Regional Off-Grid Electrification Project (ROGEP)

Off-Grid Solar Market Assessment and Private Sector Support Facility Design

THIRD REGIONAL CONFERENCE

Lomé, Togo

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NOTE: The findings, analysis, conclusions and recommendations expressed in this presentation are those of the authors – they do not necessarily represent the views of ECREEE, the World Bank or any of the individuals and organizations that contributed to this study.

Agenda

1. Background and Context of the Assignment
2. Scope of Work and Objectives
3. Methodology
4. Results

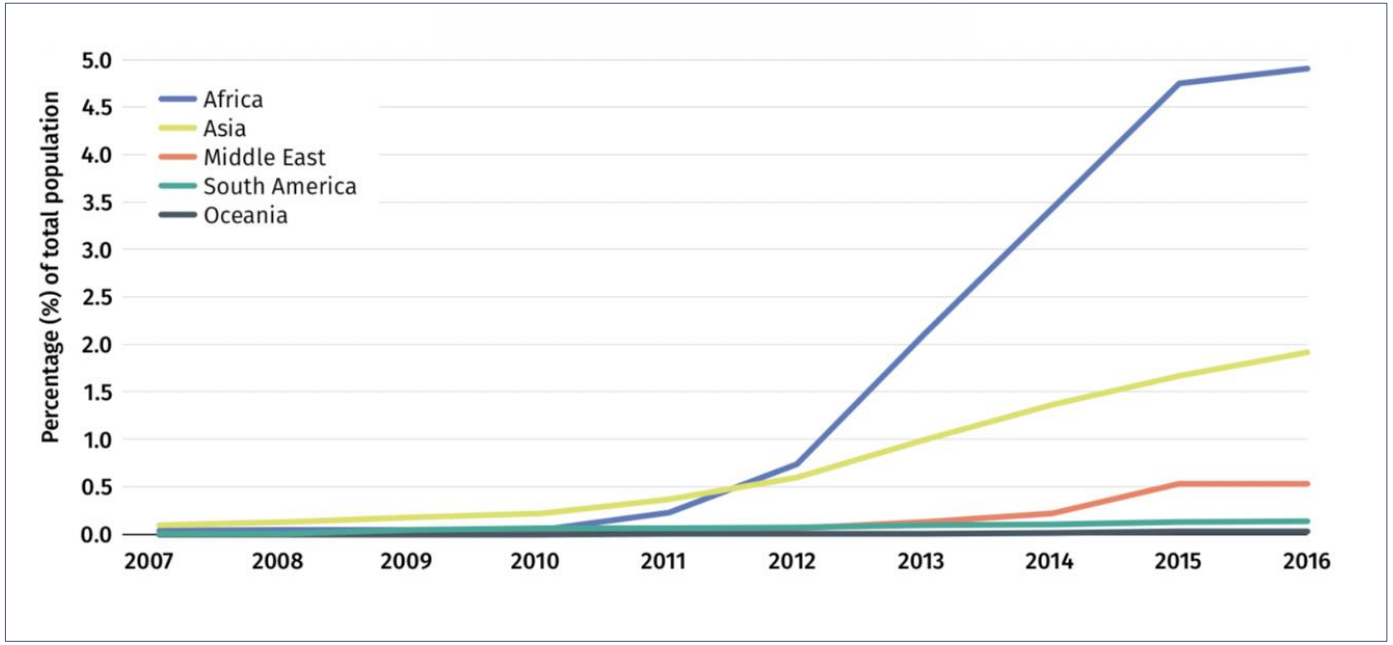
Background and Context of the Assignment

Electricity Access Deficit

- As of 2016, over 200 million people in West Africa and the Sahel – more than half of the region's population – lacked access to electricity. This figure represents nearly one-third of Africa's total unelectrified population.
- Rates of urban and rural electrification vary widely across the region, with the average rate of access more than three times higher in urban areas (60%) when compared to rural areas (18%).
- Even where grid connections exist, power supply is often unreliable. On average, less than one-third of firms and households in West Africa and the Sahel reported reliable electricity supply when surveyed.
- The advent of decentralized renewable energy technologies, particularly solar mini-grids and stand-alone systems, offers opportunities to deliver clean and cost-effective off-grid solutions to complement grid extensions.

Sources:
International Energy Agency – Energy Access Outlook 2017
World Bank Enterprise Surveys, 2013-2017; Afrobarometer Household Surveys, 2014-2015

Off-Grid Solar Electrification



Tier 1 access and above

The use of off-grid solar power is increasing significantly, with African countries accounting for most of the sector's growth over the last decade. The pace of solar electrification has accelerated more rapidly in Sub-Saharan Africa than anywhere in the world.

Source: International Renewable Energy Agency: Tracking SDG7 – The Energy Access Report 2018

Regional Off-Grid Electrification Project

In this context, with funding from the World Bank, ECREEE launched the **Regional Off-Grid Electrification Project (ROGEP)** in 19 countries in West Africa and the Sahel. The project aims to enhance shared capacity, institutions and knowledge in order to increase electricity access of households, businesses and public institutions using modern stand-alone solar systems through a harmonized regional approach.

Conceptual Overview

ROGEP has two main components/objectives:

- **Component 1: Accelerate development of a regional off-grid solar market:**

  (1A) Foster regional collaboration and promote a supportive enabling environment for the OGS sector;

  (1B) Provide entrepreneurship technical support to OGS companies at various stages of development (training to accelerate business growth and/or facilitate market entry);

  (1C) Provide entrepreneurship financial support to OGS companies at various stages of development (matching grants);

  (1D) Provide financing to remove barriers in challenging markets (market entry grants and performance grants to OGS companies operating in challenging markets)

- **Component 2: Facilitate access to financing for off-grid solar businesses:**

  (2A) Provide line of credit for OGS businesses via BOAD to be extended to local financial institutions for on-lending to local entrepreneurs (working capital for solar companies to finance equipment imports, receivables from Pay-Go schemes etc.)

  (2B) Implement contingent grant facility via BOAD to share risks with local financial institutions and encourage lending to OGS businesses

BOAD = Banque Ouest Africaine de Développement (West African Development Bank)

Project Team

The ECOWAS Center for Renewable Energy and Energy Efficiency (ECREEE) was launched in 2010 with the objective of promoting sustainable development across the ECOWAS region, focusing on infrastructure development and the provision of efficient, reliable and competitive energy sources to member states, with a specific emphasis on rural electrification and energy access.

GreenMax Capital Advisors is a specialized provider of sustainable energy policy, finance and management advisory services, with an extensive track record facilitating the implementation of international development funds targeting renewable energy investment in emerging markets worldwide. GreenMax has successfully executed projects across five continents, with experience in more than 80 countries globally since 1994. GreenMax has been engaged as a leading advisor in Africa's off-grid renewable energy sector since 2005.

African Solar Designs has more than 20 years of energy sector experience, offering a strategic mix of technical, management and project development services to a wide range of clients, including governments, donors, private clients and community groups. ASD has been working extensively on renewable energy and rural electrification initiatives throughout Africa, specializing in off-grid market studies, technical assessments and related renewable energy project design, engineering and development, with particular expertise in solar PV technology.

Energio Verda Africa is a Tanzanian renewable energy and GIS consulting firm that has advised clients from the private and international development sector since 2012. EVA has supported electrification programs via either grid extension or isolated grids and has developed a suite of geospatial methodologies to support company strategies and the development of projects. Acting as a co-developer for international companies, EVA offers a wide range of services, including site searching (GIS and field) and land acquisition.

Scope of Work and Objectives

Geographic Scope

The 19 countries covered by ROGEP (collectively referred to as "West Africa and the Sahel") include the 15 member states of ECOWAS – Benin, Burkina Faso, Cabo Verde, Cote d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Sierra Leone, Senegal and Togo – plus Cameroon, Central African Republic, Chad and Mauritania.

Off-Grid Solar Market Assessment

Scope of Work/Objectives:

- **Task 1**: Enabling policy and market environment
- **Task 2**: Off-grid solar market assessment
  - Demand [private households, public institutions, productive use]
  - Supply
- **Task 3:** Willingness and capacity of national and regional financial institutions to provide financing
- **Task 4**: Models to incentivize private sector and financial institutions to support off-grid solar market development

Two complementary work-streams:

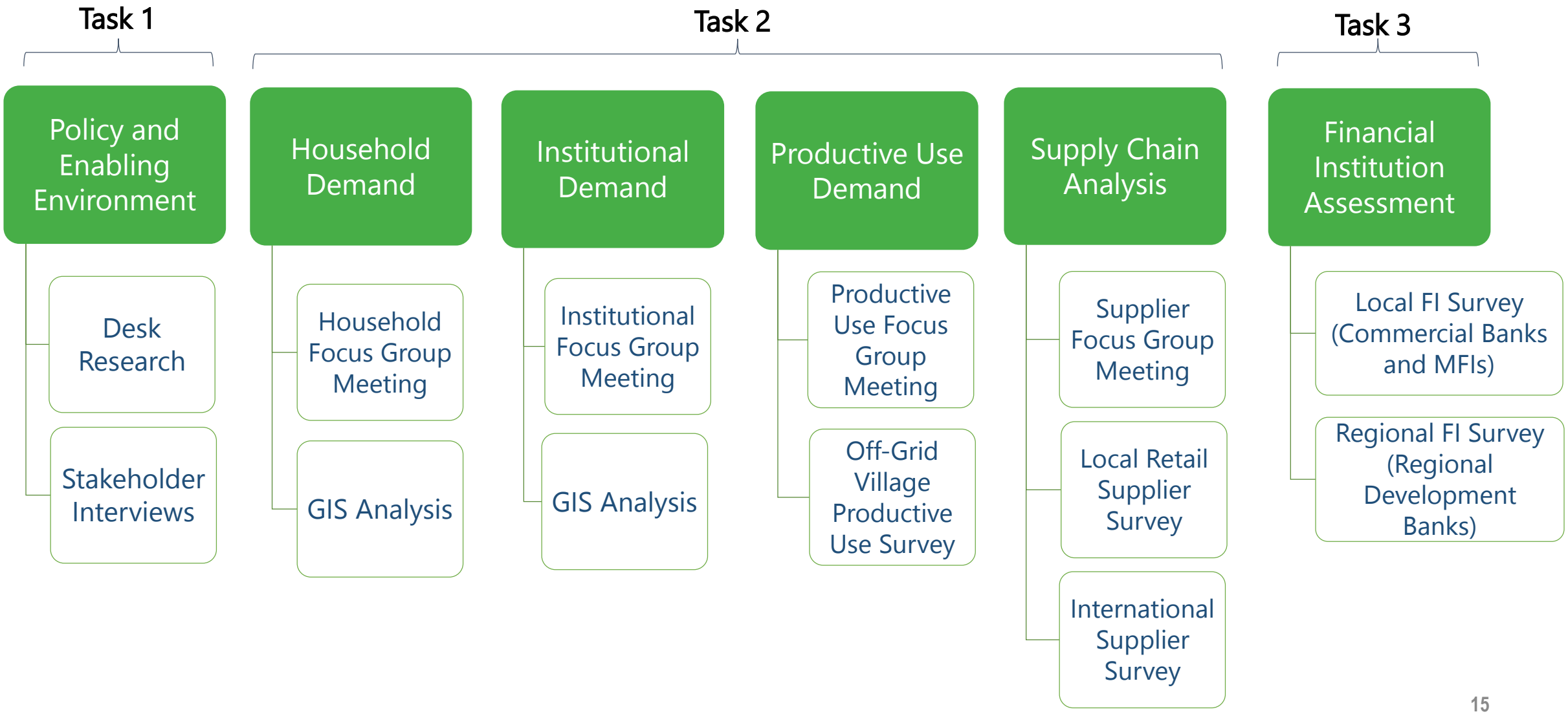
- Least-Cost Electrification Analysis
- Gender Assessment

Methodology

Data Collection Methods and Tools

Available Information	• Government statistics (census data, electrification data), energy sector plans (electrification master plan), published reports (GOGLA, World Bank, IEA data) and input from local experts
Key Stakeholders	• Representatives from government, donor community, NGOs, solar companies, financial institutions, industry associations, academia, community groups and women's groups
Focus groups	• Key stakeholders from household, institutional, productive use and supply sectors • Relevant data and high-level market insights
Surveys and Questionnaires	• Solicited information from selected target groups (solar companies, financial institutions)
GIS Data and Analysis	• Datasets on population, settlements, households, public/social facilities (health facilities and schools), electrical grid network, etc. • Least-cost electrification analysis

Data Collection Methods and Tools



Enabling Policy and Market Environment

Review of Primary Source Documents

- Electrification Master Plans
- Renewable Energy Policies/Laws/Regulations
- Renewable Energy Action Plans (SEforALL)

Stakeholder Interviews; Market Research

- Interviews with local public officials and solar industry stakeholders
- Supplemental research from published industry reports (GOGLA, World Bank, IEA)

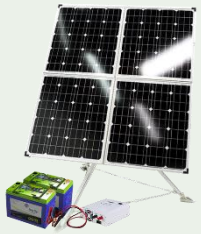
Policy Analysis

- Status of off-grid solar policy and regulatory framework
- Recommendations to facilitate market development

Off-Grid Solar Market Assessment: Demand

Household Demand

- **Market Segment**: Off-Grid Households
  - ✓ Pico solar
  - ✓ Plug and play SHS (single module)
  - ✓ Small SHS (multiple module)
  - ✓ Medium-Large SHS

Household solar product/system	Pico-Solar / Solar Lantern	Single Module Solar Home System (DC)	Multiple Module Solar Home Systems (AC)	Medium-Large Solar Home Systems (AC)
Size	≤ 10 W	11 – 100 W	101 – 500 W	> 500 W
Cost	< $100	$60 – 500	$500 - $3000	> $2000
Description	All-in-one lighting and/or phone charging	Includes several lights, mobile phone charging and TV or fan	Capacity to power lights, TVs, fans and radios	Multiple modules with capacity to power homes
				

Off-Grid Solar Market Assessment: Demand

Institutional Demand

- **Market Segment**: Off-Grid Public Institutions/Sectors
  - ✓ Water supply
  - ✓ Healthcare
  - ✓ Education
  - ✓ Public lighting

Public / Institutional Sector	Village Water Supply	Healthcare	Education	Public Lighting
Description	Solar pumping systems (low, medium, and high power pumps)	Health facilities (health post, basic facility, enhanced facility)	Primary and secondary schools	Public lighting for village/town centers
				

Off-Grid Solar Market Assessment: Demand

Productive Use of Energy

- **Market Segment**: Off-Grid Productive Use Applications
  - ✓ SME applications for village businesses (microenterprises)
  - ✓ Value-added applications (solar powered irrigation, chilling/refrigeration and milling)
  - ✓ Connectivity/ICT applications (mobile phone charging)

Productive Use Market Segment	SME Applications for Village Businesses	Value-Added Applications	Connectivity / ICT Applications
Description	Microenterprises (barbers and tailors)	Solar powered irrigation, milling and refrigeration	Telecommunications, Information and Communication Technology (ICT), mobile phone charging
			

Off-Grid Solar Market Assessment: Supply

The Role of Financial Institutions

Stakeholder Interviews; FI Surveys

Financial Institution Assessment

- Commercial Banks/Microfinance Institutions
- Regional Development Banks
  - ✓ ECOWAS Bank for Investment and Development (EBID)
  - ✓ West African Development Bank (Banque Ouest Africaine de Développement, BOAD)

FI Assessment

Assessment of awareness, interest and capacity of FIs to serve as local implementation partners of ROGEP

Market Research

Overview of Financial Market and Commercial Lending Environment

- ✓ Commercial Banks
- ✓ Microfinance Institutions
- ✓ Development Finance Institutions
- ✓ Non-bank FIs (crowd funders, impact investors, trade funders, export credit agencies)
- ✓ Informal Financial Institutions
- ✓ Financial Inclusion
- ✓ Digital Financial Services / Mobile Money

Market Analysis

Analysis of financing and TA needs, existing barriers to lending etc.

Recommendations to facilitate off-grid solar lending

Least-Cost Electrification Analysis

Available GIS Data

- **Scope of Analysis**
  - ✓ Settlements
  - ✓ Population
  - ✓ Households
  - ✓ Schools
  - ✓ Health Facilities
  - ✓ Water Points (boreholes and wells)
- **Key Parameters**
  - ✓ National electricity grid proximity
  - ✓ Population density
  - ✓ Nodes of economic growth
- **Analyzed Timeframes/Scenarios**
  - ✓ 2023
  - ✓ 2030

GIS Analysis
Geospatial Mapping

- **Least-Cost Electrification Options**
  - ✓ On-Grid (grid extension, densification)
  - ✓ Mini-Grid
  - ✓ Off-Grid Stand-alone Systems

Task 1 Analysis:
Findings compared to national electrification plans and targets for off-grid sector through 2030 (SEforALL)

Task 2 Market Sizing:
Estimated number of off-grid households, schools and health facilities suitable for stand-alone systems

Gender Assessment

Gender Survey; Market Research

Scope of Analysis

- State of gender equality and existing barriers to inclusive participation in energy/off-grid sectors
- Gender, human capital and economic development
- Gender policy, institutional and legal framework

Gender considerations

- **Enabling environment**
  - ✓ Female education, literacy, employment
  - ✓ Gender policy and mainstreaming
  - ✓ Cultural and social norms
- **Off-grid solar market assessment**
  - ✓ **Demand** (sex-disaggregated market data is necessary to understand female consumer electricity needs, usage and experience)
  - ✓ **Supply** (improve female inclusion in energy/off-grid sector development)*
- **Financial market**
  - ✓ Financial inclusion
  - ✓ Access to capital, asset ownership, collateral, credit

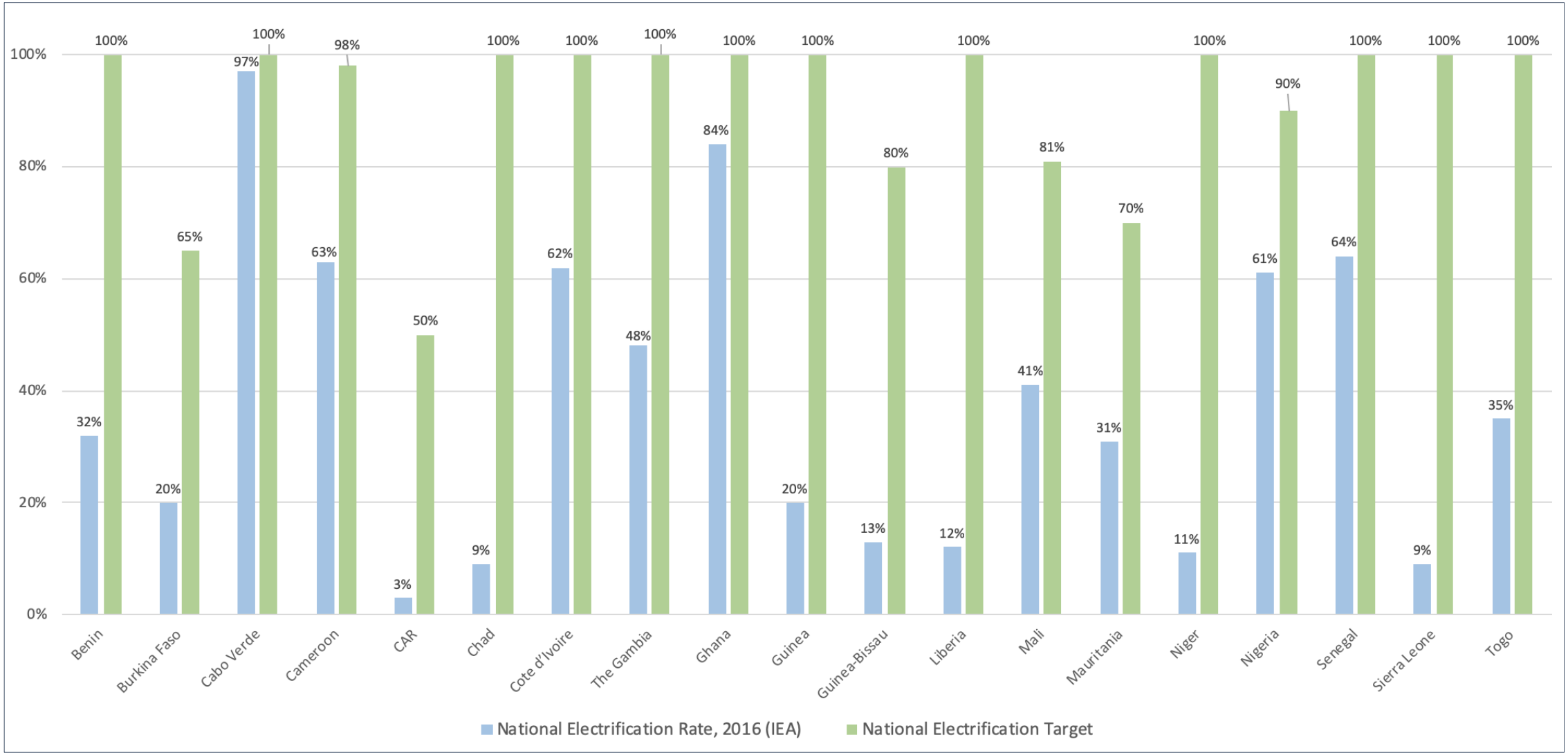
* Women represent only 2% of energy sector entrepreneurs in West Africa

Results


ECREEE
TOWARDS SUSTAINABLE ENERGY
ROGEP
Regional Off-Grid Electrification Project
WORLD BANK GROUP
LIGHTING AFRICA
BOAD
CTF

Enabling Policy and Market Environment

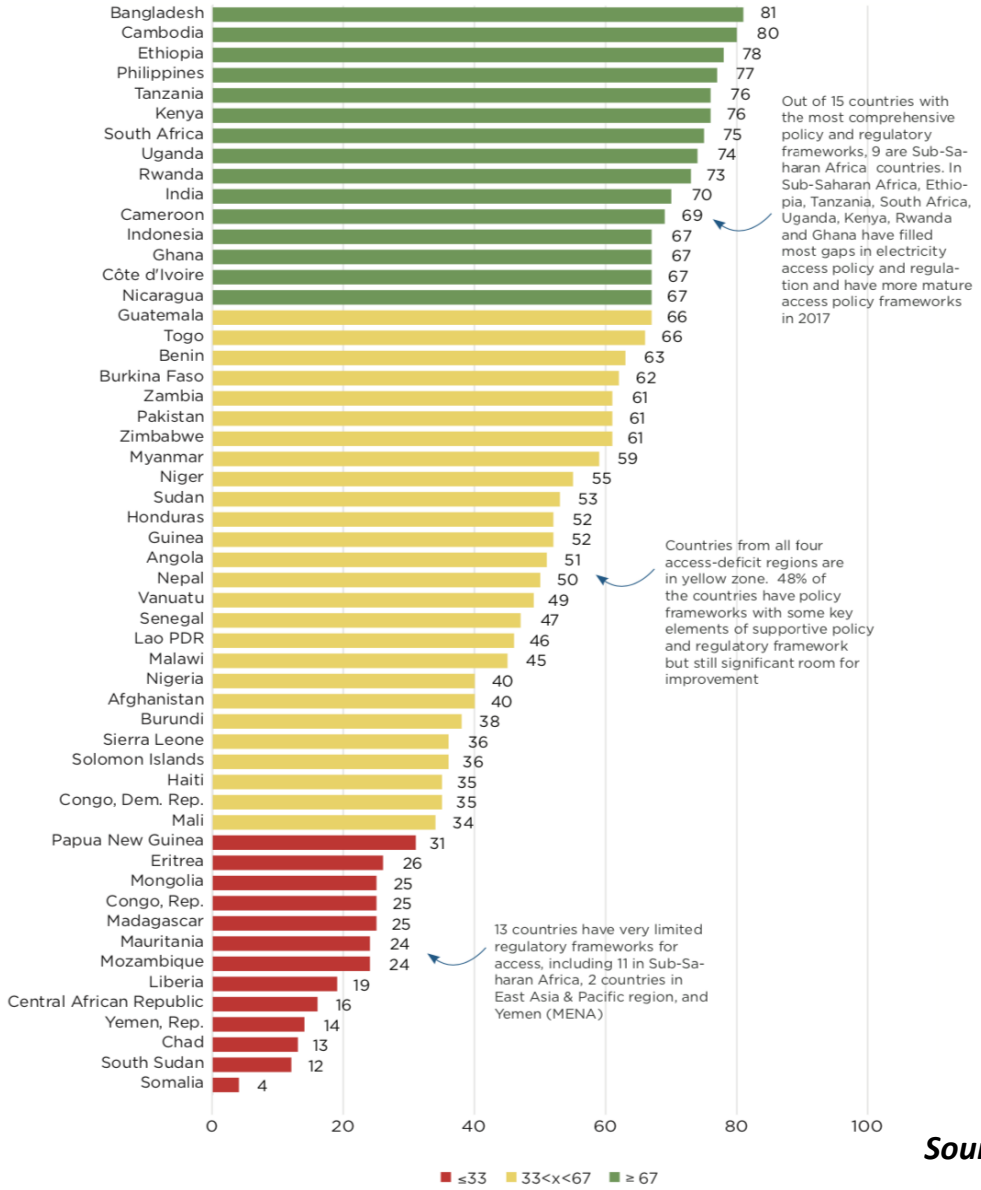
National Electrification Rates and Targets in West Africa and the Sahel



All electrification targets for 2030 with the exception of Cameroon (2035), Côte d'Ivoire (2025), Niger (2035), Senegal (2025) and Sierra Leone (2025).

Enabling Policy and Market Environment

RISE Electricity Access Scores in Access-Deficit Countries, 2017



Source: World Bank

RISE

World Bank Regulatory Indicators for Sustainable Energy

2017 Ranks among Access Deficit Countries

Average ROGEP score: 46

Highest scoring ROGEP countries:

- Cameroon (69)
- Ghana (67)
- Cote d'Ivoire (67)
- Togo (66)
- Benin (63)
- Burkina Faso (62)

Biggest improvement in score between 2015 and 2017:

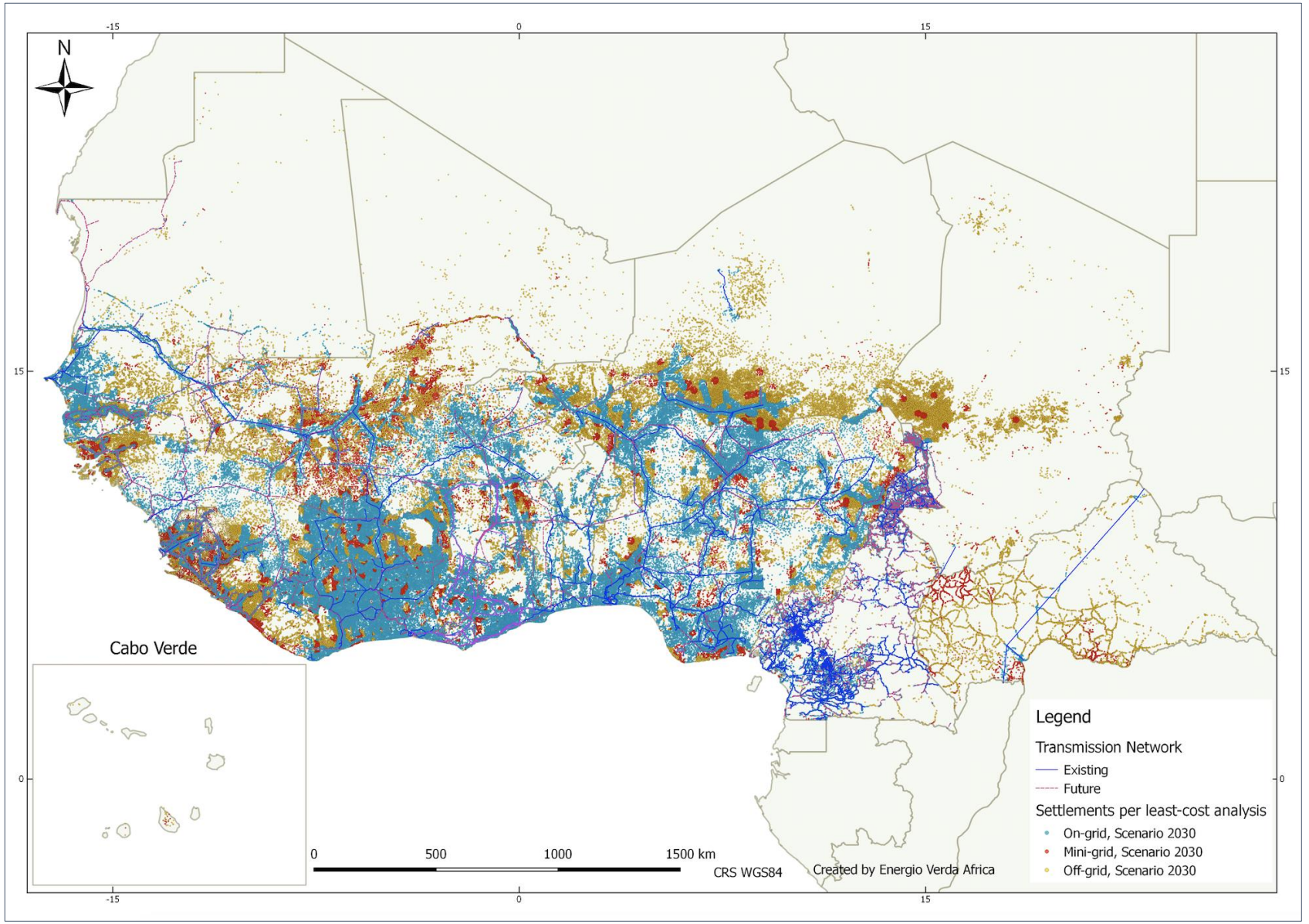
- Togo (+34)
- Niger (+26)
- Burkina Faso (+22)
- Sierra Leone (+19)
- Nigeria (+18)
- Benin (+14)

Togo
+34 pts
(106%)

NOTE: Cabo Verde, Gambia and Guinea-Bissau excluded from RISE analysis

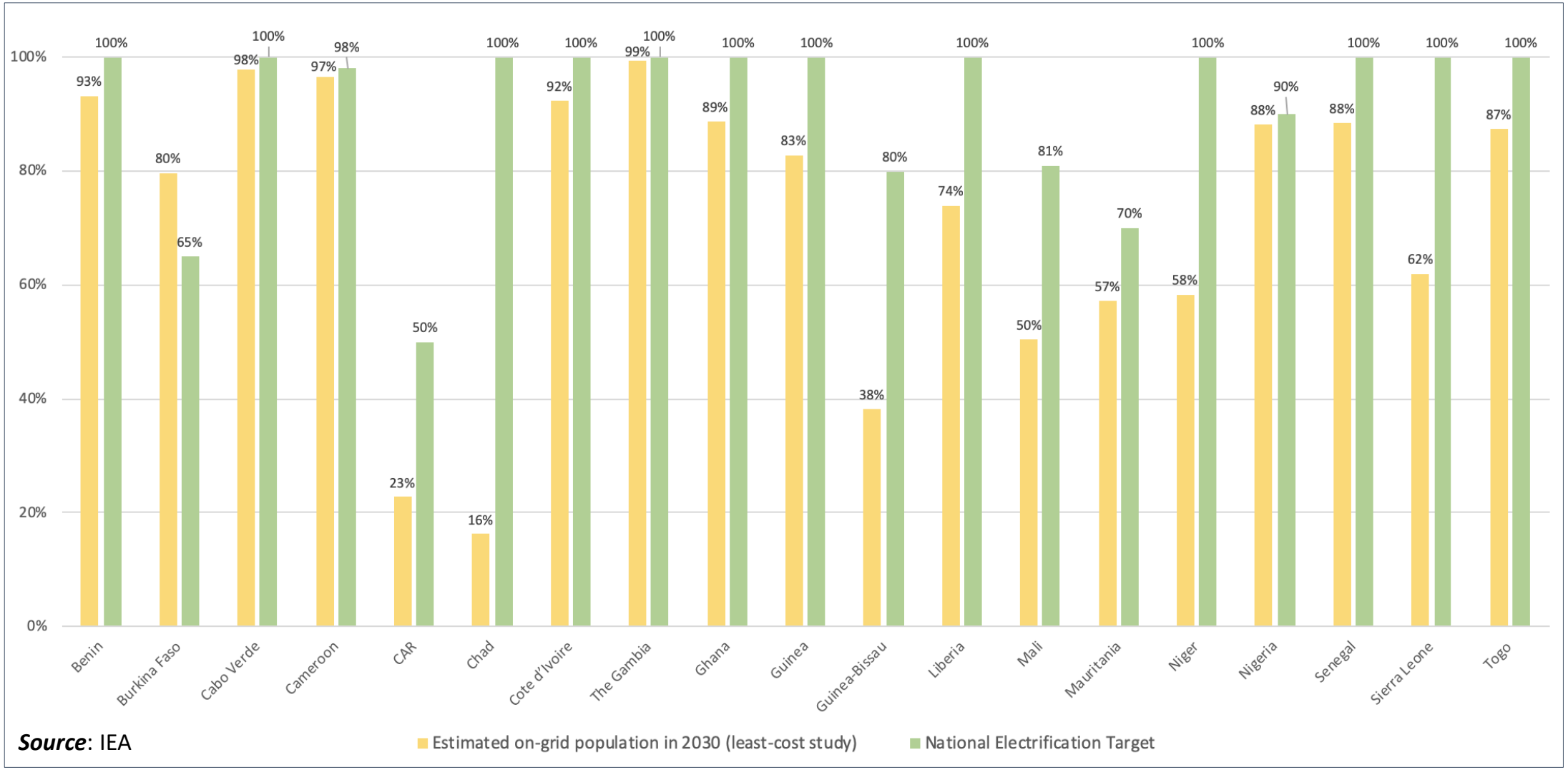
Least-Cost Electrification Analysis

Distribution of Settlements by Least-Cost Electrification Option, 2030



Least-Cost Electrification Analysis

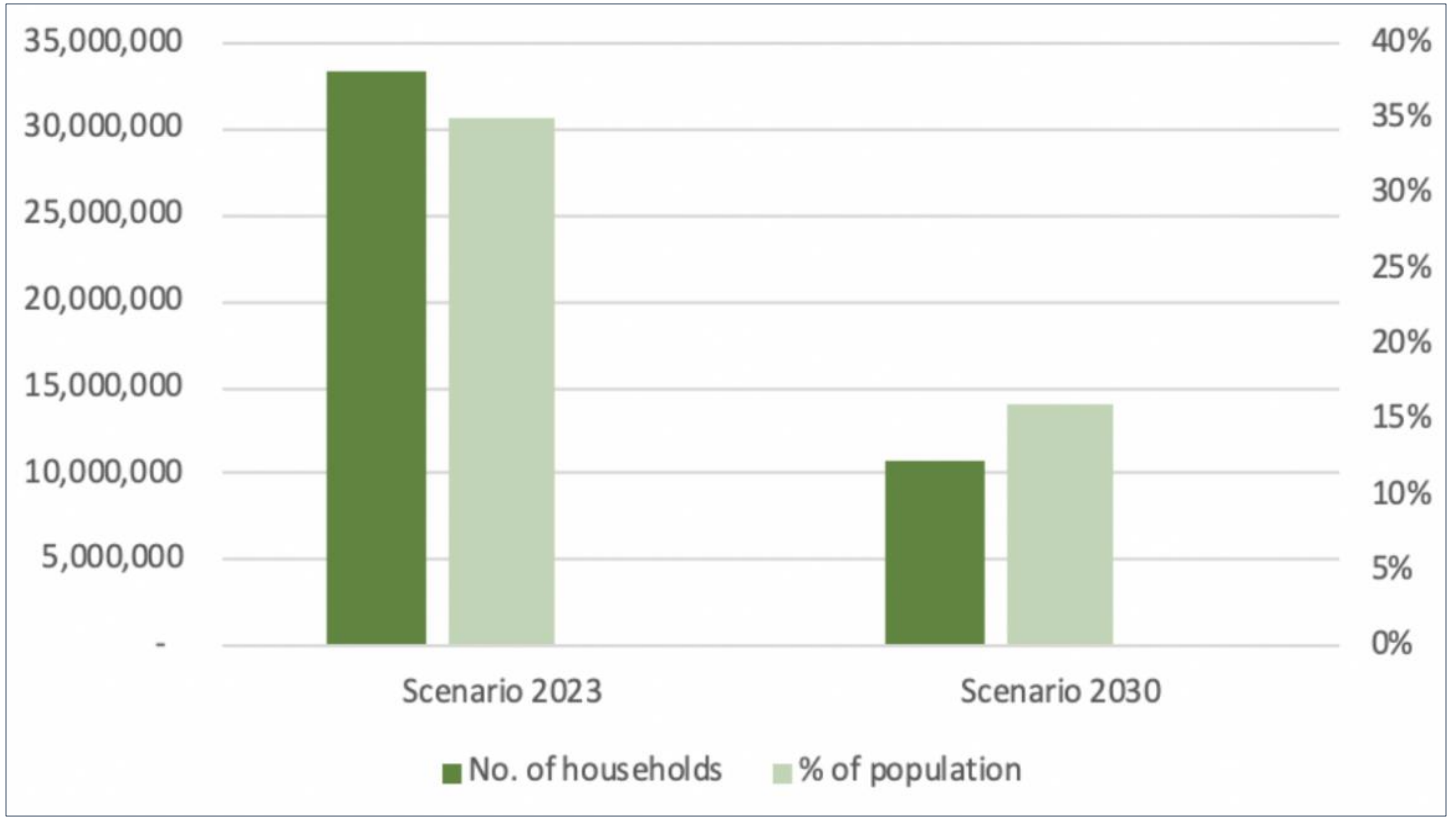
Estimated Share of Population with Electricity Access via the National Grid and National Electrification Targets



Source: IEA

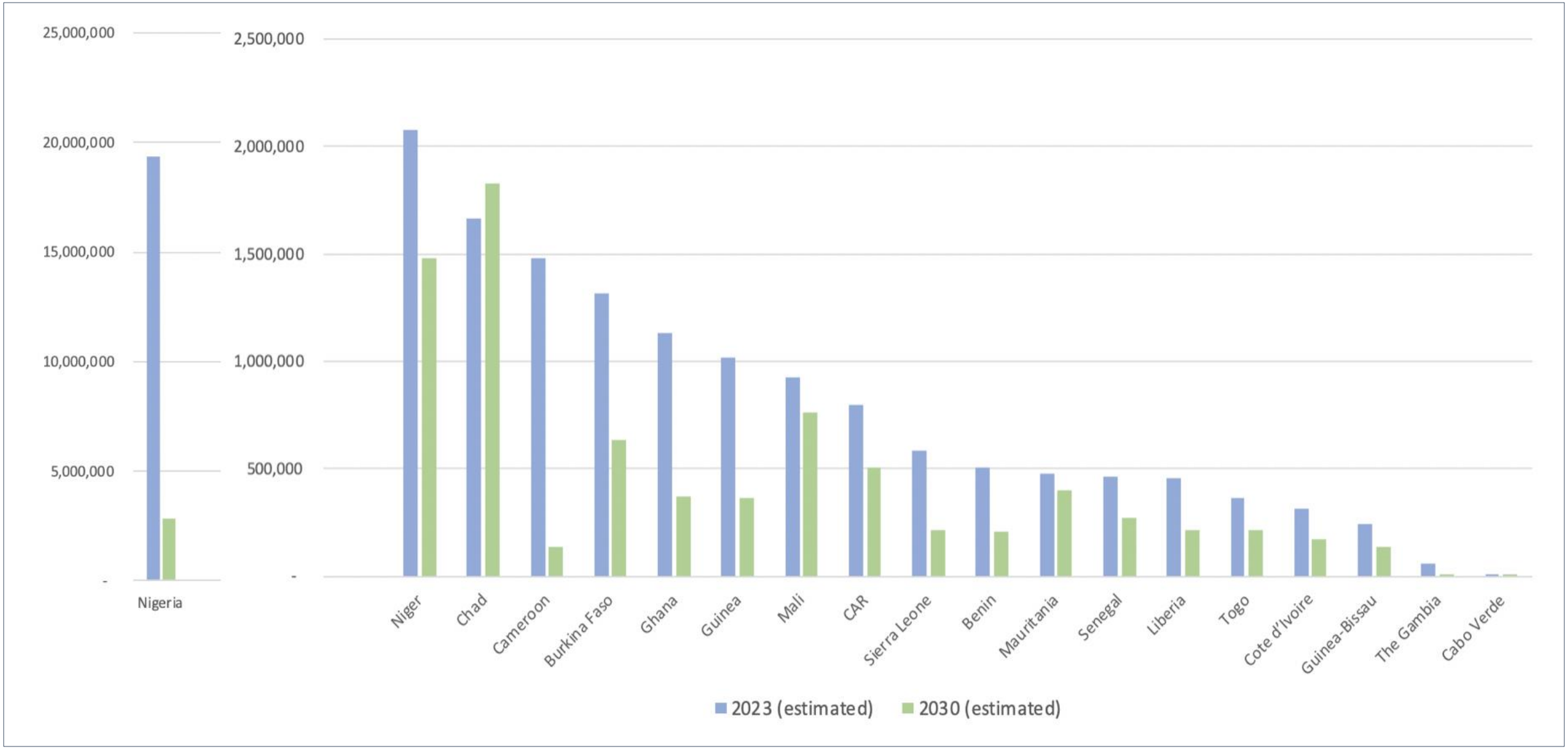
All electrification targets for 2030 with the exception of Cameroon (2035), Côte d'Ivoire (2025), Niger (2035), Senegal (2025) and Sierra Leone (2025).

Estimated Number of Households and Share of Population Suitable for Off-Grid Stand-Alone Systems, 2023 and 2030

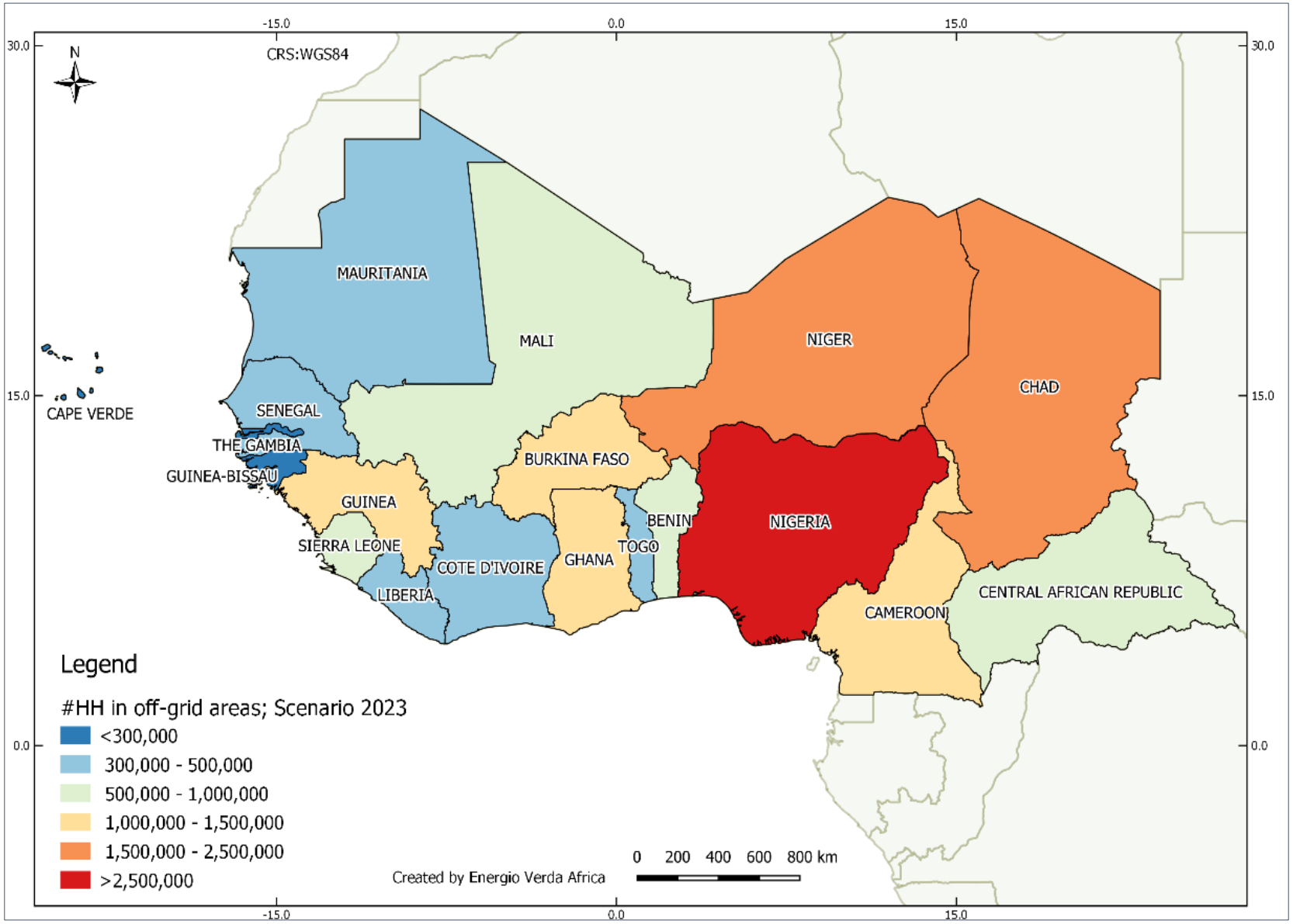


By 2023, about 166 million people, 33 million households and an average of 35% of the population across West Africa and the Sahel will be suitable for stand-alone systems. These estimates will decrease to about 60 million people, 11 million households and an average of 16% of the region's population by 2030.

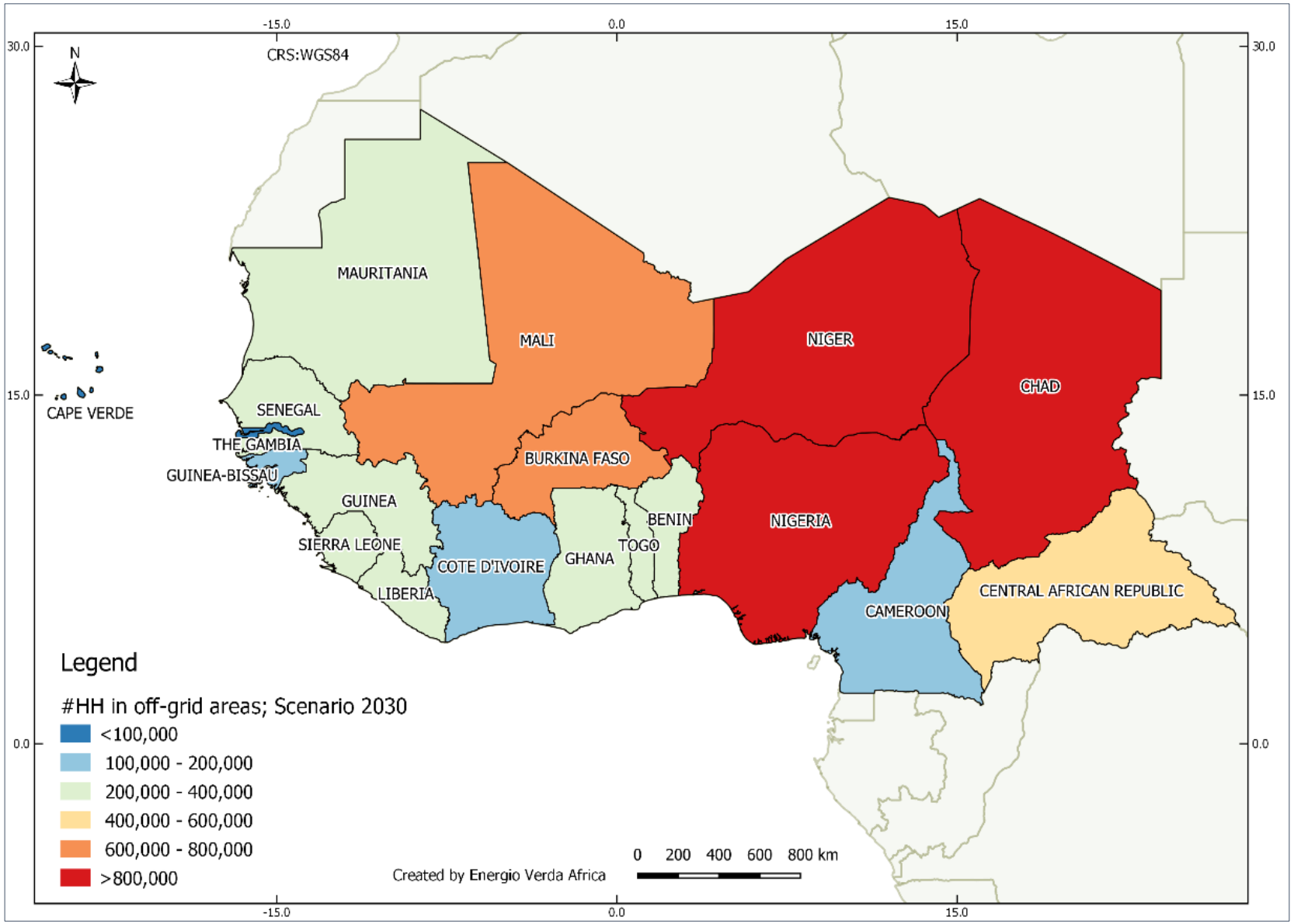
Estimated Number of Households Suitable for OGS Systems, 2023 and 2030



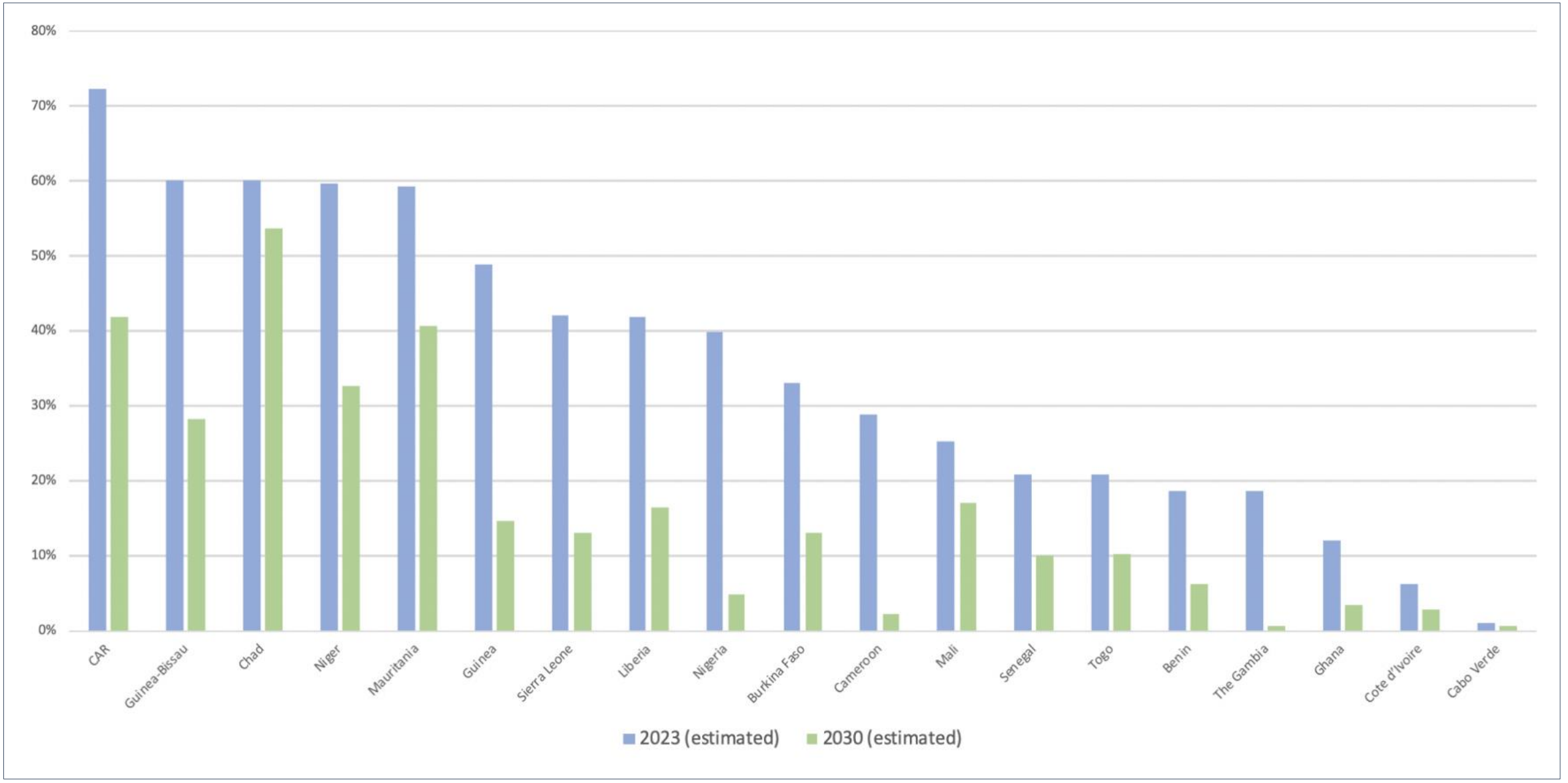
Estimated Number of Households Suitable for OGS Systems, 2023



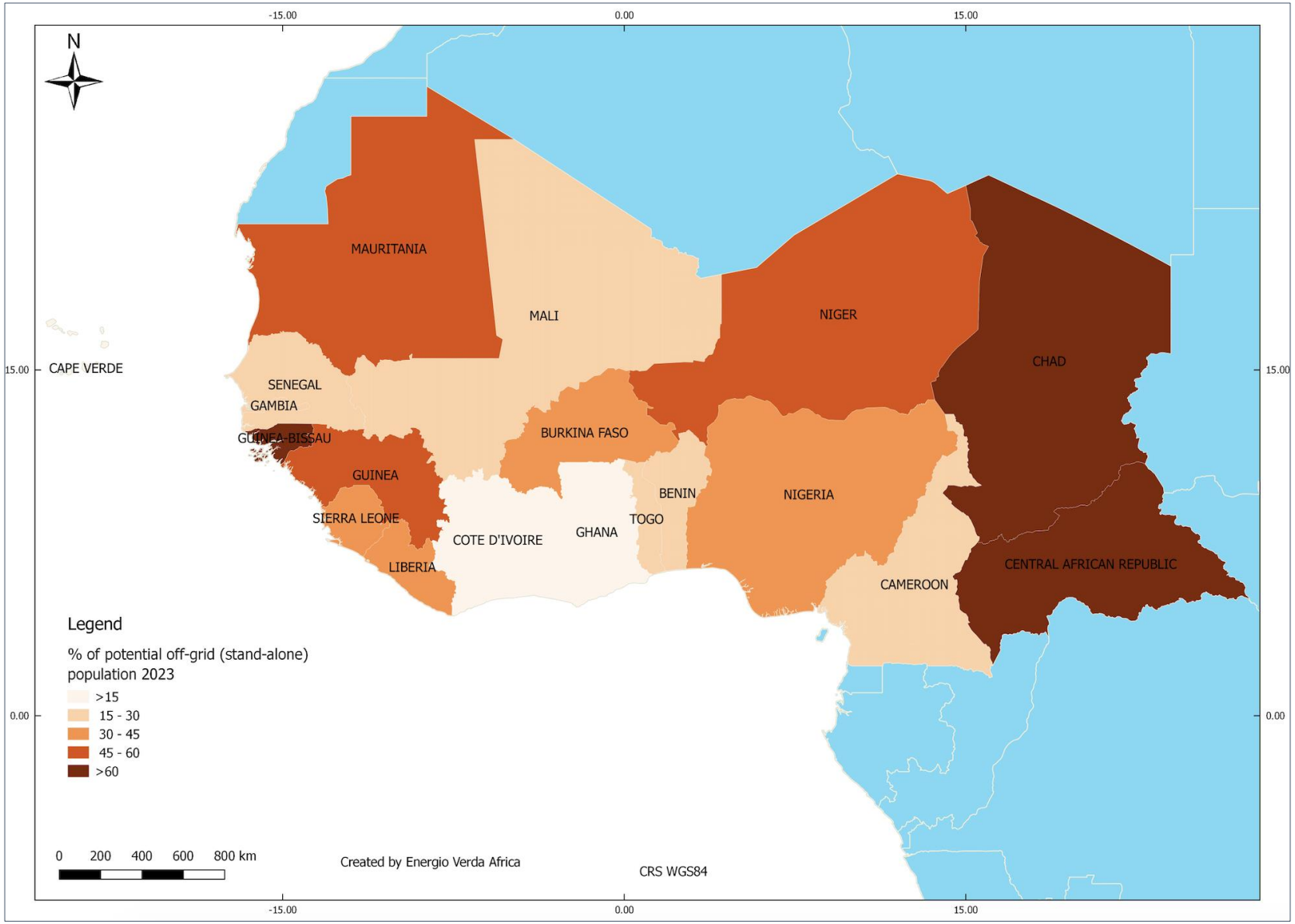
Estimated Number of Households Suitable for OGS Systems, 2030



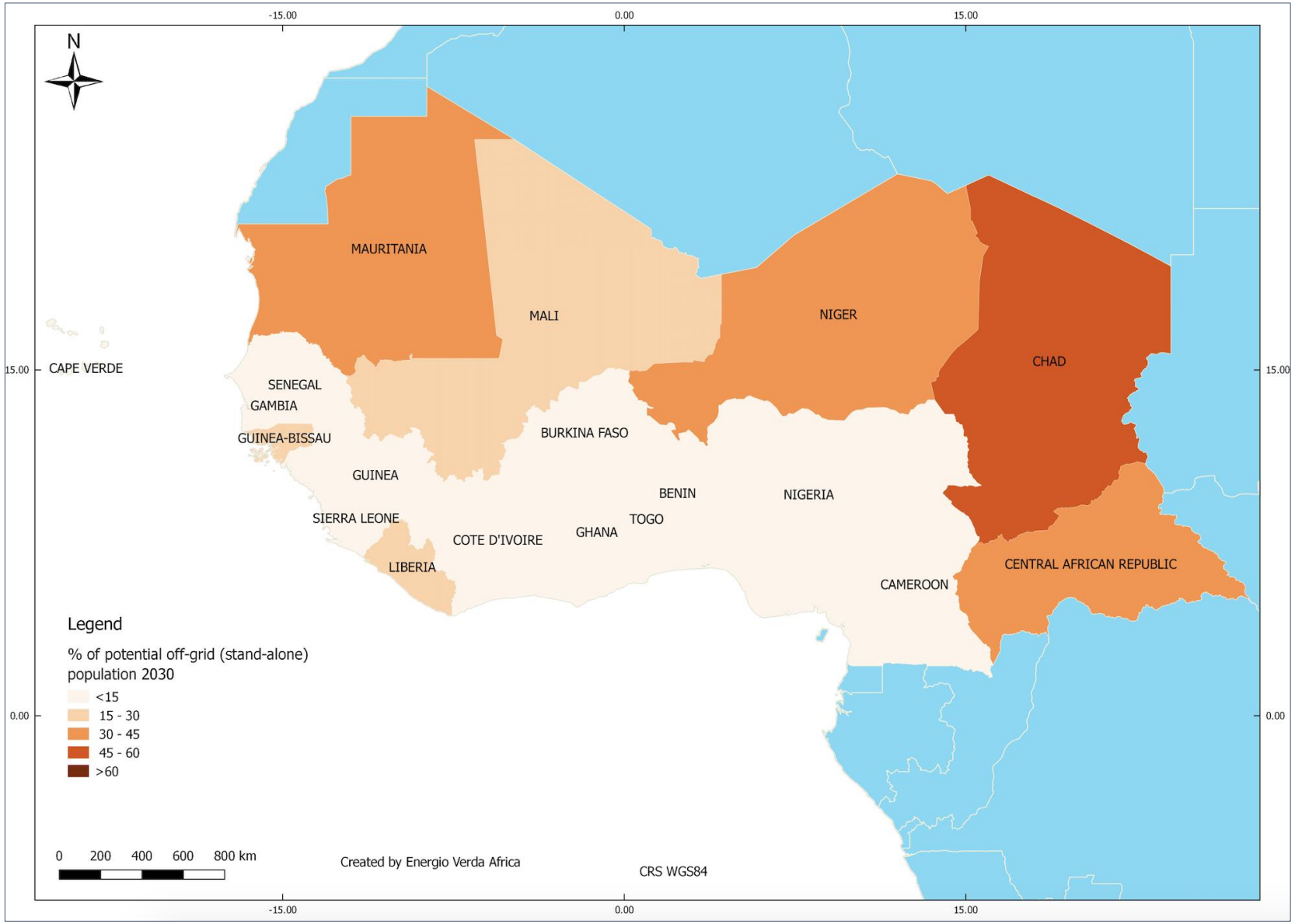
Estimated Share of Population Suitable for OGS Systems, 2023 and 2030



Estimated Share of Population Suitable for OGS Systems, 2023

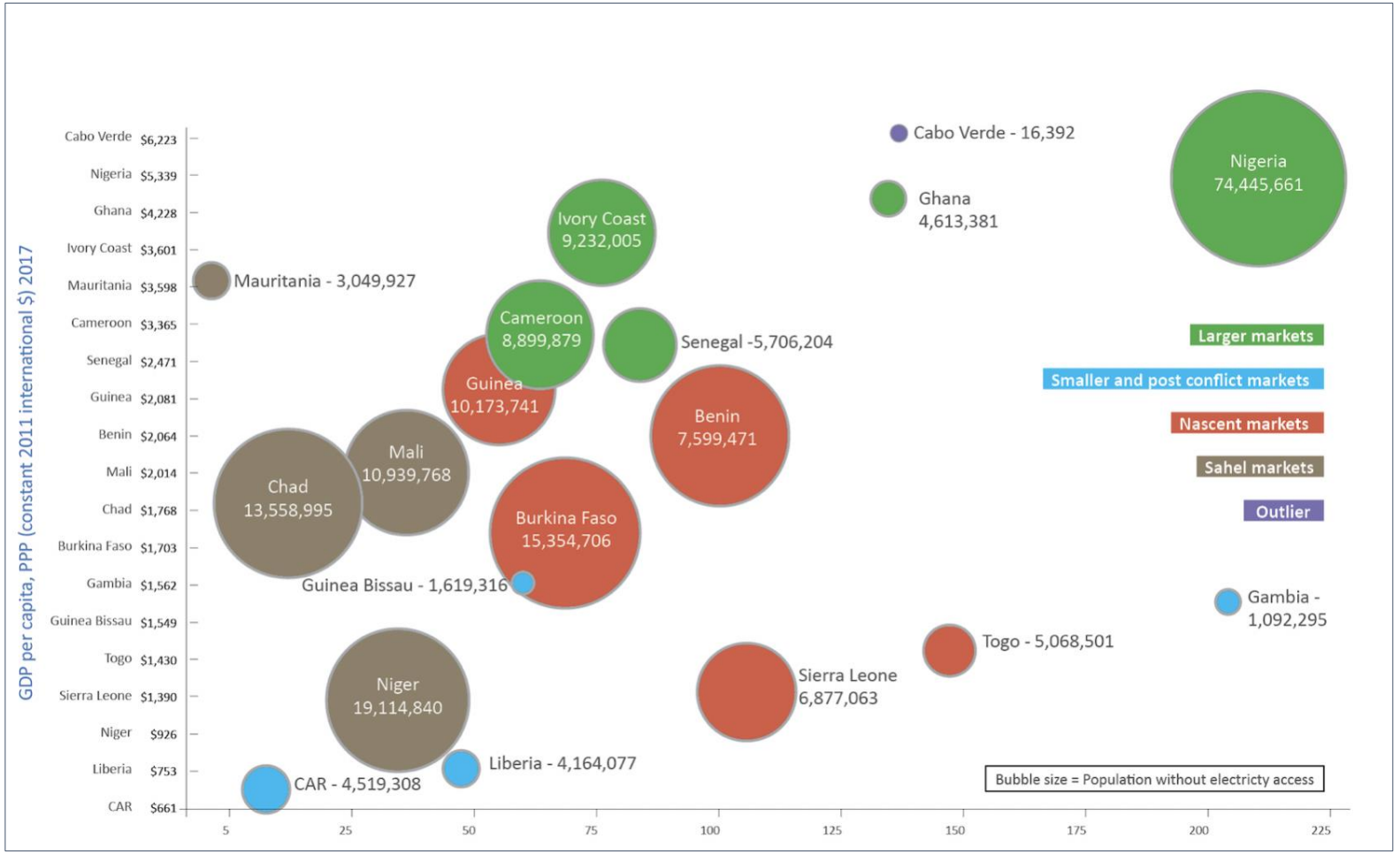


Estimated Share of Population Suitable for OGS Systems, 2030



Off-Grid Solar Market Assessment

Country Categorization by Electricity Access, Income and Population Density



Population Density: people per sq. km of land area (2017)

Market definitions	GDP per capita	Population Density	Population without electricity access
Larger markets	>$2,500	>75	>5 million
Nascent markets	$1500 - 2500	>50	>5 million
Smaller and post conflict markets	$0-1500	Varies	<5 million
Sahel markets	Varies	<20	>10 million
Outlier	>$5000		<50,000

Source: IEA, World Bank

Off-Grid Solar Market Assessment

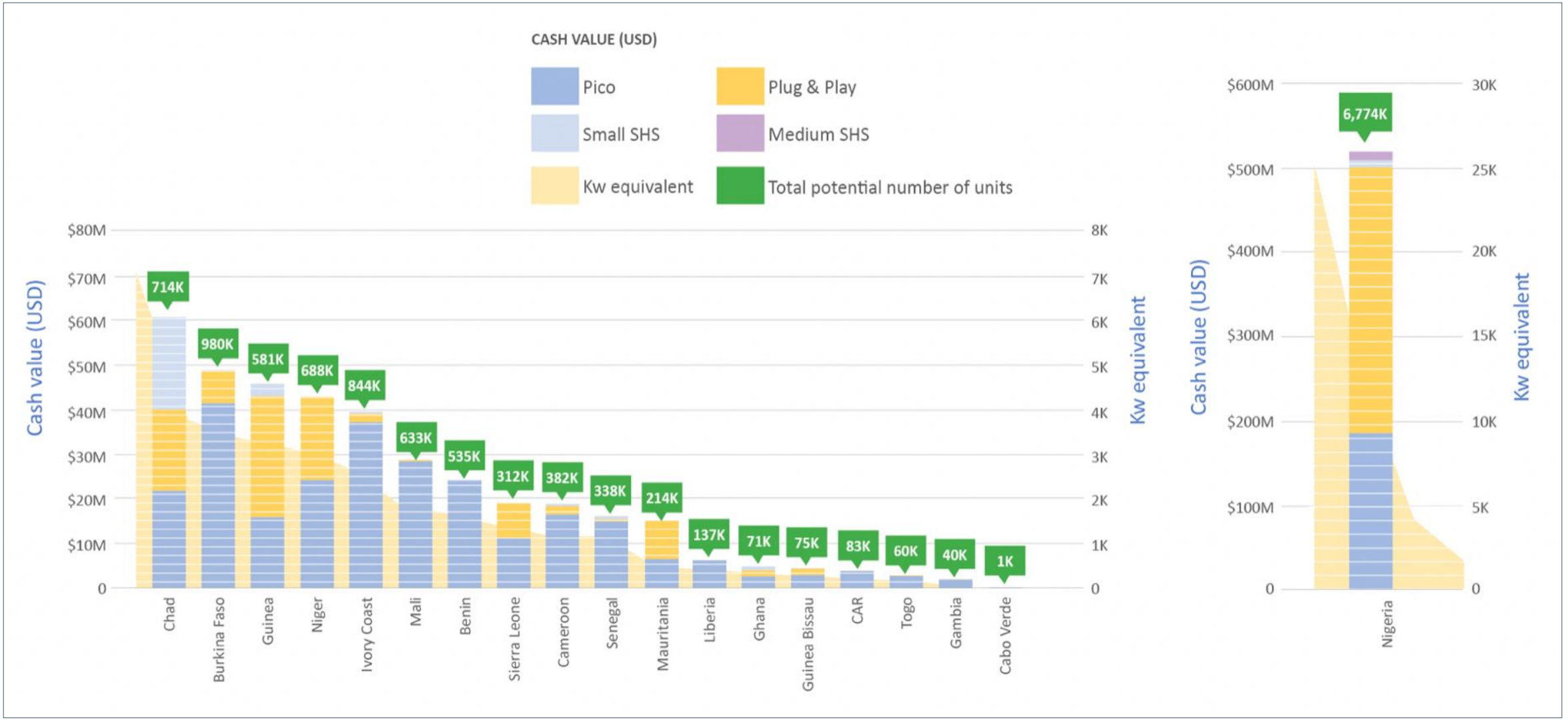
Indicative Total Off-Grid Solar Cash Market Potential in West Africa and the Sahel, 2018

Off-Grid Market Segment	Units	kW Equivalent	Cash Value (USD)
HOUSEHOLD			
Pico solar	9,978,800	29,937	$449,046,106
Plug and play	3,310,212	33,103	$413,776,330
Small SHS	137,451	6,874	$34,362,608
Medium and Large SHS	16,559	4,150	$10,374,256
Estimated Regional Household Cash Market Potential	**13,443,062**	**74,064**	**$907,559,300**
Pico solar	359,236	1,078	$16,165,641
Plug and play	1,334,607	13,347	$166,825,867
Small SHS	4,261,681	213,084	$1,065,420,256
Medium and Large SHS	2,597,536	649,384	$1,623,459,999
Estimated Regional Household Financed Market Potential	**8,553,060**	**876,893**	**$2,871,871,764**
INSTITUTIONAL			
Water supply	18,919	71,375	$178,424,250
Healthcare facilities	8,500	4,666	$11,659,375
Primary and secondary schools	8,246	6,413	$17,681,235
Public lighting	3,449	1,726	$5,173,875
Estimated Regional Institutional Cash Market Subtotal	**39,114**	**84,180**	**$212,938,735**
PRODUCTIVE USE			
SME applications for micro-enterprises (barbers and tailors)	691,466	172,867	$432,166,625
Connectivity / ICT (phone charging)	206,036	82,414	$177,602,737
Value-added applications (irrigation, milling and refrigeration)	1,642,952	272,532	$1,252,030,852
Estimated Regional Productive Use Cash Market Subtotal	**2,540,454**	**527,813**	**$1,861,800,214**
ESTIMATED ANNUALIZED REGIONAL CASH MARKET POTENTIAL	**16,022,630**	**686,057**	**$2,982,298,249**

Household Demand

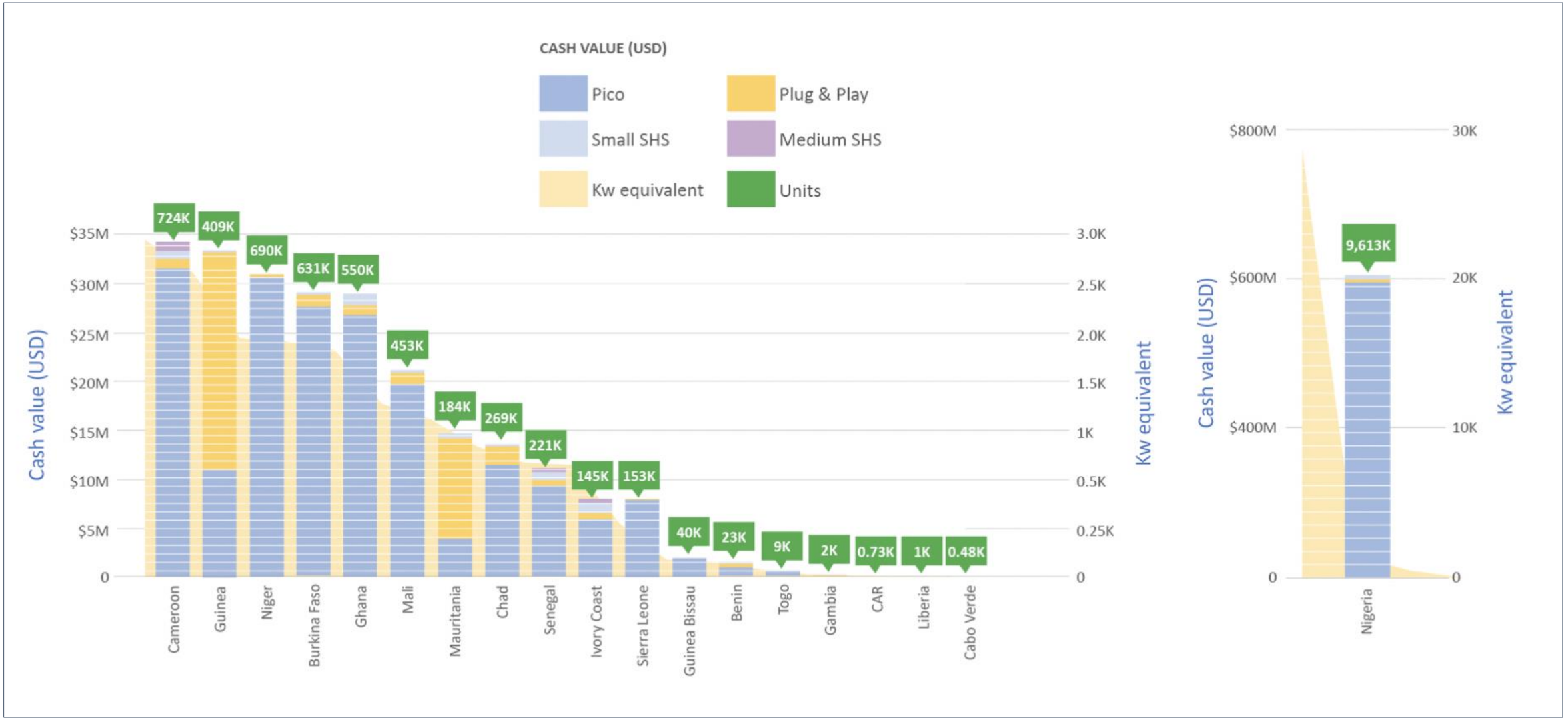
Estimated Household Cash Market, 2018

Estimated Regional OGS Cash Market Potential for Household Sector, 2018



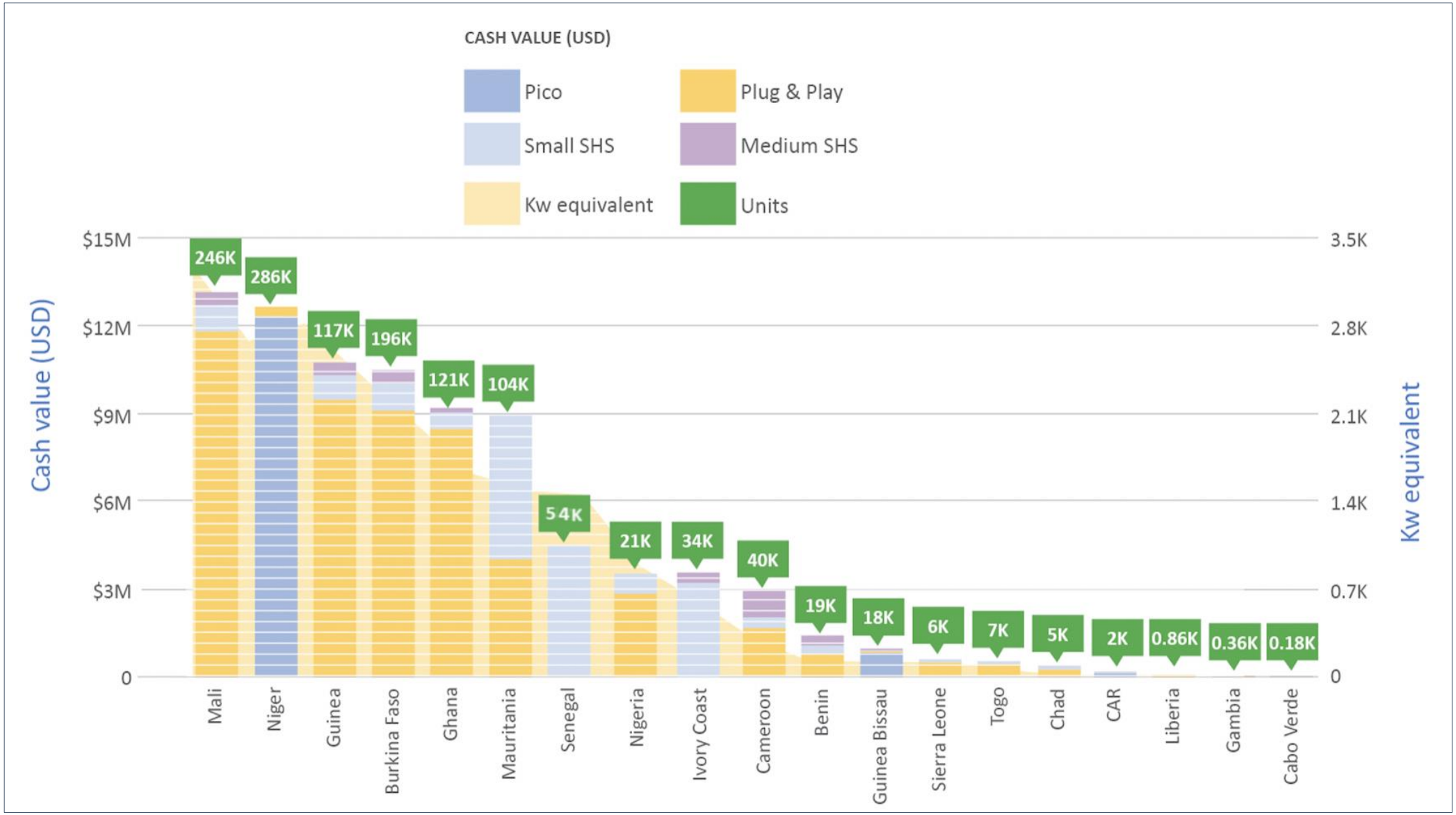
Estimated Household Cash Market, 2023

Estimated Regional OGS Cash Market Potential for Household Sector, 2023



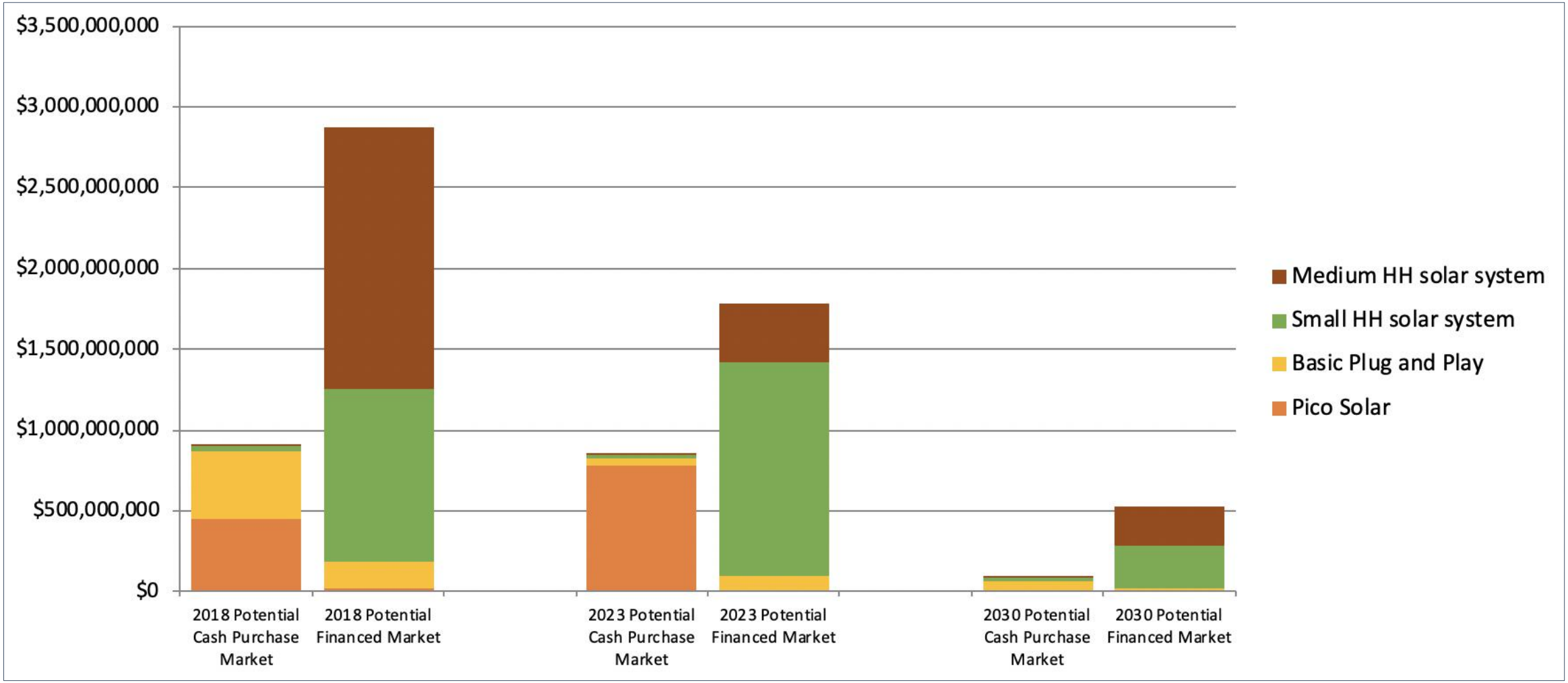
Estimated Household Cash Market, 2030

Estimated Regional OGS Cash Market Potential for Household Sector, 2030



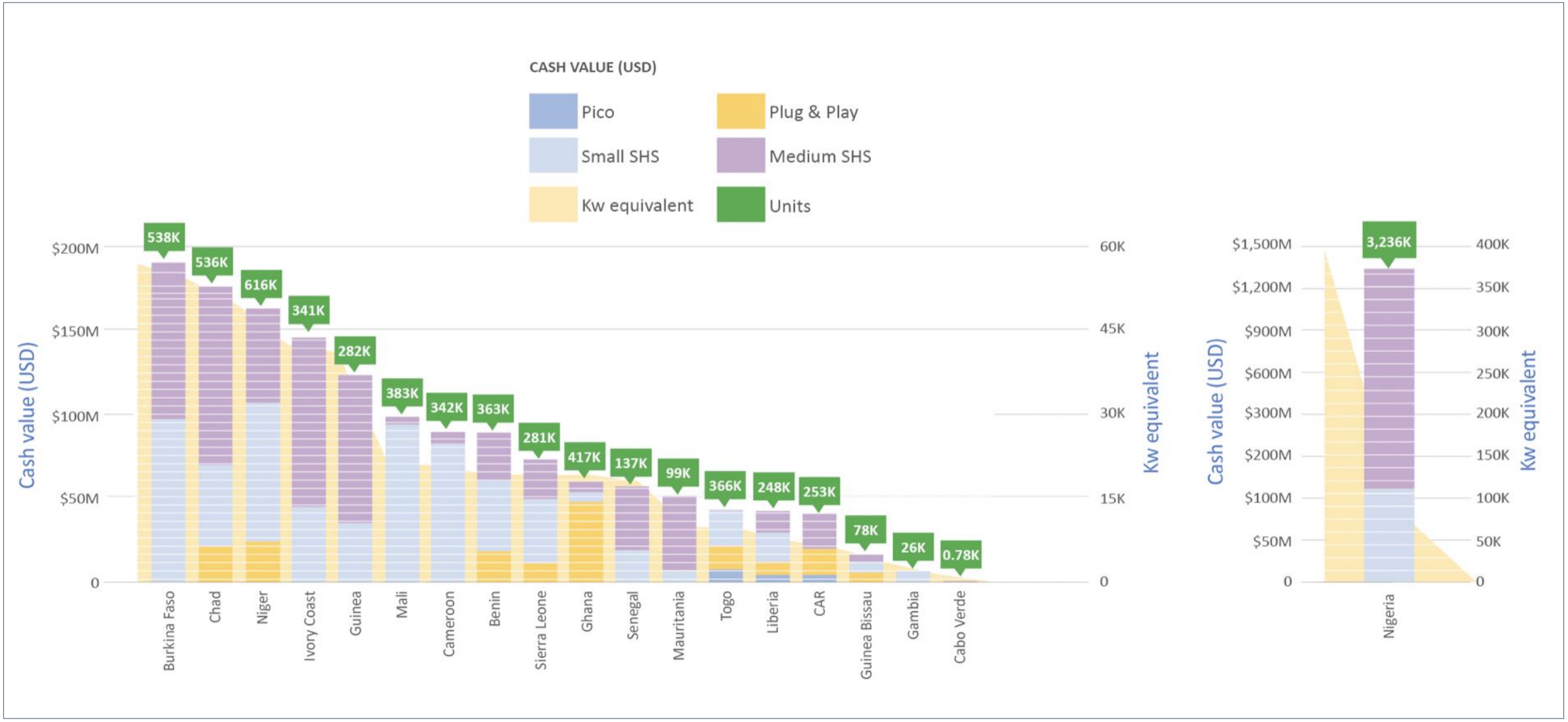
Estimated Household Cash and Financed Market, 2018, 2023 and 2030

Estimated OGS Cash and Financed Market Potential for Household Sector by System Type in West Africa and the Sahel



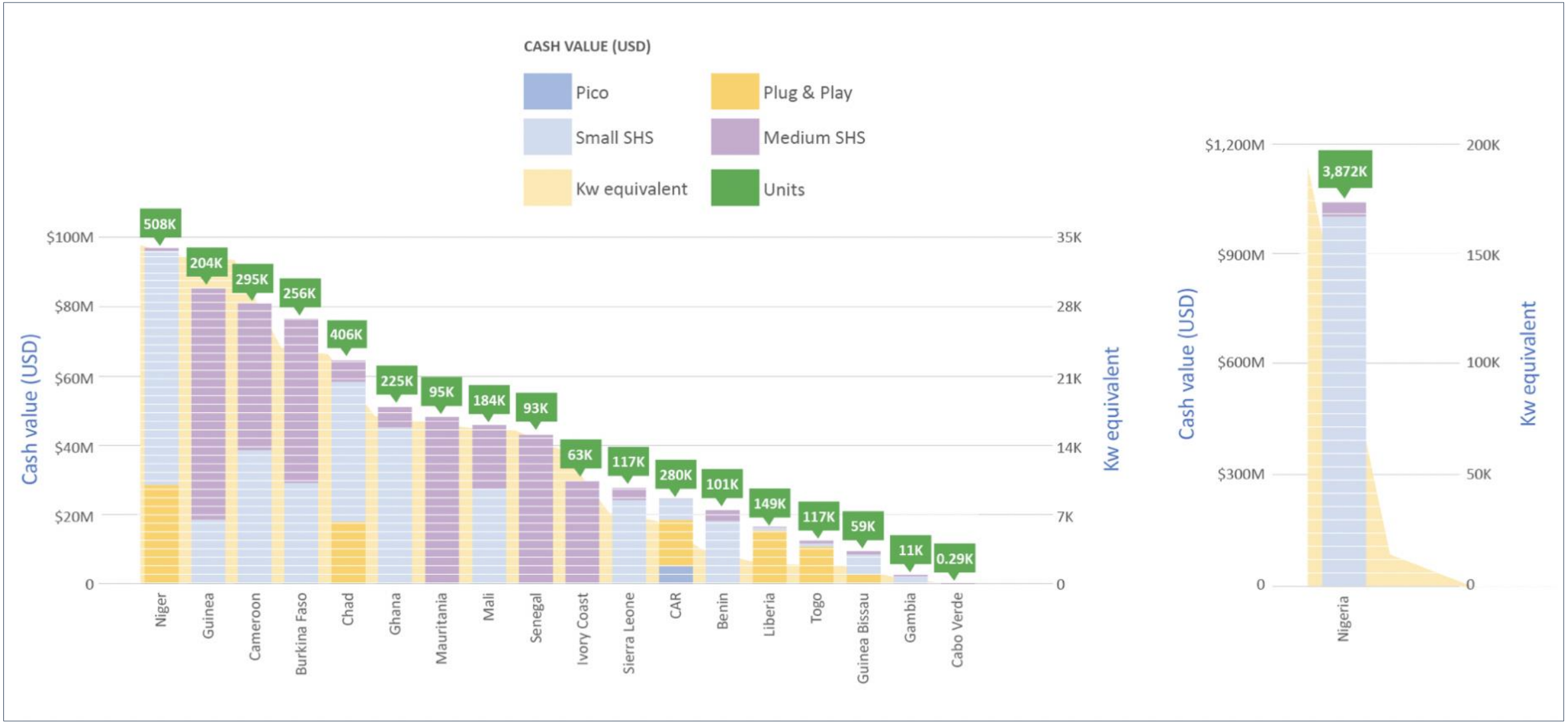
Estimated Household Financed Market, 2018

Estimated Regional OGS Financed Market Potential for Household Sector, 2018



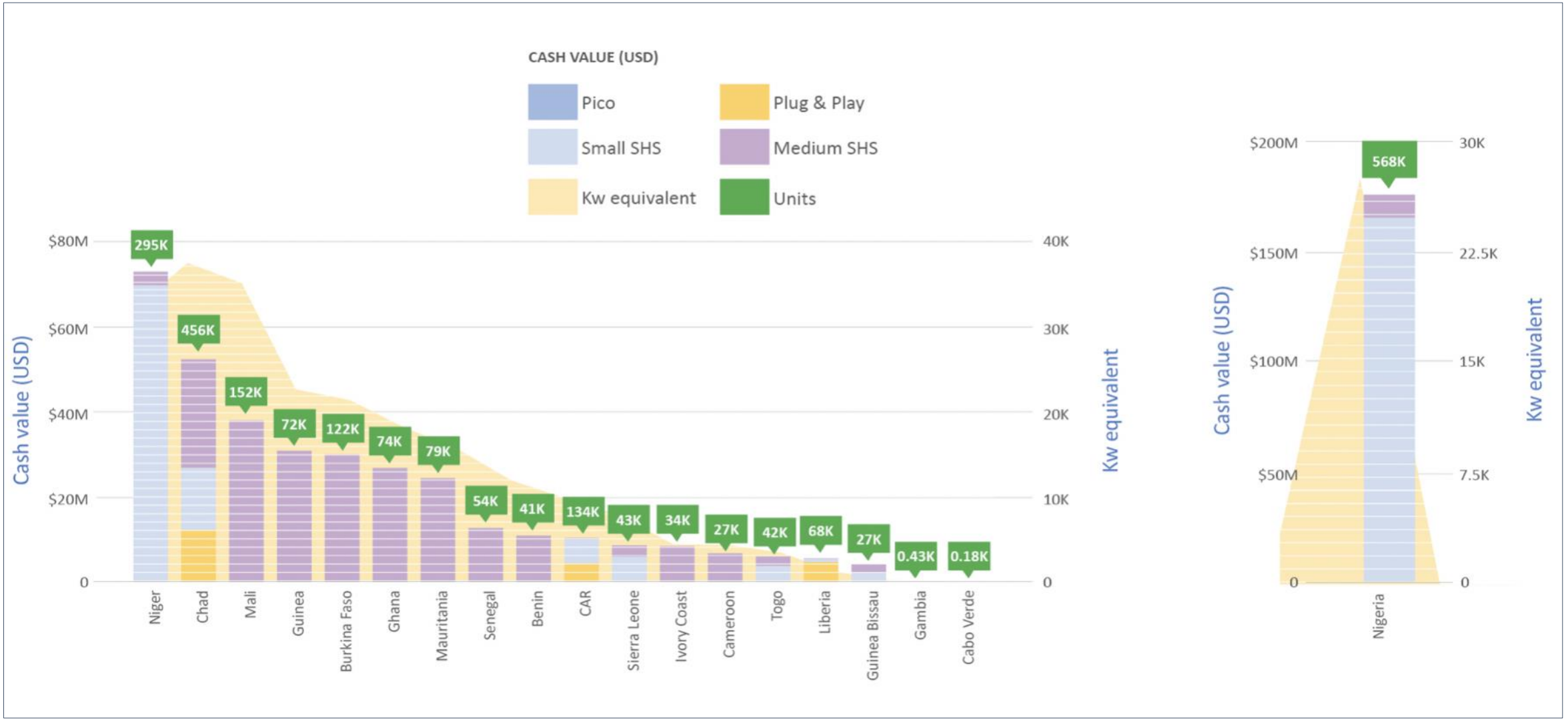
Estimated Household Financed Market, 2023

Estimated Regional OGS Financed Market Potential for Household Sector, 2023



Estimated Household Financed Market 2030

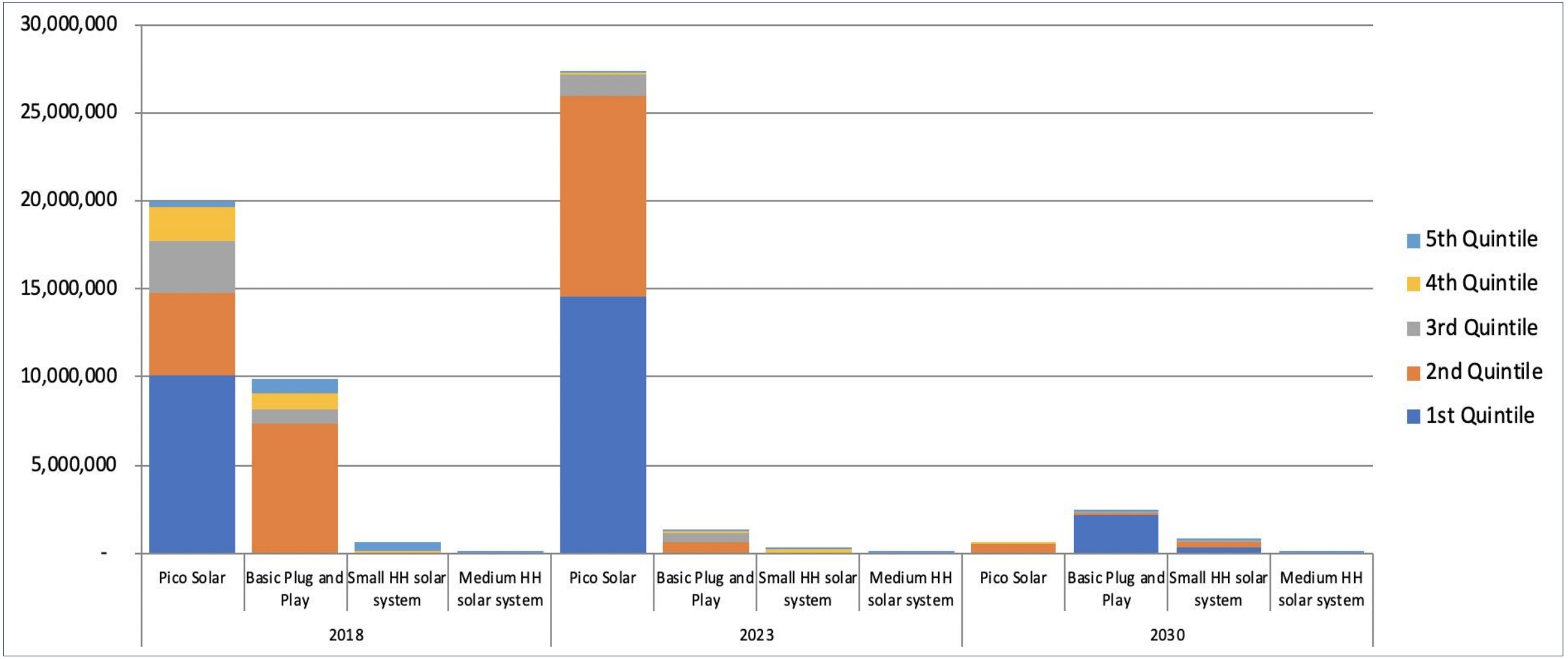
Estimated Regional OGS Financed Market Potential for Household Sector, 2030



Household Ability to Pay

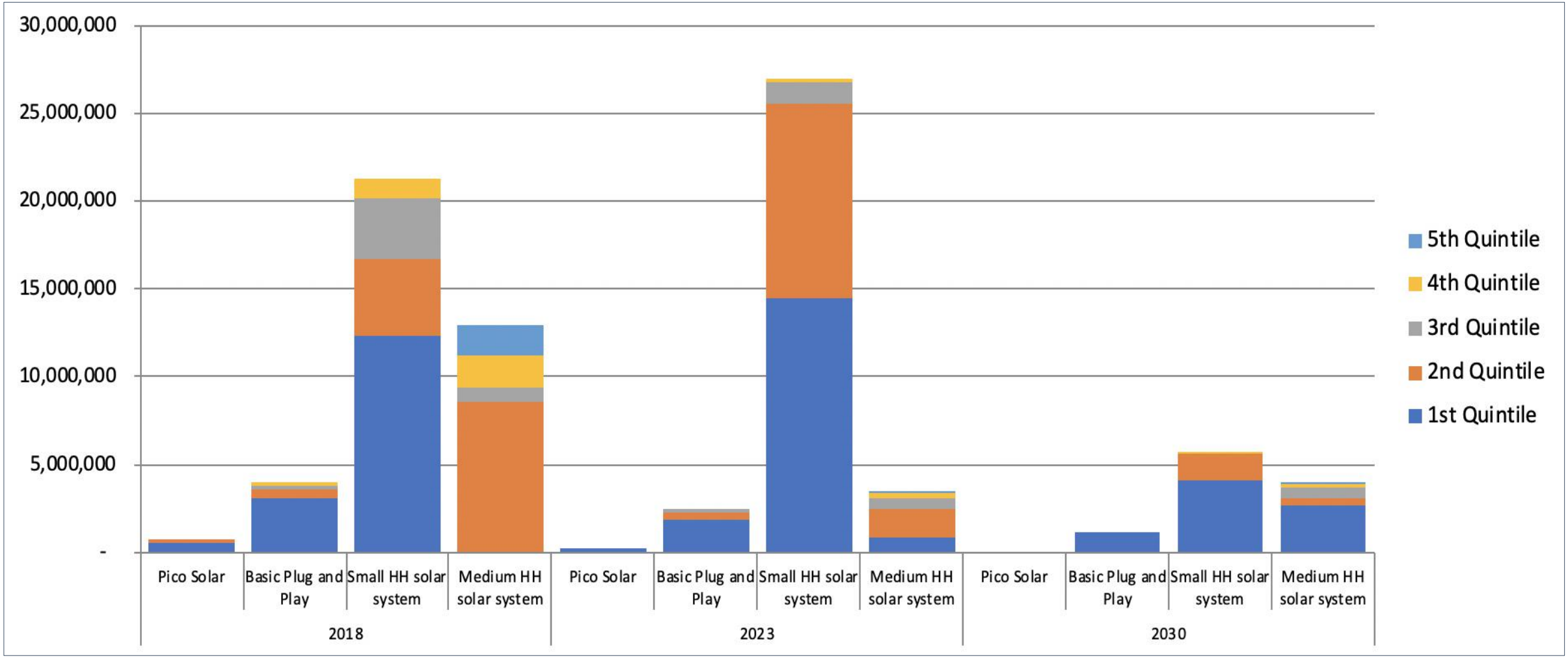
Household Ability to Pay

Estimated Number of Households with Ability to Pay for Cash Purchase of OGS Systems in West Africa and the Sahel

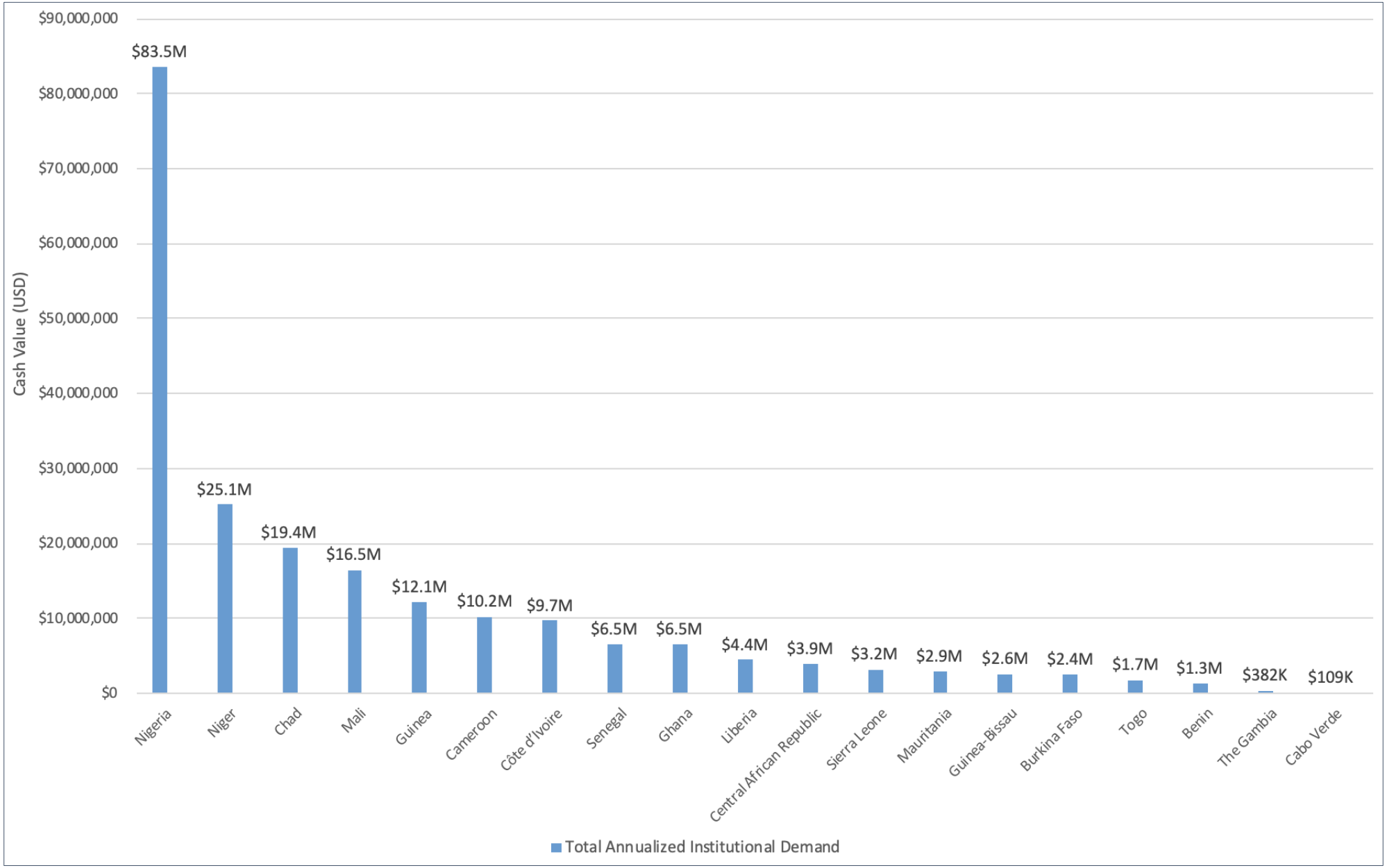


Household Ability to Pay

Estimated Number of Households with Ability to Pay for Financed Purchase of OGS Systems in West Africa and the Sahel



Institutional Demand



Institutional Demand

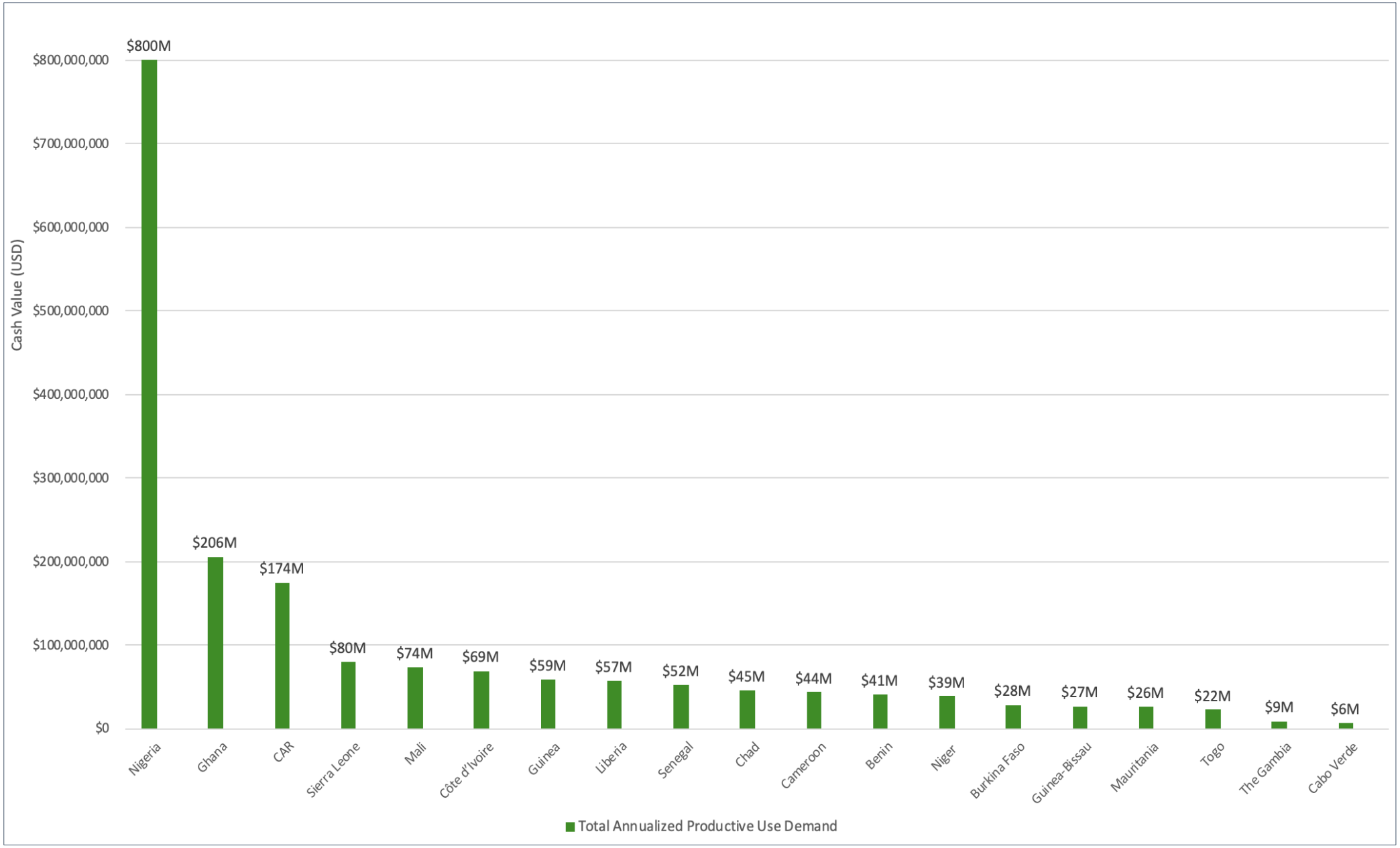
Estimated Regional Off-Grid Solar Cash Market Potential for Public/Institutional Sector

Water Supply	Healthcare	Education	Public Lighting
			
Units: 18,939 kW equivalent: 71,375 Cash Value (USD): $178,424,250	Units: 8,500 kW equivalent: 8,500 Cash Value (USD): $11,659,375	Units: 164,857 kW equivalent: 6,413 Cash Value (USD): $17,681,235	Units: 8,246 kW equivalent: 1,726 Cash Value (USD): $5,173,875

Estimated Annualized Cash Market Potential

Units: 39,114
kW equivalent: 84,180
Annualized Cash Value (USD): $212,938,735

Productive Use Demand



Productive Use Demand: SME Applications

Estimated Annualized Regional Off-Grid Solar Cash Market Potential for SME Applications: Barbers and Tailors

Key Inputs: Number of SMEs with constrained access to finance: 3,457,333

Assumptions: Hair cutting and sewing appliances will be retrofitted to be powered by a Tier 3 solar system (5-year lifespan).

Estimated Annualized Cash Market Potential

Units: 691,466
kW equivalent: 172,867
Annualized Cash Value (USD): $432,166,625

- Barbers and tailors: rural village microenterprises that benefit significantly from extended working hours and the use of modern appliances/machinery
- Indicative sample of service-based SME off-grid solar market; baseline estimate for future research

Sources: SME Finance Forum: MSME Finance Gap

Productive Use Demand: Connectivity Applications

Estimated Regional OGS Cash Market Potential for Connectivity Applications: Mobile Phone Charging Enterprises

Key Inputs: Number of unique mobile subscribers (2017): 192,405,166

% Rural Population; Costs of Solar Mobile Phone Charging Stations

Estimated Annualized Cash Market Potential

Units: 206,036
kW equivalent: 82,414
Annualized Cash Value (USD): $177,602,737

Source: GSMA

Productive Use Demand: Value-Added Applications

Estimated Regional Off-Grid Solar Cash Market Potential for Value-Added Applications

Agricultural Irrigation	Milling	Refrigeration
Key Inputs: Smallholder irrigation potential (hectare)	**Key Inputs**: Milling market products (cereals, roots and tuber crops)	**Key Inputs**: Off-Grid Market Centers 5.5 kW solar refrigeration system
Estimated Cash Value (USD): $1,059,888,194	**Estimated Cash Value (USD): $144,715,467**	**Estimated Cash Value (USD): $47,427,188**

Estimated Annualized Cash Market Potential

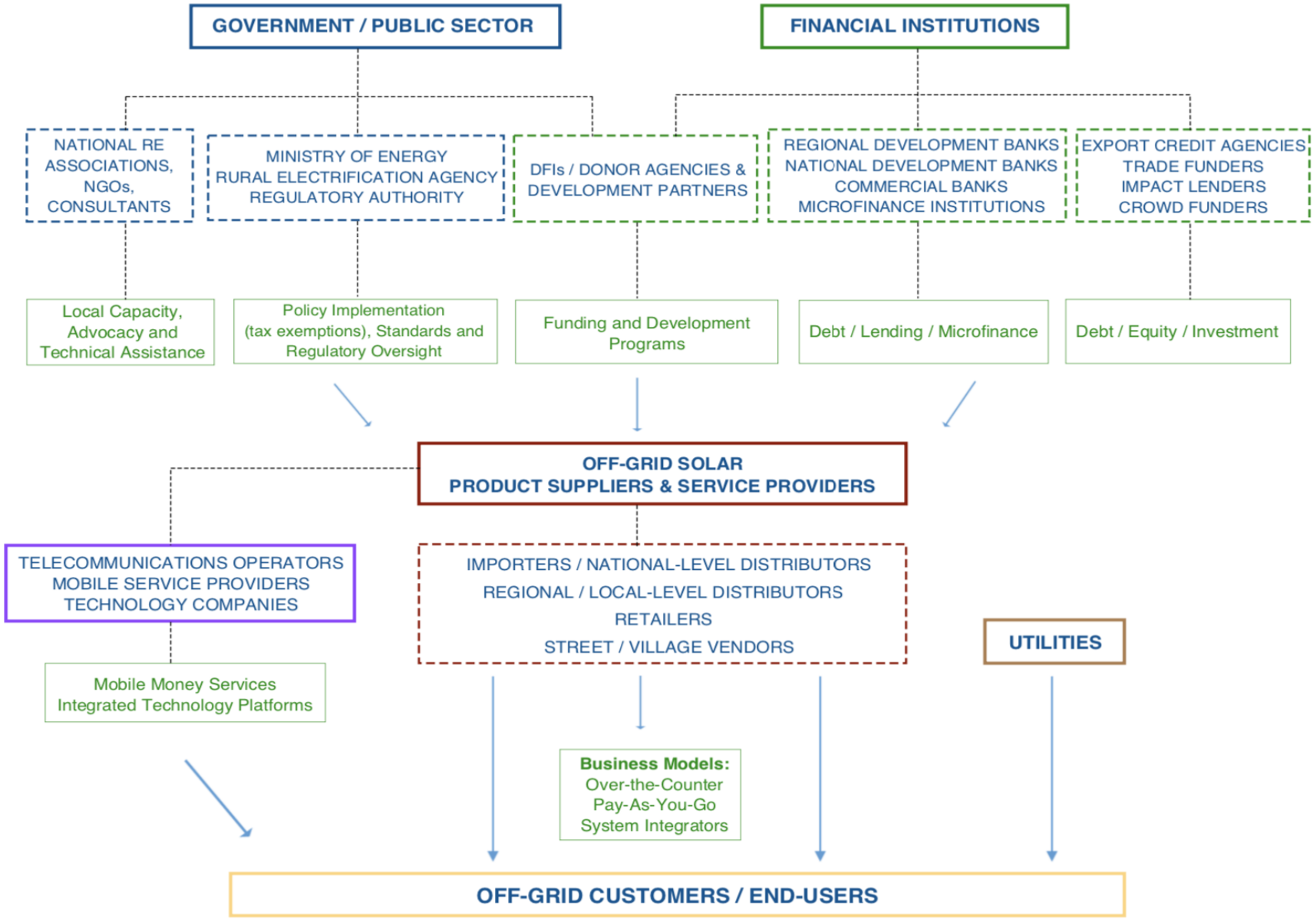
Units: 1,642,952
kW equivalent: 272,532
Annualized Cash Value (USD): $1,252,030,852

Sources: World Bank; UN Food and Agriculture Organization

Solar Company Tier Classification

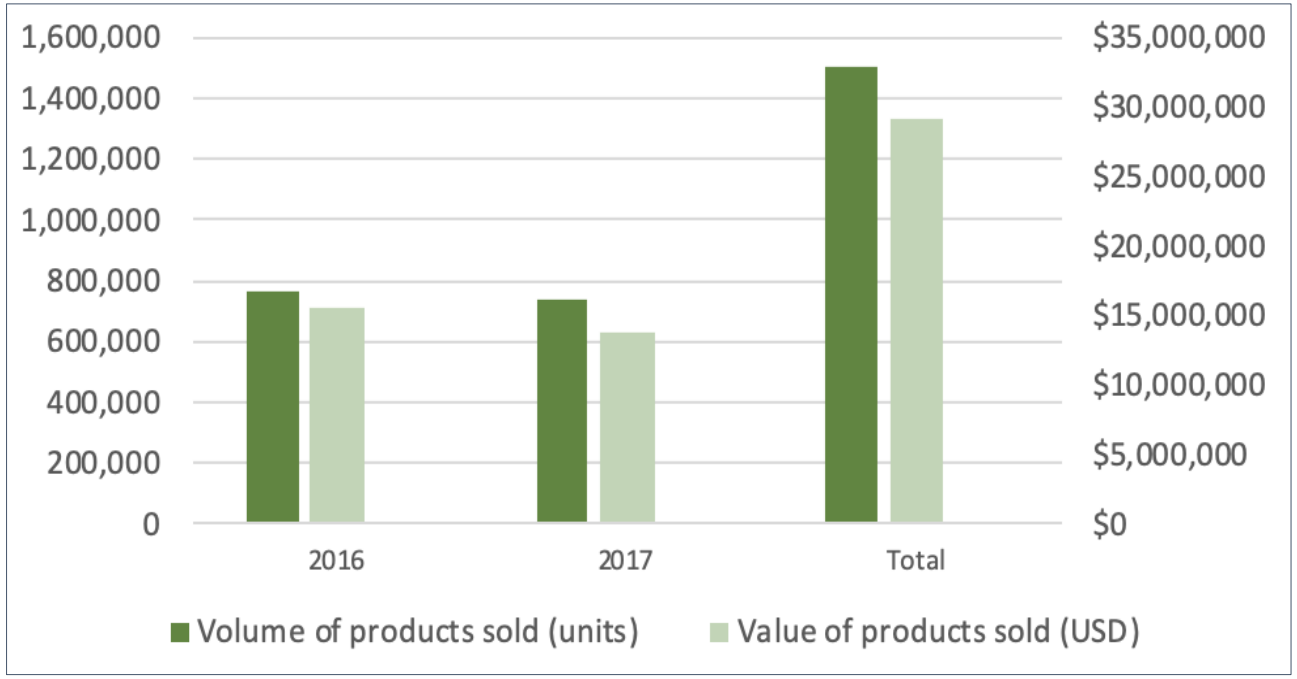
Classification		Description
Tier 1	Startup companies	• Less than 3 full time employees • Less than 300 SHS or Less than 1,500 lanterns sold • Less than USD 100,000 annual revenues • Does not have access to outside finance except personal loans and may have a business account
Tier 2	Early stage companies	• 3 to 25 full time employees • 300 to 30,000 solar home systems or 1,500 to 50,000 lanterns sold
Tier 3	Growth/Mature	• More than 25 full time employees • More than 30,000 solar home systems or 50,000 lanterns sold • More than USD 3 million annual revenues • Has a credit line at a bank and financial statements • Raising equity or other outside financing

Off-Grid Solar Supply Chain Overview

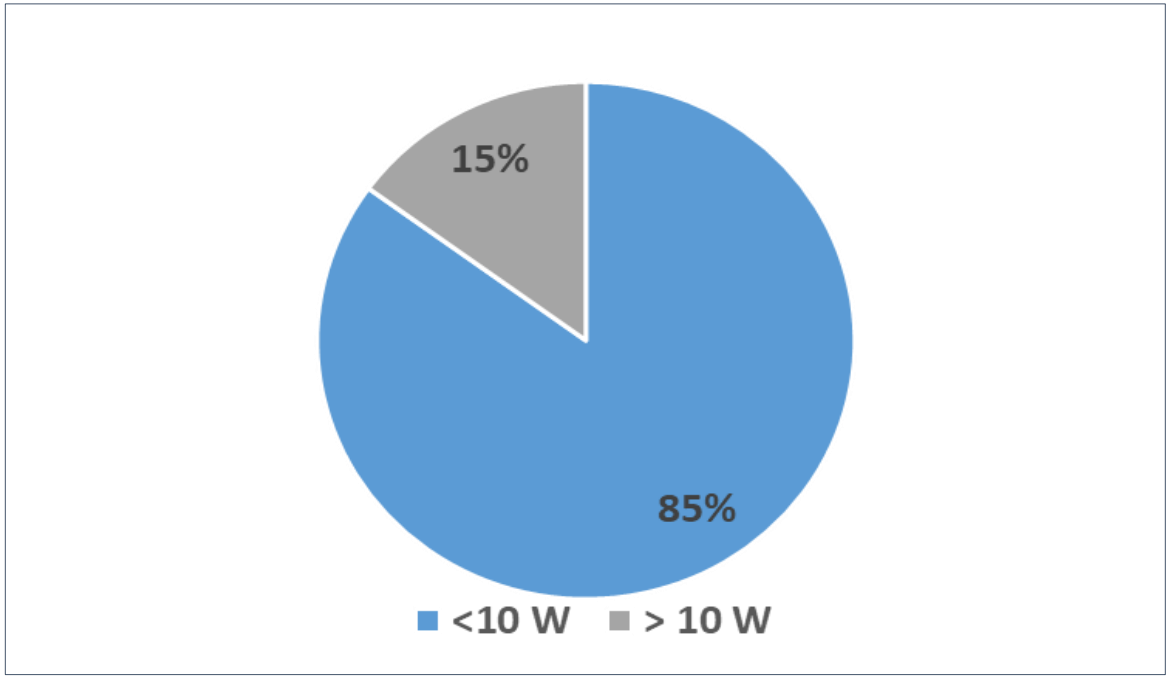


Commercial Market

Off-Grid Solar Product Sales Volume and Cash Revenue, 2016-2017



Off-Grid Solar Product Sales Volume by System Size, 2017

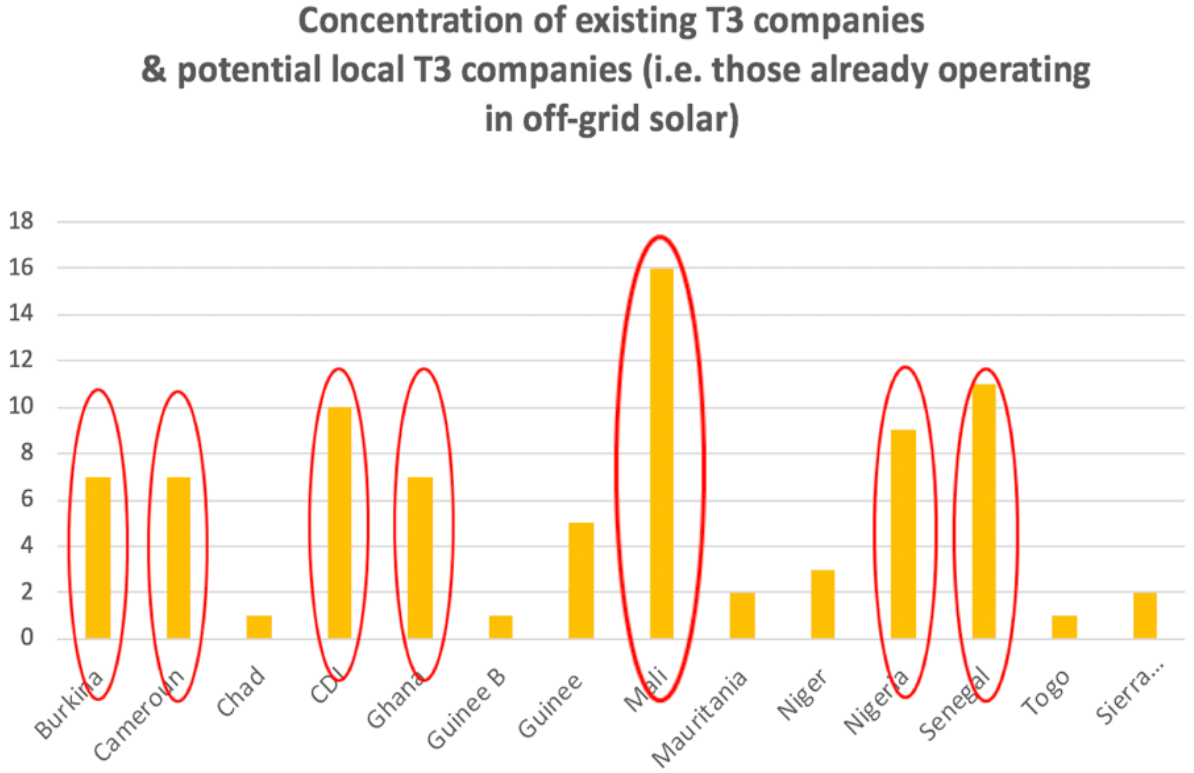


NOTE: Sales figures include both pico solar and SHS products; Cabo Verde, Central African Republic, Chad, Guinea, Guinea-Bissau and Mauritania excluded (no data)

Source: Global Off-Grid Lighting Association

Off-Grid Solar Supply Chain Overview

ROGEP Supplier Market Insights



High concentration of T3 companies in 7 countries yet:

- **Different profiles (international vs local)**
- **Different expansion strategies**
- **Different financial needs**

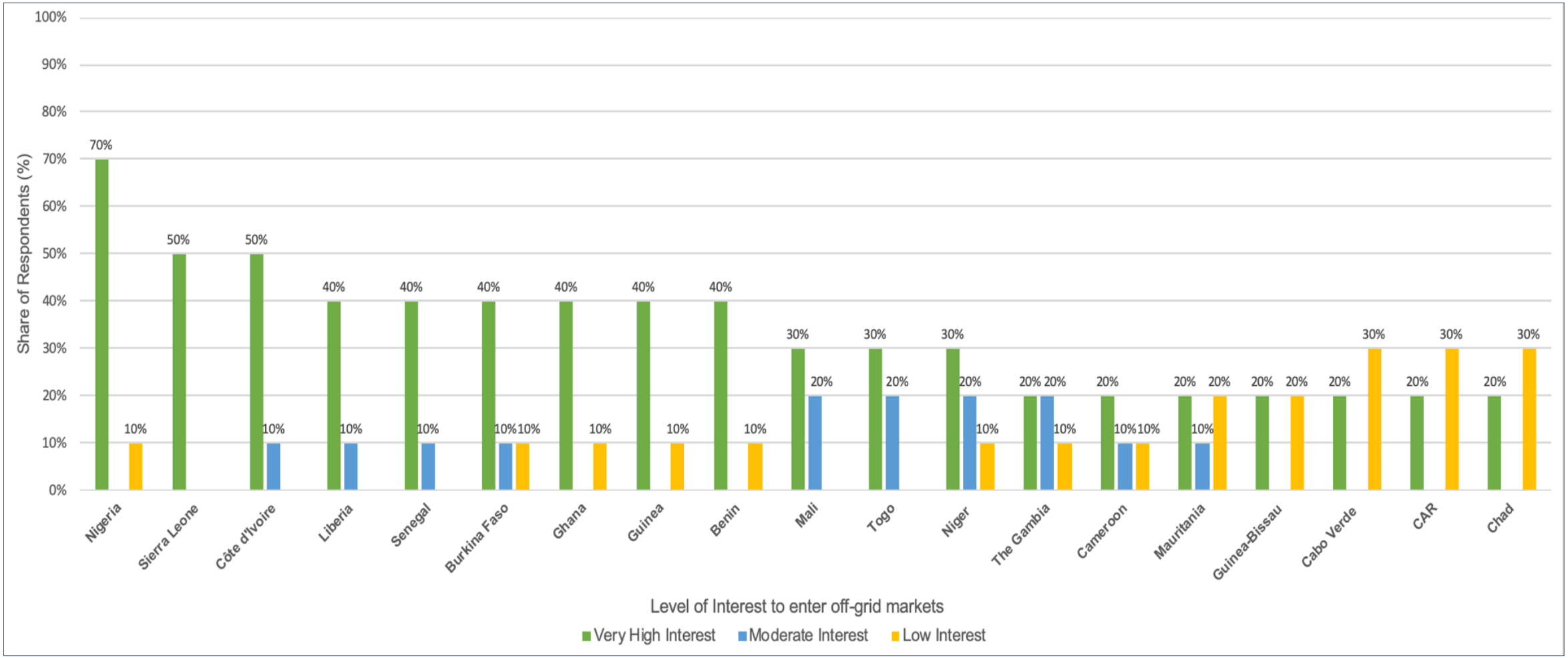
As of now no T3 companies were identified to date in: Benin; Capo Verde; Gambia; Liberia; and RCA.

The preliminary insights collected from our team show a higher concentration of off-grid solar actors in Burkina, Cameroon, CDI, Ghana, Mali, Nigeria, and Senegal

Source: ECREEE

Level of Interest in the Region

Level of Interest in Off-Grid Markets in West Africa and the Sahel among Major Suppliers



Key Challenges for the Supply Chain

Key Barriers to Off-Grid Solar Market Growth

Key Market Barriers:

- Low consumer purchasing power and lack of consumer financing options
- Low levels of consumer awareness and/or misperceptions about the value of solar solutions, particularly in rural areas
- Lack of financing for solar companies
- Lack of enforceable standards and regulation leads to informal sector competition and market spoilage
- Lack of local capacity/qualified technicians to maintain systems
- Insufficient or fragmented market data on consumer electricity needs, usage or experience
- High transaction costs associated with equipment inventory, distribution, importation, taxation etc. (and corresponding lack of policy support/financial incentives)
- Policy/regulatory barriers – many governments have not done enough to disincentivize alternatives/substitutes for solar (e.g. diesel subsidies), which makes solar a less attractive option to consumers

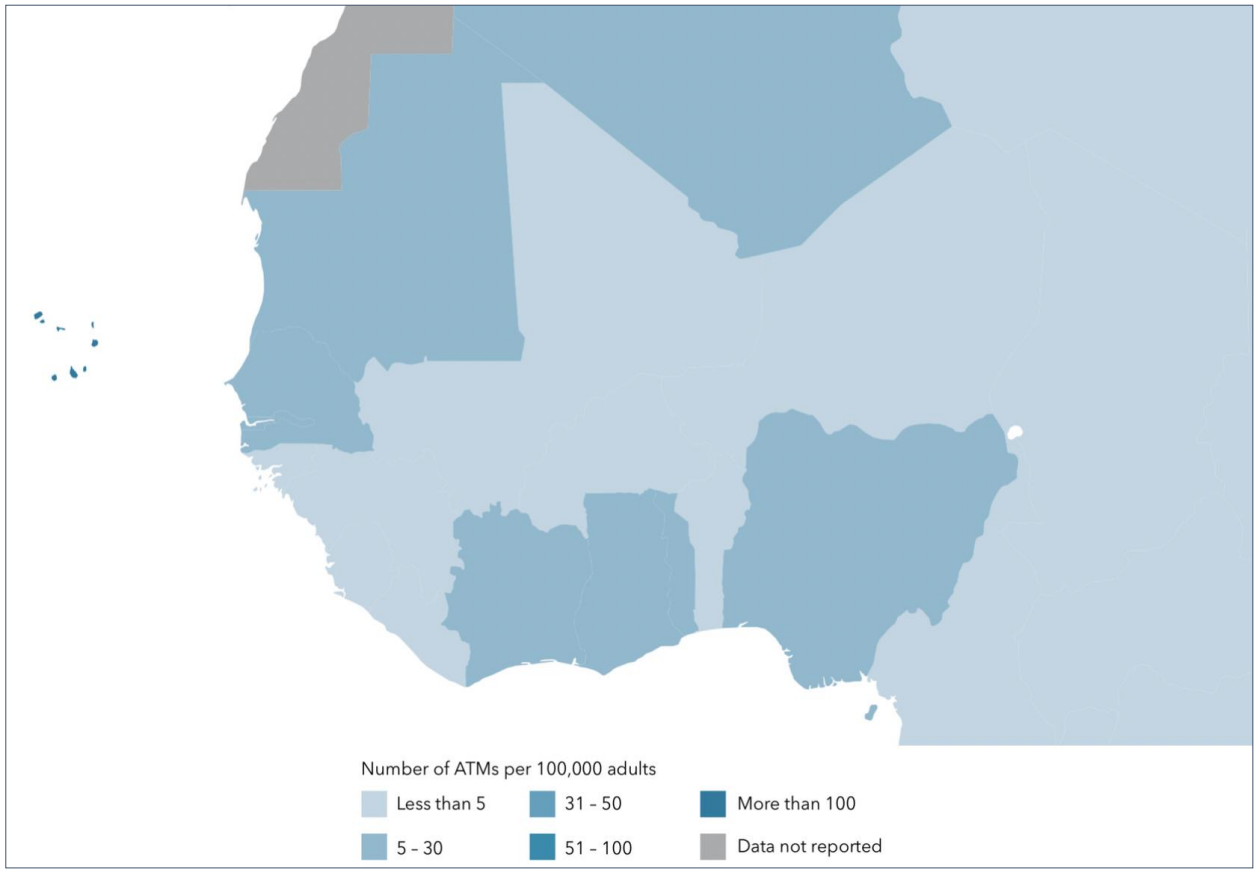
Key Drivers of Off-Grid Solar Market Growth

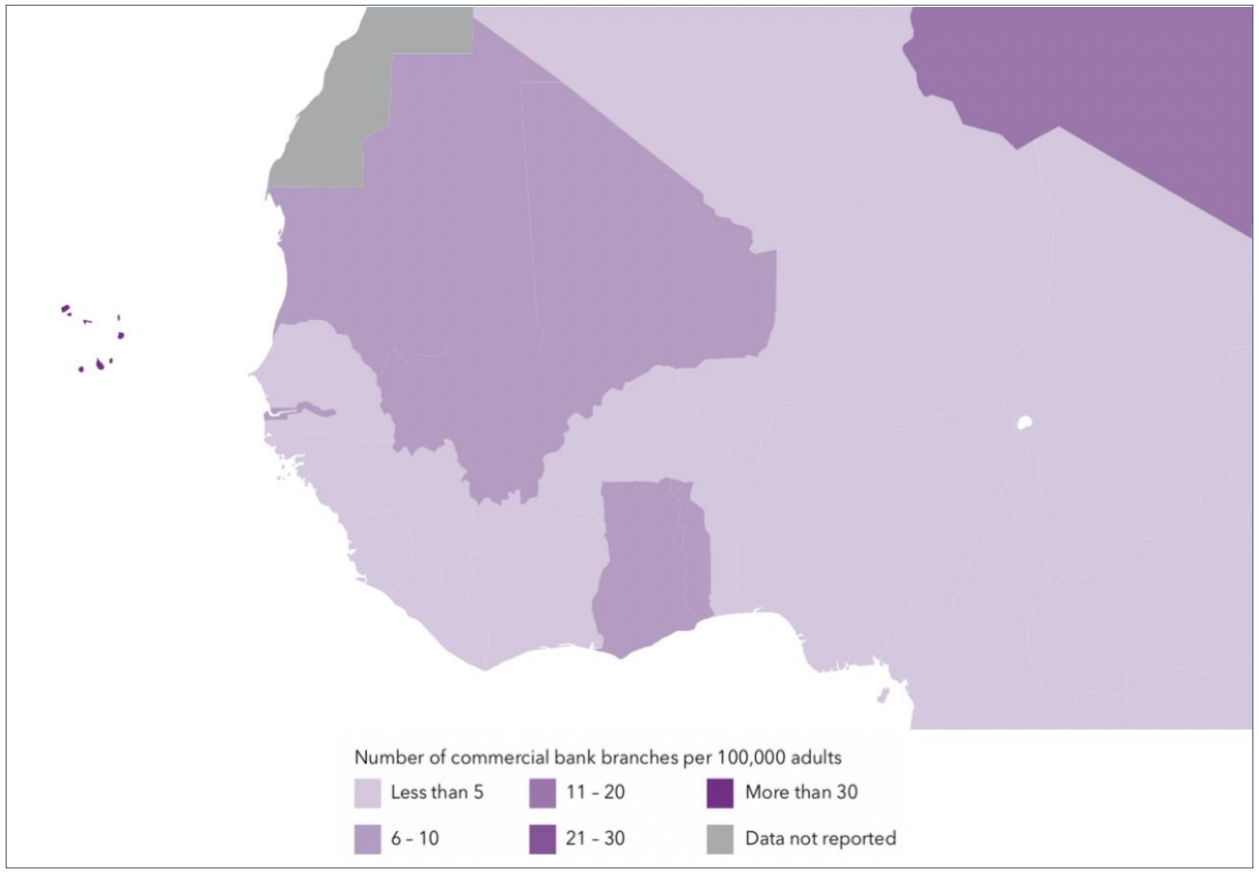
Key Market Drivers:

- Strong off-grid electricity demand – electricity needs are much higher than what national utilities can offer in the short and medium-term
- Increasing demand for consumer appliances that require electricity (e.g. cellphone, radio, TV, refrigerator etc.)
- Government policy/action is generally supportive of the industry, which helps attract substantial/sustained investment to the market
- Growing penetration of mobile money services allows OGS companies to increasingly utilize integrated technology platforms and innovative business models to offer PAYG consumer financing solutions to the market
- Extensive private sector engagement in development of the region's off-grid sector, with companies adopting new business models and strategies to attract external investment and expand their operations
- Strong donor presence and support from the international development community provides confidence that the market will continue to receive financial, policy and technical support necessary to develop (e.g. CEADIR and SUNREF programs)

The Role of Financial Institutions

Number of ATMS (left) and Commercial Bank Branches (right) per 1,000 Adults in West Africa and the Sahel, 2017

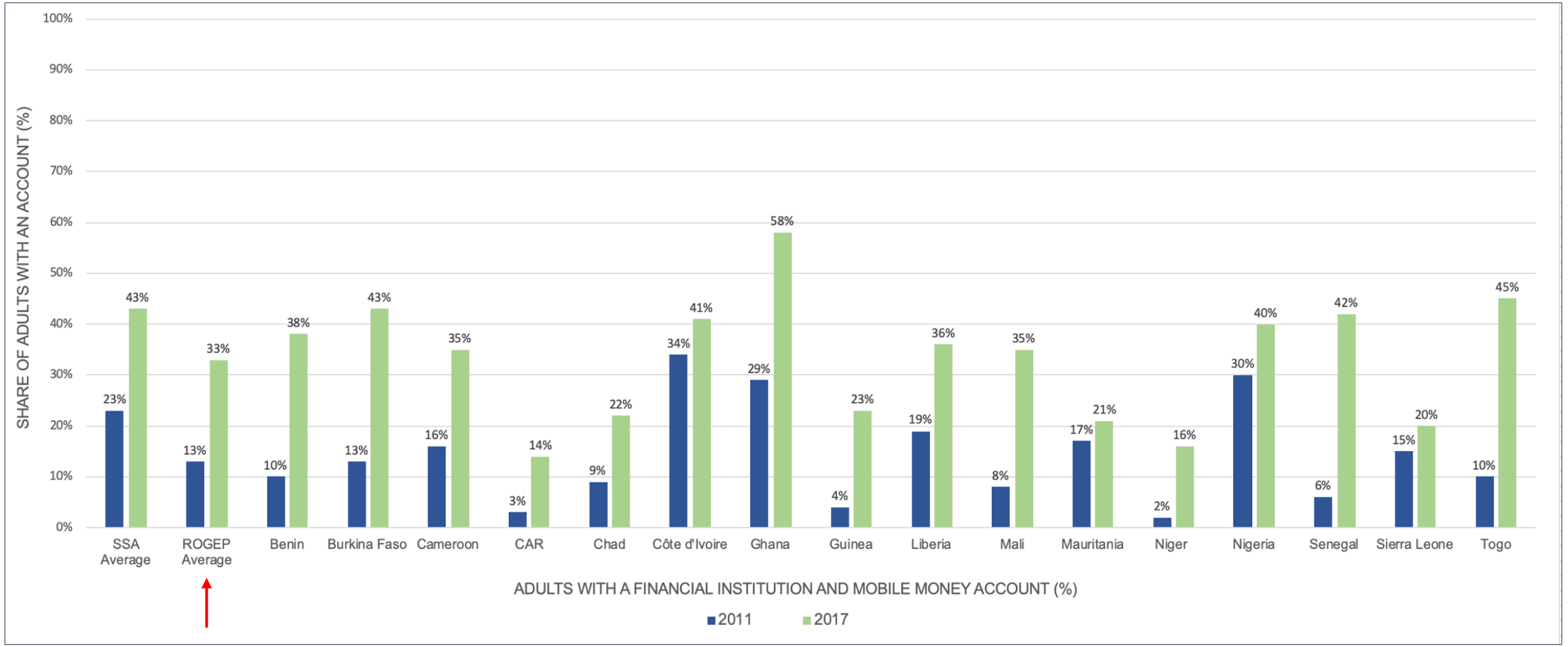




Source: International Monetary Fund – Financial Access Survey

Financial Inclusion in West Africa and the Sahel

Share of Adults with Access to Financial Services, 2011 and 2017



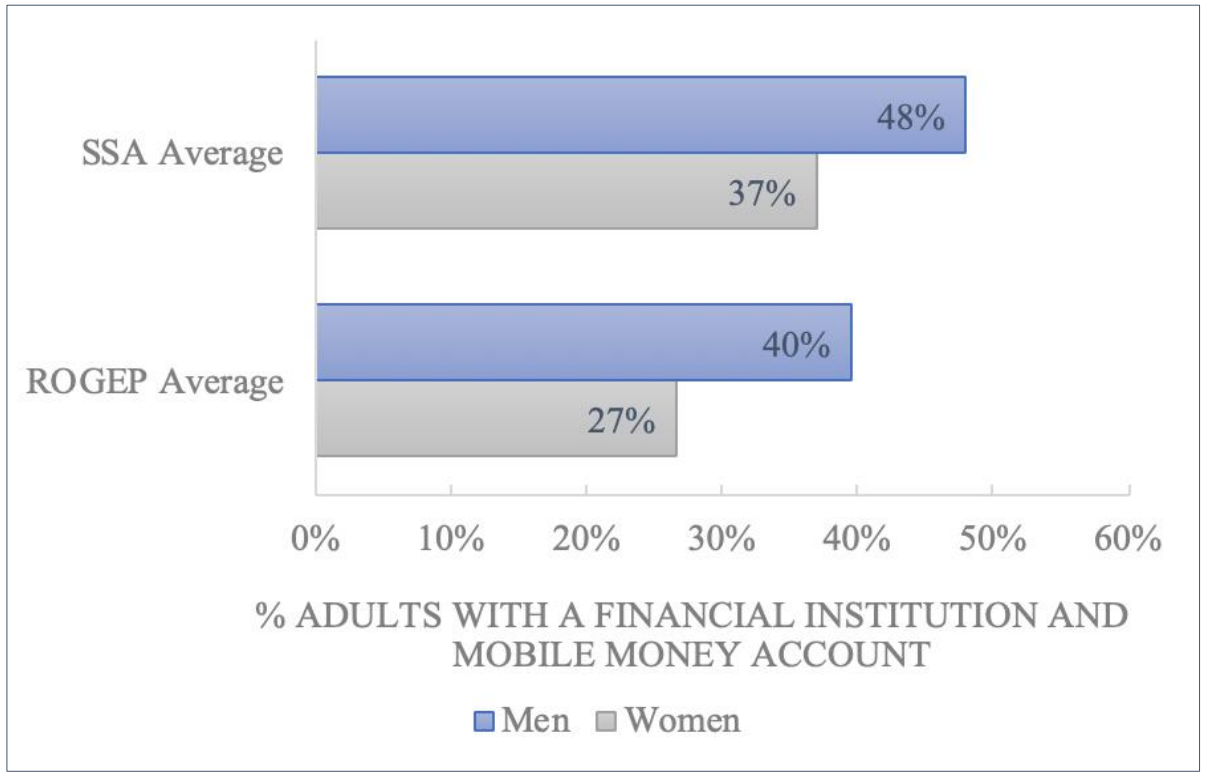
NOTE: Cabo Verde, Guinea-Bissau and The Gambia excluded (no data); data for Côte d'Ivoire is from 2014 and 2017

Source: World Bank Global Findex Database

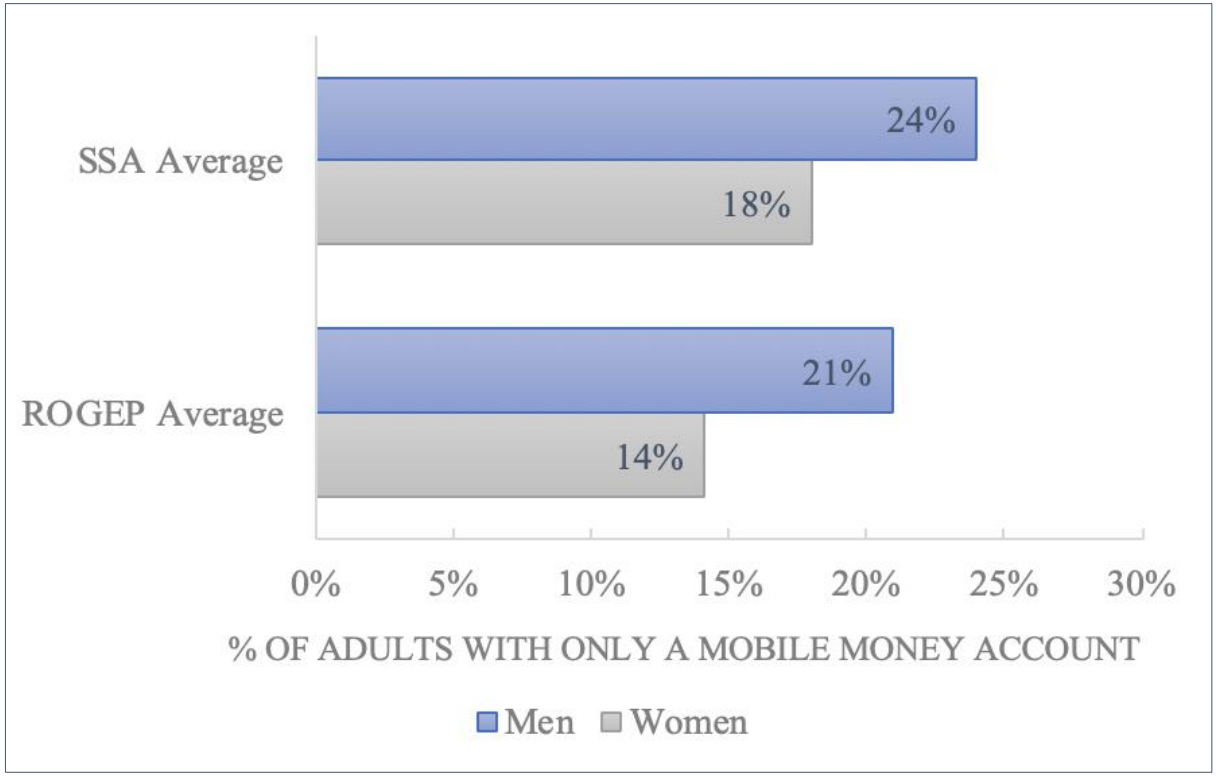
Financial Inclusion Gender Gap

Financial Inclusion Gender Gap in Sub-Saharan Africa and West Africa and the Sahel, 2017

Financial Inclusion Gender Gap



Mobile Money Gender Gap



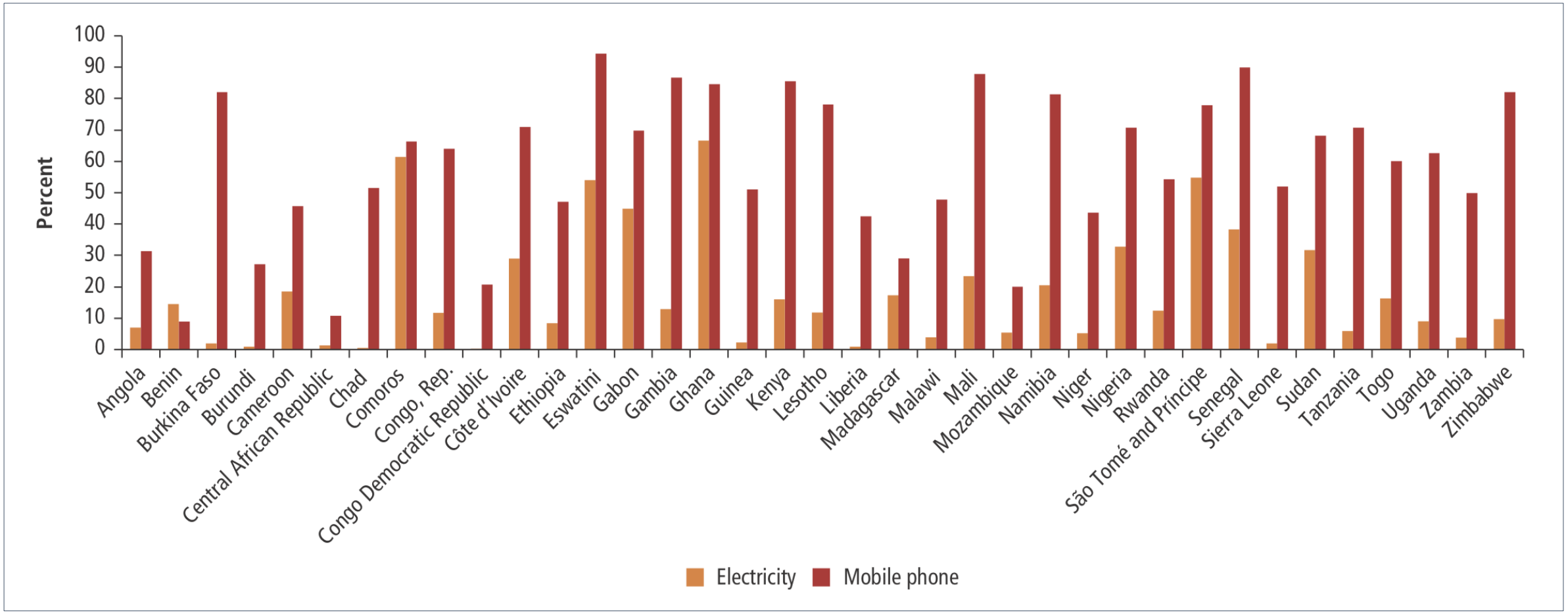
Women in West Africa and the Sahel are 13% less likely than men to have an account at a financial institution or with a mobile money service provider. The gender gap in access to mobile money services is smaller (7%).

NOTE: Cabo Verde, Guinea-Bissau and The Gambia excluded (no data)

Source: World Bank Global Findex Database

The Digital Revolution and Electricity Access

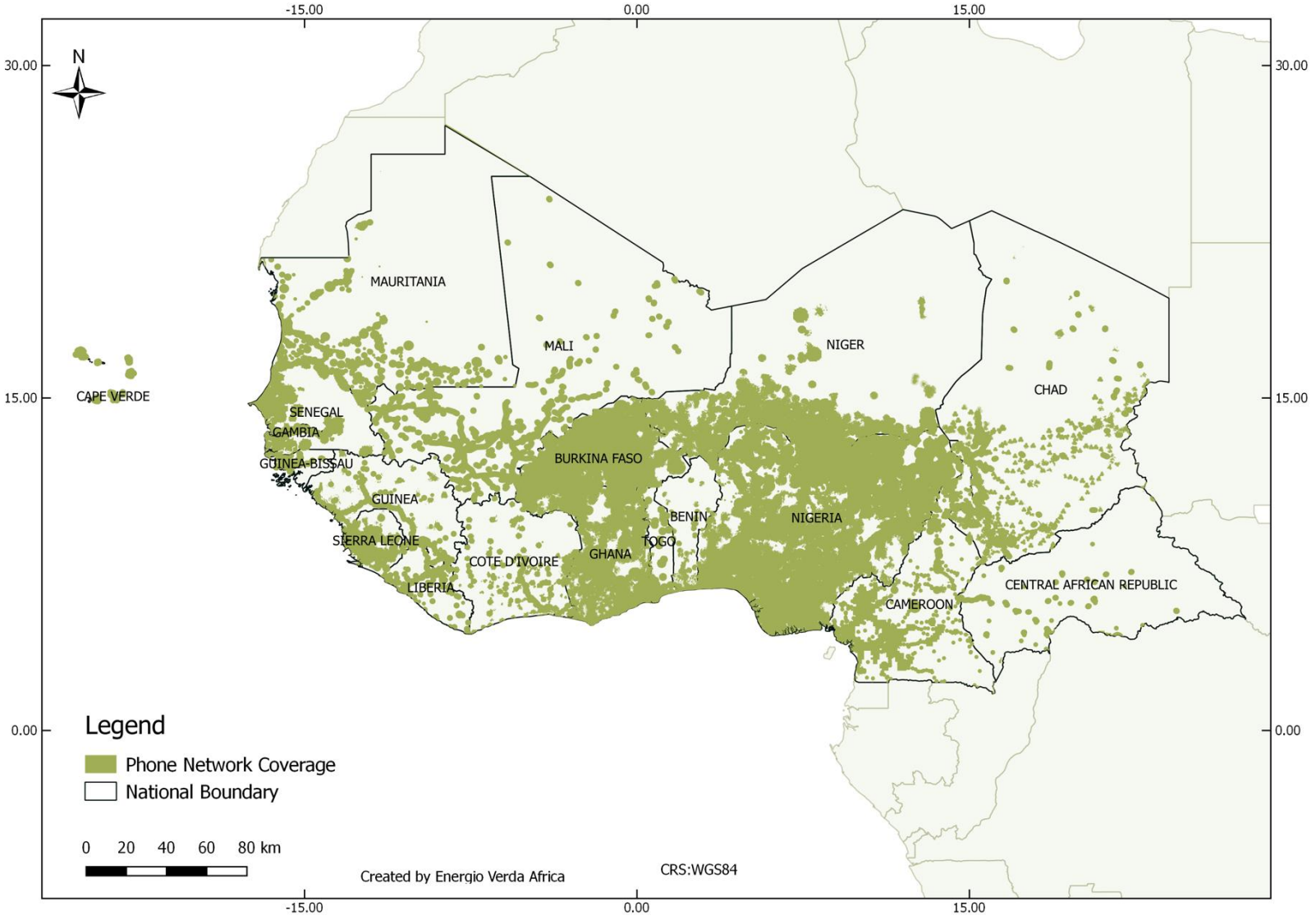
Electricity Access and Mobile Phone Ownership in Sub-Saharan, 2016 (% of rural households)



Source: World Bank

The Digital Revolution and Electricity Access

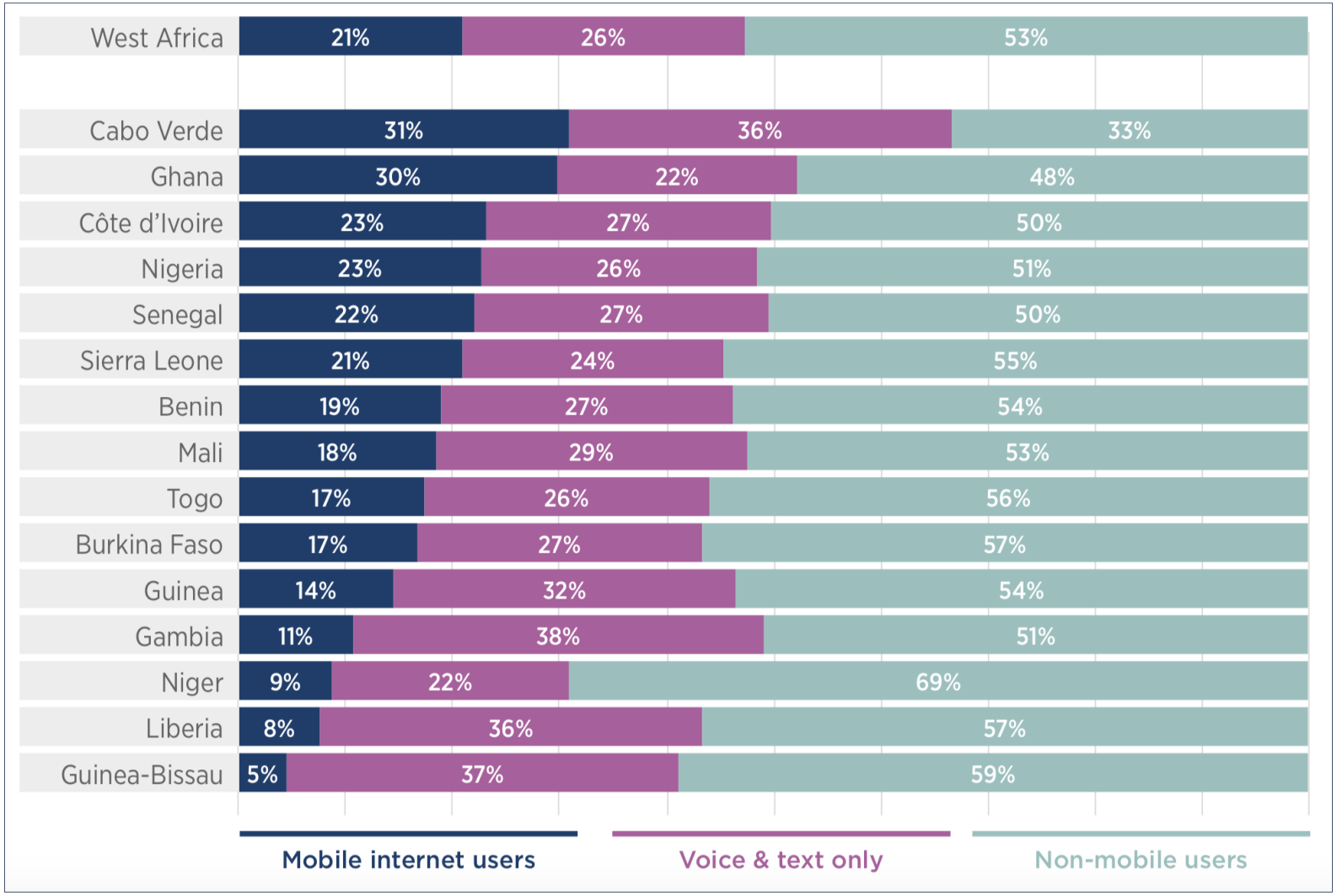
Mobile Phone Geographic Network Coverage in West Africa and the Sahel, 2017



Source: GSMA

The Digital Revolution and Electricity Access

West Africa Mobile Internet Penetration, 2017

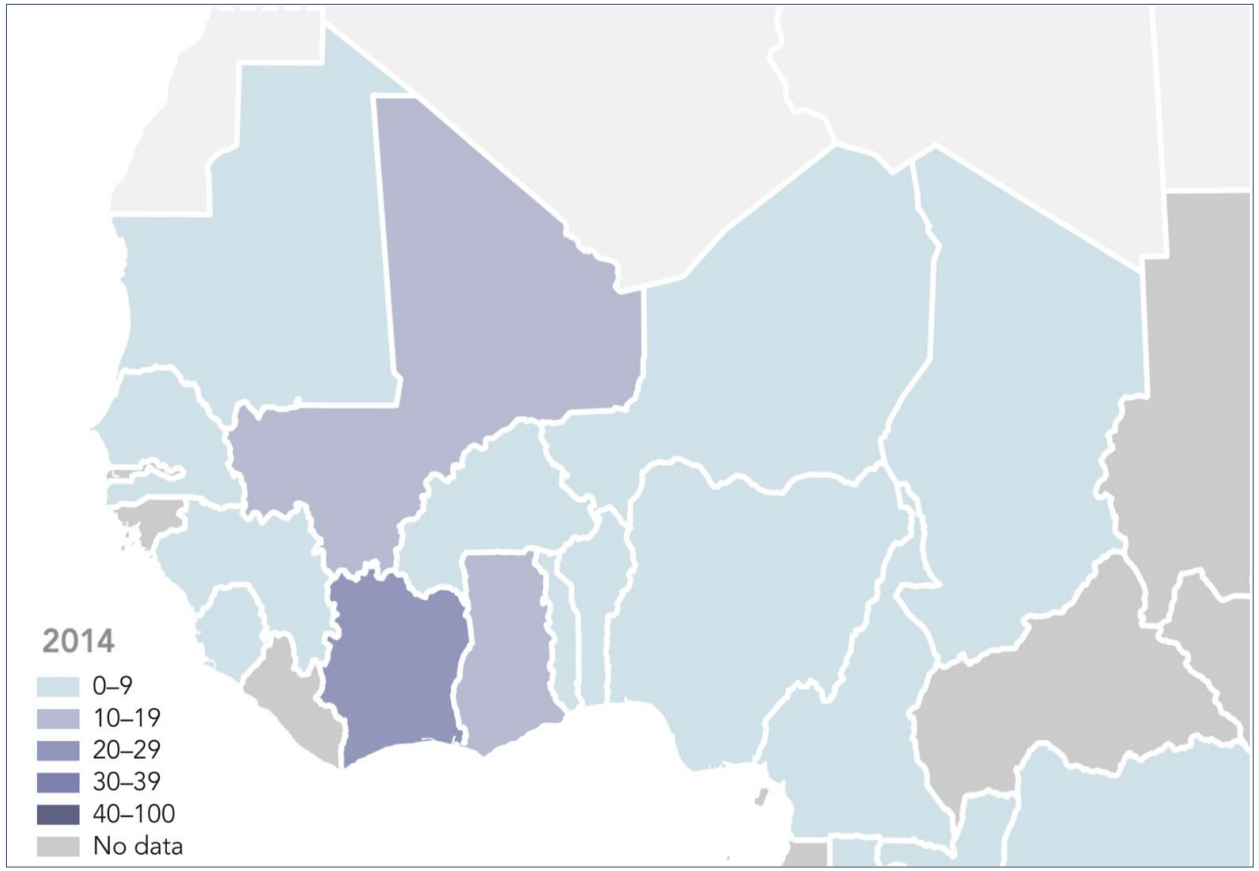


Source: GSMA

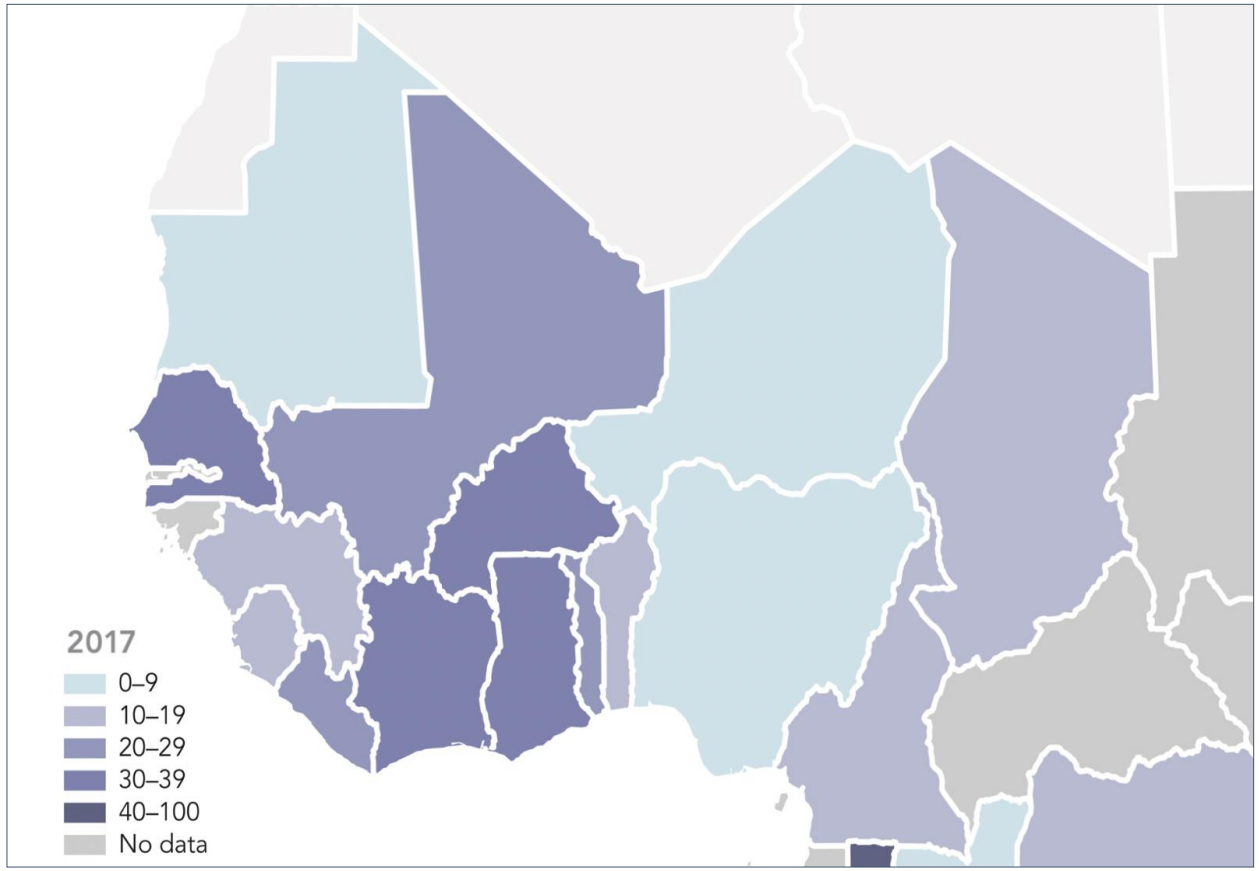
The Digital Revolution and Electricity Access

Share of Adults with a Mobile Money Account in West Africa and the Sahel (%), 2014 and 2017

2014



2017

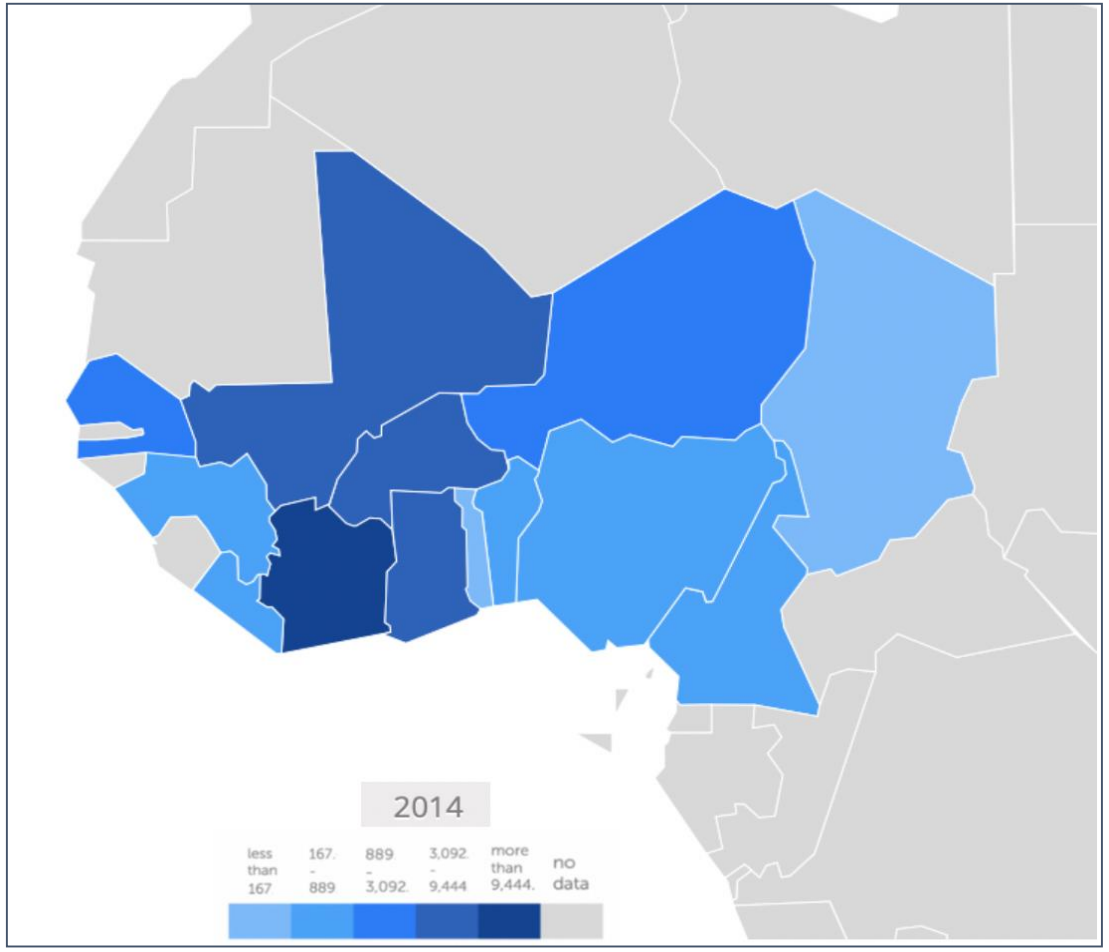


Source: World Bank Global Findex Database

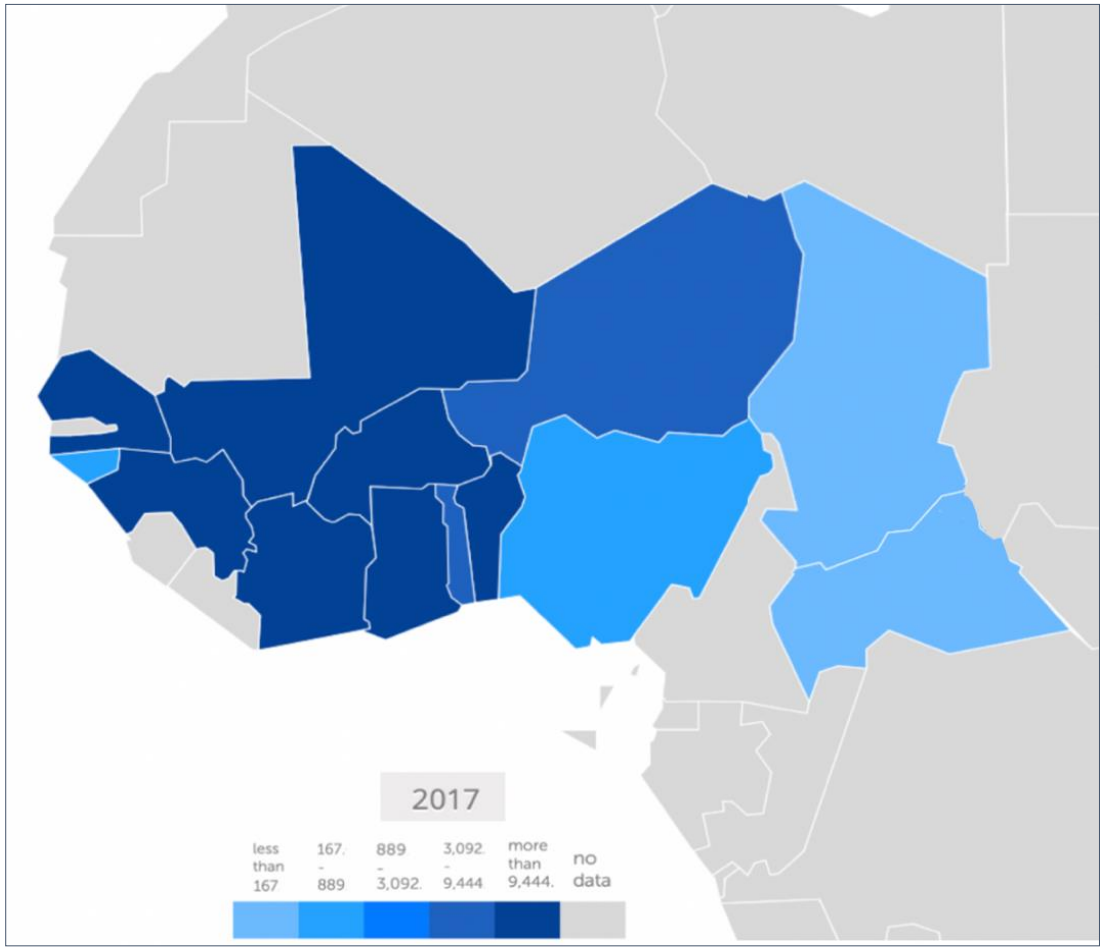
The Digital Revolution and Electricity Access

Mobile Money Transactions per 1,000 Adults in West Africa and the Sahel, 2014 and 2017

2014



2017



Source: International Monetary Fund – Financial Access Survey

Financial Institutions and Programs Supporting Off-Grid Solar Lending

AFRICAN DEVELOPMENT BANK GROUP

SUSTAINABLE ENERGY FUND FOR AFRICA

FEI OGEF

AGENCE FRANÇAISE DE DÉVELOPPEMENT

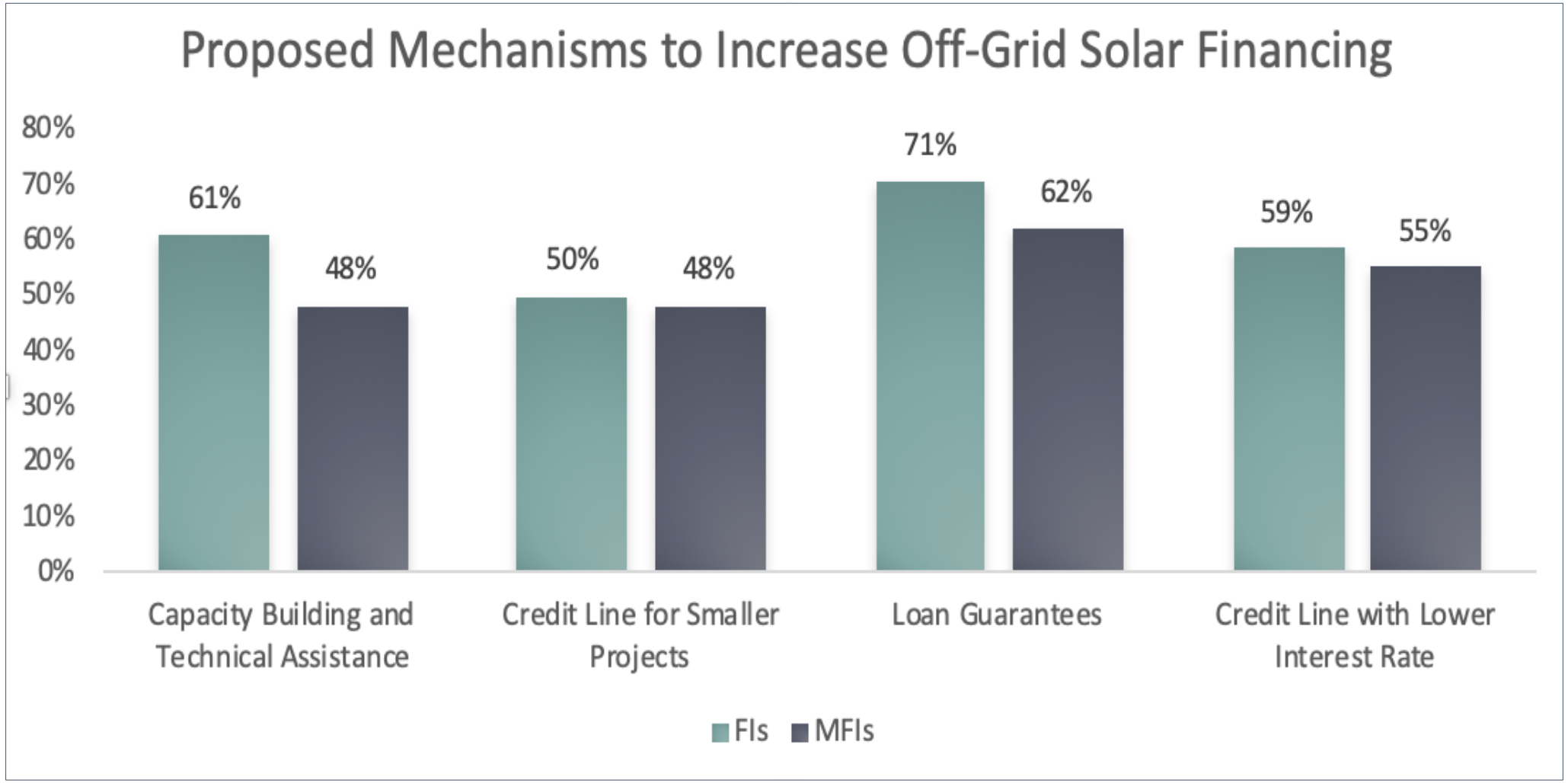
Sunref

USAID

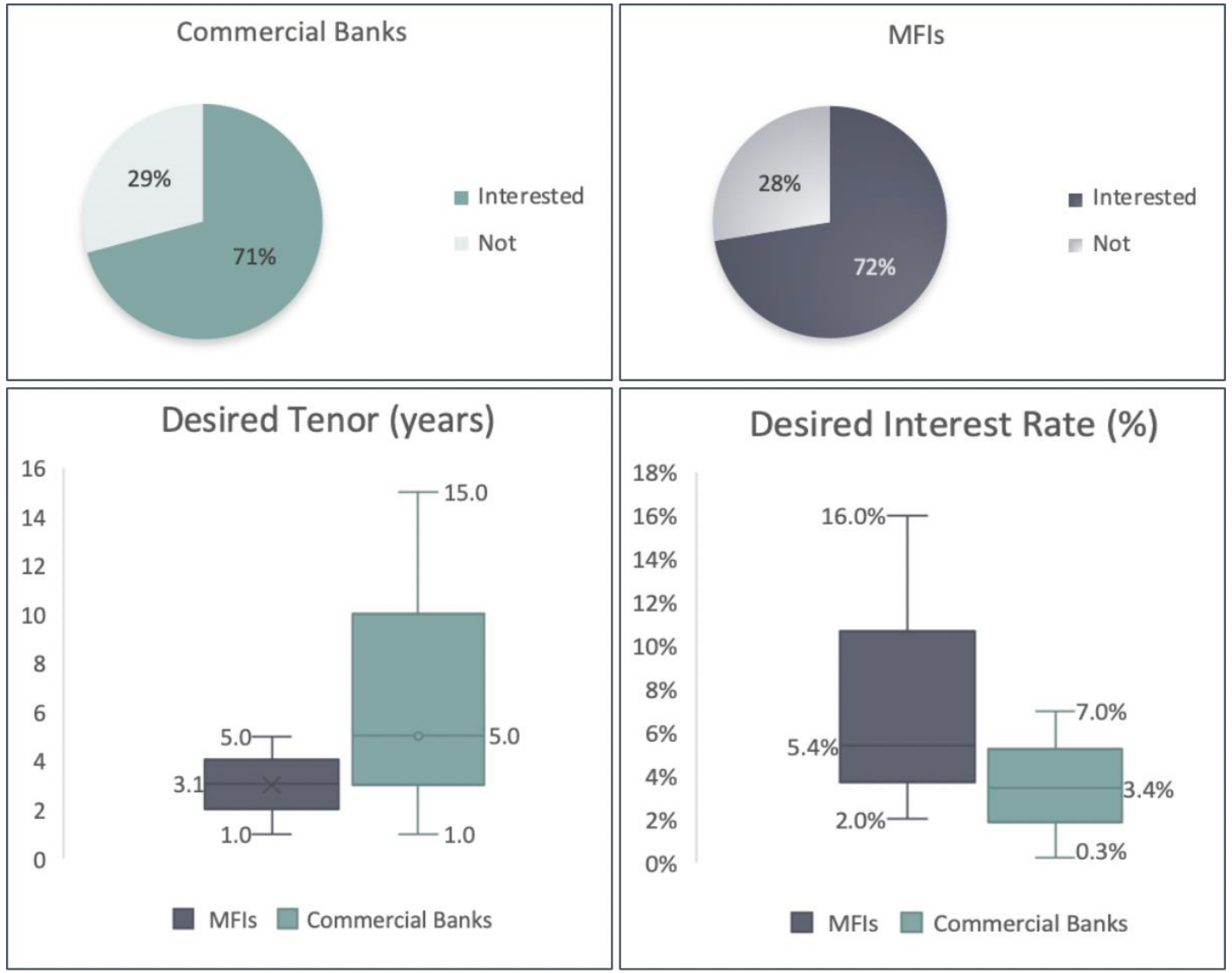
CEADIR

IFC

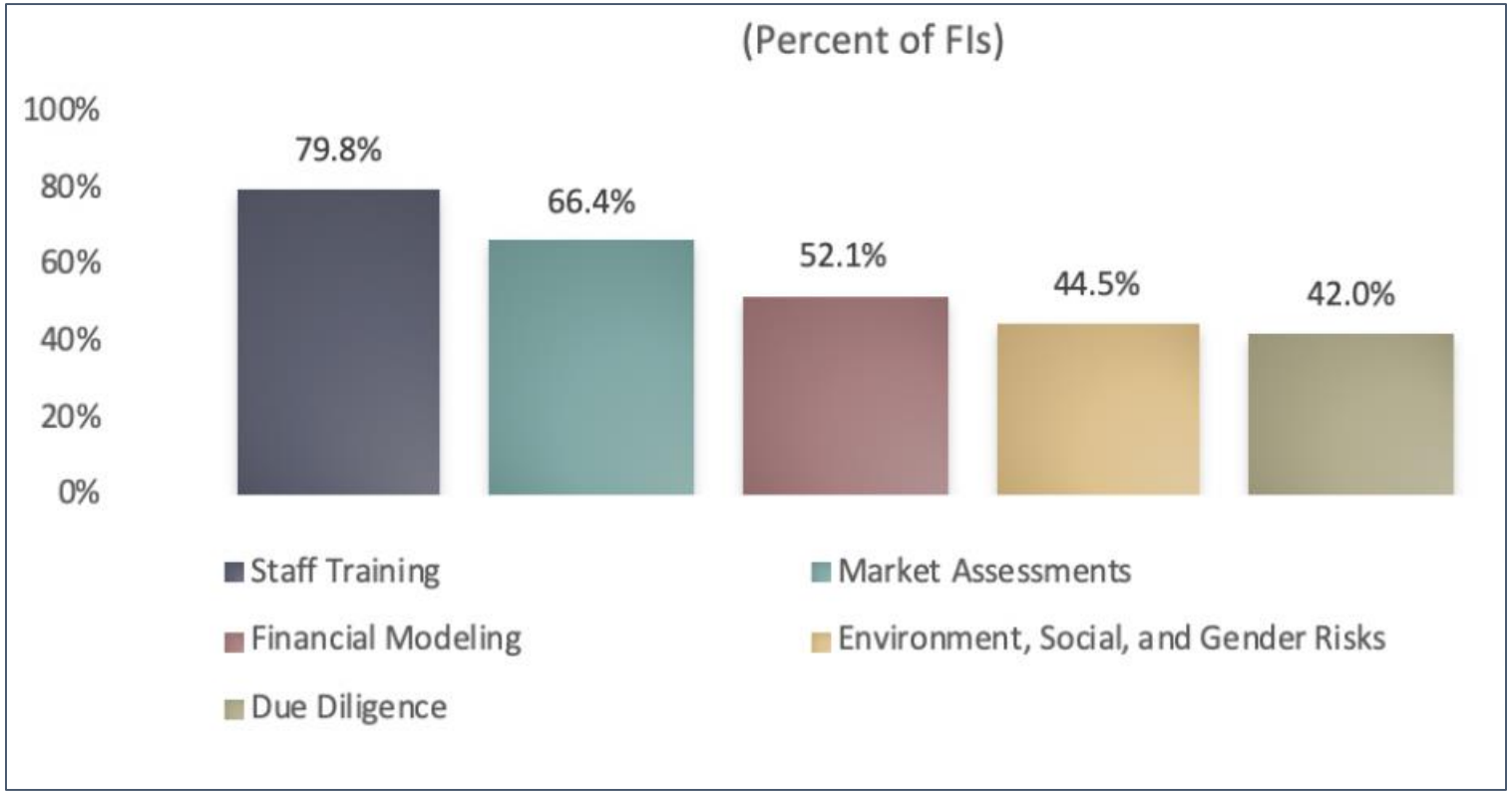
Financial Institution Assessment



Financial Institution Assessment

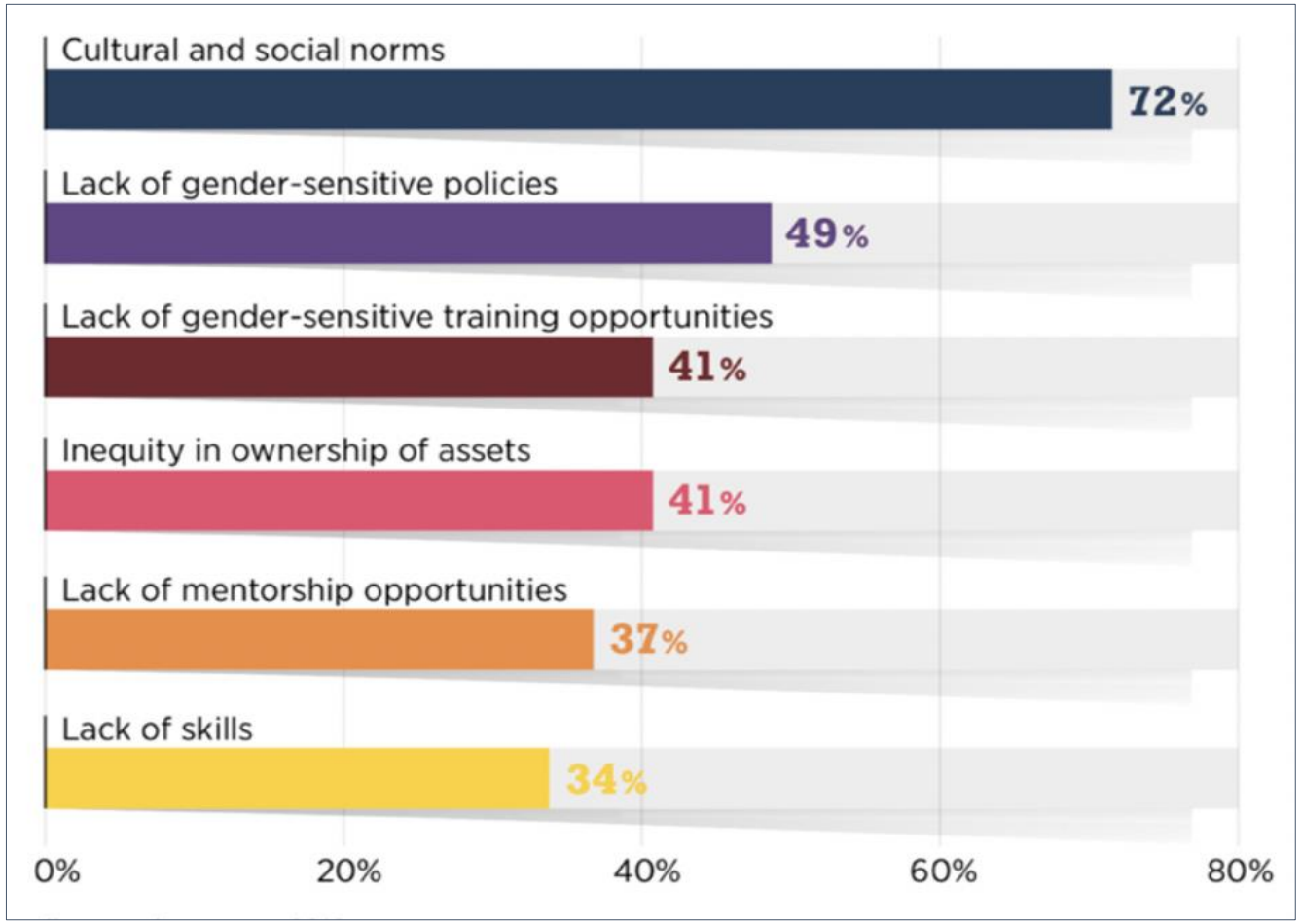


Financial Institution Assessment



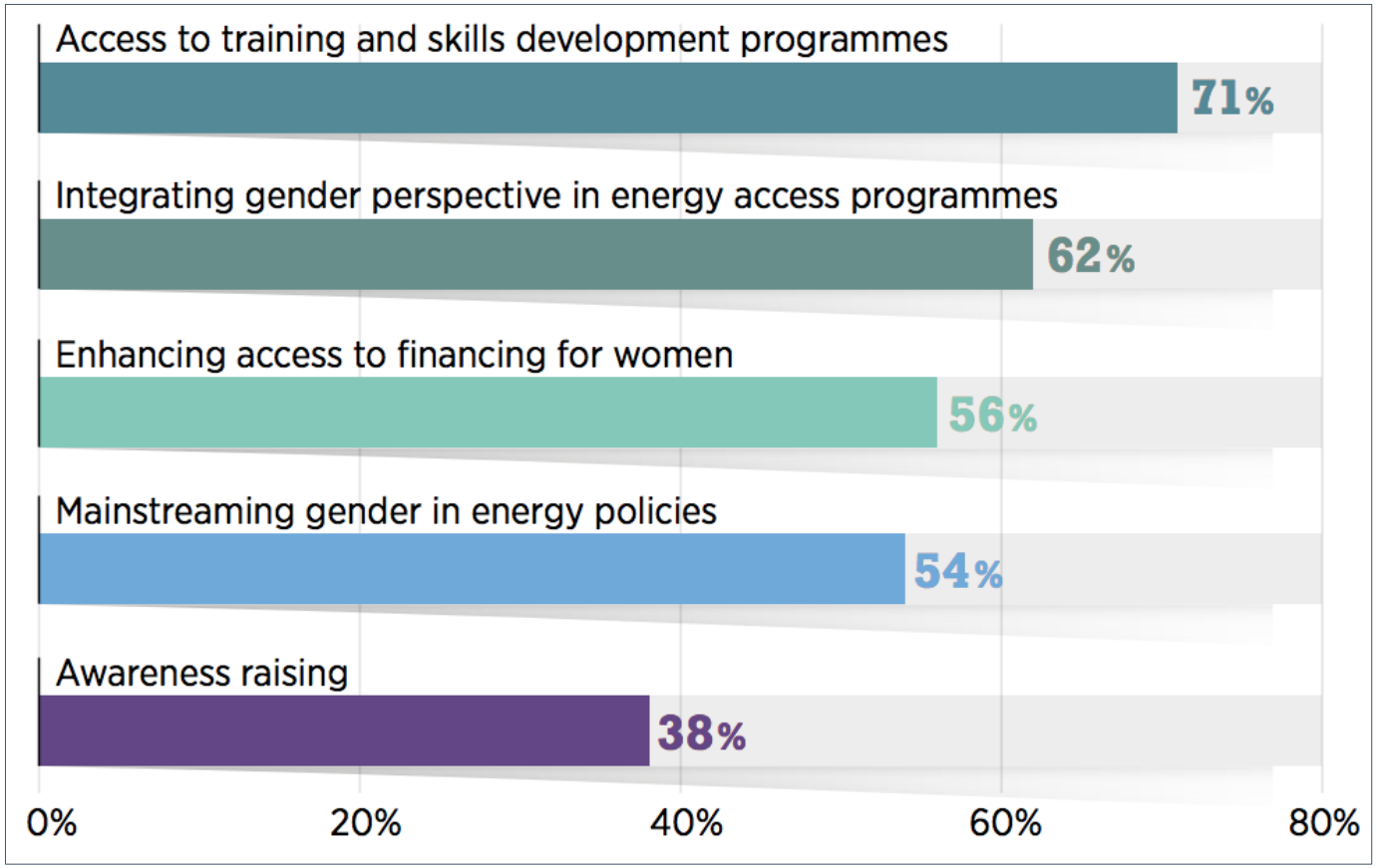
Surveyed Financial Institutions (Commercial Banks and Microfinance Institutions) identified several areas of internal capacity that require improvement in order to lend (or increase lending) to the off-grid solar sector. The most common need among FIs was training for bank staff.

Key Barriers to Women's Participation in Expanding Energy Access



Source: International Renewable Energy Agency, 2018

Measures to Improve Women's Engagement in Energy Access



Source: International Renewable Energy Agency, 2018

Questions and Comments

ECREEE
TOWARDS SUSTAINABLE ENERGY

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Thank You
Merci
Obrigado

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