AFSIA
Africa Solar Industry Association

ANNUAL SOLAR OUTLOOK 2022

A country-by-country review of the status of solar energy in Africa.

Trinasolar

Vertex

BIGGER IN POWER

UP TO
690W

21.6%
MAXIMUM EFFICIENCY

+34%
HIGH STRING POWER

30
YEARS WARRANTY

RANGING FROM 400W - 690W+

The Vertex Ultra high-power modules have been widely used in many applications globally, due to its great advantages:

- Large Silicon Wafers
- Diversified Layout Design
- High-Density Encapsulation
- MULTI-BUSBAR (MBB) technology
- Non-Destructive Cutting Technology(NDC)
- Low-Voltage & High-String Power Design

EXPLORE THE POTENTIAL OF VERTEX MODULES

www.trinasolar.com/en-mea /TrinaSolarMEA /trina-solar

BROUGHT TO YOU BY:

AFSIA
Africa Solar Industry Association

ALONGSIDE OUR PARTNERS:

Trinasolar
JA SOLAR
WORLD FUTURE ENERGY SUMMIT
Dutch&Co
LED's go SOLAR
LONGi
SustainSolar
AMMP
JinkoSolar
UL
Empower
Impact Investment
GLOBAL ICE TEC
greenyellow
smart energy solutions

WORDS OF GRATITUDE

This report has been prepared and curated for you over the past few months thanks to the dedication and professionalism of several key people and organizations. Please join me in thanking all those who have made this 2nd edition possible and, I believe, have set the bar even higher than last year in terms of content and quality.

Special thanks to Aline Uwimana and Ines Rachel Dushime who have relentlessly collected, analyzed and computed information over the past few months. Their attention to details and outstanding knowledge and understanding of the industry have been instrumental in bringing you this report, which I am sure will guide you

Credit: Elaine Solar

WORDS OF GRATITUDE

throughout 2022 in your different solar activities. I would also like to thank the World Future Energy Summit ("WFES" for those of you who attend regularly) for their enthusiasm about our work and their support in enhancing the visibility of this report and AFSIA's work in general. I also thank this year's announcers for their support and participation to this report.

Unlike many other industry organizations, AFSIA is completely privately funded. The participation of announcers is crucial for AFSIA to be able to dedicate resources and time in curating this report, which I hope will help many of you in refining your business strategy in Africa or even identifying new business opportunities. A big thank you to Trina Solar, JA Solar, Dutch & Co, Empower New Energy, UL, Jinko Solar, AMMP, SustainSolar and Global Ice Tec. While preparing this year's report, we received the support of fellow international and local organizations which are also working on the harmonious development and growth of the solar industry in Africa. At AFSIA we put a great emphasis on the quality and completeness of information.

WORDS OF GRATITUDE

Hence it is always a pleasure to work with like-minded entities and individuals who are doing an amazing job at collecting info for more transparency in the industry. Thanks once again for your gracious help.

Final thanks to those who accepted the invitation to contribute an article and share some of their expert knowledge with the readers. In this report, you will be able to read Terje Osmundsen, CEO of Empower New Energy, view on the development of C&I in Africa. You will also get a chance to learn about the future of green hydrogen in Africa, more specifically what it enables in terms of green ammonia and fertilizer production IN Africa and FOR Africa thanks to Toby Greenbury, Ambassador of the African Hydrogen Partnership. Final thanks to those who accepted the invitation to contribute an article and share some of their expert knowledge with the readers.

AFSIA
Africa Solar Industry Association

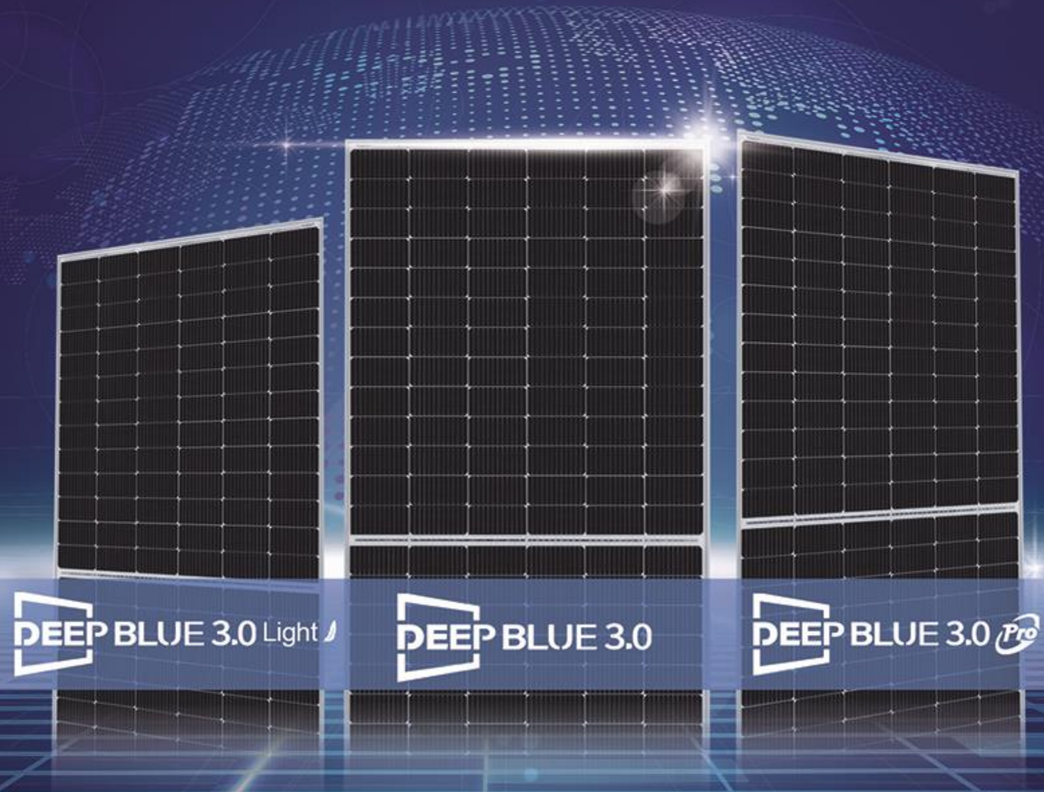
JOHN VAN ZUYLEN

sales@jasolar.com africa@jasolar.com

JA SOLAR

Harvest the Sunshine

Premium Cells, Premium Modules



Born for the Present
Making the Future

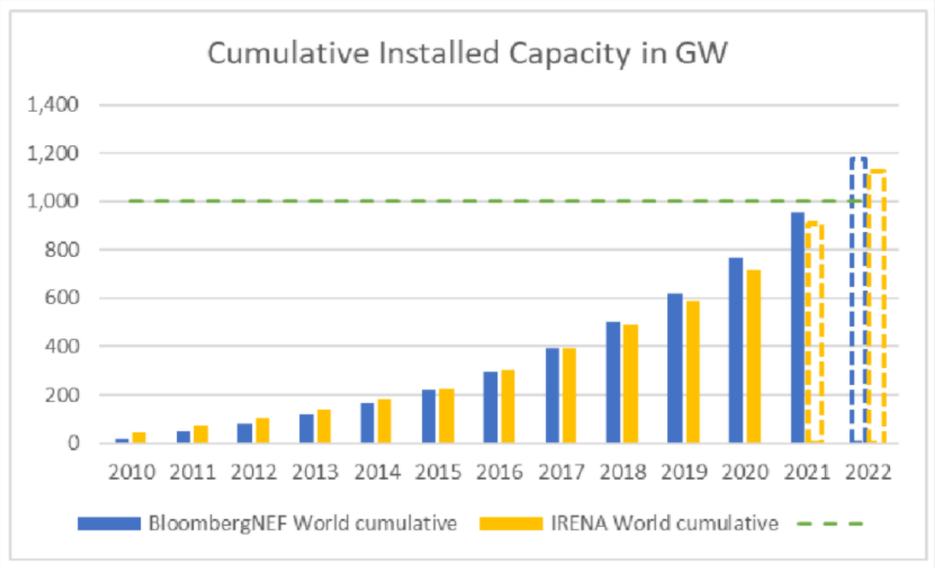
EXECUTIVE SUMMARY

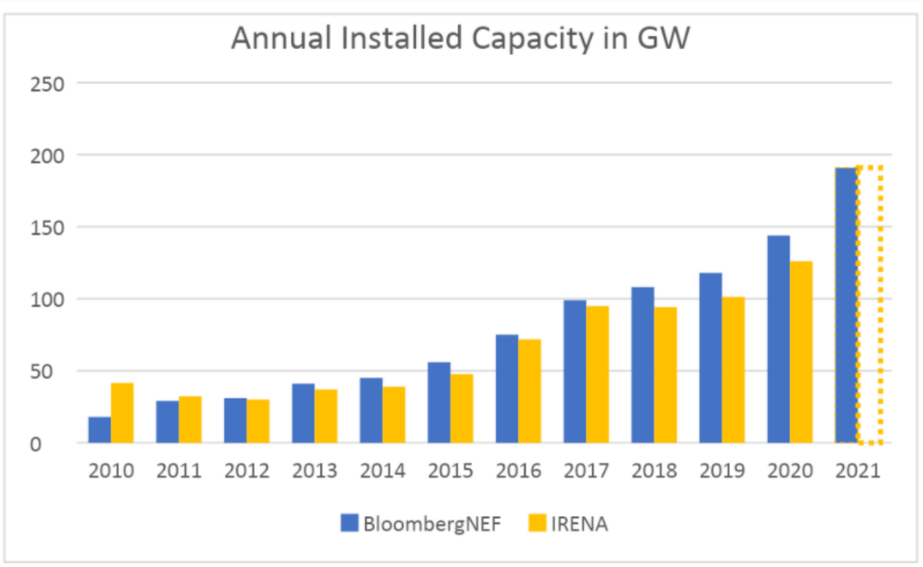
The world will pass the 1 TWp installed solar capacity in 2022.

This symbolic threshold is sure to be met after a record 191 GWp has been installed in 2021 based on various sources citing Bloomberg New Energy Finance (BNEF) predictions in October 2021. A similar, but somewhat more conservative estimate comes from IRENA, which calculated the total installed capacity at the end of 2020 at 716 GW (it is to be noted that IRENA adds PV and CSP capacity, while BNEF only computes PV capacities).

If the 191 GWp BNEF prediction is confirmed, this means the world would have added around 25% of all PV capacity installed in the last decade in just 1 year!

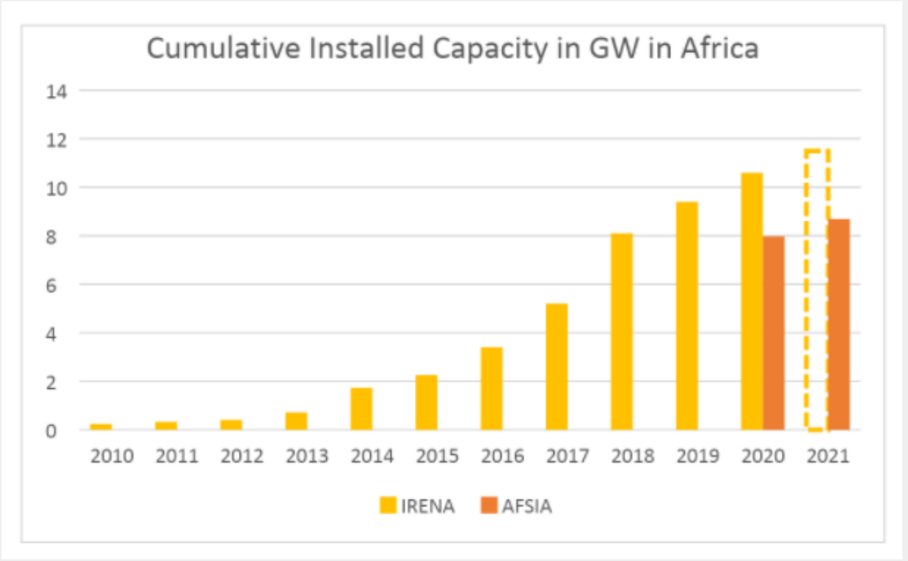
The IRENA statistics offer granularity about regions and countries. When looking specifically at Africa, IRENA states that 10.6 GWp had been installed across the continent





by the end of 2020 (2021 figures are still to be published at the time of writing this report).
AFSIA also compiles its own database of solar projects. While IRENA bases its computations on a combination of data gathering methods (among which import statistics), AFSIA has opted for the approach of identifying individual projects and their related capacities. This approach offers the benefits of even more granularity (**the AFSIA team has identified more than 8,600 projects to date out of which close to 4,000 already in operation)** but it also has its disadvantages.

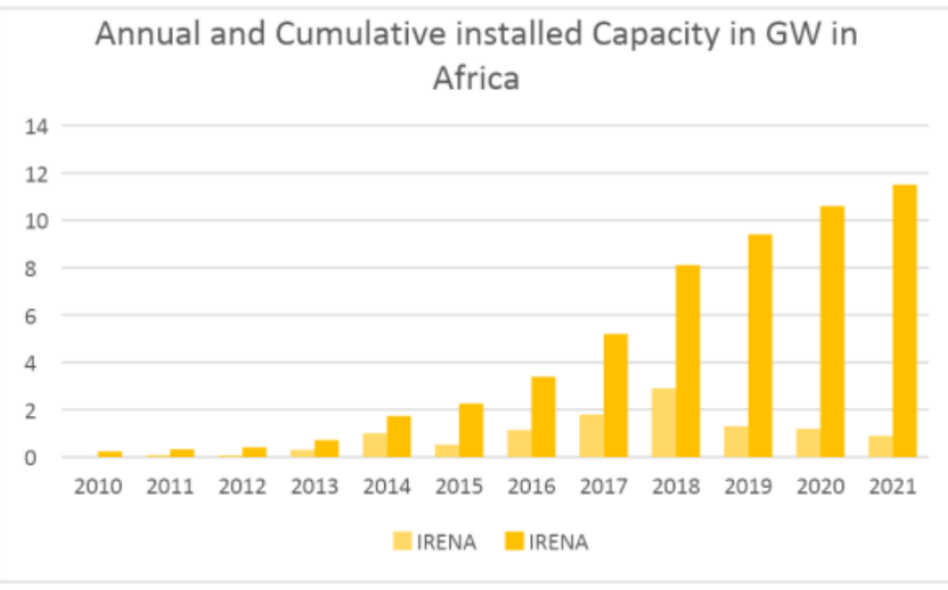
First, it is almost impossible to track all the capacity that has been installed for residential use as these projects are rarely documented publicly. Second, some projects (large-scale, C&I, mini-grid) inevitably escape our attention and do not end up in our database. In 2022 we will put even more effort in tracking, identifying and listing more projects, so as to reduce the gap between the aggregate IRENA data and AFSIA's project-by-project database. In this effort, we invite all installers across the continent to get in touch with us and inform us about the projects they have delivered so we can build a more accurate picture.



As far as the AFSIA database is concerned, 7.9 GWp of projects were identified as "in operation" by the end of 2020 (75% of the IRENA stated capacity) and an additional 721 MWp were identified as 2021 new capacity so that the documented total capacity by end of 2021 reaches 8.7 GWp in AFSIA database.

IRENA

		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
WORLD	ANNUAL INSTALLED	41.6	32.3	30.1	37	39	47.7	71.9	94.9	94.2	101.3	126	191
	CUMULATIVE	41.6	73.9	104	141	180	227.7	299.6	394.5	488.7	590	716	907
AFRICA	ANNUAL INSTALLED		0.09	0.08	0.31	1.01	0.53	1.14	1.8	2.9	1.3	1.2	0.90
	CUMULATIVE	0.24	0.33	0.41	0.72	1.73	2.26	3.4	5.2	8.1	9.4	10.6	11.5
%	INSTALLED VS. WORLD		0.3%	0.3%	0.8%	2.6%	1.1%	1.6%	1.9%	3.1%	1.3%	1.0%	0.5%
	CUMULATIVE VS. WORLD		0.4%	0.4%	0.5%	1.0%	1.0%	1.1%	1.3%	1.7%	1.6%	1.5%	1.3%



What is noticeable is that amidst a record year for solar globally, Africa has slightly underperformed compared to the rest of the world. In the past 7 years, Africa has experienced 2 peaks in 2014 and 2017 when it installed 2.6% and 3.1% of the global new capacity respectively. In 2021, data indicates Africa has represented only 0.5% of the new capacity globally. This is the lowest level since 2012.

As a result, despite the formidable known solar potential across the continent, Africa still only hosts a small 1.3% of the global installed capacity. And because of other regions going faster and bigger, this African share has been reducing since 2018 when it represented 1.7%.

Despite this apparent pessimistic analysis, we believe there are many reasons to be enthusiastic about solar in Africa.

First, despite not being aligned with the mind-blowing 25% global capacity increase, solar in Africa has grown by 9% compared to the capacity installed historically. In normal times and for any other industry, this would be considered as a remarkable performance. Further, these numbers may also be reflecting the fact that most of Africa (with the exception of its northern part and South Africa) is simply not suited for massive large scale plants as we witness in other parts of the world. This is not due to lack of demand for electricity, but based on grids which cannot absorb important quantities of solar. As a result, Africa simply cannot (yet) be the place where super large scale projects are built and can boost up statistics when coming online.

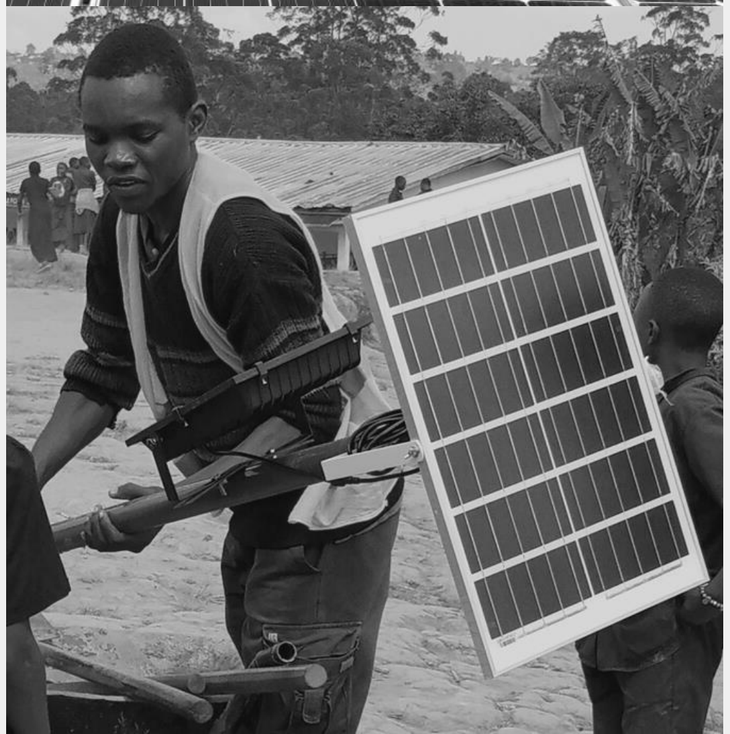
The reality of solar in Africa is also very different from what we see elsewhere in the world because of the wide diversity of solar applications that are present in Africa.

Solar Home Systems (SHS) are legion across the continent but do not exist in Europe or the US. Yet they enable millions of people to get access to electricity and to the basic needs it allows to address in rural areas. The SHS market has remained solid in most African countries despite challenges related to COVID. And **SHS providers continue to rival with ingenuity to come up with better, cheaper and more diversified solutions to reach the 600 million people who still lack access to electricity in Africa.**

Mini-grids are also a special form of solar which is not to be found in the developed world but which Africa excels at. These systems have been receiving a lot of attention in the media and from several key international institutions and donors.

The expectation of mini-grids is for them to build a "pool" of electricity access in villages with a strong focus on enabling commercial and small industrial activity (what is called "productive use"). While the concept is extremely appealing, mini-grid stakeholders are still battling to reach economies of scale and reach undisputable commercial viability (high CAPEX and inadequate policy are the two main obstacles).

A final reason to be optimistic is the boom of solar for Commercial and Industrial (C&I) users. Business leaders across the continent often cite reliability and access to electricity as their main challenge (and not political instability, insecurity or red tape as many might be tempted to think). Thanks to the improvement of storage technologies and their fast cost decrease, more and more C&I customers (shops, factories, offices,...) are now able to produce their own electricity with solar, reliably and at an affordable cost. Add to this the growing number of investors specialized in financing such type of installations, and this



Credit: Azimuth 360 and Africa Solution Energy

removes the burden of the (high) initial CAPEX. These 2 factors combined create a virtuous circle of being able to plan and conduct business operations, reduce OPEX, increase turnover and ultimately create more jobs. This past year has shown extremely encouraging signs of the growth in this segment, and we are convinced that the continent is yet to experience the real boom of C&I solar.

For all these reasons, we remain extremely optimistic about solar in Africa for the next decade. Africa comes with its challenges but it also offers a wide diversity of solar applications that exist nowhere else. Solar entrepreneurs and investors need to do their work in identifying these needs and offer the suitable solutions, often specific to the region or even the country. Many of them already do and are very successful at it, and many more will come.

AFSIA looks forward to supporting the entire solar eco-system in Africa, to enable a wider awareness and roll-out of solar solutions, ultimately improving the lives of people on the continent.


WORLD FUTURE ENERGY SUMMIT
Hosted by
Masdar
A MUBADALA COMPANY
The World's Leading Business Event for Future Energy and Sustainability
18 - 16 January 2023 | ADNEC, Abu Dhabi
Built by
RX
In the business of building businesses

FOREWORD

I am delighted to share with you the 2nd edition of AFSIA's Annual Solar Outlook for solar energy in Africa. Solar in Africa has experienced a continued tremendous growth despite all the challenges the world has experienced in these past 12 months. This is an undeniable demonstration of the solid fundamentals of solar energy in Africa. We have indeed reached a point where the combination of technology improvement, lowering costs and increasing awareness about solar all converge and allow a growing number of people and companies across

the continent to finally get access to reliable and affordable energy. Precisely what so many of them had been missing for so long. This trend is set to continue in the years to come. And more than “just” having access to electricity, it is the ripple effect of this electricity that will have the most drastic impact. More and more people and companies across Africa are now in a position to improve their revenue-generating activity (or in many cases start one). As a consequence, they have more available income to grow their business, create new jobs, and in the end, improve their life standard. This virtuous circle is the real power of solar energy in Africa.

This has been in motion for a few years now, mostly with some isolated success stories across the continent. But new solutions and applications are being invented every day, and more end-users learn about the great potential of solar for them every day as well. No doubt solar in Africa is set to experience an amazing decade of growth. The AFSIA team is delighted to witness and support this development. And we look forward to continuing our educational and informational work with all stakeholders so Africa can quickly catch up with the rest of the world in terms of access to cheap and reliable electricity for the benefit of all.

MEET THE TEAM

AFSIA
Africa Solar Industry Association

INÈS	ALINE	JOHN	VESTINE	JOSÉE	LÉONCIE
TEAM MANAGER	MARKET INTELLIGENCE	CEO	RESEARCH & NEW PROGRAMS	COMMUNITY MANAGEMENT	EVENTS MANAGEMENT

LED's go SOLAR

2020 Solar Energy Award

2018 Renewable Energy Company of the Year

100+ LED lighting project
reducing up to 70% in electricity

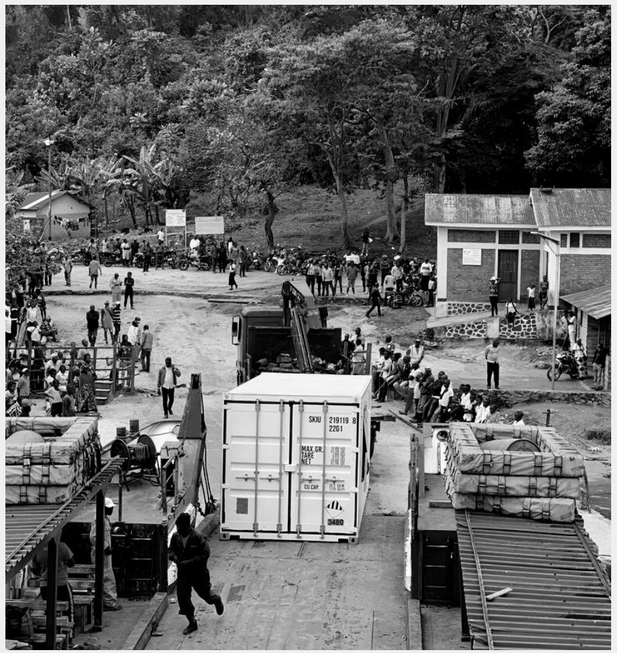
40 PV Solar installations with
capacity of 2,954 kWp
producing 4,038,159 kWh
of green energy yearly

CO2 emission reduction
annually of 1,736 tonnes

+233 30 279 7190
info@dutchandco.nl
www.dutchandco.com.gh
No 8 Bortey Avenue
Airport Residential, Accra

SCAN ME

TABLE OF CONTENTS



Credit: GC Solar, SustainSolar and Powerlife

The clean energy transition is powered by trust.

Innovative solutions for the renewable energy future

Solar

Wind

Energy storage

Microgrids and hybrid power

Empowering Trust®

Advanced advisory and due diligence services

HOMER microgrid optimization software

Performance analytics for solar plant operations

Rely on UL for trusted, comprehensive support across the project life cycle.

Connect at UL.com/renewables

INTRODUCTION

AFSIA's Annual Solar Outlook report distinguishes itself from other industry report through its format. It is composed of concise and information-rich "country vignettes" which are literally deep-dives into the key market drivers and indicators for solar opportunities on a country level. This report is meant to become the solar decision-maker year-long companion for fast access to information and identifying business opportunities.

Each country vignette will contain synthesized data about solar in the country. This information has been gathered through a continuous market watch conducted by the AFSIA team. Each information element is presented in summarized format to provide a "straight-to-the-point" read but every piece of information is also sourced so the reader can easily track the origin of the information and also decide to collect complementary

INTRODUCTION

information directly from the source.
Additionally, this year the report also proposes summarized data tables to easily and quickly compare key metrics and policy markers between countries. This should help the reader quickly identify the next targets for international expansion and/or business development efforts.
On top of the country vignettes, this report also provides deep-dives into some hot topics and key segments of the industry through various articles disseminated throughout the report. This year's report will provide a privileged angle on topics such as the successful launch and roll-out of the mini-grid program in Mozambique, the rise of receivables platforms in the SHS space, South Africa's REIPPP Round 5 and the opportunity for green ammonia and green fertilizers as an application of green hydrogen to cite a few.
We hope you will enjoy AFSIA's 2nd Annual Solar Outlook report and look forward to your comments to make future reports better and more useful. Please do not hesitate to share your suggestions and remarks so that we can continue building a strong and growing industry together.

WEBSITE
AFSIASOLAR.COM

EMAIL
INFO@AFSIASOLAR.COM

COUNTRY VIGNETTE EXPLAINED

OBJECTIVES

This section contains information on the objectives of a country to include renewable energy in its energy mix. Targets are set for the next 5 years, 10 years or maybe more.

ELECTRIFICATION RATE

This shows the percentage of people in each country that currently has access to the grid and/or electricity. It also highlights electrification rate objectives in the near future. Please keep in mind that different countries count “electrification” differently. In some countries it means “connected to the grid”, in some other it means “has access to lighting, even through SHS”.

POLICY / REGULATION

Lists all applicable rules in terms of duties, taxes, exemptions, net-metering, wheeling, feed-in tariffs or any special government program that supports or restricts the deployment of solar or renewables in general in a country.

COUNTRY VIGNETTE EXPLAINED

TOTAL PV INSTALLED

Displays figures of the currently installed capacity as identified by AFSIA for each solar segment.

CURRENT TARIFF GRID ELECTRICITY

Represents the tariff charged to different types of consumers classified by residential, commercial, and industrial depending on their electricity consumption. This tariff excludes VAT and provides the range between the minimum and the maximum $/kWh that can be charged per category in this country.

NOTEWORTHY DEVELOPMENTS

Identifies bigger projects/programs that are either under development, construction, tendering or any other phase of development and which are expected to significantly contribute to the solar opportunity in a given country.

TABLE OF CONTENTS / Country links

PAGE N°

COUNTRY SLIDE

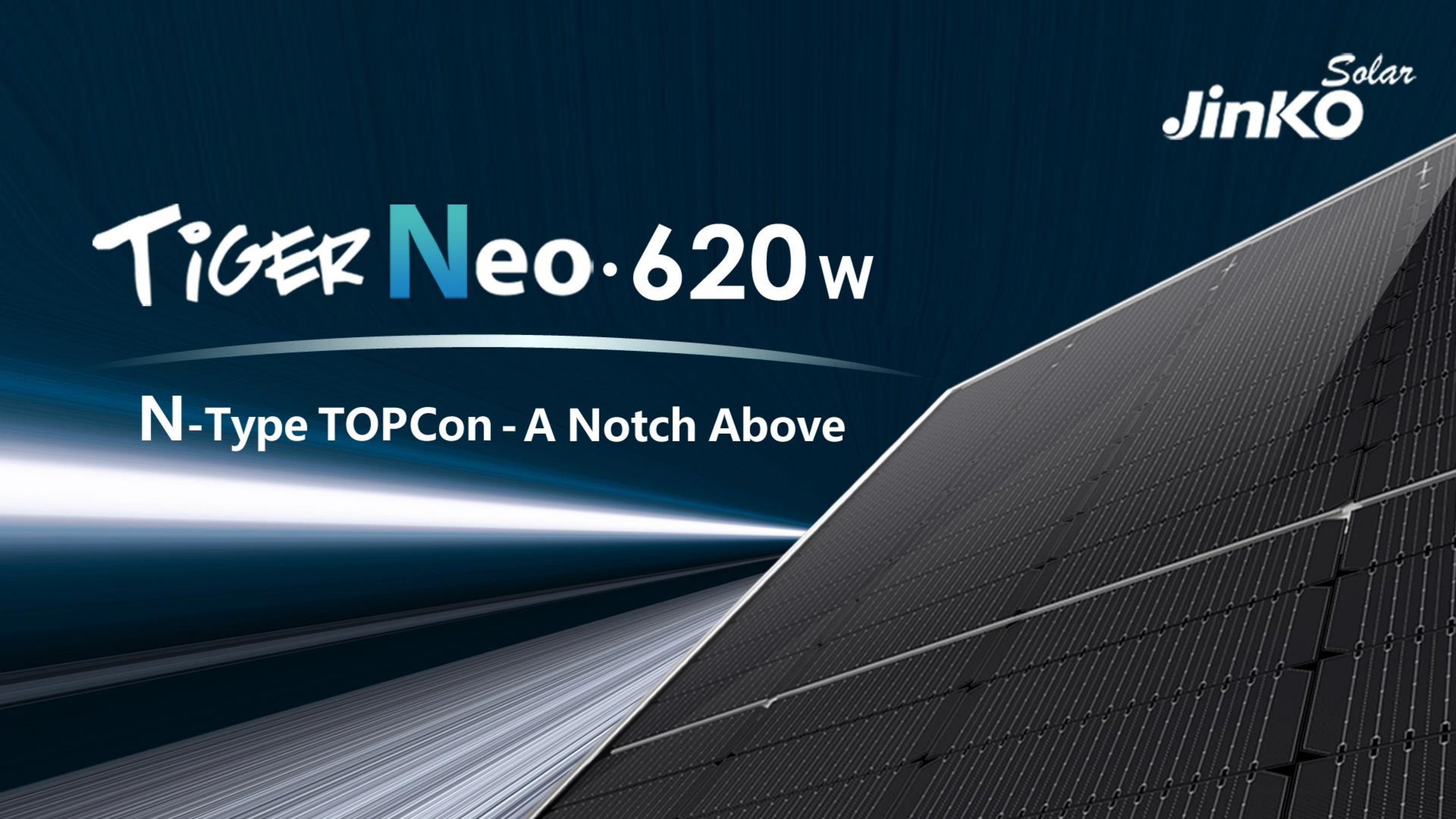
TABLE OF CONTENTS / Article links

ARTICLE | PAGE N°

JinKO Solar

TIGER Neo·620w

N-Type TOPCon - A Notch Above



ALGERIA

OBJECTIVES

- 22 GW (27%) of RE by 2030 with 13.6 GW reserved for solar energy link
- 4,000 MW by 2024 and 15000 MW of RE by 2035 link

ELECTRIFICATION RATE

- 100% of the population has access to electricity link

POLICY / REGULATION

- 30% import duties on foreign solar panels
- No limit of self-consumption
- No FiT, no net-metering

TOTAL PV INSTALLED

LARGE SCALE	344.1 MWp PV + 25 MWe CSP
C&I	10 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.009	$ 0.007	$ 0.004
MAX.	$ 0.059	$ 0.064	$ 0.048

NOTEWORTHY DEVELOPMENTS

- Launch of 2 x 500 MWp tender in 2021 link
- Authorities set to launch 1GW PV tender link

ANGOLA

OBJECTIVES

- 9.9 GW of installed generation capacity by2025 link
- 100 MW of solar of which 30 MW is off-grid 2025 link
- 500 solar villages by 2025 link
- 600 MW through 30,000 off-grid systems by 2022 link
- 370 MW of RE by2022 link

ELECTRIFICATION RATE

- 45% of the population has access to electricity link
- 65% in urban areas and 6% in rural areas link
- Objective to reach 60% electrification rate by 2025 link
- Objective to reach 50% electrification rate by 2022 link

POLICY / REGULATION

- In June 2019 grid electricity subsidies were cut by 85% link
- Objective is to apply cost-reflective tariffs by 2025 link
- PV is subject to import duties and VAT link
- No FiT, no net-metering

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0 MWp
MG	0 MWp
SHS & RESIDENTIAL	0.035 MWp

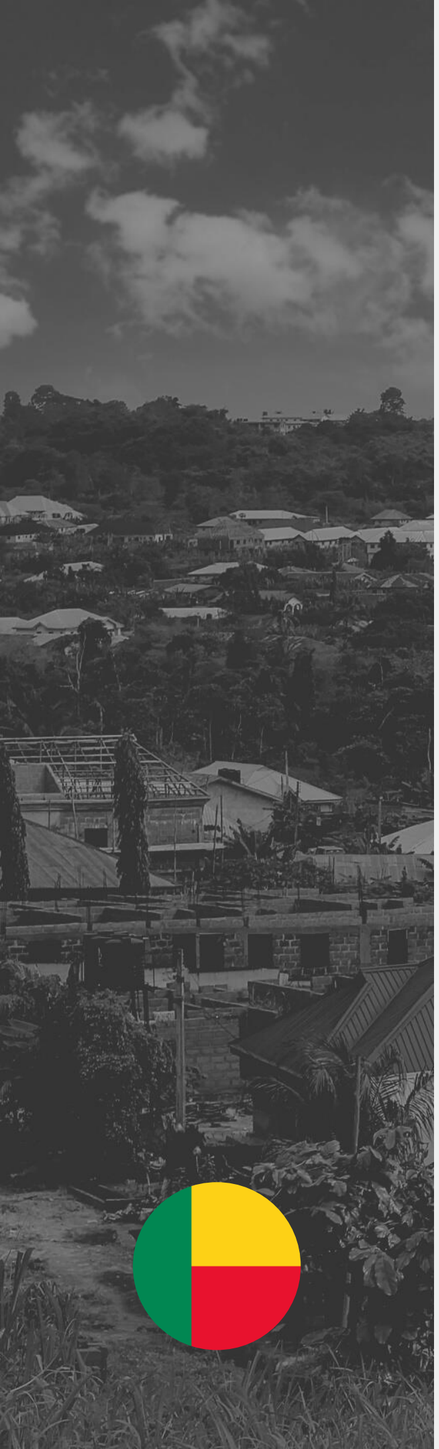
SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.004	$ 0.021	$ 0.013
MAX.	$ 0.027	$ 0.027	$ 0.023

NOTEWORTHY DEVELOPMENTS

- MCA Group, Hitachi ABB Power Grids and Sun Africa to build 7 large-scale plants for total of 370MWp link
- Construction going on with 96 MW Baía Farta and Biópio solar plants in Benguela link
- Solenova to develop the 50MWp Caraculo PV project Link



BENIN

OBJECTIVES

- Achieve 24.6 % and 35% of renewable energy in the energy mix by 2025 and 2030 respectively link
- More than 127 localities to be electrified via mini-grids by June 2023 link

ELECTRIFICATION RATE

- 53% of the population has access to electricity link
- Target to achieve urban and rural electrification rates of 95% and 65% by 2025 link

POLICY / REGULATION

- All PV components, except inverters, are exempted from VAT on import link
- No net-metering and no limit on self-consumption link
- Universal Energy Facility managed by SEforALL offering RBF for mini-grid developers link

TOTAL PV INSTALLED

LARGE SCALE	1.3 MWp
C&I	6.3 MWp
MG	0.1 MWp
SHS & RESIDENTIAL	3.6 MWp

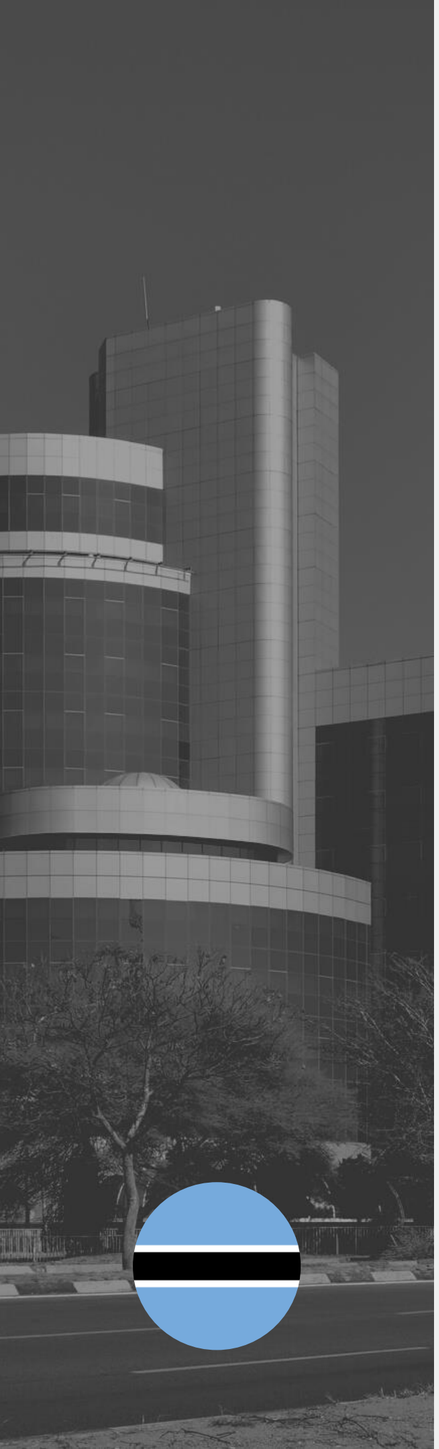
SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.155	$ 0.164	$ 0.158
MAX.	$ 0.266	$ 0.295	$ 0.270

NOTEWORTHY DEVELOPMENTS

- 119 MGs operational and/or under construction link
- 2x10 MW + 2x15MW tendered in 2019 through MCA-Benin II link
- Adress to equip 15 private hospitals with solar link
- GAGENERGY to build 10 MW KANDI solar plant link



BOTSWANA

OBJECTIVES

- 1.5 GW new capacity to be added by 2040 link
- Increase share of RE in the energy mix to 18 by 2030 link
- 50% of RE in the energy mix by 2036 link
- 135 MWp PV by 2022, up to 800 MWp by 2040 link
- 200 MW CSP by 2026 link

ELECTRIFICATION RATE

- 56% electricity access on average throughout the country (77% in urban areas and 37% in rural areas) link
- Target to reach 100% electrification by 2030 link

POLICY / REGULATION

- FiT for residential and commercial installations for a total capacity of up to 10 MWp in 2021 link

TOTAL PV INSTALLED

LARGE SCALE	1.3 MWp
C&I	5.3 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.088	$ 0.106	$ 0.072
MAX.	$ 0.122	$ 0.157	$ 0.080

NOTEWORTHY DEVELOPMENTS

- 56% electricity access on average throughout the country (77% in urban areas and 37% in rural areas) link
- Target to reach 100% electrification by 2030 link

BURKINA FASO

OBJECTIVES

- Reach 1,000 MW of installed capacity by 2022 link
- Target of 50% Renewable Energy in the electric mix by 2030 link

ELECTRIFICATION RATE

- 20% of the population has access to electricity link
- 64% in urban areas and 4% in rural areas link
- Target to reach 95% electrification rate country-wide by 2030 link

POLICY / REGULATION

- All PV components are exempted from import duties and VAT link
- No feed-in tariff, no net-metering

TOTAL PV INSTALLED

LARGE SCALE	33 MWp
C&I	16.7MWp
MG	0 MWp
SHS & RESIDENTIAL	6 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.135	$ 0.115	$ 0.097
MAX.	$ 0.297	$ 0.297	$ 0.252

NOTEWORTHY DEVELOPMENTS

- Total of 369 MW of large-scale PV plants under construction and/or development
- Bouly & Bissa mine looking at 13 MW of solar with storage link
- Results-based financing program for 100 MGs announced link

BURUNDI

OBJECTIVES

- Target of 50% of Renewable Energy in the electricity mix by 2025 link

ELECTRIFICATION RATE

- 7% of the population has access to electricity link
- Target to reach 30% electrification rate country-wide by 2030 link

POLICY / REGULATION

- PV components are not exempted from VAT

TOTAL PV INSTALLED

LARGE SCALE	7.5 MWp
C&I	0.1 MWp
MG	0 MWp
SHS & RESIDENTIAL	0.013 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.021	$ 0.021	Not available
MAX.	$ 0.064	$ 0.064	Not available

NOTEWORTHY DEVELOPMENTS

- 7.5 MWp Mubuga solar plant under construction link
- 2x4.5 MWp hybrid under development link
- 13 MGs being developed by UNDP link
- World bank to support 17 MW "Soleil-Nyakiriza" project through MGs link

CAMEROON

OBJECTIVES

- 25% RE in national mix by 2035 link
- Reach to 6000 MW of RE by 2030 link
- Electrify 10,000 additional localities using RE by 2035 link
- Add 3500 MW hydro power by 2035 link

ELECTRIFICATION RATE

- 7% of the population has access to electricity link
- Target to reach 30% electrification rate country-wide by 2030 link

POLICY / REGULATION

- All PV components are subject to a 10% import tax but no VAT link
- FER (Rural Energy Fund) provides subsidies up to 80% of the feasibility and up to 70% of the infrastructure costs link
- No FiT, no net-metering

TOTAL PV INSTALLED

LARGE SCALE	0.1 MWp
C&I	2.3 MWp
MG	0 MWp
SHS & RESIDENTIAL	10.7 MWp

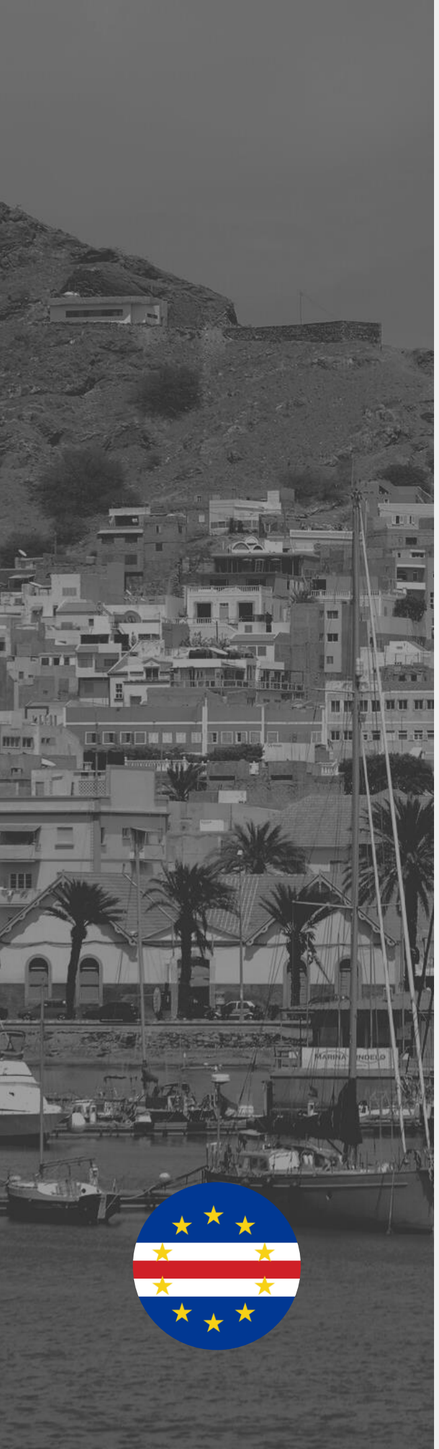
SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.090	$ 0.151	$ 0.108
MAX.	$ 0.178	$ 0.178	$ 0.153

NOTEWORTHY DEVELOPMENTS

- Maroua 14.52 MWp and Guider 15.78 MWp in late stage of development link
- 687 villages to be electrified with MGs link
- Gila AlTawakol Electric to build 30 MW project link
- Former French Minister of the Environment to equip 13 maternity hospitals with solar link



CAPE VERDE

OBJECTIVES

- Plans to run on 100% renewable energy by 2025 link
- Target reviewed to 30% by 2025 and 50% by 2030 link
- Invest 250 MW in renewable production by 2030 link

ELECTRIFICATION RATE

- 93% of the population has access to electricity link

POLICY / REGULATION

- All PV components are subject to a 10% import tax but no VAT link
- FER (Rural Energy Fund) provides subsidies up to 80% of the feasibility and up to 70% of the infrastructure costs link
- No FiT, no net-metering

TOTAL PV INSTALLED

LARGE SCALE	33.8 MWp
C&I	0 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.311	$ 0.349	$ 0.295
MAX.	$ 0.437	$ 0.416	$ 0.334

NOTEWORTHY DEVELOPMENTS

- Two 5 MW projects in total tender ongoing link

CENTRAL AFRICAN REPUBLIC

OBJECTIVES

- Revealed plans to expand its use of RE including solar link

ELECTRIFICATION RATE

- 14% of the population has access to electricity link
- Target to connect 50% of the population by 2030 link

POLICY / REGULATION

- n/a

TOTAL PV INSTALLED

LARGE SCALE	5 MWp
C&I	0 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.123	$ 0.049	$ 0.049
MAX.	$ 0.258	$ 0.068	$ 0.068

NOTEWORTHY DEVELOPMENTS

- Shanxi Construction Investment Group begun the construction of the first phase of 25MW from the 40 MW Bangui solar PV plant link

CHAD

OBJECTIVES

- The share of renewable energies to be increased to 20% of the energy mix by 2030 link

ELECTRIFICATION RATE

- 9% of the population has access to electricity link
- 38% in urban areas and 4% in rural areas link
- Increase of electricity coverage to 53% by 2030, with 20% electrification rate in rural areas link

POLICY / REGULATION

- All RE materials and equipment exempt from VAT link

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0.6 MWp
MG	0 MWp
SHS & RESIDENTIAL	0.019 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.149	$ 0.151	$ 0.151
MAX.	$ 0.362	$ 0.380	$ 0.360

NOTEWORTHY DEVELOPMENTS

- AMEA Power to build 120 MWp project link
- Aldwych progressing with Djermaya 60 MWp project link
- More developers announcing total of 955 MW developments
- UNDP to equip 149 health centers with solar link

FOCUS ON LARGE SCALE

ANALYSIS

In 2021, the large scale segment has continued its growth in several corners of the continent with an additional 552 MWp coming online, representing a 7.7% increase of the historically installed capacity for large scale projects in Africa.
South Africa again is leading the charge here and has contributed to 2/3 of this new capacity. But some new countries have joined the group of African nations including solar in their generation mix in 2021, such as Malawi, Togo, Somaliland, Burundi and Somalia. Other projects might not have reached operational stage yet but have made significant progress, confirming for the most part AFSIA's 2021 anticipation of African countries susceptible to join the "Gigawatt Club" in the near future. These notable developments are currently taking place in Algeria, Morocco, Angola, Namibia, Botswana to cite a few.
South Africa should further consolidate its #1 position in African solar with the roll-out of REEIPP Round 5 through which 975 MW of projects have been awarded in 2021. Four consortia have been awarded a total of 13 PV projects, including Mainstream Renewable Power (450 MW), ENGIE (225 MW), Scatec (225 MW) and TotalEnergies / Mulilo (75 MW). As highlighted by AFSIA member and financial advisory boutique Finergreen, it is interesting to note that average PV tariff of this Round 5 have dropped 51% compared to the previous round of tender in South Africa organized in 2015.

FOCUS ON LARGE SCALE

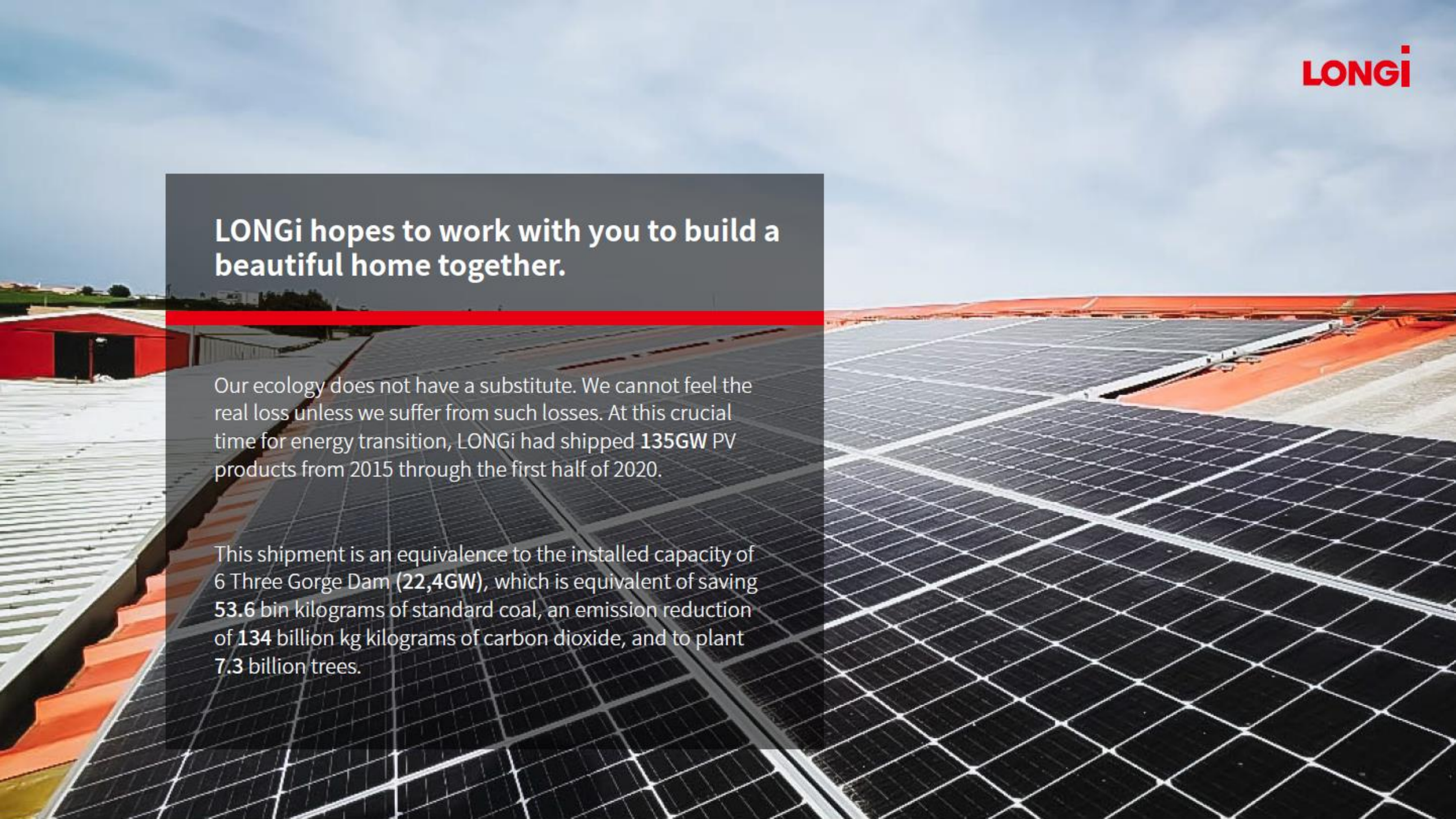
This year also, significant progress has been made in Namibia and Botswana, where a $9B project hosting a total of 5 GW is being planned. This initiative will be dedicated to powering what could become the largest green ammonia production center in the world. As explained in a separate article of this report, green ammonia can be produced through green hydrogen. In an effort to curb global carbon emission, there has been an intense global focus on green hydrogen over the past 12-18 months. The race is on to produce the cheapest possible green hydrogen and Namibia, with one of the best solar irradiations in the world, is ideally placed to become part of the global leaders of this industry.

In Algeria, the long-awaited 4 GW program has moved to the next stage in 2021 through the recent release of the

FOCUS ON LARGE SCALE

tender for the 1st phase of 1 GW. This phase called “Solar 1000 MW” will welcome the best offers from international IPP for individual projects ranging between 50 MW and 300 MW. Each bidder will be allowed to submit offers for a maximum of 300 MW, de facto meaning there will be at least 4 companies awarded projects under this scheme. Each project will be a PPP (Public-Private Partnership) as the local company SHAEMS, mandated by the Ministry of Energetic Transition and Renewable Energies, will provide the land for the projects and will take a participation in each project company.

Finally, Angola is also experiencing an interesting and promising development of large scale projects on its territory. As discussed in a separate article, several projects have started construction in the country, albeit a bit under the radar. It is no surprise given the importance of oil and gas in the country that traditional oil giants are playing a key role in the development of large scale solar in Angola. But the non-oil consortium composed of MCA Group and Sun Africa is currently also building important projects in the country, with a total pipeline of close to 1 GW.



LONGi

LONGi hopes to work with you to build a beautiful home together.

Our ecology does not have a substitute. We cannot feel the real loss unless we suffer from such losses. At this crucial time for energy transition, LONGi had shipped **135GW** PV products from 2015 through the first half of 2020.

This shipment is an equivalence to the installed capacity of 6 Three Gorge Dam **(22,4GW)**, which is equivalent of saving **53.6** bin kilograms of standard coal, an emission reduction of **134** billion kg kilograms of carbon dioxide, and to plant **7.3** billion trees.

FOCUS ON LARGE SCALE

ARTICLE

REIPPP-ING THE BENEFITS

Such is the success of South Africa's Renewable Energy Independent Power Producer Procurement program (REIPPP), President Cyril Ramaphosa, in his 2021 state of the nation address, promised the sixth bid window would arrive in August, according to the Renewables Now website. While that pledge was moved to "no later than the end of January" by minister of mineral resources and energy Gwede Mantashe, in an interview given to the ESI Africa power industry website in October, the popularity of the solar and wind power procurement program is understandable.

The long-awaited fifth round of the REIPPP scheme, whose results were announced in October will, if all the allocated projects take shape, add 2,583 MW of solar and wind generation capacity to the creaking South African grid, will attract investment of ZAR50 billion to the economy ($3.15 billion) and ZAR2.7 billion of skills training commitments from clean power developers ($170 million), and will create 13,912 jobs. The procurement round generated a weighted average clean electricity price of ZAR0.473/kWh ($0.03) for the electricity to be generated, which is approaching the ZAR0.40/kWh cost of the power generated at the Koeberg nuclear plant, Mantashe told ESI Africa. With the results of round five attracting a handful of clean power projects to KwaZulu Natal and the Free State for the first time – and gobbling up the remaining grid capacity in the Northern Cape and Western Cape – the winners included

FOCUS ON LARGE SCALE

Norwegian renewable business Scatec, which landed preferred bidder status for three solar projects with a total generation capacity of 273 MW, the company announced on the Globenewswire press release service. Those solar fields, from which national utility Eskom will buy power under a 20-year power purchase agreement, will be 51% held by Scatec, with H1 Holdings, the developer's local Black economic empowerment partner, having a 46.5% stake, and with the balance belonging to a community trust. Scatec said it expects financial close on the plants in the first half of the year – although the ESI Africa article cited April as the deadline – with the projects to be up and running next year.

FOCUS ON LARGE SCALE

ARTICLE

ANGOLA GOING BIG

With the last set of figures published by the International Renewable Energy Agency indicating Angola had only an estimated 13MW of grid connected solar capacity a year ago, news broke this year of plans for another 405MW. That would represent quite a leap for the energy transition in a nation with deep oil and gas reserves and two big players in the fossil fuel industry are involved in the 35MWp Quilemba solar plant announced in October. State-owned oil and gas company Sonangol is set to hold a 30% stake in the solar field planned near the town of Quilemba, in southern Angola, and the Total Eren clean power developer in which French oil and gas business TotalEnergies has a 30% holding will control 51% of the solar project. Luanda-based developer Angola Environment Technology will hold the balance, according to a report on the Construction Review Online website. The solar array planned at Quilemba, however, will be dwarfed by the scale of the seven sites announced by US company Sun Africa in March, which include a near-189MW project at Biópio which the American business has claimed will be the biggest such facility in sub-Saharan Africa. Sun Africa, a subsidiary of Chicago-based developer Urban Green Technologies, is

FOCUS ON LARGE SCALE

planning to construct five grid-connected solar sites plus two rural mini-grids in a $623 million plan financed by the Swedish state's export agency and assisted by the governments of the US and Angola. According to a report on the Ver Angola news website, Sun Africa will install the 189MW site at Biópio plus arrays at Benguela (with 97MW of generation capacity); Saurimo, in Lunda Sul province (27MW); Luena, in Moxico (27MW); Cuito, in Bié (15MW); Bailundo, in Huambo (8MW); and at Lucapa, in Lunda Norte (7MW). The projects, which will be constructed by Portuguese engineering, procurement and construction services company MCA and will feature a million solar panels from South Korean manufacturer Hanwha Q Cells, are slated for completion in the third quarter. The Swedish finance is explained by the fact Hitachi-ABB, which has its roots in the Nordic nation and still employs a large workforce there, is supplying equipment for the projects. US solar tracker company NEXTracker is also a supplier.

COMOROS

OBJECTIVES

- World Bank supports the "ComorSol" project harnessing the island's renewables potential link
- Target 100% RE in the energy mix by 2050 link

ELECTRIFICATION RATE

- WB estimates 84% of the population has access to electricity link
- AfDB estimates only 8% of the population is serviced in the 3 islands link
- Target of 100% electrification by 2033 link

POLICY / REGULATION

- All PV components exempted from import duty and taxes, including the single administrative fee link
- No net-metering and no FiT

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.370	$ 0.270	$ 0.270
MAX.	$ 0.380	$ 0.330	$ 0.330

NOTEWORTHY DEVELOPMENTS

- Innovent Group building 4MWp Dahu solar power plant link

COTE D'IVOIRE

OBJECTIVES

- Target to generate 42% of its electricity from renewable energy by 2030, non-hydro representing 16% link
- Target 400 MW of solar by 2030 link

ELECTRIFICATION RATE

- 74% of the population has access to electricity link
- Target of 100% electrification by 2025 link

POLICY / REGULATION

- Reduced VAT on PV components from 18% to 9% link
- No FiT
- No net-metering

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0.5 MWp
MG	0 MWp
SHS & RESIDENTIAL	3.6 MWp

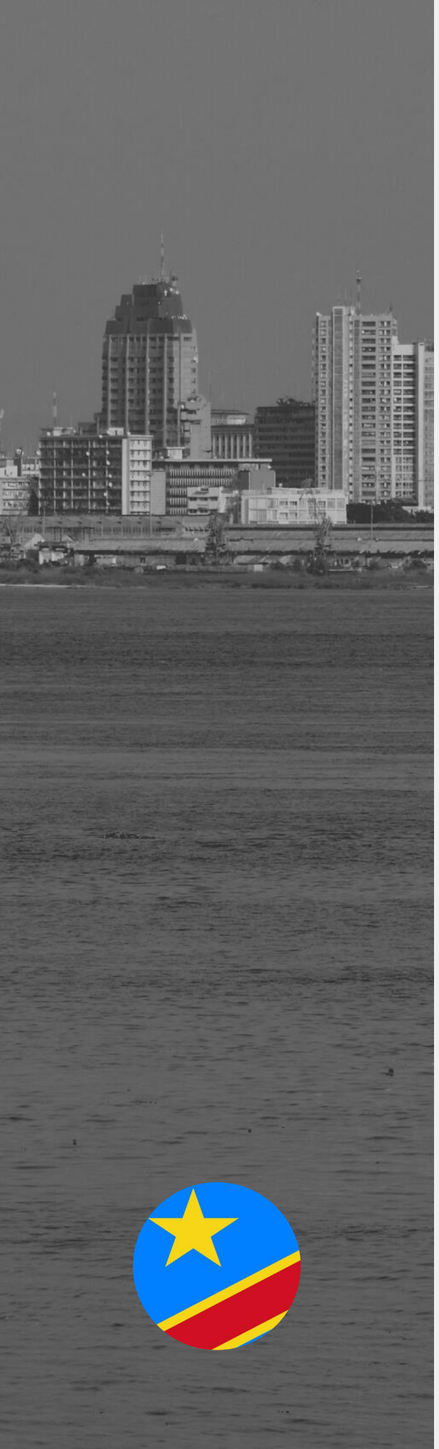
SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.032	$0.132	$0.082
MAX.	$0.121	$0.155	$0.119

NOTEWORTHY DEVELOPMENTS

- 2 PV projects of 60 MW tender through IFC Scaling Solar link
- Dekel Agri-Vision considering hybrid plant with 30 MWp of solar link
- Filatex working on 66 MW solar project link



DEMOCRATIC REPUBLIC OF CONGO

OBJECTIVES

- ACERD surveyed 22 companies ambitioning to connect 7,616,000 households by 2023 link

ELECTRIFICATION RATE

- 19% of the population has access to electricity link
- Target to electrify 30% by 2024 and 60% of the population by 2025 link
- Target universal electricity access by 2030 link

POLICY / REGULATION

- Exemption of import duty and VAT for generation equipment, but unclear if this applies to solar generation as well link
- By end of 2019, most solar off-grid companies were still paying import duties and VAT amounting to 35% link

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0.8 MWp
MG	3.7 MWp
SHS & RESIDENTIAL	7.16 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.027	$0.087	$0.057
MAX.	$0.087	$0.150	$0.057

NOTEWORTHY DEVELOPMENTS

- Kinshasa Solar City to bring 1 GW of PV in 2 phases link
- Other large-scale projects under construction or/and development totaling 805 MW
- Eranove to build 3 MGs in Bumba, Isiro and Gemena for total $110M link
- 50 health centers under development by various stakeholders
- Scaling mini-grid project to cover 21 provincial capitals with 200 MW plus link

DJIBOUTI

OBJECTIVES

- Target 100% RE by 2035 link

ELECTRIFICATION RATE

- 42% of the population has access to electricity link
- 53% in urban areas, 4% in rural areas link
- Universal access to electricity by 2035 link

POLICY / REGULATION

- N/A

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

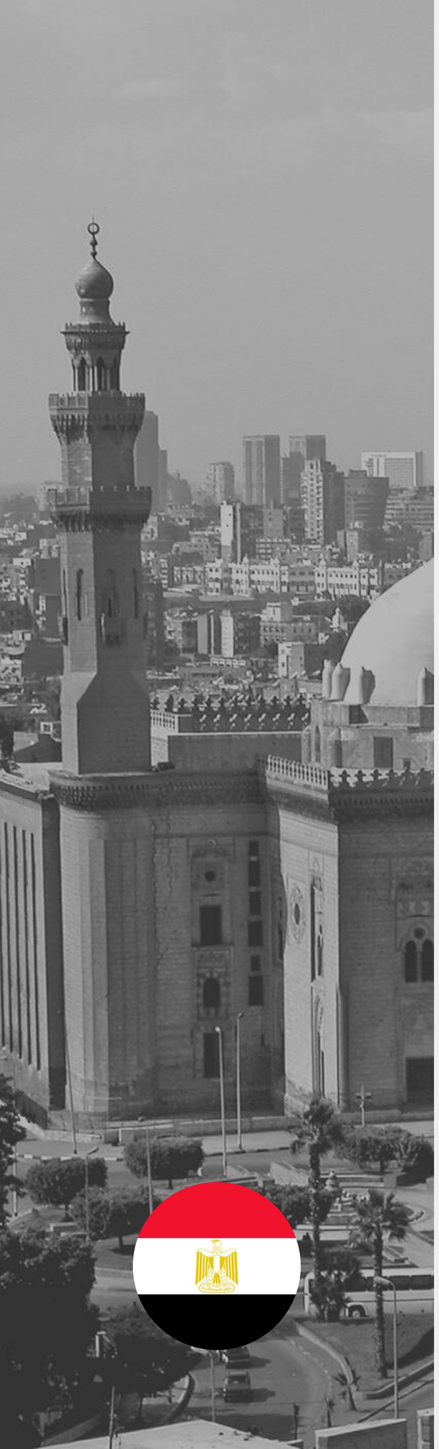
SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.151	$0.224	$0.162
MAX.	$0.308	$0.308	$0.230

NOTEWORTHY DEVELOPMENTS

- Grand Bara 300 MWp project to be built in 2 phases of 30 MWp and 270 MWp link
- Engie to build the first 30MWp of the 300MWp project in Grand Bara link



EGYPT

OBJECTIVES

- 20% RE in energy mix by 2022 and 42% (61 GW) by 2035 link
- 31000 MW of solar and 12000 MW of CSP by 2035 link

ELECTRIFICATION RATE

- 100% of the population has access to electricity **link**

POLICY / REGULATION

- 2% customs duties for all equipment and machinery for RE link
- 30% deduction of the net taxable profits, free land for RE link
- FiT in place between 2014 and 2018 link
- Net-metering with some requirements up to 20MW link

TOTAL PV INSTALLED

LARGE SCALE	1,927.9 MWp PV + 120 MWe CSP
C&I	112.6 MWp
MG	0.1 MWp
SHS & RESIDENTIAL	4.89 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.031	$0.042	$0.046
MAX.	$0.082	$0.102	$0.102

NOTEWORTHY DEVELOPMENTS

- Kom Ombo Project increased from to 200 to 500 MW link
- Multiple C&I projects being undertaken among other installations at 65 government buildings of 18MW total link
- 500 MW solar stations to be built in Suez Gulf link
- Agriculture industry also starting solar projects, for ex. 23.5 MWp project for Dakahlia Group link
- NREA building 100 Kom Ombo CSP plant link

EQUATORIAL GUINEA

OBJECTIVES

- No available target for renewable energy link

ELECTRIFICATION RATE

- 66.6% of the population has access to electricity link
- Target universal electricity access by 2030 with 70% in urban areas link

POLICY / REGULATION

- No tax incentives
- State can authorize reduced rates or total VAT exemption depending on the nature of activities of investors link
- No FiT

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

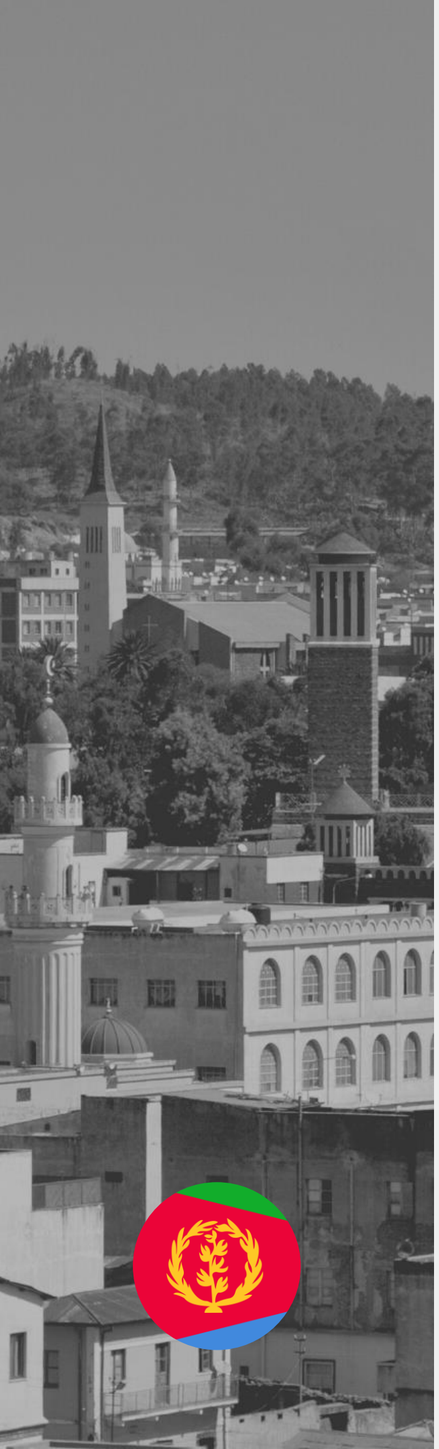
SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	NO RELIABLE DATA		
MAX.			

NOTEWORTHY DEVELOPMENTS

- MAECI solar, GE Power and Water Systems and Princeton Power Systems working on 5 MW mini-grid link



ERITREA

OBJECTIVES

- 50% RE in the energy mix by 2030 link

ELECTRIFICATION RATE

- 50.39 % of the population has access to electricity link
- 100% rural electricity access by 2030 (electrification of about 50 villages per year) link
- Universal access by 2030 link

POLICY / REGULATION

- No specific incentives for the energy sector
- No FiT

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	7.5 MWp
MG	2.3 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.217	$0.217	$0.217
MAX.	$0.217	$0.217	$0.217

NOTEWORTHY DEVELOPMENTS

- More than 70 MW large scale projects initiated by the Ministry of Energy and Mines link

ESWATINI

OBJECTIVES

- Reduce dependency on electricity imports link
- Produce 100% of its own electricity consumption by 2034 link

ELECTRIFICATION RATE

- 87% of the population has access to electricity link
- 96% in urban areas and 83% in rural areas link
- Goal is to reach universal access by 2022 link

POLICY / REGULATION

- No tax exemption for PV link

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.075	$0.159	$0.064
MAX.	$0.124	$0.337	$0.330

NOTEWORTHY DEVELOPMENTS

- 10 MWp Lavumisa project finishing construction link
- Swaziland Electricity Company developing new 40 MWp project link
- King Mswati III international airport soon getting 850 kWp link
- Frazium Energy to build 100 MW Edwaleni power plant link

ETHIOPIA

OBJECTIVES

- Increase generating capacity by 25 GW by 2030: 22 GW of hydro; 1 GW of geothermal and 2 GW of wind link
- Mitigating GHG emissions by 64% by 2030 link
- 45% of solar PV and geothermal in the electricity mix by 2040 link
- 3,500 MW of installed capacity by 2037 link

ELECTRIFICATION RATE

- 45% of the population has access to electricity link
- 95% in urban areas and 32% in rural areas link
- Goal is 100% access by 2025, with 35% off-grid and 65% grid link
- Reach 96% grid connections by 2030 link

POLICY / REGULATION

- PV and off-grid lighting exempt from import duty link
- PV and off-grid lighting subject to VAT link
- New set of laws governing off-grid generators & distributors link
- No FiT (evaluation conducted in 2015 link)

TOTAL PV INSTALLED

LARGE SCALE		0 MWp
C&I		0 MWp
MG		4 MWp
SHS & RESIDENTIAL		24.9 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.006	$0.049	$0.021
MAX.	$0.057	$0.049	$0.035

NOTEWORTHY DEVELOPMENTS

- 1,000 MWp projects at different stages of development through Scaling Solar Program link
- 37 solar plants under construction and/or development throughout the country link
- 10 universities to get 10 MW each link
- Aqua Power to build 2 of the 14 solar power plants planned for next ten years link

GABON

OBJECTIVES

- 80% RE in national energy mix by 2025 link

ELECTRIFICATION RATE

- 90.7% of the population has access to electricity link
- Targets to provide electricity for 85% of rural areas by 2025 link
- Seeks universal access by 2035 link

POLICY / REGULATION

- All PV components are subject to regular import duties and VAT link

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0.2 MWp
MG	0.4 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.099	$0.155	$0.155
MAX.	$0.246	$0.265	$0.192

NOTEWORTHY DEVELOPMENTS

- AUSAR Energy finishing construction of 8 MG with 2.8MW total capacity link
- 50 MW Libreville solar plant under construction by Total Eren link
- Desiba Energy soon starting the construction of 20 MW Mouila project link

FOCUS ON SHS

ANALYSIS

The SHS ("Solar Home Systems") segment has experienced another sweet and sour year in 2021. Among all solar segments, SHS indeed is among the segments that were most impacted by the COVID crisis. This is mostly due to 2 main factors. First, the target end-users of SHS are by definition the most vulnerable on the continent and the most quickly affected by changes in the economy. Once the world came to a stop when COVID broke out, the rural populations were severely affected financially and this resulted in less income being available to acquire SHS. The second reason can also be found in the nature of the SHS distribution business which relies on teams covering and moving across wide areas of the country. COVID, again, had a very negative impact on this due to movement restrictions and many SHS professionals simply could not perform their job for a certain period of time.

Despite those challenges, the SHS providers have managed to maintain a good level of business. But based on GOGLA data, 2020 and 2021 show 2 opposite pictures. In 2020, close to 4.8 million SHS were sold across the continent. This represented a 5.3% decrease in units sold compared to 2019. However, the total capacity associated with these SHS represented 56.7 MWp, which was a 2% increase compared to 2019. This leads us to conclude that fewer but bigger SHS were sold in 2020. In 2021, the situation seems to turn around.

FOCUS ON SHS

SHS UNITS SOLD	2017	2018	2019	2020	2021	TOTAL
EAST AFRICA	2,499,103	2,743,877	4,129,014	3,738,100	3,879,078*	16,989,172
WEST AFRICA	706,142	540,084	714,035	773,000	947,662*	3,680,923
CENTRAL AFRICA	321,486	179,112	192,143	286,000	302,000*	1,280,741
SOUTHERN AFRICA	59,625	50,672	32,873	n/a	n/a	143,170
	3,586,356	3,513,745	5,068,065	4,797,100	5,128,740*	22,094,006
CUMULATIVE	3,586,356	7,100,101877	12,168,166	16,965,266	22,094,006	
GROWTH vs. CUMULATIVE	-	98%	71%	39%	30%	

At the time of writing this report, 2021 H2 from GOGLA have not yet been published so we are missing half of the picture for this past year. However, if we assume that the same trend is followed in the second part of the year, 2021 should see the SHS segment hit a record 5.1 million units sold (higher than 2019!). Yet, the total installed capacity is likely to reach only 50 MWp this year, which represents a decrease of more than 11% compared to 2020. This means more but smaller units have been acquired in 2021. Reasons explaining these

FOCUS ON SHS

differences are not yet clear. One possibility could be the continued pressure on income due to COVID, and people adapting by acquiring smaller systems. Alternatively, it could be that our H2 2021 projections are underestimated, as sales in the second semester are generally higher than in the first, especially in East Africa. It will be interesting to read the analysis of GOGLA on this topic in their next report and we warmly encourage you to keep an eye out for the 2021 H2 release to find out more.

2021 is also a year of symbolic importance as the African SHS industry has passed the 20 million of units in operation this year. Contrarily to other types of solar installations, for which it is considered that the lifetime is 25 years, SHS are considered to have a shorter

* Projected based on H1 2021 figures

FOCUS ON SHS

lifetime and their numbers and capacities are therefore only taken into account for 5 years. While many SHS may still operate after 5 years, they are considered obsolete by then for statistical purposes.

East Africa remains by far the leader of SHS in Africa, with Kenya being the undisputed leader in terms of units sold. But West and Central Africa are also growing strongly and could soon catch up with East Africa. Southern Africa remains at very humble levels for now. It is to be noted that data was not available for 2020 and 2021 and that the "n/a" do not depict no sales, but rather lack of available info.

Another reason for optimism is the continued innovation in the SHS space. SHS providers are permanently optimizing their solutions, to make them cheaper and more affordable, but also to allow more uses of the available solar energy. Whereas the original SHS were mostly meant to provide lighting, SHS nowadays can power an entire collection of appliances such as radios, TVs, fans, cookers, fridges, etc... This has been made possible thanks to the development of a wider range of DC (direct current) devices which consume significantly less electricity and are therefore well suited for solar home systems. Thanks to these innovations, the world of SHS is now gradually meeting the world of C&I as SHS are no longer restricted to a pure residential use, but are now growingly powering "productive use". Great examples of productive use applications with SHS are refrigeration units and solar water pumping. GOGLA calculated that 3,000

FOCUS ON SHS

refrigeration units and 6,000 solar water pumps were acquired for H1 2021 alone. These numbers are of course significantly lower than “traditional” SHS for residential use. However their progression is commendable and we may reasonably expect these figures to boom in the years to come. These systems are of particular interest as they enable individuals to increase or create income where there was not. Refrigeration units can help avoid food spoilage, thereby reducing post-harvest loss and making it possible to sell a wider share of the food that has been produced. This has an immediate impact on the bottom line of the farmer or the food reseller. And solar water pumps and irrigation systems have been demonstrated to increase yield by 3 times in many circumstances. Thanks to their excellent economics, no doubt awareness about the great potential of these new SHS solutions will spread quickly across Africa and many will join the bandwagon of off-grid productive use soon!

GLOBAL ICE TEC

Designed and
Engineered in Germany
*Produced in Europe

INTRODUCING THE MOST INNOVATIVE SOLAR DIRECT DRIVE REFRIGERATOR

FRIDGE
UNOCOOL® 165

No Battery

WARRANTY ★★24 MONTHS★★ WARRANTY

PRODUCT BENEFITS

- ✔ Keeps food cool for up to 36 hours even without a continuous power supply
- ✔ Simple & maintenance free design
- ✔ No running costs
- ✔ Can be used in off grid areas or in areas with unstable grid power supply
- ✔ Can be used even in countries with high humidity
- ✔ Can store vaccines and medicines that require cold chain
- ✔ No battery or inverter required- powered directly by the solar panel
- ✔ Available at an affordable price
- ✔ made in Europe

For any enquiry, please write to **info@global-ice-tec.com**
www.**global-ice-tec**.com

ARTICLE

‘RECEIVABLES’ PLATFORMS SHAKE UP PAYG SOLAR

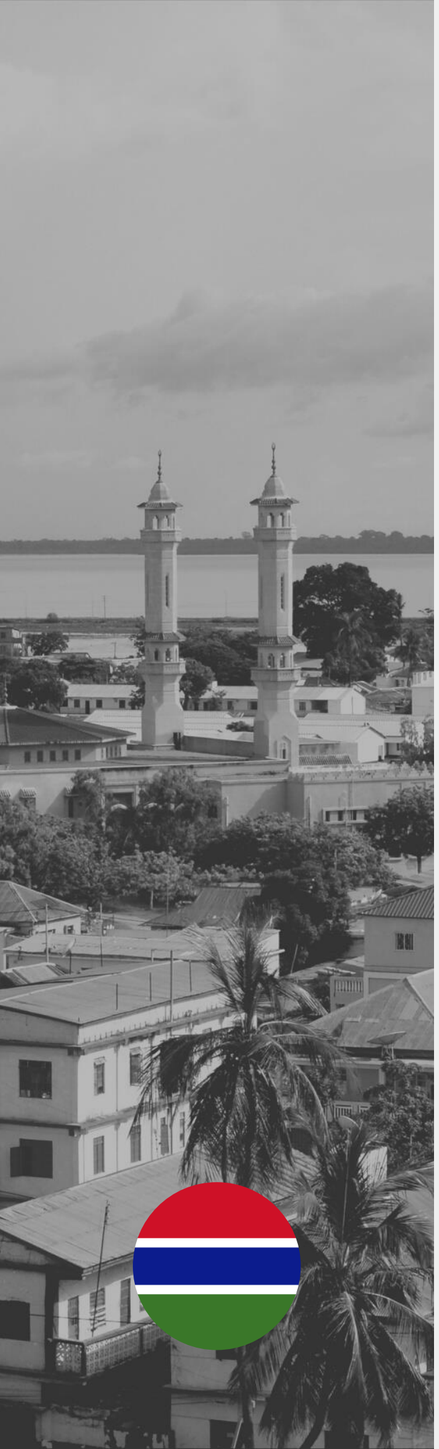
When pay-as-you-go (PAYG) African solar appliance distributor d.light revealed in January how direct sales of its customer revenue streams would finance its operations, it is tempting to wonder whether the Stanford, California-headquartered company realized it might have solved the perennial problem of scaling such operations. While the success of PAYG solar in Africa has been undeniable, all but the biggest distributors can struggle to scale up operations given the lack of appetite by investors to undertake due diligence in a sector with little standardization of revenue information, and for relatively small investments.

d.light appeared to have hit upon a novel solution at the start of the year, by directly selling the monies expected over time from its PAYG customers to the Better Life Kenya 1 Ltd fund financed by US and Norwegian state development entities, with a subsidiary of London-based African Frontier Capital (Mauritius) LLC on-lending the funds. Selling such “receivables“ revenue directly, removed any concern d.light itself, in addition to cash-strapped customers, might default.

FOCUS ON SHS

And although that may have been less of a concern for the Norfund and US International Development Finance Corporation-backed fund in Kenya, the approach opened eyes across the continent to the PAYG scaling potential of the receivables method. Fast forward eight months and the PaygOps software platform developed by London-based PAYG solutions company Solaris Offgrid was describing a similar project which saw it join forces with Paris-based sub-Saharan African venture capital business First Growth Ventures to help scale the operations of Nairobi-based solar distributor Pawame. The PaygOps platform not only removes the risk of the distributor going under by selling Pawame's receivables directly, it does so in a manner which standardizes the information available to investors about the revenue streams they are investing in, thus making it possible to attract interest from smaller backers who might not otherwise be prepared to carry out the due diligence donkey work.

Credit: Bboxx



GAMBIA

OBJECTIVES

- 48% RE to be achieved by 2030 link
- Targeting 200 MW of RE in the energy mix by 2025 link

ELECTRIFICATION RATE

- 56.2% of the population has access to electricity link
- 13% in rural areas link
- Targets with 30% in urban areas link

POLICY / REGULATION

- Investment enterprise within priority categories is granted import VAT waiver link
- Research conducted on the benefits of FiT and net-metering but no policy in place link

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	1.2 MWp
MG	0 MWp
SHS & RESIDENTIAL	0.016 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.173	$0.184	$0.198
MAX.	$0.193	$0.207	$0.221

NOTEWORTHY DEVELOPMENTS

- Government developing the 150 MW / 1500 MWh Soma project link
- UNDP, World Bank and EIB developing 10.5MW of large-scale projects link
- 1,100 rural schools and health centers to be powered with solar through EIB, EU and World Bank support link

GHANA

OBJECTIVES

- Goal to reach a 10%(2.5 G) contribution of RE in the electricity generation mix by 2030 link

ELECTRIFICATION RATE

- 84% of the population has access to electricity link
- 93% in urban areas and 73% in rural areas link
- Pushed universal access from 2020 to 2025 link

POLICY / REGULATION

- PV panels are exempted from import duties, but if they are part of a pre-assembled kit (like SHS) they attract 5% import duties link
- PV panels are VAT exempt link
- Some regional and national import levies may still apply on PV panels link
- FIT for large-scale plants exists ($11.58/kWh since 2016) but is not being applied link

TOTAL PV INSTALLED

LARGE SCALE	54 MWp
C&I	51.6 MWp
MG	0 MWp
SHS & RESIDENTIAL	3.8 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.055	$0.136	$0.135
MAX.	$0.160	$0.228	$0.449

NOTEWORTHY DEVELOPMENTS

- 50 MWp ground-mount and 1 MWp floating solar constructed at Bui dam out of full 250 MWp project link
- 1.5 MW planned for 3 airport projects by the CIAL link
- PEG Africa to electrify 91 health centers with Power Africa's support link
- Greenheart AAAi conducted study to electrify 2,700 catholic church buildings link
- Alpha TND working on 7MW project in Prampram link

GUINEA

OBJECTIVES

- Installation of up to 2,600MW by 2025 from the current 658MW link
- Target 30% of RE in the energy mix by 2030 link

ELECTRIFICATION RATE

- 42.42% of the population has access to electricity link
- Target is to achieve 100% electrification by 2030 link

POLICY / REGULATION

- Tax exemptions vary between projects link
- No regulatory framework developed for PV, Financial support through subsidies link

TOTAL PV INSTALLED

LARGE SCALE	0 MWP
C&I	0.8 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

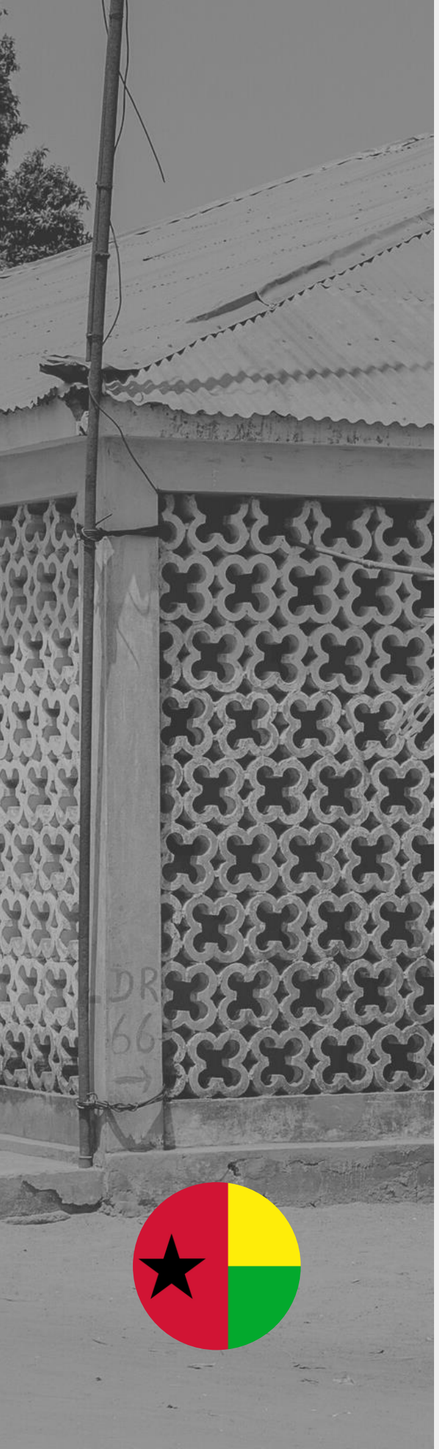
CURRENT TARIFF GRID ELECTRICITY

SOURCE

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.009	$0.118	$0.118
MAX.	$0.027	$0.181	$0.181

NOTEWORTHY DEVELOPMENTS

- 33 MW at Lefa mine developed by Nordgold Group link
- More than 200 MW large scale projects under development by various companies
- ANIES launched a tender for 137 MGs link



GUINEA BISSAU

OBJECTIVES

- Attain 80% renewable energy in the national energy mix by 2030 link

ELECTRIFICATION RATE

- 31% of the population has access to electricity link
- Target to have 81% total electricity access by 2030 link
- Target 72% of the population gain access to the electricity grid and 9% through mini-off grid systems by 2030 link

POLICY / REGULATION

- Solar panels are exempted from VAT but other components of a solar kit are not link
- No FiT, no net-metering policy

TOTAL PV INSTALLED

LARGE SCALE	0 MWP
C&I	0 MWp
MG	0.4 MWp
SHS & RESIDENTIAL	0.25 MWP

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.230	$0.184	$0.232
MAX.	$0.441	$0.230	$0.290

NOTEWORTHY DEVELOPMENTS

- 22 MW across 3 projects under construction by Sinohydro link

KENYA

OBJECTIVES

- Target 100% use of clean energy by 2030 link
- Over 60% of the country's installed capacity will be provided from renewable energy sources by 2037 link
- 852 MW of solar by 2037 link

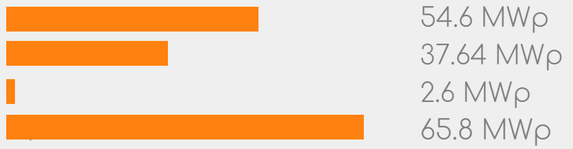
ELECTRIFICATION RATE

- 75% of the population has access to electricity link
- 100% in urban areas and 65.7% in rural areas link
- Target to reach universal access by 2022 link

POLICY / REGULATION

- Several changes about VAT in 2021, with final situation VAT exemption on all renewable energy products solar, wind and clean cooking link
- FiT is $0.12/kWh but registration procedures are complex link
- Net-metering could be launched in the near future link

TOTAL PV INSTALLED



SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.090	$0.090	$0.091
MAX.	$0.142	$0.140	$0.108

NOTEWORTHY DEVELOPMENTS

- 30 MW Tatu City industrial zone development link
- Multiple large-scale projects at different stages of development
- 17 factories Supaloaf being solarized with 2.4 MW link
- 179 MGs under development with support from various DFI's
- Tender launched for 2 MW at Kenyatta university link

LESOTHO

OBJECTIVES

- Additional renewable energy generation capacity of 200 MW by 2030 link

ELECTRIFICATION RATE

- 44.6% of the population has access to electricity link
- Target to have total 57% electricity access by 2030 link
- 78% in urban areas, 47% in rural areas by 2030 link

POLICY / REGULATION

- All PV components subject to a reduced VAT rate of 5% link
- Net-metering for systems below 500kW link
- FiT for systems above 500 kW, to be negotiated link

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0.1 MWp
MG	0.1 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.051	$0.018	$0.018
MAX.	$0.115	$0.019	$0.019

NOTEWORTHY DEVELOPMENTS

- Mafeteng 30 MW phase 1 under construction and 40 MW phase 2 scheduled link
- 7 healthcare centers under development by OnePower Lesotho through Power Africa grants link
- 30 MGs tender launched and to be financed by World Bank link

LIBERIA

OBJECTIVES

- Raise the share of RE to 30% of electricity production by 2030 link

ELECTRIFICATION RATE

- 12% of population has access to electricity link
- Target to reach 20% rural electrification by 2025 link
- Target to reach 35% rural electrification by 2030 link
- Target to reach 70% urban electrification by 2030 link

POLICY / REGULATION

- Solar companies registered under LIRENAP are eligible for a duty reduction link
- RREA looking to create permanent duty waiver for all quality-verified solar products link

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0.1 MWp
MG	0 MWp
SHS & RESIDENTIAL	0.8 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.390	$0.390	$0.390
MAX.	$0.390	$0.390	$0.390

NOTEWORTHY DEVELOPMENTS

- 20 MW mount coffee Liberia large scale project under development by GigaWatt Global link
- Orange telecom towers to be solarized through Escotel link
- UNDP solarizing 12 health centers through MG link

LIBYA

OBJECTIVES

- National Plan for Developing RE (2013-2025) targeting 10% contribution to the electricity mix by 2025 link
- 400 MW CSP, 800 MW PV and 450 MW solar water heating link
- 22% of electricity generation to come from RE by 2030 link
- Doubling electricity from 8000 to 16000 by 2030 link

ELECTRIFICATION RATE

- 68.5% of the population has access to electricity link

POLICY / REGULATION

- All PV components are subject to 4% port services tax (no import duty) link
- There is no VAT in Libya link
- To net-metering, no FiT

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0.2 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

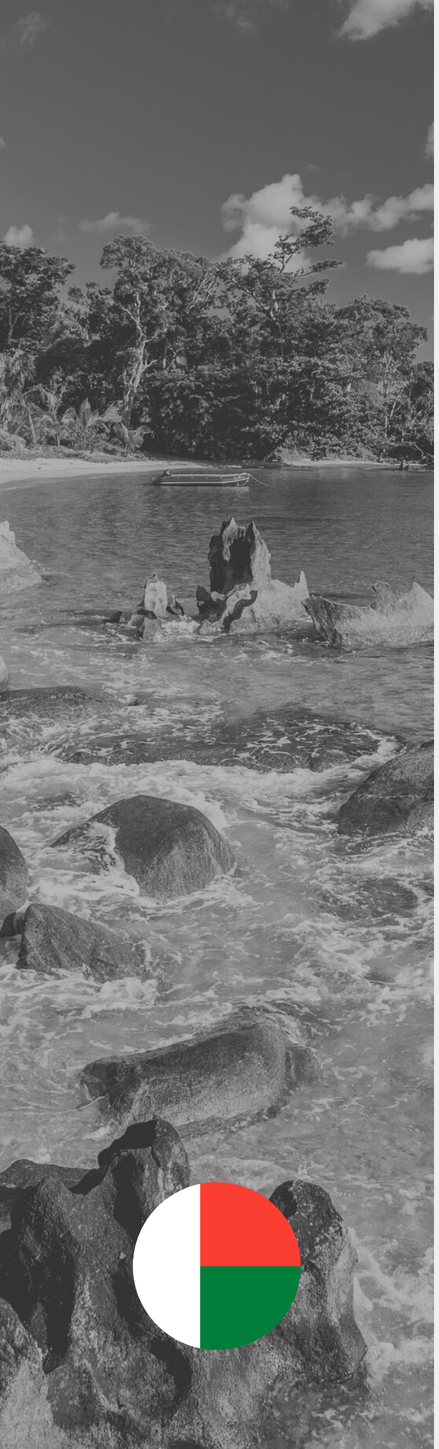
SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.044	$ 0.150	$ 0.068
MAX.	$ 0.110	$ 0.150	$ 0.092

NOTEWORTHY DEVELOPMENTS

- Construction of 100 MW Kufra solar plant link
- Total Energies to develop 500 MW solar plant link
- ENI is studying the construction of a solar power project in the Rebiana region link



MADAGASCAR

OBJECTIVES

- Double total installed capacity to reach 800 MW by 2023 link
- RE to represent 85% of energy mix by 2030 link
- Solar to represent 5% of energy mix by 2030 link

ELECTRIFICATION RATE

- 25 % of the population has access to electricity link
- 46% in urban areas and 12% in rural areas link
- 67.9% in urban areas, 1.9% in rural areas link
- Target to connect 70% of the population by 2030 link

POLICY / REGULATION

- No import duties and no VAT on solar panels and lithium batteries link
- Other equipment subject to 20% import duties and 20% VAT link
- No net-metering, no FiT link

TOTAL PV INSTALLED

LARGE SCALE	29.5 MWp
C&I	1 MWp
MG	0.2 MWp
SHS & RESIDENTIAL	2.5 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.033	$ 0.052	$ 0.022
MAX.	$ 0.227	$ 0.286	$ 0.271

NOTEWORTHY DEVELOPMENTS

- Filatex to develop a 170 MW total capacity link
- ANKA Madagascar rolling out 60 MG link
- Power Africa to electrify more 25 rural health clinics link
- Enerdeal to develop 7.5 MW solar power plants in 5 cities link
- CrossBoundary to build 8 MW solar plant at Ilmenite mine link
- 196 mini-grids under tender link

MALAWI

OBJECTIVES

- Target 20% Solar and 55% hydro in the generation mix by 2030 link

ELECTRIFICATION RATE

- 15% of the population has access to electricity link
- 62% in urban areas and 5% in rural areas link
- Target to increase electricity access rate to 80% by 2035 link

POLICY / REGULATION

- Solar lighting products exempt from import duty link
- 0% VAT on all solar product and components link
- FiT available since 2012 for projects between 500 kW and 10 MW at $0.10/kWh without storage and $0.20/kWh with storage but no single project using FiT yet link

TOTAL PV INSTALLED

LARGE SCALE	75.6 MWp
C&I	1.2 MWp
MG	0 MWp
SHS & RESIDENTIAL	4 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.059	$ 0.134	$ 0.057
MAX.	$ 0.136	$ 0.156	$ 0.176

NOTEWORTHY DEVELOPMENTS

- The Nkhotakota Solar Power Plant is expected to add 37 MWac of clean energy link
- Chint Group to start construction of 20 MW salima PV plant link
- Exim bank tendered 30 MW for Blantyre Water Board link
- NTPC secured contract to set up 100 MW solar capacity link

MALI

OBJECTIVES

- Increase installed renewables capacity to 1.42 GW by 2030, with more than 600 MW off-grid link
- Increase share of RE in electricity mix to 25% by 2033 link

ELECTRIFICATION RATE

- 40% of the population has access to electricity link
- 68% in urban areas and 20% in rural areas link
- Target to add a 61% rural electrification by 2033 link

POLICY / REGULATION

- All PV components are exempted from import duty and VAT link
- No net-metering, no FiT

TOTAL PV INSTALLED

LARGE SCALE	50 MWp
C&I	51.1 MWp
MG	2 MWp
SHS & RESIDENTIAL	3.5 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.106	$ 0.232	$ 0.164
MAX.	$ 0.275	$ 0.275	$ 0.239

NOTEWORTHY DEVELOPMENTS

- Scatec building 33 MWp Segou plant link
- 70+ MW for mining activity under construction or development
- Green Climate Fund financing 70 MG link
- NTPC awarded PMC contract to set up 500 MW solar project link
- Orange Mali to install 25MW/30MWh solar power station link
- Legendre Energie to build 50 MW project in Fana link

FOCUS ON C&I

ANALYSIS

All segments of the African solar industry have performed very well in 2021, but some have performed better than others. This is particularly the case for C&I and productive use systems.
Based on info collected by AFSIA, operational C&I installations across Africa now account for 717 MWp, an increase of 138 MWp from 2020, which represents a 24% growth. This installed capacity is still very far from the 7.7 GWp of large-scale projects. But it is to be noted that while C&I represents only 8% of the current total installed capacity in Africa, it represented 19% of the newly installed capacity in 2021.

C&I IN AFRICA	2021	HISTORICAL
MWp C&I	137.8	716.9
MWp all solar	721.4	8,693.6
Share of C&I	19.1%	8.2%
Growth C&I	23.8%	
Growth all solar	9.0%	
Average C&I MWp	1.150	0.273
Median C&I MWp	0.225	0.050

FOCUS ON C&I

This growth of the C&I segment should experience an additional boost in the months to come, driven by 2 major factors: the new 100 MW threshold for self-generation in South Africa and the appetite for solar from the mining industry.

Due to public pressure about the disastrous electricity situation in South Africa, the government had no choice but to allow more flexibility for individuals and companies to produce and consume their own electricity through solar. Several announcements for major C&I projects have already been made and 2022 should witness an acceleration of such projects being rolled out in South Africa. In a recent AFSIA article we also highlighted the growing appetite of the mining industry to switch to solar (AFSIA November 2021 newsletter – "Digging down into Africa's solar-powered mining"). While many solar professionals have been advocating for solar at African mines for several years, the mining industry now seems to have understood the benefits of solar for its operations. A certain number of deals have been signed and announced in 2021 and we expect this is only the tip of the iceberg and many more such projects should be programmed in the months and years to come.

These 2 main drivers of multi-MW C&I projects will undeniably have an additional impact on the average size of C&I systems across the continent. Based on AFSIA information among the almost 3,000 C&I projects already in operation, the historical average size of C&I projects in Africa is 273kWp and the median size 50kWp.

FOCUS ON C&I

However these capacities have experienced an impressive increase for the C&I installations commissioned in 2021. This year, the average size of C&I systems has reached 1.15MWp and the median size 224kWp. This shows a clear trend towards larger systems being installed.

The growing importance of productive use solar is also an undeniable trend of the African solar industry. This trend was started a few years ago with direct drive solar water pumping and irrigation systems for agriculture (leading to tremendous increase in yields and revenue for the agricultural industry). While solar water systems continue to conquer the continent, a multitude of new applications have seen the light or received more attention this year, such as solar fridges and freezers (one positive effect of COVID!), e-mobility applications in rural as well as urban areas, “SHS-type” systems dedicated to small businesses and a whole set of purpose-built solutions dedicated to specific commercial and small industrial activities. It is still difficult to put exact numbers on the size of this market and the magnitude of its growth. AFSIA will focus on this segment more closely in the run of 2022 to share more insights about this interesting market.


All your data
under one roof
AMMP
The operating system
for distributed energy
www.ammp.io

ARTICLE

THE COMMERCIAL AND INDUSTRIAL CLAIMS OF SOLAR

If a fresh round of grid electricity load shedding in South Africa in the second half of 2021 was grim news for many businesses, at least it emphasized the reliability of solar and storage systems.

Plenty of miners in sub-Saharan Africa were prepared to invest in off-grid power systems to avoid an overreliance on unpredictable grid electricity last year, including the Grand Côte Opérations Senegal subsidiary of French company Eramet Group, which signed up with Nairobi-based CrossBoundary Energy for a 13 MW solar array with 8 MW of battery storage, according to the African Energy website.

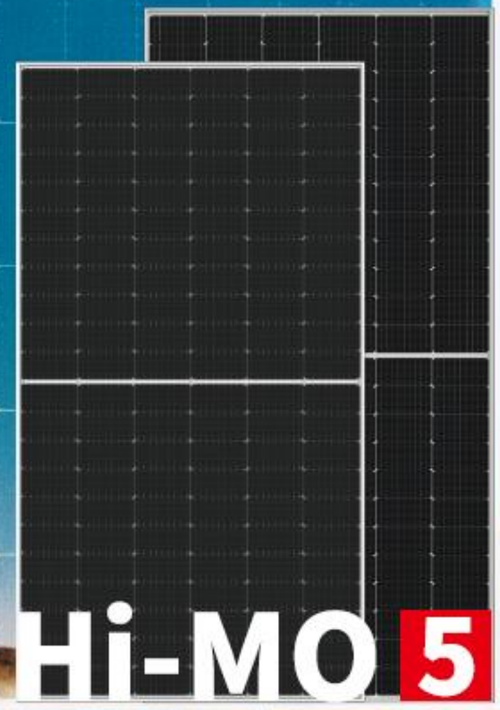
Shameel Joosub, CEO of South African mobile telecoms business Vodacom – quoted in an interview given to IT Web and later run by the Developing Telecoms industry website – did not pull his punches when talking about his dissatisfaction with national utility Eskom. Ever more frequent load shedding on the South African power company's creaking grid had cost Vodafone-owned Vodacom around a billion rand ($63 million) in battery expenditure in 2020, said Joosub, and the bill for the year just ended was expected to come in at half that

FOCUS ON C&I

figure again.
Another solution being increasingly embraced by Vodacom and its continental peers is to cut out the intermediary entirely by installing solar and battery-equipped masts, with the South African business said to have 1,088 such base stations when the IT Web interview was given, in November. “It’s a constant investment,” said a clearly frustrated Joosub, “if the situation gets worse, we have to up the level of investment.”

LONGi

Shaping the future.
Once again.



Hi-MO 5

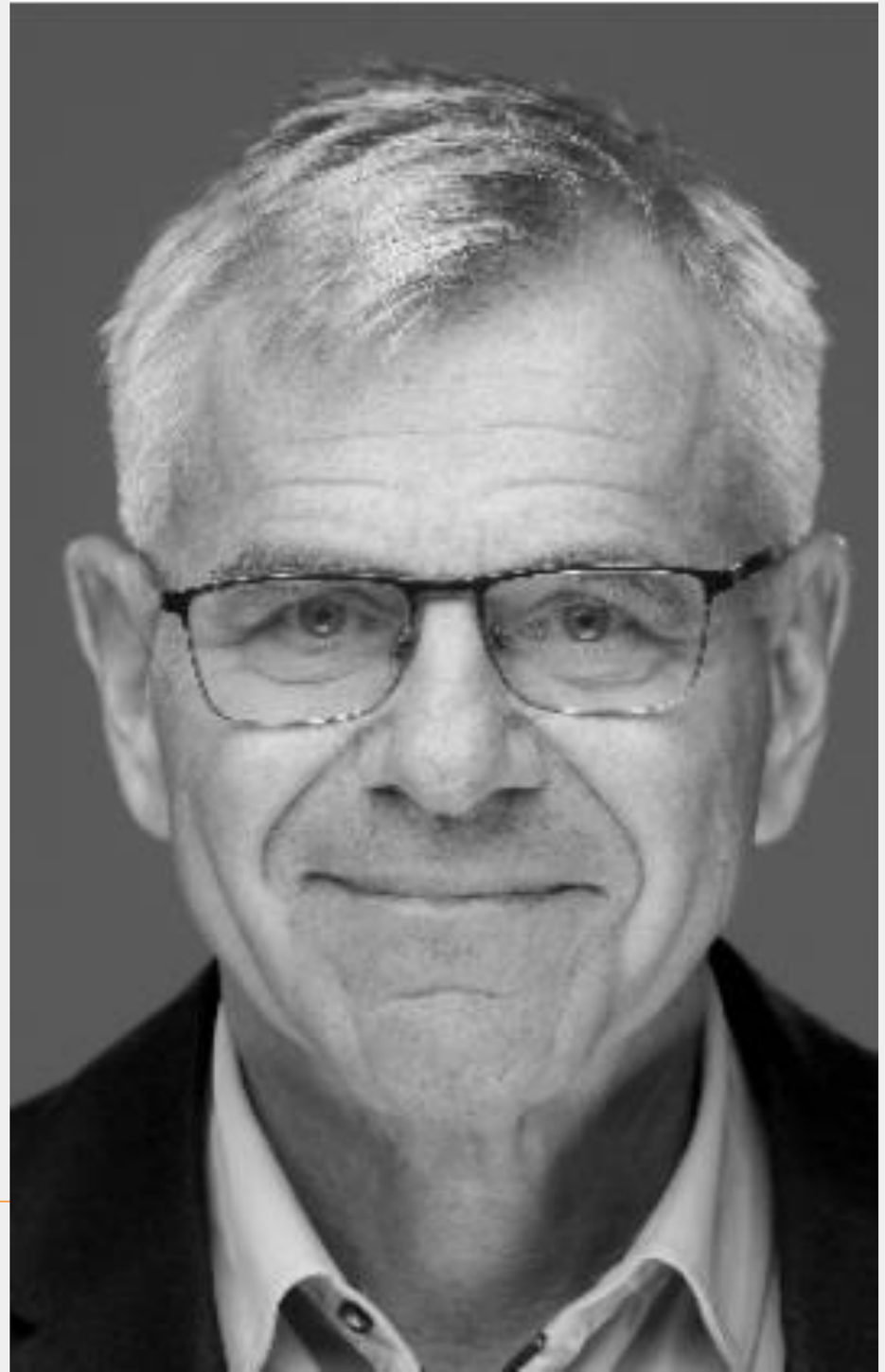
Delivering true value | Higher power, Lower LCOE

FOCUS ON C&I

ARTICLE

BY TERJE OSMUNDSEN
Founder and CEO

Empower
Impact Investment



UNLEASH SOLAR AND GET AFFORDABLE POWER

Amidst swelling costs and a heavy debt burden, Africa's electricity utilities are struggling. To address the crisis South Africa's power utility Eskom has applied for a 20.5% electricity tariff increase. Zambia's new government has announced the removal of subsidised electricity prices from January 2022. In Nigeria, the regulator NERC has announced that the implementation of Service Based Tariffs will result in electricity tariffs

FOCUS ON C&I

Credit: Stella Futura

increasing up to 50 percent over the next 2 years. In Ghana, the state-owned energy utilities are suffering from a steadily growing debt which has already reached $7,5 billion. And so on.

Unfortunately, the story will not stop here. In 2021, we have seen a dramatic tripling in world coal and natural gas prices, combined with soaring oil and diesel prices. Many African countries have become dependent on Imported fossil fuels to meet the growing demand for power. In 2022, energy users across Africa will be asked to foot the bill for the 2021 rise in fuel prices, through the index setting yearly tariff adjustments.

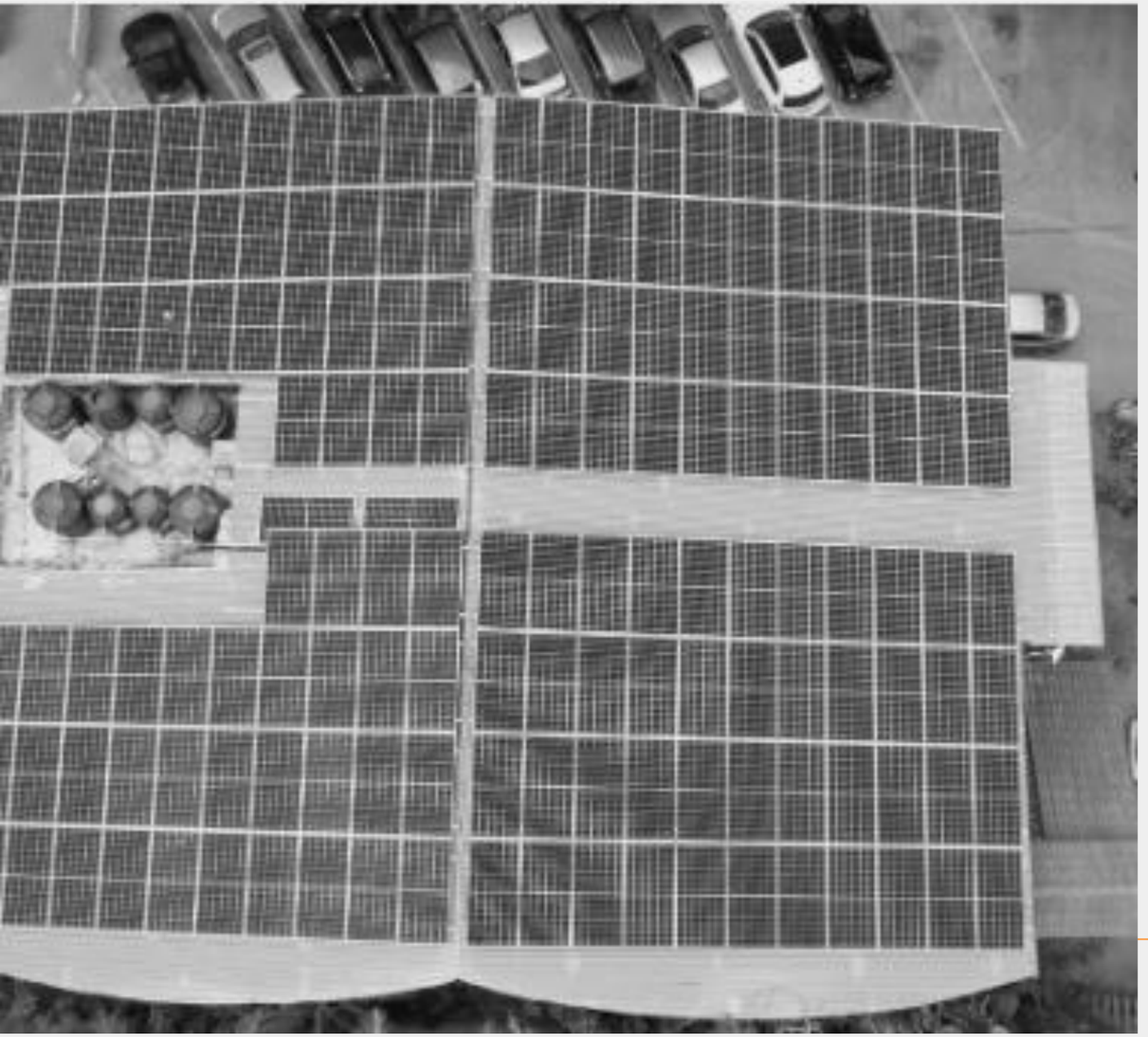
Fortunately, a small but growing number of businesses across Africa have started the journey to take control of their energy bills. The Accra-based plastic-recycling company Miniplast is an example. In 2020 the company signed a 20-year Power Sales Agreement with Empower New Energy, partnering with our local development and construction partner Stella Futura. The tariff paid from the 0,7 MWp rooftop solar plant represents a saving on the energy bill of 20 %, and the 800 MWh of clean energy produced equals 400 tonnes of CO2 emissions avoided yearly. In addition, new jobs are created during construction, operation and maintenance and as a result of improved competitiveness of the client. The Miniplast story illustrates that Africa doesn't have to wait for more soft financing from the rich countries to

FOCUS ON C&I

unleash the solar revolution.
Unfortunately, regulation prohibits energy-users in most African countries – with the exception of Kenya, Nigeria, Egypt, South Africa and a few others – to sign Power Purchase Agreements from private providers of solar energy. (In Ghana, the possibility is limited to large energy-users, so-called "bulk customers"). In the majority of Africa's 55 countries, the only investment possibility is to set up a rental or a lease-to-own contract with the off-taker. Such contracts are also fine, but generally seen as less attractive to the energy-user than the PPAs most commonly used outside Africa. A second regulatory barrier holding back solar investments in Africa is the absence of net-metering. With the notable exception of South Africa and Egypt, energy-users in Africa have no possibility to valorize surplus electricity. In most parts of the world energy-users producing their own electricity have net-metering contracts with the

Credit: Stella Futura

FOCUS ON C&I



Credit: Stella Futura

local distribution company. This means that in periods when the captive power plant is generating more electricity than needed, during maintenance or holidays for example, the energy users can “sell” surplus electricity back to the local utility company. The absence of net-metering means that the energy-user needs to pay for all unused solar electricity, making the solar investment less attractive for the energy-user. Africa’s governments should study the lessons learnt from South Africa and Egypt, and make it easier for businesses to buy solar energy produced on their own rooftops and grounds.

Associations and important voices like AFSIA should continue to advocate the policy-changes that will fully unleash the solar revolution required to bring affordable power to the energy-users across Africa.

MAURITANIA

OBJECTIVES

- Target to generate 35% RE by 2030 link

ELECTRIFICATION RATE

- 30% of the population has access to electricity link
- 56% in urban areas and 4% in rural areas link
- Target to increase access rate to 95% in urban areas and 40% in rural areas, reach national electrification rate of 70% by 2030 link

POLICY / REGULATION

- Professionals said to import solar equipment with exemption for import duties and taxes, but no official document to be found link
- ADER provides subsidies of 60-80% for some of the isolated grids link

TOTAL PV INSTALLED

LARGE SCALE	69.3 MWp
C&I	0 MWp
MG	15 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.069	$ 0.165	$ 0.060
MAX.	$ 0.165	$ 0.165	$ 0.167

NOTEWORTHY DEVELOPMENTS

- 14 MW / 4 MWh MG under development in Ndiago
- Sani and Kankossa college C&I projects under tender link

MAURITIUS

OBJECTIVES

- Goal of having 35% of its electricity produced from renewables by 2025 link
- Government target 60% of renewable energy in its energy mix by 2030 link

ELECTRIFICATION RATE

- 99.6% of the population has access to electricity link

POLICY / REGULATION

- Several tax incentives for solar investment link
- Net-metering for residential customers for installations not exceeding 5 kWp link
- Prosumers registered under the CEB net-metering scheme get FiT (scheme closed in 2015 after target was reached) link
- Green energy scheme for SMEs: 2,000 2 kWp systems installed free of charge link

TOTAL PV INSTALLED

LARGE SCALE	69.5 MWp
C&I	2.1 MWp
MG	0 MWp
SHS & RESIDENTIAL	7 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.050	$ 0.068	$ 0.050
MAX.	$ 0.202	$ 0.230	$ 0.124

NOTEWORTHY DEVELOPMENTS

- 17 MWp Henrietta project under construction link
- UNDP to build 25 MW power to local communities link
- 8 MW Tamarind Falls project under tender link

MOROCCO

OBJECTIVES

- RE to represent 52% of energy mix by 2030 link
- And 100% by 2050 link
- Adding 6000 MW of RE by 2030 link
- 4,560 MW of solar by 2030 link

ELECTRIFICATION RATE

- 99.6% of the population has access to electricity link

POLICY / REGULATION

- PV equipment subject to 30% import duties (maybe 40% in near future) link
- Solar pumps for agriculture are exempt from import duties link
- Law 54-14 allow for self-consumption: up to 2 MW only requires a declaration, above 2 MW requires permit
- Laws 13-09 allow for corporate PPAs
- FiT technically allowed by price not determined yet

TOTAL PV INSTALLED

LARGE SCALE	810 MWp PV + 510 MWe CSP
C&I	9.3 MWp
MG	0 MWp
SHS & RESIDENTIAL	15,86 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$0.099	$0.066	$0.067
MAX.	$0.176	$0.267	$0.322

NOTEWORTHY DEVELOPMENTS

- Launch of 400 MW Noor PV II – Phase 1 tender link
- 960 MWp + 800MWac Noor Midelt II tender in preparation link
- MASEN to build 200 MW NOOR Atlas project link
- 400 MW NOOR PV II, Noor Tifilalet, and 800 MW NOOR Midelt I projects in the pipeline link
- Xlinks to build 7 GW solar and 3.5 GW of wind project link

greenyellow

SHIFT TO PROFITABLE ENERGY !

YOUR PARTNER TO CONSUME LESS AND BETTER

OUR GOAL

is to reduce our customers' energy costs and carbon footprint in order to support them in their energy, economic and ecological transition.

Today we accelerate innovative ideas for the energy transition

SOLAR PHOTOVOLTAIC OFFER

SHIFT PRODUCTION, part of our unique complementary global platform of offers, allowing you to produce green, local and low-cost energy.

Some credentials

SONABEL - BURKINA FASO	**30 MWp**
LES DOMAINES - MOROCCO	**1,2 MWp**
NOUAKCHOTT AIRPORT - MAURITANIA	**1,5 MWp**
GEANT TUNIS CITY - TUNISIA	**1,2 MWp**
PATISEN - SENEGAL	**1,0 MWp**

- ✓ Tailor-made projects
- ✓ Provided investment
- ✓ Guarantees of the solutions implemented

www.greenyellow.com

MOZAMBIQUE

OBJECTIVES

- Increase installed capacity to 3,138 MW by 2022 and 4,163 MW by 2030 link
- Target 20% integration of renewable energy in the grid by 2030 link

ELECTRIFICATION RATE

- 29% of the population has access to electricity link
- 57% in urban areas and 33% in rural areas link
- Target access of 50% of the population by 2023 link
- Target 50% grid connected access by 2030 link
- Target universal electrification by 2030 link

POLICY / REGULATION

- PV equipment subject to import duties and VAT but work ongoing to create exemption link
- FiT available since 2014 but no success thus far link

TOTAL PV INSTALLED

LARGE SCALE	66 MWp
C&I	0.1 MWp
MG	0 MWp
SHS & RESIDENTIAL	0.1 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.016	$ 0.044	$ 0.075
MAX.	$ 0.143	$ 0.233	$ 0.075

NOTEWORTHY DEVELOPMENTS

- 41 MW Metoro project under construction link
- 340 MW of large-scale projects being tendered
- Balama graphite mine planning 11.2 MW + 8.5 MWh C&I project link
- Globeleq started the construction of 19 MWp/ 7MWh Cuamba solar plant link

NAMIBIA

OBJECTIVES

- RE to represent 70% of country's energy mix by 2030 link
- Expecting to increase the installed capacity to 1,138 MW by 2030 link
- Target to have 229 MW of solar PV and 250 MW of CSP by 2035 link

ELECTRIFICATION RATE

- 56% of the population has access to electricity link
- 72% in urban areas and 35% in rural areas link
- Target to reach universal electricity access by 2030 link

POLICY / REGULATION

- VAT is applicable to all imports of solar energy products in Namibia. Imports of these products from other SACU member countries will be free of customs duties in terms of the SACU Agreement, but not free of import VAT. link
- Net-metering in place since 2017 for residential and C&I installations below 500 kWp link
- No FiT

TOTAL PV INSTALLED

LARGE SCALE	225.7 MWp
C&I	29.1 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.050	$ 0.132	$ 0.072
MAX.	$ 0.223	$ 0.200	$ 0.127

NOTEWORTHY DEVELOPMENTS

- 4.5 GW PV + CSP initiative with Botswana launched link
- Groot Glass planning for 80 MW project in Tses link
- 2x20 MW tender by NamPower ongoing link
- Results for 25 MW Windhoek solar plant to be announced link
- Natura Energy and Globeleq to build 81 MW TeraSun Energy Solar PV Power Park link

NIGER

OBJECTIVES

- The government aim to source 30% of its power from renewables by 2035 link
- Deployment of 100 MW of solar by 2021 link

ELECTRIFICATION RATE

- 11.2% of the population has access to electricity link
- 54.3% in urban areas and 0.4% in rural areas link
- Target to electrify 65% of the population by 2030 link
- Achieve 30% rural and 100% urban electrification by 2030 link
- Achieve universal electrification by 2035 link

POLICY / REGULATION

- All RE components are exempt from import duties and VAT link

TOTAL PV INSTALLED

LARGE SCALE	7 MWp
C&I	0.1 MWp
MG	0.1 MWp
SHS & RESIDENTIAL	0 MWp

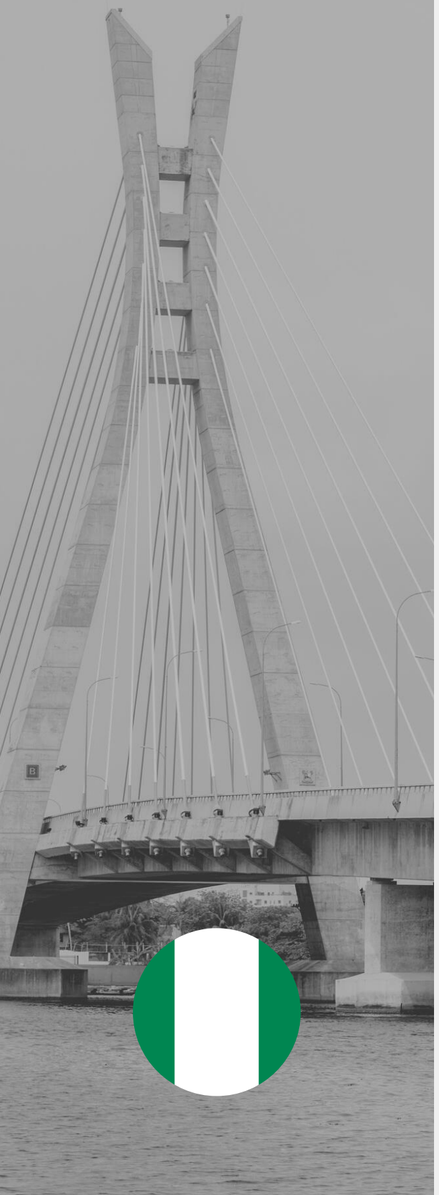
SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.107	$ 0.143	$ 0.127
MAX.	$ 0.143	$ 0.143	$ 0.127

NOTEWORTHY DEVELOPMENTS

- 150 MW being developed by West African Power Pool link
- Sterling & Wilson building 18.9 MW + 11.5 MWh Agadez hybrid link
- World bank to develop 50 MW as part of scaling solar program link
- • NTPC secured contract to set up 50 MW solar capacity link



NIGERIA

OBJECTIVES

- RE to represent 23% of generation by 2025 and 36% by 2030 link
- RE to account for 10% of total energy consumption by 2025 link
- 500 MW of PV by 2025 link

ELECTRIFICATION RATE

- 86% of the urban population and 34% of the rural population has access to electricity for a national average at 60% link
- Target to increase electricity access to 75% by 2025 link
- and to 90% by 2030 link

POLICY / REGULATION

- 5% import duty and 5% VAT on PV components link
- Solar Nigeria Programme (NSP) supporting the market for off-grid solar link
- $350M program to support mini-grid and SHS development link
- FiT for projects up to 5 MW link
- Net-metering for projects below 1MW link

TOTAL PV INSTALLED

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.010	$ 0.071	$ 0.069
MAX.	$ 0.124	$ 0.120	$ 0.125

NOTEWORTHY DEVELOPMENTS

- Katsina State looking to generate 600 MW link
- GVE building 72 MG financed by REPP link
- ABG Paulas Resources supporting the development of 30 MW green houses solar project link
- B&S POWER HOLDING PTE and SUNNYFRED GLOBAL to build 200 MW Ashama solar PV farm link
- Okra Solar and SAO Group to power over 10,000 households link

REPUBLIC OF THE CONGO

OBJECTIVES

- Congo Energy Strategy 2015-2025 aiming at developing a PV electrification plan for remote villages link

ELECTRIFICATION RATE

- 48.3% of the population countrywide has access to electricity link

POLICY / REGULATION

- All RE components are subject to import duties and VAT link
- Country has no implemented legislation intended to incentivize the development of renewable energy projects link

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.078	$ 0.078	$ 0.056
MAX.	$ 0.088	$ 0.078	$ 0.056

NOTEWORTHY DEVELOPMENTS

- Copasol and Green Corp to establish more than 150 MW solar power plants in various parts of the country link

RWANDA

OBJECTIVES

- Rwanda eyes to reach 512MW of total installed capacity by 2024 link
- The government target 60% of renewable resources by 2030 link

ELECTRIFICATION RATE

- 67% of the population has access to electricity link
- 48.6% are connected to the grid and 18.5% have access through off-grid systems (mainly solar) link
- Target to reach 100% electrification by 2024, 69.1% on-grid and 30.9% off-grid link

POLICY / REGULATION

- All PV components are exempted from VAT link
- $15M subsidy + $20M guarantee program for SHS launched in 2020 link
- No permit required for systems <50kWp
- No net-metering and no FiT

TOTAL PV INSTALLED

LARGE SCALE	8.8 MWp
C&I	5.2 MWp
MG	0.3 MWp
SHS & RESIDENTIAL	16.99 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.087	$ 0.123	$ 0.092
MAX.	$ 0.244	$ 0.250	$ 0.131

NOTEWORTHY DEVELOPMENTS

- CrossBoundary together with Solarcentury and SolarAfrica planning 1 MW at Heineken brewery link
- ARC Power planning to facilitate 20,000 connections though solar business parks link

SAO TOME & PRINCIPE

OBJECTIVES

- Increase RE in national energy mix to 50% by 2030 link

ELECTRIFICATION RATE

- 75% of the population has access to electricity link

POLICY / REGULATION

- Solar equipment subject to regular import duties and VAT
- no net-metering, no FIT

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.079	$ 0.181	$ 0.162
MAX.	$ 0.353	$ 0.181	$ 0.162

NOTEWORTHY DEVELOPMENTS

- CISAN developing a hybrid 15 MWp / 2 MWh project on Sao Tome island link
- EDP Renewables planning 4.75 MWp / 3.5 MWh project on Principe island link
- 34 MW additional total capacity being developed by various companies

SENEGAL

OBJECTIVES

- 30% RE contribution in energy mix by 2030 link
- 100% solar mini-grids in 1,000 villages in Senegal by 2025 link

ELECTRIFICATION RATE

- 69% of the population has access to electricity link
- 93% in urban areas and 47% in rural areas link
- Objective of 100% electricity coverage by 2025 link
- Connection of at least 90% of rural households by 2025 link

POLICY / REGULATION

- All RE components are exempted from VAT link
- Hybrid form of net-metering and FiT introduced in 2018 link

TOTAL PV INSTALLED

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.164	$ 0.134	$ 0.106
MAX.	$ 0.240	$ 0.350	$ 0.204

NOTEWORTHY DEVELOPMENTS

- 30 MW Niakhar hybrid plant under construction link
- tender launched for 133 MG link
- Green Yellow to install 1.56 MW for Senico link
- CrossBoundary to build 13 MW hybrid plant for Grande Côte Operations link

FOCUS ON MINI-GRIDS

ANALYSIS

The African mini-grid segment has made great progress this year with AFSIA numbers indicating an increase of 16% of historical installed capacity in 2021. In absolute terms however, this increase remains relatively small: at the end of 2021, there was 49.5 MWp of capacity installed at mini-grids throughout the continent (0.6% of all installed solar capacity in Africa). In 2021, 6.7 MWp of new mini-grids were commissioned. These numbers however need to be considered with care as they are based on partial information. Out of 371 projects identified by AFSIA as already in operation, no information on capacities were available for 127 of them. This means the above figures could be underestimated anywhere between 25% and 50% and our team continues to work hard to collect precise and official information about these projects.

Uganda, Sierra Leone and Nigeria have been particularly active on the mini-grid front this year. The company Winch Energy has demonstrated a lot of strength by commissioning a large number of sites in both Uganda and Sierra Leone. Another African mini-grid specialist PowerGen has also delivered a substantial number of projects in Sierra Leone. And in Nigeria, Husk Power Systems has made a great push and has sharpened its appetite for many more mini-grids to be developed by them in Nigeria in the coming years.

FOCUS ON MINI-GRIDS

In Benin, things have also been progressing but rather slowly. While several companies had been selected for the construction of various numbers of mini-grids several months ago, administrative aspects seem to have gotten in the way and slowed down further development of these sites. ENGIE PowerCorner did however sign an agreement with ABERME, the Beninese Agency for Rural Electrification and Energy Management, for the electrification of 1 village and with an ambition to electrify 22 additional villages through 2023.

In Togo, after several months without movement, the tender for the development and construction of mini-grids in 317 villages seems to have been relaunched in December through a call to identify a consultant for topographical studies.

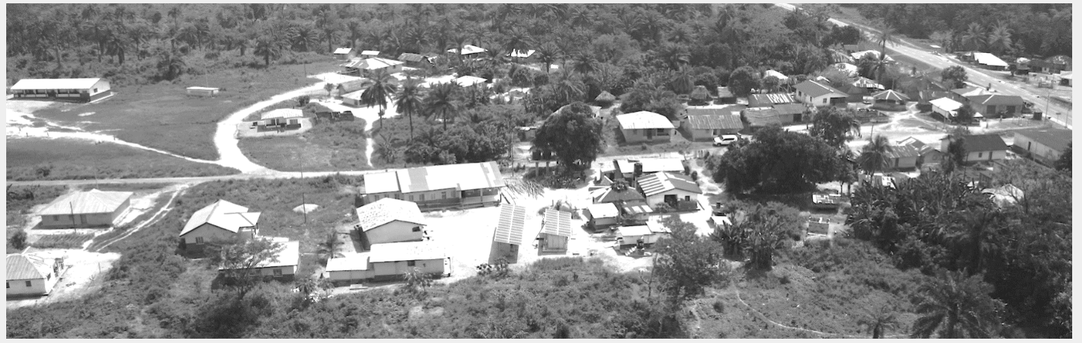
In December 2021, the Rwandese Bank of Development also released a new tender to identify a consultant which will have the task of evaluating feasibility studies and loan applications for PV and hydro mini-grids. This is part of a new round of tender for the $48.9 million Renewable Energy Fund (REF) of BRD dedicated to off-grid energy. The considered mini-grids will have a capacity of 10 kW to 1 MW.

These new projects coming online this year, and the multiple plans of more developments for the coming years across the continent are both a welcome and much needed evolution for the populations living off-

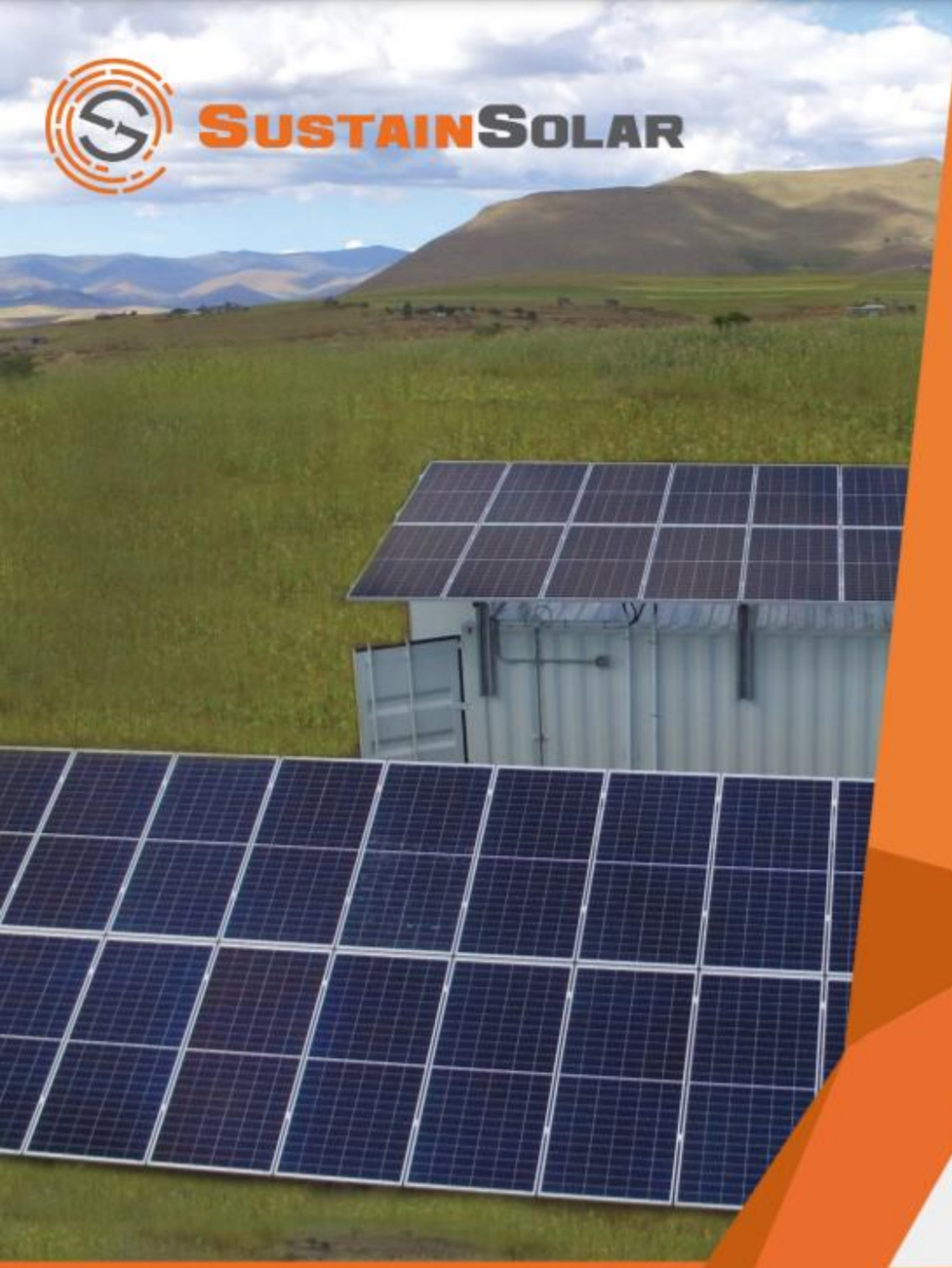
FOCUS ON MINI-GRIDS

grid and who need access to electricity. However some could argue that this is a drop in the ocean when considering the 600 million people without electricity access on the continent and much work remains to be done.

This relatively small capacity increase also raises questions when compared with the financial commitments made by the international donors and development institutions to support the development of mini-grids. There seems to be an obvious disconnect between announcements of financial commitment to mini-grids and the reality on the ground at the moment. As highlighted in an article published by Power for All in 2020, between 2012 and 2019 donors committed US$1.6 billion to help scale the mini-grid sector in Sub-Saharan Africa. However, only 13% (US$208 million) of that capital had been deployed by 2020 according to a report by Sustainable Energy for All. Moreover, of that money, at least half was for technical assistance and was not used to actually build mini-grids. And yet, most governments who received that assistance still do not have a viable regulatory framework. So it is to be hoped that this gap will soon be filled for the benefits of the population in dire need of electricity and improved living conditions.



Credit: InfraCo



SUSTAINSOLAR

FLEXIBLE TURN-KEY CONTAINERISED SOLAR PV & BATTERY ENERGY STORAGE SYSTEMS

SustainSolar is a leading equipment provider of high quality, turn-key and plug-and-play containerised SolarPV and battery energy storage systems (BESS) with operational experience since 2018 designing, commissioning, servicing turn-key SolarPV generation systems across Sub-Saharan Africa.

WHY SUSTAINSOLAR

- **RAPID** DEPLOYMENT
- **MODULAR** & EXPANDABLE
- **CLEAN** POWER
- **REMOTE** MONITORING
- **TURNKEY** SOLUTION
- **FINANCE** OPTIONS

SUSTAIN COMPACT™

UP TO 30KWP AND 100 KWH

SUSTAIN EXTENDED™

UP TO 84KWP AND 310KWH

SUSTAIN BOX™

8KWP/ 10KWP/ 12KWP WITH UP TO 30KWH

SUSTAIN STORAGE™

LV AND HV BESS, UP TO 1MWH

E: info@sustainsolar.co.za | W: www.sustainsolar.co.za | T: +27 21 204 1881

FOCUS ON MINI-GRIDS

ARTICLE

MOZAMBIQUE MINI-GRIDS

Mozambique took big steps toward embracing the rural electrification benefits of off-grid solar in 2021, with a tender for five solar-plus-storage mini-grids followed by much-needed supporting legislation.

Belgian development agency ENABEL in April tendered for the installation of five solar-diesel local networks in the coastal provinces of Zambézia and Nampula. With generation capacities ranging from 75-230kWp each, the mini-grids were also required to feature 445-1,130kWh of battery storage, and back-up diesel capacity of 45-120kVa, according to an online article about the tender run by solar trade title pv magazine. The networks were planned by ENABEL alongside the nation's Ministry of Mineral Resource and Energy and with African renewables industry representatives constantly highlighting a lack of supporting legislation for off-grid solar deployment, Maputo delivered in September, with a framework of rules encouraging and governing the use of photovoltaics in applications from solar home systems to mini-grids.

The energy ministry was instrumental in the legislation, along with the Energy Regulatory Authority and the National Energy Fund, as explained by Dutch development entity SNV, which administers the BRILHO programme to drive off-grid solar in Mozambique which

FOCUS ON MINI-GRIDS

is funded by the UK government. Vivian Vendeirinho, president of the Africa Mini-Grid Developers Association, quoted in an article about the legislation by SNV, said: "The new regulation allows for decentralized renewable energy providers to build mini-grid systems that will provide reliable, sustainable and affordable electricity to under-served rural communities in Mozambique. This will anchor their socio-economic development opportunities so they are not left behind as the economy of the country evolves and grows. The end result will be the empowerment of rural communities and more jobs and trading opportunities for Mozambique."

Credit: ANKA Madagascar

SEYCHELLES

OBJECTIVES

- 15% RE in the energy mix by 2030 link

ELECTRIFICATION RATE

- 100% of the population have access to electricity link

POLICY / REGULATION

- All RE components are exempted from Goods and Service tax link
- SEEREP provides loan facility open to households to acquire solar systems link
- Rebate scheme residential and small commercial installations link
- Net-metering for residential and commercial users since 2013 link

TOTAL PV INSTALLED

LARGE SCALE	41.4 MWp
C&I	1.8 MWp
MG	2.9 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.108	$ 0.277	$ 0.321
MAX.	$ 0.314	$ 0341	$ 0.341

NOTEWORTHY DEVELOPMENTS

- Construction of 5.8 MW Providence floating solar plant is moving forward link
- 5 MW / 3.3 MWh Romainville MG under construction link
- Results to be announced for Seychelles Trading company tender link

SIERRA LEONE

OBJECTIVES

- RE to represent 65.3% in the energy mix by 2030 with 1,229 MW installed capacity link

ELECTRIFICATION RATE

- 26% of the population has access to electricity with only 6% in rural areas link
- Target to reach 92% total access to electricity by 2030 with 37% being off-grid link

POLICY / REGULATION

- All SHS are exempted from import duties and VAT link
- PV equipment and low energy or energy-efficient appliances that meet IEC global standards are exempt from GST link
- No net-metering, no FiT

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	0.4 MWp
MG	3.1 MWp
SHS & RESIDENTIAL	3.2 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.053	$ 0.176	$ 0.178
MAX.	$ 0.987	$ 0.176	$ 0.178

NOTEWORTHY DEVELOPMENTS

- Orange telecom towers to be solarize through Escotel link
- Sunon Asogli to build 50 MWp Freetown solar park link
- 98 MGs commissioned or under construction link

SOMALIA

OBJECTIVES

- Addition of 200 MW of RE by 2025, of which 50 MW PV link

ELECTRIFICATION RATE

- 35.3% of the population has access to electricity link
- Target to achieve universal access by 2030 link

POLICY / REGULATION

- Tax exemptions can be negotiated by both local and foreign investors
- No national electrification policy in place waiving taxes on PV products
- No FiT and no net-metering

TOTAL PV INSTALLED

LARGE SCALE	12.8 MWp
C&I	0.6 MWp
MG	1.6 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	NO RELIABLE DATA		
MAX.			

NOTEWORTHY DEVELOPMENTS

- BECO planning on extending the 8MW Mogadishu solar plant to 100MW link
- Abu Dhabi fund for development financing construction of 7 MWp Bosaso solar plant link

SOMALILAND

OBJECTIVES

- n/a

ELECTRIFICATION RATE

- n/a

POLICY / REGULATION

- n/a

TOTAL PV INSTALLED

LARGE SCALE	8 MWp
C&I	1.4 MWp
MG	0.2 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	NO RELIABLE DATA		
MAX.			

NOTEWORTHY DEVELOPMENTS

- n/a

SOUTH AFRICA

OBJECTIVES

- 41% of RE in national energy mix by 2030 link
- 17,742 MW of wind; 8,288 MW of solar PV; 4,600 MW of hydropower, and 600 MW of CSP by 2030 link

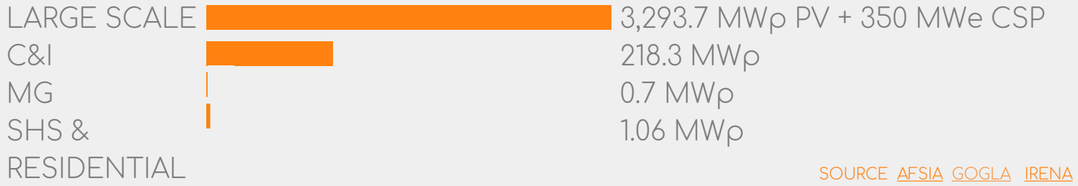
ELECTRIFICATION RATE

- 95% of the population has access to electricity link
- 95% in urban areas and 92% in rural areas link

POLICY / REGULATION

- No import duties link
- Possible for companies to write off 100% solar investment in year 1 link
- Net-metering available in some municipalities link

TOTAL PV INSTALLED



SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.041	$ 0.041	$ 0.037
MAX.	$ 0.296	$ 0.292	$ 0.283

NOTEWORTHY DEVELOPMENTS

- South Africa launching large scale procurement for 6.8 GW PV in 3 rounds link
- 25 projects were selected among 63 under 2.6 GW REIPPPP round5 tender link
- Multitude of C&I projects launched or under tender, among others Sasol 600 MW project link

SOUTH SUDAN

OBJECTIVES

- The Infrastructure Action Plan aims to expand generation capacity to about 580 MW by 2025 link
- Solar expected to be the best option to improve the nation's dependence on diesel link

ELECTRIFICATION RATE

- 6.7% % of the population has access to electricity link

POLICY / REGULATION

- PV subject to 10% import duties and 10% VAT link
- No FiT, no net-metering

TOTAL PV INSTALLED

LARGE SCALE	0 MWp
C&I	5 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

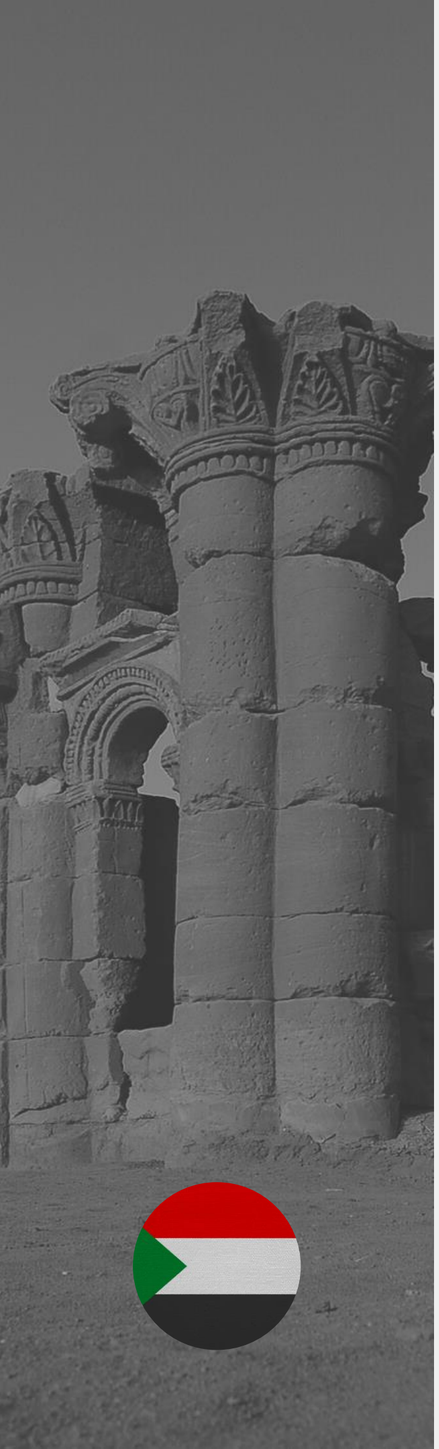
SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	NO RELIABLE DATA		
MAX.			

NOTEWORTHY DEVELOPMENTS

- Elsewedy Electric to build 20 MWp and 35 MWh hybrid in Juba link



SUDAN

OBJECTIVES

- 20% RE to be integrated in the power system by 2030 link
- 1,000 MW of solar PV;100 MW of solar CSP link
- 50% RE excluding hydro in the national energy mix by 2031 link

ELECTRIFICATION RATE

- 54% of the population has access to electricity, 32% in rural areas and 22% in urban areas link

POLICY / REGULATION

- Import duty on PV components is 0% and VAT is 0% link
- September 21 law amendment to allow private companies to enter electricity market link
- Net-metering to be launched in 2022 link

TOTAL PV INSTALLED

LARGE SCALE	5 MWp
C&I	11.5 MWp
MG	0 MWp
SHS & RESIDENTIAL	0 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.015	$ 0.023	$ 0.023
MAX.	$ 0.015	$ 0.023	$ 0.023

NOTEWORTHY DEVELOPMENTS

- UAE government financing 500 MW total capacity in multiple large scale projects link
- TAQA Arabia to develop solar power plants link

TANZANIA

OBJECTIVES

- Electricity Industry Reform Roadmap planned for 100 MW PV and 200 MW wind by 2025 link
- 50% of RE in the energy mix by 2030 link

ELECTRIFICATION RATE

- 32.7% of the population has access to electricity link
- Target universal access by 2030 link
- Plans to increase connections to 50% by 2025 and 75% by 2033 link

POLICY / REGULATION

- PV products and associated components (except solar lights) are exempted from import duties and VAT link
- FiT of $0.21/kWh for MG, FiT to systems connected to the national grid at $0.079/kWh in the dry season, $0.059/kWh in the wet season link
- Net-metering in application since 2017 link

TOTAL PV INSTALLED

LARGE SCALE	6 MWp
C&I	1.5 MWp
MG	0.7 MWp
SHS & RESIDENTIAL	23.76 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE 1
SOURCE 2

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.043	$ 0.084	$ 0.065
MAX.	$ 0.126	$ 0.126	$ 0.068

NOTEWORTHY DEVELOPMENTS

- 10 MW Kahama Solar under construction link
- AFD supporting the development of the 150 MWp Shinyanga Solar Project link
- Tanesco 50 MW tender results still expected link
- AFD to finance the construction of 150 MW Kishapu solar power plan link

TOGO

OBJECTIVES

- Increase the installed capacity to 300 MW by 2022 link
- CIZO Programme to reach 300,000 households with off-grid solar by 2022 link
- Having 50% of its energy mix coming from RE by 2030 link
- Target of 10% of PV in the energy by 2030 link

ELECTRIFICATION RATE

- 43% of the population has access to electricity link
- 79% in urban areas and 16% in rural areas link
- Target of 75% of electricity access by 2025 and 100% by 2030 link

POLICY / REGULATION

- All RE components are exempt from import duties and VAT link
- CIZO Programme offers subsidies to households to cover the cost of off-grid PV systems link
- no net-metering, no FiT

TOTAL PV INSTALLED

LARGE SCALE	50 MWp
C&I	3.8 MWp
MG	0.4 MWp
SHS & RESIDENTIAL	2.9 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE 1
SOURCE 2

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.113	$ 0.155	$ 0.128
MAX.	$ 0.216	$ 0.216	$ 0.173

NOTEWORTHY DEVELOPMENTS

- Results to be announced for 317 MG tender link
- Government to announce the results for 60 MW Salimde and 80 MW Awandjelo tenders link
- 350 mini-grids to be developed through funds from Exim bank link
- ARISE IIP to announce tender results for 390 MW and 200 MWh storage plant link

TUNISIA

OBJECTIVES

- 3.5 GW (30%) of RE capacity by 2030 link
- Solar plan 2030 targets 1,510 MW of PV and 450 MW of CSP link

ELECTRIFICATION RATE

- 100% of the population has access to electricity link

POLICY / REGULATION

- Imported energy equipment with no locally produced equivalent are subject to minimum customs duties and are exempt from VAT link
- net-metering and FiT possible link

TOTAL PV INSTALLED

LARGE SCALE	37.2MWp
C&I	7.6 MWp
MG	0 MWp
SHS & RESIDENTIAL	1.80 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE 1 SOURCE 3 SOURCE 2

	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.023	$ 0.038	$ 0.058
MAX.	$ 0.147	$ 0.139	$ 0.124

NOTEWORTHY DEVELOPMENTS

- Tunisia launches 5th round of tender for 70 MWp link
- Scatec to build 60MW, 60MW, and 240MW in Tatouine, Tozeur and Sidi Bouzid link
- Qair to test floating PV of 200 kWp in Tunis link
- Akuo Energy, HBG Holding and Nour Energy to build 10 MW Gabès solar PV plant link

UGANDA

OBJECTIVES

- Achieving more than 90% of renewable electricity production by 2030 link
- Targeting 100% clean renewable by 2050 link

ELECTRIFICATION RATE

- 23% of the population has access to electricity,
- 63% on-grid and 11% off-grid connections link
- Increase rural electricity access to 26% by 2022 link
- Target 100% electrification rate by 2030 link

POLICY / REGULATION

- PV panels exempt from import duties and VAT link
- related solar accessories are subject to import duty up to 35% and VAT up to 18% link
- analysis being done on net-metering scheme link

TOTAL PV INSTALLED

LARGE SCALE	70 MWp
C&I	3 MWp
MG	1.7 MWp
SHS & RESIDENTIAL	15.2 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.070	$ 0.100	$ 0.050
MAX.	$ 0.209	$ 0.226	$ 0.194

NOTEWORTHY DEVELOPMENTS

- AMEA Power to develop 90 MW link
- Chinese CEEC to build 500 MW link
- 128 MG under development with support of various DFI's

ZAMBIA

OBJECTIVES

- increase the electricity generation to 6000 MW by 2030 link
- 30%of national energy needs to be covered with RE (excluding large hydro)by 2030 link
- target to generate 600 MW of PV by 2030 link

ELECTRIFICATION RATE

- 40% of the population has access to electricity link
- 77% in urban areas and 11% in rural areas link
- target by 2030 to electrify 90% of urban population and 51% of rural link

POLICY / REGULATION

- 0% import duties and 0% VAT on solar products link
- no permit required for systems <100kW link
- no FiT
- Net-metering is mentioned in 2016 grid code but it has never been applied link

TOTAL PV INSTALLED

LARGE SCALE	89 MWp
C&I	0.3 MWp
MG	0.1 MWp
SHS & RESIDENTIAL	4.9 MWp

SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.028	$ 0.063	$ 0.016
MAX.	$ 0.114	$ 0.109	$ 0.045

NOTEWORTHY DEVELOPMENTS

- PowerChina to build 3 PV plants with total capacity of 600MW link
- Globeleq and SOLA Group awarded 2 times 20 MW link
- Toyota Tshusho and Elsewedy electric to build two 50 MW Ac link
- Ultra Green starts the installation of 200 MW PV plant in Serenje link
- Ilute Solar to build 25 MW in Sesheke link

ZIMBABWE

OBJECTIVES

- Target 1,575MW of power from solar by 2030 link
- deploy 1 GW of clean energy 2025 link
- Target to add 2,000 MW to the national grid from solar by 2030 link

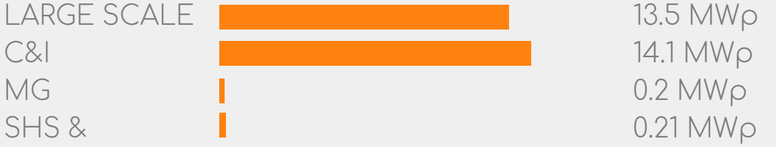
ELECTRIFICATION RATE

- 41.09% of the population has access to electricity link

POLICY / REGULATION

- All PV components are exempt from import duties link
- net-metering possible with basic registration link

TOTAL PV INSTALLED



SOURCE AFSIA GOGLA IRENA

CURRENT TARIFF GRID ELECTRICITY

SOURCE	RESIDENTIAL	COMMERCIAL	INDUSTRIAL
MIN.	$ 0.023	$ 0.39	$ 0.039
MAX.	$ 0.138	$ 0.127	$ 0.127

NOTEWORTHY DEVELOPMENTS

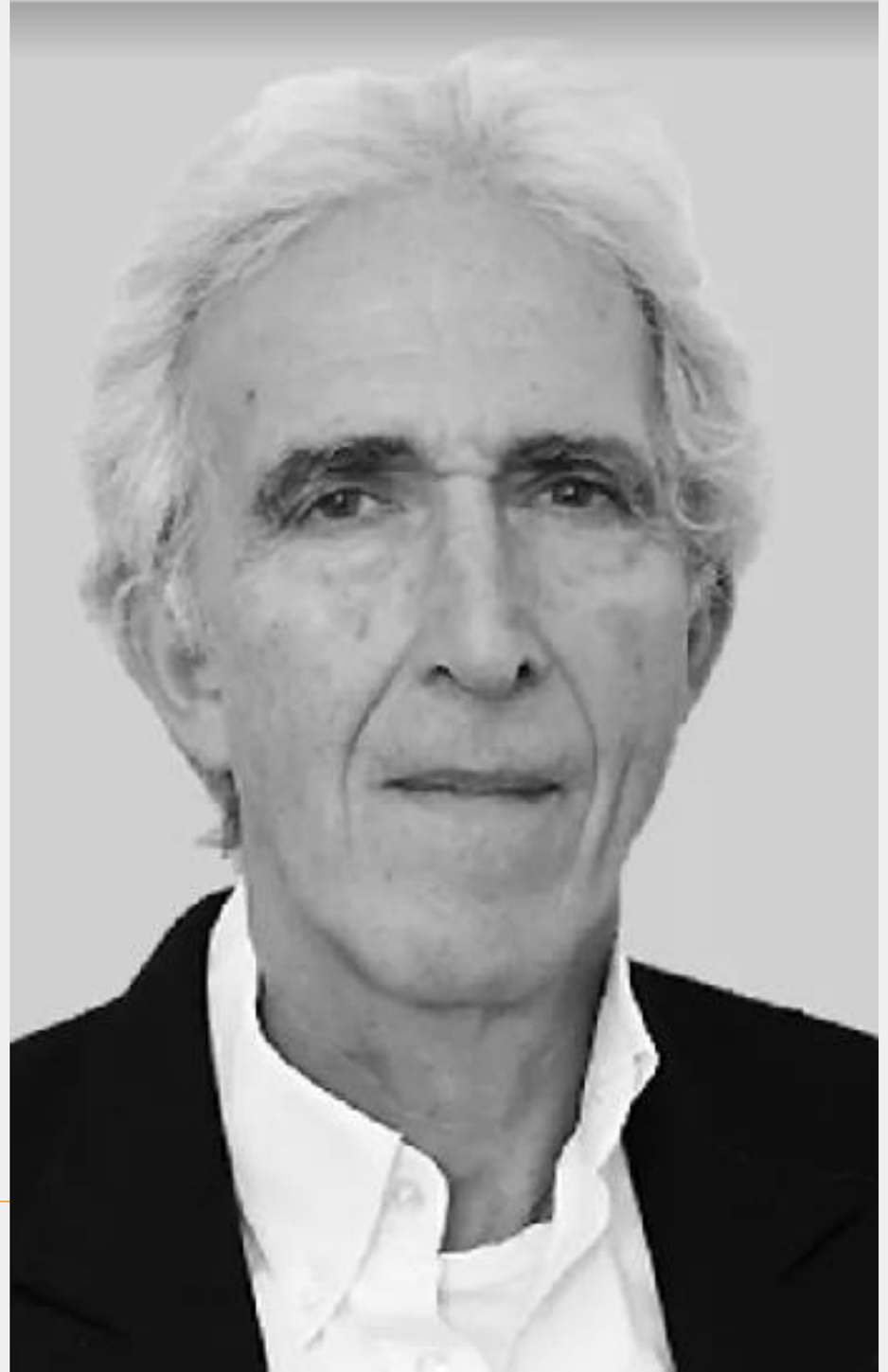
- 100 MW Victoria Falls project under construction link
- 500 MWP solar power plants under tender link
- Zuva Petroleum to solarize 180 service stations link
- 22.5 MW Nyabira solar plant under construction link
- 425 MW total capacity under development or construction at Zimbabwean mines

FOCUS ON GREEN HYDROGEN

ARTICLE

BY TOBY GREENBURY
Ambassador

African Hydrogen Partnership



GREEN AMMONIA AND GREEN FERTILISERS – THE WINNING TICKET FOR AFRICA

Carbon-free African hydrogen can play a major part in the global race against climate change. Green hydrogen – that is hydrogen produced from water by hydrolysis, powered by renewable energy – and natural, or naturally occurring, hydrogen are both carbon-free and environmentally clean to produce and also to consume,

FOCUS ON GREEN HYDROGEN

since the only emission is water.
In order to produce green hydrogen competitively it is necessary to have an abundance of sun and wind, water and space and countries which meet these conditions will potentially be able to become energy producers: for their own domestic use; for industrial businesses which use hydrogen; and for export.
Hydrogen will be used increasingly in many manufacturing processes, such as the manufacture of fertilizers, steel and various chemicals and if green hydrogen is produced in Africa then it would also be logical for those industries which use hydrogen in their industrial processes to be located near to where the green hydrogen is being produced.
Although, in time, it will be possible for several countries in Africa to produce significant amounts of green hydrogen for, amongst other things, export, there is a real and current need for green hydrogen facilities to produce green ammonia and fertilizers for use in Africa. Commercially viable green ammonia and fertilizer projects can kickstart the broader development of green hydrogen and hydrogen-related business in Africa.
Because of the current cost of oil - the trajectory of the price of fossil fuels is likely to be upwards in the medium and long term - and other issues mainly related to transportation internationally and within Africa, we believe that it will be possible to produce green ammonia in many countries in Africa at a cost which is significantly lower than the overall cost of buying ammonia from elsewhere in Africa or internationally. Currently, in many places in Africa, fertilizers are not

FOCUS ON GREEN HYDROGEN

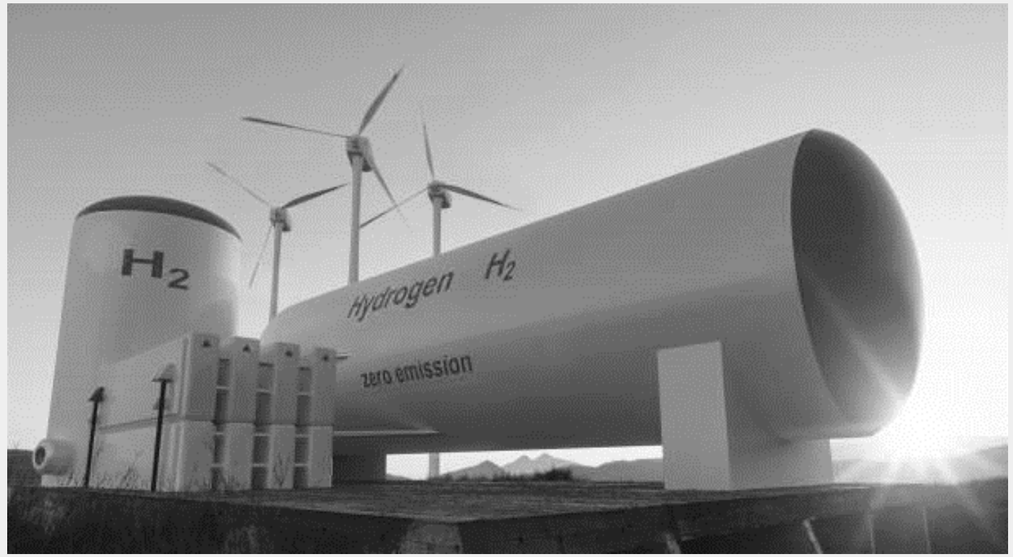
available in sufficient quantity or at sufficiently affordable prices and often are not available when needed in the agricultural cycle. However, it is possible to make fertilizers utilizing green ammonia and to make them available on a more timely and more responsive basis, as well as at a lower cost. This type of project can be replicated in many countries and places in Africa.

This type of project can be replicated in many countries and places in Africa. And green ammonia can be used for many other purposes, such as in ammonia generators and also, in time, for fueling shipping.

The AHP is excited at the prospect of green ammonia being produced in Africa to make fertilizers. It will make a significant difference to farmers and agricultural communities in Africa. But the hydrogen revolution will mean much more than this alone and there is a real opportunity for Africa to leap-frog the developed world in manufacturing and deploying green hydrogen and green ammonia.

FOCUS ON GREEN HYDROGEN

The AHP is a not for profit hydrogen association dedicated to the development in Africa of green and natural hydrogen. The AHP began accepting members – it only accepts corporate members and organizations or institutions – in February 2021 and today it has fourteen members, and a number in the pipeline, from eleven countries. It is expecting to more than double its membership during 2022.



ARIS
AFRICA RENEWABLES INVESTMENT SUMMIT

The most important event on renewable energy investment on the African continent!

BROUGHT TO YOU BY:

RENEWAFRICA
INTELLIGENCE ON AFRICA'S RENEWABLE ENERGY TRANSITION

AFSIA
Africa Solar Industry Association

ENABLING RENEWABLE ENERGY INVESTMENT IN AFRICA

ARIS seeks to accelerate renewable energy investment in African countries by linking institutional investors, project developers, policy makers, energy utilities, regulators, corporates and the most influential energy sector decision makers under one roof. Project "Energise Africa" is Africa's most ambitious to date. Key experts will gather at ARIS to dissect solutions to rapidly energise Africa. As well as facilitating investment of Renewable Energy projects right at the event!)

Date: 27 - 29 September, 2022

www.invest-renewables.africa

Cape Town International Convention Centre (CTICC)

CAPE TOWN, SOUTH AFRICA

FOR SPONSORSHIP AND INQUIRIES CONTACT: Munyaradzi Jani, munya@invest-renewables.africa

SUMMARY TABLES / Duties & Taxes

COUNTRY	IMPORT DUTIES	VAT ON IMPORT	VAT
Algeria	Exemption on raw materials for local module production		
Angola	No traditional exemption		14% VAT on solar products
Benin	5% import duties on pre-assembled solar generating assets (SHS) Exemption for goods destined for renewable energy projects	0% VAT in imports of PV, thermal and storage (except inverters)	0% VAT on solar panel and batteries
Botswana			
Burkina Faso	Exemption on solar equipment		0% VAT on solar equipment
Burundi	Exemption on solar panels 25%-35% duties on batteries		18% VAT on solar panels and batteries
Cameroon	5% duties on solar equipment not similar to that manufactured locally 30% on pico-solar products		No VAT on materials and equipment used in harnessing solar energy
Cape Verde		0% VAT in imports of solar panels and storage	
Central African Republic (CAR)	16% import duties applied on solar products		16% VAT applies to solar products

SUMMARY TABLES / Duties & Taxes

COUNTRY	IMPORT DUTIES	VAT ON IMPORT	VAT
Chad			0% on materials and equipment used for the production & promotion of RE
Comoros	0% duties on solar panels		0% on equipment and materials for RE development
Congo (DRC)	0% duties on on equipment intended for electricity production		0% VAT on equipment intended for electricity production
Congo (Republic of The Congo)	30% import duties		18.9% VAT
Cote d'Ivoire	0% on solar panel 20% on batteries		9% VAT on solar panels and SHS 18% VAT on batteries
Djibouti	33% on solar equipment		33% VAT on solar products
Egypt	2% import duties on RE equipment used for production		5 % VAT on RE equipment
Equatorial Guinea	state can authorize reduced rate or total exemption depending on activities of investors		state can authorize reduced rate or total exemption depending on activities of investors
Eritrea			

SUMMARY TABLES / Duties & Taxes

COUNTRY	IMPORT DUTIES	VAT ON IMPORT	VAT
eSwatini	0% import duties on solar panels and batteries		15% VAT on solar panels and batteries
Ethiopia	0% import duties on batteries (If used for storing RE)		15% VAT on solar panels and batteries
Gabon			18% VAT on solar components
Gambia		Import VAT waiver for investment enterprises within priority categories	
Ghana	0% import duties on solar panels 5% import duties on SHS and 20% import duties on batteries		0% VAT on solar panels 15% VAT on batteries and other components
Guinea			
Guinea-Bissau			Tax exemptions very between projects VAT exemption for solar panels, but not for other components
Kenya	0% duties on solar panels 35% duties on batteries 25% duties on solar Lanterns and LED lights within an SHS kit		VAT exemption on all RE products
Lesotho			

SUMMARY TABLES / Duties & Taxes

COUNTRY	IMPORT DUTIES	VAT ON IMPORT	VAT
Liberia	Solar companies under LIRENAP are eligible for duty reduction on some products		0% VAT on some RE products
Libya	0.5% import duties on solar components		No VAT in Libya
Madagascar	0% import duties on solar panels and batteries	0% import VAT on PV components	0% VAT on solar panel and batteries
Malawi	0% import duties on solar PV products	0% import VAT on equipment for health and education sector	16.5% VAT on solar products
Mali	0% import duties on solar products		0% VAT on solar products
Mauritania	1% import duties on solar products		16% VAT on solar goods
Mauritius	0-15% import duties (unspecified)	15% VAT on imports	0% VAT on solar projects
Morocco		Exemption for solar water pumps for agricultural use	20% on solar panels 10% on locally-made solar water heaters
Mozambique	7.5% import duties on solar panels and batteries		17% VAT on solar panels and batteries
Namibia	0% import duties on solar panels and batteries		15% VAT on solar panels and batteries

SUMMARY TABLES / Duties & Taxes

COUNTRY	IMPORT DUTIES	VAT ON IMPORT	VAT
Niger	0% import duties on RE products		0% VAT on RE products
Nigeria	5% import duties on solar components		5% VAT on solar components
Rwanda	Exemption of import duties for solar products and solar-powered appliances		Exemption of VAT on solar components and solar-powered appliances
Sao Tome and Principe			
Senegal	0% import duties on solar equipment 5% import duties on SHS		0% VAT on RE equipment
Seychelles	0% import duties on RE equipment		0% VAT on RE equipment
Sierra Leone	0% import duties on SHS		0% VAT on SHS
Somalia			
South Africa		15% import VAT on customs value + 10%	15% VAT on solar products
South Sudan	10% import duties on solar-powered goods		15% VAT on solar products
Sudan	0% import duties on solar equipment		0% VAT on solar equipment
Tanzania	0% import duties on solar products reserved for development and generation		0% VAT on solar products reserved for development and generation

SUMMARY TABLES / Duties & Taxes

COUNTRY	IMPORT DUTIES	VAT ON IMPORT	VAT
Togo	0% import duties on solar products reserved for development and generation		0% VAT on solar products reserved for development and generation
Tunisia	10% import duties on solar products without similarities to the ones produced locally		6% VAT on solar products made locally
Uganda	0% import duties on solar panels 25% import duties on batteries		0% VAT on solar panels 18% VAT on batteries
Zambia	0% import duties on solar products for development and generation		0% VAT on solar products
Zimbabwe	0% import duties on solar equipment		15% VAT on solar equipment

SUMMARY TABLES / Electrification Rate & Electricity Tariffs

COUNTRY	ELECTRIFICATION RATE	RESIDENTIAL		COMMERCIAL		INDUSTRIIAL		SOURCE		
		MIN	MAX	MIN	MAX	MIN	MAX			
Algeria	100%	0.009	0.059	0.007	0.064	0.004	0.048	Link		
Angola	45%	0.004	0.027	0.021	0.027	0.013	0.023	Link		
Benin	53%	0.155	0.266	0.164	0.295	0.158	0.270	Link	Link	Link
Botswana	56%	0.088	0.122	0.106	0.157	0.072	0.080	Link		
Burkina Faso	20%	0.135	0.297	0.115	0.297	0.097	0.252	Link		
Burundi	7%	0.021	0.064	0.021	0.064	n/a	n/a	Link	Link	
Cameroon	63%	0.090	0.178	0.151	0.178	0.108	0.153	Link		
Cape Verde	93%	0.311	0.437	0.349	0.416	0.295	0.334	Link	Link	
Central African Republic	14.3%	0.123	0.258	0.049	0.068	0.049	0.068	Link		
Chad	9%	0.149	0.362	0.151	0.380	0.151	0.360	Link	Link	
Comoros	78%	0.370	0.380	0.270	0.330	0.270	0.330	Link	Link	
Cote d'Ivoire	74%	0.032	0.121	0.132	0.155	0.082	0.119	Link	Link	

All tariffs in USD equivalent at 1/1/2022

SUMMARY TABLES / Electrification Rate & Electricity Tariffs

COUNTRY	ELECTRIFICATION RATE	RESIDENTIAL		COMMERCIAL		INDUSTRIIAL		SOURCE
		MIN	MAX	MIN	MAX	MIN	MAX	
RDC	19%	0.027	0.087	0.087	0.150	0.057	0.057	Link
Republic of the Congo	48.3%	0.078	0.088	0.078	0.078	0.056	0.056	Link Link
Djibouti	42%	0.151	0.308	0.224	0.308	0.162	0.230	Link Link
Egypt	100%	0.031	0.082	0.042	0.102	0.046	0.102	Link Link Link
Equatorial Guinea	66.6%	n/a	n/a	n/a	n/a	n/a	n/a	
Eritrea	56.23%	0.217	0.217	n/a	n/a	0.217	0.217	Link
Eswatini	87%	0.075	0.124	0.159	0.337	0.064	0.330	Link
Ethiopia	45%	0.006	0.057	0.049	0.049	0.021	0.035	Link
Gabon	90.7%	0.099	0.246	0.155	0.265	0.155	0.192	Link
Gambia	56.2%	0.173	0.193	0.184	0.207	0.198	0.221	Link
Ghana	84%	0.055	0.160	0.136	0.228	0.135	0.449	Link
Guinea	42.42%	0.009	0.027	0.118	0.181	0.118	0.181	Link

All tariffs in USD equivalent at 1/1/2022

SUMMARY TABLES / Electrification Rate & Electricity Tariffs

COUNTRY	ELECTRIFICATION RATE	RESIDENTIAL		COMMERCIAL		INDUSTRIIAL		SOURCE
		MIN	MAX	MIN	MAX	MIN	MAX	
Guinea Bissau	31%	0.230	0.441	0.184	0.230	0.232	0.290	Link
Kenya	75%	0.090	0.142	0.090	0.140	0.091	0.108	Link Link
Lesotho	44.6%	0.051	0.115	0.018	0.019	0.018	0.019	Link
Liberia	12%	0.390	0.390	0.390	0.390	0.390	0.390	Link
Libya	68.5%	0.044	0.110	0.150	0.150	0.068	0.092	Link
Madagascar	25%	0.033	0.227	0.052	0.286	0.022	0.271	Link
Malawi	15%	0.059	0.136	0.134	0.156	0.057	0.176	Link
Mali	40%	0.106	0.275	0.232	0.275	0.164	0.239	Link
Mauritania	30%	0.069	0.165	0.165	0.165	0.060	0.167	Link
Mauritius	99.6%	0.050	0.202	0.068	0.230	0.050	0.124	Link Link Link
Morocco	99.6%	0.099	0.176	0.066	0.267	0.067	0.322	Link Link Link Link
Mozambique	29%	0.016	0.143	0.044	0.233	0.075	0.075	Link

All tariffs in USD equivalent at 1/1/2022

SUMMARY TABLES / Electrification Rate & Electricity Tariffs

COUNTRY	ELECTRIFICATION RATE	RESIDENTIAL		COMMERCIAL		INDUSTRIAL		SOURCE
		MIN	MAX	MIN	MAX	MIN	MAX	
Namibia	56%	0.050	0.223	0.132	0.200	0.072	0.127	Link Link Link Link
Niger	11.2%	0.107	0.143	0.143	0.143	0.127	0.127	Link
Nigeria	60%	0.010	0.124	0.071	0.120	0.069	0.125	Link Link Link
Liberia	12%	0.390	0.390	0.390	0.390	0.390	0.390	Link
Rwanda	67%	0.087	0.244	0.123	0.250	0.092	0.131	Link
Sao Tome and Principe	75%	0.079	0.353	0.181	0.181	0.162	0.162	Link
Senegal	69%	0.164	0.240	0.134	0.350	0.106	0.204	Link
Seychelles	100%	0.108	0.314	0.277	0.341	0.321	0.341	Link
Sierra Leone	26%	0.053	0.987	0.176	0.176	0.178	0.178	Link
Somalia	35.3%	n/a	n/a	n/a	n/a	n/a	n/a	
Somaliland	n/a	0.650	0.650	0.650	0.650	0.390	0.390	Local industry source
South Africa	95%	0.041	0.296	0.041	0.292	0.037	0.0283	Link

All tariffs in USD equivalent at 1/1/2022

SUMMARY TABLES / Electrification Rate & Electricity Tariffs

COUNTRY	ELECTRIFICATION RATE	RESIDENTIAL		COMMERCIAL		INDUSTRIIAL		SOURCE
		MIN	MAX	MIN	MAX	MIN	MAX	
South Sudan	6.7%	n/a	n/a	n/a	n/a	n/a	n/a	Link
Sudan	54%	0.015	0.015	0.023	0.023	0.023	0.023	Link
Tanzania	32.7%	0.043	0.126	0.084	0.126	0.065	0.068	Link Link
Togo	43%	0.113	0.216	0.155	0.216	0.128	0.173	Link Link
Tunisia	100%	0.023	0.147	0.038	0.139	0.058	0.124	Link Link Link Link
Uganda	23%	0.070	0.209	0.100	0.226	0.050	0.194	Link
Zambia	40%	0.028	0.114	0.063	0.109	0.016	0.045	Link
Zimbabwe	41.9%	0.023	0.138	0.039	0.127	0.039	0.127	Local industry source

All tariffs in USD equivalent at 1/1/2022

AFSIA
Africa Solar Industry Association

OUR MEMBERS

AFSIA

Africa Solar Industry Association

WEBSITE
AFSIASOLAR.COM

EMAIL
INFO@AFSIASOLAR.COM

ADRESS
WAKA TOWN – KN 72 STREET
KIGALI – RWANDA