



**ECREEE**  
Towards Sustainable Energy

# REGIONAL PROGRESS REPORT

ON RENEWABLE ENERGY, ENERGY EFFICIENCY  
AND ENERGY ACCESS IN ECOWAS REGION

**MONITORING YEAR 2021**

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Prédio ADS, 3. Andar, Achada Santo António

C.P. 288, Praia, Cabo Verde

info@ecreee.org

www.ecreee.org

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## **AUTEURS**

Hodonou Alexandre Binazon – ECREEE , Jafaru Abdulrahman – ECREEE

## **CONCEPTION ET DESIGN**

Joarel Barros, Mbaye Diouf (ECREEE)

## **REVIEWED BY**

Guei G. F. Kouhie, Hyacinth Elayo, Madi Kabore, Juste C.T. Damada, Abdoulaye Ballo, Jihane Bakounoure, Dorriane H. R. D. Lopes, Samuel Dodobotia Wetajega, Edmilson Monteiro (ECREEE)

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## ABBREVIATIONS

<b>AFREC</b>	African Energy Commission
<b>BMZ</b>	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung
<b>CEMG</b>	Clean Energy Mini-Grids
<b>DNE</b>	Direction Nationale de l'Énergie
<b>ECOWAS</b>	Economic Community of West African States
<b>ECOWREX</b>	ECOWAS Observatory for Renewable Energy and Energy Efficiency
<b>ECREEE</b>	ECOWAS Centre for Renewable Energy and Energy Efficiency
<b>EE</b>	Energy Efficiency
<b>EEEP</b>	ECOWAS Energy Efficiency Policy
<b>EIS</b>	Energy Information System
<b>EREP</b>	ECOWAS Renewable Energy Policy
<b>ESEF</b>	ECOWAS Sustainable Energy Forum
<b>EUR</b>	EURO
<b>GIZ</b>	Gesellschaft für Internationale Zusammenarbeit
<b>GW/ GWh</b>	Gigawatt / Gigawatt hour
<b>HH</b>	Household
<b>ICS</b>	Improved Cook-Stoves
<b>IRENA</b>	International Renewable Energy Agency
<b>LMSH</b>	Large and Medium Scale Hydropower
<b>LPG</b>	Liquefied Petroleum Gas
<b>MPEER</b>	Ministère du Pétrole, de l'Énergie et des Énergies Renouvelables
<b>MW/ MWh</b>	Megawatt / Megawatt hour
<b>NEEAPs</b>	National Energy Efficiency Action Plans
<b>NREAPs</b>	National Renewable Energy Action Plans
<b>RE</b>	Renewable Energy
<b>SDG</b>	Sustainable Development Goals
<b>SECAPs</b>	Sustainable Energy Country Action Plans
<b>SEforALL</b>	Sustainable Energy for ALL
<b>SWH</b>	Solar Water Heaters
<b>WAPP</b>	West African Power Pool

## FOREWORD



In a challenging environment, access to sustainable energy services remains a significant developmental challenge in the ECOWAS region and the shift to clean energy is becoming increasingly imperative.

The availability of relevant and quality information in the fields of Renewable Energy (RE) and Energy Efficiency (EE) is crucial for energy planning and informed decision making, which ultimately contributes towards achieving the sustainable development goals (SDG 7 – Affordable and Clean Energy) by 2030.

ECREEE have developed two regional initiatives in the 2023-2027 strategic plan that contributes to mitigating the lack of up-to-date energy information

and to support in translating the regional policies into concrete actions. These two initiatives are, the ECOWAS Observatory on Renewable Energy and Efficiency of ECOWAS (ECOWREX), and the Regional Progress Report on Renewable Energy and Energy Efficiency in the ECOWAS region. The regional progress report, which is published annually, was established to provide an overview of the efforts made by the governments of ECOWAS countries in achieving their national targets, which contributes towards the regional target established in the EREP and EEEP policies. This report is the 6th edition that shows the increasing reliance on sustainable energy sources and the determination of the public authorities of ECOWAS and other stakeholders in shaping the transitions to clean energy.

The report provides relevant information on renewable energy, energy efficiency, and energy access. Despite the challenge of inadequate data, the initiative to assess ourselves as a region is crucial towards the 2030 agenda. With increased efforts to improve data availability, future editions of this report are expected to be more informative and provide a more comprehensive and accurate representation of where the region stands on its path towards attaining sustainable energy-for-all.

ECREEE remains committed to designing and implementing interventions with high socio-economic impact in the Sustainable Energy domain, utilizing the entrusted resources to support regional and national efforts in meeting RE & EE targets.

**Mr. Jean Francis SEMPORE**

Executive Director ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)

## DEFINITIONS

**Electricity access:** Access to electricity is the share of households with electricity supplied by electricity grid (national grid and mini grids), and the share of 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 taken into 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 m<sup>2</sup> 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).<sup>1</sup> This excludes solar lamps that are for lighting only.

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## EXECUTIVE SUMMARY

In 2021, the ECOWAS region experienced significant developments in its energy landscape. The rate of access to electricity at the regional level slightly increased to 56%, from 55% in 2020 (55%). Cabo Verde is currently leading in the region, with a remarkable 91% access rate, followed closely by Côte d'Ivoire and Ghana at 85% and 84%, respectively. Conversely, Sierra Leone, Niger, and Liberia have the lowest access rates at 21%, 18%, and 8%, respectively. Notably, Côte d'Ivoire demonstrated the most substantial improvement, increasing its access rate from 78% to 85% between 2020 to 2021.

The total on-grid installed electricity capacity in the ECOWAS region increased from 26,202 MW in 2020 to 27,424 MW in 2021, representing 4.7% growth. This increase was primarily driven by contributions from Guinea, Mali, Niger, Senegal, and Ghana, which bolstered the region's capacity. Conversely, on-grid installed electricity capacity remains the same in countries such as Burkina Faso, the Gambia, Guinea-Bissau, Liberia, and Sierra Leone. The increase in installed capacity in 2021 was partly attributed to renewable energy sources, which accounted for 43.3% of the total increase. The overall share of on-grid renewable energy in the ECOWAS region now stands at 24.7%.

The renewable energy installed capacity, including large, medium, and small hydro, increased to 6,784 MW in 2021, compared to 6,255 MW in 2020, reflecting an increase of 8.45%. This regional upsurge was primarily driven by Guinea, Nigeria, Senegal, and Togo, with added additional installed capacities of 225 MW, 123 MW, 69 MW, and 58 MW, respectively. For renewable energy excluding large and medium, the installed capacity rose from 795 MW in 2020 to 944 MW in 2021, marking a notable increase of 18.7%. Senegal and Nigeria were the main contributors to this growth, with respective additional installed capacities of 74 MW and 64 MW.

The overall electricity generation in the region reached 85,431 GWh in 2021, with Nigeria, Ghana, and Côte d'Ivoire taking the lead, generating 33,373 GWh, 22,051 GWh, and 11,427 GWh respectively. On-grid energy generation from renewable sources including large and medium-scale hydropower (LMSH), accounts for 25% of the total generation, while generation from renewable sources excluding large and medium-scale hydropower (excluding LMSH) represents 1.3%.

In the region, the total number of functional Mini-Grids amounted to 468 in 2021. The cumulative installed capacity of these Mini-Grids is 27.7 MW. Additionally, the number of standalone systems is estimated to be 1,858,295.



The average technical and non-technical losses losses in the region increased from 22.7% to 23.2%. Although this are high rates, it is worth nothing the effort of Liberia recorded significant decrease in its losses having 47% in 2021, as against 62.8% In 2020 (16% decrease). Conversely, Cabo Verde, Côte d'Ivoire, and Benin had the highest increase in their distribution losses, with respective losses in 2021 amounting to 32.0% (25.0% in 2020), 18.0% (13.1% in 2020), and 27.0% (22.1% in 2020).

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## INTRODUCTION

The ECOWAS Energy Ministers reaffirmed their commitment towards achieving the sustainable energy targets in October 2012, by mandating the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) to coordinate the SEforALL initiatives in the region.. Subsequently, in July 2013, the ECOWAS Heads of State and Government adopted the ECOWAS Renewable Energy Policy (EREP) and the ECOWAS Energy Efficiency Policy (EEEP), setting the primary objectives and targets. A summary of these targets is outlined in Table 1 below.

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 cook stoves penetration	100%	100%
Use of modern fuel alternatives for cooking e.g. liquefied petroleum gas (LPG)	36%	41%
Solar water heaters		
• Residential homes – new detached house price exceeding 75,000 Euros (EUR)	Au moins 1 par maison	Au moins 1 par maison
• 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	10%	Not specified for 2030

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

Penetration rate of efficient bulbs	100%	100%
Energy efficiency in public buildings larger than 500 square metres (m2) (new or renovation): implement energy efficiency measures and issue energy performance certificate	100%	100%

Following the adoption of these regional policies, ECREEE supported the ECOWAS Member States to develop their National Renewable Energy Action Plans (NREAPs), National Energy Efficiency Action Plans (NEEAPs), and SEforALL Action Agenda. The national targets of each ECOWAS member state, as outlined in the Sustainable Energy Country Action Plans (SECAPs), closely align with the regional targets set forth in EREP and EEEP.

The Regional Monitoring and Reporting Framework was validated during the ECOWAS Sustainable Energy Workshop held in Dakar in April 2016 and subsequently endorsed at the 11th Meeting of the ECOWAS Ministers in charge of Energy in Conakry, Guinea, in December 2016. In the resolution adopting the framework, all Member States were required to appoint national focal persons responsible for compiling and submitting annual national monitoring reports to ECREEE.



These reports are expected to provide the latest updates on progress toward achieving the targets outlined in their NREAPs, NEEAPs, and SEforALL Action Agendas, including a summary of the main activities undertaken to pursue these targets during the previous year. ECREEE conducts an annual assessment of the implementation status of the regional policies based on these national reports.

# 1 | OBJECTIVE, METHODOLOGY AND DATA COLLECTION

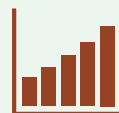
## 1.1 Objective

This report aims to provide an assessment of access to energy, renewable energy, and energy efficiency in the ECOWAS region, for the year 2021.

Specifically, the report highlights:



The status of renewable energy, and energy access in ECOWAS countries, encompassing the overall energy access and access to sustainable energy.



The energy efficiency situation in the ECOWAS countries.

## 1.2 Methodology and data collection

Data collected for the purpose this report, was directly from Member States. The national monitoring report template, adopted in 2016, serves as a reference for the focal institutions of each Member State for data collection at the national level. Data published by government institutions was preferred in all circumstances.

In each country, the national data focal person responsible for their information systems, collates data from pre-identified institutions, including:

- The national bureau of statistics, to report demographic data such as population size, number of households, and average household size.
- Power utilities, for data on installed electricity capacity, electricity generated, and electricity losses.



- **Other data providers such as rural electrification, renewable energy, and energy efficiency agencies, and the regulatory authorities.**

ECREEE compiles the data collected at the national level into a draft regional report, which undergoes validation by energy data focal points in the Member States. This process take place at a regional workshop held in Niamey, Niger from the 24th to the 28th July of 2023. The report was subsequently approved at the workshop, incorporating additional inputs from Member States.

Data on clean energy mini-grids remains informative and only a few countries provided information on the use of solar water heaters, bioethanol production, electricity distribution losses and efficient lighting.



## 2 | STATUS OF ENERGY ACCESS, RENEWABLE ENERGY AND ENERGY EFFICIENCY IN THE ECOWAS REGION

### 2.1 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) or to stand-alone renewable energy systems. The indicators used to monitor electricity access includes share of households connected to electrical grid, share of households connected to renewable energy mini-grids 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.

#### 2.1.1 Access to Electricity

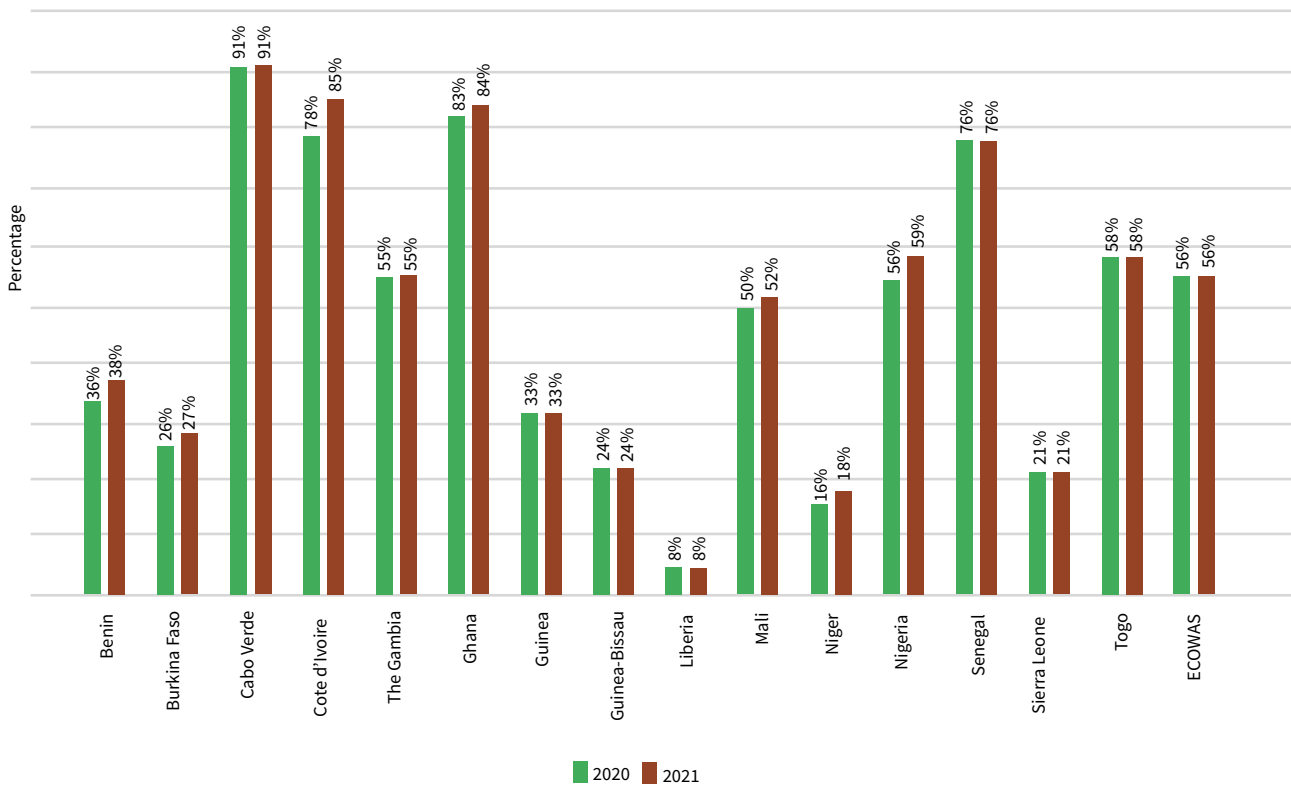
Access to electricity is calculated as the share of households with electricity supplied by electricity grid (national grid and mini grids), and the share of households with electricity supplied by renewable energy stand-alone systems. In theory, aggregating all these types of access should provide each country's total rate of access to electricity. Electricity access is also measured in terms of number of connections to the national electricity grid, to CEMGs, and to stand-alone renewable energy systems.

##### 2.1.1.1 Access to Electricity Grid

Overall, at the regional level, the electricity access rate is 56% in 2021. At national level, the rate varies significantly from one country to another.

In 2021, Cabo Verde maintains its lead with an access rate of 91%, followed by Côte d'Ivoire and Ghana with respective rates of 85% and 84%. Sierra Leone, Niger, and Liberia reported the lowest household electricity access rates, standing at 21%, 18%, and 8%, respectively (Figure 1). Côte d'Ivoire experienced the largest increase between 2020 and 2021 with rates increasing from 78% to 85%.

Figure 1: Share (%) of household connected to an electricity grid in 2021.



Source: EIS-ECOWAS, the data from 2020 has been retained for certain countries.

### 2.1.1.2 Share of households served by Clean Energy Mini-Grids (CEMGs)

Data on the existing and operational CEMGs in 2021 was available from only ten (10) countries. These numbers, given in the table 2 below were gathered from the best available data collected from the private operators and companies, and other relevant energy institutions.

In 2021, a total of 585 250 households were connected to clean energy mini-grids compared to 566 000 households in 2020, representing an increase of 3.4%. Mali (295 114 households), Nigeria (120 000 households), and Liberia (54 347 households) has the highest number of households connected to clean energy mini-grids.

In the region, the total number of functional Mini-Grids amounted to 468 in 2021. The cumulative installed capacity of these Mini-Grids is 27.7 MW. Additionally, the number of standalone systems is estimated to be 1 858 295 (Table 2).

Table 2: Existing CEMGs

Country	Existing CEMGs 2021	Capacité des CEMGs (MW)	Number of Households Connected to CEMGs 2021	Estimated number of stand-alone systems
Benin	23	2.0	1 284	691 926
Burkina Faso*	36	1.9	9 168	1 457
Cabo Verde	6	0.2	411	
Cote d'Ivoire	7	0.2	762	54 604
The Gambia*	1	0.1	21 746	583
Ghana	5	0.3	5 248	185 258
Guinea	6	2.0	12 103	
Guinea Bissau*	2	1.2	13 502	3 126
Liberia	15	8.2	54 347	54 000
Mali	40	12.0	295 114	131 918
Niger*	13	0.5	20 737	39 643
Nigeria	72	3.3	120 000	493 826
Senegal*	181	3.1	1 067	67 195
Sierra Leone*	57	1.0	23 250	61 944
Togo	4	0.6	6 536	72 815
<b>ECOWAS</b>	<b>468</b>	<b>27.7</b>	<b>573 650</b>	<b>1 858 295</b>

Source: national monitoring reports 2021 (based on data provided by national directorates of energy, national Energy Information Systems)

\* These are the countries for which data of 2020 has been reported in 2021



## 2.1.2 Access to Modern Cooking Energy

### 2.1.2.1 Share of ECOWAS households using modern cooking solutions

According to national censuses, the utilization of wood and charcoal has gradually transitioned to LPG or a combination of LPG and traditional fuels over the years. LPG predominantly found application in urban areas. Only six (6) out of the fifteen (15) countries were able to submit data on LPG (Table 3).

Cabo Verde maintains its position as the country in the sub-region with the highest number of households using modern cooking solutions, reaching 79.6% in 2021, followed by The Gambia (59%) and Ghana (49.9%). Conversely, the countries with the lowest rates are Togo (3.3%), Sierra Leone (3.1%), and Niger (3.0%) (Table 3).

Table 3: Share of households using modern cooking solutions in ECOWAS Countries

Share of HH using modern cooking solutions (%)		
Country	2020	2021
Benin*	8.1	8.1
Burkina Faso*	10	10
Cabo Verde	81.9	79.6
Cote d'Ivoire	22	39.6
The Gambia*	59	59
Ghana	24.8	49.9
Guinea	0.1	35
Guinea Bissau	5	5.93
Liberia	n/a	n/a
Mali*	28.9	28.9
Niger	2.9	3.04
Nigeria*	26	26

Tableau 3: Part des ménages utilisant des solutions de cuisson modernes dans les pays de la CEDEAO

Senegal*	43.5	43.5
Sierra Leone*	3.1	3.1
Togo*	3.3	3.3

Source: national statistical services, national directorates of energy and/or national Energy Information Systems

\* These are the countries for which data of 2020 has been reported in 2021

### 2.1.2.2 Share of ECOWAS households using improved cookstoves

Except for Benin, the penetration rates of Improved Cook-Stoves (ICS) remained the same for most countries. However, there was notable increase in Guinea and Mali from 2020 to 2021, with rates moving up from 0.5% to 46% and from 20% to 59.5%, respectively (Table 4).

It should be remembered that data relating to the penetration rates of improved stoves are not available for most countries.

Table 4: Share of households with improved cookstoves in the ECOWAS countries

Share of HH with improved cookstoves (%)		
Country	2020	2021
Benin	10.7	6.1
Burkina Faso*	23	23
Cabo Verde	n/a	n/a
Cote d'Ivoire	n/a	n/a
The Gambia*	63	63
Ghana*	24.8	24.8
Guinea	0.5	46

Table 4: Share of households with improved cookstoves in the ECOWAS countries

Guinea Bissau*	2	2
Liberia	n/a	n/a
Mali	20	59.5
Niger*	2	2
Nigeria*	n/a	n/a
Senegal*	13.5	13.5
Sierra Leone*	6.3	6.3
Togo	n/a	n/a

Source: national statistical services, national directorates of energy and/or national Energy Information Systems

\* These are the countries for which data of 2020 has been reported in 2021

## 2.2 Renewable Energy

### 2.2.1 Installed Capacity

The aggregate electricity capacity integrated into the ECOWAS power grid exhibited an upward trend, increasing from 26 202MW in 2020 to 27 424MW in 2021, depicting a growth rate of 4.7%. This increase was chiefly propelled by noteworthy contributions from countries such as Guinea, Mali, Niger, Senegal, and Ghana, further enhancing the overall energy infrastructure of the region. Conversely, certain countries including Burkina Faso, the Gambia, Guinea-Bissau, Liberia, and Sierra Leone recorded no significant change during this period.

The renewable energy installed capacity, including large, and medium amounted to 6 784 MW in 2021, compared to 6 255 MW in 2020, reflecting an increase of 8.5%. This regional upsurge was primarily driven by Guinea, Nigeria, Senegal, and Togo, which added additional installed capacities of 225 MW, 123 MW, 69 MW, and 58 MW, respectively.

For installed capacity excluding large, medium and small hydro, the installed capacity increased from 795 MW in 2020 to 944 MW in 2021, marking a notable increase of 18.7%. Senegal and Nigeria were the main contributors to this growth, with respective additional installed capacities of 74 MW and 64 MW.



Table 5: On-grid installed electricity capacity (MW) in the ECOWAS region.

Country	Total Installed Capacity		RE installed capacity (including LMSH)		RE installed capacity (excluding LMSH)	
	2021	2020	2021	2020	2021	2020
Benin	371	348	12	3	12	2
Burkina Faso*	419	419	67	67	35	35
Cabo Verde	183	178	41	35	41	35
Cote d'Ivoire	2 269	2 229	879	879	55	55
The Gambia*	147	147	1	1	1	1
Ghana	5 451	5 328	1 696	1 679	112	99
Guinea	1 301	942	818	593	2	53
Guinea Bissau*	26	26	5	5	5	5
Liberia*	126	134	88	66	22	22
Mali	1 213	901	401	401	120	95
Niger	268	136	7	7	7	7
Nigeria	13 500	13 500	2 071	1 948	95	31
Senegal	1 616	1 484	470	401	400	326
Sierra Leone*	202	202	103	103	27	27
Togo	332	228	125	67	10	2
<b>ECOWAS</b>	<b>27 424</b>	<b>26 202</b>	<b>6784</b>	<b>6 255</b>	<b>944</b>	<b>795</b>

Source: National monitoring reports 2021 (based on the 2021 utility and electricity regulator reports and the national directorates of energy and energy commissions). Data was validated again at National Focal Point regional meeting at 24th to 28th July in Niamey

\* These are the countries for which data from 2020 or 2019 has been reported

Of particular significance is the substantial increase in the contribution from renewable energy sources, accounting for 43.3% of the total growth in installed capacity for the year 2021. Consequently, the total contribution of renewable energy on the overall installed on-grid capacity now stands at 24.7%, underscoring the region's trajectory towards an energy transition supported by growth in the share of sustainable energy sources in the electricity mix.

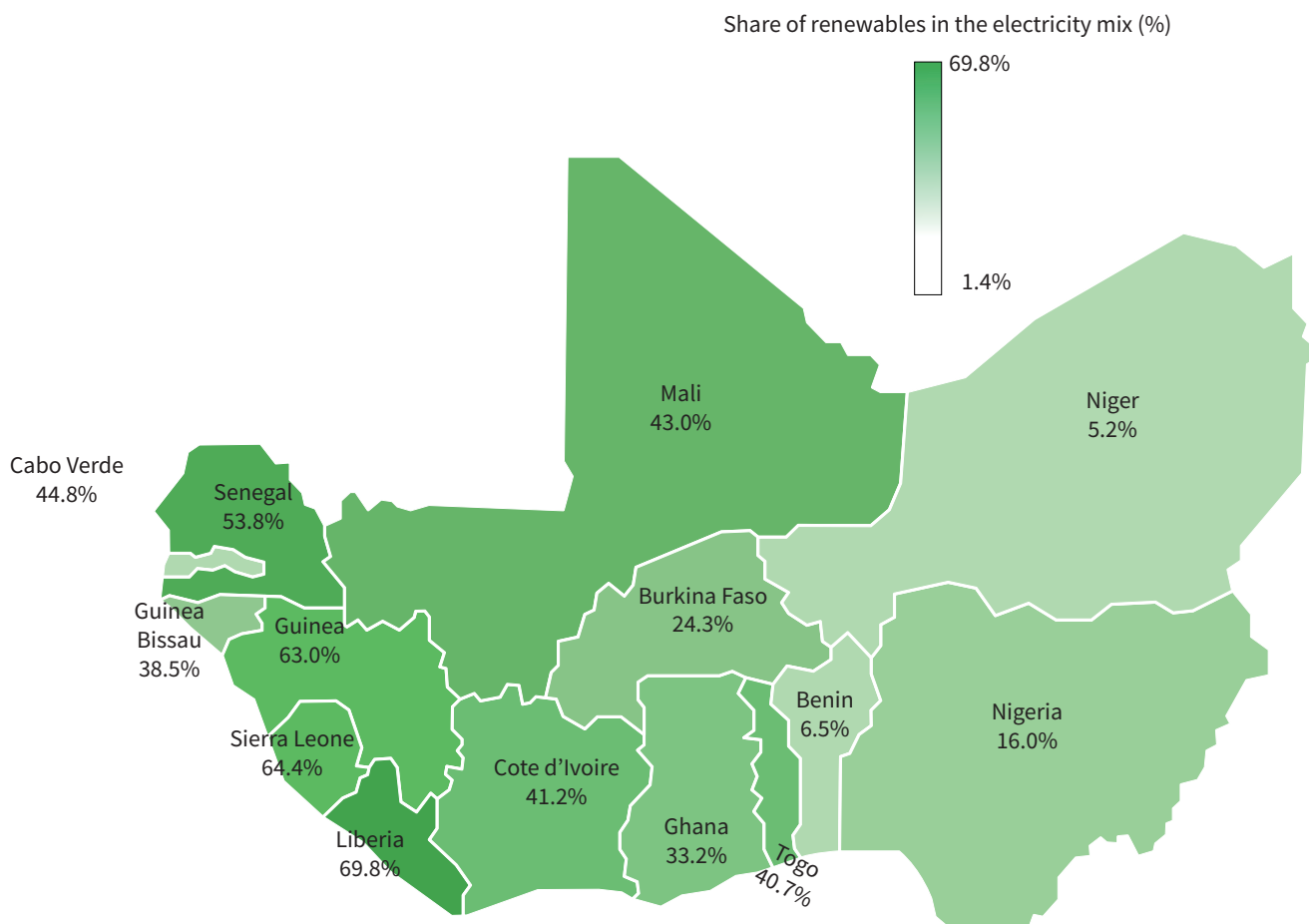


Figure 2 : Share (%) of Renewable Energy in ECOWAS Region In 2021

### 2.2.2 Electricity production from renewable energy

In 2021, the total electricity generated in the ECOWAS region amounted to 85,430.6 GWh. Renewable Energy generation, from Large and Medium Scale Hydropower (LMSH), constituted approximately 25.0%, while other renewable energy sources constituted about 1.3%. Nigeria, Ghana, and Côte d'Ivoire take the lead, with 33 373.3 GWh (39%), 22 050.8 GWh (25.8%), and 11 427.0 GWh (13.4%) respectively.

Table 6: Total on-grid energy generation and renewable generation (MWh) in the ECOWAS region 2021

Country	Total generation GWh	Renewable energy generation in GWh (including LMSH)	Renewable energy generation in GWh (excluding LMSH)
Benin	1 126.9	16.8	16.8
Burkina Faso*	2 193.8	174.8	62.4
Cabo Verde	474.4	93.1	93.1
Cote d'Ivoire	11 427.0	2 627.1	163.8
The Gambia*	433.0	0.003	0.003
Ghana	22 050.8	7 643.1	122.2
Guinea	3.1	2.6	0.0
Guinea Bissau*	115.6	0.1	0.1
Liberia	272.3	222.3	
Mali	5 133.6	1 289.0	0.2
Niger	1 105.8	11.6	11.6
Nigeria*	33 373.3	7 612.7	
Senegal	5 167.5	685.0	370.0
Sierra Leone*	1 768.0	900.5	236.5
Togo	785.5	158.5	21.9
<b>ECOWAS</b>	<b>85 430.6</b>	<b>21 437.1</b>	<b>1 098.6</b>

Source: National monitoring reports 2021 (based on the 2021 utility and electricity regulator reports and the national directorates of energy and energy commissions). Data was validated again at National Focal Point regional meeting at 24th to 28th July in Niamey

\* These are the countries for which data from 2020 or 2019 has been reported in 2021

Notes:

The share of renewable energy generation (excluding LMSH) is based on the weighted average of the countries for which information was available.



### 2.2.3 Solar Water Heaters

Solar Water heaters (SWHs) to meet domestic, commercial, and industrial requirements is one of the most important solutions to reduce electricity demand in West Africa. Although solar energy potential is abundant, the use of SWHs is still extremely low in ECOWAS region. This is evidenced from the lack of information on SWHs penetration in the national monitoring reports.

Table 7: Number of existing and/or installed SWHs

Country	Number of HH SWH		Number of SWH in public institutions		Number of SWH in SMEs, hotels and industries	
	2021	2020	2021	2020	2021	2020
Benin			20		1	
Burkina Faso*		n/a		181		n/a
Cabo Verde		984				
Cote d'Ivoire						
The Gambia*		n/a		n/a		1
Ghana		1		1		3
Guinea						
Guinea Bissau*		n/a		25		n/a
Liberia		n/a		n/a		45
Mali		10		17		n/a
Niger						
Nigeria*		n/a	1	68		n/a
Senegal		n/a		200		n/a
Sierra Leone*		485				

Source: National monitoring reports 2021 (based on the 2021 utility and electricity regulator reports and the national directorates of energy and energy commissions). Data was validated again at National Focal Point regional meeting at 24th to 28th July in Niamey

## 2.2.4 Bioethanol Production

Table 8 below presents bioethanol and biodiesel production from 2020 to 2021. In 2021, only data from Mali is available on bioethanol production, which amounted to 7 342 tons compared to 8 976 tons in 2020. This highlights the need for an effective baseline assessment and data collection framework.

Table 8: Bioethanol and biodiesel production

	Bioethanol production (Tons)	Bioethanol production (Tons) <sup>2</sup>	Biodiesel production (Tons)	Biodiesel production (Tons) <sup>3</sup>
Country	2021	2020	2021	2020
Liberia				8 701
Mali	7 341.51	8 975.77	7.8	15.63
Niger				27.36
Senegal		0.5		
Sierra Leone		4000		

Source: National monitoring reports 2021 (based on the 2021 utility and electricity regulator reports and the national directorates of energy and energy commissions). Data was validated again at National Focal Point regional meeting held from 24th to 28th July in Niamey, Agence Nationale du Développement des Biocarburants (Mali), Compagnie Sucrière Sénégalaise (Senegal), SUNBIRD (Sierra Leone)

## 2.3 Energy Efficiency

This section shows the technical and non-technical losses in the electricity distribution system. However, this was not completely possible for all countries because some utilities reported the overall losses or only technical losses in the distribution system and could not differentiate between technical and non-technical or commercial losses.

Liberia, similar to 2020 (63%) still recorded the highest losses in 2021 (47%) which is twice the losses in some countries.

Between 2020 and 2021, the total average losses in the ECOWAS region increased from 22.7% to 23.2%. If Liberia is excluded, the total average electricity loss in the region for 2020 and 2021

becomes 19.8% and 21.5%, respectively.

Despite its high losses, Liberia is the only country that experienced a significant decrease from 2020 to 2021 (16% decrease). Conversely, Cabo Verde, Côte d'Ivoire, and Benin experienced the highest increases in their losses, recording 7.0%, 5.1%, and 4.9% respectively.

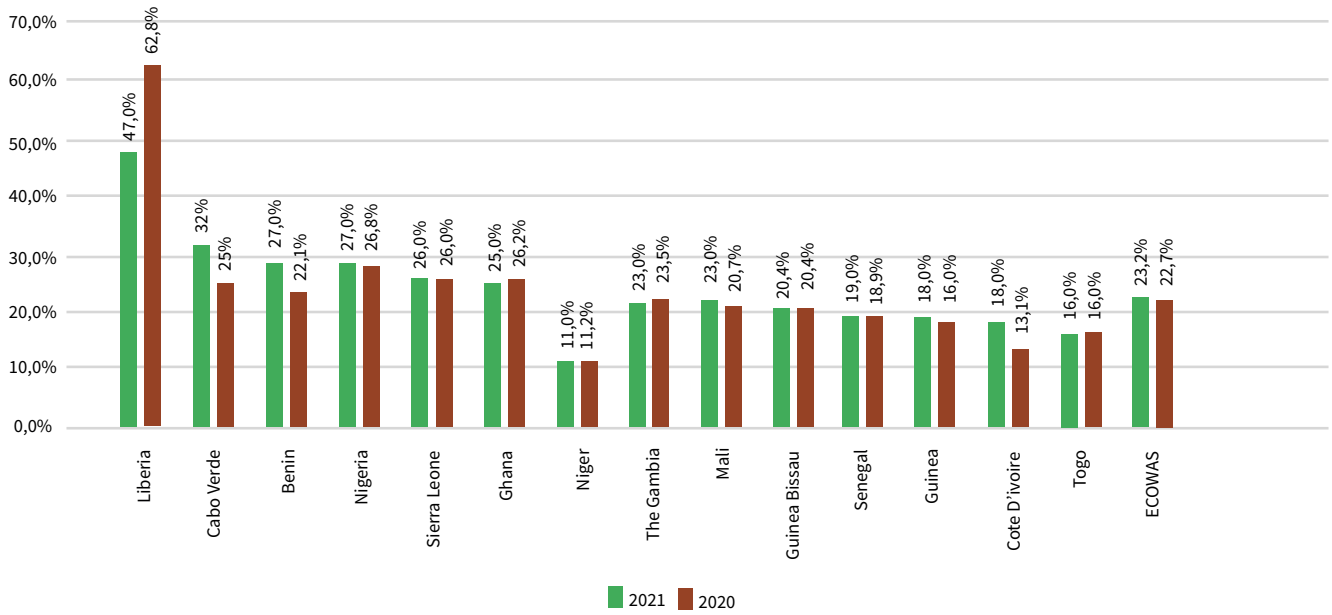


Figure 3: Aggregated electricity losses

(Source: National monitoring reports 2021 & WAPP 2020 report)

## 3 | CONCLUSION

The ECOWAS Member States are making numerous efforts to improve access to sustainable energy in the region, however the achieved objectives are well below the regional targets set within the framework of ECOWAS Renewable Energy (REEP) and Energy Efficiency (EEEP) Policies.

The share of households connected to CEMGs (estimate at 1%), is far short from the target, to reach 22% of rural population served from renewable energy off-grid systems in 2020, which means huge efforts must be deployed to reach 25% by 2030.

The goal of achieving 35% of renewable energy in the electricity mix by 2020 was not met. To bridge this gap and reach the new target of 48% by 2030, it is crucial for member states to sustain their current efforts, and more important to accelerate the development of renewable energy capacities in the region.

No significant progress was reported regarding the share of households with access to modern cooking solutions, although it is important to highlight the substantial efforts made in Cape Verde (79.6%) and Ghana (49.9%).

With regards to energy efficiency, although the regional target of 10% electricity distribution losses was not attained in 2020, it was noticed that from 2020 to 2021, the overall electricity loss at the regional level has improved, declining from 31% to 27%. Liberia notably achieved a substantial reduction from 56% to 47%, showing that huge efforts are ongoing in enhancing efficiency within its distribution system. Concerning the penetration rates of energy-efficient lighting in 2021, data was only available from Côte d'Ivoire, making it impossible to provide comprehensive analysis of the entire region.

Numerous challenges persist in delivering relevant and quality information on sustainable energy at the regional level, particularly in areas such as clean cooking solutions. Strengthening the energy information systems in Member States is crucial to enhancing their ability to collect reliable sustainable energy data.



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# ANNEX 1: QUESTIONNAIRE 1

## Policy Tracking Information for «Country Name»

1a. General Information					
Stats Nationales	Description	Unités	2021	2022	Source
National Stats	Description	Units			
1a.1	Population	million			
1a.2	Rural Population	#			
1a.3	Urban Population	#			
1a.4	Number of Households	#			
1a.5	Number of Rural Households	#			
1a.6	Number of Urban Households	#			
1a.7	GDP	million US\$			

1b. Electricity					
Capacities, Generation, Transfers	Description	Units	2021	2022	Source
1b.1	Total electricity generation capacity	MW			
1b.2	Total electricity generation	MWh			
1b.3	Imports	MWh			
1b.4	Exports	MWh			
Renewable Energy (RE)	Description	Units			
1b.5	RE capacity excl. Medium and large hydro	MW			
1b.6	RE capacity incl. Medium and large hydro	MW			
1b.7	RE generation excl. Medium and large hydro	MWh			
1b.8	RE generation incl. Medium and large hydro	MWh			
Solar Water Heaters (SWH)	Description	Units			
1b.9	Total Number of SWH	#			
1b.10	Number of Household SWH	#			
1b.11	Number of SWH in Public Institutions	#			
1b.12	Number of SWH in SMEs, Hotels, and Industries	#			

Access to Grid	Description	Units			
1b.13	Number of Connections to Grid	#			
1b.14	Connected Households	#			
1b.15	Connected Urban Households	#			
1b.16	Connected Rural Households	#			
Losses	Description	Units			
1b.17	Technical losses	%			
1b.18	Technical Losses (Transmission)	%			
1b.19	Technical Losses (Distribution)	%			
1b.20	Non-Technical losses	%			
1b.21	Commercial Losses	%			
1b.22	Collection Losses	%			
Minigrids	Description	Units			
1b.23	Total Number of Minigrids	#			
1b.24	Number of Households Connected to Minigrids	#			
1b.25	Number of Rural Connections to Minigrids	#			
1b.26	Number of Urban Connections to Minigrids	#			
1b.27	Number of Standalone Systems	#			
1b.28	Capacity of Minigrids	MW			
1b.29	Energy from Minigrids	MWh			
1b.29	Energy from Minigrids	MWh			

1c. BioEnergy					
Cooking	Description	Units	2021	2022	Source
1c.1	Households with Improved Cookstoves	#			
1c.2	Households with LPG Cooking Solutions	#			
1c.3	Households with Alternative Modern Fuels (Electricity) for Cooking	#			
Production and Consumption of BioEnergy	Description	Units			
1c.4	Total Charcoal Production	tons			
1c.5	Efficient Charcoal Production	tons			
1c.6	Fossil Fuel Production	tons			
1c.7	Biodiesel Production	tons			
1c.8	Bioethanol Production	tons			
1c.9	Fossil Fuel Consumption	tons	4 641 000	4 318 000	Energy Commission. It does not include lean gas (natural gas) used in transformation. E.g. natural gas used for electricity generation
1c.10	Biodiesel Consumption	tons			
1c.11	Bioethanol Consumption	tons			

1d. Energy Efficiency					
Efficiency Efficiency (EE)	Description	Units	2021	2022	Source
<b>Lighting</b>					
1d.1	Total Number of Lamps	#			
1d.2	Number of Efficient Lamps	#			
1d.3	Number of Efficient Public Lamps Installed	#			
1d.4	Number of Efficient Lamps in the Private Sector	#			
1d.5	Number of Solar Street Lights Installed	#			
1d.6	Number of Policy Documents Related to EE Lighting	#			

1d.7	Total Number of Buildings	#			
1d.8	Number of Energy Efficient Buildings	#			
1d.9	Number of Energy Efficient Buildings in the Public Sector	#			
1d.10	Number of Energy Efficient Buildings in the Private Sector	#			
1d.11	Number of Certified EE Buildings	#			
1d.12	Number of Policy Documents Related to EE	#			
<b>Industries</b>					
1d.13	Total Number of Industries	#			
1d.14	Number of industries implementing ISO 50,001	#			
1d.15	Number of certified Industries in ISO 50,001	#			
1d.16	Number of Industries with EE Measures	#			
<b>Cooling</b>					
1d.17	Number of Air Conditioners	#			
1d.18	Number of Energy Efficient Air Conditioners Installed	#			
1d.19	Number of Inefficient ACs removed in the Public Sector	#			
1d.20	Number of Inefficient ACs removed in the Private Sector	#			
1d.21	Number of Policy Documents related to EE Air Conditioning	#			
1d.22	Number of Refrigerators	#			
1d.23	Number of Energy Efficient Refrigerators Installed	#			
1d.24	Number of Inefficient Refrigerators Removed	#			
1d.25	Number of other Inefficient Electrical Appliances Removed	#			
1d.26	Number of Policy Documents related to EE Cooling/Refrigeration	#			

<b>MEPS and Labels</b>					
1d.27	Number of MEPS for Electrical Appliances	#			
1d.28	Number of Electrical Appliances with EE Labels	#			
<b>Testing Facilities</b>					
1d.29	Number of Testing Facilities for Lighting	#			
1d.30	Number of Testing Facilities for Refrigeration	#			
1d.31	Number of Testing Facilities for Air Conditioning	#			
1d.32	Number of Testing Facilities for other Electrical Appliances	#			
1d.33	Number of Policy Documents related to Efficient ACs	#			
<b>E-Mobility</b>					
1d.34	Number of Electric Vehicles	#			
1d.35	Number of Electric Cars	#			
1d.36	Number of Electric Motor Cycles	#			
1d.37	Number of Electric Bicycles	#			



## ANNEX 2 : QUESTIONNAIRE 2

### Renewable Energy Technology in «Country Name»

Name	Type	Capacity (MW)	Status	Connection	Lon	Lat	Ownership	Year Com-missioned	Source

# ANNEX 3 : QUESTIONNAIRE GUIDE

## Annual Report on the Implementation of NREAP, NEEAP and SE4ALL Action Agenda in Ghana

This note guides how data in the templates on Sheets **Policy Tracker** and **Renewable Energy Info** should be filled. Each required information is hyperlinked to and from its relevant description in this guide.

### Notes on inputs

Input type are colour-coded as shown below

- Type inputs: decimals and percentages greater than or equal to zero.
- Type inputs: descriptions and sources
- Select inputs: accepted range of inputs selectable from a drop-down list

The source of data may be supplied by the user and is common to all inputs.

Additional rows may be added to Sheet Renewable Energy Info if necessary.

Some cell validations have been added to each sheet, but care should be taken to enter accurate data with sources for additional validations.

### Sheet **Policy Tracker**

*Relates with more information required to track the status of regional and national policies and actions on renewable energy energy efficiency, and bioenergy in Ghana*

1a. General Information	General information on national population, households and GDP
<b>National Stats</b>	
<i>1a.1</i> Population	The total number of people in the country, as cumulated in the respective year.
<i>1a.2</i> Rural Population	The total number of people in the rural parts of the country, as cumulated in the respective year.
<i>1a.3</i> Urban Population	The total number of people in the urban parts of the country, as cumulated in the respective year.
<i>1a.4</i> Number of Households	The total number of households in the country, as cumulated in the respective year.
<i>1a.5</i> Number of Rural Households	The total number of households in the rural parts of the country, as cumulated in the respective year.
<i>1a.6</i> Number of Urban Households	The total number of households in the urban parts of the country, as cumulated in the respective year.
<i>1a.7</i> GDP	The Gross Domestic Product of the country in the respective year.

1b. Electricity	Information relating with Electricity and the Renewable Energy Policy and Action Plans
<b>Capacities, Generation, Transfers</b>	
<i>1b.1</i> Total electricity generation capacity	The total electricity generation capacity, irrespective of source, in the respective year.
<i>1b.2</i> Total electricity generation	The total energy output, irrespective of source, in the respective year.
<i>1b.3</i> Imports	The total energy transferred from other countries in the respective year.
<i>1b.4</i> Exports	The total energy transferred to other countries in the respective year.
<b>Renewable Energy (RE)</b>	
<i>1b.5</i> RE capacity excl. medium and large hydro	The MWh renewable energy capacity without hydropower plants with capacities greater than 30MWh, as cumulated in the respective year.
<i>1b.6</i> RE capacity incl. medium and large hydro	The total MWh renewable energy capacity, as cumulated in the respective year.
<i>1b.7</i> RE generation excl. medium and large hydro	The MWh renewable energy generated without hydropower plants with capacities greater than 30MWh, as cumulated in the respective year.
<i>1b.8</i> RE generation incl. medium and large hydro	The total MWh renewable energy generated, as cumulated in the respective year.
<b>Solar Water Heaters (SWH)</b>	
<i>1b.9</i> Total Number of SWH	The total number of solar water heaters in the respective year.
<i>1b.10</i> Number of Household SWH	The total number of solar water heaters owned by households in the respective year.
<i>1b.11</i> Number of SWH in Public Institutions	The total number of solar water heaters in public institutions, such as hospitals, in the respective year.
<i>1b.12</i> Number of SWH in SMEs, Hotels, and Industries	The total number of solar water heaters in SMEs, hotels, and industries in the respective year.
<b>Access to Grid</b>	
<i>1b.13</i> Number of Grid Connections	The cumulative number of grid connections in the respective year.
<i>1b.14</i> Connected Households	The cumulative number of households connected to the grid in the respective year.
<i>1b.15</i> Connected Urban Households	The total number of urban households connected to the grid in the respective year.
<i>1b.16</i> Connected Rural Households	The total number of rural households connected to the grid in the respective year.
<b>Losses</b>	
<i>1b.17</i> Technical losses	<b>The technical and non-technical losses in the electric grid.</b> The percentage of energy, delivered to the grid, that is lost when transferred across system components such as transmission and distribution lines, transformers and measurement systems.
<i>1b.18</i> Technical Losses (Transmission)	The technical losses in the electricity transmission grid as a percentage of the total technical losses.
<i>1b.19</i> Technical Losses (Distribution)	The technical losses in the electricity distribution grid as a percentage of the total technical losses.
<i>1b.20</i> Non-Technical Losses	The commercial and collection losses in the system.
<i>1b.21</i> Commercial Losses	The percentage of energy consumed but not billed.
<i>1b.22</i> Collection Losses	The percentage of energy billed but not collected.
<b>Minigrids</b>	
<i>1b.23</i> Total Number of Minigrids	<b>Minigrid information</b> The total number of minigrids in the country, as cumulated in the respective year.
<i>1b.24</i> Number of Households Connected to Minigrids	The total number of households connected to minigrids in the country, as cumulated in the respective year.
<i>1b.25</i> Number of Rural Connections to Minigrids	The total number of connections to minigrids in the rural parts of the country, as cumulated in the respective year.
<i>1b.26</i> Number of Urban Connections to Minigrids	The total number of connections to minigrids in the urban parts of the country, as cumulated in the respective year.
<i>1b.27</i> Number of Standalone Systems	The total number of minigrids in the country, as cumulated in the respective year.
<i>1b.28</i> Capacity of Minigrids	The MWh capacity of the minigrids in the country, as cumulated in the respective year.
<i>1b.29</i> Energy from Minigrids	The total MWh energy generation from minigrids in the country, in the respective year.

13. BioEnergy	Information relating with the Bioenergy Policy and Action Plans
<p><b>Cooking</b></p> <p>A1.1 Households with Improved Cookstoves                      A1.2 Households with LPG Cooking Solutions                      A1.3 Households with Alternative Modern Fuels for Cooking</p> <p><b>Production and Consumption of BioEnergy</b></p> <p>A1.4 Total Charcoal Production                      A1.5 Efficient Charcoal Production                      A1.6 Fossil Fuel Production                      A1.7 Biodiesel Production                      A1.8 Bioethanol Production                      A1.9 Fossil Fuel Consumption                      A1.10 Biodiesel Consumption                      A1.11 Bioethanol Consumption</p>	<p>The number of households using improved cookstoves (e.g. charcoal, wood, briquettes, pellets, biochar, etc.), as cumulated in the respective year.                      The number of households using Liquefied Petroleum Gas (LPG) for cooking, as cumulated in the respective year.                      The number of households using other modern solutions for cooking (e.g. solar, ethanol, electricity, etc.), as cumulated in the respective year.</p> <p>The total charcoal produced in the country, expressed in tons, as cumulated in the respective year.                      The charcoal, in tons, produced with a kiln efficiency of at least 20%, as cumulated in the respective year.                      The annual fossil fuel produced in the respective year, expressed in tons.                      The annual biodiesel produced in the respective year, expressed in tons.                      The annual bioethanol produced in the respective year, expressed in tons.                      The annual fossil fuel consumed in the respective year, expressed in tons.                      The annual biodiesel consumed in the respective year, expressed in tons.                      The annual bioethanol consumed in the respective year, expressed in tons.</p>
14. Energy Efficiency	Information relating with the Energy Efficiency Policy and Action Plans
<p><b>Energy Efficiency Information</b></p> <p>A1.1 Number of Lamps                      A1.2 Number of Efficient Lamps                      A1.3 Number of Efficient Public Lamps                      A1.4 Number of Solar Street Lights Installed                      A1.5 Number of Buildings                      A1.6 Number of Energy Efficient Buildings                      A1.7 Number of Industries                      A1.8 Number of Industries with EE Measures                      A1.9 Number of Air Conditioners                      A1.10 Number of Energy Efficient Air Conditioners                      A1.11 Number of Refrigerators                      A1.12 Number of Energy Efficient Refrigerators</p>	<p>The total number of efficient and inefficient lamps, as cumulated in the respective year.                      The total number of efficient lamps, as cumulated in the respective year.                      The total number of efficient public lamps, as cumulated in the respective year.                      The total number of solar street lights, as cumulated in the respective year.                      The total number of buildings, as cumulated in the respective year.                      The number of Energy Efficient buildings (with ratings A or B), as cumulated in the respective year.                      The total number of industries, as cumulated in the respective year.                      The number of industries with energy efficiency measures, as cumulated in the respective year.                      The total number of refrigerators, as cumulated in the respective year.                      The total number of energy-efficient refrigerators, as cumulated in the respective year.                      The total number of air conditioners, as cumulated in the respective year.                      The total number of energy-efficient air conditioners, as cumulated in the respective year.</p>
14. Energy Efficiency	Information relating with the Energy Efficiency Policy and Action Plans
<p><b>Lighting</b></p> <p>M1.1 Total Number of Lamps                      M1.2 Number of Efficient Lamps Installed                      M1.3 Number of Efficient Public Lamps Installed                      M1.4 Number of Efficient Lamps Installed in the Private Sector                      M1.5 Number of Solar Street Lights Installed                      M1.6 Number of Policy Documents Related to EE Lighting                      M1.7 Total Number of Buildings                      M1.8 Total Number of Energy Efficient Buildings                      M1.9 Number of Energy Efficient Buildings in the Public Sector                      M1.10 Number of Energy Efficient Buildings in the Private Sector                      M1.11 Number of Certified EE Buildings                      M1.12 Number of Policy Documents Related to EE</p> <p><b>Industries</b></p> <p>M1.13 Total Number of Industries                      M1.14 Number of Industries implementing ISO 50,001                      M1.15 Number of certified Industries in ISO 50,001                      M1.16 Number of Industries with EE Measures</p> <p><b>Cooling</b></p> <p>M1.17 Number of Air Conditioners                      M1.18 Number of Energy Efficient Air Conditioners Installed                      M1.19 Number of Inefficient ACs removed in the Public Sector                      M1.20 Number of Inefficient ACs removed in the Private Sector                      M1.21 Number of Policy Documents related to EE Air Conditioning                      M1.22 Number of Refrigerators                      M1.23 Number of Energy Efficient Refrigerators Installed                      M1.24 Number of Inefficient Refrigerators Removed                      M1.25 Number of other Inefficient Electrical Appliances Removed                      M1.26 Number of Policy Documents related to EE Cooling/Refrigeration</p> <p><b>MEPS and Labels</b></p> <p>M1.27 Number of MEPS for Electrical Appliances                      M1.28 Number of Electrical Appliances with EE Labels</p> <p><b>Testing Facilities</b></p> <p>M1.29 Number of Testing Facilities for Lighting                      M1.30 Number of Testing Facilities for Refrigeration                      M1.31 Number of Testing Facilities for Air Conditioning                      M1.32 Number of Testing Facilities for other Electrical Appliances                      M1.33 Number of Policy Documents related to Efficient ACs</p> <p><b>E-Mobility</b></p> <p>M1.35 Number of Electric Vehicles                      M1.36 Number of Electric Cars                      M1.37 Number of Electric Motor Cycles                      M1.38 Number of Electric Bicycles</p>	<p>The total number of installed efficient and inefficient lamps, as cumulated in the respective year.                      The total number of efficient and installed lamps, as cumulated in the respective year.                      The total number of efficient and installed lamps in the private sector, as cumulated in the respective year.                      The total number of efficient and installed lamps in the public sector, as cumulated in the respective year.                      The total number of solar street lights installed, as cumulated in the respective year.</p> <p>The total number of buildings, as cumulated in the respective year.                      The number of energy-efficient buildings (with ratings A or B), as cumulated in the respective year.                      The number of energy-efficient buildings (with ratings A or B) in the public sector, as cumulated in the respective year.                      The number of energy-efficient buildings (with ratings A or B) in the private sector, as cumulated in the respective year.                      The number of buildings certified to be energy efficient by an appropriate licensing authority, as cumulated in the respective year.                      The number of policies on energy efficiency, published and made available, as cumulated in the respective year.</p> <p>The total number of industries, as cumulated in the respective year.                      The total number of ISO50,001-compliant industries, as cumulated in the respective year.                      The total number of industries certified to be ISO50,001-compliant by an appropriate licensing authority in the respective year.                      The total number of ISO50,001-compliant industries, as cumulated in the respective year.</p> <p>The total number of refrigerators installed, as cumulated in the respective year.                      The total number of energy-efficient air-conditioners installed, as cumulated in the respective year.                      The total number of inefficient air-conditioners that were uninstalled in the public sector, as cumulated in the respective year.                      The total number of inefficient air-conditioners that were uninstalled in the private sector, as cumulated in the respective year.                      The number of policies on energy efficiency for air conditioners, published and made available, as cumulated in the respective year.                      The total number of air-conditioners installed, as cumulated in the respective year.                      The total number of refrigerators installed, as cumulated in the respective year.                      The total number of energy-efficient refrigerators installed, as cumulated in the respective year.                      The total number of energy-efficient refrigerators uninstalled, as cumulated in the respective year.                      The number of policies on energy efficiency for cooling and air-conditioners, published and made available, as cumulated in the respective year.</p> <p>The number of minimum energy performance standards that were made for electrical appliances, as cumulated in the respective year.                      The number of electrical appliances that have labels denoting their energy efficiency ratings, as cumulated in the respective year.</p> <p>The number of facilities that have been set up for testing the energy efficiency of appliances relating to lighting, as cumulated in the respective year.                      The number of facilities that have been set up for testing the energy efficiency of appliances relating to refrigeration, as cumulated in the respective year.                      The number of facilities that have been set up for testing the energy efficiency of appliances relating to air-conditioning, as cumulated in the respective year.                      The number of facilities that have been set up for testing the energy efficiency of appliances relating to electrical appliances with the exception of air conditioners, as cumulated in the respective year.                      The number of policies on energy efficiency for air conditioners, published and made available, as cumulated in the respective year.</p> <p>The total number of electric mobility vehicles, as cumulated in the respective year.                      The total number of electric cars in the country, as cumulated in the respective year.                      The total number of electric motorcycles in the country, as cumulated in the respective year.                      The total number of electric bicycles in the country, as cumulated in the respective year.</p>

## ANNEX 4 : LIST OF PARTICIPANTS IN THE DATA VALIDATION WORKSHOP (FROM JULY 24TH TO JULY 28TH, 2023 IN NIAMEY)

N°	Country	Full Name	Institution/	Focal Point
1	Algeria	Yagouba Traore	AFREC	Head of Energy Policy, Planning and Strategy
2	Benin	Mawufemo MODJINOU	WAPP	Project Coordinator
3	Benin	Pascal Sourougnon DEGBE-GNON	General Directorate of Energy Resources / Ministry of Energy	Data Focal Point
4	Burkina Faso	Boubakar Thierry OUE-DRAOGO	Ministry of Environment, Energy, Water, and Sanitation	Data Focal Point
5	Cabo Verde	Jaqueline Marizia Amado de Pina	National Directorate of Industry, Commerce and Energy	Data Focal Point
6	Cote D'Ivoire	Angui Sylvain KOBENAN	Ministry of Petroleum, Energy, and Renewable Energies	Data Focal Point
7	The Gambia	Samba JALLOW	Ministry of and Petroleum	Data Focal Point
8	Ghana	Salifu Addo	Energy Commission of Nigeria	Data Focal Point
9	Guinea Bissau	Kassimo Cunha BORIS		Data Focal Point
10	Guinea	Alpha Ibrahim DIALLO	Ministry of Energy, Hydraulics, and Hydrocarbons	Data Focal Point
11	Liberia	Monyan K. FLOMO	Ministry of Mines and Energy	Data Focal Point
12	Mali	Oumar Alassane MAIGA	National Directorate of Energy	Data Focal Point
13	Niger	Mamoudou Mory	Ministry of Energy and Renewable Energies	Data Focal Point
14	Nigeria	Arkadius Koumoin	ECOWAS Commission	PO Energy
15	Nigeria	Salim Chitou	ECOWAS Commission	ECOWAS SIE EXPERT
16	Nigeria	Temitope Olusegun DINA	Federal Ministry of Power	Data Focal Point
17	Senegal	Fatou Thiam Sow	Ministry of Petroleum and Energies	Data Focal Point
18	Sierra Leone	Benjamin Kamara	Ministry of Energy	Data Focal Point
19	Togo	Hodabalo ASSIH	General Directorate of Energy	Data Focal Point





**ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)**

**Address: Achada Sto António C.P 288, Praia - Cabo Verde**

**Tel: (+238) 260 4630**

**mail: [info@ecreee.org](mailto:info@ecreee.org)**

**[www.ecreee.org](http://www.ecreee.org)**



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