

# Renewables in Sub-Saharan Africa

Revego Africa Energy Limited

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# Contents

- 01** Executive summary
- 02** Renewable market in SSA
- 03** Secondary market
- 04** Listed vehicles - Yieldcos
- 05** Risk and return overview
- 06** Appendix

# Executive summary

# Energy landscape

# Introduction

## The future of energy is electric

- As the world lurches towards net zero amid unrelenting climate change, investments in renewable and decarbonized electricity systems will continue to boom, especially as more sectors electrify their operations
- In Sub-Saharan Africa (SSA), fossil fuels still dominate the electricity generation mix, accounting for over 60% in 2021. Nearly 579 million people still lack access to electricity and the average electrification rate in the region is only about 48%
- Ensuring universal access to electricity by 2030 goal, in line with the UN Sustainable Development Goals, is a major driver for the African energy transition
- Africa's energy transition will be structured differently to advanced economies. It will primarily be additive where supply-demand gaps exist.

## Sub-Saharan Africa has a persistent lack of electricity access partly due to massive underinvestment in electricity infrastructure

- Most of the public electric utilities are loss-making, with limited ability to maintain existing assets or invest in new ones

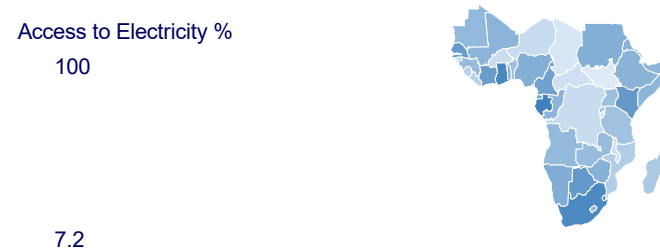
## In adversity lies opportunity

- Achieving universal electricity access in Sub-Saharan Africa and shifting towards greener sources of electricity, would represent an opportunity of \$193 Bn over the period 2023-2031

## Sub-Saharan Africa electricity production by source, 2021 (TWh)



## Share of population in Africa with access to electricity by region



# The total addressable market (TAM) for Sub-Saharan Africa's (SSA) renewable energy transition is estimated to reach \$193 Bn over the period 2023-2031

## Wind, solar and storage addressable market opportunity is estimated to be \$127 Bn through 2031

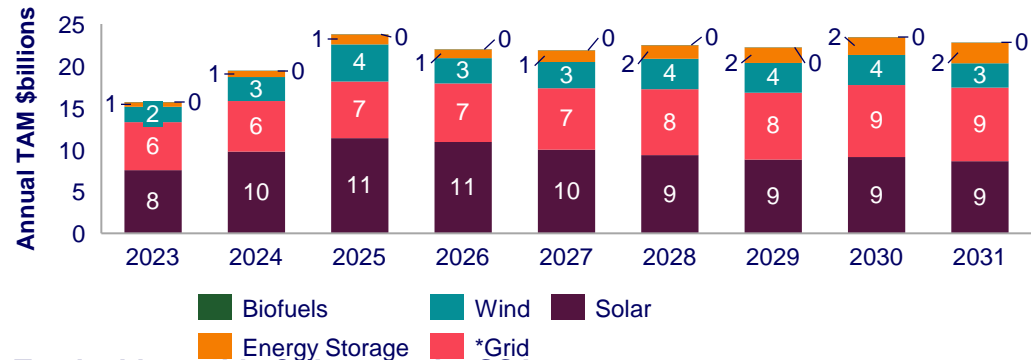
- An average annual capital investment of \$21 Bn is expected with a focus on solar and grid investments
- Solar investments dominate the landscape, comprising around 44% of the total opportunity over the forecast period
- Onshore wind total addressable market could reach US\$29 billion during the period 2023-2031 with about 24 GW of new installed capacity
- Average annual \*Grid investments are estimated to be \$7.3Bn and the total addressable market could reach \$66 Bn during the period 2023-2031

## South Africa is the largest C&I solar market, followed by Nigeria and Kenya

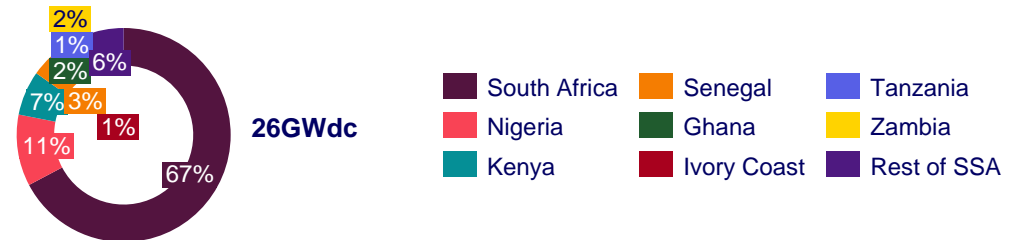
- Woodmac forecasts SSA to reach ~26GWdc of cumulative installed capacity by 2031
- On average, about \$2.6 Bn investment per year is expected on solar C&I

\*Grid includes transmission and microgrids

## Sub-Saharan Africa annual total addressable market (TAM) outlook, 2023-2031, \$billions









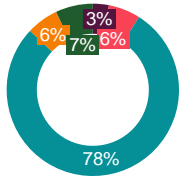
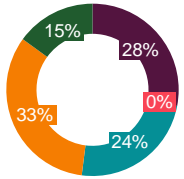
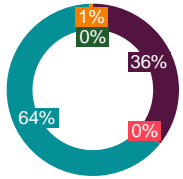
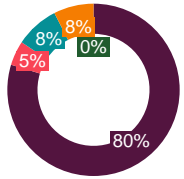
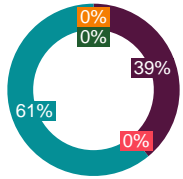
## Total addressable C&I market by SSA country, 2022-2031



# PPAs and FiT mechanisms are available in some key SSA markets, increasing countries' attractiveness for renewable investment

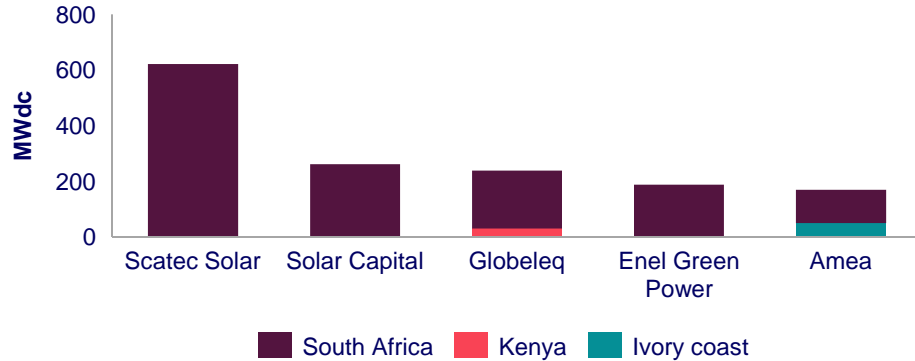
## Renewable deployment in SSA is driven by decarbonization targets, rising fossil fuel costs and electrification rate national goals

- PPAs and FiT mechanisms are increasing countries' attractiveness for renewable investments, but limited access to financing and skills shortage are both key challenges in the region
- Auction programs run by African governments and others initiated by the World bank are leading the renewable build out in the region. Major auction programs are South Africa's REIPPP and Scaling Solar Program

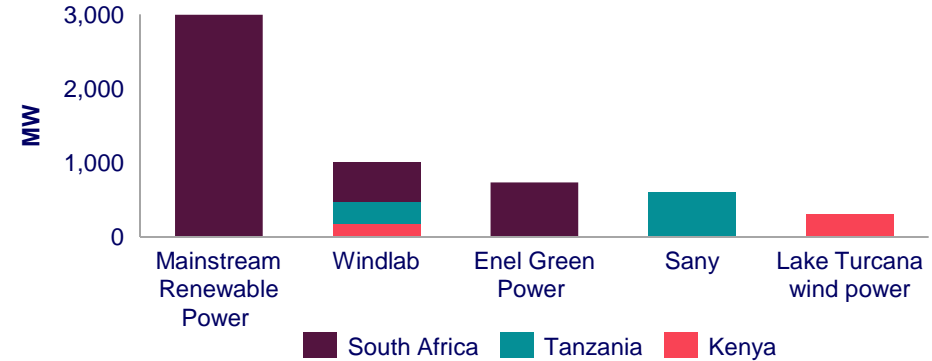
	 South Africa	 Kenya	 Tanzania	 Uganda	 Cote d'Ivoire
<b>Installed capacity mix</b> 					
<b>Installed capacity (2021)</b>	61,850 MW	2981 MW	1609 MW	1346 MW	2269 MW
<b>Program / auctions</b>	REIPPPP (round 6 closed)	REAP planned	Auctions cancelled	GET FIT closed	Scaling solar ongoing
<b>Country RES target</b>	Decarbonization of electricity sector by 2050	100% renewables by 2030	No specific target	3.2GW renewables by 2030	42% renewable electricity by 2030
<b>Corporate PPA/ Utility PPA</b>	✓	✓	✓ Standard PPA for facilities less than 10 MW	✓	✓
<b>Feed in Tariff mechanism</b>	✗	✓ <i>Less and above 10MW (excl Solar &amp; wind)</i>	✓ <i>Less than 10MW</i>	✓ <i>Less than 20MW</i>	✗

# Wind and solar markets are fragmented. Scatec and Mainstream Renewable are the major players in the region

**Top 5 solar PV owners in key SSA markets by capacity, MWdc**



**Top 5 wind owners in key SSA markets by capacity, MW**



## Scatec leads the field of solar in key SSA markets with 600 MW installed and under development projects in South Africa

- South Africa has a fragmented utility-scale solar market with more than 40 owners in solar
- Of the ~650MW of C&I capacity tracked, roughly 40% of it is in South Africa. More than half of the C&I market in South Africa is projects <10MW
- Senegal, Cote d'Ivoire, Uganda, and Tanzania are at a very early C&I market stage

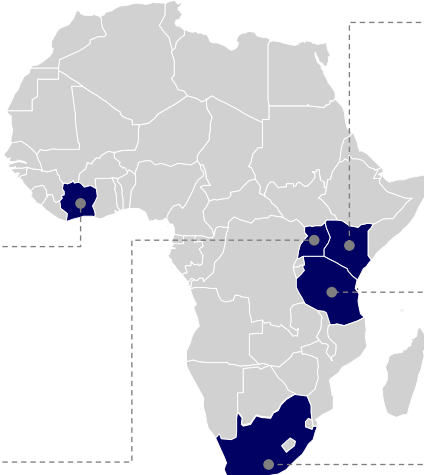
## Mainstream Renewable Power leads the field of wind in key SSA markets with ~3GW installed capacity in South Africa

- South Africa has a fragmented wind market with more than 100 owners in wind
- Kenya has close to 2GW of wind capacity operational or at the announced stage. Kenya wind market is fragmented, and 4 key players own 54% of the wind capacity (Lake Turkana Wind Power, Windlab, Gitson Energy and Bluesea Energy)



# Renewable deployment in Sub-Saharan Africa is driven by decarbonisation targets, rising fossil fuel costs and electrification rate national goals

Limited access to financing and skills shortage are key challenges in the region



Key drivers and barriers for renewable deployment in SSA	
<b>Drivers</b> <ul style="list-style-type: none"> <li>National electrification rate target</li> <li>Rising fuel costs</li> <li>Specific programs supported by international fundings</li> </ul>	<b>Barriers</b> <ul style="list-style-type: none"> <li>Lack of scale: negotiating individual project at small scale impacts both development and transaction costs</li> <li>High perceived risk and cost of capital</li> <li>Skills shortage</li> </ul>
<b>Cote d'Ivoire</b>	
<b>Drivers</b> <ul style="list-style-type: none"> <li>Electrification rate national target</li> <li>Tax reduction for solar energy production equipment</li> <li>Scaling solar program</li> </ul>	<b>Barriers</b> <ul style="list-style-type: none"> <li>No FIT system in place</li> <li>Limited access to financing</li> </ul>
<b>Uganda</b>	
<b>Drivers</b> <ul style="list-style-type: none"> <li>Tax incentives</li> <li>Fixed FIT mechanism for less than 20 MW</li> <li>Financing options to facilitate investment are available</li> <li>GET FIT program 2013-2022</li> </ul>	<b>Barriers</b> <ul style="list-style-type: none"> <li>Lack of technical capabilities</li> <li>Skills shortage</li> <li>Lower availability of program funds</li> </ul>
<b>Kenya</b>	
<b>Drivers</b> <ul style="list-style-type: none"> <li>FIT system with tariffs for &lt;10 MW and &gt;10 MW projects for 20 years</li> <li>Tax incentives on aspects related to renewable investments</li> <li>Renewable government targets</li> </ul>	<b>Barriers</b> <ul style="list-style-type: none"> <li>Complex regulatory system with many authorities and committees</li> </ul>
<b>Tanzania</b>	
<b>Drivers</b> <ul style="list-style-type: none"> <li>Electrification rate national target</li> <li>Import duty exemption</li> <li>FIT mechanism for less than 10MW</li> </ul>	<b>Barriers</b> <ul style="list-style-type: none"> <li>Lack of domestic supply chain and necessary skills and experience</li> <li>Lack of tender/ auction programs</li> </ul>
<b>South Africa</b>	
<b>Drivers</b> <ul style="list-style-type: none"> <li>Rising fuel costs and decarbonisation target</li> <li>Financing and REIPPPP scheme. REIPPPP has resulted in the allocation of ~10GW of renewable capacity since 2011</li> </ul>	<b>Barriers</b> <ul style="list-style-type: none"> <li>Limited capacity to manage and negotiate</li> <li>Restructuring Eskom and associated liabilities</li> </ul>

Source: Wood Mackenzie

# Limited access to financing and skills shortage are key challenges hindering the energy transition in SSA region in SSA

## Capital deployment



- Limited scale of renewables in SSA impacts both development and transaction costs
- Limited capital flow and sources of capital compared to Europe/ US. The main capital sources are Development Finance Institutions and commercial banks

## Technology and supply chain



- While SSA can benefit from the latest technologies in the European/ US markets, they still lack local competencies and skilled resources to better drive project implementation in the region
- As per the global trend regarding increased costs for wind and solar technologies as a result of supply chain issues, SSA will be also impacted in the short term. Developers are reviewing their business cases for investment under the current market dynamic

## Country risks



- Most of World Bank Worldwide Governance Indicators in the region are weak, with an unstable political environment in some countries impacting the delivery of some projects
- High perceived political, and regulatory risks in some SSA countries result in higher cost of capital

## Policy and regulation



- While universal access to electricity goal as per UN Sustainable Development Goals is driving the renewable build out in SSA, there are still considerable efforts to be made by different governments to incentivize investors
- Most SSA have defined electrification rate targets to be achieved in the next decade but had not necessarily translated that into clear action plans
- Some SSA markets are still lacking auction programs, FIT systems, and streamlined processes easing investments

# Secondary market

# The secondary market in Sub-Saharan Africa

## SSA's current size of transactions is similar to the US and Europe back in 2012

- In 2012, the size of the US/ Europe secondary market was relatively small. The large scale of installed capacities in Europe/ US driven by different enablers of the energy transition resulted in a massive growth of the secondary market
- Developers and IPPs are considering the secondary market as a key enabler for growth and increased return. For example, Neoen considers farm-downs as a strategy to diversify the non-equity funding and achieved a € 90m of capital gain for 114 MW capacity sold between 2021-2023

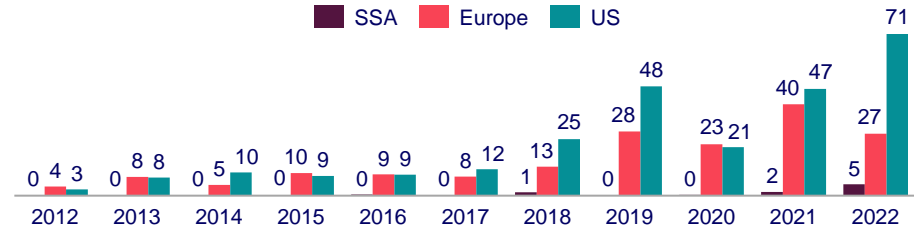
## Capital deployment in SSA is still at early stage – the secondary market will represent an opportunity to increase the volume of capital available and ultimately accelerate renewables deployment

- While most of the key enablers for SSA renewable deployment are on track to mature over time, given all the efforts put in place by different governments, financing is in development
- As equity is highly leveraged in renewable projects in SSA, developers have a great incentive to farm down de-risked assets to sustain their growth. The mechanism will result in more capital injected into the region

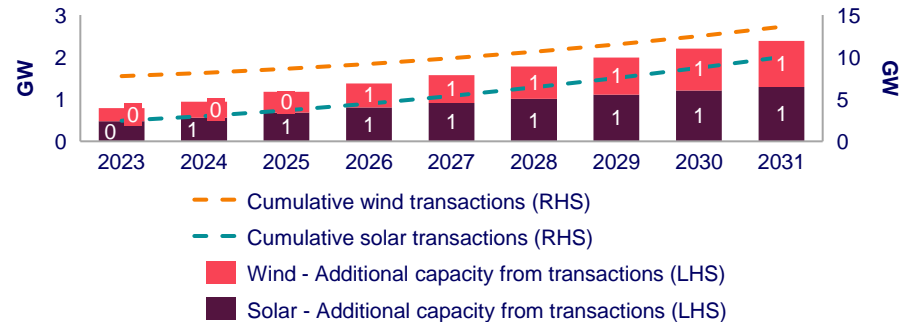
## The secondary market in SSA is expected to grow and cumulative transactions of solar and wind assets are expected to reach 10 GW and 14 GW respectively by 2031

- The secondary market's growth is led by the growth of transactions of operational assets rather than non-operational assets. The SSA recycling rates for operational assets acquisitions are expected to be on average 3.4% similar to US and Europe rates

## Combined solar and wind annual transactions(\*) in Europe, the US and Sub-Saharan Africa - GW



## Woodmac transactions outlook for SSA



Note: IPP: Independent power producer, SSA: Sub Saharan Africa, (\*) Transactions tracked in Wood Mackenzie's asset database

# Institutional investors are required to widen the pool of capital for the renewable sector

Developers tend to gain new capital to create a pipeline of bankable projects through the sale of assets

## Renewables capital deployment

### Institutional investors



- Direct and indirect investments through infra/ renewable funds, are helping to build more and more capabilities in this space
- Institutional investors and renewable funds' main strength is having access to lower cost of capital. They have a better ability to win secondary market auctions with lower hurdle rates
- By providing a lower cost of capital, the institutional investors help reduce the overall cost of renewables and attract other investors
- Institutional investors invest in Yieldcos which allows access to a larger pool of capital from those who have a lower risk appetite – lower cost of capital means competitive offers for projects
- Public equity markets have widened the capital pool in Europe and US as financing vehicles allow raising capital by issuing shared and debt to acquire renewable assets and pay back dividends to shareholders

### Developers / IPPs / Utilities



Some developers have strong financial partners (e.g., pension funds, big O&G players, infra-funds etc.) giving them financial flexibility. Others do asset rotation to strengthen their financial capacity and contribute to financing the construction of new assets

### PEs



Capital raised from private funds. They have a high-risk appetite and invest in high-growth opportunities. Their core business is to acquire, hold and develop into attractive acquisition target, and exit with a short-term approach. On average they have 5 years exit strategy at EV/EBITDA basis

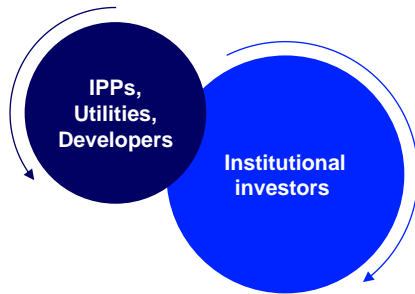
Source: Wood Mackenzie

# The secondary market accelerates investments in renewable infrastructures

Renewable transactions widen the pool of capital, and enable capital redeployment

## Players' motivation in the renewable M&A space

- Improve the balance sheet
- Free up capital to redeploy
- Gain market share
- Increase return



- Access to higher long-term returns through the funding
- Safe investment and better value for shareholders through yieldcos

### Key points:

- Accelerating finance for renewable build-out requires looking at developing bankable projects and at the same time looking at efficiently allocating capital at the scale needed at different phases of the project
- Developers have a high-risk appetite to develop new projects from scratch, raising capital and impacting their corporate balance sheets
- As the project gains more maturity approaching the construction and operation phases, the project is getting de-risked and becomes more attractive to institutional investors. The secondary market plays a key role here in meeting the needs of each type of players and ultimately materializing a transaction deal that will let developers have access to a new funding source
- Farm downs strategy enables short-term value creation that finances new growth to realize the long-term value creation. Developers typically use the proceeds to develop new projects and/or invest in new higher-risk renewable technologies, increasing the pipeline of bankable projects over time
- In the absence of a farm down strategy, IPPs and developers would have limited growth as they would only finance new projects through the typical other sources of funds that have limitations

## Illustrative sources of non equity funding for IPPs/ developers



*Opportunity to grow the size of farm-downs funds*

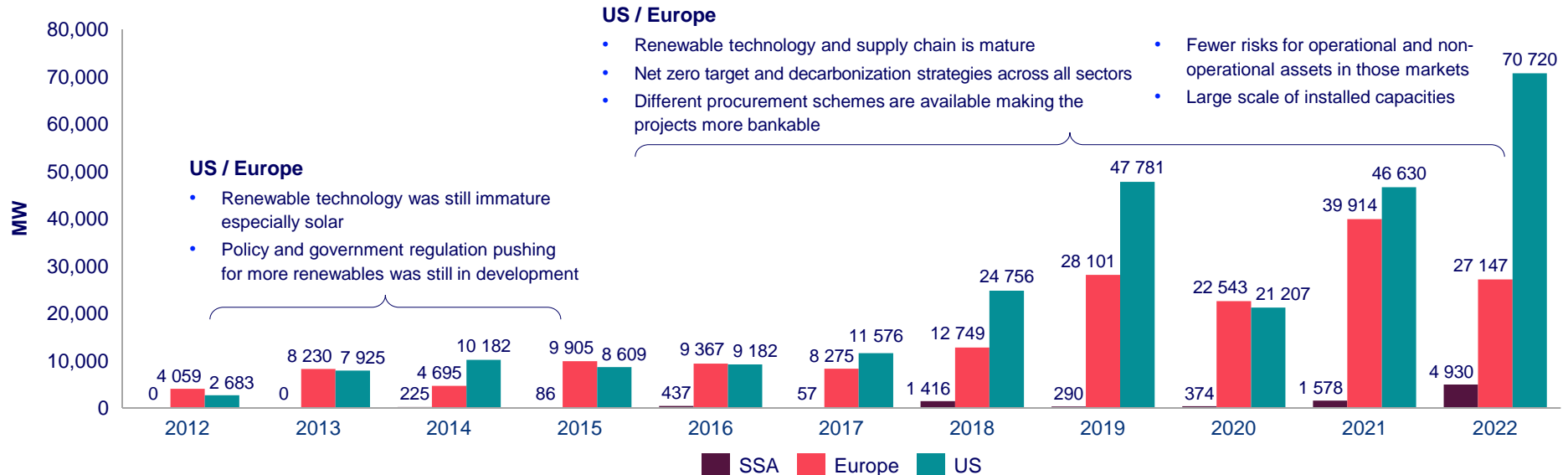
- Project financing and refinancing
- Corporate debt financing and refinancing
- Cash flow from operations
- Opportunistic farm-downs
- Potential minority stake sales

Source: Wood Mackenzie

## Tracked transactions in the SSA has a similar trend to US/Europe a decade prior

As renewable technology matured and became less risky over the last decade, transactions grew substantially in both US and Europe markets

### Combined solar and wind annual transactions tracked in Wood Mackenzie's asset database in Europe, the US and Sub-Saharan Africa



Note: Analysis done based on Wood Mackenzie tracked M&A transactions data. Source: Wood Mackenzie

# Capital deployment in SSA is still at early stage, the secondary market will represent an opportunity to accelerate access to finance in the region

Secondary market growth increases capital deployed in the region which can be redeployed into new project development activity

## Key enablers for renewable deployment in SSA

Key enablers	Description	Maturity in SSA
<b>Policy and regulation</b>	Universal access to electricity by 2030 goal as per UN Sustainable Development Goals is driving the renewable build-out in SSA	
<b>Technology and supply chain</b>	While SSA can benefit from the latest technologies in the European/ US markets, they still lack local competencies in this space. Competencies development will come with more scale of renewables	
<b>Remuneration and procurement framework</b>	Key SSA markets offer good contracting schemes that should attract more and more developers	
<b>Capital deployment</b>	Developers and IPPs are the first movers in SSA on both primary and secondary markets. Financing is leveraged at a higher equity ratio compared to other mature/ developed markets. Limited capital flow for secondary market	

Note: SSA: Sub Sahran African  
Source: Wood Mackenzie

### Key points:

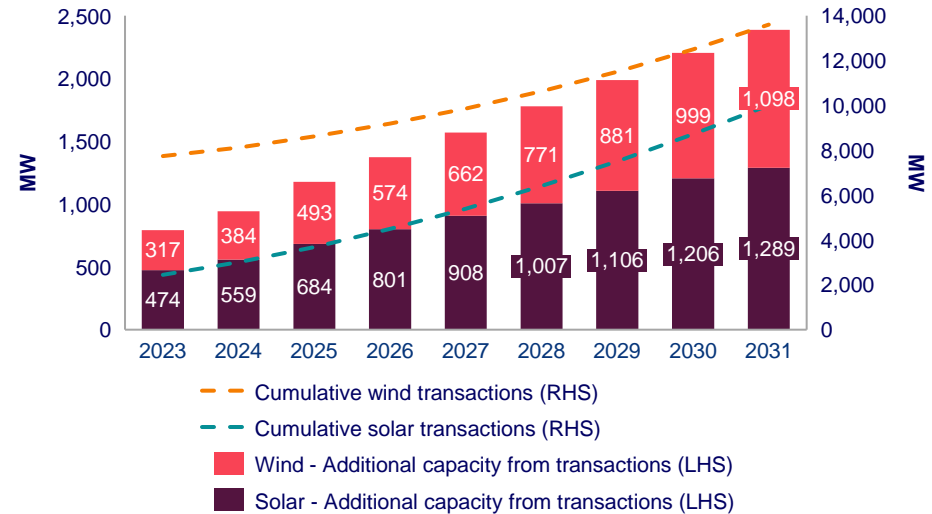
- While most of the key enablers for SSA renewable deployment are on track to mature over time, given all the efforts put in place by different governments, financing still remains at an early maturity level given all the surrounding risks of projects. The limited current capital sources in SSA are to be widened to enhance energy transition by incentivizing private and public funds to invest more in the region
- Local developers and IPPs are most suited to bear the risks of early-stage development projects. As equity is highly leveraged in SSA, developers have a great incentive to farm down assets once those reach a reasonable maturity and risk is acceptable by other types of investors. By replicating the recycling strategy, developers in SSA are able to use the proceeds and inject more capital required for developing new projects
- Looking at trends of the secondary market, SSA' current size of transactions is similar to the US and Europe back in 2012
- We expect the SSA secondary market's growth to be led by the growth of transactions of operational assets rather than non-operational assets. We expect the SSA recycling rates for operational assets acquisitions to be on average 3.4% similar to US and Europe rates



# Cumulative transactions of solar assets in SSA will grow at 20% CAGR between 2022 and 2031 while cumulative transactions of wind assets will grow at 7% CAGR over the same period

- Historically between 2014 and 2022 the cumulative secondary wind market that we track has grown at 55% CAGR. A significant portion of this growth is driven by the Windlab asset acquisition by Seriti Green in 2022.
- Our forecast is driven by historic US and European recycling rates for operational assets acquisitions
- Throughout the forecast period (2023-31) we forecast additional wind transactions to rise from ~320MW in 2023 to ~1.1GW by 2031
- The cumulative wind secondary market by 2031 could reach 14GW, representing significant investment over the forecast period
- Annual additional transactions in the wind sector in 2031 (1.1GW) could account for ~4% of cumulative installed capacity (29.2GW)
- In the solar market between 2016 and 2022 the cumulative secondary market has grown at a compound annual growth rate of 45%
- We expect additional solar transactions to rise from 475MW in 2023 to 1.3GW in 2031. This will result in the cumulative solar secondary market reaching 10GW by the end of the forecast period (2031)
- Annual additional transactions in the solar sector in 2031 (1.3GW) accounts for ~1.4% of cumulative installed capacity (91GW)

## Cumulative annual tracked transactions in solar and wind for SSA



Note: Analysis done based on Wood Mackenzie tracked M&A transactions data. Methodology to be explained in the appendix  
 Source: Wood Mackenzie

# Woodmac forecasts cumulative transactions of solar and wind assets to reach 10GW and 14 GW respectively by 2031

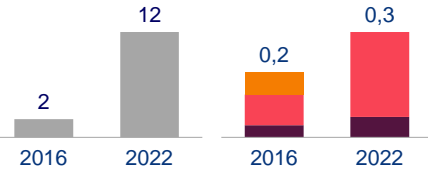
Solar and wind assets acquired are predominately at non-operational stages

## SSA historical

Cumulative installed capacity (LHS) and annual **solar** transactions size (RHS), GW

CAGR +34%

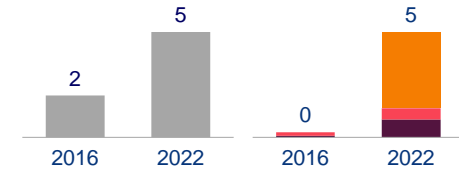
CAGR +7%



Cumulative installed capacity (LHS) and annual **wind** transactions size (RHS), GW

CAGR +17%

CAGR +65%



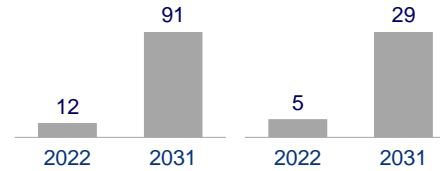
Undisclosed Under construction Planned & proposed/ Developed Operational

## SSA outlook

Cumulative installed **solar** capacity (LHS) and cumulative installed **wind** capacity (RHS), GW

CAGR +25%

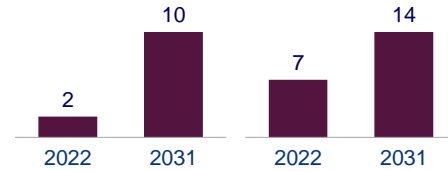
CAGR +16%



Cumulative **solar** transactions (LHS) and cumulative **wind** transactions (RHS), GW

CAGR +20%

CAGR 7%



- Wind acquisitions have developed much faster than solar acquisitions with 5GW tracked wind transactions in 2022
- While solar installed capacity grew much faster during the period 2016-2022, annual transactions for solar are still at a very small scale. In 2022, only 300 MW solar transactions were tracked
- IPPs are the top buyers acquiring solar assets at the development stage reflecting their low-risk perception of the technology in the SSA market

- We forecast significant growth in cumulative installed capacity in both wind and solar
- Similarly we forecast cumulative transactions of solar assets in SSA to grow at 20% CAGR between 2022 and 2031
- We expect growth in annual transactions of wind assets, of 7% CAGR. The large transaction of Windlab assets by Seriti Green has pushed cumulative wind transactions very high in 2022

Note: Analysis is done based on the available and tracked data by Wood Mackenzie. It may be not exhaustive, (\*) undisclosed status refers to acquisition of portfolio of assets at various stages  
Source: Wood Mackenzie tracked data

# Challenges and opportunities in the Sub-Saharan Africa secondary market

## Opportunities



- **Electrification potential and climate goals:** Universal access to electricity by 2030 goal along with the government push for off-grid solutions will push renewables build-out. Capital will need to be raised by developers which will push de-risked assets in the secondary market to gain new sources of funding
- **Renewable market size:** Installed capacities for wind and solar will grow in the next decade to reach a total of 91 GW solar and 29 GW wind by 2031. This will represent a strong pipeline of operational assets opportunities in the secondary market
- **Yieldco model:** A more secure vehicle to deploy for the secondary market
- **Farm down strategy:** developers and IPPs have started adopting the recycling strategy to diversify and widen their sources of funds. More growth of those companies will result in the growth of installed capacity and consequently increased size of the secondary market

## Challenges



- **Macro economic and financial risks:** high inflation affects acquisitions as debt financing becomes more costly, and lowers real returns. Due to the depreciation of local currencies against hard currencies, the acquisition of operational assets on the secondary market is at risk of not achieving the expected returns
- **Supply Chain Risk:** Purchasing assets in the secondary market, particularly those that are under construction poses a significant supply chain risk as little is manufactured in SSA, with high inflation and weak exchange rates raising the cost of goods
- **Regulatory risk:** The secondary market is subject to regulatory risk in SSA. A change in regulation impacting the FiT prices or a change in electricity tariff structure prices could impact the long term cash flows expected and returns
- **Political risk:** instability of the political environment in some of SSA countries could halt the growth of the secondary market, as demand will shrink
- **Capital availability:** Limited capital for the secondary market as Development Finance Institutions (DFIs) have a preference for greenfield projects

# Role of listed vehicles- Yieldcos

# Public markets contribute to deepen capital pool for renewable energy investments

Public-market vehicles allow access to a wider pool of institutional investors

## Public markets



- Publicly listed clean energy companies can raise equity on public markets by issuing shares. The equity raised is generally used to develop and finance more projects to achieve a sustainable growth
- Public markets allow access to different institutional investors' profile
- Access to public markets through special vehicles deepens the pool of capital, as some of the special vehicles tap into the risk-averse type of investors

## Listed structures



- Investments on the public market can be channeled through open-ended funds such as most mutual funds and exchange-traded funds (ETF), exchange-listed closed-end funds (a type of mutual fund that issues a fixed number of shares through a single initial public offering) and Yieldcos
- Yieldcos are lower-risk investments than stocks in renewable energy companies. Yieldcos have enough projects in the backlog to sustain the dividends pay-outs and growth.
- Closed-end funds have been used in infrastructure finance

## Typical investors in Yieldcos



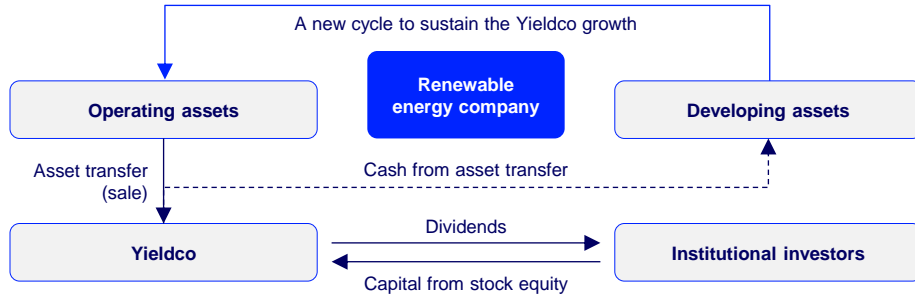
- Yieldcos are attracting two types of investors: socially responsible investors and income investors
- A Yieldco can raise money from any party including retirement funds, pension funds, and very risk-averse types of investors

Source: Wood Mackenzie, OECD,

# Yieldcos represent an important vehicle used by institutional investors

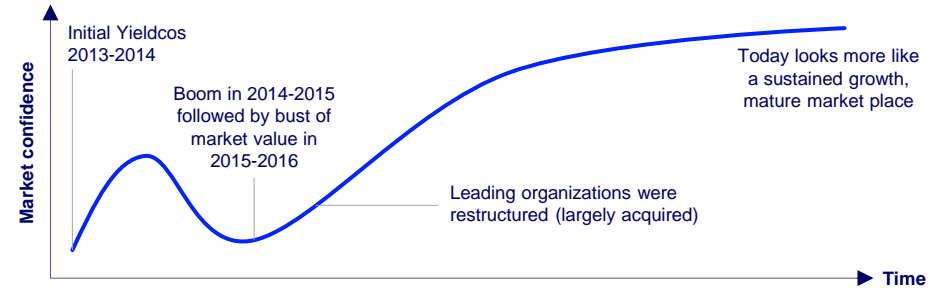
They can increase the pool of lower cost capital available to help accelerate the energy transition

## Yieldco model



- **Yieldco** – a publicly listed fund that owns a portfolio of renewable energy assets which typically acquires operating assets with contracted revenues, long-term predictable cashflows, and lower risk premiums.
- Under the typical Yieldco arrangement model, a renewable company creates the Yieldco entity and transfers its operating assets (at a premium above their costs). The Yieldco entity acquires the assets by issuing shares to investors. The cash generated from the assets sale is used by the renewable company to finance new assets. Once operational, those assets can be again sold to Yieldco. Investors are paid earnings as dividends
- Bundling renewable assets under a Yieldco reduces risks associated with individual assets. This help attract new investors

## Brief history of Yieldcos




























- Initial Yieldcos formed in 2012-13 largely in the US, followed by Europe
- They were initially formed by large energy companies looking to ringfence development and operation projects, whilst increasing access to capital for development – once projects were developed, they could be flipped to raise capital
- A ramp in size of market, swiftly followed the bankruptcy of SunEdison which led to a trend of market devalue and restructuring (acquisitions)
- The market has learnt and grown more sustainably now in the US and Europe
- Yieldcos are now widely accepted as a financial vehicle that can help increase the pool of capital available. They effectively create a sort of revolving credit facility which can be cheaper than project financing

Source: Climate Policy Initiative (CPI), OECD, Wood Mackenzie

# Risks and returns overview

# Off-taker and government credit rating is a key risk across all the key SSA markets

Selected key markets' currencies are not pegged to a hard currency, excluding for Ivory Coast

	South Africa	Kenya	Tanzania	Uganda	Ivory Coast
<b>Geopolitical risk</b> <i>Political stability and absence of violence</i>	 World Bank metric above (-0.9)	 World Bank metric below (-0.9)	 World Bank metric above (-0.9)	 World Bank metric above (-0.9)	 World Bank metric below (-0.9)
<b>Regulatory risk</b> <i>Includes government effectiveness, corruption, regulatory quality, voice and accountability, rule of law</i>	 Average World Bank metrics positive	 Average World Bank metrics above (-0.5)	 Average World Bank metrics below (-0.5)	 Average World Bank metrics below (-0.5)	 Average World Bank metrics above (-0.5)
<b>Financial risk</b> <i>Includes currency and inflation risks</i>	 Not pegged. PPAs in local currency. Currency depreciated by 28% between 2015-2022. Short term Inflation to average 4.87%	 Not pegged. PPAs in USD but might shift to local currency. Currency depreciated by 20% between 2015-2022. Short term Inflation to average 5.36%	 Not pegged. FIT in USD. Currency depreciated by 16% between 2015-2022. Short term Inflation to average 4.38%	 Not pegged. FIT in USD/Euro. Currency depreciated by 15% between 2015-2022. Short term Inflation to average 5.42%	 Pegged to Euro. Scaling program is in USD. Currency depreciated by 5% between 2015-2022. Short-term Inflation to average 2.24%
<b>Power grid and transmission risk</b> <i>Electric power transmission and distribution losses. Number of power outages in firms in a typical month</i>					
<b>Off-taker risk</b> <i>Credit rating of the off-taker and the government</i>	 Government debt 69.9% of GDP in 2021 -Moody's rating: Ba2. ESKOM facing financial difficulties	 Government debt 68.4% of GDP in 2021 -Moody's rating: B2	 Government debt 37.3% of GDP in 2022-Moody's rating: B2	 Government debt 51.7% of GDP in 2022-Moody's rating: B2	 Government debt 51.4% of GDP in 2022 -Moody's rating: Ba3

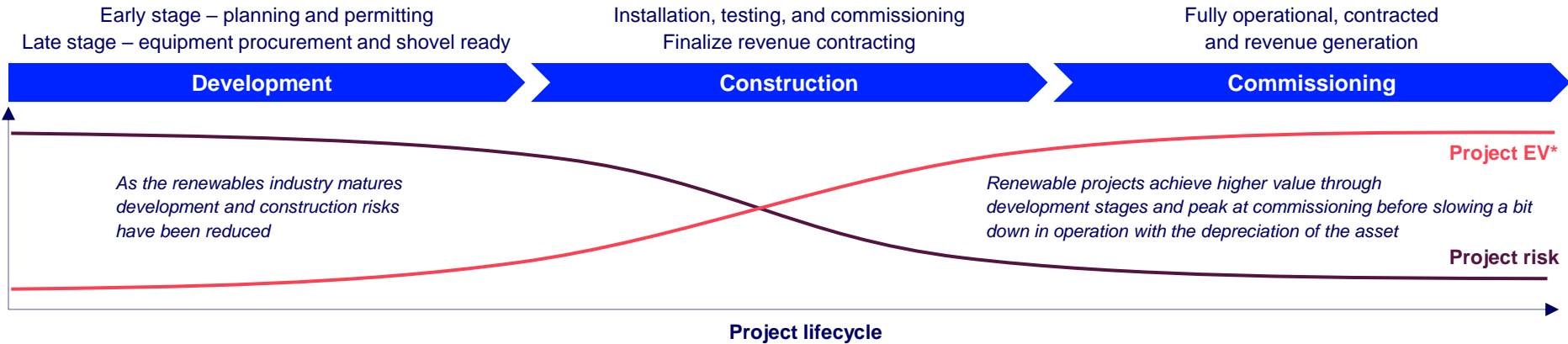
Source : World Bank, Moody's, Trading economics, Wood Mackenzie

High impact  —> Medium impact  —> Low impact 



# Capital source is dependent on the risk profile and development stage of the project

Yieldcos provide a portfolio of operating assets with an ideal risk profile and long term contracted revenues for institutional investors



- Typical investors: IPPs, utilities
- High costs of capital largely equity finance
- High risk, and uncertainty on technology, construction, and contracting..)

- Typical investors : banks, developers
- Capex spend peaks, mix of equity and debt
- The biggest transition between risk and value occurs
- Most low WACC players came into the picture once the asset was put into operation, under construction, or ready to build.

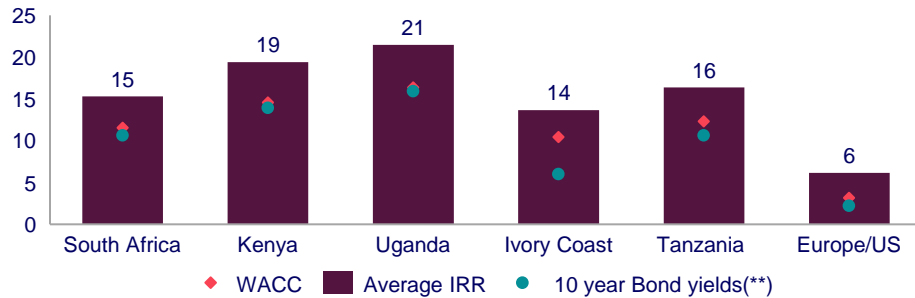
- Typical investors: Institutional investors
- The assets are largely de-risked as the project started generating long-term cash flow and are more attractive for institutional investors, in this instance through a Yieldco
- Projects, and portfolios ready to be recycled

\*EV – enterprise value

Source: Climate Policy Initiative (CPI), OECD, Wood Mackenzie

# Returns and LCOEs in SSA

## Indicative target IRRs, WACC (%)\* and average 10-year bond yields

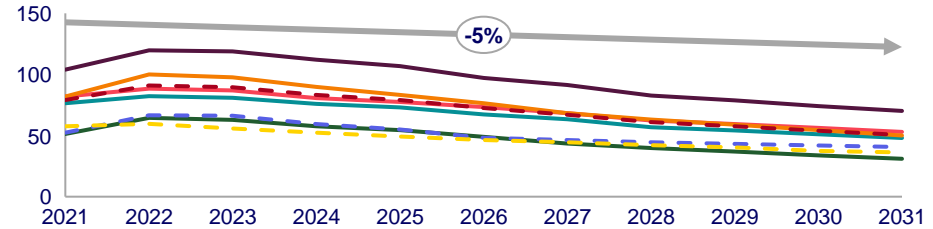


### Average WACC in key SSA markets is about 13%, and IRR can be as high as 20% in riskier markets

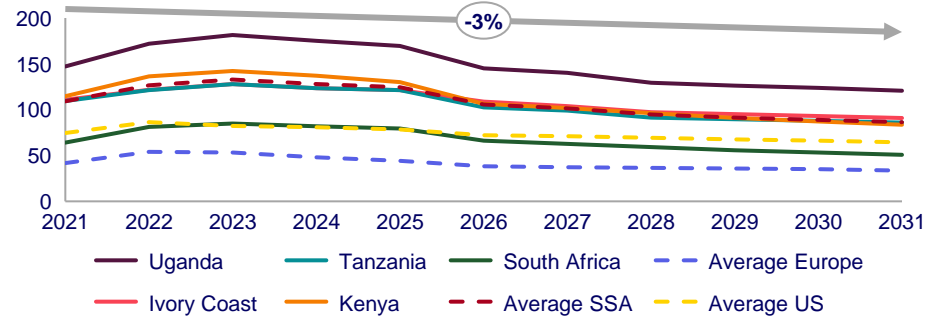
- When investing in a multi-currency environment, the investor can incur losses or gains as a result of changes in the exchange rate
- Uganda, Ivory coast, and Tanzania offer contracts denominated in hard currency, limiting impact on returns
- South Africa has a lower LCOE compared to the other SSA countries. South Africa benefited from the existing wind manufacturing facilities, lower financing costs, and big scale of renewable projects

Note: (\*) This is an average IRRs for new built onshore wind and solar utility-scale assets and include full value chain project origination through to operation and maintenance. We assumed Costs and revenues in same currency dollar- 2022 data – For South Africa and Kenya, a debt/equity ratio is assumed of 60% for solar and 65% for wind, while in Tanzania, Ivory Coast and Uganda D/E is 50% (\*\*) Average 10-year bond yield in 2022. Source: Wood Mackenzie, Oxford Economics, Factset

## Solar Utility scale LCOE outlook to 2031 (\$/MWh)



## Wind Utility scale LCOE outlook to 2031 (\$/MWh)



# Appendix

# Glossary

## The meaning of terms used throughout the Workstream

Term	Meaning
<b>TAM</b>	Total Addressable Market
<b>SSA</b>	Sub-Saharan Africa
<b>C&amp;I</b>	Commercial and Industrial
<b>GW, MW, kW</b>	Gigawatt, Megawatt, kilowatt
<b>MWdc</b>	Megawatts direct current (needs to be converted to ac using inverters – with a loss of efficiency)
<b>REIPPPP</b>	Renewable Energy IPP Procurement Programme
<b>IPP</b>	Independent Power Producers
<b>DFI</b>	Development Finance Institutions
<b>WB</b>	World Bank
<b>PV</b>	Photovoltaic
<b>YoY</b>	Year on year
<b>IRP</b>	Integrated resource plan

Term	Meaning
<b>REAP</b>	Renewable Energy Auction Policy
<b>FiT</b>	Feed-in-Tariff
<b>GET FiT</b>	Global Energy Transfer Feed- in-Tariff
<b>RES</b>	Renewable Energy Sources
<b>TWh, MWh, kWh</b>	Terawatt hour, Megawatt hour, Kilowatt hour
<b>CAGR</b>	Compound annual growth rate
<b>Kt</b>	Thousand metric tons
<b>LHS, RHS</b>	Left hand side, Right hand side
<b>WACC</b>	Weighted average cost of capital
<b>IRR</b>	Internal rate of return
<b>LCOE</b>	Levelized cost of electricity

Term	Meaning
<b>FTM</b>	Front of the meter
<b>Kt</b>	Thousand tonnes
<b>HV</b>	High voltage
<b>kVA</b>	1,000 volt amps
<b>PPA</b>	Purchase power agreement
<b>USD</b>	US dollar
<b>TZS</b>	Tanzania Shilling
<b>ZAR</b>	South African Rand
<b>KES</b>	Kenyan Shilling
<b>CFA</b>	Central African Franc
<b>UGX</b>	Uganda Shilling

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