Why only 2% of global RE in Africa?
Acknowledgments

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Introduction

5 years after the adoption of the SDGs and with just 10 years ahead to achieve the Agenda’s objectives, RES4Africa Foundation and Enel Green Power present a strategic analysis to look at what happened in the last 10 years in Africa, as well as main gaps, best practices and lessons learned to achieve access to affordable, reliable, sustainable and modern energy for all.

This strategic narrative will move from the status of renewable energy in Africa to the needed actions, where RES4Africa is committed with its renewAfrica, The Missing Link and the Water-Energy-Food Nexus initiatives, along with many other local and international partners and stakeholders.
Preface

Renewable solutions have never been better suited to support the world and Africa to getting back up again and to sustaining their sustainable development. Renewables can bring a key contribution to Africa’s post-Covid recovery improving the quality of life of millions of people.

Africa is a continent in continuous transformation, with a sustained economic and population growth, a fast-paced urbanization and a generation of talents who is leading a neglected business revolution. This transformation requires energy and will require it even more in the next decades. While in the rest of the world the growth of renewable energy has intensively increased, only 2% of renewables addition occurred in Africa in the last decade. We cannot settle with what has been achieved. Universal access to electricity will not be ensured if we won’t be able to accelerate the renewable energy transition.

This has never been more urgent.

Renewable energy is now the cheapest sources of energy generation and, what is more important, is the most suitable and effective solution to achieve Africa’s energy security, energy equity and environmental sustainability all at once.
Unlocking Africa’s renewable energy potential requires to bridge the missing link between commitments and actions. An attractive electricity market, integrated power transmission grid, properly designed stable policies and regulatory frameworks, mature developed projects, as well as a comprehensive de-risking instrument to foster investments are the cornerstones of a just energy transition able to fill the continent’s energy access gap.

In this context, RES4Africa Foundation, in collaboration with Enel Green Power, has launched this analysis as the first in a series of publications that will focus on what happened in the last years and the way forward to achieve a sustainable and prosperous future for Africa.

We all have the historical opportunity and the responsibility to make it happen, now.

*Antonio Cammisecra*
President at RES4Africa Foundation,
CEO of Enel Green Power,
Abbreviations and Acronyms

AC  Africa Case
The Africa Case scenario reflects the Agenda 2063 and incorporates key sustainable development goals by 2030, including achieving full electricity.

AfDB  Africa Development Bank

Bn  Billion

BNEF  Bloomberg New Energy Finance

C&I  Commercial and industrial

FDI  Foreign Direct Investment

GDP  Gross Domestic Product

GW  Gigawatts

GWh  Gigawatt-hours

IEA  International Energy Agency

IEEFA  Institute for Energy Economics and Financial Analysis

IRENA  International Renewable Energy Agency

kW  Kilowatts

kWh  Kilowatt-hours

LAC  Latin America & the Caribbean

LATAM  Latin America

LCOE  Levelized Cost of Energy

MENA  Middle East & North Africa

Mtoe  Million Tonnes of Oil Equivalent

MW  Megawatts

MWh  Megawatt-hours

OECD  Organisation for Economic Co-operation and Development

PPA  Private purchase agreement

Ppl  People

PV  Photovoltaic

QFD  Quasi Fiscal Deficit

RE  Renewable Energy

RISE  Regulatory Indicators for Sustainable Energy

SIC  Central Interconnected System

SIGN  Northern Interconnected System

SMEs  Small and Medium Enterprises

SACE  Italian export credit agency

SSA  Sub-Saharan Africa

STEPS  Stated Policy Scenario
The Stated Policies Scenario reflects the impact of existing policy frameworks and today’s announced policy intentions.

T&D  Transmission & Distribution

UN  United Nations

USD  United States Dollars

WACC  Weighted Average Cost of Capital
Chapter 1. “What happened in the last 10 years” analyses, among others, population and GDP growth, installed capacity, energy and electricity demand, LCOE and investment trends in the last 10 years.

Chapter 2. “What limited the renewable energy growth” analyses political commitment, objectives and targets achievement, grid and electrical system development, productive uses of energy, regulatory framework and investment risks.

Chapter 3. “The time to act is now” presents the key recommendations to overcoming highlighted challenges, fostering renewable energy investments, and meeting continent and countries’ needs.
Africa is a transforming continent. But transformations require energy. RE are booming globally, but Africa is lagging behind. RE are now the cheapest sources of energy.

1. What happened in the last 10 years
1. What happened in the last 10 years

Africa is a transforming continent
AFRICA IS A TRANSFORMING CONTINENT

It has among the fastest growing population and economies

Global Population
Billion people

<table>
<thead>
<tr>
<th>Year</th>
<th>Africa</th>
<th>Latam</th>
<th>India</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>6.9</td>
<td>1.2</td>
<td>1.0</td>
<td>1.6</td>
</tr>
<tr>
<td>2011</td>
<td>7.0</td>
<td>1.3</td>
<td>1.1</td>
<td>2.1</td>
</tr>
<tr>
<td>2013</td>
<td>7.2</td>
<td>1.3</td>
<td>1.1</td>
<td>2.4</td>
</tr>
<tr>
<td>2015</td>
<td>7.4</td>
<td>1.3</td>
<td>1.2</td>
<td>2.4</td>
</tr>
<tr>
<td>2018</td>
<td>7.6</td>
<td>1.4</td>
<td>1.3</td>
<td>2.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change</th>
<th>2009-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>+0.26</td>
</tr>
<tr>
<td>Latam</td>
<td>+0.04</td>
</tr>
<tr>
<td>India</td>
<td>+0.13</td>
</tr>
<tr>
<td>World</td>
<td>+0.76</td>
</tr>
</tbody>
</table>

Y% 2018
- Africa: 2.6%
- Latam: 1.0%
- India: 1.2%
- World: 1.2%

Share 2018
- Africa: 17%
- Latam: 7%
- India: 18%

Sources: UN dataset, 2019 / IMF, Oct 2019

GDP Growth
Trillion USD

<table>
<thead>
<tr>
<th>Year</th>
<th>Africa</th>
<th>Latam</th>
<th>India</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>60.4</td>
<td>1.4</td>
<td>1.6</td>
<td>3.2</td>
</tr>
<tr>
<td>2011</td>
<td>73.3</td>
<td>1.8</td>
<td>2.1</td>
<td>4.7</td>
</tr>
<tr>
<td>2013</td>
<td>76.8</td>
<td>1.9</td>
<td>2.4</td>
<td>4.7</td>
</tr>
<tr>
<td>2015</td>
<td>74.8</td>
<td>2.1</td>
<td>2.2</td>
<td>4.1</td>
</tr>
<tr>
<td>2018</td>
<td>84.9</td>
<td>2.7</td>
<td>2.3</td>
<td>4.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Change</th>
<th>2009-2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>+0.65</td>
</tr>
<tr>
<td>Latam</td>
<td>+0.88</td>
</tr>
<tr>
<td>India</td>
<td>+1.35</td>
</tr>
<tr>
<td>World</td>
<td>+24.49</td>
</tr>
</tbody>
</table>

Y% 2018
- Africa: 3.8%
- Latam: 2.8%
- India: 8.0%
- World: 3.9%

Share 2018
- Africa: 3%
- Latam: 5%
- India: 3%
Africa experienced a digital transformation. In 2017 the Internet was used by 25% of people in sub-Saharan countries and by 65% in the MENA region, while the World and the OECD’s average was 50% and 82% respectively.

Urbanization in sub-Saharan Africa has been moving faster compared to other regions in the world. This trend will be more and more evident due to the population growth foreseen for the coming years.

Africa is a transforming continent
People are moving to urban cities and getting connected

**People living in urban areas by region (% of population) – 2009-2018**

<table>
<thead>
<tr>
<th>Region</th>
<th>2009</th>
<th>2017</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>25%</td>
<td>5%</td>
<td>-20%</td>
</tr>
<tr>
<td>MENA</td>
<td>65%</td>
<td>56%</td>
<td>-9%</td>
</tr>
<tr>
<td>India</td>
<td>55%</td>
<td>65%</td>
<td>+10%</td>
</tr>
<tr>
<td>LAC</td>
<td>20%</td>
<td>30%</td>
<td>+10%</td>
</tr>
</tbody>
</table>

**Individuals using the Internet (% of population) – 2009-2017**

<table>
<thead>
<tr>
<th>Region</th>
<th>2009</th>
<th>2017</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-Saharan Africa</td>
<td>5%</td>
<td>25%</td>
<td>+20%</td>
</tr>
<tr>
<td>MENA</td>
<td>22%</td>
<td>56%</td>
<td>+34%</td>
</tr>
</tbody>
</table>

Source: World Bank dataset, 2020
Small and medium-size enterprises (SMEs) provide most of Africa’s formal sector jobs. High unemployment rates have pushed many young people into entrepreneurship leading to the emergence of a large number of new businesses among SMEs, often characterized by high discontinuance rates.

Despite the predominance of SMEs, Africa accounts for about 700 big companies, mostly based in South Africa, and of which just over a half are owned by Africa-based private shareholders, while 17% are state-owned enterprises and 27% are foreign-based multinationals.

Note: “Big companies” refers to enterprises earning more than $500mn/year

Sources: AfDB, 2017 McKinsey, 2018
Among the fastest growing regions worldwide (in terms of GDP, population, etc.), only India has experienced an increase, although limited, of the perceived quality of governance in the last years. In sub-Saharan Africa, MENA and LAC it has decreased constantly.

- voice and accountability
- political stability
- government effectiveness
- regulatory quality
- rule of law
- control of corruption

Quality of governance (2018) percentile rank (0 - 100)

Source: World Bank dataset, 2020
1. What happened in the last 10 years

But transformations require energy
Bioenergy is still the largest source of energy

With 16% of the world’s population, Africa accounts for only 6% of the global energy demand and little more than 3% of the electricity demand.

Bioenergy is the largest source of energy in Africa today, meeting over half of the final energy consumption, but the use of charcoal for heating and cooking brings environmental (emission and uncontrolled deforestation) and healthy issues.

Source: IEA, 2019
BUT TRANSFORMATIONS REQUIRE ENERGY

Electricity consumption is low and concentrated in North and South Africa

North Africa and South Africa’s electricity demand represents nearly three-quarters of Africa’s demand.

Sub-Saharan Africa’s per capita consumption is very low compared to India or Central & South America

African electricity demand (TWh)

Sub-Saharan Africa without South Africa

Northern Africa plus South Africa

705 TWh

29% 71%

Electricity consumption per capita (MWh)

<table>
<thead>
<tr>
<th></th>
<th>Africa continent average</th>
<th>World</th>
<th>Central &amp; South America</th>
<th>India</th>
<th>North Africa</th>
<th>Sub-Saharan Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total per capita electricity consumption</td>
<td>0,6 MWh</td>
<td>2,9</td>
<td>2,0</td>
<td>0,9</td>
<td>1,3</td>
<td>0,4</td>
</tr>
<tr>
<td>Renewable per capita electricity consumption</td>
<td>1,0</td>
<td>1,3</td>
<td>0,2</td>
<td>0,1</td>
<td>0,1</td>
<td></td>
</tr>
</tbody>
</table>

Sources: UN dataset, 2019 IEA, 2019 / Enerdata. 2020
BUT TRANSFORMATIONS REQUIRE ENERGY

600 million people still lack access to electricity

While India and Latam experienced a reduction in the number of people without access to electricity with a yearly rate of 19.1% and 6.5% respectively, in sub-Saharan Africa the electrification pace is not keeping up with population growth.

<table>
<thead>
<tr>
<th>Sub-Saharan Africa</th>
<th>Latam</th>
<th>India</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bn ppl</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.4</td>
<td>0.03</td>
<td>0.3</td>
<td>0.6</td>
</tr>
<tr>
<td>1.1</td>
<td>0.9</td>
<td>0.6</td>
<td>1.1</td>
</tr>
<tr>
<td>2010</td>
<td>2015</td>
<td>2018</td>
<td></td>
</tr>
</tbody>
</table>

Note: Y% = Annual Growth Rate / Note: North Africa has >99% electricity access rate

Sources: UN dataset, 2019 IEA, 2019
BUT TRANSFORMATIONS REQUIRE ENERGY

Firms are suffering economic losses because of lack of quality services

80% of firms in sub-Saharan Africa suffer frequent electricity disruptions.

Outages vary from 15 up to more than 60 hours each month in many sub-Saharan Africa countries, compared to 27 hours experienced in India and half an hour by OECD countries.

Frequent outages lead to economic annual losses for many firms in sub-Saharan Africa, with an average of 8% of total turnover (2% of annual GDP).

Low water levels due to droughts strongly affect the number of outages of countries that depend on hydropower for much of their electricity generation.

Note: Data refers to latest available for country.
Sources: World Bank dataset, 2020 IEA, 2019
1. What happened in the last 10 years

RE are booming globally, but Africa is lagging behind
RE ARE BOOMING GLOBALLY, BUT AFRICA IS LAGGING BEHIND

Just 2% of global RE capacity installed in the continent

Share of Africa on world RE additional capacity 2009-2018 accounts for only 2% while population accounts for a 16%.

RE share in electricity capacity 2009 - 2018 (GW)

<table>
<thead>
<tr>
<th>Region</th>
<th>2009</th>
<th>2018</th>
<th>Δ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>29</td>
<td>48</td>
<td>19</td>
</tr>
<tr>
<td>Central &amp; South America</td>
<td>149</td>
<td>226</td>
<td>77</td>
</tr>
<tr>
<td>India</td>
<td>52</td>
<td>119</td>
<td>67</td>
</tr>
<tr>
<td>Europe</td>
<td>344</td>
<td>614</td>
<td>270</td>
</tr>
<tr>
<td>China</td>
<td>218</td>
<td>720</td>
<td>502</td>
</tr>
<tr>
<td>North America</td>
<td>249</td>
<td>386</td>
<td>137</td>
</tr>
<tr>
<td>Rest of the World</td>
<td>202</td>
<td>356</td>
<td>154</td>
</tr>
</tbody>
</table>

Sources: IEA, 2019 Enerdata, 2020
RE growth has been limited and uneven across the continent.

North Africa and South Africa represent more than 50% of all additional RE capacity since 2009.

Source: IEA, 2019 Enerdata, 2020
Large hydro still has the main share of generation capacity

Africa’s RE growth has been continuous, and almost half of new capacity comes from hydro. However onshore wind and solar PV are now rapidly growing.

Share of different RE sources (2018)

- **Solar**: 12%
- **Wind**: 10%
- **Geo & bioenergy**: 4%
- **Small hydro**: 1%
- **Large hydro**: 73%

Source: IEA, 2019 Enerdata, 2020
RE are booming globally, but Africa is lagging behind

Huge untapped resources can meet the continent’s growing demand

Africa has plentiful renewable energy resources: bioenergy, hydropower, solar and wind power account for the bulk of the resources.

This RE potential capacity could generate up to 24 000 TWh of electricity each year: this is almost 90% of the World’s electricity generation in 2018, and more than 26 times the African electricity generation.

<table>
<thead>
<tr>
<th>Source</th>
<th>Potential Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar</td>
<td>11 000 GW</td>
</tr>
<tr>
<td>Hydro</td>
<td>1 750 GW</td>
</tr>
<tr>
<td>Wind</td>
<td>1 300 GW</td>
</tr>
<tr>
<td>Geo</td>
<td>15 GW (East Africa)</td>
</tr>
</tbody>
</table>

Note: Africa RE installed capacity in 2018: 48 GW

Sources: IRENA, 2013 IEA, 2019
1. What happened in the last 10 years

RE are now the cheapest sources of energy
Levelized cost of electricity (LCOE) of solar technologies has constantly declined since 2010, gaining increased competitiveness compared to fossil fuels, with solar technologies experiencing the highest decrease in LCOE with a reduction of 77% since 2010.

Solar is already more convenient than most conventional sources

Average auction prices by region and global weighted average LCOE for solar

LCOEs generally tend to be higher than awarded auction prices, partly due to the fact that auction prices may not always reflect full costs while may include financing terms or tax conditions.

Sources: IEA database, 2020 IRENA, 2019
On-shore wind has the lowest averaged cost among renewables.

Levelized cost of electricity (LCOE) of wind technologies has declined by 35% since 2010.

LCOEs generally tend to be higher than awarded auction prices, partly due to the fact that auction prices may not always reflect full costs while may include financing terms or tax conditions.

Sources: IEA database, 2020 IRENA, 2019
Given the scarcity of bankable sub-Saharan African utilities, special measures are required to address risks, increasing project financing costs across emerging markets.

Source: Bloomberg NEF, 2020
RE ARE NOW THE CHEAPEST SOURCES OF ENERGY

RE investments in Africa are still limited and highly reliant on FDI

Over 2009-18 Foreign Direct Investment accounted for 50% of total RE investments in Africa, while they represented only 6% in the rest of the world. The African dependency on FDI makes necessary a better risk mitigation.

*Total value for small hydro, onshore wind, solar, geothermal, biofuels and biomass & waste technologies

Source: Bloomberg NEF, 2020
FDI are growing but remain concentrated in few countries

- South Africa, Morocco and Egypt attract most of the investment, accounting for 60% of the total, but other countries like Kenya and Ethiopia are growing their share.

- Solar technology attracted most of the investment followed by wind.

Note: only values > 0.2 are reported.

Source: Bloomberg NEF, 2020
Last 10 years of RE

Uncertain political stability

Stable GDP growth

Low electricity share on total energy consumption

Sustained population growth

Low access-to-energy rate

Fast paced urbanization

Poor quality of power supply

High RE potential

Uneven increase of RE across the continent

Decreased RE generation costs
2. What limited the renewable energy growth
2. What limited the renewable energy growth
It’s hard to take on commitments and even harder to keep them.

Nearly 30 African countries have set national renewables targets.

8 countries had set clear 2020 renewables targets at some point before 2015.

Sources: Bloomberg NEF, 2020 Enerdata, 2020
The time factor: process from tender to construction is often lengthy and costly.

Except for South Africa, investments are often characterized by mismatches of planned and actual dates of both bidding and awarding phases, which negatively affect investors’ risk perception.

<table>
<thead>
<tr>
<th>Country</th>
<th>BIDDING</th>
<th>AWARDING</th>
<th>CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morocco</td>
<td>SEP 14</td>
<td>OCT 15</td>
<td>~ 2 YEARS</td>
</tr>
<tr>
<td>South Africa R3</td>
<td>AUG 13</td>
<td>AUG 13</td>
<td>~ 2 YEARS</td>
</tr>
<tr>
<td>South Africa R4</td>
<td>AUG 14</td>
<td>NOV 14</td>
<td>~ 2 YEARS</td>
</tr>
<tr>
<td>Zambia</td>
<td>APR 16, MAY 16</td>
<td>MAY 16, JUN 16</td>
<td>~ 1 YEARS</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>AUG 16</td>
<td>APR 17</td>
<td>Not yet implemented</td>
</tr>
</tbody>
</table>
Regulatory frameworks have advanced but space for improvements still remains.

RISE scores reflect a snapshot of a country’s policies and regulations in the energy sector, organized by the three pillars of sustainable energy: energy access, energy efficiency, and renewable energy. It shows that the results achieved in Africa have been limited to a small number of countries.

RISE: Regulatory Indicators for Sustainable Energy

Sources: ESMAP database, 2020
Few countries are adopting regulations and supporting schemes

- Regulation and supporting schemes vary across African countries.
- Central Africa’s regulation systems remains the less attractive for Renewables.
- Additional incentive measures have been adopted, like feed-in-tariffs in Algeria, Kenya, Uganda, Ghana and Tanzania.
- In sub-Saharan Africa, more than 60% of IPP capacity was awarded through a competitive process in 2018.

Source: renewAfrica Initiative, 2019
Regulatory effectiveness: behind 4 countries success

- Morocco
- Tunisia
- Egypt
- South Africa

- **Morocco**: Solid *masterplan* for RE development with targets differentiated by technology and with milestones
- **Tunisia**: Direct contracts between private generators and bulk customers (*commercial PPAs*) + net-metering
- **Egypt**: Independent energy *regulator*
- **South Africa**: Partial *unbundling* of power market
- **Morocco**, **Tunisia**, **Egypt**, **South Africa**: *Auctions* as preferred procurement scheme
2. What limited the renewable energy growth

The deficit of the power sector
Lack of T&D lines between countries hinders access to power integration

With a total length of 89,731 km, the transmission network in Africa is small if compared to the continent’s area: 3.3 meters of line per square km, about 10 times less than in India.

Transmission lines between national grids are insufficient in Sub-Saharan Africa even in power integrated region (Eastern Africa, Southern Africa and West Africa).

Poor power integration limits the access to new markets and new sources of supply, requiring the single utilities a larger investment and preventing countries for taking advantage of economies of scale.

Source: AfDB, 2017
Inside the power integrated regions, power trade is still low and mostly realised through bilateral contracts. Among the three regions, West Africa has the highest share of trade in total electricity demand (~5%).

Even where transmission interconnections exist, they are sometimes congested and some countries remain then isolated from regional grids. To facilitate trading, interconnections need to be upgraded.

Transmission cost allocation is also an issue. Fully integrated regional power markets have also the potential to reduce the cost of electricity services in many countries.

On the contrary, in Northern Africa, even if the region is well interconnected, power trade between the countries remains well under the interconnection capacities.

Sources: IEA, 2019 Cambridge University, 2017
Best practices in transmission enhancement: Chile

The RE generation rapid uptake, coupled with lack of interconnection between the two main grids, caused grid congestions, curtailments and volatile/unprofitable prices for RE until 2016.

In 2017 and 2019 two new transmission lines (600 + 750 km) connected the two main grids leading to two main effects:
- nodal prices converged;
- congestions reduced: from 14% curtailment rate for wind and solar in 2017 to 1% in 2019.

Transmission expansion plan considers generation options, location and costs; it’s updated every year, with a 20-years simulation (plus a mechanism to allow for urgent interventions).

Wind and solar generation vs SIC and SING spot prices

Source: Bloomberg NEF, 2019

Note: SIC Central Interconnected System, SIGN Northern Interconnected System
India got 100% electrified in 2019 (from 59% in 2000); all regional grids got synchronised with national grid in 2013. National Electricity Plan consists of a 5+5 year plan for electricity development, including projections for growth of HV inter-regional transmission capacity, considering ambitious target of 175 GW of RE by 2022. RE integration is enabled by a co-optimized planning for generation and transmission development:

- In mid 2018, a committee on power transmission networks proposed the implementation of transmission lines to support 67 GW of solar and wind capacity in 7 States, to be completed by 2021 with an investment of US$6bn.

- In Dec 2018 the government announced a 23GW solar project in Ladach region, including a 850 km transmission line.

Source: IEEFA. 2019
Most countries suffer from a low-quality and unreliable grid

Most African Countries suffer from a low-quality and unreliable grid, affecting the whole economic system.

- With 16% of transmission and distribution (T&D) losses, Africa’s average is 7 percentage points higher compared to the average of advanced countries.
- Losses also vary by region, with a difference of ten percentage points between South and North Africa.
- High T&D losses strongly affect the economy of sub-Saharan utilities, leading to losses equivalent to the 0.3% of annual GDP (median value).

Source: IEA, 2019
THE DEFICIT OF THE POWER SECTOR

Utilities are challenged by underpricing and operational inefficiencies

- In only 2 out of 39 (5%) countries in sub-Saharan Africa utilities are able to cover their capital and operating cost of service (Seychelles and Uganda), while operating costs are covered by only 49% of them.

- Underpricing, transmission and distribution losses, under-collection of bills and overstaffing are the hidden costs responsible for the fiscal deficit of sub-Saharan Utilities, with underpricing counting for more than 40%.

- Across sub-Saharan Africa, the quasi-fiscal deficit (QFD) is equivalent to US$21 billion (2014), or 1.1% of GDP (2014).

- This strongly affects the ability of utilities to make investments, braking the development of necessary transmission and distribution grids across the continent.

The QFD is the difference between the net revenue of an efficient electricity sector covering operational and capital costs and the net cash collected by the utilities.

Sources: World Bank, 2016
Non-reflective tariffs are increasingly unsustainable

The weighted average tariff in SSA is US$0.08 per kWh, with significant variations across the region. The financial gap due to underpricing accounts for US$0.10 per kWh billed, leading to losses equivalent to 0.4% of the annual GDP (median values).

Following the reform to unbundle the state-owned utility network, **losses halved from 38% in 2005 to 17% in 2018**, driven by an increase in annual investments and an improvement in power supply.

Key factors of Uganda’s reform include:

- **Contract-based performance indicators**, including loss reduction targets and investment obligations;
- **Regulatory independence**, allowing the regulator to set annual cost-reflective tariffs based on a methodology defined in the concession contract;
- **Increased channels to pay** bills and introduction of roll-out of prepayment metering which in 2018 represented 24% of revenues;
- **Various risk mitigation mechanisms**.

Source: IEA, 2019

Note: collection rates surpass 100% due to pre-paid metering
2. What limited the renewable energy growth

Productive uses of energy: the middle piece of the puzzle
Low electricity share and residential sector predominance on total final energy consumption are indicative of a slow industrialization process playing a braking role in the Africa’s economic growth.

Despite North Africa and South Africa are relatively industrialized, industry and other services currently constitute less than 20% of final consumption in Sub-Saharan Africa.

Source: World Bank database, 2020
Agriculture is the dominant sector by employment, despite its low added value

Despite its low added value to Africa’s economy, agriculture is the dominant sector by employment in sub-Saharan Africa accounting for more than 50%, while less than 20% of total population is employed in industry.

Services contribute for the higher share to GDP in both North and sub-Saharan Africa.

Source: World Bank database, 2020
The low productivity rates, shown by their respective added values per workers, could be enhanced by a reliable energy supply supported by a clear regulatory system.

Source: World Bank database, 2020
Renewable energy: a driver to foster productive activities and added value

<table>
<thead>
<tr>
<th>Sector</th>
<th>Rural</th>
<th>Commercial and industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>TANZANIA</td>
<td>SOUTH AFRICA</td>
</tr>
<tr>
<td>Project developed</td>
<td>Small-hydro energy for rural integrated project</td>
<td>Solar energy for beverage industry</td>
</tr>
<tr>
<td></td>
<td>The 550 kW hydro-powered rural project supplies electricity and water to local population, while running agro-forestry and livestock activities as part of a Water-Energy-Food integrated business model.</td>
<td>11 rooftop solar photovoltaic (PV) units, with a combined installed capacity of 10.4 MW, produce 18 GWh per year for the production of beverages.</td>
</tr>
<tr>
<td>Benefits</td>
<td>● Increased productivity and farmers income. ● Increased access to electricity for basic and productive uses of 23 percentage points. ● Improved health conditions and food security. ● Avoided carbon emissions by 172 t/y.</td>
<td>● Increased productivity (+ 9.24% in a year). ● Savings in electricity drawn from the grid. ● Avoided carbon emissions by 14 000 t/y.</td>
</tr>
</tbody>
</table>
2. What limited the renewable energy growth

Perceived high-risk environment
Despite a growing energy demand and a huge potential in electricity production from renewable energy sources, investments in renewables are still limited in Africa.

This scarce investment appetite can be interpreted as a sign of market unreadiness and high-level of perceived risk of the business environment mainly due to the lack of:

1. Political stability
2. Macroeconomic conditions
3. Clear and ready policy and regulatory frameworks
4. Institutional stability
5. Transparency
A **sovereign credit risk** can be defined as a measure of 4 dimensions:

- Financial
- Economic
- Exposure to international credit agencies
- Political

Efficient and comprehensive **de-risking tools** are essential to minimize the overall business risk and improve the **attractiveness** of the continent to **investors**.

**PERCEIVED HIGH-RISK ENVIRONMENT**

Risky environments limit the potential appetite of investors.

Source: SACE database, 2020
Bridging Africa’s energy access gap requires unlocking investments in RE

By 2040 ~33 billion dollars/year to be invested in generation capacity in the IEA’s Stated Policy Scenario.

By 2040 ~60 billion dollars/year are to be invested in generation capacity in the IEA’s Africa Case.

Source: IEA, 2019
PERCEIVED HIGH-RISK ENVIRONMENT

Most of de-risking instruments do not cover all investment phases

Preparation: Legal, technical and economic analysis

Bidding Phase: Tender information & documents

Tender Process and Awarding: Bidder consultation RFP & proposal review signing

Final Agreement: Loan, insurances, PPA, guarantees

Construction and O&M: Construction, commissioning, O&M

Minimizing the risks of investing in RE projects is a complex process that should encompass different phases.

An analysis carried out on EU de-risking instruments shows that while 100% of the instruments provide support in the early stages of the project, tender process is the most uncovered area, addressed by only 18% of the instruments.

Moreover, the bidding phase is covered by 29% of the EU tools, final agreement by 65%, and construction and operation phases by 41%.

Source: renewAfrica Initiative, 2019
**BEST PRACTICES**

Best existing instruments, but with space for improvements

<table>
<thead>
<tr>
<th>Strengths</th>
<th>GETFiT</th>
<th>REIPPPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensures political support</td>
<td>Fair risk allocation between public and private sector</td>
<td>First structured auction program in the continent (2011)</td>
</tr>
<tr>
<td>Ensures bidders’ reliability and competitiveness</td>
<td>Allocation of risks to the party which is best positioned to manage it</td>
<td>Delivered almost 4 GW in operation of wind and solar plants</td>
</tr>
<tr>
<td>Fully developed project agreements and credit</td>
<td>Public sector to absorb the credit risk in relation to the single offtaker of electricity (counterparty risk guarantee)</td>
<td>Bankable PPA backed by sovereign guarantee</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>Limited technological and geographical coverage</td>
<td>Limited to small scale projects</td>
<td>Interferences by the State-owned off-taker Eskom caused substantial delays in program implementation</td>
</tr>
<tr>
<td>After 5 years since the launch of the initiative, operational plants only in Zambia</td>
<td>Private sector to absorb all manageable risks, particularly technological and operational risk</td>
<td>Grid connection issues (costs higher than expected)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Challenging local content/ownership requirements due to limited local manufacturing capacity</td>
</tr>
</tbody>
</table>
Limited reliability and development of the grid

Poor power trading in interconnected regions

Low share of productive uses of energy

High sovereign credit risk

Unrealistic eye-catching targets

Weak regulatory frameworks

Lengthy tender to construction processes

Uncertain utilities’ financial viability

Non cost-reflective tariff

Inadequate de-risking instruments

Why only 2%?
1. Foster Africa’s electricity market openness, attractiveness and readiness

2. Provide an integrated power transmission grid and create regional energy markets

3. Develop a comprehensive de-risking instrument to unlock Africa’s renewable energy potential

4. Put productive uses of energy on top of the agenda

3. The time to act is now
1. Openness
Ensuring trustworthiness of the energy strategy through:
- Adoption, integration and monitoring of renewable targets;
- Separation between the natural monopoly of T&D services and the competitive activities;
- Clear rules for network access.

2. Attractiveness
Guaranteeing fair competition among generation technologies through:
- A transparent procurement framework for both conventional and renewable technologies (competitive tenders);
- The withdrawal of all electricity price distortion mechanisms such as fossil fuel subsidies and not-cost-reflective retail tariffs.

3. Readiness
Fostering an adequate network development through:
- Definition of a structured network development plan;
- Establishment of a clear and cost-based remuneration system for the TSO.

Guaranteeing availability of multiple and viable routes-to-market for renewable energy by allowing renewable generators to freely sell their energy to end-users through a spot market or bilateral PPAs.

THE TIME TO ACT IS NOW

Foster Africa’s electricity market openness, attractiveness and readiness

To ensure an effective regulatory system to foster RE development, an open, attractive and ready market is needed.
Stimulate integrated power transmission and create regional energy markets

According to IEA’s outlook, in 2040 **90% of electricity will be provided through national grids (Africa Case), with mini-grids and stand alone systems covering the remaining 10%.**

Addressing the deficit of power infrastructure in sub-Saharan Africa will **require a huge expenditure in the coming years**, half of which is expected to be invested by utilities to **expand and upgrade electricity networks**.

Improving regional power integrations will **help to reduce the investment needed** by opening up a wider range of supply sources.

The traditional “transmission follows generation” approach does not work anymore. A planned approach has to be adopted, **coordinating generation and transmission development at different geographic levels** (regional, national and local).

Source: IEA, 2019
THE TIME TO ACT IS NOW

Put productive uses of energy on top of the agenda

The provision of quality power for productive uses enables the activation of a wider value chain, leading to the increase of energy demand.

Long-term investment masterplans, aiming to increase countries’ electricity demand through the creation of new productive activities and to ensure them a reliable and abundant electricity supply, will foster the economic growth of many African countries.

According to the IEA, the share of productive activities’ energy consumption will increase of 23 percentage points by 2040 (Africa Case).

Sources: IEA, 2019
The renewAfrica Initiative aims to boost renewable energy investments in Africa by covering all the phases.

**Preparation**
- Public-Private Partnerships
- Capacity building and knowledge transfer
- Renewable energy projects portfolio
- Allocation of funds for project financing

**Bidding Phase**
- Standardized documents for the tendering process
- Project evaluation

**Tender Process and Award**
- Negotiation process for the contracts’ finalization
- Guarantees and insurances to cover risks

**Final Agreement**
- Monitoring the construction and operation phase
- Development of local skilled workforce

**Construction and O&M**

Source: renewAfrica Initiative, 2019
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Looking back at the past to face the present and plan for a sustainable energy future and prosperous Africa.