

# The Challenges of Funding Power and Water Projects in Africa: November 2019



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# Executive Summary

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As the continent of Africa looks towards economic growth, there is an imperative need to build effective capacity in the power sector and increase general access to clean water supplies.

Translating the potential of Africa into economic success depends on the ability of stakeholders to work together to develop the continent's huge energy capacity (in particular power & water).

Sustainable projects such as Metito's landmark Kigali Bulk Water Supply Project signpost real positivity and much needed progress (when completed the project is expected to deliver up to 40 million litres of water a day)

Infrastructure funding is recognised as the No.1 barrier to addressing the huge need for new utility projects across the region. Effective innovative procurement & development strategies are needed as a priority.

It is with this in mind that Open Africa convened an invite only roundtable event in Kigali on Wednesday 6th November.

Over 80+ participants attended.

The aim was to discuss the challenges and outline effective solutions.

All stakeholders in the projects community were represented at the event. This included Government Related Entities (GRE's); Utility NGO's; Utility Operators; Independent Power Producers (IPP's) & Developers; Corporate Finance and Transaction Advisory Firms; Engineering Firms; Water Consultants and Operation & Maintenance Providers.

# Financing Power & Water Projects

Wednesday November 6th  
Kigali Convention Centre, Rwanda

## Speakers involved included:



**Dr. Humphrey  
Ndwiga Richard**  
Regional Power Sector Manager  
African Development Bank



**Joseph Murenzi,**  
Director of Development Services  
WASAC



**Robert Nyamvumba,**  
Energy Division Manager  
Ministry of Infrastructure (MININFRA)



**Dr Benjamin Rutimirwa,**  
Senior Manager  
Research & Development, Rwanda  
Utilities Regulatory Authority (RURA)



**Michael Opagi,**  
Senior Investment Officer  
IFC



**Rami Ghandour,**  
Managing Director  
Metito



**Theoneste Higaniro,**  
Head of Power Generation &  
Implementation, Rwanda Energy  
Group (REG)/ Energy Development  
Corporation (EDCL)



**Walid Madwar,**  
Business Development,  
Vice President, Metito Utilities

## Topics discussed included:

- ▶ Rwanda energy outlook: MININFRA overview
- ▶ An overview of Africa's power and water requirements over the next 10 years
- ▶ Financing Rwanda's immediate power and water needs
- ▶ How do you make PPPs work for effective power & water supply?
- ▶ Technology & innovation and the role it is playing in driving the utilities sector going forward
- ▶ Power and water sector as an enabler for local content

## Responding to the Challenge

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The New Deal on Energy for Africa aspires to achieve universal access for the continent's populace by 2025.

The three main entities behind the project are the Africa Development Bank (ADB), the Africa Development Fund (ADF) and the Nigeria Trust Fund (NTF). These organisations come together to become the Africa Development Bank Group (AfDB).

Headquartered in Abidjan, Ivory Coast, the AfDB has 80 member countries, of which Rwanda is one. As a public institution it is owned and run by its member nations and its stated aim is to contribute to sustainable economic development and the social progress of its regional member nations, either on an individual basis, or collectively.

The AfDB operates under the motto:

**“Building today, a better Africa tomorrow”.**

The group has devised a 10 year strategy built around five pillars (The High 5s as they are known). These are:



**Light Up and  
Power Africa**

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**Feed Africa**

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**Industrialise Africa**

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**Integrate Africa**

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**Improve the Quality of Life  
for the People of Africa**

## RESPONDING TO THE CHALLENGE

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As the group recognised the importance of an adequate, reliable and reasonably priced power supply to drive these stated goals it launched the New Deal on Energy for Africa (NDEA) in collaboration with African Union, like minded financial institutions both bilateral and multi lateral as well as other development partners.

The NDEA utilises the AfDB in a central role among the energy related institutions and has four key elements towards providing the capacity necessary to power its High5s agenda.

These are:

- ▶ **On-grid generation to add 160 GW of new capacity**
- ▶ **On-grid transmission and distribution that will create 130 million new connections**
- ▶ **Off-grid connections to add 75 million new connections**
- ▶ **Access to clean cooking energy for around 150 million households**

The group has identified key challenges to its universal access objective which need to be overcome by developing new resources and improving the distribution network.

Firstly there is a huge infrastructure gap which needs bridging and a need for large scale resources. The figure to overcome this has been identified as between US\$60-80bn on an annual basis. There is also a lack of public funding and an inadequate policy and regulatory environment to attract public sector participation.

There are also insufficient utilities to design, operate and manage the large projects which would be necessary to obtain the goal. Challenges exist in the sectors of environmental issues, land acquisition along with contractor performance and project management.

## RESPONDING TO THE CHALLENGE

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Most utilities are weak financially and are active in countries with a high risk factor, while many local entrepreneurs do not have the capacity to take on ambitious developments. Regional integration and interconnection is also lacking and so limits the ability to operate large, efficient and environmentally friendly power plants.

The AfDB has identified a number of key areas for developing new power resources.

These include the 250 MW Bujagali hydropower station Uganda and the multinational Ruzizi III projects. This 147 MW hydropower plant will be constructed on the Ruzizi River and will provide electricity supply to Rwanda, Burundi and the Democratic Republic of Congo.

It entails the construction of a run-of-river dam between DRC and Rwanda, downstream from the Ruzizi II hydropower dam, a 147 MW power plant and a distribution station. Power will be transmitted to the three countries from the Kamanyola substation by 220 kV transmission lines.

The 300MW Lake Turkana Wind Power Project is the single largest private investment in Kenya's history and the largest facility of its type in Africa. The power station covers 160 square kilometres and is located in Loiyangalani District, in Marsabit County, approximately 545 kilometres north of the capital city of Nairobi.

Rwanda is home to the 26MW Kivuwatt methane gas extraction and conversion plant which is utilising new technology to generate power, while the country is also the site of off-grid and mini-grid projects, along with Ethiopia, Kenya and Sudan.

The AfDB has approved a US\$100m anchor investment to close funding gaps in the small scale energy infrastructure sector and promote energy access solutions. It has also approved 12 projects to bring in an additional 166MW and leverage US\$340m from private sector investors.

## RESPONDING TO THE CHALLENGE

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Power transmission and regional interconnectivity will benefit from the US\$300m Eastern Electricity Highway covering Ethiopia, Kenya, Tanzania and Zambia while Last Mile Access in Rwanda and Kenya is set to be scaled-up.

The AfDB has also identified areas of opportunity for partnerships for the years 2021 – 2025. These include:

- ▶ **Installed generation capacity (total) 15GW**
- ▶ **Installed electricity generation (on-grid) 14.5GW**
- ▶ **Installed electricity generation (mini and off-grids) 250MW**
- ▶ **Installed renewable electricity generation 10GW**
- ▶ **Additional households with direct electricity access 10 million**
- ▶ **New or improved power distribution lines (national) 60,000km**
- ▶ **New or improved power transmission lines (national) 10,000km**
- ▶ **Cross-border power transmission lines 5,000km**

A major project for the AfDB is the Distribution Energy Companies/Cooperatives, which is run in collaboration with EU. It aims at unlocking finance and providing investment opportunities for sustainable development. Eur50m is available to cover loss and Eur6m for technical assistance.

By far the biggest potential for growth in hydro generated energy exists in East Africa at 83 per cent of the total of 7.3GW.



# Water resources in East Africa

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Access to clean water and sanitation services in parts of the East African region is a challenge, especially with its rising population and an increase in urbanisation.

Government's across the region are devising plans based around three pillars.

**Policy:** Participate in policy formulation for the water sector

**Technology:** Showcase innovations

**Financing:** Insights and Investment Opportunities

Global warming has caused the global average temperature to rise 0.85C higher than it was in the late 19th century causing weather patterns to changing and become more unpredictable by the day.

East African countries are signatories of the Kyoto protocol and the Paris agreement, to cut down on the generation of greenhouse gases by 143 million tonnes. In respect to these agreements and recognition of the key issues, the East African stakeholders regularly convene to debate and discuss issues in order to arrive at specific action points that will influence policy, technology application and investment on sustainable water and sanitation.

East Africa's population is forecasted at 300 million and policy-makers are basing decisions on the following statistics:

**75%** of the Earth is covered by water

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**2.5%** of Earth's water is freshwater  
(mostly preserved in glaciers)

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**80%** of the water produced is lost

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**85%** of global wastewater is discharged  
without treatment

## WATER RESOURCES IN EAST AFRICA

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There is a recognition that water resource have been diminishing with the increase in abstraction due to an increase in demand caused by population growth. Encroachment of water towers has led to degradation of water catchment areas

This has resulted in reduced river volumes and dry riverbeds. Agricultural activities upstream have resulted in erosion, poor river water quality and siltation in dams, reducing their capacity.

Water losses are high in the East African region, where up to 80% of the water produced is lost. The populace is not enlightened on reuse and recycling of water and proper measures for water conservation are almost non-existent.

Almost 85% of global wastewater is discharged without treatment leading to serious impacts on public health. Access to sanitation services in parts of the East African region is a challenge, especially with rapid population growth and urbanisation which creates an added demand for water and sanitation services.

Water is a key contributor to social-economic development, from industries, to families, to farms. Water is a scarce resource, but is at the heart of production and the economic engine of any country. Cost has also been on the agenda in previous years..

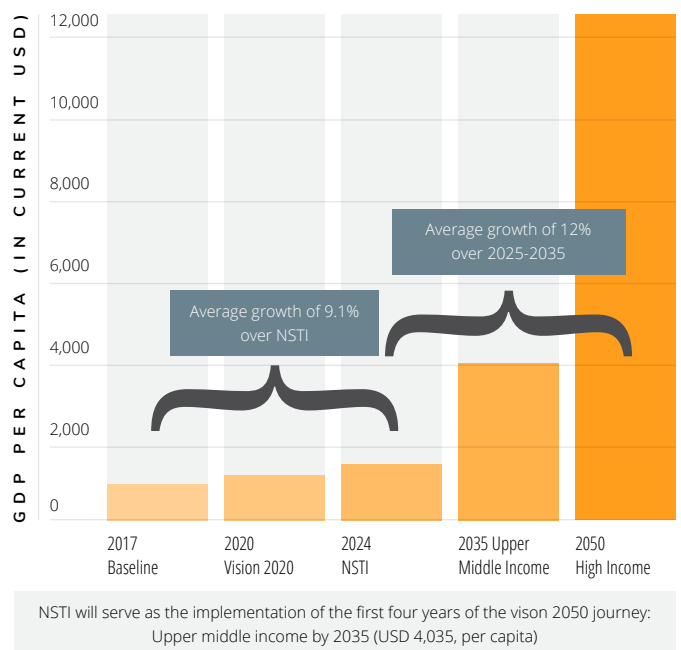
Groundwater has been used in mega irrigation projects, mega infrastructure projects, real estate developments but still, there is much more to do in this field.

# Rwanda Economy

Overall Rwanda is a growing market with a government committed towards investing in infrastructure, housing and improving its traditional agriculture-based economy transforming the sector from a subsistence role towards a profitability. It has a population of 11.9 million people and a Gross Domestic Product (GDP) of US\$ 8.37 billion and the national economy grew by an average of 8 percent annually from 2002 to 2012.

The country is ranked 29 among 190 economies in the ease of doing business, according to the latest World Bank annual ratings.

The country's growth strategy is guided by its Vision 2050 programme which has four drivers of future growth for the country - innovation, integration, agglomeration, and competition.



Under the vision, Rwanda has targeted an upper-middle income status (US\$4,000 annual per capita income) by 2035 and a high income status (US\$12,000 annual per capita income) by 2050.

# Rwanda Electricity

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According to ABiQ's population forecast model, Rwanda's population is expected to increase from the current circa. 12 million to almost 20 million by 2050. To provide electricity to the ever increasing population it is estimated that an additional 250 MW of generating capacity would be required.

The Government of Rwanda envisions transitioning from a developing country to a middle-income country. To achieve this goal, the government is targeting 100 per cent electricity access by 2024. Rwanda is endowed with natural energy resources including hydro, solar, and methane gas.

Hydro power is by far the greatest contributor to the Rwandan energy sector at 41 per cent. The next highest is thermal at 26 per cent while other small contributions come from solar power, peat, imports and diesel generators, the last of which is used for emergency supplies.

But according to the latest figures only 44 percent of the country's population have access to electricity. The energy generation for 2017, the latest figure available, is at 210.9 MW installed capacity. However grid-connected generation capacity has tripled since 2010.

To improve living conditions and boost economic growth the Rwandan government is committed to a large number of power purchase agreements with independent producers to increase generation capacity.

## RWANDA ELECTRICITY

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This is aimed at creating a power supply and demand surplus in the region of 200MW in 2024, so in order to fully exploit this potential export opportunity the Rwandan Government is shifting focus to increasing access, stimulating demand, and strengthening the transmission network.

By 2024, Rwanda plans to supply electricity to 100 percent of the population, 52 percent through the grid expansion and 48 percent through off-grid technologies. It also aims for improvements in the grid network, including reducing system losses and improving reliability, as well as connecting with neighboring countries to enable the importing and exporting of power across national borders. Export prospects neighboring Burundi and eastern Democratic Republic of the Congo, while power could be bought in and possibly re-exported from Uganda, Kenya and Ethiopia where there are surpluses.

While power production projects are expected to generate more power than the expected demand over the next decade, opportunities exist for companies to invest in off-grid projects and transmission and distribution systems are growing. Several US-based or owned micro-hydro, off-grid solar, and mini-grid firms are present in the country and there are many opportunities to do business for firms which are able to provide innovative and affordable transmission and distribution systems and equipment.

A key user of power is the field of mineral extraction which is an important part of the country's economy and one which is expanding. A new Rwanda Mining, Gas and Petroleum Board was established in February 2017 to coordinate government plans to formalise the sector, attract international mining investors, and increase processing of minerals internally. The country is one of the world's largest producers of what are known as the 3Ts tin, tantalum, and tungsten and also exports some gold and gemstones. Minerals such as silica sands, kaolin, vermiculite, diatomite, clays, limestone, talcum, gypsum, and pozzolan are also present. Small-scale mining accounts for around 80 percent of the country's mineral output.

# Rwanda Water

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Universal access to safe water, sanitation and hygiene (WASH) services are priorities in Rwanda, according to a study from UNICEF. It emphasises WASH is critically linked to improved nutrition, good health, gender equality, economic growth, and environmental management.

UNICEF has provided water supply to over 600,000 people in rural areas of the country in the past 10 years and continues to operate there.

The study found that only 57 per cent of the Rwandan population has access to safe drinking water within 30 minutes of their home. It stated that education suffers as children spend time collecting water, so it often keeps them out of school. This is an issue especially for girls, who are often expected to take on the majority of household tasks.

Even if water is available from sources near the home, that water is often not safe to drink. When children drink contaminated water, they risk severe illness – and even death – from water-borne diseases.

Basic sanitation means that every household has its own toilet and does not share with another household. These toilets should also keep human waste out of contact with people. However only 64 per cent of the population in Rwanda have access to these services.

There is also a huge disparity depending on the wealth of the family: 94 per cent of the wealthiest households have their own toilet, compared to only 74 per cent of the poorest households. Just five per cent of households in Rwanda have a place for family members to wash their hands with soap. Handwashing with soap at critical moments is essential for good health, especially in children.

UNICEF is currently working in 10 of Rwanda's 30 districts to ensure that every household has and uses a hygienic and private latrine.

With the Ministry of Health and partners, it supports district authorities to mobilise households to build new toilets and improve older, poor quality ones. We also strive to improve monitoring of sanitation coverage and use and increase the availability of toilet-building products in local markets.

## RWANDA WATER

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UNICEF supports key government partners in WASH like the Ministry of Health, Ministry of Infrastructure, Rwanda Utility Regulatory Authority (RURA), and the Water and Sanitation Corporation (WASAC) to strengthen national WASH systems

In addition to these strategic programmes, the Water and Sanitation Corporation (WASAC) has identified 8 projects potential to improve overall capacity of water and waste water:

- Kigali Municipal Solid Waste Management
- Kigali Centralised Sewerage system II
- Masaka Faecal Sludge Treatment Plant (FSTP) Phase II
- Municipal Solid Waste Management (SWM) in Secondary Cities
- Masaka Waste Treatment Plant (WTP) - 50,000 cum/day
- Reduction of Non-Revenue Water (NRW) - from 38% to 15%
- Upgrade of Karege Waste Treatment Plant
- Upgrade and Rehabilitation of NZOVE1

SOURCE : WASAC

Other objectives include the provision of critical information to improve the targeting of resources to where they are needed most.

Also water needs to be affordable. UNICEF is supporting a review of rural water tariffs to ensure that everyone can afford drinking water, and that rural water private operators have the resources they need to keep the water flowing.

## Case Study: Kigali Bulk Water Supply Project

How do you make PPPs work for effective water-supply?

1. Political will – vision, commitment, PPP framework
2. Planning & preparation – demand & supply
3. Affordability – NRW
4. Solid advisors:
  - Contract and risk allocation, two-way contracts
  - Procurement, transparency, define selection criteria
  - Clear obligation, scope
5. Accountability & ownership – checks & balance
6. Capacity building – training
7. Developer experience – financially & technically
8. Innovation – enhance cost

Source: Metito



**KIGALI WATER**



**METITO**



For further information, please email  
[info@openafricabusiness.com](mailto:info@openafricabusiness.com)

One current ambitious project to provide Rwanda with supplies comes from the water and alternative energy management solutions provider Metito.

The project, a public private partnership (PPP) venture, is aimed at supplying sustainable bulk water to serve Kigali city's potable water requirements.

As cost continues to be an issue the Emerging Africa Infrastructure Fund (EAIF) arranged the debt finance for the project, which was awarded to Kigali Water Limited (KWL), a Rwandan subsidiary of Metito. KWL now represents sub-Saharan Africa's largest known build, operate and supply water deal.

The facility is set to deliver up to 40 million litres of potable water a day, extracted from the south bank of the Nyabarongo River, and is expected to grow Kigali's existing water capacity by a third.

Approximately 500,000 of the city's population of one million will benefit directly from the new facility.

The funding partnership has been set up to cover the medium & long term requirements of the project with the lenders covering US\$40.6 million of the capital cost of the US\$60.8 million project. The balance in equity finance has been provided by Metito.

Metito has over 60 years of worldwide water industry experience across a full range of water and waste management infrastructure projects. On completion, the plant will employ around 60 permanent staff, with at least 30 per cent women.

In his company's Sustainability Report, Metito's CEO and Chairman, Mutaz Ghandour, said: "The Kigali Bulk Water project serves as a template for similar upcoming projects in sub-Saharan Africa and plays a crucial role in infrastructure development in the region."

Through the 27-year PPP arrangement, Metito is responsible for the financing, design construction, operation and maintenance of the water treatment plant.