced mandatory and periodic energy audits for facilities that consume large amounts of electricity, including public buildings and institutions.

NIGERIA

Nigeria adopted a Building Energy Efficiency Guideline and a Building Energy Efficiency Code in June 2016. These documents were developed by the Federal Ministry of Power, Works and Housing in collaboration with the Nigerian Energy Support Programme (NESP),. The objective is to provide practical advice to professionals on how to design, construct, and operate energy-efficient buildings. It also aims to raise public awareness of energy efficiency measures and provide information for identifying energy efficiency measures in buildings.

SENEGAL

In Senegal, a Franco-Senegalese ministerial agreement on low-carbon buildings was signed in December 2016 between the French Environment and Energy Management Agency (ADEME) and the Senegalese Ministry of Environment. As a result, the green building industry has developed, evidenced by the emergence of local actors and the creation of new jobs. To further promote sustainable practices, ADEME is participating in the Typha Combustible Construction West Africa (TyCCAO) project. Typha Australis, an invasive plant from West Africa with thermal insulation and combustion properties, will be used both as a building material and for biomass. The project aims to use Typha on a large scale to combat climate change by providing renewable fuel and developing energy-efficient buildings.

CABO VERDE

In Cabo Verde, the implementation of energy efficiency measures in the building sector is supported by the Building and Equipment Energy Efficiency Project. The country has already developed a framework for the energy management system to measure energy savings, water consumption, and emission reductions from buildings. The Energy Conservation Code for Buildings will set minimum energy efficiency requirements for the design and construction of buildings. It will also define the requirements necessary to achieve energy efficiency levels above the minimum standards and provide intervention guidelines for existing buildings to meet the minimum energy efficiency requirements. With the approval and implementation of the energy management system and the Energy Conservation Code for Buildings, the country plans to increase the number of energy-efficient buildings. In 2022, Cabo Verde reported 56 energy-efficient buildings constructed in the country.

"Within the West African Economic and Monetary Union (UEMOA), Directive No. 05/2020/CM/UEMOA was developed under the Regional Energy Saving Program (PREE) of the Regional Initiative for Sustainable Energy (IRED). This directive aims to integrate mandatory minimum energy efficiency requirements into national construction standards across UEMOA member states.

Another key achievement is the retrofitting of the SOGEFIHA building, located in Abidjan-Plateau and housing the Directorate-General and several departments of the Public Treasury. Completed in 2023 as part of the ENERGOS II — Projet Éclair Ivoire initiative, this facility is now the first public building in Côte d'Ivoire to fully comply with the new national regulations on energy efficiency. Energy consumption is estimated to have been reduced by 25–30%.

Finally, according to the 2022-2023 annual report published by Voûte Nubienne[14], 6,250 constructions[15] were completed in Benin, Burkina Faso, Ghana, Mali, and Senegal in 2022. Voûte Nubienne is a non-profit organization focused on energy efficiency in buildings. The Nubian Vault technical concept is an ancient architectural method primarily made from raw earth. It is an adaptable housing solution that meets both private and community needs in rural areas and cities. The need for fans or air conditioning in Nubian Vault constructions seems minimal or absent, making them a potentially energy-efficient option[16].

3.3.5. Energy Efficiency in Industry

National Energy Efficiency Programs (NEEPs) have highlighted that improving energy efficiency in the industrial sector is a means to release energy production capacity and create a more competitive industrial sector by reducing operational costs. Action plans have also reported and quantified efforts and objectives related to energy efficiency in this sector. This progress report aims to monitor the number of industries, companies, etc., that have implemented energy efficiency measures.

The ISO 50001 was approved by Nigeria in 2015 by the Federal Ministries of Industry (FMI) and the Federal Ministry of Power (FMP) through the Standards Organization of Nigeria (SON). In 2023, in Nigeria, nine industries obtained ISO 50001 certification, and 11 companies began applying this standard. Additionally, 30 companies reported implementing energy efficiency measures, such as energy audits and upgrading some equipment to achieve energy savings.
In Togo, three companies have taken similar actions, including replacing motors and generators with high-efficiency technologies and installing solar panels for energy production. These companies operate in the production of sheet metal, metallurgical products, construction materials, gas, and plastics.

In Guinea, in 2023, two companies also reported implementing energy efficiency measures, including replacing inefficient lamps and other electrical appliances, as well as modernizing some energy-intensive equipment to improve their energy efficiency.

[16] *Association la Voûte Nubienne (2023)*
[17] *final-web_rapport-d_activite__22-23_compressed.pdf (lavoutenubienne.org)*
[18] *Madiana Hazoume (2013).*

Table 16: Industries Certified ISO 50001 or Implementing Energy Efficiency Measures

	Guinea	Nigeria	Togo
Number of Industries Implementing ISO 50001	0	11	0
Number of Industries Certified ISO 50001	0	9	0
Number of Industries with Energy Efficiency Measures	2	30	3

Source: 2023 National Monitoring Reports of ECOWAS Countries (based on 2023 reports from public utilities and electricity regulators)

3.3.6. Summary of Energy Efficiency Progress (2023 Status)

xi. Distribution losses:

Target : by 2030.

10 %

Achievement: of Electricity loss in 2023.

~ 21.3 %

xi. Taux de pénétration des ampoules efficaces :

Target : by 2030.

100 %

Regional Achievement: under rate of achievement

50%

xiii. Energy efficiency in public buildings larger than 500 square metres (m2)

Target : by 2030.

100 %

Regional Achievement: rate of achievement.

LOW


A
B
C
D
E
Energy
Efficiency
MC
MR
OFF
CE
AC
ON/C

4 KEY HIGHLIGHTS OF 2023

Cote d'Ivoire Launches Its First 30 MWp Solar Photovoltaic Plant:

In 2023, Côte d'Ivoire inaugurated Phase 1 of the 30 MWp Boundiali solar photovoltaic power plant project, followed by the groundbreaking ceremony for Phase 2, with construction expected to be completed by April 2025.

Covering a total area of 78 hectares (Phase 1: 36 ha, Phase 2: 42 ha), this project is part of the national strategy to diversify electricity production sources. It contributes to the country's renewable energy targets, aiming to increase the share of renewables to 45% of the energy mix by 2030 (including large-scale hydropower) while supporting Côte d'Ivoire's international commitments to reduce greenhouse gas emissions by 31.4%.
With a total investment of €75.6 million, this infrastructure will enhance rural electrification and improve service quality for more than 430,000 households. Additionally, it will supply electricity to approximately 70,000 homes, reduce CO_2 emissions by 60,000 metric tons annually, and create 300 direct and indirect jobs during the construction phase, as well as 40 jobs during the operational phase.

CONCLUSION

Despite significant progress in expanding access to sustainable energy, ECOWAS member states face substantial challenges in achieving the targets set forth in the ECOWAS Renewable Energy Policy (EREP) and the ECOWAS Energy Efficiency Policy (EEEP). The current electricity access rate stands at 57.4%, highlighting the need for considerable efforts to achieve universal access by 2030. In 2023, Niger, Guinea-Bissau, Sierra Leone, Burkina Faso, and Liberia recorded electricity access rates below 30%. Benin's access rate is below 50%. Mali, Guinea, Togo, Nigeria, Gambia, and Senegal have electricity access rates under 80%. In contrast, Côte d'Ivoire, Ghana, and Cabo Verde stand out with electricity access rates exceeding 80%.

Despite an increase in renewable energy capacity, its share in the overall electricity mix remains stagnant at 25%, far from the 48% target set for 2030 as outlined in the ECOWAS Renewable Energy Action Plan (EREP. Excluding large and medium hydroelectric plants, renewable sources contributed only 4.4%, well below the 19% target in EREP. Continued efforts are crucial in countries such as Guinea, Liberia, and Sierra Leone, which have made progress, while Benin, Niger, and Gambia need to accelerate their initiatives in this critical area.

Regarding energy efficiency, Total electricity losses, which include both technical and non-technical losses, were 21.3% for 21 companies covering 88% of users. Non-technical losses remain a major issue, particularly in Nigeria and Guinea-Bissau, where seven out of nine Nigerian utilities report non-technical losses exceeding 30%

Since 2018, energy-efficient lighting using Light Emitting Diode (LED) technology has experienced strong market penetration, with sales volumes doubling between 2018 and 2023, reaching 828,000 units in 2023. Nigeria accounted for 83% of the total sales volume.

Similar to efficient lighting, high-efficiency appliances have also seen substantial penetration in the region over the same period, with sales volumes doubling between 2018 and 2023, reaching 530,000 units in 2023, with Nigeria dominating the market with 72% of the total volume sold during the period.

In the region, only Nigeria has ISO 50001 certified industries. Nine Nigerian industries have obtained ISO 50001 certification, and an additional 11 companies have started applying this standard. Moreover, 30 Nigerian companies, 3 Togolese companies, and 2 Guinean companies have reported implementing energy efficiency measures, such as energy audits and the modernization of certain equipment to achieve energy savings.

Efforts are also underway in the region in the field of energy-efficient building construction. However, the lack of comprehensive national data remains a major constraint in assessing the penetration of energy-efficient buildings in the region.

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ANNEX 4 : LIST OF PARTICIPANTS

List of participants in data collection training and gathering workshop from June 24th to June 28th, 2024 in Cotonou

S/N	Country	Name	Institution/Organisation	Position
1	Bénin	Pascal Sourougnon DEGBEGNON	Ministère de l'Energie, de l'Eau et des Mines	Chef Service des Études et de la Planification
2	Bénin	Largum MADOUGOU	DGPER	Coordonnateur P2EGeDBE
3	Bénin	Todeman ASSAN	Ministère de l'Energie, de l'Eau et des Mines	Directeur général de la planification énergétique et de l'électrification rurale
4	Burkina Faso	Bakary LINGANI	Ministère de l'Energie, des Mines et des Carrières	Directeur des Énergies Conventionnelles
5	Burkina Faso	Windpouiré Rebecca ZABSONRE	Ministère de l'Energie, des Mines et des Carrières	Chef de service de la maîtrise de l'énergie
6	Cap Vert	Mario Joao MARQUES DE OLIVEIRA	Ministère de l'industrie, du commerce et de l'énergie	Técnico
8	Côte d'Ivoire	Angui Sylvain KOBENAN	Direction Générale de l'Energie	Sous-Directeur de l'Energie Hydraulique et Éolienne
9	Côte d'Ivoire	François KOKOLA	Direction Générale de l'Energie	Responsable du Service de l'Evaluation, du Suivi Economique et de la Statistique
10	Gambie	Tijan JALLOW	Ministère du pétrole et de l'énergie	Planificateur principal
11	Gambie	Emmanuel CORREA	Ministère du pétrole et de l'énergie	Fonctionnaire principal chargé de l'énergie
12	Ghana	Laura ZORDEH	Commission de l'énergie du Ghana	Directeur adjoint
13	Ghana	Kofi Agyekum ANSONG-DWAMENA	Commission de l'énergie du Ghana	Statisticien
14	Guinée Bissau	Mendes DIVALDINO	Ministère de l'énergie	Técnico/ Responsável adjunto da Estatistíca
15	Guinée Bissau	Noé Saba N'BUNDÉ	Ministère de l'énergie	Assessor Para Relações Público-Privadas
16	Guinée Conakry	Bourhane BANGOURA	Ministère de l'Energie de l'Hydraulique et des Hydrocarbures	Chef de section Système d'information Energétique
17	Guinée Conakry	Alpha Ibrahima DIALLO	Ministère de l'Energie, de l'Hydraulique et des Hydrocarbures	Ingénieur Energéticien (DESS) chargé d'études, point focal collecte de données PANER, PANEE, Se4ALL
18	Libéria	Danwin F. HOFF	Ministère des mines et de l'énergie	Responsable des données énergétiques

19	Libéria	Mentor Zahn KOTEE	Ministère des mines et de l'énergie	Directeur adjoint pour la grille
20	Mali	Seydou TANGARA	Direction Nationale de l'Energie	Chef de Section Economie d'Energie et de l'Efficacité Energétique
21	Mali	Mahamoud TRAORE	Ministère de l'Energie et de l'Eau du Mali (ANADEB)	Chef de Département Promotion de la Production et des Technologies
22	Nigéria	Ejura Gloria EZEKIEL	Commission de l'énergie du Nigeria	Directeur scientifique adjoint
23	Nigéria	Teddy OMOREGBEE	Ministère fédéral de l'électricité	Engr.
24	Sénégal	Amadou Makhtar SARR	Ministère de l'Energie du Pétrole et des Mines	Chargé du Systèmes d'information Géographiques et des Données d'électrification Rurale
25	Sénégal	Fatma SOW	Ministère de l'Energie du Pétrole et des Mines	Chef du Bureau Efficacité énergétique
26	Sierra Leone	Benjamin KAMARA	Ministère de l'énergie	Directeur général de l'énergie Point focal CEREEC
27	Sierra Leone	Shebora Onikeh KAMARA	Ministère de l'énergie	Directeur de la politique, de la recherche, de la planification, du suivi et de l'évaluation
28	Togo	M'ba DJASSAH	Direction Générale de l'Energie	Directeur de la planification
29	Togo	Aboudou-Kafarou AKONDO	Direction Générale de l'Energie (DGE)	Ingénieur chargé d'études et suivi des projets
30	Algérie-AFREC	Oueddo ABDOULAYE	AFREC	Chargé de mission principal Statisticien
31	Algérie-AFREC	Salomé MAHEYA	AFREC	Chargé de mission principal Statistiques de l'énergie
32	Algérie-AFREC	Samson Bel-Aube NOUGBO-DOHOUE	AFREC	Chef de la division du système d'information sur l'énergie et des statistiques
33	Burkina Faso - UEMOA	Salif BAGAYOKO	Commission de l'UEMOA	Chargé de l'Energie
34	Commission de la CEDEAO-Abuja	Eya Sophie DESSI	Direction de l'Energie de la Commission	Ingénieur en électricité débutant
35	Cap Vert - CEREEC	Jean Francis SEMPORE	CEREEC	Directeur exécutif
36	Cap Vert - CEREEC	Mawufemo MODJINOU	CEREEC	Chargé de projet principal. Efficacité énergétique
37	Cap Vert - CEREEC	Hodonou Alexandre BINAZON	CEREEC	Expert en données énergétiques
38	Cap Vert - CEREEC	Marcel FLAN	CEREEC	Conseiller en énergie
39	Cap Vert - CEREEC	Mistoul Jihane Gnanki BA-KOUNOURE	CEREEC	Expert junior en efficacité énergétique
41	Niger - CEREEC	Nassourou BELLO	CEREEC	Coordinateur de projet

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