

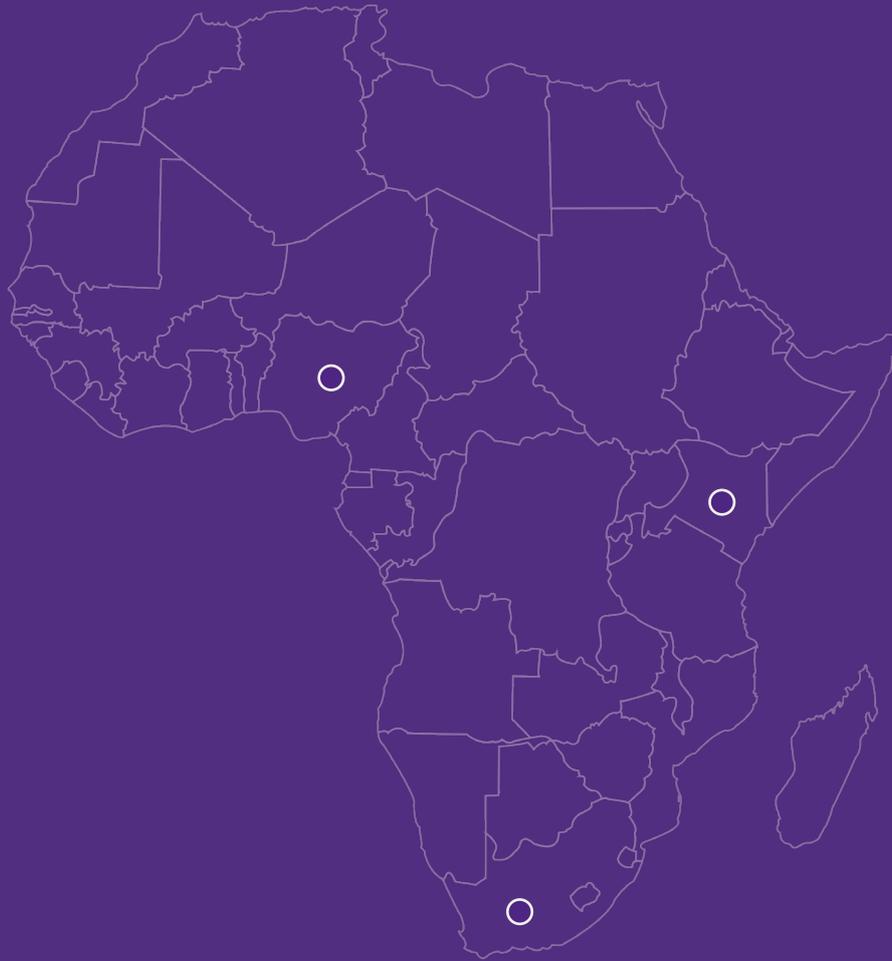
Africa renewable energy discount rate survey – 2018

A Grant Thornton and Renewables in Africa initiative
in collaboration with Clean Energy Pipeline

October 2018



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About this report

Grant Thornton, in collaboration with Renewables in Africa and Clean Energy Pipeline, is pleased to present the Grant Thornton renewable energy discount rate survey summary for Africa. Our survey focused on the three most developed markets for renewable energy technologies in Africa: Kenya, Nigeria and South Africa.

The discount rate (a proxy of cost of capital) for secondary market renewable energy M&A deals is a vitally important piece of information for investors. It is a key driver in determining the fair value or market price for projects. However, this data is extremely hard to gather so investors often have to rely solely on their own experience and advice from valuation experts in evaluating the cost of capital. In Africa especially, where projects have a considerable development lead-time to reach bankable stage, the cost of capital is often something that is held tightly to chest.

With this in mind, Grant Thornton launched a survey to gauge investors' perception of cost of capital in Africa. Our survey focused on two technologies: ground mount solar and onshore wind. We asked one simple question: what most closely matches the discount rate you would expect to see for the following secondary market deals?

How to value renewable energy projects

Renewable energy represents a niche segment of the overall infrastructure asset class. These assets need to be approached slightly differently due to the varying risk return profile associated with long-term incentive schemes, financial leverage, construction/technology risks and input/output price volatility.

Typically, when valuing renewable energy projects, an income approach is utilised. Sometimes, valuers use the capital asset pricing model ('CAPM') in determining the appropriate cost of equity and in turn the weighted average cost of capital ('WACC'). Because some of the risks associated with equities

are not present in renewable energy assets, the CAPM model may not always be the most appropriate method to rely on when deriving the appropriate discount rate.

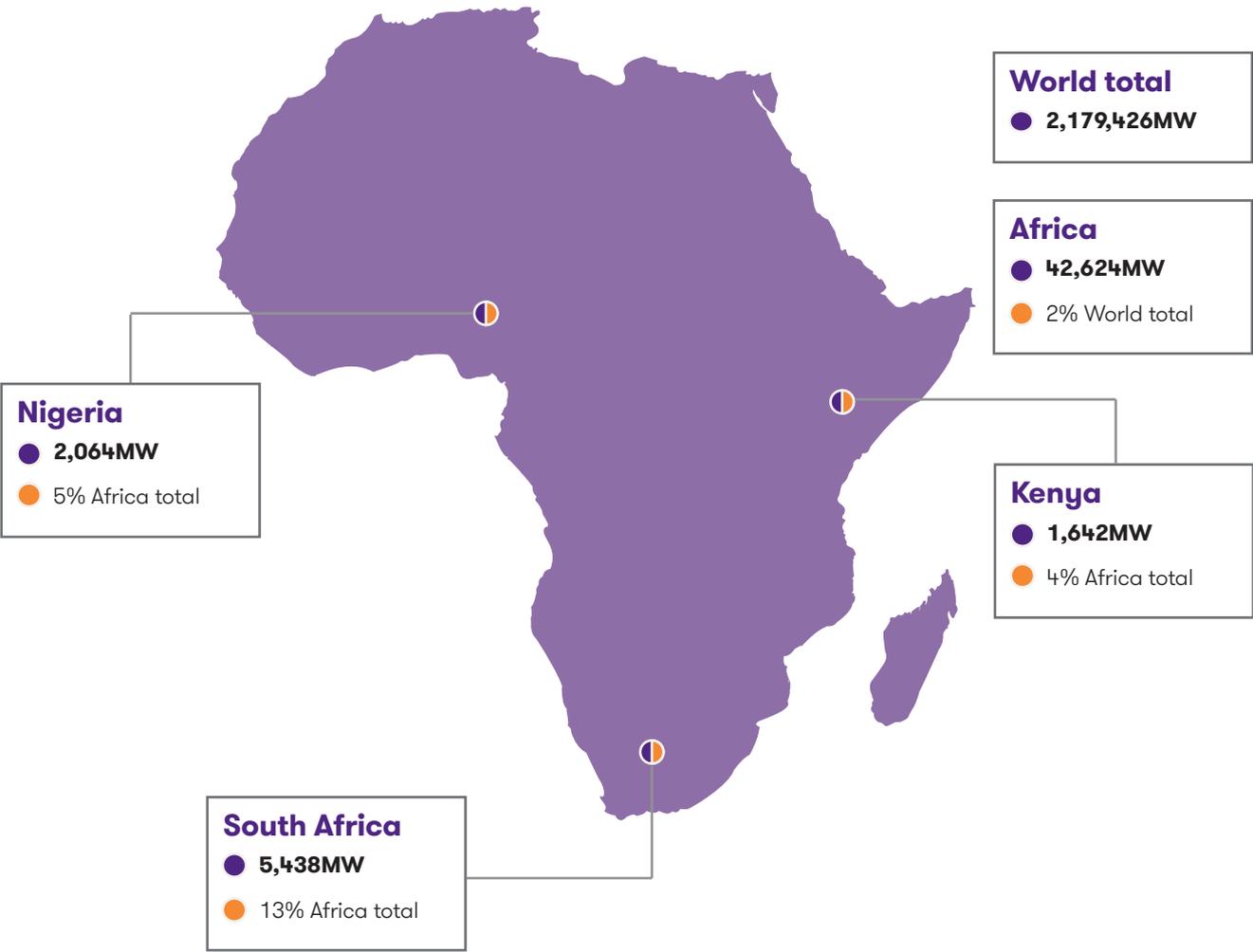
As the pricing for renewable assets is competitive and unique to the specific aspects of the asset, the implied cost of capital (or IRR) from comparable transactions can be a strong indicator for valuing projects. This data is not readily available so Grant Thornton has surveyed investors in trying to obtain the latest view on where cost of capital is across various technologies globally.



African renewable energy sector overview

Renewable energy is at the forefront in the fight against climate change. This has translated into rapid renewable energy commercialisation and industry expansion, therefore leading to an increase in the number of deals in the sector. Some \$201 billion has been invested in utility-scale renewable

energy projects alone in 2016¹, with wind and solar leading the industry in terms of MW deployment and deal value. The market is expected to see high growth in investments over the coming decades as project costs continue to decrease and grid parity is achieved in more and more geographies.



Source: International Renewable Energy Agency (IRENA)

Country profiles

Kenya

Kenya has a liberalized energy market where electricity generation is open to the private sector; however, the supply side of the market operates on a single buyer model, the buyer being Kenya Power and Lighting Company Limited. Kenya had a total effective capacity of 2,333MW as at 2017 and in 2016 around 53% of the Kenyan population had access to electricity, the Government aims to reach universal access by 2020, which would require adding 1 million new customers to the grid each year.¹

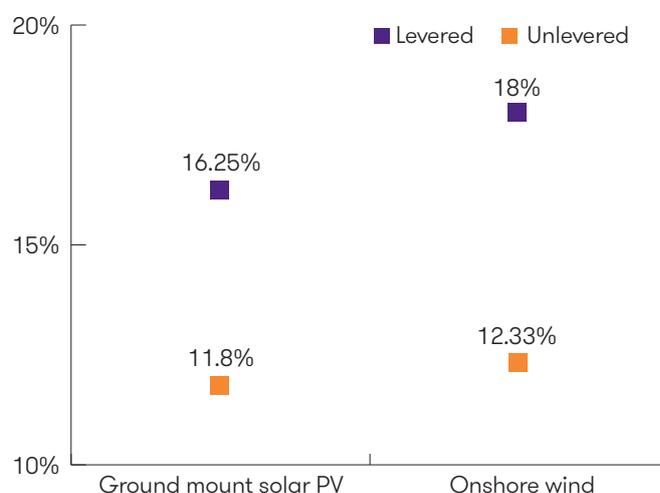
Kenya is the regional leader in utilizing renewable energy resources to provide grid capacity and has a dedicated government department, which holds responsibility for

leading development of renewable energy in the country. The government has undertaken a number of initiatives to encourage development of the sector and to attract foreign direct investment.

In addition to established PV and wind sectors, renewable energy from hydro and geothermal sources accounted for 33% and 44% respectively of total energy purchased in 2017.² Geothermal is becoming increasingly attractive as a result of its output consistency which is unaffected by weather variations This is likely to increase as the Government is in the process of introducing a renewable energy auction system for all projects above 10MW.

Discount rates

Please find beside the results of our survey for Kenya.



¹ DLA Piper, Renewable Energy in Africa, 2018

² DLA Piper, Renewable Energy in Africa, 2018

Recent transactions

Date	Technology	Company	Transaction value (USD)	Details
Under construction	Solar and Wind	Four Seasons Power	268.55 million	The 140MW portfolio of renewable energy projects is located in Embu County, Kenya. It represents a total investment of \$268.55 million. The project comprises 80MW of solar and 40MW of wind farm. Four Seasons Powers of US has partnered with the local government to build the project under the model of public private partnership
December 2018 completion	Wind Power	General Electric and Overseas Private Investment Corporation and Sinomach	300 million	<p>This project is to be located in the Kipeto area of Kajiado County in the Rift Valley, Kenya. General Electric Company is the project developer. The \$300 million project will be developed in partnership with one of Power Africa's private sector partners, African Infrastructure Investment Managers, fund adviser to African Infrastructure Investment Fund 2, and situated in an area with strong, consistent wind currents. In 2015, Kenya Power signed a 20-year power purchasing agreement (PPA) and the project is scheduled to be completed by December 2018</p> <p>The wind project comprises 365 Vestas V52 850kW wind turbines and covers 66,000 hectares of land. It is significant to Kenya's energy security since it represents 20% of the country's existing electricity capacity.</p>
Q3 2018	Wind Power	Joint venture between, Aldwych, KP&P, Norfun, Vestas, Finnfund, IFU	691 million	The project is owned by Lake Turkana Wind Power - a joint venture of Aldwych (32.5%), KP&P (25.25%), Norfund (12.5%), Vestas (12.5%), Finnfund (12.5%), and IFU (6.5%). As of June 2017, The wind park is fully built and ready for commissioning.

Nigeria

Nigeria’s renewable energy sector remains underdeveloped due to prospective investors being discouraged by the lack of government oversight, funding and support. Barriers to development of renewables in Nigeria include; the large oil and gas production together with government fuel subsidies and the lack of clarity on private sector opportunities available within the country.

According to Reuters, Nigeria currently has the capacity to produce an estimated 7,000MW of power, but due to weak infrastructure, gas supply problems and water shortages only about 4,000MW reaches the national grid.

Nigeria is committed to developing its renewable energy industry and the Energy Commission of Nigeria created the Renewable Energy Master Plan (REMP) in collaboration with the United Nations Development Program in 2005. The aim of the program is to increase the role of renewable energy in achieving sustainable development. The REMP states that Nigeria aims to increase supply of renewable electricity to 23% in 2025 and 36% by 2030.

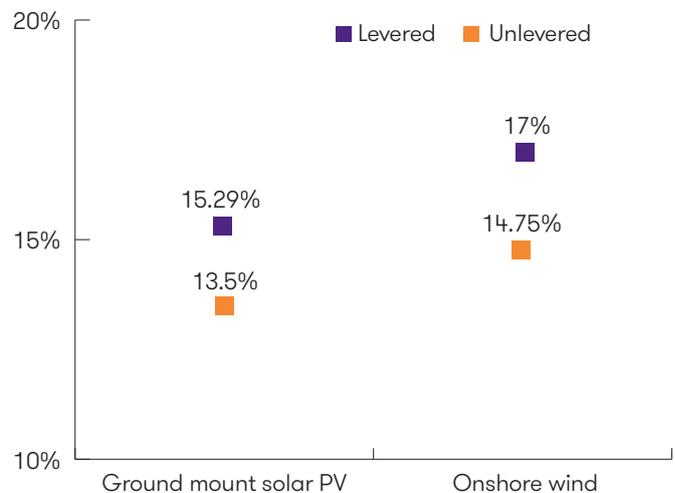
The government is investing in hydropower, with several projects close to completion. The largest is the Mambilla Power Station in central Nigeria, a \$5.79 billion project due to be completed in 2024 with most of the financing coming from Chinese lenders. Reuters states that it will be able to generate 3,050MW of renewable energy in the rural region, and is scheduled to be completed in 2024. Given the country’s climate though, most of the focus is on generating solar power, focusing on mini-grids as opposed to commonly associated ground mount PV. A \$350 million World Bank loan will be used to build 10,000 solar-powered mini-grids by 2023 in rural areas, bringing power to hospitals, schools and households.³

The Nigerian Electricity Regulatory Commission (NERC) is set to stand by the deployment of renewables in order to revive the energy sector, while enticing investment. The NERC has stated that it has made some amendments to accommodate and promote investments in the country’s renewable energy sector including a revision of the feed-in-tariff and proposed regulation to ensure that local electricity distribution companies source up to 50% of their power from renewable sources.

Discount rates

Please find beside the results of our survey for Nigeria.

Location within Nigeria plays a part in defining the discount rate with projects in the North typically attracting a premium.



³ <https://www.reuters.com/article/us-nigeria-britain-renewables-analysis/oil-rich-nigeria-turns-to-renewable-energy-as-population-booms-idUSKBN11419F>

Recent transactions

Date	Technology	Entities/ Company	Transaction value (USD)	Details
Under construction	Wind power	Mentach Energy	100 million	The 50MW wind farm in Lagos and Nigeria Bulk Electricity Trading Company is the offtaker of the project. The total investment cost is \$87.50 million on the basis that solar projects cost on average \$1.75 in Africa million/MW to develop and construct during 2016, according to Clean Energy Pipeline's project cost analysis. Mentach Energy is the developer of the project.
Q3 2016	Solar / Solar Plant / PV	Phanes Group	Undisclosed	Phanes Group has acquired a 300MW portfolio of solar PV farms under development in Nigeria. The trio of 100MW projects are located in the Mando area of Kaduna, Birnin-Kebbi in Kebbi and Sokoto in the north west of the country. The first 50MW of the Sokoto project is expected to come online in the first quarter of 2018, with the remaining 50MW to connect to the grid by the end of that year. The Kebbi and Kaduna projects are scheduled to come online before the end of 2019 and will be developed by Hasken-Rana – a joint venture between Phanes Group and its Nigerian partners.
Q1 2017	Solar / Solar Plant / PV	Quaint Global Energy Solutions	100 million	ABIBA Project is a 50MW on-grid solar utility plant in development, by an affiliate of Quaint Energy USA. InfraCo Africa is co-financing the project with Access Power via convertible loan agreement. It will be the first solar project in Kaduna State and will supply electricity directly into the national grid.

South Africa

The South African Department of Energy implemented the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) in 2011, which gave private sector participants the ability to bid to sell renewable energy to the state-owned Eskom which controls the majority of generation, transmission and distribution of electricity in South Africa and owns, operates and maintains 95% of the national network. Between 2011 and 2015 four such bidding rounds, known as bid windows (BW), had been completed. 390 bids had been submitted, of which 92 were selected for the procurement of 6,328MW amounting to R193 billion (\$20.5 billion) in investment. The transparency of the programme attracted a multitude of international and local project developers and investment into grid-connected renewables in South Africa. The REIPPPP also benefitted the country's sophisticated capital market, which offered long-term project finance.

Under this procurement process, the government provides revenue certainty with a PPA. This guarantee is subject to plant availability. Competitive pricing, compliance with the project's technical requirements as well as environmental laws are key to market entry in South Africa. However, until recently, political

challenges and impending Eskom bankruptcy, resulted in the stalling of the programme and subsequent expiration of many bids.

All outstanding PPAs were signed shortly before the former president Jacob Zuma, stepped down and on 4 April 2018, an additional 27 projects, procured under BW 3.5 and 4, were confirmed. These projects ranged across solar PV, wind, concentrating solar power (CSP), biomass and small hydroelectric technologies.

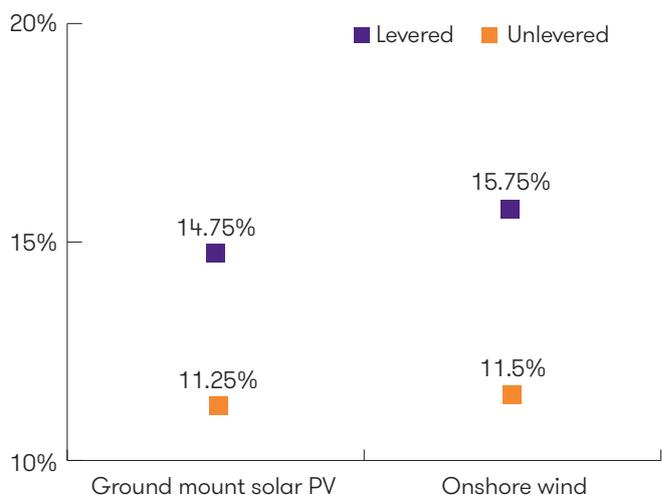
The procurement of these 27 new projects was the biggest independent power producer (IPP) procurement to date in South Africa, representing about 2,300MW of generation capacity to be added to the grid over the next five years, according to the South African Minister of Energy, Jeff Radebe.

The fifth BW is due to kick-off in November this year in an effort to get South Africa's once-buoyant renewable energy market back on track. This BW is targeting 1.8GW of capacity worth c. R50 billion (\$4 billion) but this will hinge on the success of Eskom's financial restructuring.

Discount rates

Please find beside the results of our survey for South Africa.

The cost of capital has narrowed with increased competition from the REIPPPP programme.



Recent transactions

Date	Technology	Entities/ Company	Transaction value (USD)	Details
Q3 2018	Onshore wind	Enel Green Power RSA	1,103 million	Enel Green Power RSA, a South African Renewable energy developer, has signed project financing agreements with lenders for a portfolio of 5 new wind energy projects with a capacity of approximately 700MW. Construction is expected to commence at the end of 2018 and the projects are expected to be operational by 2021.
Q3 2018	Ground mounted solar	Scatec Solar	322 million	Scatec Solar to commence construction in the third quarter of 2018 of 3 solar power plants in Upington, South Africa under the REIPPP programme. The approximate capacity for the project will be 258MW and expected to be operation by the end of 2019.
Q3 2018	Wind Farm	Gestamp Corporation	174 million	The 102MW Copperton wind farm is located in Northern Cape, South Africa. The project represents a total investment of \$169.22 million. On 6 September 2015, Gestamp Renewables secured a 20-year PPR (PPA agreement) for it. Gestamp Renewables was selected as preferred bidder under Round 4B of the REIPPPP procurement process following its submission in August 2014. On 9 April 2018, Elawan Energy secured the 20-year PPA for its 102MW Copperton wind farm.

Conclusions

There remain some enduring challenges in the renewables market in Africa and there are contrasts across the continent in terms of transparency, co-operation from governments, regulatory environment and the capital markets. M&A activity is limited with projects typically being project financed. However, there is a clear trend across the continent of governments accommodating and promoting the renewable energy sector in the form of capital and more favourable regulations. We are hopeful this will spur both greenfield and brownfield activity. This trend will accelerate as the technologies become more affordable and consumption increases due to population growth.

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We hope you find this report insightful.

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Renewables in Africa

Renewables in Africa is a clean energy engineering consultancy providing services in renewable energy and energy management to project developers and investors. RiA is primarily focusing in projects in Africa but will also advise clients for projects in other emerging markets. We provide technical assistance, markets insights and routes to markets to projects developers, investors and clean energy companies. We are also a media platform with vision to transform Africa and African lives by leveraging the power of renewable energy. The ambition is to raise the technical awareness of renewable energy and energy management in the African continent and disseminate the information.

Should you wish to share any comments or ideas for questions you would like included in subsequent surveys, please contact **Tomas Freyman, Valuations Partner at Grant Thornton UK LLP** at tomas.freyman@uk.gt.com / +44 (0) 20 7184 4336 or any of our country leads below.

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