



ECOWAS SUSTAINABLE ENERGY FORUM & EXHIBITION 2019

Achieving Sustainable Energy Targets in ECOWAS

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Kempinski Hotel Gold Coast City, Accra, Ghana

www.ecreee.org



Review of the Results of the ROGEP Market Assessment



Context and Scope of the ROGEP Market Assessment



ROGEP

Regional Off-Grid Electrification Project



Regional Off-Grid Electrification Project



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.

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 applications]
 - 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



ROGEP

Regional Off-Grid Electrification Project



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 Group Discussions

- 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

Results



**ECREEE**
TOWARDS SUSTAINABLE ENERGY

ROGEP

Regional Off-Grid Electrification Project

 **WORLD BANK GROUP**

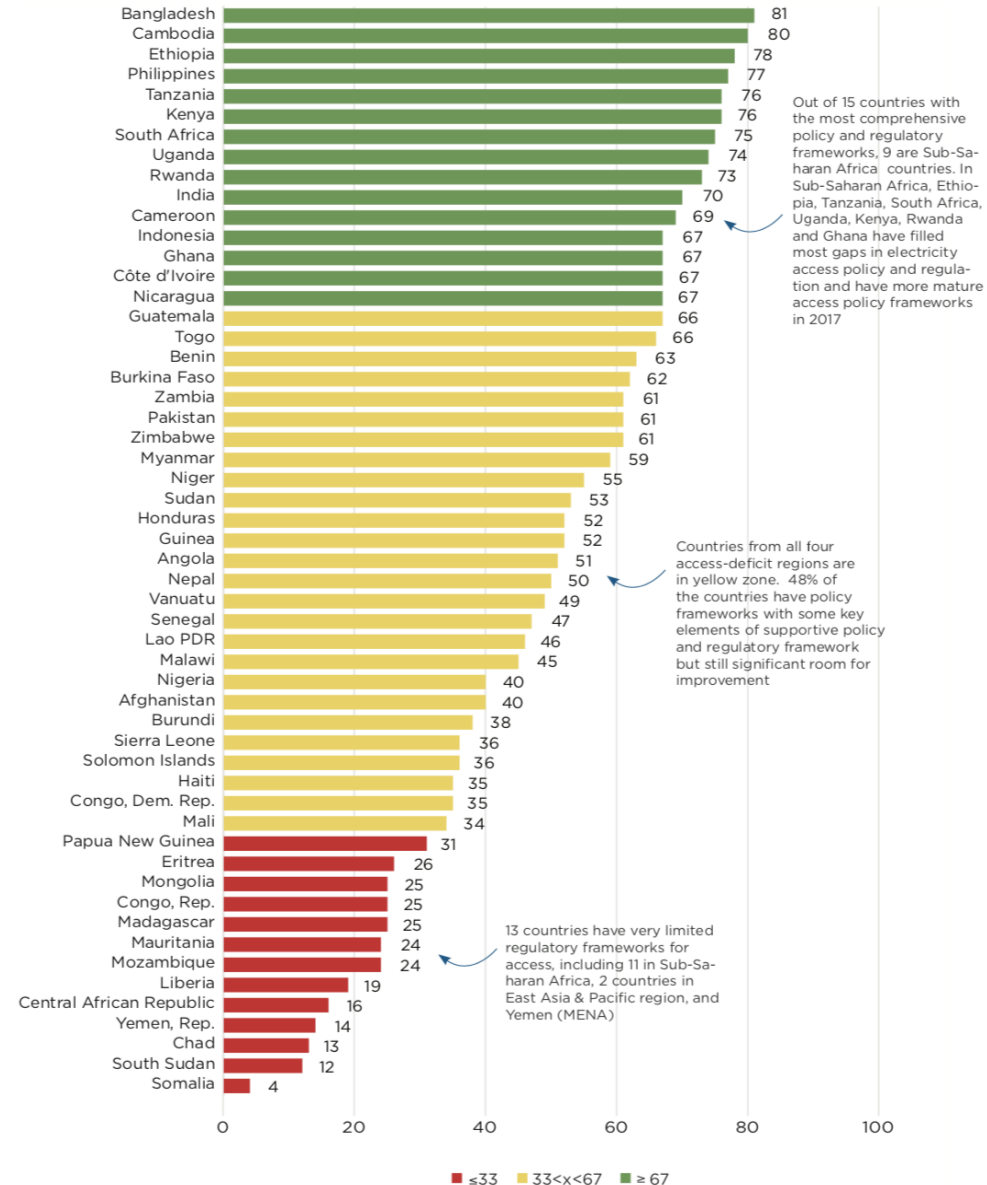
 **LIGHTING AFRICA**

 **BOAD**

 **CTF** CLEAN TECHNOLOGY FUND

Enabling Policy and Market Environment

RISE Electricity Access Scores in Access-Deficit Countries, 2017



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)

Largest improvement in score between 2015 and 2017:

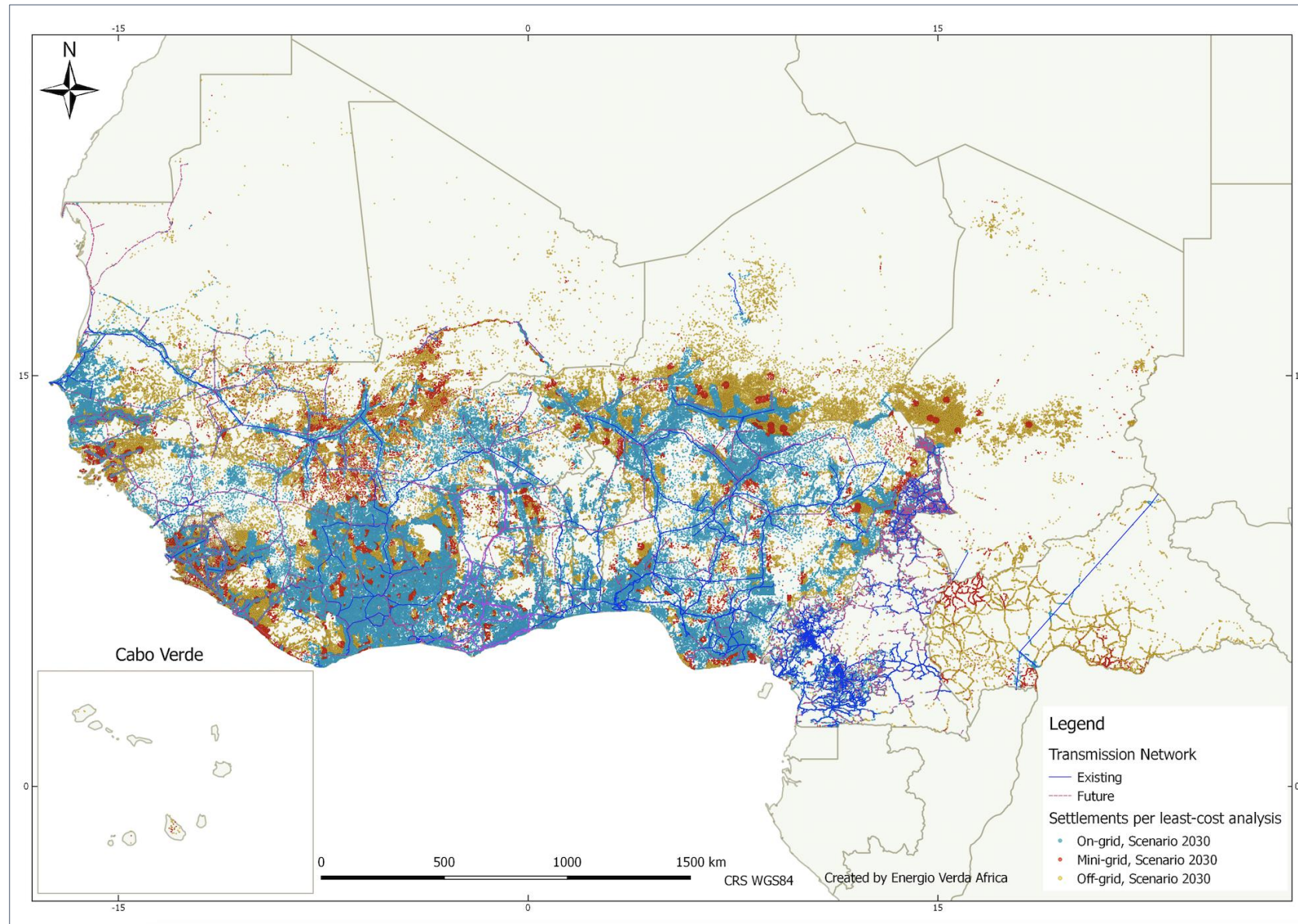
- Togo (+34)
- Niger (+26)
- Burkina Faso (+22)
- Sierra Leone (+19)
- Nigeria (+18)
- Benin (+14)



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

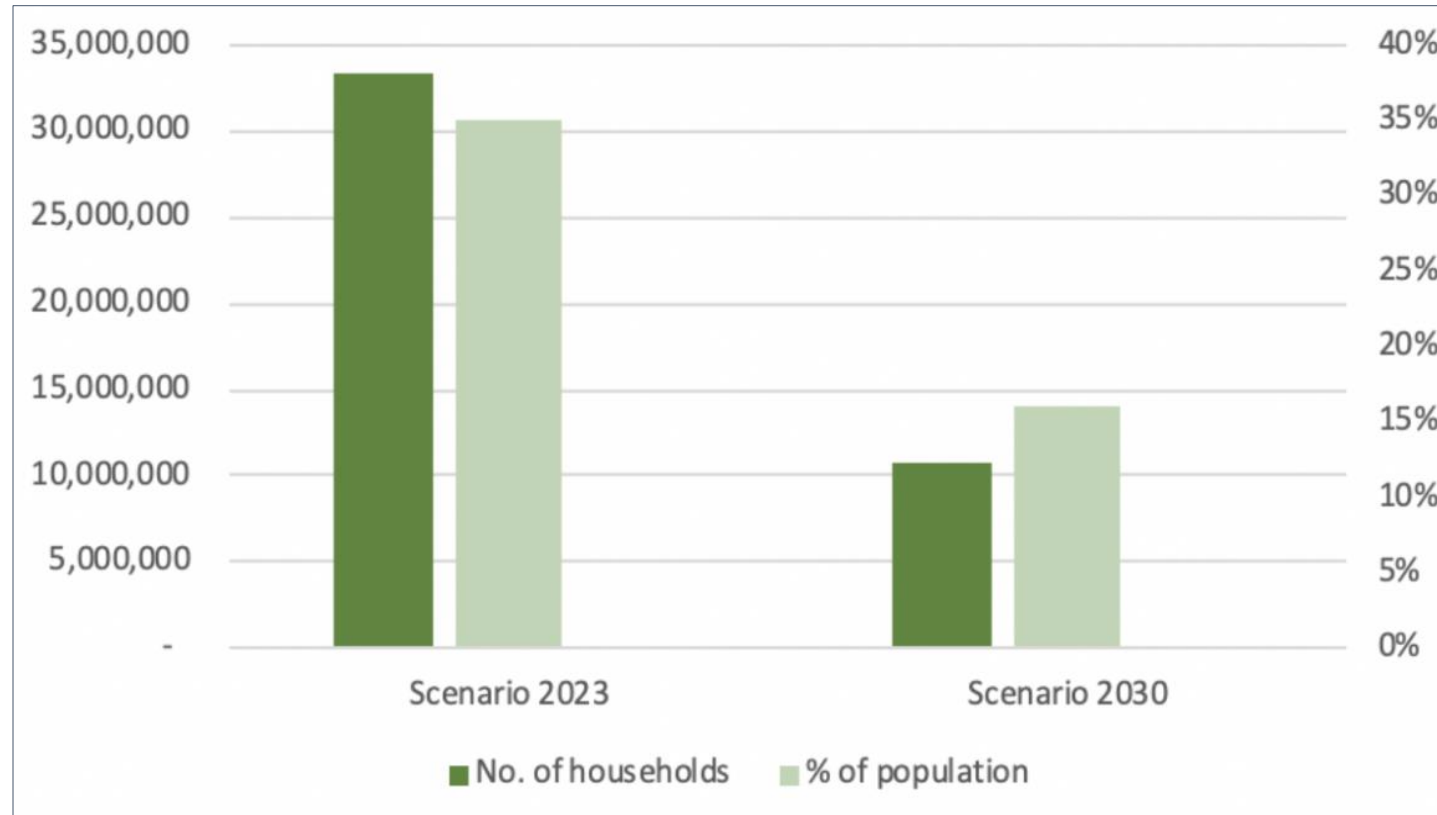
Source: World Bank RISE Index

Distribution of Settlements by Least-Cost Electrification Option, 2030



Least-Cost Electrification Analysis: Stand-alone Systems

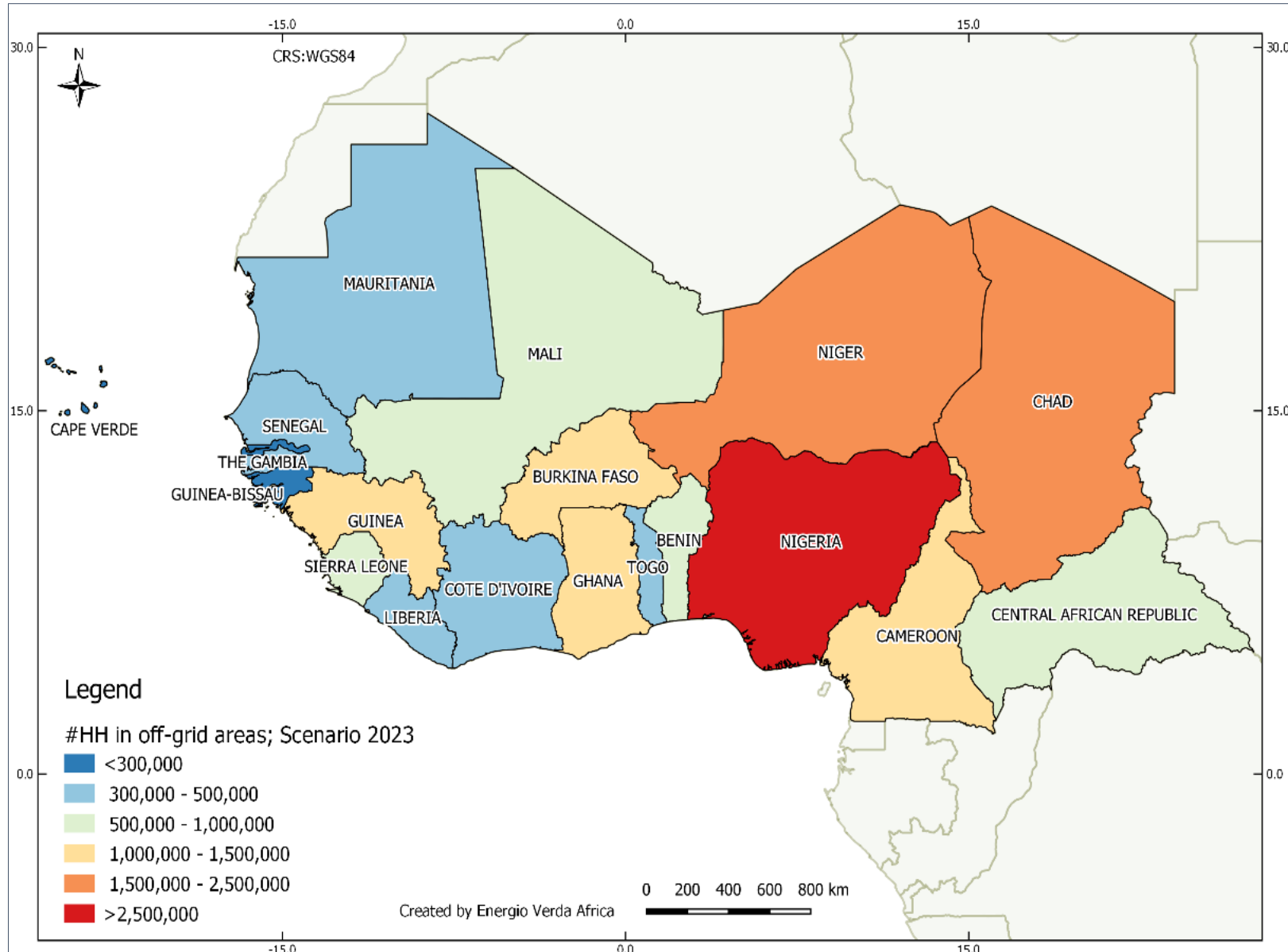
Estimated Number of Households and Share of Population Suitable for Off-Grid Stand-Alone Systems, 2023 and 2030



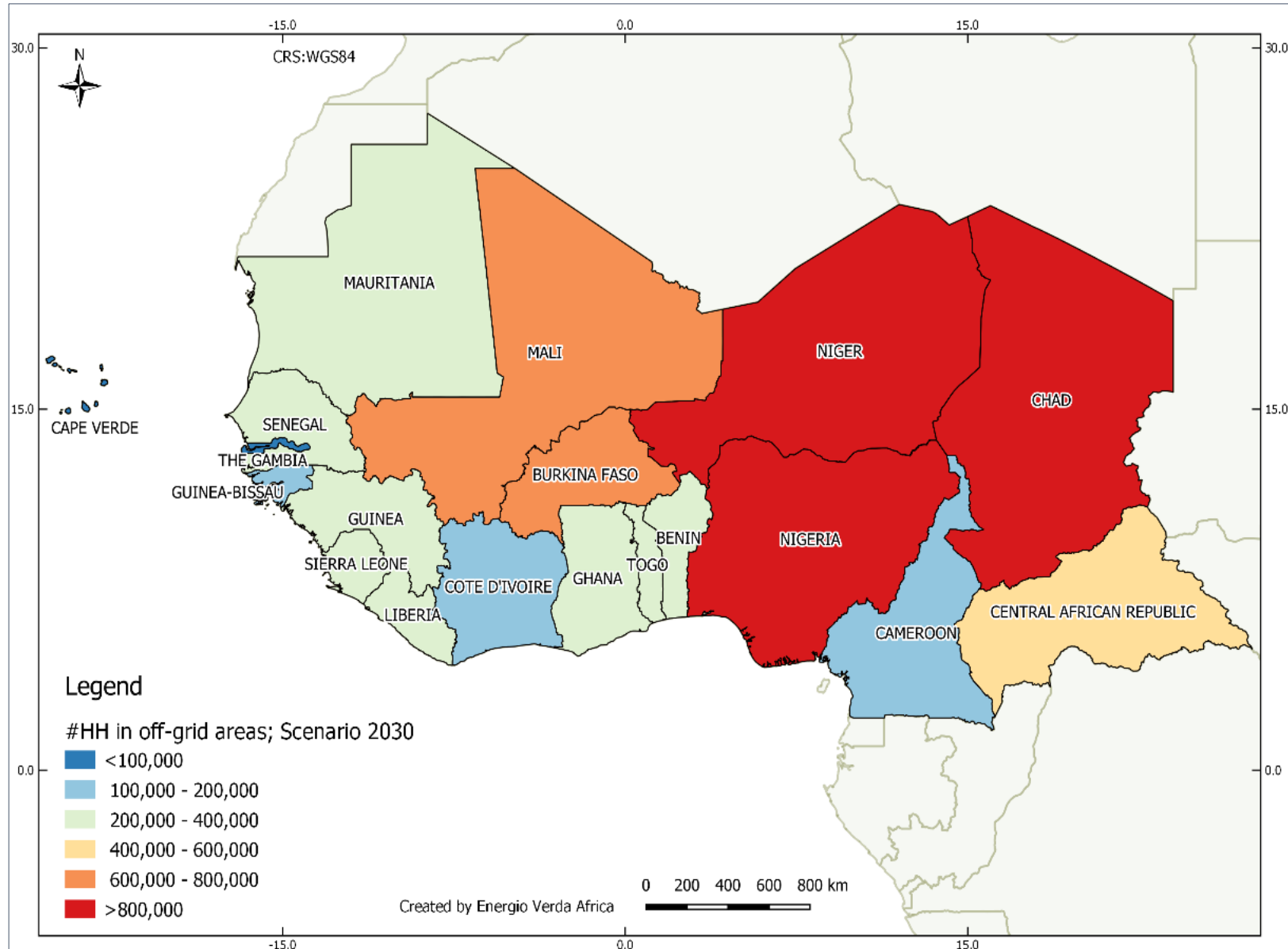
By 2023, about 166 million people, 33 million households and an average of 35% of the population across West Africa and the Sahel will be suitable for stand-alone systems. These estimates will decrease to about 60 million people, 11 million households and an average of 16% of the region's population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

NOTE: Estimate assumes that all grid extensions will be completed through 2030 as planned.

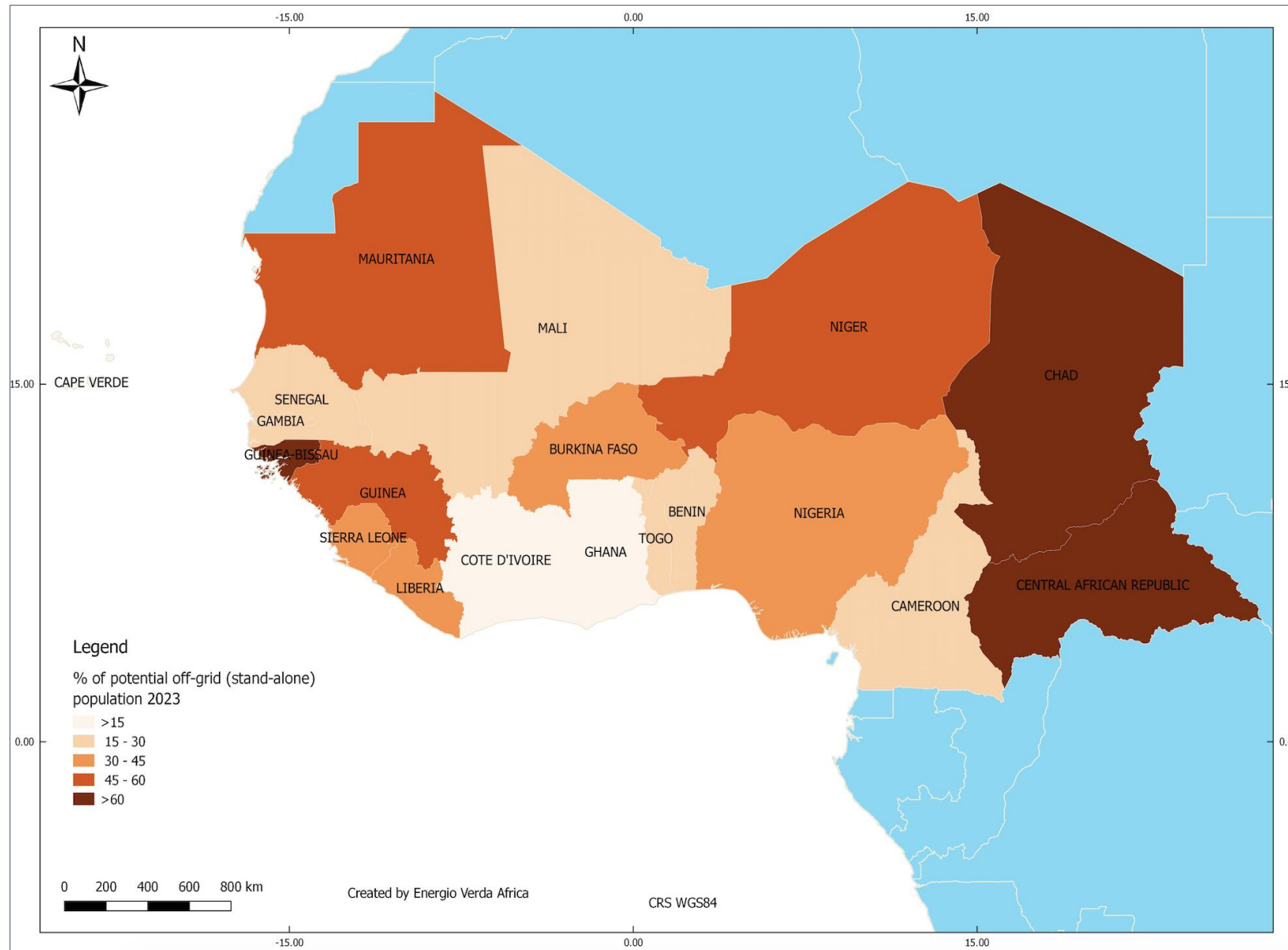
Estimated Number of Households Suitable for Stand-alone Systems, 2023



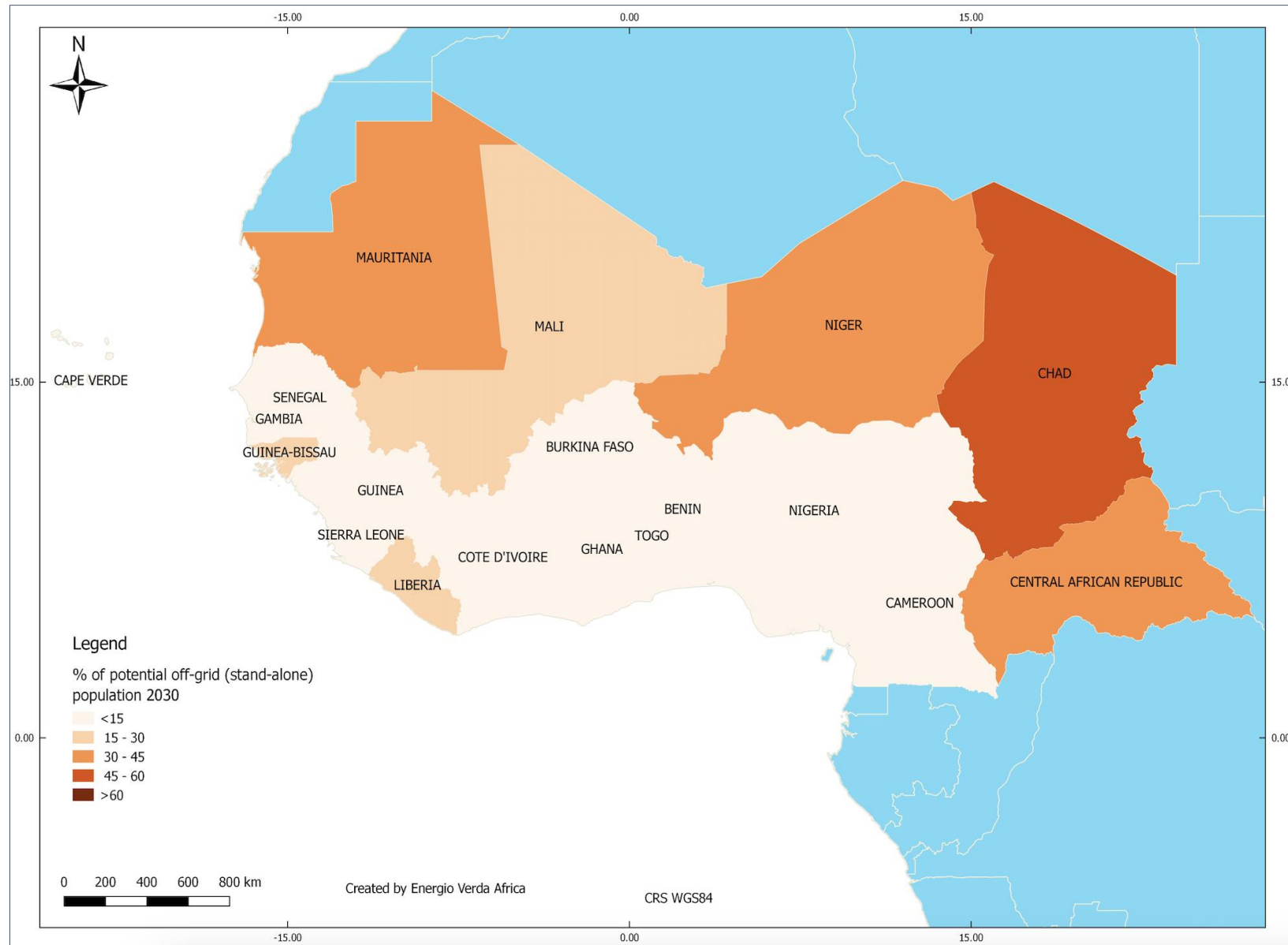
Estimated Number of Households Suitable for Stand-alone Systems, 2030



Estimated Share of Population Suitable for Stand-alone Systems, 2023



Estimated Share of Population Suitable for Stand-alone Systems, 2030

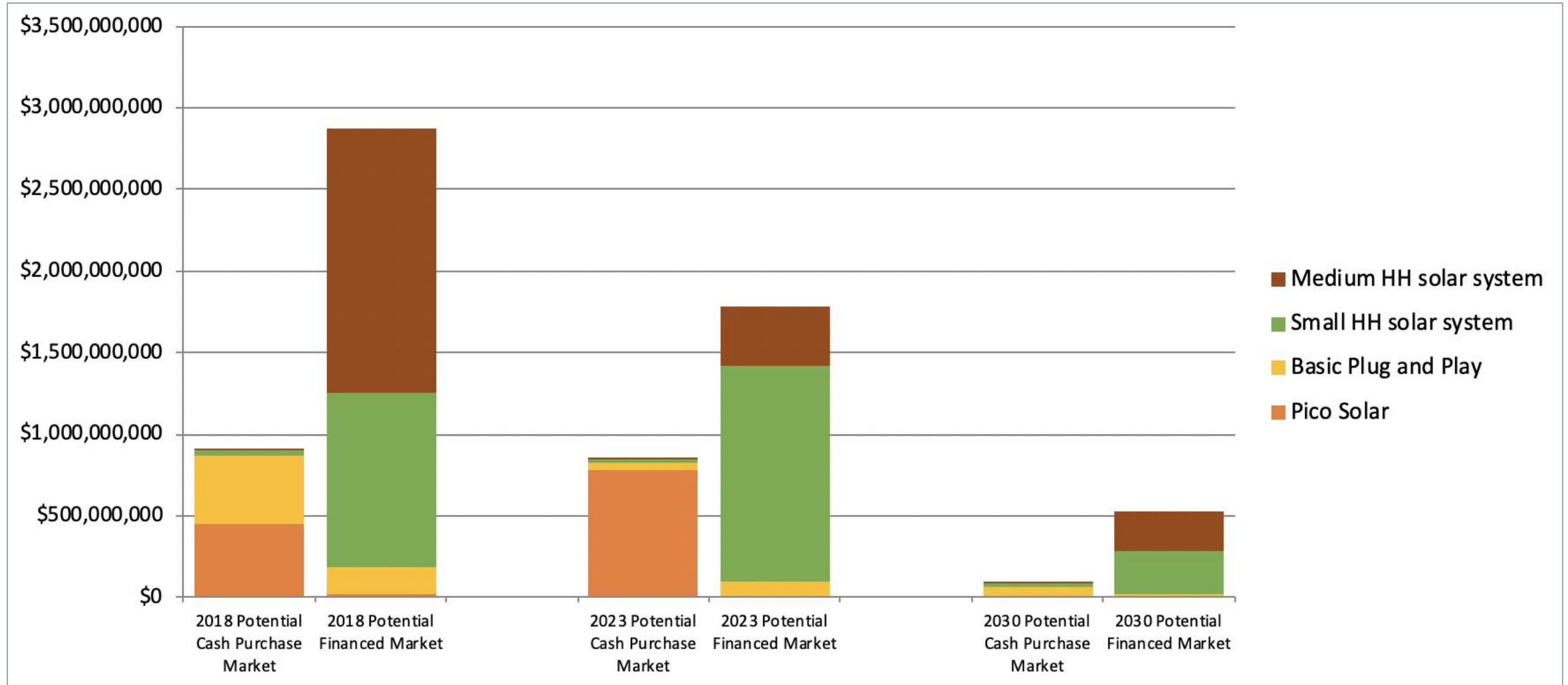


Indicative Annualized Off-Grid Solar Cash Market Potential in West Africa and the Sahel, 2018

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



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



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

Water Supply



Units: 18,939
kW equivalent: 71,375
Cash Value (USD): \$178,424,250

Healthcare



Units: 8,500
kW equivalent: 8,500
Cash Value (USD): \$11,659,375

Education



Units: 164,857
kW equivalent: 6,413
Cash Value (USD): \$17,681,235

Public Lighting



Units: 8,246
kW equivalent: 1,726
Cash Value (USD): \$5,173,875

Total Estimated Annualized Cash Market Potential

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

Estimated Regional Off-Grid Solar Cash Market Potential for Productive Use Sector

Value-Added Applications	SME Applications for Village Businesses	Connectivity / ICT Applications
Solar powered irrigation, milling and refrigeration	Microenterprises (barbers and tailors)	Mobile phone charging



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

- Agricultural Irrigation: \$1,059,888,194
- Milling: \$144,715,467
- Refrigeration: \$47,427,188



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



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

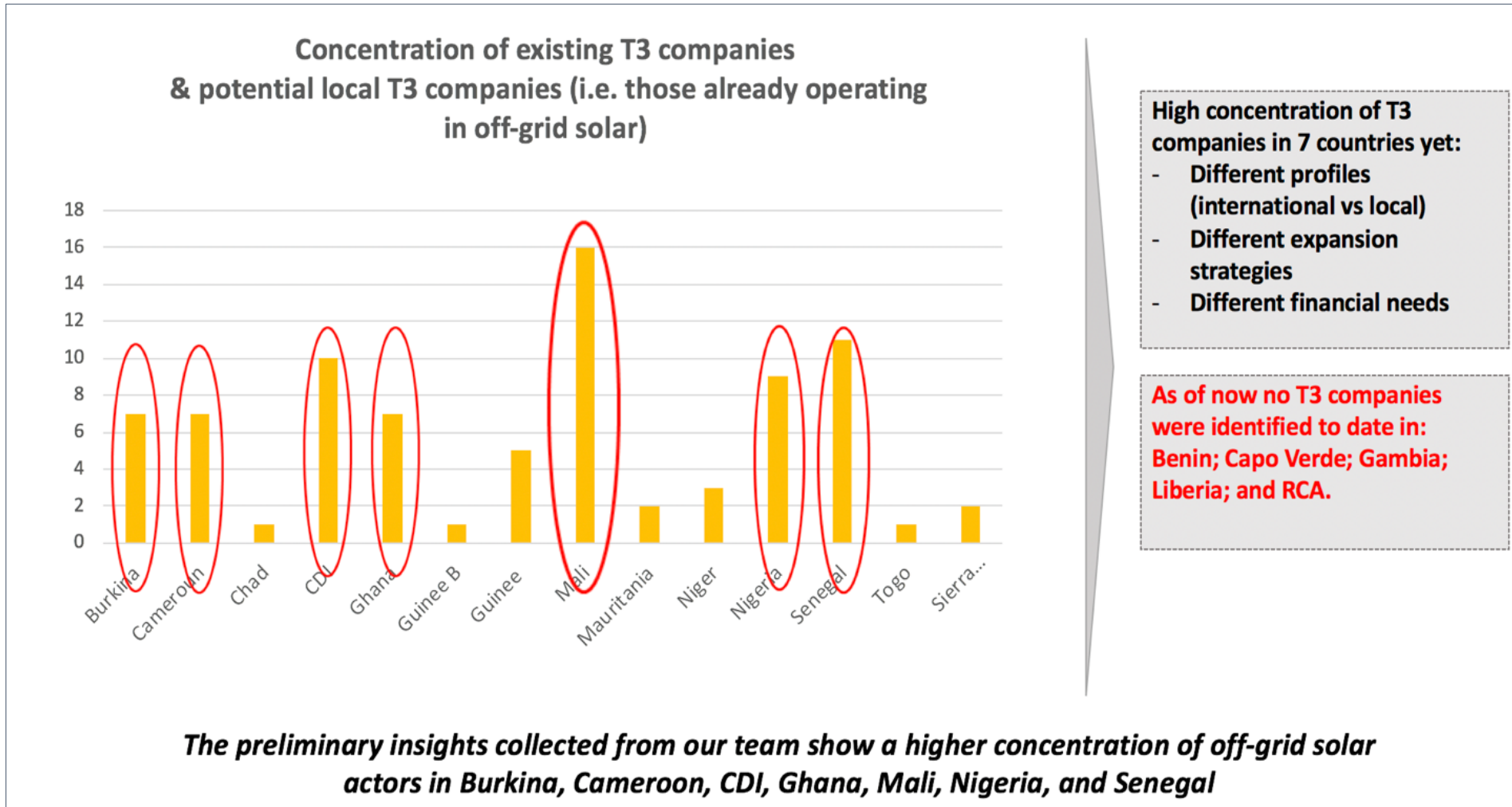
Total Estimated Annualized Cash Market Potential

Units: 2,540,454
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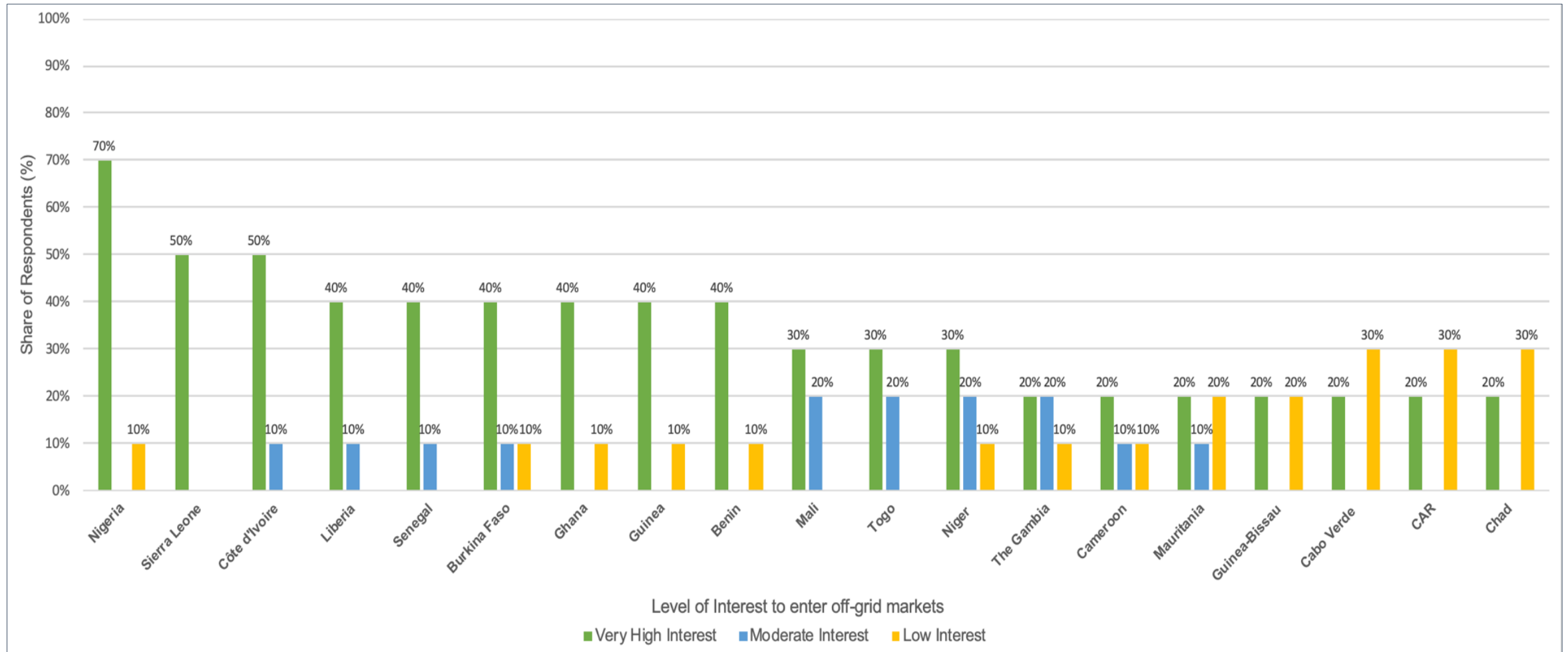
Solar Company Tier Classification

Classification		Description
Tier 1	Startup companies	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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

ROGEP Supplier Market Insights



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



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 off-grid solar 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

Key Insights and Recommendations



ROGEP

Regional Off-Grid Electrification Project

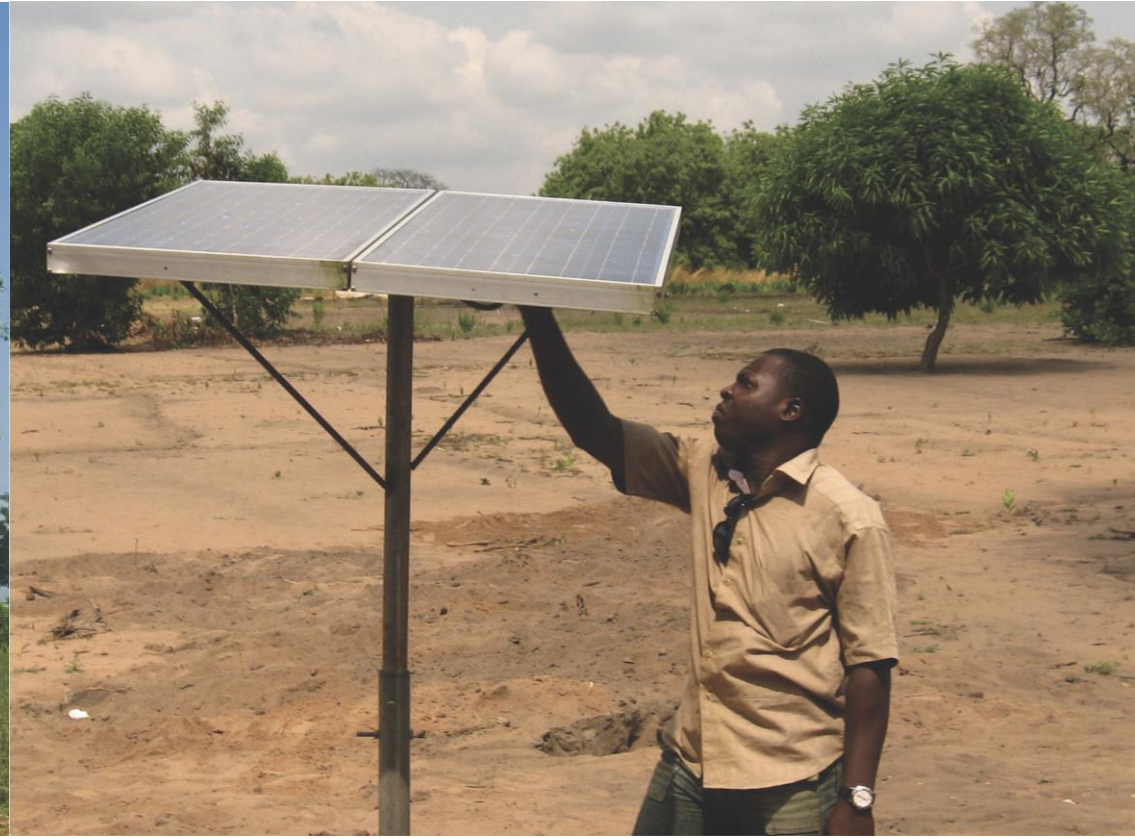


- **Policy & Enabling Environment**: With the exception of a few countries, most countries across the region still have significant room for improvement in development and implementation of supportive policy and regulatory frameworks for energy access.
- **Least-Cost Electrification Analysis**: In 2023, an estimated 33 million households across West Africa and the Sahel (35% of the population) will be suitable for stand-alone systems. By 2030 -- assuming that all grid extensions will be completed as planned -- these estimates decrease to 11 million households (16% of the population).
- **Off-Grid Solar Market Potential**: Countries with largest estimated off-grid solar cash market potential are listed below (figures include demand from household, public/institutional, and productive use sectors):
 - Nigeria (\$1.4B)*
 - Ghana (\$217M)
 - CAR (\$182M)
 - Chad (\$125M)
 - Mali (\$119M)
 - Cote d'Ivoire (\$118M)

* Nigeria accounts for nearly half of the region's overall demand (\$2.9B)
- **Consumer Financing**: Consumer financing is critical to off-grid solar market growth, as it allows the poorest households to enter the market and those already in the market to afford larger systems. The household sector analysis found that in 2018 the estimated regional financed market potential is *more than triple* the estimated cash market value in that year (increase from ~USD 900 million to ~USD 2.8 billion).

Summary of Recommendations

- ✓ Strengthen regional energy access policies and support development of national energy access policies
- ✓ Adopt regional standards and quality assurance framework for stand-alone systems
- ✓ Remove trade barriers and simplify tax regime to enhance product affordability
- ✓ Support development of regional/national certification schemes for solar technicians/service providers
- ✓ Support development of mobile money sector through harmonization of mobile sector policies, regulations and taxation
- ✓ Unlock demand through consumer awareness/education and promotional campaigns
- ✓ Share market intelligence and facilitate stakeholder exchanges
- ✓ Provide extensive technical and financial support to off-grid solar companies and entrepreneurs to accelerate business growth and/or facilitate market entry
- ✓ Develop standardized business training materials for off-grid solar entrepreneurs
- ✓ Deliver customized business acceleration support and TA to start-up and early-stage off-grid solar enterprises



Questions & Comments



Thank You

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