

SOLARPLAZA

THE BIG 5

AFRICA'S FASTEST GROWING SOLAR ENERGY MARKETS



UNLOCKING SOLAR
CAPITAL **AFRICA** 4TH
EDITION

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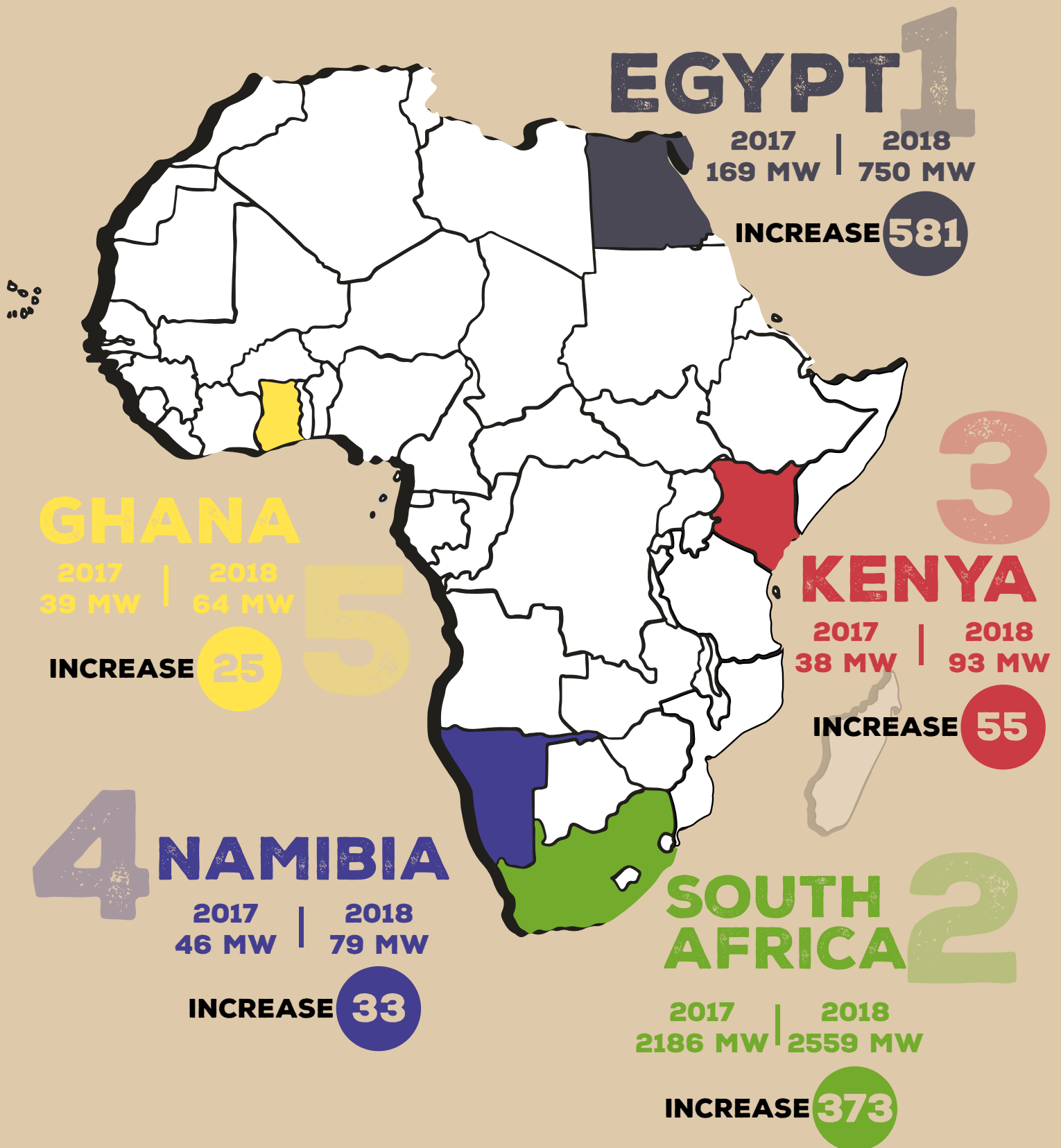
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THE BIG 5

AFRICA'S FASTEST GROWING SOLAR ENERGY MARKETS

CUMULATIVE INSTALLED SOLAR PV CAPACITY IN AFRICA (MW)



INTRODUCTION

Africa has shown great progress in the development of its solar energy markets over the last year. The continent has experienced a growth of over 1.8 GW of new solar installations, with 1.4 GW coming from photovoltaic (PV) installations, which was a significant jump from the 786 MW that was brought online in 2017. Of this new capacity, around 94% was attributed to new on-grid installations and 6% to off-grid systems. Therefore, Solarplaza has decided to analyze the 5 fastest growing solar PV markets in Africa ("The Big 5") based on the 2018 statistics provided by the International Renewable Energy Agency (IRENA).

According to IRENA, last year's growth was mainly driven by five specific countries: Egypt, South Africa, Kenya, Namibia and

Ghana. Together they contributed to 1,067 MW of newly installed PV capacity in 2018. It should be noted that Morocco was excluded from this report as the market consists mostly of concentrated solar power (CSP) capacity. The aim of this report is to provide a comprehensive overview of the key facts and figures related to these solar PV markets.

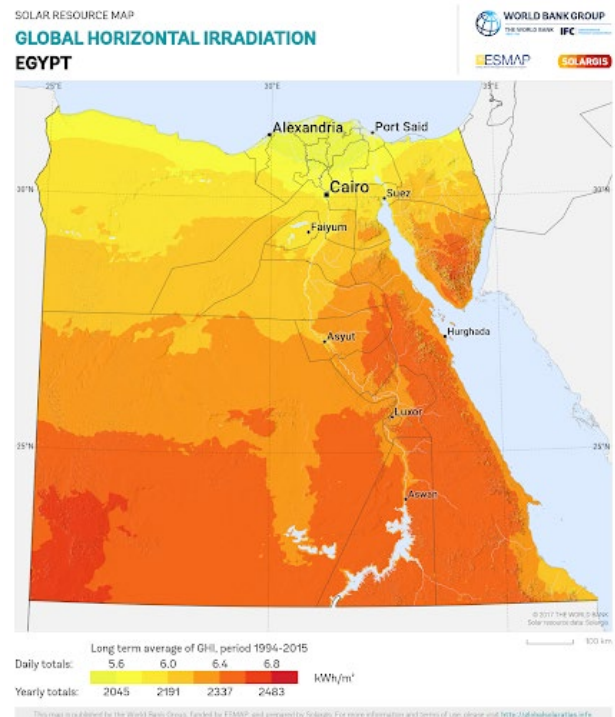


EGYPT



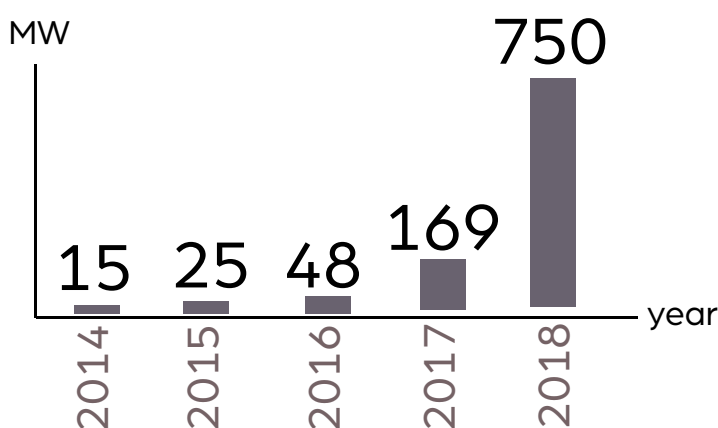
Egypt - one of the sunniest countries in Africa - has enjoyed a monumental year in terms of new PV installations, making it the fastest-growing solar energy market in Africa in 2018, ahead of South Africa, Kenya, Namibia and Ghana. The country's solar industry burst onto the scene last year by adding around 581 MW of new PV capacity, an almost fourfold increase compared to what it had installed in 2017, thereby overshadowing the 373 MW of PV capacity added by South Africa.

This was mainly due to the completion of the first installations in the world's largest solar complex, the gigantic 1.46 GW Benban solar facility, which has been one of the focal points of the country's solar energy market. This has not been an easy feat, as the project consists of 32 separate solar plants with numerous parties involved, all trying to get a piece of the pie. Nonetheless, through a thorough arbitration agreement, the Egyptian

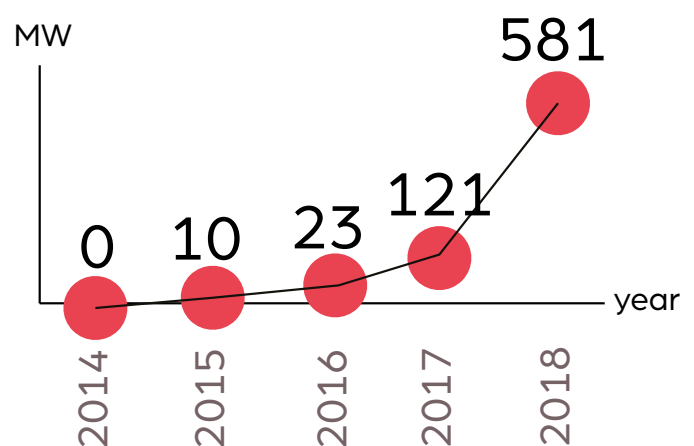


Electricity Transmission Company (EETC) has been able to keep all of the parties involved at bay and installations have been coming online at a rapid pace.

Total cumulative PV capacity

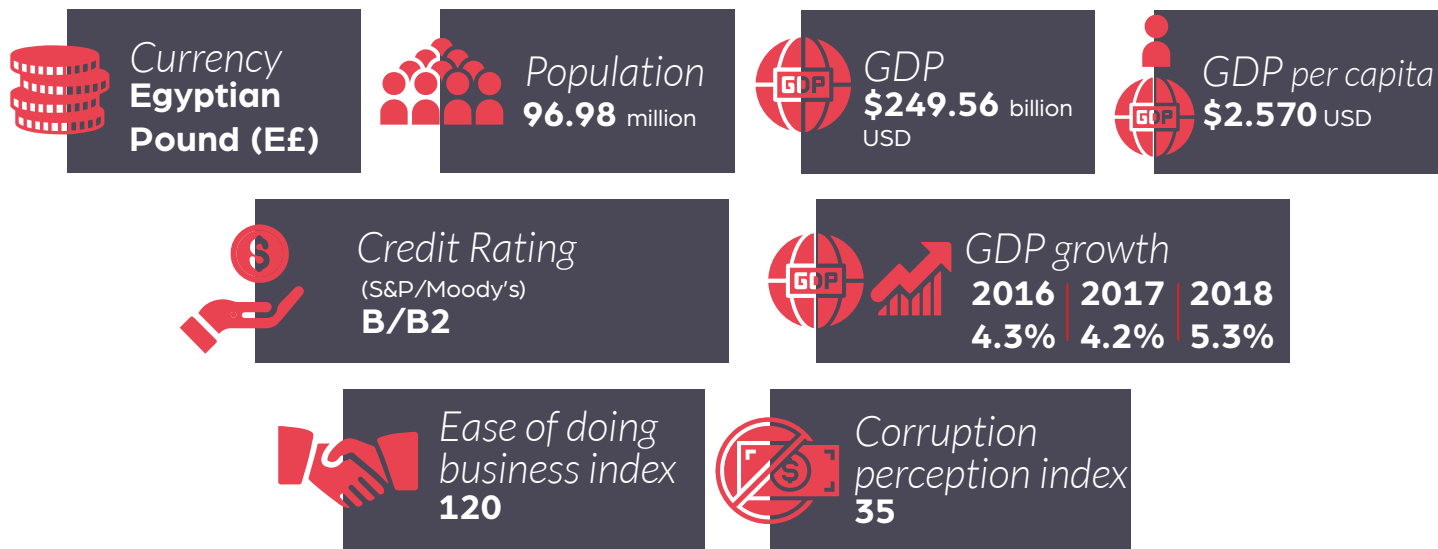


Annual PV capacity installed



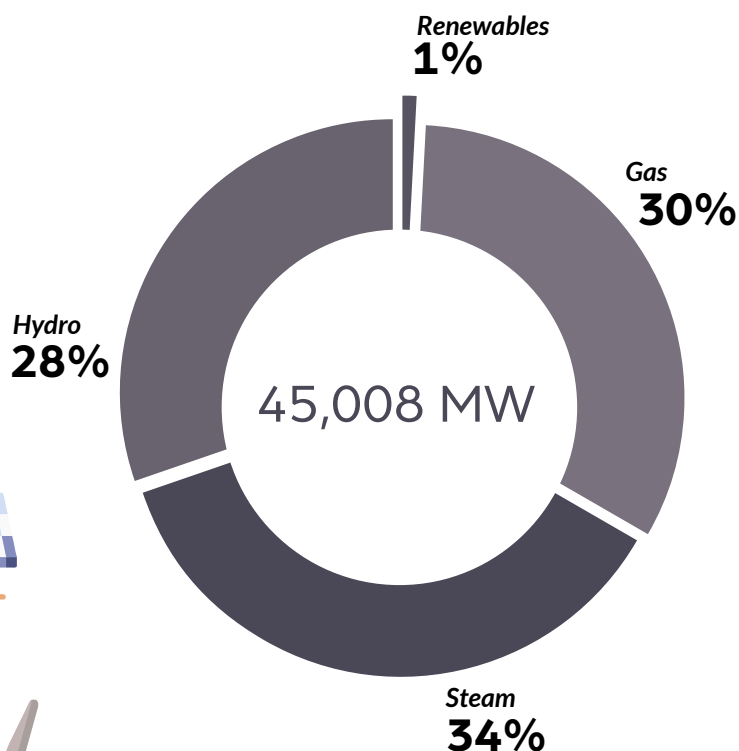
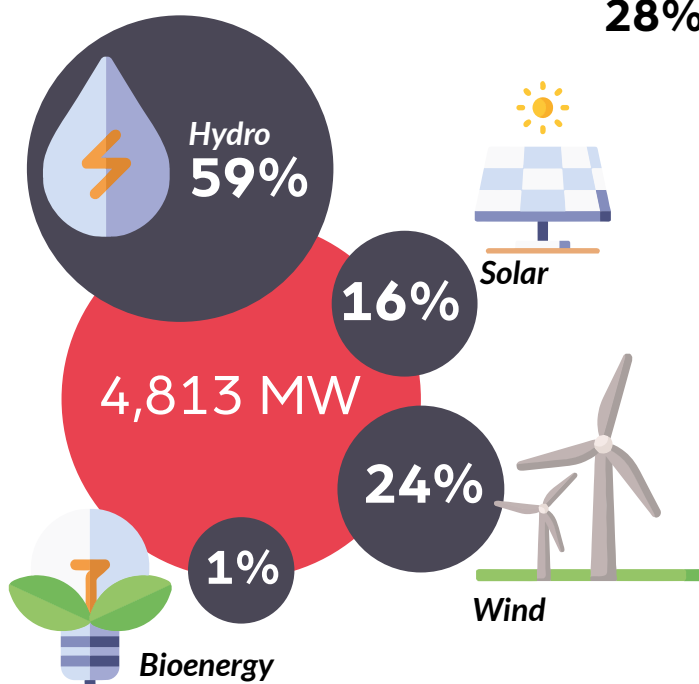
KEY FIGURES

Data: IMF



Renewable energy mix (2018)

Data: IRENA



Power generation mix (2018)

Data: Ministry of Electricity and Renewable Energy

TIMELINE OF SOLAR MILESTONES

SEPT
2014

Feed-in tariff (FiT) scheme for renewables is introduced + targets

RE target: 20% share of renewables in its energy mix by 2022

Solar PV target: 2 GW of solar PV capacity by 2022

FEB
2017

New net-metering scheme is put in place

DEC
2017

First solar tender is launched

Transition from FiTs to auctions

Tendered: 600 MW

Location: West Nile

JAN
2018

Annual installed PV capacity in 2017 breaks the 100 MW mark

MARCH
2018

First PV project part of the FiT scheme is inaugurated

Size: 64.1 MW

Location: Aswan Governorate

AUG
2018

Second solar tender is issued

Tendered: 200 MW (Kom Ombo solar project)

Location: Aswan Governorate

JAN
2019

First private PPA for utility-scale solar is signed

Size: 6 MW

Length: 25 years

Location: Suez Governorate

Offtaker: Arabian Cement Company

Seller: SolarizEgypt

DEC
2018

World's largest solar complex starts coming online

Capacity commissioned: 581MW

Location: Aswan Governorate

Total capacity: 1,465 MW

NOTEWORTHY PROJECTS

SIZE	NAME	PARTIES INVOLVED	LOCATION	STATUS	COD
1,465 MW	Benban	Multiple (32 plants)	Aswan Governorate	Partly commissioned	End-2019
600 MW	West Nile	EETC & IFC	West of Nile Area	Under development	Undisclosed
200 MW	Kom Ombo	EBRD, EETC & ACWA	Aswan Governorate	Under development	Undisclosed
6 MW	Undisclosed	SolarizEgypt, ACC, QNB AIAHli & EBRD	Suez Governorate	Still under construction	April 2019

OUTLOOK

During 2018, Egypt's solar energy market went through some major changes. The country shifted its framework for large-scale solar projects from FiTs - which it had put in place in 2014 - and transitioned to a tender mechanism. As a result, the country's government issued a total of 800 MW of PV capacity through two solar tenders, one for a 600 MW project in the West Nile region, and the other a 200 MW project located in the Aswan Governorate, both resulting in astonishing bids below \$0.03/kWh. On top of these successful auction results, the country signed its first-ever private power purchase agreement (PPA) for a 6 MW PV plant in the Suez Governorate. Remarkably, the PPA was signed for a duration of 25 years, which is a good sign for the market and indicates trust and security from both investors and developers.

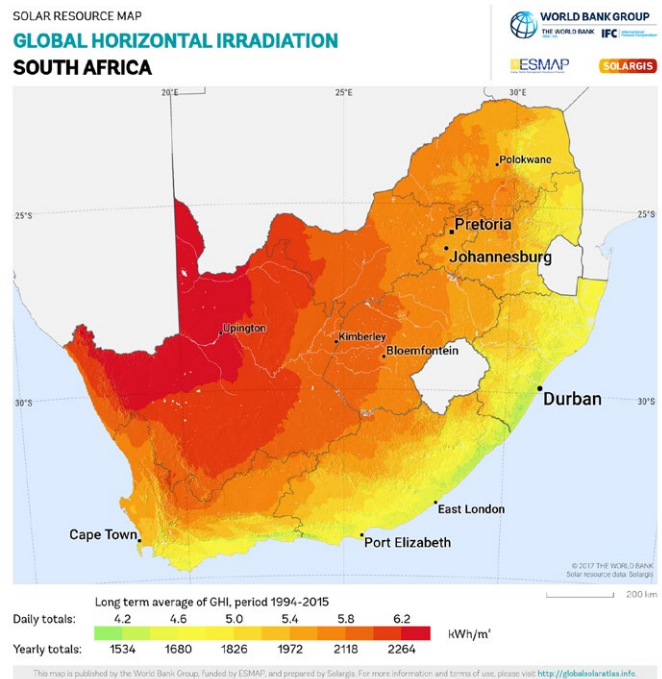
For 2019, things are looking very promising for Egypt's solar energy market. The Benban project is on track to becoming fully operational by the end of this year. Additionally, another solar auction might be in the works. And the country is well on its way to reaching its solar energy target of 2 GW by 2022. With a cumulative PV capacity of 750 MW at the end of 2018, Egypt closed the year as the second-largest solar energy market in Africa, and opened 2019 as a prime candidate and a worthy competitor to be able to dethrone South Africa and ascend to the top spot as the continent's solar market leader.

SOUTH AFRICA

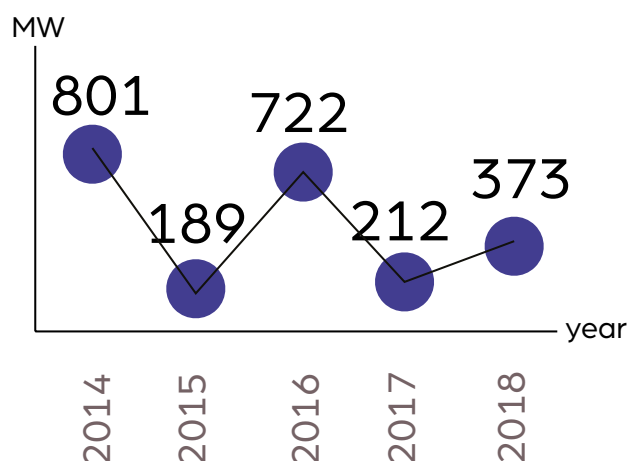


South Africa has long been hailed as Africa's largest solar energy market, and justifiably so. With an installed PV capacity of 2.5 GW, the country is by far the largest market in terms of operational solar systems. However, the market has experienced some stagnation over the past years, especially due to the postponement of its renewable energy auctions. Despite this, South Africa was able to add 373 MW of solar energy capacity to its power mix in 2018. Most of this growth came from the rooftop/residential segment, complemented by some commercial & industrial (C&I) and ground-mounted installations.

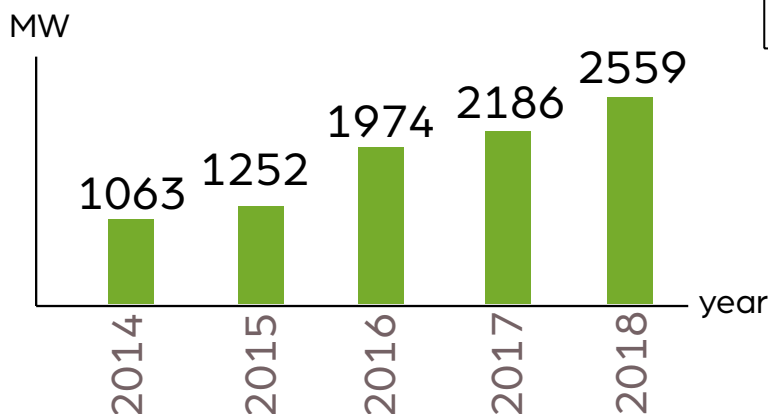
Last year, in April, the government signed the 27 outstanding renewable PPAs, bringing some much-needed hope to the market and further propelling the industry forward. Of these PPAs, 12 of them are related to solar PV projects - totaling 813 MW - and are expected to be added to the grid over the next five years.



Annual PV capacity installed

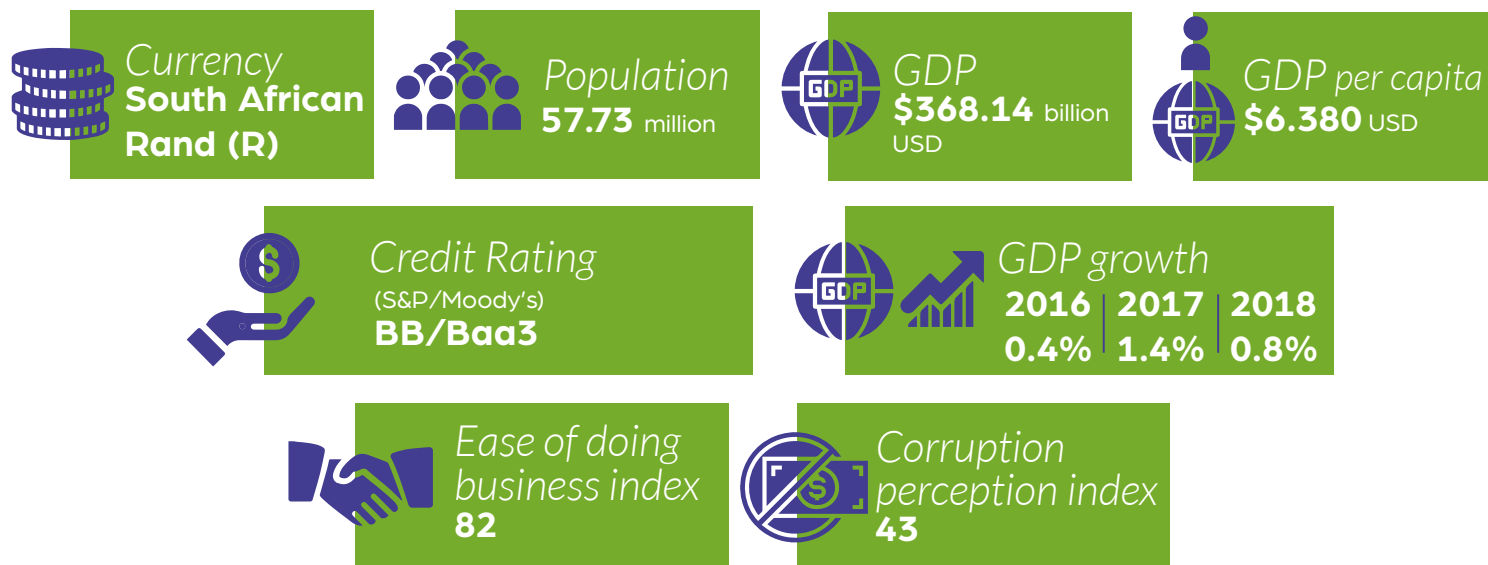


Total cumulative PV capacity



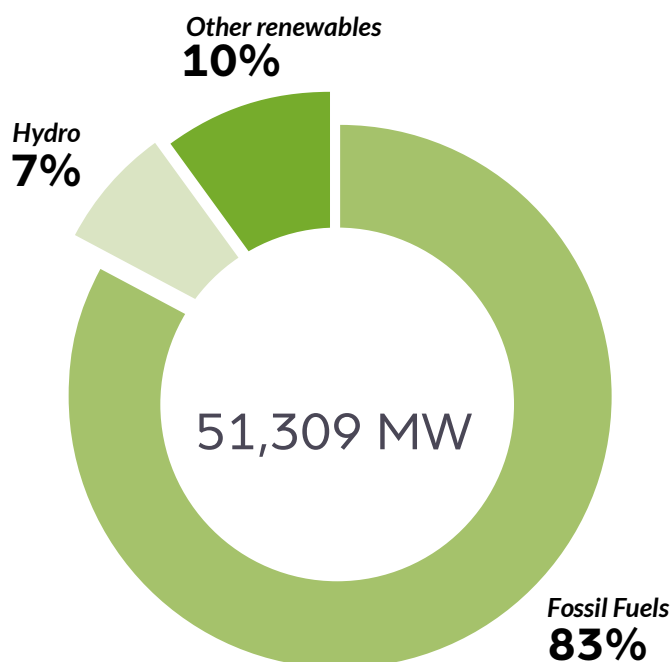
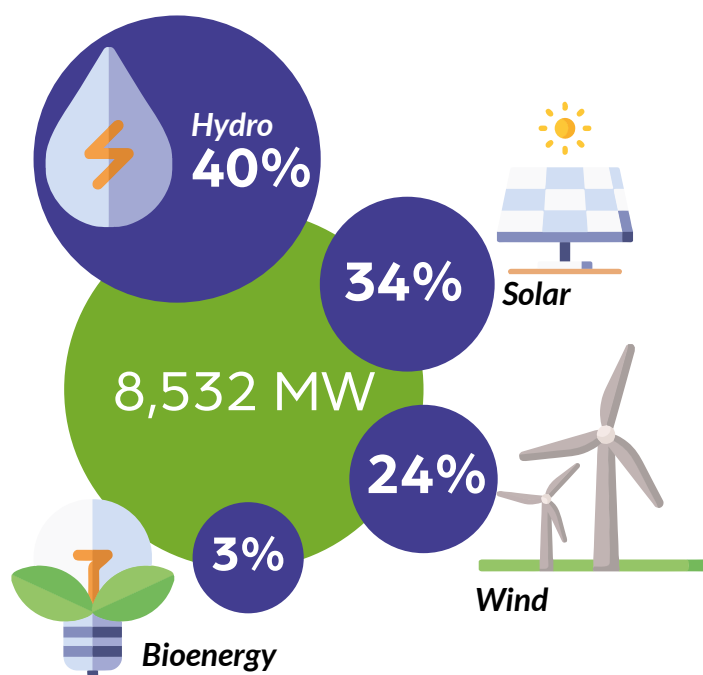
KEY FIGURES

Data: IMF



Renewable energy mix (2018)

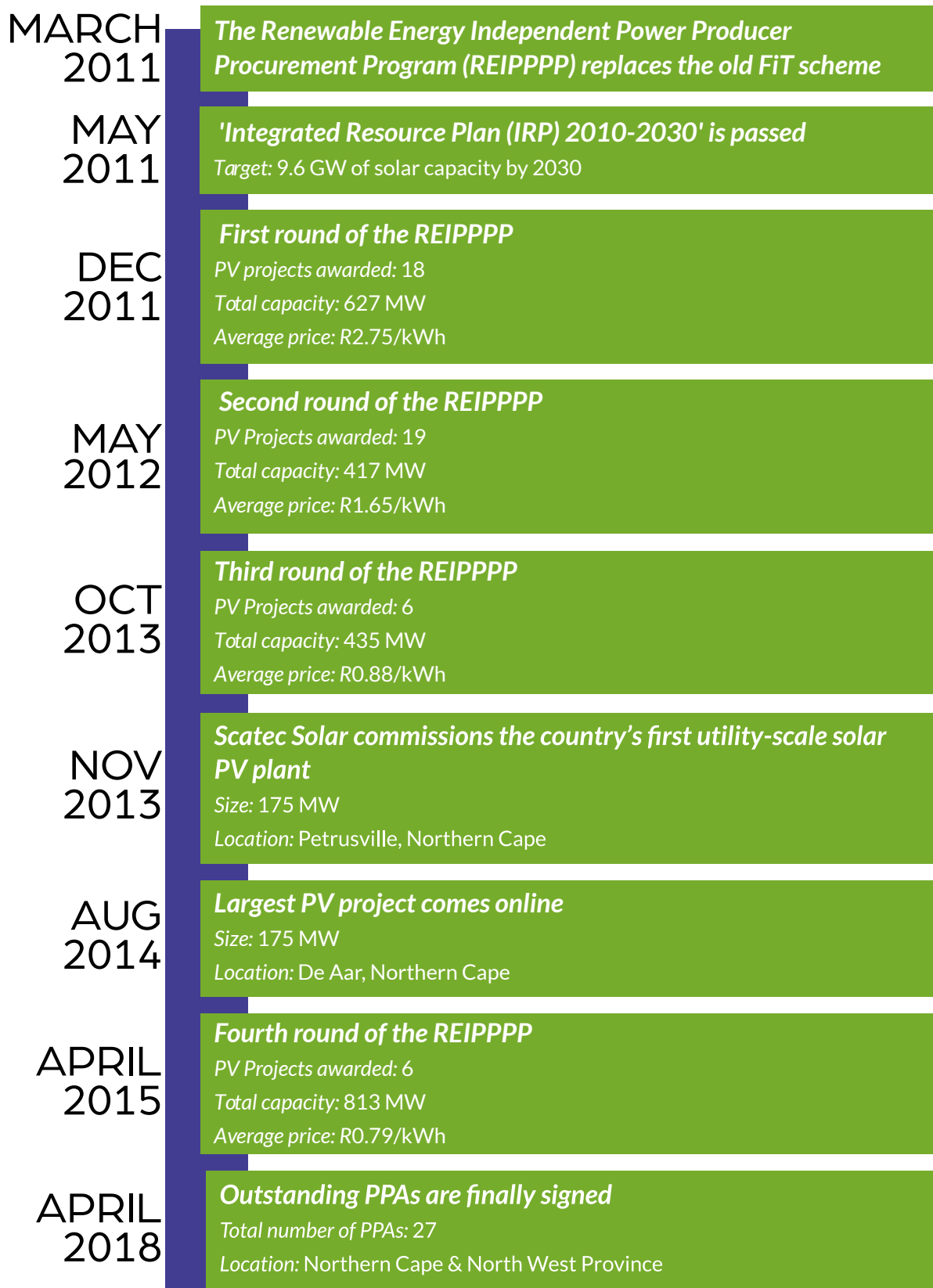
Data: IRENA



Power generation mix (2017)

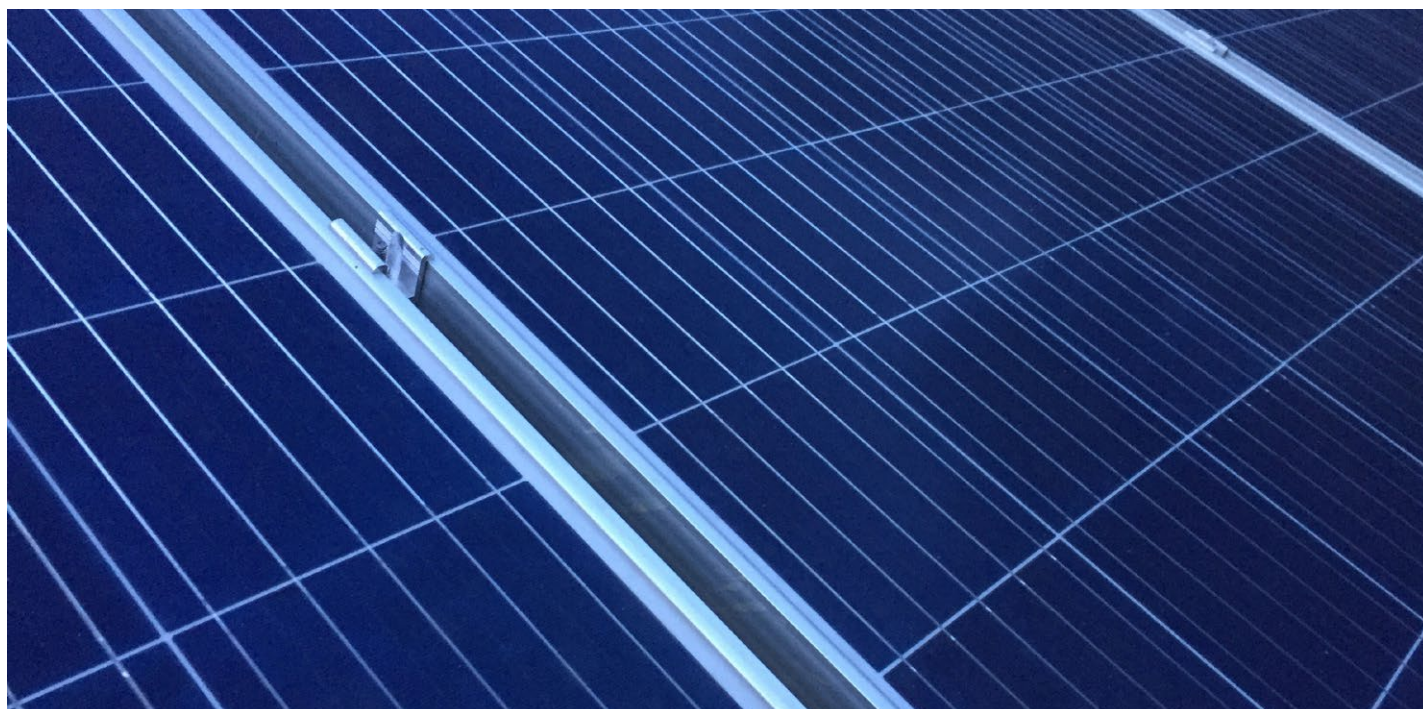
Data: Ministry of Energy + IRENA

TIMELINE OF SOLAR MILESTONES



NOTEWORTHY PROJECTS

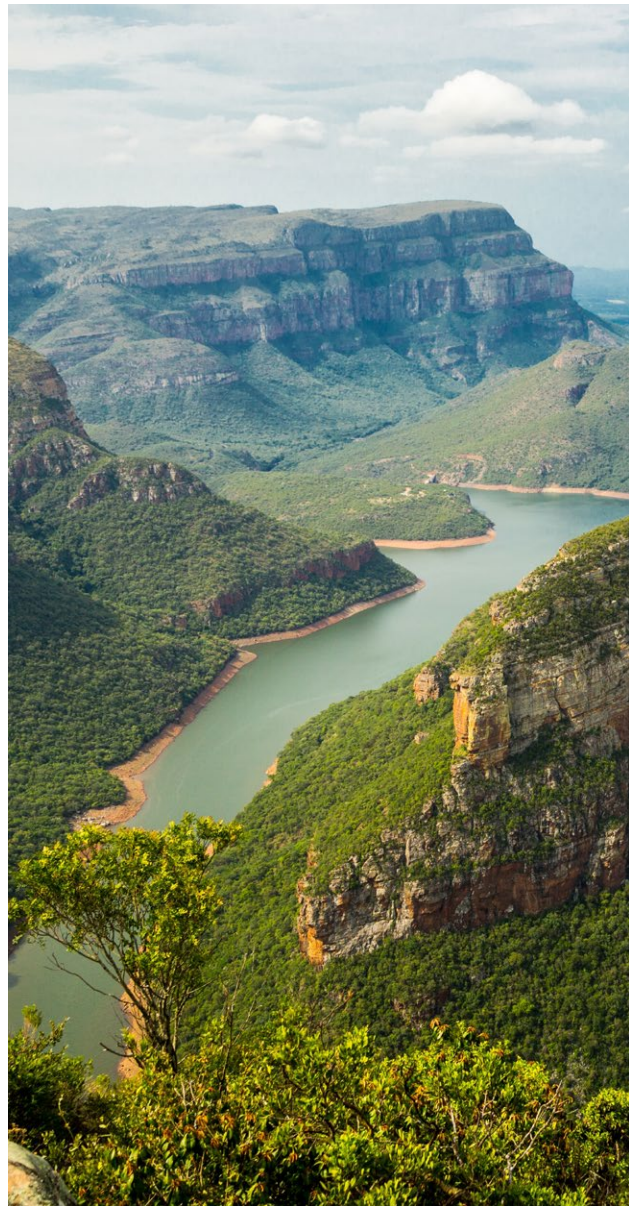
SIZE	NAME	PARTIES INVOLVED	LOCATION	STATUS	COD
175 MW	The Solca Capital De Aar	Solar Capital, Moncada, BEE	De Aar, Northern Cape	Commissioned	Aug. 2014
86 MW	Mulio Sonnedix Prieska	Sonnexix, juwi SA & Eskom	Northern Cape	Commissioned	Oct. 2016
82.5 MW	Adams	EGP RSA & Eskom	Northern Cape	Commissioned	Feb. 2017
75 MW	Kalkbult	Scatec Solar & Eskom	Petrusville, Northern Cape	Commissioned	Nov. 2013
86 MW	Waterloo Solar Park	Juwi & AIIIM	Vryburg, North West Province	Under construction	<i>Undisclosed</i>



OUTLOOK

The South African solar energy market has experienced moderate growth in 2018, in terms of new PV installations, but many challenges still remain on the road ahead. One of those challenges involves the main market driver, the REIPPPP auctions, which were supposed to take place in November 2018 for the fifth time, but has been postponed until further notice. It is still unclear when that round will take place, as the country's main utility, Eskom, is currently going through a financial crisis.

Besides these troubles, South Africa has set strong targets for the coming years part of the country's IRP. By 2030, the country aims to have 7,958 MW of solar PV capacity, making up 10% of the country's installed power generation mix. For this year, some estimates indicate that the country could add as much as 700 MW to its grid. However, the speed at which this can be accomplished will depend on how fast Eskom can bounce back to its feet. For now, it is inevitable that renewable energy sources, especially solar PV, form a core part of South Africa's current and future energy mix.

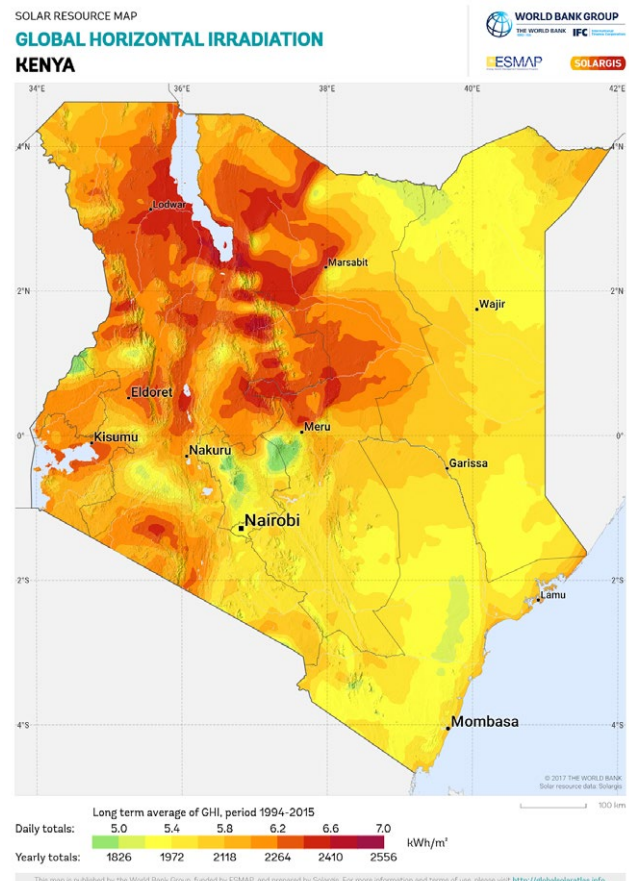


KENYA

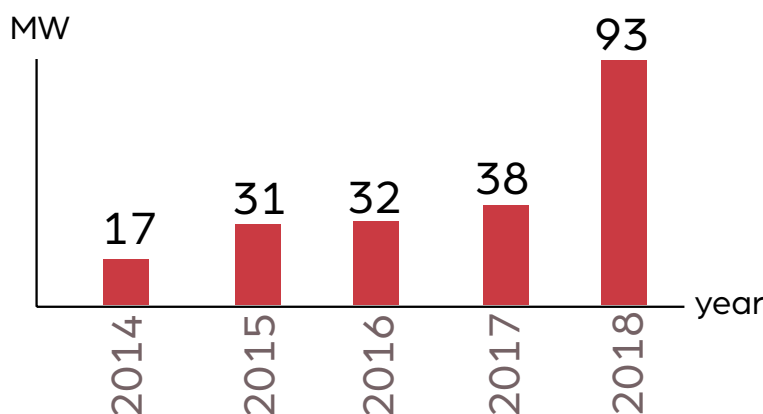


Kenya, one of the strongest and most advanced economies in Central and East Africa, has set out ambitious goals to meet its growing energy demand by investing heavily in renewable energy sources. The country currently has an energy mix consisting of around 65% of renewables, making it one of the renewable energy leaders in Africa.

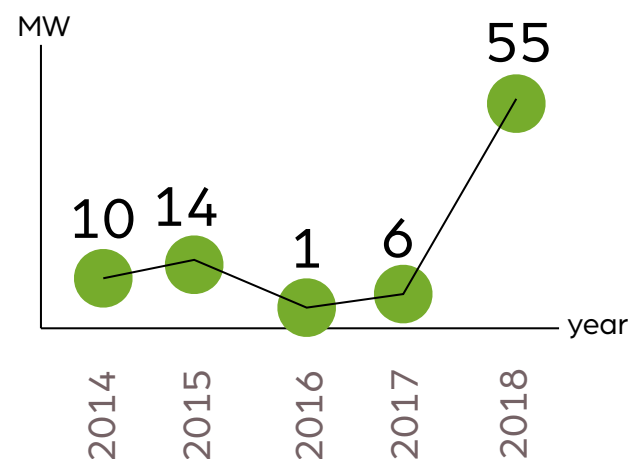
In 2018, Kenya added 55 MW of PV capacity, a new record for the country. This was due to the commissioning of the country's first utility-scale PV plant, the 55 MW Garissa solar park located in Barki Village. The project was commissioned in November and is the largest solar plant of its kind in the region. The commissioning of the plant has helped to diversify Kenya's energy mix, which has traditionally been comprised of mostly hydro and geothermal energy sources. Kenya is also striving to install a further 500 MW and 300,000 domestic solar systems by 2030.



Total cumulative PV capacity

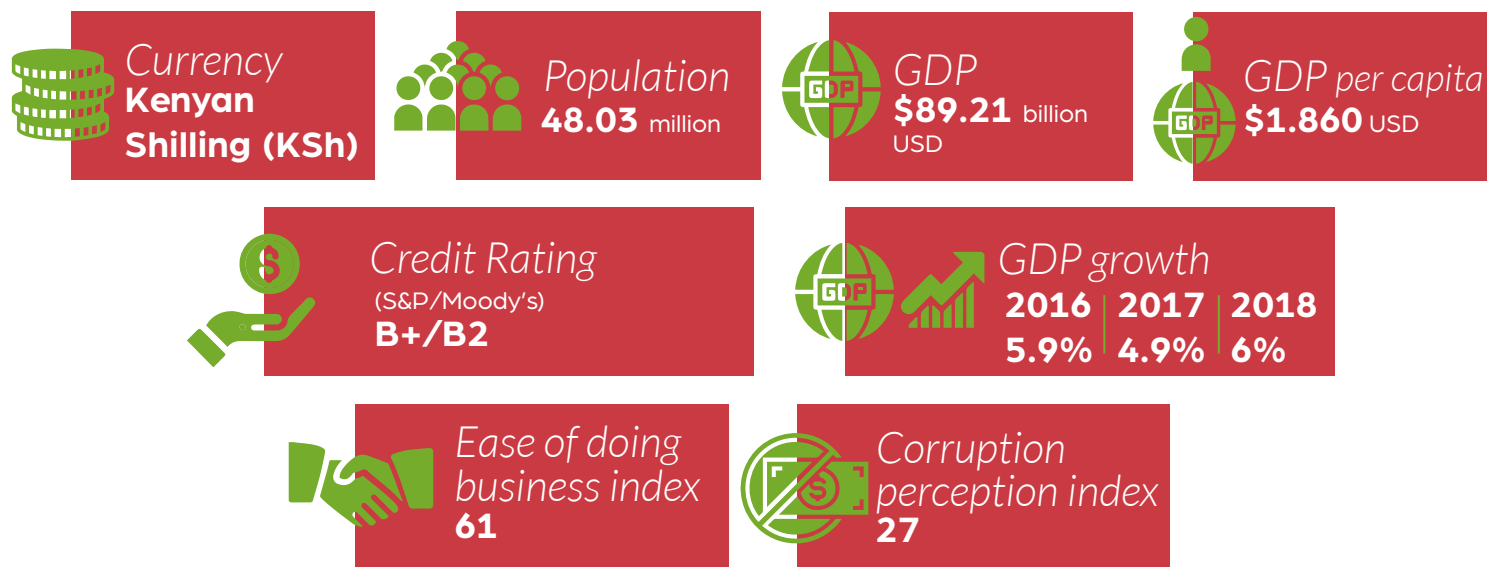


Annual PV capacity installed



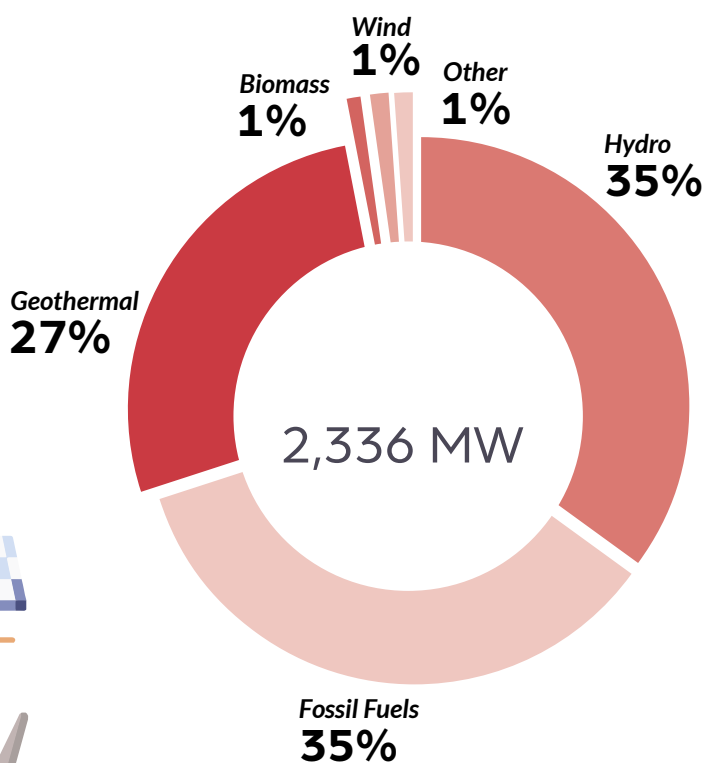
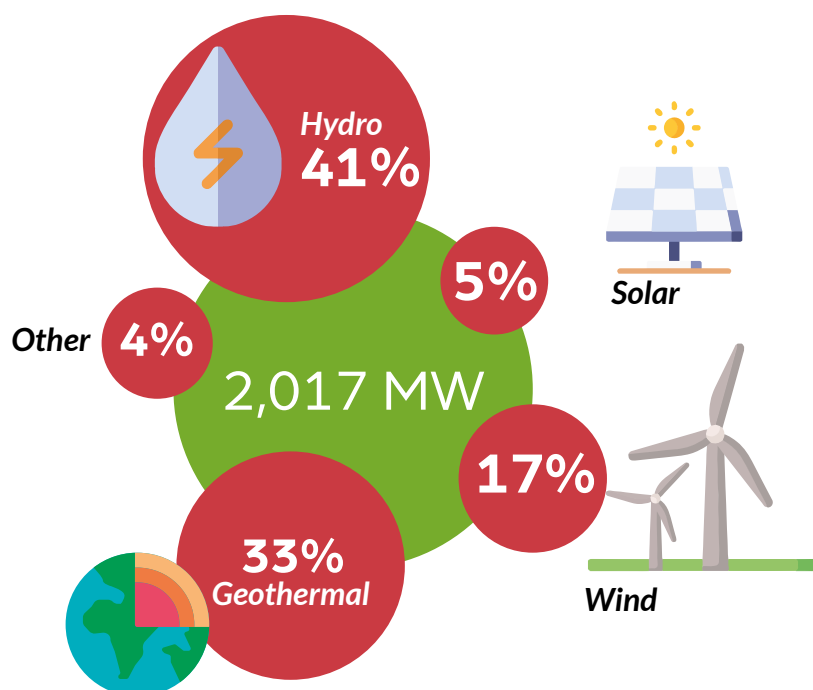
KEY FIGURES

Data: IMF



Renewable energy mix (2018)

Data: IRENA



Power generation mix (2017)

Data: KPLC + IRENA

TIMELINE OF SOLAR MILESTONES

2008

FiTs are put in place

Enables IPPs to sell electricity to KPLC

Fixed-priced for a fixed term of 20 years

Standardized PPA framework for systems up to 10 MW

APRIL
2014

First grid-connected solar project is inaugurated

Size: 600 kW

Location: Strathmore University, Nairobi

MAY
2014

Solar projects receive both VAT and import tax exemptions

END
2015

Kenya reaches 31 MW of installed PV capacity

Newly installed capacity: 14 MW (a record at that time)

Type of systems installed: Rooftop and off-grid

MARCH
2017

SolarAfrica commissions East Africa's largest solar hybrid C&I project

Size: 991 kW

Location: Malindi

Offtaker: Krystalline Salt

NOV
2018

Largest solar PV plant in East and Central Africa is commissioned

First utility-scale solar plant in Kenya

Size: 55 MW

Location: Barki Village

MARCH
2019

Energy Bill 2017 is enacted

Provides a net-metering scheme for households

Possibility for community solar projects

NOTEWORTHY PROJECTS

SIZE	NAME	PARTIES INVOLVED	LOCATION	STATUS	COD
55 MW	Garissa	KenGen + Chinese government	Barki Village	Commissioned	Nov. 2018
52 MW	Malindi	AEDC + Globeleq + KPLC	Mombasa	Under construction	Mid-2020
50 MW	Kopere	Voltalia + KPLC	Nandi County	Under construction	End-2020
40 MW	Kesses	Alten Africa + Voltalia + KPLC	Eldoret	Under construction	March 2020



OUTLOOK

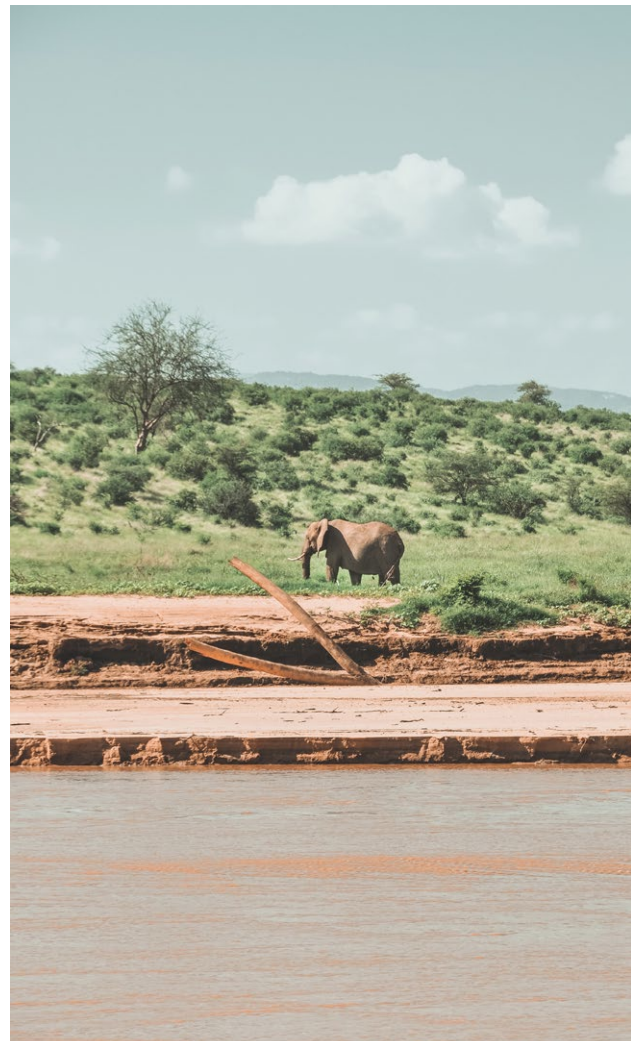
Kenya entered this year with an installed PV capacity of 93 MW, and plans to add much more in the coming years. According to Bloomberg New Energy Finance, the country currently has a solar pipeline of around 15 utility-scale solar projects. These efforts are part of the country's goal of reaching universal electrification of its inhabitants by 2022. So far, the country has been able to increase its electricity access rate from 32% in 2013, to an astounding 73.4% at the end of April 2018, making it one of the highest rates in Africa.

Besides these ongoing solar energy projects, the country is going through some significant regulatory changes. Kenya is in the midst of transitioning from a FiT scheme, introduced in 2008 for renewable energy projects, to an auction system aimed at generating the lowest tariffs possible. If this is the case, then the country's solar energy sector could be in for a massive push led by large-scale solar projects.

Another change in legislation has been the enactment of the new energy bill, which has put a net-metering scheme in place, allowing for households with solar home systems (SHS) to be able to sell surplus power generated to KLPC, the country's main utility and energy offtaker. Kenya is definitely leading the solar revolution in East Africa, but even so, experts estimate that 95% of the SHS market is yet to be unlocked. This presents a major opportunity for the country as most of its grid-connected inhabitants

have to deal with frequent blackouts and relatively high electricity costs, whereas solar has the potential to provide stable and reliable access to power.

Regardless, Kenya is well on its way to installing massive amounts of solar in the coming years. Since the country is home to the region's largest solar power plant, and has a pipeline of around 526 MW of large-scale PV projects fueled by its ambitious electrification targets, it will be interesting to see how Kenya's solar PV sector will develop in the coming years.

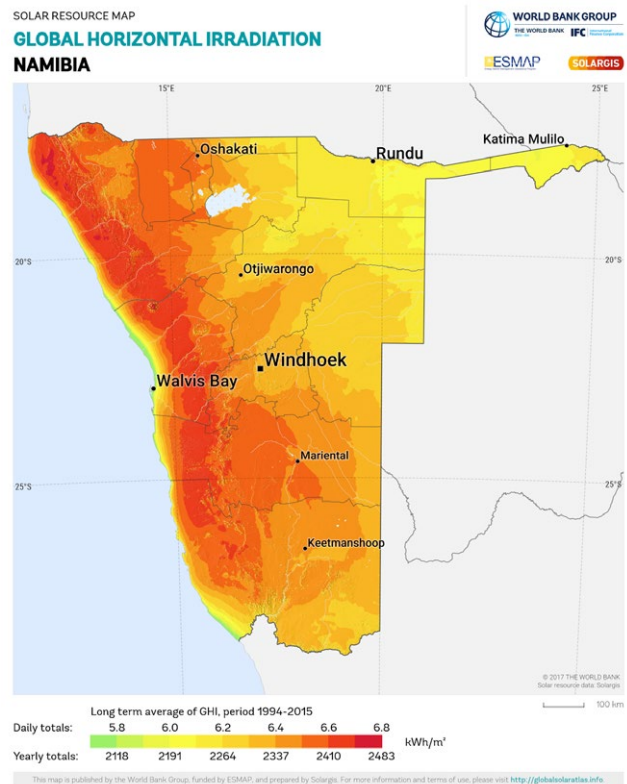


NAMIBIA



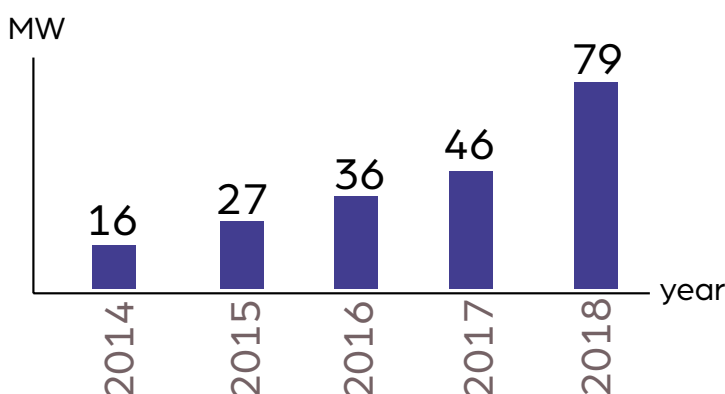
Namibia, the driest country in Sub-Saharan Africa, experiences more than 300 sunny days per year and has a relatively stable government. The country has always shown significant potential for solar energy development, but has only recently been able to truly step up to the plate. Last year, Namibia's solar energy market was able to almost double its installed PV capacity, from 46 MW in 2017 to 79 MW in 2018. These new installations were mainly attributed to the wave of utility-scale solar projects that have been connected to the country's grid, instead of the usual residential and C&I installations. The market even welcomed the first solar-plus-storage facility, a 150 kW project located in Barki Village, mid-August last year.

This year, Namibia was able to stay on the same trajectory and brought online its largest solar project to date, the 45.5 MW Hardap solar PV plant, which is equivalent to around 10 percent of the country's power mix. Since Namibia has

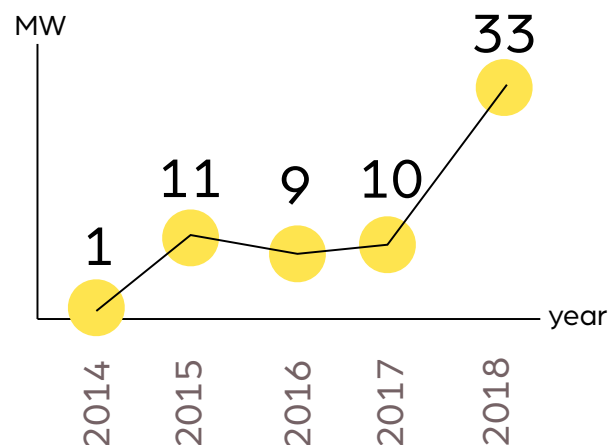


to import 70% of its energy, the addition of such a large project to the electricity grid represents a major milestone for renewable energy generation in Namibia.

Total cumulative PV capacity



Annual PV capacity installed



KEY FIGURES

Data: IMF



Currency
**Namibian
Dollar (N\$)**



Population
2.41 million



GDP
\$13.82 billion
USD



GDP per capita
\$5.730 USD



Credit Rating
(S&P/Moody's)
BB+/Ba1



GDP growth
2016 2017 2018
0.6% -0.9% -0.1%



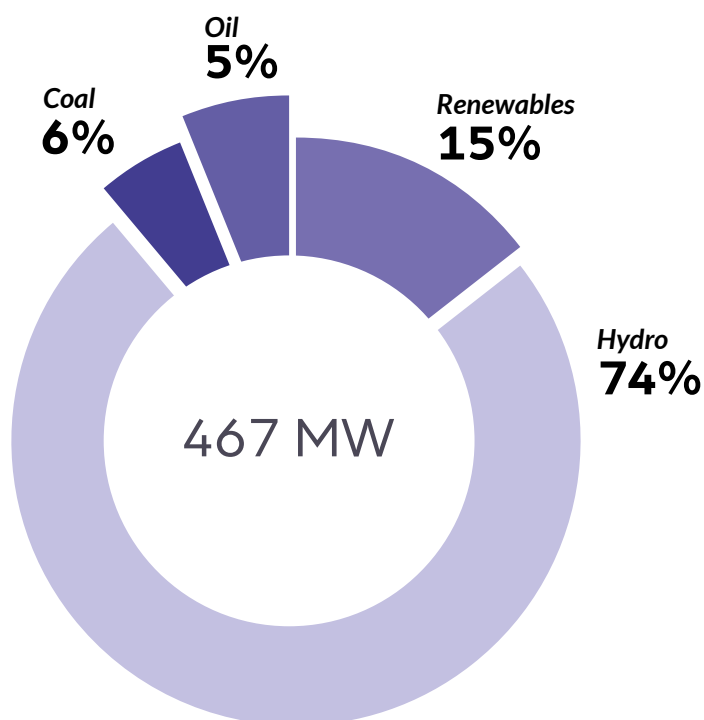
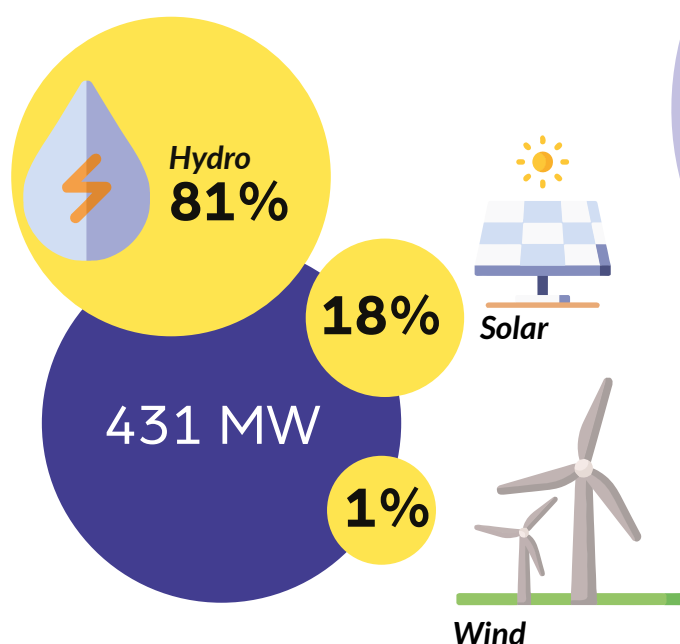
Ease of doing
business index
107



Corruption
perception index
53

Renewable energy mix (2018)

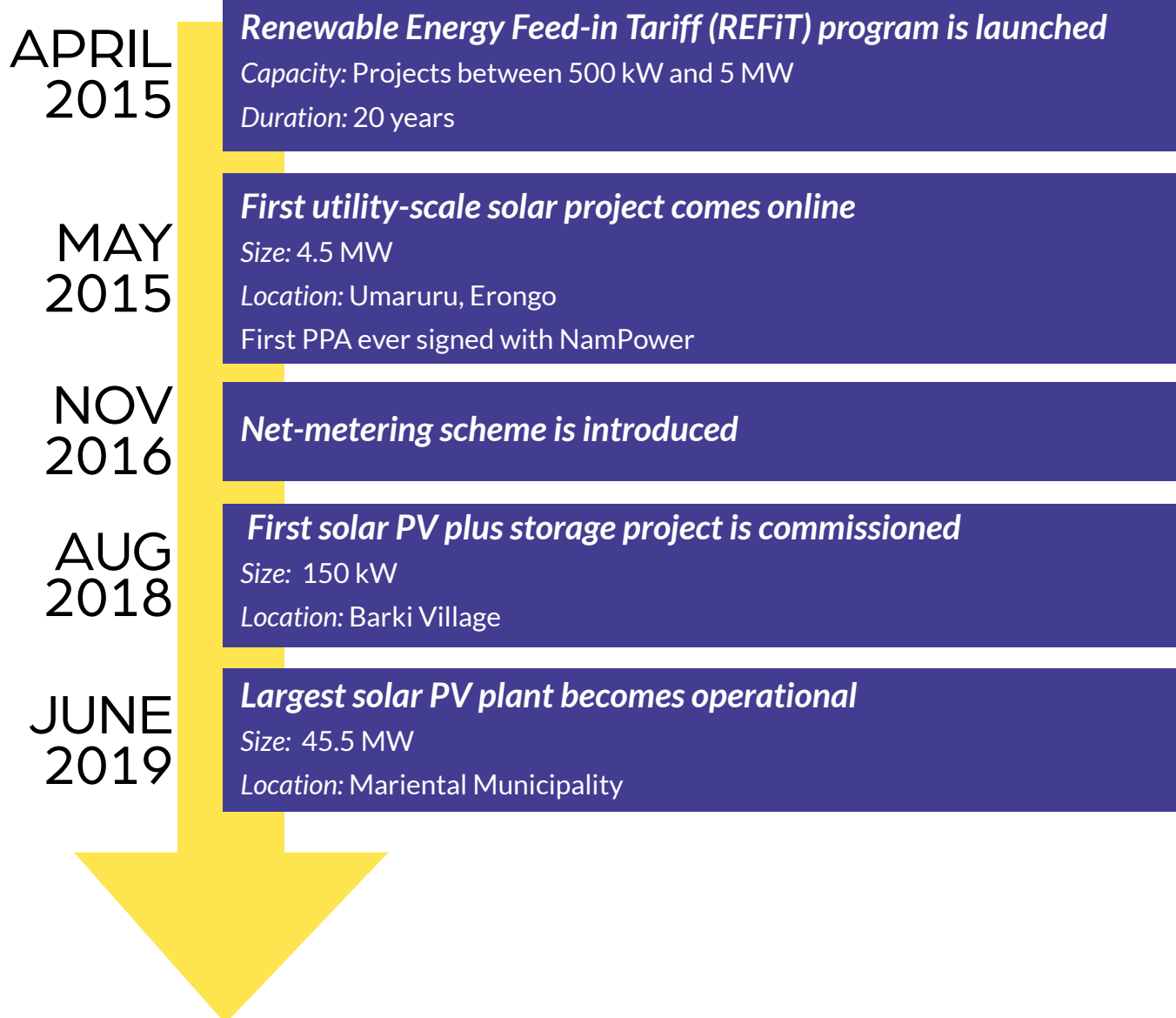
Data: IRENA



Power generation mix (2018)

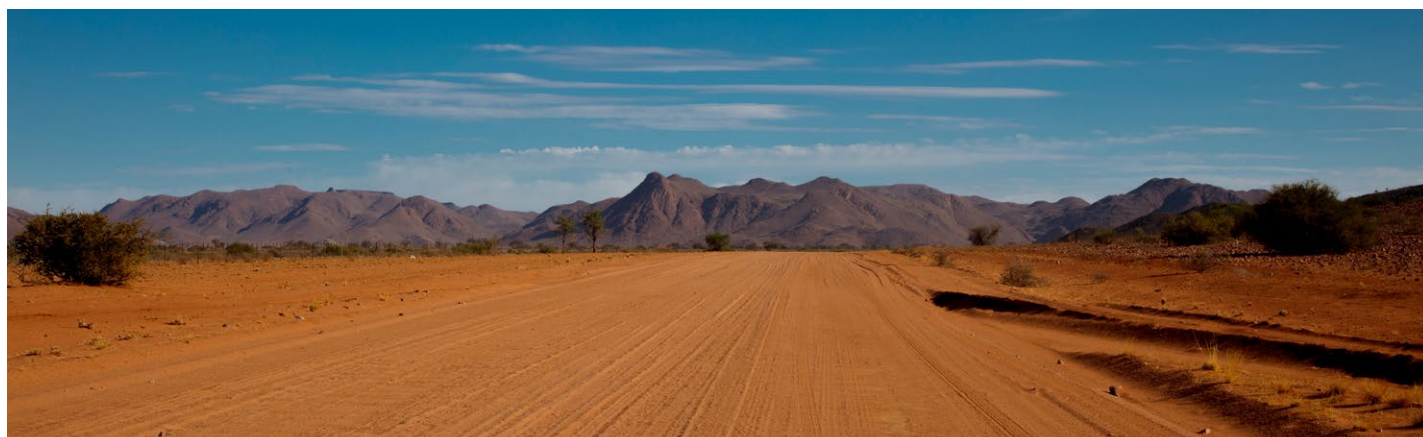
Data: Ministry of Mines and Energy

TIMELINE OF SOLAR MILESTONES



NOTEWORTHY PROJECTS

SIZE	NAME	PARTIES INVOLVED	LOCATION	STATUS	COD
45.5 MW	Hardap	Alten Energias Renovables, NamPower, Mangrove, Talyeni & First Place Investment	Mariental municipality	Commissioned	Commissioned
4.5 MW	Omburu	Innosun Energy, NamPower	Erongo	Commissioned	Commissioned
150 kW	Chobe Water Villas	Cronimet, OLC Solar Energy & Qinous	Zambezi region	Commissioned	Commissioned
80 MW	Groot	Groot glass & Suntrace	Tses	Under development	Under development
50 MW	N/A	TeraSun Energy	Arandis	Under development	Under development



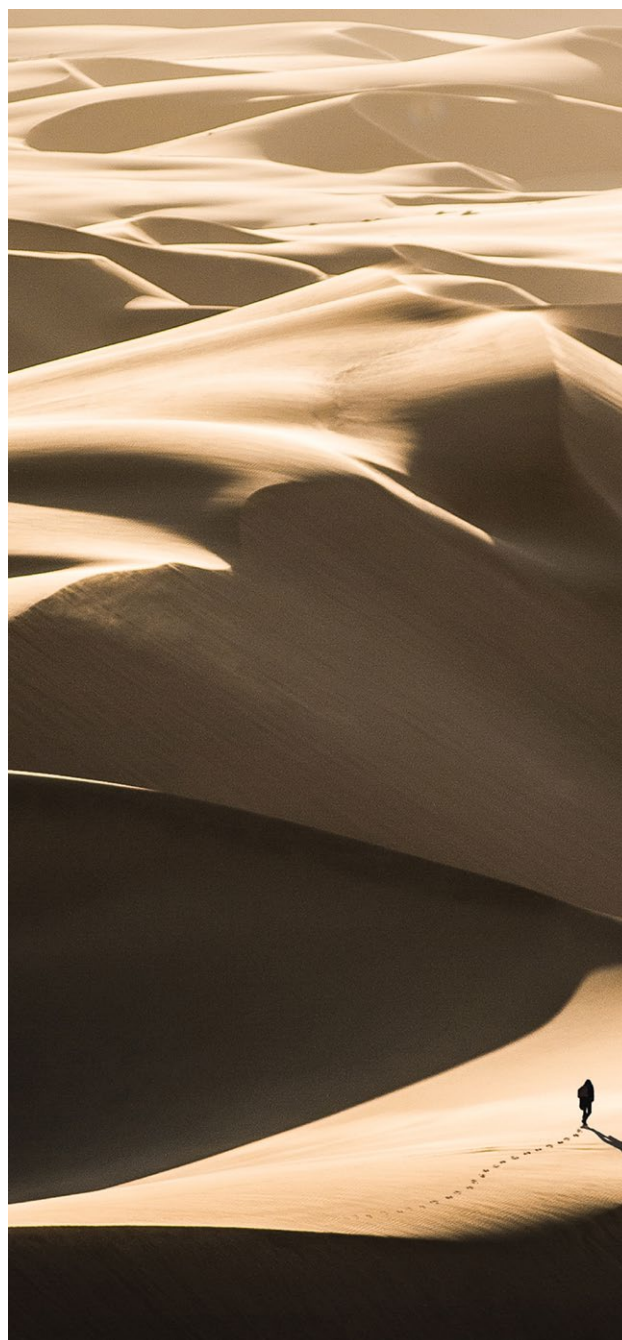
OUTLOOK

Namibia's solar energy market had a stellar year in terms of new PV installations in 2018. The market experienced an impressive growth of 74%, one of the highest in the continent. One of the main drivers for this growth has been Namibia's increasing need for local energy generation.

Last year, the country imported around three-quarters of its energy needs - the highest figure since the country got its independence in 1990. As a result, the government implemented plans to have at least 80% of the nation's electricity consumption locally produced by 2022. Namibia's state-owned electric utility NamPower wants to reach that goal by adding 220 MW to the country's power generation capacity over the next five years, consisting of 40 MW of solar (20 MW for IPPs), 90 MW of wind, 40 MW of biomass and 50 MW of other energy sources.

The utility wants to take up to a 51% stake in the power plants and turn over 49 percent to interested investors, including contractors and financial institutions. This growth has sparked immense interest in the market, from both local and foreign financiers. On top of that, the government has announced plans to allow IPPs to sell their electricity directly to large energy consumers, such as mining companies, which is a major step for an African country. These types of bilateral agreements are what drive solar energy markets and facilitate the development and generation of renewable electricity.

Only time will tell how much solar PV capacity will be added to the country's grid in the coming years, as public news outlets have reported that the country has a pipeline of more than 120 MW of large-scale solar projects set to come online by the end of 2021.

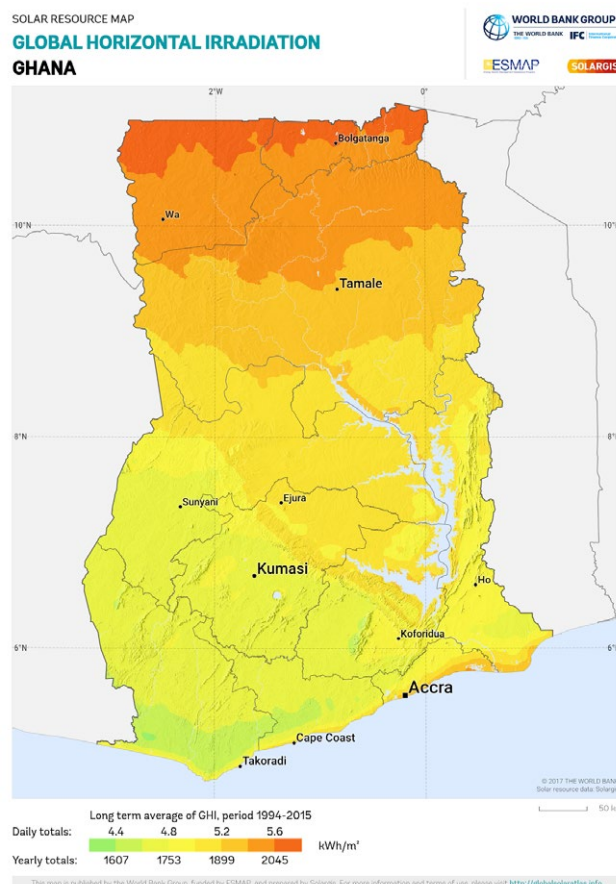


GHANA

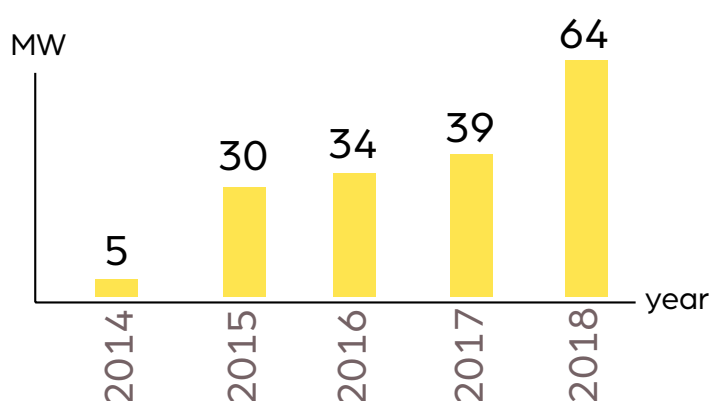


Ghana, the only country in West-Africa highlighted in this report, has put an impressive amount of focus on solar energy development over the last couple of years. The country added 25 MW of new PV installations in 2018 to come to a total of 64 MW of cumulative installed solar energy capacity, which is an annual growth of 76%. Most of this capacity - around 42 MW - can be attributed to its utility-scale segment, while 7 MW is contributed by the C&I segment and around 15 MW by solar home systems/off-grid projects.

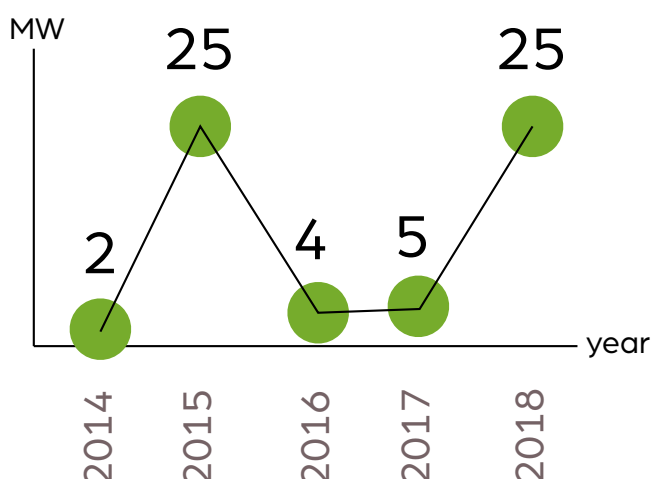
Ghana has progressively pushed solar PV, driven largely by foreign players making deals with local companies looking to develop the country's renewable energy footprint. One of the most significant developments during last year was the commissioning of the 20 MW utility-scale solar plant in September located in Gomoa Onyaadze by Meinergy Ghana. Other developments in Ghana's solar energy market include the 400 kW C&I PV project by Kasapreko, which came online in February of this year.



Total cumulative PV capacity



Annual PV capacity installed



KEY FIGURES

Data: IMF



Currency
**Ghanaian
Cedi (GH¢)**



Population
29.56 million



GDP
\$65.19 billion
USD



GDP per capita
\$2.210 USD



Credit Rating
(S&P/Moody's)
B/B3



GDP growth
2016 | **2017** | **2018**
3.4% | **8.1%** | **5.6%**



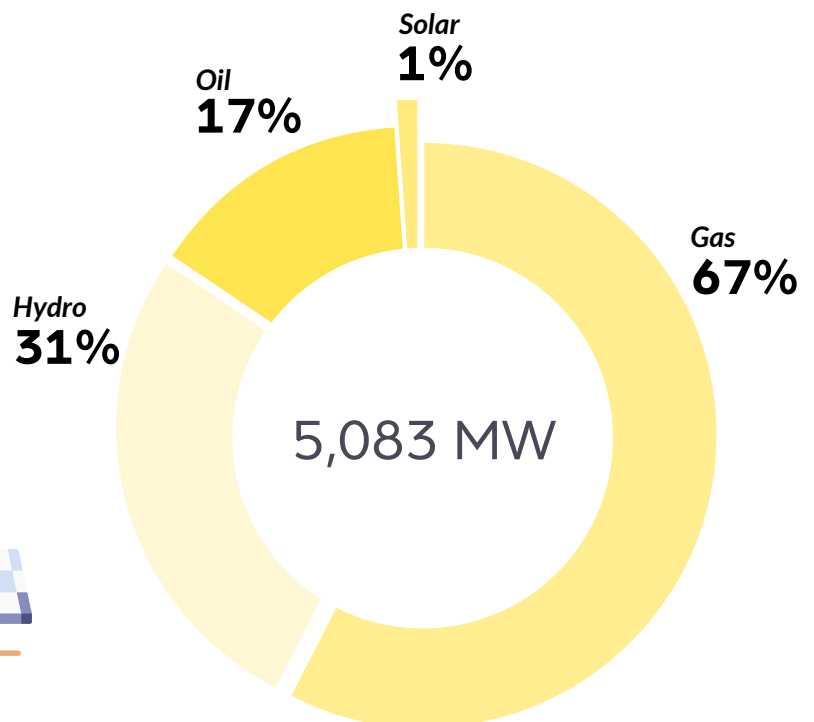
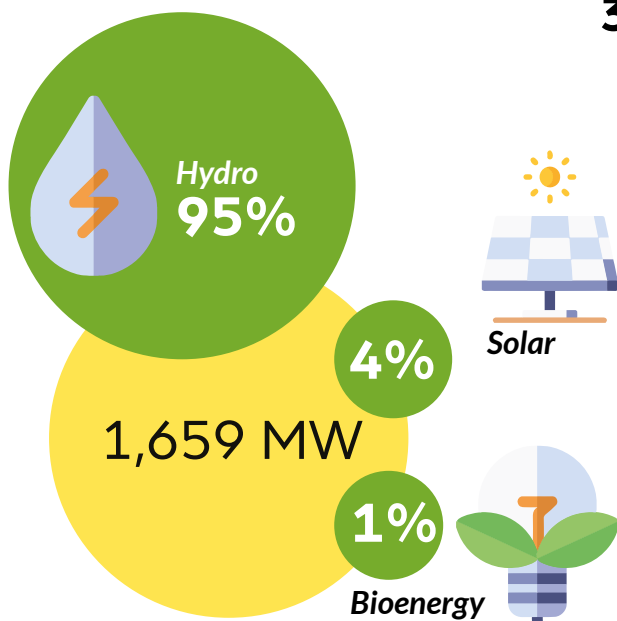
Ease of doing
business index
114



Corruption
perception index
41

Renewable energy mix (2018)

Data: IRENA



Power generation mix (2018)

Data: Energy Commission Ghana

TIMELINE OF SOLAR MILESTONES

DEC
2011

Ghana's Renewable Energy Act is enacted

Aimed at fast-tracking the development of RE sources
Increase the contribution of RE in the economy to 10% by 2020
Establishes a legal basis for feed-in tariff scheme and net-metering program

SEPT
2013

Feed-in tariffs for solar are put in place

APRIL
2016

First PV module manufacturing plant opens

Production capacity: 30 MW/year
Location: Kpone
Developer: Strategic Power Solutions (SPS)

APRIL
2016

Largest solar project comes online

Size: 20 MW
Location: Winneba

NOV
2018

Second largest solar project is inaugurated

Size: 20 MW
Location: Gomoa Onyaadze

FEB
2019

First PPA-financed solar plant is commissioned

Size: 400 kW
Location: Spintex Road
First PPA ever signed for a commercial customer

NOTEWORTHY PROJECTS

SIZE	PROJECT TYPE	PARTIES INVOLVED	LOCATION	STATUS	COD
20 MW	Utility-scale	BXC & ECG	Winneba	Commissioned	April 2016
20 MW	Utility-scale	Meinergy Ghana	Gomoa Onyaadze	Commissioned	Sept. 2018
2 MW	Utility-scale	VRA & KfW	Navrongo	Commissioned	2013
400 kW	C&I	Kasapreko, CBE Ghana, Yingli Namene	Accra	Commissioned	Feb. 2019
565 kW	C&I	Cargill	Tema	Commissioned	Nov. 2017
12 MW	C&I	Helius Power Company	Tema	Under development	Undisclosed

OUTLOOK

The solar energy market in Ghana has gone through some ups and downs over the past 5 years. A few promising large-scale solar projects were announced in the past but have never come to fruition. However, after the boom it experienced in 2018, the country has gained the traction it needs to maintain its position as one of the fastest-growing solar PV markets in Africa.

Last year, Ghana's government announced plans to install 200 MW of rooftop solar energy capacity throughout the country. The program, also known

as the "Government Goes Solar" campaign, is aimed at ensuring that governmental institutions transition towards renewables in order to reduce expenditure on utilities. Since the government has plans to have a 10% share of renewables in its electricity production by 2020, it understood that it will have to focus on not only growing its utility-scale segment, but also on developing new C&I and rooftop projects if it wants to reach its clean energy goals by next year.

CLOSING REMARKS

All in all, 'the Big 5' have positioned themselves as the continent's fastest growing solar energy markets, and are likely to keep their position for the coming years.

(1) Egypt is set to keep its top position, as the country is getting ready to fully commission the largest solar PV complex in the world, with many more projects in the pipeline.

(2) South Africa might face some tough challenges in order to keep its spot, due to the financial situation of its main utility. Despite that, the government is pushing for more solar and has signed all of its outstanding solar PPAs, which could mean big business for the South African PV market.

(3) Kenya might experience less activity in 2019 than in previous years, but has the potential to more than double its cumulative installed PV capacity by the end of 2020.

(4) Namibia also has ambitious plans of doubling its solar energy generation capacity, but this might have to wait until 2021. Nevertheless, the Namibian government wants to speed that up by allowing large energy producers to sell their energy directly to offtakers through private PPAs, making the development of solar energy projects more attractive for both developers and investors.

(5) Ghana will have to invest significant efforts to keep growing its solar energy market, since the country currently does not have any realizable large-scale

PV plants in its pipeline, but has great potential for developing rooftop and C&I solar projects.

Want to learn more about Africa's solar energy industry? Join us at the fourth edition of the Unlocking Solar Capital: Africa conference, taking place on 16-17 October 2019 in Dakar, Senegal. This unique international platform and 2-day conference is focused on connecting solar project development and finance & investment in the four leading solar electrification segments (utility-scale, commercial & industrial, mini/microgrids and off-grid).



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