

A paradigm shift towards renewable energy finance for Sub-Saharan Africa?¹

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Introduction

Sub-Saharan Africa is one of the most promising future markets for renewable energy projects for the next decades. There is a significant effort of project developers and investors to enter the market. But huge stumbling blocks hinder the realization of projects. For this reason Allianz Climate Solutions and the Project Development Programme (PDP), implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) under the German Energy Solutions Initiative of the German Federal Ministry for Economic Affairs and Energy (BMWi), hosted a workshop in Berlin to discuss possible financing models for CAPEX-free operator models for photovoltaic projects in Ghana and Kenya.

Under the participants of the workshop were institutional investors, representatives from crowdfunding platforms, project developers for photovoltaic, storage and hybrid solutions, the Federal Ministry for Economic Affairs and Energy (BMWi) and the International Finance Corporation (IFC) as member of World Bank Group.

A very fruitful discussion on the objectives, contributions and needs of every represented institution was proof that the topic of renewable energy projects in emerging markets stirred the interest of the workshop participants. All attendees were united by a blazing fire to get things moving. Consensus existed regarding necessity, meaningfulness and economic opportunities, but also that frameworks and financial structures are missing in those pioneer regions.

The need for discussion and exchange between investors, project developers and financial institutions as well as policy makers was identified as crucial in order to successfully develop and implement responsive solutions to the upcoming challenges in emerging markets like the Sub-Saharan region. Can we already observe a paradigm shift in the financing models? This discussion paper addresses possible ways of rethinking the transaction process and developing tools for renewable energy projects which could be a step forward to respond to the challenges of emerging markets.

¹ The findings, interpretations and conclusions expressed herein are those of the authors and do not necessarily reflect the views of Allianz Climate Solutions GmbH.

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Berlin



Figure 1: Berlin at night²

The picture above shows the German capital by night photographed by the International Space Station (ISS). Streets are as easily identifiable since a stable grid is available and reliable in Germany and Europe.

Interesting fact: the old separation between East and West Berlin is apparent by the city lighting: matt bluish-white light within the Western part of the town and warm more yellow light in the Eastern quarters.

Some might refer to old-fashioned light bulbs in the East and modern LEDs in the West. But actually efficient LEDs are not spread widely yet. Sodium vapor lamps light up the Eastern while mercury vapor lamps light up the Western city. The transition to more efficient LEDs and with this a unification of the Berlin illumination is yet to come.

One can transfer this picture to the established world of the “Energiewende” – the transformation from fossil fuel and nuclear power to renewable energy and energy efficiency – into a world of green tech and clean tech.

² Berlin at night from the ISS: Accessed 2016/11/30.

Africa



Figure 2: Africa at night³

Regarding renewable energies, the starting position is a completely different one. Nowadays nearly 600 million people⁴ suffer from a lack of electricity. After sunset whole regions fall into darkness.

One cannot speak about “Energiewende” or energy transition – the African debate is first of all about electrification. But emphasizing technological solutions as modern, clean and sustainable as possible.

Electrification is one of the major challenges for Africa. Energy poverty, limited access to reliable and affordable energy, and high electricity prices are barriers to the industrial sector, economic development and the standard of life in general. What type of energy is Africa

³ Africa at night by NASA: Accessed 2016/30/11.

⁴ IRENA 2012: 2.

going to choose to meet the needs of its population? Will it follow the path of the industrialized countries by installing expensive (and CO₂ intensive) fossil fuel plants or will it skip this stage of industrialization and straight enter into clean energy power supply?

“What worked well in Europe and other mature photovoltaic markets cannot be a simple template for the new markets in Africa.” Sebastian Hack, ib vogt

The African Energy Challenge

Africa’s population quintupled since 1950 and this rapid population growth is expected to continue. UNICEF expects another doubling from 1.2 billion people in 2015 to 2.4 billion in 2050. This means that half of the expected world population growth will take place on this continent⁵.

A similar fast-paced development appears regarding urbanization. Moving beyond the image of a rural continent – 40 % of the African people are currently living in cities, an increase of this number to 60 % is expected by mid-century⁶.

This rapidly growing and young population has an increasing energy demand. Secure energy supply is urgently needed for homes and business as well as for village’s and cities’ infrastructure, for transportation and communication. Up to nearly 57 % of the population⁷ have no access to electricity at all.

The increase of population and the growing lack of electricity affects the Sub-Saharan region exponentially. It is an enormous potential:

Today 13 % of the world’s population lives in the Sub-Saharan region but they only represent 4 % of the global energy demand⁸. In 2012 two-thirds of the population in the Sub-Saharan African region did not have any access to electricity⁹. According to the International Energy Agency (IEA), the electricity demand of 2012 will be exceeded more than three times by 2040¹⁰ but still 530 million¹¹ people will remain without having access to power. Electrification situation is more developed within the North African (98 %) countries and South Africa¹². Two-thirds of the African population will live in the Eastern and Western African countries by 2050¹³. And still 40 % of the population will live in rural areas with very limited access to modern energy.

Besides energy poverty and grid stability the highly unreliable energy supply poses a real problem and has considerable implications for the industry. Furthermore power outages are very common with all its negative effects.

Insufficient electricity supply is seen as the major barrier for the development of African businesses¹⁴ – higher ranked than tax rates, political instability, corruption and crime¹⁵. Reliable and affordable energy access and economic growth are strongly linked.

⁵ UNICEF 2014: 7.

⁶ UNICEF 2014: 9.

⁷ IRENA 2012: 2.

⁸ IEA 2014: 13.

⁹ IRENA 2015: 9.

¹⁰ IEA 2014: 80.

¹¹ IEA 2014: 3.

¹² IASS 2016: 9.

¹³ UNICEF 2014: 15.

¹⁴ IEA 2014: 25.

¹⁵ AREI 2016: 13.

Sub-Saharan Africa is the region with the lowest energy use per capita in the world¹⁶. 80 % of the population rely on the traditional usage of biomass –two-thirds of energy consumption is for households with the highest share for cooking with mainly fuelwood¹⁷. Nearly 730 million people¹⁸ use harmful forms of cooking. According to the World Health Organization (WHO) more than 600,000 people died due to household air pollution in 2012.¹⁹

In 2012, 48 % of the total primary energy demand came from bioenergy whilst electricity generation and the transport sector are dominated by fossil energy sources. The energy mix differs from country to country, e.g. energy in the Eastern and Central regions is mainly generated by hydropower²⁰. Many African countries are still very dependent on importing fossil fuels.

Excluding the traditional use of solid biomass, modern renewables do not even account for 2 %²¹ of the current energy mix although their share has grown relatively substantially within the last years²². The potential is huge with the main source in large-scale hydropower and an increasing interest in photovoltaics and wind power.²³

Renewable energies are incentivized by policies in most African countries. Instruments, policies and concepts include feed-in tariffs/premium payments, auctioning of power supply, net metering, tax reductions. The targets for renewables' participation in the energy mix are among the world's highest.²⁴

Powering Africa with a higher share of renewable energies would help to solve three problems at the time: It would fight energy poverty and contribute to economic growth by establishing a clean and environmental friendly domestic energy system. The reduction of negative external effects to the global community is another vital benefit. The development of renewable energies has the strong potential of improving the living conditions for millions of people.

“Sub-Saharan Africa in particular has one of the world’s highest potentials for solar PV power generation. However, so far, these possibilities are only harnessed to a very small extent. Despite huge project development activities on the whole continent we see only very few closed transactions and projects under implementation.”

Sebastian Hack, ib vogt

¹⁶ IEA 2014: 33.

¹⁷ IEA 2014: 45

¹⁸ IEA 2014: 3.

¹⁹ WHO 2014: 1.

²⁰ IASS 2016: 18.

²¹ IEA 2014: 38:

²² IASS 2016: 19.

²³ REN 21 SADC 2015: 10.

²⁴ REN 21 2016: 107.

Investments

In view of the stagnating opportunities in established renewable energy markets the African continent with its enormous potential could become quite interesting for foreign EPCs and investors.

“Strong political and country risks have long hampered renewable and traditional energy infrastructure investments in Africa. At the same time the renewable energy suppliers first focused on markets in Europe and North America. Today however the spectacular cost decline as well as easy and decentral availability of clean technologies make renewables an ever more viable solution for energy poverty in Africa.”

Timon Herzog, GRIPS Energy

Europe has become a challenging market with declining return rates. Furthermore, the availability of attractive new projects is decreasing. The European market is shifting from feed-in tariffs to tenders for large-scale projects and new applications for the residential market.

“Trying to do business-as-usual which worked pretty well in the past subsidy- and feed-in tariff driven era is no sufficient strategy any longer. In order to stabilize or even increase market share traditional views and strategies have to hold up a critical and honest reality check. The competition for (large and utility scale) investments has become tougher.”

Bertram Uecker, prospaera

In addition, as costs for particularly solar and wind were and are falling, now projects in more locations are viable, in emerging as well as in developing markets.

Despite their multiple benefits, the overall expansion of renewables in Africa remains very moderate and mainly concentrated in a selected number of countries. Although there is a large number of initiatives, harnessing large-scale investment in the energy sector in general and the field of renewables in particular remains a critical challenge.

Hence, on the one hand we can observe a high technical and policy supported potential as well as a shift from established to developing and emerging markets. But on the other hand we see only few investments in these markets: In 2014 only 3 % of the global renewables investments were attracted by African projects (South Africa accounting for USD 5.3 billion)²⁵. Within the last 10 years USD 33.5 billion have been invested in total.

One of the major challenges is a lack of clear and stable economic framework. A second big issue for the implementation of renewable energy projects in the Sub-Saharan region is access to finance. Obtaining financing at affordable rates is a huge challenge. On the other side risk-return-ratios seem to be still unfavorable for most investors. Are investments too risky? Are the investors' expectations up to date?

There are big obstacles and deficiencies within the established transaction mechanisms to scale-up the realization of renewable energy projects in Sub-Saharan Africa. What are structural barriers that hinder the process of project financing in that region?

²⁵ REN 21 SADC 2015: 13.

Relatively high risks prevail in the African energy sector generally which is constraining investments in the energy sector:

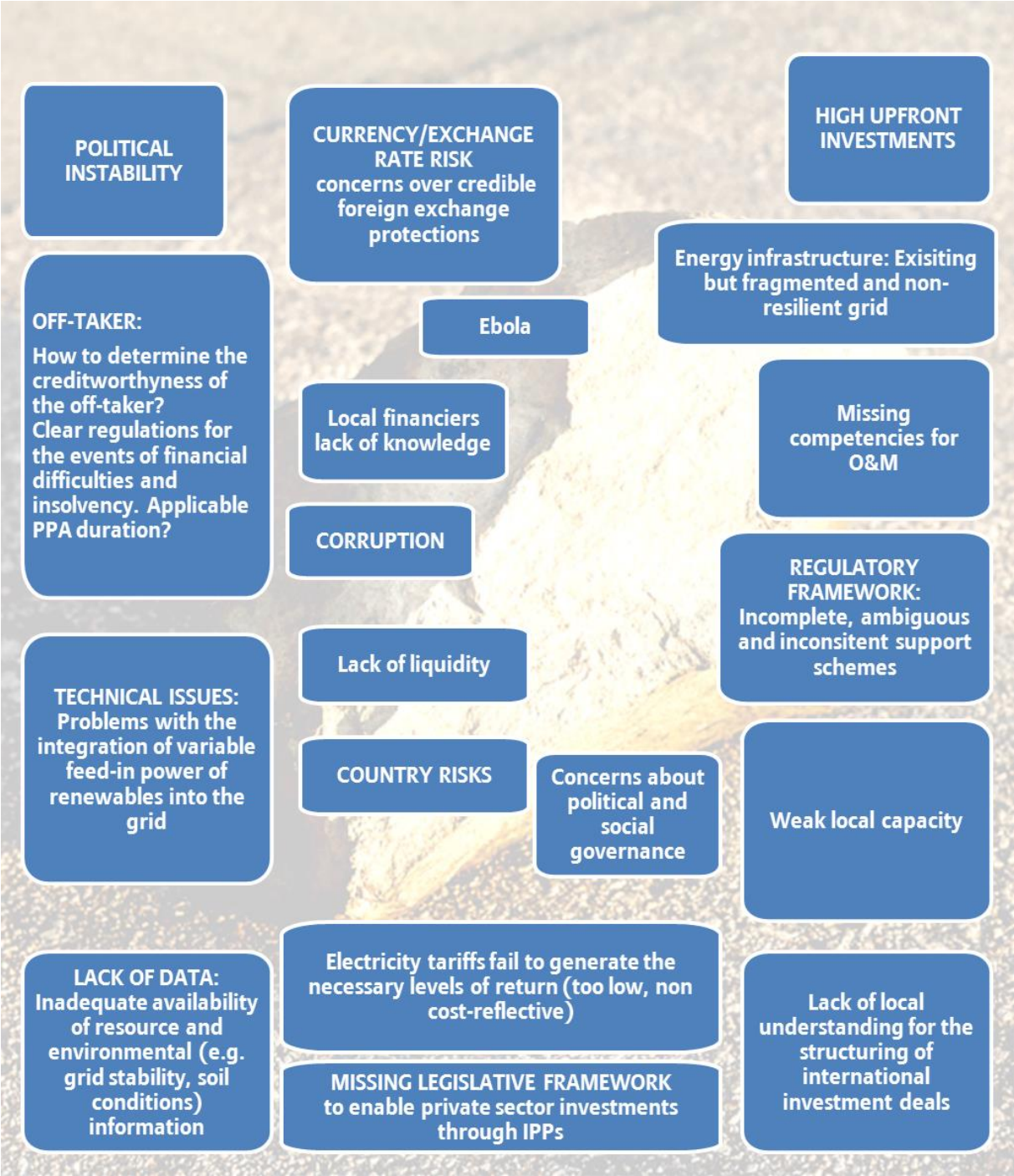


Figure 3: Barriers to investments²⁶

The table does not only show a lot of barriers but also their partially conflicting interaction, e.g. the integration of renewables – in itself it is not a technical problem but it is based on a huge lack of local capacity – knowledge and experiences.

Studying a lot of reports and papers regarding risks and risk mitigation one point seems missing but should be named as one of the big obstacles: the overall approach. Nobody seems to be quite sure **how** to enter emerging markets.

²⁶ Gathered with support of Sebastian Hack, ib vogt / Timon Herzog, GRIPS Energy / Bertram Uecker, Prospaera Sustainable Alliance.

The only constant is change

In the introduction we took a look at Berlin and Africa by night. No need to tell about a necessarily other way to deal with Africa.

“One cannot answer new challenges with old recipes.” Bertram Uecker, *prospaera*

For a moment let us transfer our renewables to the automotive industry – how would they sell cars? For the developed markets they build and sell cars for streets but would they start building streets to sell cars in Africa or wouldn't they rather build off-roaders?

Due to the lack of experience and different framework conditions traditional structures cannot be applied in emerging markets in the same way. In emerging markets, it is not sufficient to understand just the project itself, but the overall context has to be analyzed to be able to build an interconnection between cash-flows and the project itself. For this reason there is an obligation for a shift of mindset – away from building and financing renewable energy projects the way we are doing it within the established markets and very different contexts.

1. First of all, an in-depth understanding for the Sub-Saharan market is required – as a first step to overcome these barriers.

Europeans often recognize Sub-Saharan Africa as a single market. But no one would refer to Europe as a single market for renewable energy projects. Every country in Sub-Saharan Africa has manifold and unique challenges and its own opportunities. This lack of understanding has to be bridged to fully understand the opportunities and challenges in each market. One cannot understand the risk without taking the time to learn more about the place. It is often more about risk perception than risk itself. Information and knowledge provide confidence and security.

There is a crucial need for getting more than familiar with local circumstances, to understand the domestic market. An on-site evaluation of risk profiles is necessary. This is why foreign investments should be implemented by building partnerships/partnering with local developers – including potential off-takers as shareholders into a project as they are familiar with the local circumstances. Access into the new market and mutually beneficiary capacities on a committing base are much more certain.

2. Think obstacles as opportunities

“Renewables are disruptive per definition, so renewable energy innovation will be disruptive. Disruptive innovation is possible because fundamentally new approaches address existing needs. Key to tapping the African renewables markets is to re-think products by identifying and addressing local need. Challenge becomes opportunity.”

Simon Bittner, GIZ

Missing grid connection and grid capacities are understood as an obstacle to projects. For the whole continent, connections to central electric grids are extremely uneconomical. It would take decades to pay-off, if at all.²⁷

“Today's clean energy technologies have made a centrally organized power supply architecture obsolete. This is a unique opportunity for less developed countries who don't have to redesign an old-fashioned system based on large power producers and central energy supply but can leapfrog to a significantly cheaper decentralized system”

Timon Herzog, GRIPS Energy

²⁷ REN 21 2016: 87.

Bearing this in mind and considering the following arguments, two trends occur:

- a. An expansion of **off-grid** and **storage** energy services (often small-scale) particularly driven by local innovative entrepreneurship takes place. For off-grid-areas local storage could support the application of solar and wind within remote areas even more since cost of batteries are rapidly falling.
- b. 2015 about USD 65 billion were invested in **small-scale energy projects** (< 1 MWp) worldwide.²⁸ Small distributed power systems have the potential to drive innovation and value creation in an African low-carbon economy as they involve millions of people. Utility-scale projects are fitting better to our mindset: big project, high transaction cost, small projects – even higher with regard to installed capacity.

“Logically, it’s much easier to scale a decentralized energy infrastructure and leapfrog the cumbersome, expensive and slow nationwide top-down grid extension.”

Timon Herzog, GRIPS Energy

“For a sustainable and successful market development it will be of high importance to find and pave the way for standardized financing and risk mitigation solutions.”

Sebastian Hack, ib vogt

Are there ways to scale-up those small-scale projects especially for off-grid and rural areas?

The “old” world shows large and grid-connected projects, the “new” one offers rural off-grid areas and increasing investments in small-scale projects.

A paradigm shift is needed away from blueprinting to the recognition of these new, specific trends. From a new perspective, missing grid connections and small projects linked with high transaction costs can be seen as opportunities for off-grid applications and a pooling of small-scale projects to portfolios by standardization.

Standardization can be carried out for technological aspects (e.g. usage only of components with defined criteria, criteria for commissioning) as well as project parties (e.g. assessed and approved – local – partners with sufficient references) and contract design (e.g. standardized supplier, EPC and O&M-contracts). With this, small-scale projects could be transferred into a bigger and homogenous portfolio.

“Comparable with the continent-wide launch of mobile networks without the landline detour – Africa can substantially benefit from technological leapfrogging experiences.”

Sebastian Hack, ib vogt

Bertram Uecker from Prospaera Sustainable Alliances states that “institutional investors are not eligible for the first project stages”. While in established markets institutional investors are meanwhile willing to bear even development risks, handing over assets in emerging markets requires a few years of successful commissioning. The lifecycle from an investor’s view has to be redesigned.

²⁸ Frankfurt School FS-UNEP Collaborating Center 2016: 54.

3. Risk-return profiles of investments have to be shifted. An approach might be to turn investment stages upside down by starting with the final investor.

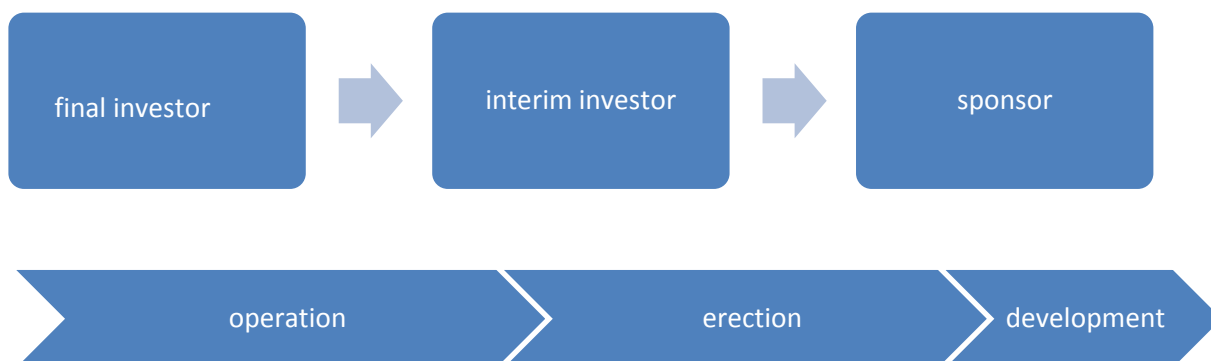


Figure 4: Turning investment decisions upside down

“We see significantly more complex project design cycles as well as an content-related paradigm shift. Risk mitigation and financing strategies as well as the financial structuring are in the limelight from the beginning and are one of the priorities of our work. The question of bankability is a continuous – if not to say daily – companion.”

Sebastian Hack, ib vogt

4. To unlock the Sub-Saharan potential it is also time for the evolution of bankability. Sophisticated but flexible industry standards need to be built.

In established markets, the realization of renewable energy projects is done with a meanwhile proven system. For those markets, bankability advisory is reduced to technical, tax and legal advisory services since market participants are familiar with the transaction procedures.

True bankability examination takes place where project developers and investors meet. In its actual sense, bankability is the enabling connection between market, project and capital procurement. Time to get back to it and not only to assess projects and financial models but to develop them.

“In developing countries the success of institutional investors is determined by how soon and how serious they start shaping the renewable energy projects of tomorrow. You have to initially specify the project which you want to buy 4 years down the road”

Simon Bittner, GIZ

True Sustainability

“It is not the strongest species that survive, nor the most intelligent, but the ones most responsive to change.”
Charles Darwin

Bridging the gap to tap the potential of renewables by making projects and financing meet on common ground requires a paradigm shift. First, it is about knowledge building to gain a deep understanding on the domestic market. In this process, local businesses are to be involved to receive wide acceptance (and thus their support). We must not try to transfer our established energy transition model to emerging markets. Africa is about to leapfrog to a low-carbon future energy system. In order to implement this future energy system successfully, local realities and trends offer an applicable way to realize renewable energy projects within one of the most promising markets for the next decades.

For investors, advisors and project developers and EPC companies as exporter firms of ideas, concepts and projects from established markets, the application of business models for renewable energy projects and thus their realization do not only lead to higher yields, selling prices and a contribution to a low-carbon society. They also support Africa's citizens, foster economic growth and open up a diverse new international market region. This value proposition makes renewables more sustainable than ever.

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