Energy transition in Africa
Economic expansion and population growth are driving the demand for electricity. Abundant renewable resources are available to meet this need for power.

The long road to power
Before small- and medium-scale energy projects can be financed in Africa, they must first be developed. This requires financial resources and, above all, expertise.

“Transparency is of key importance”
With an entire social engagement team, responsAbility is ensuring that the Nyamindi power plant project on Mount Kenya gains the support of the local population.

From river current to electricity
How small-scale power plants planned, developed, financed, built and operated by a responsAbility-managed company are providing a sustainable power supply for rural regions of Africa
The demand for electricity in Africa is soaring as a result of economic expansion and population growth. However, an inadequate energy infrastructure means that the continent is chronically underserved. Abundant renewable resources are available to meet this need for power.

Africa’s economy is growing. Between 2000 and 2014, countries in Sub-Saharan Africa achieved average annual growth rates of 5%\(^1\) and experienced a level of economic prosperity not seen since the 1960s. Despite these positive developments, around 600 million of the population in Sub-Saharan Africa still have no access to electricity.\(^2\) Rural areas in particular are massively underserved: While in 2012 the average electrification rate in Kenya was around 23%, only 7% of the rural population was connected to a mains power supply.\(^3\)

Even where there is a power line, the supply is anything but reliable. African manufacturers have to contend with power outages on an average of 56 days per year. Their subsequent loss of annual revenues can be as high as 20%. Most of these companies operate their own generators during power outages to avoid having to stop production each time.

A recent report estimates that Sub-Saharan Africa needs to add 292 GW of electricity by the year 2040, which would amount to an investment of about USD 490 billion.\(^4\) It will not just take a herculean effort to finance and build these projects. A tremendous amount of effort and close to USD 40 billion will also be needed to develop the projects.\(^5\)

**An abundance of resources**

The natural resources needed for energy production—biomass, water and the necessary river gradients, geothermal heat, wind, and in particular solar radiation—are available in abundance in Africa. It is often called the ‘Sun Continent’ given its abundance of sun and potential for solar power. It is therefore not surprising that Africa is increasingly looking at these resources to generate more power. While currently the role of renewable energy in power in Africa is still small, it is expected to grow significantly.

Through an investment company focusing on Sub-Saharan Africa, responsAbility is developing, financing, constructing and operating small- and medium-scale renewable energy projects. The objective is to open the way to more power for the region and to ensure a sustainable supply of renewable energy at fair prices for the growing population while, at the same time, providing stable long-term income for investors from a diversified portfolio of power plants.

---

5. Source: Solargis.info.
6. Source: Index Mundi.
Growing economies: Since the start of the millennium, countries in Sub-Saharan Africa have reached a new level of prosperity.

Unreliable electricity supply: African manufacturers have to contend with power outages on the equivalent to an average of 56 days per year.

Average electricity consumption in Sub-Saharan Africa (excluding South Africa) is 150 KWh per capita, compared with 12,186 KWh in the USA.  

The installed renewable power generation capacity in Sub-Saharan Africa is about 30 GW – around 30% of the installed power base.  

600 million Africans, particularly in rural areas, have no access to electricity.
Nyamindi, Kirinyaga County, is located 130 kilometres or a 2.5-hour drive to the north east of Nairobi. It is mid-May and the rainy season is gradually coming to an end. After weeks of intense rainfall, the landscape is covered with lush green vegetation.

Kirinyaga is the Massai name for Mount Kenya which, at 5,199 meters, is the second-highest mountain range in Africa. Its tallest peaks are covered in snow all year round. Although it is only a few kilometres south of the equator, the mountain range has a total of 11 glaciers.

It is also the source of numerous rivers that supply water directly to two million people. One such river is the Nyamindi – the reason for our visit.

150 GWh from hydropower each year

Water flows rapidly over the rocky river bed. Apart from grass and stones, there is nothing to see on the banks of the Nyamindi – at least not yet. “From September 2018, this site will be home to the Kiamutugu hydropower plant,” explains Jerry Owuonda from responsAbility Investments in Nairobi. The 28-year-old environmental scientist and hydrologist is assisting project developer Victor Okinda with the planning and construction of the power plant cascade on the Nyamindi.

A total of four small-scale power plants with a total capacity of 26 MW are being built on the river. It is planned that they will jointly generate 150 GWh of renewable energy each year – enough to supply power to 200,000 African households, given the average consumption of 150 kWh per capita in Africa.

Even if it will still take time for the river to produce its first electricity, much has already been accomplished by those responsible for the project.

THE LONG JOURNEY FROM THE RIVER TO ELECTRIC POWER
THE NYAMINDI CASCADE: FOUR RUN-OF-RIVER POWER PLANTS WITH A TOTAL CAPACITY OF 25.5 MW

April 2015: Start of negotiations about the development rights
October 2015: Signing of formal agreement with local promoter
March 2016: Selection of technical partner
May 2016: Awareness programme for local population
July 2016: Start of technical feasibility study
May 2017: Completion of technical feasibility study
June 2017: Financing round
In the beginning, there was demand

In 2011, Patrik Huber was sitting in Nairobi with instructions to open a regional office in Africa for his employer. As a specialist in development investments, responsAbility wanted to establish a presence on the ground in its investment countries – close to where things are happening – by opening its own branches.

“I met with as many people as possible to gain an impression of the areas with the largest demand for financing,” explains Patrik Huber. “Energy was a recurrent theme in those discussions.”

Anyone who has experienced the frequent power outages in Africa knows why. A reliable electricity supply is still wishful thinking across large parts of the continent. Population growth, urbanization, industrialization and rising living standards are continuing to drive up demand. Production can’t keep pace with this trend – especially outside major urban centres.

Demand for the supply of electricity exists, as does the legislative framework for investment. “In Kenya, Rwanda and Uganda, the governments want to support the production of renewable energy and are therefore providing price guarantees for renewable electricity,” explains Patrik Huber. “As a result, investors can ensure that their investments will generate reliable returns over 20 or 25 years. It is no wonder that this investment theme is attracting a high level of interest.”

“Africa is home to one billion people. Only 30% have access to electricity. Our goal is to capture this potential, even in this challenging environment for investors,” explains Jerome Niessen, responsAbility’s Managing Director for renewable energy investments in Africa. Before starting with responsAbility he developed, financed and built wind farms in India and the USA and concluded infrastructure investments in emerging markets for the IFC.
Small-scale power plants for rural areas

In concrete terms, the people that Patrik Huber spoke to repeatedly mentioned the potential of smaller-scale projects in the area of renewable energy. Such projects can make a significant contribution towards supplying rural areas with electricity. At the same time, they are a manageable size – making them easier than large plants to develop, finance and construct, while at the same time having less of an impact on the environment.

The major problem was the lack of investable projects. Patrik Huber explains: “In a challenging environment such as Africa, international companies focus on larger projects, since their overheads are too high for small-scale power plants. This means that if you want to invest in small- to medium-scale power plant projects, you first have to build them.”

The missing link: investable projects

It was clear to Patrik Huber that there was a gap in the market: On the one hand, there was an existing and constantly growing demand for the supply of electricity. On the other hand, there was investor interest in this area. The missing link was the availability of projects that can be implemented and are investable.

Patrik Huber is not a person to allow obvious potential to go untapped. “Connecting market potential and investor interest – that is responsAbility’s motto,” he explains. “We couldn’t allow ourselves to miss out on this type of opportunity. I simply didn’t know that we, as an asset manager, would have to get the projects up and running.”

Top left
“I’ve been battling for more than 10 years to have the Nyamindi used for hydropower,” says Stephen Nyaga, local promoter. In 2003, the engineer from Mount Kenya called on Kenya’s parliament to end the state monopoly on the production of electricity. The relevant legislation was passed in 2008.

Top right
responsAbility is being approached by people like Stephen Nyaga to take over part of the project. In return for the development rights the community will be granted ownership of part of the electricity produced by the Nyamindi cascade.

Opposite page
Nyamindi illustrates the way in which responsAbility can create value. “The promoter’s original project involved the construction of a 6 MW power plant. We calculated that the river could produce more than three times that amount of electricity,” explains Victor Okinda, who is leading the project at responsAbility.
“A reliable electricity supply is still wishful thinking across large parts of Africa.”

Patrik Huber, Regional Director Sub-Saharan Africa, responsAbility Investments AG

There is water in the Nyamindi all year round and the river has the necessary gradients to produce electricity. responsAbility hydrologists have been collecting data on water levels and flow rates since October 2015 as a basis for the feasibility study.
responsAbility originally wanted to buy into 50% of projects in the market and to develop 50% of them itself. “It was only when we started actively targeting the market that we saw the scale of the preparations that were still needed. It is a long road to power,” Patrik Huber explains.

With a little help from our friends ...

By spring 2013, responsAbility Africa had around ten employees based in Nairobi and investing in the financial and agricultural sectors. Even though business was booming, Patrik Huber wanted more. And he finally met the partner who could help him to take the next step forward.

Monika Beck was Head of the Financial System Development team at Germany’s KfW Development Bank at the time. KfW had defined access to energy – especially in Sub-Saharan Africa – as a fundamental issue and was looking for private partners to enable it to execute its plans in this area. “Our financial resources are provided by Germany’s Federal Ministry for Economic Cooperation and Development and are to be used on a revolving basis,” says Monika Beck. “This allows a broader spectrum of investments to be implemented sustainably.”

responsAbility and KfW jointly defined the shape that their collaboration would take: KfW was to invest in a new company as a majority shareholder. The company was to develop small-scale power plants in Africa with guaranteed long-term purchase agreements with operators of national power networks or other purchasers who are similarly creditworthy.

responsAbility built up an interdisciplinary team of energy and financing specialists to run the company. Private investors are to be brought on board as soon as the company shows signs of generating a return. The initial investment made with public money serves as the foundations for sustainable development.

Top left
“To build power plants in Africa, you need to have a team on the ground,” explains Joseph Ng’ang’a, responsAbility’s Executive Director for renewable energy investments in Africa (top left with Patrik Huber). “The implementation process requires a presence on the ground and a knowledge of local practices.”

Top right
Once construction works at the Nyanzidi starts, there will be job opportunities for the local population, either in the form of direct employment or in supplying workers with catering and other services.
At the end of 2016, 12 of the now 40-strong team of responsAbility employees in Nairobi were working for the energy investment company – including financing experts, engineers, hydrologists and project developers, not to mention environmental scientists and experts who manage relations with the local population.

In total, 10 of them are from Africa – and that alone is an achievement according to Joseph Ng’ang’a, who has been building up the team since the end of 2013. “It is not easy to find specialists in this market,” he emphasizes. “In this relatively new sector there aren’t a lot of experienced experts locally, and international experts who are willing to relocate to Nairobi are prohibitively expensive.” For the type of projects managed by responsAbility, geographical proximity and an understanding of local culture are essential: Small-scale power plants can only be built here by an organization with a presence on the ground, Joseph Ng’ang’a believes.

The team led by Joseph Ng’ang’a now has 13 projects in the pipeline in four countries. For one of the projects, building work will begin on the site in early 2017. The Nyamindi cascade is one of the most complex projects and will keep Victor Okinda and his colleagues busy until 2021. The four small-scale power plants on the Nyamindi should be completed by then and will feed 150 GWh of renewable energy into Kenya’s grid each year – providing the population on Mount Kenya with a reliable supply of energy. It will also be a sustainable investment for its owners.
“Transparency is important to us.”

With an entire social engagement team, responsAbility is ensuring that the Nyamindi power plant project has the support of the local population on Mount Kenya.

“...people here have access to electricity,” says Paul Ombai as he leads the way along the narrow path that connects the plots of land close to the Nyamindi. “There is a power line but the network is anything but stable and the connection charges are high. That is why a lot of people wait before asking to be connected.”

Paul Ombai, Social Engagement & Liaison Officer for responsAbility, has first-hand knowledge of this. Since October 2015, he and his team of three people have spent at least one day a week here on Mount Kenya talking to local inhabitants.

Bringing the population on board from the beginning

“Even before we can begin the feasibility study for the actual project, we have to ensure that the company has the backing of the local population,” he explains. “If their support can’t be guaranteed, that can have fatal consequences.” Paul Ombai knows what he is talking about: The failure of a major project in Kenya hit the headlines only recently. The consultation with the local community was carried out too late and they blocked the construction of the plant.

responsAbility wants to avoid this type of experience. Paul Ombai’s role is to cultivate relations with the local authorities, the community and also numerous non-government organizations. “A power plant project such as this has an impact on a very wide range of stakeholders. A lack of information fuels fear. It is important to us that people know that this will mainly be of benefit to them.”

This is not clear to everyone at first glance. “In addition to an improved electricity supply, the project offers other opportunities,” emphasizes Paul Ombai. “Jobs are created here during the construction phase. Local providers can supply materials such as bricks or sand for the building site, not to mention selling food to the workers. And, in particular, a stable electricity supply will attract manufacturing companies to the region, thus generating employment.”

The river remains intact

responsAbility wants to minimize the negative impacts of the construction of the power plant. “We plan run-of-the-river power plants where only part of the river water is diverted for electricity generation,” explains Paul Ombai. “In doing so, we ensure that there is always enough drinking water and water for agriculture and fishing, as well as to swim in.”

The water that is diverted from the river is transferred to the power plant itself via open channels or – ideally – through underground pipes. This requires land: a five-meter-wide strip crossing countless plots of land that responsAbility wants to buy from the landowners. “We are planning to transport the water below ground, allowing farmers to continue cultivating the land.” It is nevertheless necessary for responsAbility to buy the land. “We need to ensure that we have access to the pipes,” says Paul Ombai.

That is a sensitive topic. The fertile land on Mount Kenya is farmed intensively – primarily by smallholder farmers whose plots of land continue to decrease in size as they are divided up. “Some cultivate plots of 500 m². In such cases, a five-meter-wide strip probably matters a lot.”

Paul and his team are spending four weeks going from house to house and explaining what responsAbility is planning and how this will affect the local population. They managed to visit 100 households in week 1 and have another 200 to go.

What was the response so far?
“Largely positive. We explain our plans to people and tell them that we work with external experts to determine a fair price for any land purchases, etc.” says Paul Ombai. “And we explain to them that further information will soon be provided. We will hold a meeting for all members of the community at which they can publicly ask questions and discuss matters. Transparency is important to us – this is the only way we can sustainably implement the project for the benefit of everyone concerned.”
Above
Willis Gachiri (center, with his wife) farms 4,000 m² of land which used to belong to his parents Nimrod and Margret (above). He wants to get connected to mains electricity to power a mowing machine, lights for his home – where his two daughters study – and a television. At present, he charges his mobile phone at a neighbour’s house once a week at a cost of USD 0.20.

Top row
According to Paul Ombai (top right, listening) the greatest benefit of the Nyamindi project for the local population is that power plants stabilize the local electricity network – which only then becomes attractive to consumers.

Left
Stephen Nyaga (right) speaking to a local farmer.
“We knew this was a difficult task.”

Dr. Johannes Feist represents KfW and the German Federal Ministry for Economic Cooperation and Development (BMZ) on the Management Board of responsAbility’s energy company for Africa, where BMZ is by far the largest investor. He describes how roles are shared between the public and private sectors.

Dr. Feist, why are BMZ and KfW supporting the expansion of the energy supply in Sub-Saharan Africa?

Access to energy is a human right. Energy – and specifically electricity – is a vital prerequisite for development, education and the use of media and is therefore essential for every type of development. Against this backdrop, it is clear that ensuring the supply of energy across the whole of Sub-Saharan Africa is a major development goal – and this is therefore assigned key importance by BMZ and KfW.

I should point out that in addition to the electricity network, a decentralized energy supply will remain crucial in large parts of the African continent: The distances are simply too great and the density of usage is too low for it to be possible to build an electricity network that provides blanket coverage.

How important is the focus on renewable energy in this context?

It would be unrealistic to call for all of the energy that is so urgently needed to be produced using climate-friendly sources right from the outset. However, if it is possible to harness renewable energy sources when building new energy production plants and to thus replace the current use of biomass as fuel, this will make a valuable contribution to energy transition and prevent the intensification of climate change. BMZ and KfW are also pursuing this objective, and it is being assigned equal importance to the goal of development.

Why did you decide to work with an asset manager?

If you want to develop and build small-scale power plants in certain regions of the globe, i.e. across borders, you need to establish a dedicated company for that purpose. This cannot be achieved by setting up individual projects or concluding bilateral agreements. This type of undertaking only works based on a private sector approach with a special purpose vehicle or investment company. Here, both partners – from the private and public sectors – can contribute their respective strengths.

What role does the private partner play in this type of cooperation?

The private partner can manage and run the company. Management is the main skill required here. Once the company is successfully up and running, the private partner must then be in a position to mobilize private capital for it. responsAbility has already demonstrated impressively that this can work in the area of financial sector development and has used public start-up investments to develop large investment funds that are now financed exclusively by the private sector.

What contribution does the public sector make?

The public sector can integrate a special purpose vehicle into development policy concepts and finance it. The public sector supplies the start-up capital and provides additional funding in certain circumstances. It also supports the marketing process to attract new investors. If difficulties were to arise at government level or in terms of regulations in different markets, the public sector partner can try to assert its political influence.

---

Dr. Johannes Feist is Head of the Financial Systems Development in Southern Africa and Regional Funds team at Germany’s KfW Development Bank.
“Ensuring the supply of energy across the whole of Sub-Saharan Africa is a key development goal.”

Dr. Johannes Feist

What are the public partner’s financial expectations of the project?

The public partner pursues two objectives: On the one hand, it wants to see the capital preserved. On the other hand, it has expectations of a social nature and believes that the corresponding projects should be supported. In concrete terms, this means that an investor such as BMZ does not have the same return expectations as a private equity investor. By lowering its return expectations and covering the initial costs, the public sector partner helps to ensure that the project can be carried out in the first place and is attractive to private investors in the end.

What motivated you to work together with responsAbility?

responsAbility approached us with this project and asked if we would like to work together with it. KfW was not looking for a fund manager for a specific project. Instead, it financed an existing project.

How has the project developed since responsAbility’s renewable energy company for Africa was founded at the end of 2013?

We have had to revise some of our original expectations and adapt to the much more difficult operating environment in Africa. At first, the aim was to invest around 50% in existing projects, which would generate returns as rapidly as possible and allow us to develop the remaining 50% of projects during the first 2–3 years. In hindsight, I have to admit that we were overly optimistic as far as the availability of investable projects is concerned. The market environment is much more challenging than we anticipated.

What impact did that have on the company’s focus?

At present, 100% of the projects are being developed by the company itself. This means that we need to invest substantially more capital than was originally thought to achieve our objective. It has also become clear that the geographical focus on East Africa that was originally defined is too narrow. In the future, the team will look for projects throughout Sub-Saharan Africa. Equally, the initial decision to concentrate solely on small-scale power plants limited the investment universe too much. The scope of investments is therefore being expanded to encompass small to medium-sized production plants.

How is this growth to be financed?

During the initial phase, it is once again necessary for BMZ to step in – as well as other development banks that are pursuing similar objectives and want to finance suitable projects. Private capital should then be mobilized for the funds in the medium term. It is conceivable that a development infrastructure fund would, for example, one day invest USD 100 million in this company.

Is there an upper limit on the size of the company?

There is always an optimal size for a company and it is does not normally make sense to burden a team that is already working so well with additional responsibilities. In the long term, I could therefore imagine that the company may be split into two parts: One part would specialize in project development and the construction phase and the other would buy and sell completed projects. With the investment company, we would then have a structure that would allow us to also take on projects from other developers. This would make it possible to work with several developers, which will become necessary at some point in time. However, that is all still a long way off. At present, everything is carried out by a single organization, which is fine.
Only public investors can make this possible

responsAbility is active in the area of development investments. We have a clear ambition: Through investments, we want to develop markets in developing countries and thus improve living standards for local people. At the same time – as a prerequisite to be able to invest sustainably – we want to generate fair returns for our investors.

When you talk about development, energy is a topic that inevitably arises. Access to electricity is the main factor that facilitates progress in a wide variety of areas. For example, the availability of refrigeration allows farmers to increase production and to target more distant markets; hospitals need electricity to operate; and thanks to the Internet, even people living in remote regions can gain an education. All of this makes a reliable supply of electricity a key development factor.

Developing countries have a lot of catching up to do in this area. If we don’t want to further accelerate climate change, we have a social responsibility to meet this demand via renewable energies – especially in places such as Africa that are experiencing strong growth.

Increasing energy production in developing countries is no simple task. Many governments have so far failed in their efforts to do so. As this publication shows, it is a long journey from the river to electric power. Since it was founded in 2003, responsAbility has continuously entered new territory and made it investable. The fact that we dare to undertake such ventures is part of our DNA. In an ideal scenario, we are able to do so together with experienced and committed partners who – like responsAbility – are accustomed to embarking on long journeys and to seeing them through to the end.

Public investors are of key importance for the development of new investment opportunities. The development phase mainly involves costs; returns are only produced once the projects are in place – but they then span a period of 20 or 25 years. Preparations need to be carried out before responsAbility can mobilize investments in this area in a proven manner.

These preparations require initial investments. My thanks here go to Germany’s KfW Development Bank and the German Federal Ministry for Economic Cooperation and Development (BMZ) for their valuable contribution and trust. Without their initial investments, this undertaking would never have been possible.

The projects should deliver their first electricity from 2018. Once electricity is generated, this will also attract private investment in the construction of power plants in developing countries, which then make the supply sustainable. And responsAbility will be able to deliver on its dual pledge of generating impact and returns.

Rochus Mommartz
CEO of responsAbility Investments AG

Rochus Mommartz is CEO of responsAbility Investments AG and has worked in the area of development investments for 30 years, with public institutions as well as in the private sector.
ResponsAbility Investments AG is one of the world’s leading asset managers in the field of development investments and offers professionally managed investment solutions to both private and institutional investors. Through its investment products, the company supplies debt and equity financing to non-listed firms in emerging economies and developing countries. Through their activities, these companies help to meet the basic needs of broad sections of the population and to drive economic development – leading to greater prosperity in the long term.

RESPONSABILITY

ResponsAbility Investments AG is one of the world’s leading asset managers in the field of development investments and offers professionally managed investment solutions to both private and institutional investors. Through its investment products, the company supplies debt and equity financing to non-listed firms in emerging economies and developing countries. Through their activities, these companies help to meet the basic needs of broad sections of the population and to drive economic development – leading to greater prosperity in the long term.

LEGAL DISCLAIMER

This information material was produced by ResponsAbility Investments AG and/or its affiliates with the greatest of care and to the best of its knowledge and belief. However, ResponsAbility Investments AG provides no guarantee with regard to its content and completeness and does not accept any liability for losses which might arise from making use of this information. The opinions expressed in this information material are those of ResponsAbility Investments AG at the time of writing and are subject to change at any time without notice. If nothing is indicated to the contrary, all figures are unaudited. This information material is provided for information purposes only and is for the exclusive use of the recipient. It does not constitute an offer or a recommendation to buy or sell financial instruments or services and does not release the recipient from exercising his/her own judgment. The recipient is in particular recommended to check that the information provided is in line with his/her own circumstances with regard to any legal, regulatory, tax or other consequences, if necessary with the help of a professional advisor. This information material may not be reproduced either in part or in full without the written permission of ResponsAbility. It is expressly not intended for persons who, due to their nationality or place of residence, are not permitted access to such information under local law. Neither this information material nor any copy thereof may be sent, taken into or distributed in the United States or to any U.S. person. Every investment involves risk, especially with regard to fluctuations in value and return. Investments in foreign currencies involve the additional risk that the foreign currency might lose value against the investor’s reference currency. It should be noted that historical returns and financial market scenarios are no guarantee of future performance.

Texts: Ulli Janett, ResponsAbility
Photos: Jerry Riley
Layout and design: Liebchen + Liebchen Kommunikation GmbH
ResponsAbility Investments AG
Josefstrasse 59, 8005 Zurich, Switzerland
Phone +41 44 403 05 00
www.responsAbility.com

© 2017 ResponsAbility Investments AG. All rights reserved.
OUR OFFICES

ZURICH (HEAD OFFICE)
GENEVA
PARIS
HONG KONG
MUMBAI
NAIROBI
LUXEMBOURG
OSLO
LIMA
BANGKOK
www.responsAbility.com