A challenging transition: exploring East Africa’s last 10 years of renewable energy
Acknowledgements

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This publication was launched during a RES4Africa Webinar held on the 23rd of November 2023 and is available for download on: www.res4africa.org/library.
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RES4Africa Foundation, in partnership with Enel Green Power, presents a comprehensive analysis focusing on the renewable energy sector's development in the past decade in East Africa. The report delves into what has limited its growth, and the necessary steps to foster investments and deployment of renewable energy solutions in the region.

This analysis takes into consideration the unique characteristics of the Eastern Africa region, encompassing its socio-economic landscape, strengths, and vulnerabilities, which exhibit variations across the different countries within the area. While recognizing these diversities, the report utilizes empirical data and facts to outline the requirements for achieving universal access to affordable, reliable, and sustainable energy solutions.

The region hosts the fastest growing portion of Africa's population, whose demand for electricity is quickly increasing. Despite the potential exists for sustainable development, access to electricity remains limited for many, especially in rural areas. While the countries in the region differ in demographics and socio-economic conditions, the fundamentals for regional integration are in place, yet there is a need to bridge the existing gaps and connect the dots.
East Africa is witnessing the most rapid population growth of the continent, paired with a steady growth of its GDP in the last 10 years, although remaining the second poorest region of Africa. The heterogeneous group of countries that compose this area covers all the possible ranges of political and economic contexts: flourishing economies to fragile political contexts, from abundance of resources to vulnerability to climate change. These differences are more evident when analysing Kenya’s economic outlook: the country represents alone 40% of the region’s GDP and the per capita income has grown at a CAGR of 2% per year in the last decade.

The Eastern Africa energy sector is largely dominated by biofuels, which are the major source of primary energy while the renewable energy capacity is largely dominated by hydroelectric power plants, even if their full potential is yet to be unleashed. In a region where, except a few exceptions and despite improvements in the last decade, universal access to electricity is still far from achievement in particular in rural areas, the off-grid segment is gaining more and more traction in providing access to energy to millions of people.

Climate change is set to have enormous consequences for several eastern African countries, as the overall climate resilient index of the region is one of the worst globally, followed only by central Africa.
In this challenging context, to unlock the full potential of the region a number of actions need to be undertaken:

i. develop regional energy plans and sound regulatory frameworks to support the harmonization of national objectives,

ii. mobilize resources and improve policies to foster renewable energy deployment,

iii. implement infrastructure and market reforms to allow a full-fledged regional integration,

iv. build low carbon economies that could help East Africa in crafting a robust position in the future energy business.

The 2023 publication seeks to illuminate the prospects for renewable energy advancement and regional integration in East Africa, as a means of promoting socio-economic advantages for its burgeoning population. This publication serves as a platform for the exchange of insights and perspectives, a foundational resource to inspire additional research and disseminate awareness regarding the vast potential inherent within the region.

Though the path ahead is challenging, it is needed to take action without hesitation.

Salvatore Bernabei
President at RES4Africa Foundation
CEO of Enel Green Power
Abbreviations and acronyms

AfCFTA - African Continental Free Trade Area
AUC – African Union Commission
Bbls – Barrels
BNEF – Bloomberg New Energy Finance
CAGR - Compound Annual Growth Rate
CAGR - Compound Annual Growth Rate
CPI – Consumer Price Index
CRI – Climate Resilience Index
EA – East Africa
EAC – East African Community
EACOP – East African Crude Oil Pipeline
EAMU – East African Monetary Union
EAPP - Eastern Africa Power Pool
EDCL - Energy Development Corporation
ERA - Uganda Electricity Regulatory Authority
ERC - Energy Regulatory Commission
EU – European Union
EUCL - Energy Utility Corporation
FSI - Fragile States Index
GDC - Geothermal Development Company
GDP – Gross Domestic Product
GW – Gigawatt
IEA – International Energy Agency
IMF – International Monetary Fund
IPPs – Independent Power Producers
IRENA – International Renewable Energy Agency
KENG - Kenya Electricity Generating Company
KETRACO - Kenya Electricity Transmission Company
KPLC - Kenya Power and Highlighting company
kWh – Kilowatt per hour
kWh/m2 – Kilowatt hours per square metre
LCRs – Local Content Requirements
LNG – Liquified Natural Gas
m/s – Metre per second
MW – Megawatt
NDCs – Nationally Determined Contributions
OECD - Organization for Economic Co-operation and Development
PJ – Petajoule
PPAs – Power Purchase Agreements
PPP – Public-Private Partnerships
PV – Photovoltaic
RE – Renewable Energy
REA - Rural Electrification Agency
RES – Renewable Energy Solutions
RURA - Rwanda Utilities Regulatory Authority
SDG – Sustainable Development Goals
SMEs – Small and Medium Enterprises
SSA – Sub-Saharan Africa
SSEC - South Sudan Electricity Corporation
TENESCO - Tanzania electricity supply Company
TWh – Terawatt per hour
UEB - Uganda Electricity Board
UEDCL - Uganda Electricity Distribution Company
UEGCL - Uganda Electricity Generation Company
UETCL - Uganda Electricity Transmission Company
UNSD – United Nations Statistics Division
USD – United States Dollar
WHO – World Health Organisation
The study includes 14 countries of East Africa as defined by IRENA: Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Mauritius, Rwanda, Seychelles, Somalia, South Sudan, Sudan, Uganda, United Republic of Tanzania.

Any deviation from this country grouping in the data provided is further specified within the study in the “notes” section.

In this publication it is common to find references to the following country grouping:

**The East African Community (EAC)**: a regional intergovernmental organisation of 7 Partner States: The Republic of Burundi, the Democratic Republic of the Congo, the Republic of Kenya, the Republic of Rwanda, the Republic of South Sudan, the Republic of Uganda, and the United Republic of Tanzania, with its headquarters in Arusha, Tanzania.

**The Eastern Africa Power Pool (EAPP)**: it accounts for eleven member countries and fifteen utilities that signed the Inter Utility Memorandum of Understanding (IUMOU) and one regional electricity provider (SINELAC). The member countries are Burundi, Djibouti, the Democratic Republic of Congo (DRC), Rwanda, Egypt, Ethiopia, Kenya, Sudan, Tanzania, Uganda, and Libya.
## East Africa in numbers

<table>
<thead>
<tr>
<th>Country</th>
<th>Electricity Demand 2020 (TWh)</th>
<th>GDP 2020 ($)</th>
<th>Population 2020 (Mln)</th>
<th>RES Capacity 2020 (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudan</td>
<td>17,8</td>
<td>35</td>
<td>45</td>
<td>1,817</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>14,6</td>
<td>99</td>
<td>102</td>
<td>4,753</td>
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<tr>
<td>Kenya</td>
<td>12,6</td>
<td>110</td>
<td>50</td>
<td>2,371</td>
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<tr>
<td>Tanzania</td>
<td>8,6</td>
<td>70</td>
<td>60</td>
<td>682</td>
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<tr>
<td>Uganda</td>
<td>4,9</td>
<td>43</td>
<td>42</td>
<td>899</td>
</tr>
<tr>
<td>Mauritius</td>
<td>3,0</td>
<td>11</td>
<td>1</td>
<td>486</td>
</tr>
<tr>
<td>Rwanda</td>
<td>0,9</td>
<td>11</td>
<td>13</td>
<td>146</td>
</tr>
<tr>
<td>Djibuti</td>
<td>0,7</td>
<td>3</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Seychelles</td>
<td>0,5</td>
<td>1</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Somalia*</td>
<td>0,4</td>
<td>2</td>
<td>4</td>
<td>27</td>
</tr>
<tr>
<td>Eritrea</td>
<td>0,4</td>
<td>3</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>Burundi</td>
<td>0,3</td>
<td>1</td>
<td>1</td>
<td>53</td>
</tr>
<tr>
<td>Comores</td>
<td>0,1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Total 15 East Africa’s countries</strong></td>
<td><strong>64,7 TWh</strong></td>
<td><strong>3,915 B$</strong></td>
<td><strong>331 Mln</strong></td>
<td><strong>11,279 MW</strong></td>
</tr>
</tbody>
</table>

### East Africa’s share of the World

- **Electricity Demand**: 0,2%
- **GDP**: 0,4%
- **Population**: 4,3%
- **RES Capacity**: 0,4%

Source: Enerdata 2023; IMF – World Economic Outlook 2023

Notes: *GDP and Population not available for Somalia and South Sudan. Electricity demand and RES Capacity not available for South Sudan.
Chapter 1
What happened in the last 10 years

- East Africa’s socio-economic outlook is below the continent’s average
- RES hold a pivotal position in the energy mix with enormous space for improvement
- East Africa’s off-grid vibrant market shows huge potential for the sector
- Climate change is expected to cause severe consequences to the Region’s economy

Chapter 2
What limited the RE growth

- The absence of regional regulatory planning hinders the region’s ability to meet its RE objectives
- Lack of regional integration affects the efficiency of the electricity market
- East Africa is facing several challenges in the global transition era
- Insufficient climate finance hampers the region’s ability to cope with climate change
- Risks’ perception jeopardizes East Africa’s attractiveness

Chapter 3
The time to act is now

- Renewable energy development can only happen by improving policies and mobilizing resources on multiple levels
- To achieve a full-fledged regional integration, market and infrastructure reforms need to be implemented
- Building low carbon economies could help East Africa in crafting a robust position in the future energy business
- Put youth, employment and innovation on top of the agenda
1. What happened in the last 10 years
East Africa’s socio-economic outlook is below the continent’s average
EAST AFRICA’S SOCIO-ECONOMIC OUTLOOK IS BELOW THE CONTINENT’S AVERAGE

East Africa is the continent’s fastest-growing region in terms of population

While Eastern Africa accounts for 25% of the African population, it only accounts for 14% of the GDP. Of Eastern African GDP (354 bn€), Kenya accounts for 29%, closely followed by Ethiopia (27%).

Source: IMF, World Economic Outlook, 2023
Notes:
- For South Sudan and Somalia, no info is retrievable in their current war-zone status.
- GDP values are converted from national currency to U.S. dollars using market exchange rates (yearly average).
- No 2021 information available for South Sudan and Somalia.
The GDP growth across the region has been increasing steadily for most of its countries.

Over the past decade, the region’s largest economies have maintained a steady and significant level of growth, approximately 5% per year. The growth has been largely driven by Rwanda, Uganda, Ethiopia, Kenya, Djibouti, and Tanzania.

This growth was largely boosted by the services sector that surpassed agriculture and industry in 2022: the region’s natural resources contributed to attract a large number of tourists with a consequent rise in demand for accommodations, entertainment, logistics etc.

EA economies are quite heterogeneous, largely reflecting security concerns in some countries. The most politically fragile and unstable countries have seen vertical drops in the overall level of productivity.
Inflation and GDP growth are not homogeneous across the region

The EAC is one of the most integrated regional economic communities of the African Union

**Pillars**

- Customs Union (2005) – Duty-free trade among partners + external tariff
- Common Market (2010) – Free circulation of people and services
- Monetary Union (“EAMU”) – Planned for 2023
- Political Federation – Ultimate goal

- Of the 5% real GDP in EAC (2021), 2.2% was driven by the construction sector and 2% by services, continued in 2022. The region’s natural and cultural attractions draw tourists thus creating demand for accommodation, food, and entertainment.
- CPI* in EAC falls at 2% in 2018, stabilizing at 5% 2020-2021 thanks to tighter monetary policies vs non-EAC
- CPI in non-EAC is driven up by Sudan and Ethiopia after 2018 due to their war status and related expanded fiscal deficit; low productivity in agriculture; energy inflation.
- Focus Energy inflation. By end 2019, EAC countries increased access to off-grid solar renewable power (4x those in West Africa), driven by EAC: Kenya, Uganda, Tanzania.

Notes: CPI – Consumer Price Index
Despite an improvement in the last decade, East Africa remains the Continent's worst performer in terms of quality of governance.

EA scored 46/100 compared to the continent's average (48.9). The region scores lower than other region as well (North Africa 52.2; Sub-Saharan Africa 48.4; Western Africa 52.5). However, the trend is not consistent across EA countries.

EA includes both the African country ranked second in terms of Human Development Index (Seychelles) and the one with the lowest level on the continent (South Sudan).

Criteria that affect the performance of the countries include militarization of politics and authoritarian regression that negatively affect the state/populations relation and the difficult housing situation in urban areas that struggles to keep up with growing urbanization.
Several EA countries are facing complex political and social challenges.

Specific domestic risks burdening the region include the continuing humanitarian crisis in Somalia, the concern on the deterioration of the KES against the dollar and the rise in cost of living, as well as the severe migration crisis affecting South Sudan and Ethiopia.

Such an uncertain scenario could pose significant obstacles to the region's growth prospects and produce a serious impact on the perceived soundness of EA’s socioeconomic environment.

The Fragile States Index (FSI) aims to assess the fragility of countries by considering a variety of interrelated political, economic and social parameters such as demographic pressure and uneven development: in 2023, Somalia ranked first in overall fragility in the world, followed by South Sudan and Ethiopia in third and eleventh place, respectively.

Source: The FUND FOR PEACE, Fragile States Index, Washington, 2023
RES hold a pivotal position in the energy mix with enormous space for improvement.

1. What happened in the last 10 years
Biofuels and waste remain the most important source of primary energy in East Africa.

Biomass and waste account for almost 80% of the region’s primary energy consumption. Biomass is the largest source of energy today, primarily used for heating and cooking, but it brings environmental (emissions and uncontrolled deforestation) and health issues.
RES hold a pivotal position in the energy mix with enormous space for improvement.

The region has almost doubled its total electricity generation capacity in the last decade.

In total, East Africa added almost 7 GW of new electricity generation capacity between 2011 to 2021, reaching 16.3 GW in 2021. The largest renewable capacity additions came in 2017 from the 1.9 GW Gilgel Gibe III Dam in Ethiopia, and in 2018 from the 0.31 GW Lake Turkana onshore wind plant in Kenya. Once fully operational, the Grand Renaissance Dam currently under construction in Ethiopia will increment the region’s installed capacity by other 6.5 GW.

Annual installed capacity by technology:

- **2011 Capacity**: 8.8 GW (55% Hydro, 31% Coal, 7% Oil, 2% Gas, 2% Geothermal)
- **2012-2021 Capacity Development**:
  - 2012: 5.2 GW (55% Hydro, 24% Coal, 16% Wind, 7% Oil, 5% Gas)
  - 2013: 5.5 GW (58% Hydro, 24% Coal, 16% Wind, 7% Oil, 5% Gas)
  - 2014: 5.5 GW (58% Hydro, 22% Coal, 16% Wind, 7% Oil, 5% Gas)
  - 2015: 5.8 GW (58% Hydro, 22% Coal, 16% Wind, 7% Oil, 5% Gas)
  - 2016: 7.5 GW (75% Hydro, 12% Coal, 7% Wind, 5% Oil, 3% Gas)
  - 2017: 7.7 GW (79% Hydro, 11% Coal, 7% Wind, 5% Oil, 3% Gas)
  - 2018: 7.7 GW (79% Hydro, 11% Coal, 7% Wind, 5% Oil, 3% Gas)
  - 2019: 7.9 GW (81% Hydro, 11% Coal, 7% Wind, 5% Oil, 3% Gas)
  - 2020: 7.9 GW (81% Hydro, 11% Coal, 7% Wind, 5% Oil, 3% Gas)
  - 2021: 16.3 GW (69% Hydro, 12% Coal, 7% Wind, 5% Oil, 4% Gas)

**RES Share**
- 2011: 64%
- 2021: 69%

Source: Enerdata, 2023
Notes: No information available for South Sudan.
RES hold a pivotal position in the energy mix with enormous space for improvement.

Within renewable energies, hydropower holds the highest share of installed capacity. The presence of the Great Lakes, the Great Rift Valley and the Nile Basin have contributed to the major role played by hydropower (50% of total installed capacity) in the region’s total energy mix.

INSTALLED CAPACITY (GW), 2021

- **Hydro:** 16.3 GW (69%)
- **Solar PV:** 1.1 GW (6%)
- **Wind:** 0.9 GW (1%)
- **Gas:** 0.9 GW (6%)
- **Oil:** 0.1 GW (1%)
- **Coal:** 0.1 GW (1%)

**Notes:** No information available for South Sudan.

Source: Enerdata, 2023
RES hold a pivotal position in the energy mix with enormous space for improvement.

The region has huge potential for solar PV, wind and hydropower generation.

The region has a high annual average solar irradiation of 2100 kWh/m² and modest wind speeds averaging at 5.5 m/s, which can reach up to 8 m/s (IRENA, 2022). East Africa hosts some of the highest capacity factors zones for solar PV (Ethiopia, Uganda, Tanzania) and wind (Kenya), while very large hydropower capacities are possible in Ethiopia. Kenya and Ethiopia alone could have the potential for 10GW development of geothermal additional capacity.

**INSTALLED AND POTENTIAL CAPACITY PER TECHNOLOGY (GW)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Hydro</th>
<th>Solar</th>
<th>Wind</th>
<th>Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>4.1</td>
<td>16.5</td>
<td>1.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Tanzania</td>
<td>0.6</td>
<td>8.7</td>
<td>0.5</td>
<td>0.1</td>
</tr>
<tr>
<td>Sudan</td>
<td>1.5</td>
<td>0.1</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Uganda</td>
<td>0.7</td>
<td>1.2</td>
<td>0.4</td>
<td>0.1</td>
</tr>
<tr>
<td>Kenya</td>
<td>0.8</td>
<td>0.4</td>
<td>0.4</td>
<td>0.1</td>
</tr>
<tr>
<td>Burundi</td>
<td>0.3</td>
<td>0.3</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Rwanda</td>
<td>0.5</td>
<td>0.1</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Djibouti</td>
<td>1.0</td>
<td>0.8</td>
<td>0.2</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Current: 253.6 TWh (37.2 TWh)
78.9 TWh (0.4 TWh)
43.4 TWh (2.5 TWh)
67.3 TWh (0.4 TWh)

Source: Enerdata 2023; Potential capacity, IRENA, Planning and prospects for renewable power, Eastern and Southern Africa, 2021
Note: 1. Hydro includes small and large hydro. No information available for not mentioned countries.
EOH: Hydro = 4000hr, Biomass = 4500hr from internal analysis, Solar and Wind calculated from Capacity Factors found in IRENA - Planning and prospects for renewable power, Eastern and Southern Africa (2021)
East Africa’s off-grid vibrant market shows huge potential for the sector
In 2020, an estimated 182 million people across the region did not have access to electricity.

At the end of 2019, 38.5 million people in East Africa were using decentralised energy systems.

In the last decade, decentralised solutions have proven pivotal to expand the population’s access to energy globally, with 60 million people connected in Africa alone.

Kenya accounted for 42.4% of the total, followed by Ethiopia (20.5%), Uganda (16%) and the United Republic of Tanzania (9.5%). The total number is four times higher than in West Africa and almost eight times more than in Southern Africa.

As of February 2023, Kenya had 62 operational mini-grids and 28 under construction.

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**Source:** IRENA, Africa and its regions, 2021; World Bank, Solar Mini Grids Could Sustainably Power 380 million People in Africa by 2030 – if Action is Taken Now, 2023
East Africa is by far the main recipient of financial commitments in the global off-grid market.

Annual commitments to off-grid renewables in Africa grew from just above $0.5 million in 2010 to more than $380 million in 2020.

Total commitments in the reference decade were $1.748 million; almost half of total commitments to off-grid renewables in Africa went to East Africa ($822 million) – primarily Kenya and the United Republic of Tanzania.

A well-developed mobile money industry facilitated investments in this region, a necessary requirement for the adoption of pay-as-you-go (PAYG) systems. This was the most used tool for the purchase of appliances and solar energy kits, totaling 90% of the sales.

In the first half of 2023 about 4.3 million off-grid solar energy kits were sold worldwide, 50% in East Africa.

Source: IRENA, Africa and its regions, 2022; GOGLA, Global Off-Grid Solar Market Data, 2023; USAID, Off-grid solar market assessments & additional resources, 2019
Note: Exceptional growth was observed in 2014, driven mainly by a surge in capital directed to four companies operating in East Africa: ZOLA Electric (Off Grid Electric), EcoZoom, M-Kopa and Mobisol (Engie Energy Access)
Access to clean cooking technologies could lead to millions of lives saved across the region and the continent.

Energy security is closely linked to climate change: in the region, a substantial issue is the prevalence of energy poverty, with many households turning to traditional biomass for cooking and heating, largely due to the comparatively high cost of electricity. This heavy dependence on traditional biomass has led both to health problems and environmental degradation.

> 85% of the population in East Africa lack access to clean cooking.

303 Mln of people in East Africa.

170,000 premature deaths per year in the region as of 2019.

Significant impact on deforestation.

Climate change is expected to cause severe consequences to the Region’s economy.

1. What happened in the last 10 years
Climate change is expected to cause severe consequences to the region’s economy. East Africa lags behind the rest of the continent in terms of climate resilience.

The East Africa region has a relatively low levels of climate resilience and readiness, as measured by the Climate Resilience Index (CRI), which considers various dimensions including policies, economic status, infrastructure development, and institution in order to evaluate a country’s structural characteristics that either elevate or mitigate the risk of negative impacts from climate-related disasters.

East Africa, with a CRI score of 25.0, lags behind Southern Africa and North Africa, which scored 43.6 and 63.5, respectively, as well as other geographic areas commonly considered vulnerable to climate change such as South Asia (56).

Source: African Development Bank, East Africa Economic Outlook 2022; University of Notre-Dame, Country rankings in vulnerability and readiness, 2021
The region’s vulnerability to climate change is highly influenced by key economic sectors. The impact of climate change is compounded by the region’s dependence on climate-sensitive sectors such as agriculture. The agriculture sector accounted for an average of 28% of GDP in East Africa during 2017–2019. Climate change directly affects the livelihood of 65% of the region’s population, employed in agricultural activities. The rise in population is expected to aggravate the challenge of climate change through additional pressure on natural resources, leading to environmental degradation, worsening food insecurity, and higher regional poverty levels.

CLIMATE CHANGE IS EXPECTED TO CAUSE SEVERE CONSEQUENCES TO THE REGION’S ECONOMY

The countries of the region are experiencing diverse economic effects of climate change.

The risks associated with climate change stem from vulnerabilities related to natural assets like forage and water resources, as well as fluctuations in crop and livestock yields.

Such vulnerabilities particularly affect SMEs which are largely confined to agriculture and agri-processing activities and represent over 80% of businesses in EA.

Climate change is expected to exacerbate the level of exposure to current and emerging challenges facing the East Africa region including effects of the COVID-19 pandemic, the Russia-Ukraine conflict, food insecurity, energy poverty, and socio-economic issues.

Source: Brookings, Global Economy and Development, Njuguna Ndung’u, and Théophile T. Azomahou, Keys to Climate Action, 2023; African Development Bank, East Africa Economic Outlook, 2022; East Africa Drought Watch, Mapviewer, 2023
2. What limited the RE growth
The absence of regional regulatory planning hinders East Africa’s ability to meet its RE objectives.
Despite improvements, the regulatory framework still presents significant barriers to the full development of renewables.

The 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.

- Policy documents are frequently inaccessible to investors and not up to date. Renewable energy targets themselves are often not set or disclosed, preventing IPPs from planning long term investments, also facing the risk of PPAs review.
- The lack of cost reflective tariffs removes an important economic incentive making the energy market dependent on the support of state funds. This also limits the ability of utilities to plan investments or conclude long term agreements.

Source: RISE – ESMAP, 2011 - 2021
East Africa has not adopted a regional plan that presents a RE target, leaving to national plans the possibility to set them.

Although the region has embarked on an ambitious regional integration project, it is still possible to notice lack or regional coordination. The energy sector regulation is done mainly at the national level following a bottom-up approach.

- Countries are moving \textbf{from feed-in tariffs to auctions}
- \textbf{Limited routes to market} for private investors
- Structured programs (Scaling Solar and Get Fit) \textbf{failed to attract significant investments}.

<table>
<thead>
<tr>
<th>Country</th>
<th>RES target</th>
<th>RES share of generation (2022)</th>
<th>Supporting Schemes</th>
<th>Routes to Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethiopia</td>
<td>100% generation by 2030</td>
<td>97.9 %</td>
<td>- FiT</td>
<td>- PPA with Single Buyer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Auctions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Scaling Solar (2017 and 2019)</td>
<td></td>
</tr>
<tr>
<td>Kenya</td>
<td>100% generation by 2030</td>
<td>85.94 %</td>
<td>- FiT</td>
<td>- PPA with Utility</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Auctions</td>
<td>- Corporate PPA in place but not applicable</td>
</tr>
<tr>
<td>Tanzania</td>
<td>70% generation by 2025/26</td>
<td>30.92 %</td>
<td>- FiT</td>
<td>- PPA with Single Buyer</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Auctions</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Net-meetering policy</td>
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</tr>
<tr>
<td>Uganda</td>
<td>100% generation by 2050</td>
<td>90.84 %</td>
<td>- FiT</td>
<td>- PPA with Single Buyer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Get Fit Program (2014)</td>
<td></td>
</tr>
</tbody>
</table>

Source: BNEF, Climatescope, 2022; IEA, Clean Energy Transitions in the Greater Horn of Africa, 2022
The region has potential to attract private funding, but the existing risks prevent enterprises from investing.

**Regulation**
- Lack of realistic and updated national RE targets
- Masterplans need more coordination between generation and transmission expansion plans
- Enforcement of the laws though adequate implementation of secondary legislation

**Tenders and PPAs**
- Auctions programmes are not always successfully implemented
- Lack of transparency and standardized documentation.
- PPAs bankability issues (currency, take-or-pay)

**Regional integration**
- Slow integration process for the energy sector at a regional level, even though both the East African Community and the Eastern Africa Power Pool set ambitious targets.
- Delays in delivery of critical infrastructure such as transmission line linkages.

**Business Environment**
- Political instability has prevented long-term, structural investments.
- Lack of investments in transmission and distribution infrastructures
- Absence of independent public regulation authorities
- No cost-reflective tariffs
Kenya and Ethiopia are leading the energy transition in the region

**KENYA**

Kenya represents one of the countries in the region with a more comprehensive regulatory framework. The country adopted a **system of feed-in-tariffs in 2008** (revised in 2010 and 2012), a **Grid-code** and has progressively liberalized the domestic market, culminating in the passage of the **PPP Bill in 2021**. These measures are in support of the goal of achieving **100% renewable energy production by 2030**.

The **Kenya Energy Sector Roadmap 2040** sets a target of 100 GW of installed capacity by 2040, corresponding to 5 new GW installed per year for the period 2022-2040. The **National Energy Policy (2018)**, implemented by the **Energy Act (2019)** and the **Integrated National Energy Plan** have significantly opened up all segments of the industry to private participation. The **Least Cost Power Developing Plan 2021 – 2030** (LPCDP) moreover gives an overview of the iterative adjustments of tariffs in the coming years.

However, the **“PPA Taskforce” (2021)** took two measures that increased the risk perception for companies, namely the cancellation of the 'take-or-pay' policy and the revision of the currency for the payment of agreements already concluded.

**ETHIOPIA**

Ethiopia offers a stable and quite open regulatory framework for the generation side: the country **has adopted a PPP Law in 2018**, opening the generation sector to IPPs, besides adopting an **investment plan** and a **credible dispute resolution mechanism** that have further strengthen the overall framework.

The country has also a contract regulation that ensures a **standardization of PPAs** (with contracts that can be denominated in foreign currency), it offers credit enhancement and the possibility of guarantees/concessional loans. In addition, Ethiopia has a **straightforward permitting and authorization process** for environmental approval with a clear and publicly available procedure.

The main documents guiding the power sector are the **Network Development Plan**, the **Energy Master Plan** (which includes a Transmission Expansion Plan) and the **System Integration Study**.
Lack of regional integration affects the efficiency of the electricity market

2. What limited the RE growth
The East Africa Power Pool aims at developing the interconnected electrical power system in the region

Day-ahead market
Its implementation is the first step to achieve regional market efficiency and unlock power equilibrium between demand and supply.

Intra-day market
To complement the first phase and guarantee a continuous market for trading and adjust demand and supply.

Future markets
Once the two initial phases are up and running, new markets can be introduced: forward physical market, financial forward market, balancing and ancillary services market etc.

Established in 2005, the Eastern Africa Power Pool (EAPP) sees the participation of 13 countries and 15 utilities. Its objective is to optimize regional resources to facilitate the development of a competitive electricity market and to set up regional investment schemes in power generation, transmission and distribution. It attempts to re-balance the disparate power needs of the region – some states in surplus, others in oversupply, but with each nation experiencing inconsistent quality, load shedding and even complete loss of power. Participation by a member country is voluntary, does not require structural changes to EAPP member country power sectors, and does not dictate future power market rules within a country. Once the market design has been agreed, EAPP countries must together define the market rules before the regional market can begin. They will also need to establish and equip a regional market operator to manage market operations.

Source: EAPP, AfDB, A Roadmap for increasing Regional Power Trade in Eastern Africa, 2022
Notes: - Countries: Burundi, Djibouti, Democratic Republic of Congo (DRC), Rwanda, Egypt, Ethiopia, Kenya, Sudan, Tanzania, Uganda, and Libya. South Sudan and Somalia. - Utilities: REGIDESO of Burundi, SNEL of DRC, EEHC of Egypt, EEP of Ethiopia, GECOL of Libya, KenGen of Kenya, KPLC of Kenya, KETRACO of Kenya, REG of Rwanda, SETCO of Sudan, SINELAC of DRC – Rwanda – Burundi, SSEC of South Sudan, TANESCO of Tanzania, UETCL of Uganda, and EDD of Djibouti. Somalia does not have a national utility and is represented by the Ministry responsible for energy.
LACK OF REGIONAL INTEGRATION AFFECTS THE EFFICIENCY OF THE ELECTRICITY MARKET

Trade can improve the economic efficiency of the regional power sector. Presently, there is little cross-border trading in EAPP.

Electricity demand is on the rise in East Africa, with an estimated forecasted peak expanding from 58 GW in 2020 to 98 GW in 2030. Simultaneously, the installed capacity of renewable energy is expected to grow from 4 GW in 2020 to 29 GW in 2030, that would highly benefit cross-border power exchanges.

In 2021, the AfDB provided $84Mln, and in 2022, the World Bank contributed $55Mln for the second power interconnection between Ethiopia and Djibouti. This financial support aims to assist in the construction of the interconnector and transmission lines, as well as the building and restoration of substations.

If planned interconnection will be finalized on time, the EAPP could be entirely connected by 2025 already. In this case the EAPP cross border lines will shift from 654 MW in 2020 to 4.720 MW in 2025.

Source: EAPP, Lebbi Changullah, Regional Electricity Interconnection in Eastern Africa: challenges and opportunities, 2019
LACK OF REGIONAL INTEGRATION AFFECTS THE EFFICIENCY OF THE ELECTRICITY MARKET

Most of market reforms in EAC have focused on liberalization

<table>
<thead>
<tr>
<th>Country</th>
<th>Generation</th>
<th>Transmission</th>
<th>Distribution</th>
<th>Regulation</th>
<th>IPPs</th>
<th>Highlights</th>
</tr>
</thead>
<tbody>
<tr>
<td>KENYA</td>
<td>Kenya Electricity Generating Company Ltd (KENGEN) Geothermal Development Company (GDC)</td>
<td>Kenya Electricity Transmission Company (KETRACO) Open to private transmission companies1.</td>
<td>Kenya Power and Highlighting company (KPLC)</td>
<td>Energy Regulatory Commission (ERC) Rural Electrification Agency (REA)</td>
<td>Open to IPPs that can only sell to KPLC and KETRACO (single buyer market)</td>
<td>Unbundled vertically integrated monopoly of Kenya Power and Highlighting company KPLC</td>
</tr>
<tr>
<td>RWANDA</td>
<td>Energy Utility Corporation Ltd (EUCL)</td>
<td>Energy Utility Corporation Ltd (EUCL)</td>
<td>Energy Utility Corporation Ltd (EUCL)</td>
<td>Rwanda Utilities Regulatory Authority (RURA)</td>
<td>IPPs can only generate electricity</td>
<td>Energy Development Corporation Ltd (EDCL) undertakes the planning and construction of energy infrastructure and transfers responsibility to EUCL for operationalization.</td>
</tr>
<tr>
<td>SOUTH SUDAN</td>
<td>South Sudan Electricity Corporation (SSEC)</td>
<td>South Sudan Electricity Corporation (SSEC)</td>
<td>Other</td>
<td>Other</td>
<td>IPPs can sell to SSEC (SSEC) is an independent government corporation responsible for the generation and transmission, and sales of electricity to distributors.</td>
<td></td>
</tr>
<tr>
<td>TANZANIA</td>
<td>Tanzania electricity supply Company Ltd (TANESCO)</td>
<td>Tanzania electricity supply Company Ltd (TANESCO)</td>
<td>Tanzania electricity supply Company Ltd (TANESCO)</td>
<td>Tanzania electricity supply Company Ltd (TANESCO)</td>
<td>IPPs can only sell power to TANESCO</td>
<td>IPPs can only sell power to TANESCO</td>
</tr>
<tr>
<td>UGANDA</td>
<td>Uganda Electricity Generation Company Ltd (UEGCL)</td>
<td>Uganda Electricity Transmission Company Ltd (UETCL)2</td>
<td>Uganda electricity distribution Company Ltd (UEDCL)</td>
<td>Uganda Electricity Regulatory Authority (ERA)</td>
<td>Emerging IPPs and private concession avenues</td>
<td>In 2001, Uganda Electricity Board (UEB) was unbundled. UEDCL has had a management concession with a private company UMEME. The market is primarily a single buyer system3.</td>
</tr>
</tbody>
</table>

Source: Muhumuza Ezra Rubanda, Livingstone Senyonga, Mohammed Ngoma, Muyiwa S. Adaramola, Energy market integration: Harmonizing tariff recourse policies in East Africa, 2023
Notes: 1. Two lines under development by Africa50 and PowerGrids of India
2. In charge of lines of 132 kV and beyond. Tender in process to open up to private transmission ongoing
3. At the time of this publication there are active moves to rebundle. Umeeme concession will likely not be renewed
Lack of regional integration affects the efficiency of the electricity market. To achieve a uniform tariff structure in an integrated energy market across countries, harmonized tariff policies are also needed.

Tariff hikes, when not effectively handled, are more likely to diminish demand, escalate losses, and erode public trust in the supplier. This is particularly true in regions where the populace perceives electricity as a public good. As a remedy, transitioning from a domestic market to a more expansive regional market is being pursued as a viable strategy to address certain electricity supply challenges. The establishment of an integrated regional market serves to stabilize the supply, ensuring a balance between demand and fluctuating energy resource endowments and usage patterns across diverse areas.

The weighted average of the East Africa Community is $0.212 / kWh.

- EAC average: $0.212
- Global average: $0.171
- Sub-Saharan average: $0.161
- Global minimum: $0.049

Source: Muhumuza Ezra Rubanda, Livingstone Senyonga, Mohammed Ngoma, Muywa S. Adaramola, Energy market integration: Harmonizing tariff recourse policies in East Africa, 2023
East Africa is facing several challenges in the global transition era.

2. What limited the RE growth
EAST AFRICA IS FACING SEVERAL CHALLENGES IN THE GLOBAL TRANSITION ERA

The green transition is expected to lower demand for hydrocarbons, significantly diminishing potential future revenues.

In global energy dynamics, models relying heavily on income from oil resources could no longer guarantee stable future revenues. The region’s dependence on fossil fuels for energy generation leaves it exposed to unpredictable fluctuations in global oil prices, leading to unstable energy costs.

Policymakers are now confronted with the decision to capitalize on existing fossil fuel reserves to expedite development, all while curbing carbon emissions to address environmental concerns.

Embracing affordable renewables like wind and solar could enhance energy security, reduce the carbon footprint, and improve access to essential services like education and healthcare.

East Africa experienced several oil and gas discoveries over the last decade.

In 2022, South Sudan possessed approximately 3.5 billion barrels of oil reserves, making it the third-largest in SSA, following Nigeria and Angola. Nearly 90% of South Sudan's oil and gas reserves remain untapped. Uganda and Madagascar are poised to become Africa's new oil producers, with Tanzania likely becoming one of the first EA country to export LNG. Kenya, although making modest progress, remains pivotal as a crucial regional oil transit hub.

<table>
<thead>
<tr>
<th>Utilization of heavy crudes</th>
<th>Elevated production costs may diminish the competitiveness of numerous African producers in the global market, potentially leading to the premature stranding of their assets.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necessity for expensive extraction technologies</td>
<td>The adoption of carbon pricing mechanisms, including border carbon prices, by several non-African nations may adversely affect African countries reliant on oil and gas exports.</td>
</tr>
<tr>
<td>+ 15–20% Higher development and operational expenses</td>
<td>This emphasizes the importance of early investments in clean energy systems to proactively avoid enduring trade-related obstacles.</td>
</tr>
<tr>
<td>80–90% More carbon-intensive than their global counterparts (African oil and gas assets)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Mordor Intelligence, East Africa Oil and Gas Market Size and Share Analysis – Growth trend and forecasts, 2023; SEI, Climate Analytics, E3G, IISD, and UNEP, The Production Gap: Phasing down or phasing up? Top fossil fuel producers plan even more extraction despite climate promises, 2023
Climate finance plays a crucial role in addressing the disparity between current and future generations in terms of the impact of climate change.

Climate finance in the region pales compared to fossil fuel funding, hindering energy transition. Between 2016-2021, $29 billion annually went to African fossil fuel projects, mainly from the Global North and Asia. Fossil fuel subsidies, once bridging energy gaps, now support inefficient infrastructure, risking stranded assets.

Estimates suggest that between $7bln and $15bln are lost every year in East Africa due to the effects of climate change, a number that could more than double by 2040 if action is not taken.

A shift to renewable energy requires just transition principles and climate-aligned investments, an increased volume of mitigation-related projects powered by renewable energy systems.

Source: Climate Policy Initiative, Landscape of Climate Finance in Africa, 2022
The East African Crude Oil Pipeline promises growth but also poses serious environmental challenges related to climate change and land degradation.

East Africa relies significantly on agriculture for its economic sustenance, placing the region at heightened risk due to climate change. However, EACOP jeopardizes the livelihoods of 18,000 households and farmers, imperils water resources, affecting the supply for 40 million people. Furthermore, the project endangers crucial biodiversity hotspots and wildlife habitats. Presently, 7,000 individuals have been displaced, and an additional 60,000-117,000 people face adverse consequences. Particularly concerning is the potential for an oil leak, which could impact four million people dependent on Lake Victoria, owing to seismic risks associated with the project.

Source: The Green Political Foundation, EACOP oil pipeline: more of a curse than a blessing, Amann, A., Heinrich Boll Stiftung, 2022
East African Crude Oil Pipeline, Official Website, 2023
Insufficient climate finance hampers the region’s ability to cope with climate change

2. What limited the RE growth
The funding gap in East Africa concerning climate investments undermines the region’s capacity to meet its NDCs.

Among the 12 Eastern African countries considered, eight have developed renewable energy targets in their national policies to support their Nationally Determined Contributions (NDC), but only three were found to be on track in 2022 (Djibouti, Tanzania, Seychelles). According to the latest update of the NDCs, Eastern Africa countries will reduce their Greenhouse Gas emissions by an average of 37% by 2030. To do so it will be needed to leverage on international conditional and non conditional finance. In 2020, East Africa could only cover about 11% of its estimated annual climate financing needs of $67.2 billion. The resulting annual climate finance gap of $59.6 billion highlights the urgent need for increased investment in green-growth and climate resilience. About half of these funds will need to come from the private sector.

Source: Eastern Africa Alliance on Carbon Markets and Climate Finance: Regional Carbon Market Profile, 2023; AfDB, East Africa Economic Outlook, 2023
All eastern African countries have to face significant lack of finance to achieve their climate objectives. Although African countries account for less than 4% of the total global carbon emissions, they encounter substantial challenges in climate financing to address the mitigation and adaptation measures necessary for combating the effects of climate change. Some EA countries, such as Ethiopia, South Sudan, and Kenya, have significant financial needs for climate projects, with their combined needs totaling about $49.2 billion per year.

**EAST AFRICA'S ANNUAL FINANCE GAPS, 2019-2020**

- **Uganda**: 10% Finance Inflow, 90% Annual Finance Gap
- **Tanzania**: 20% Finance Inflow, 80% Annual Finance Gap
- **Sudan**: 30% Finance Inflow, 70% Annual Finance Gap
- **South Sudan**: 40% Finance Inflow, 60% Annual Finance Gap
- **Somalia**: 50% Finance Inflow, 50% Annual Finance Gap
- **Rwanda**: 60% Finance Inflow, 40% Annual Finance Gap
- **Kenya**: 70% Finance Inflow, 30% Annual Finance Gap
- **Ethiopia**: 80% Finance Inflow, 20% Annual Finance Gap
- **Eritrea**: 90% Finance Inflow, 10% Annual Finance Gap
- **Djibouti**: 100% Finance Inflow, 0% Annual Finance Gap
- **Burundi**: 100% Finance Inflow, 0% Annual Finance Gap

**SHARE OF INVESTMENTS IN EA IN 2020**

- **$ 793 million** (private climate flows in 2019/20)
- **$ 6.765 million** (public climate flows in 2019/20)

East Africa's carbon credit surpasses other regions in Africa, offering potential for future climate investments

East Africa holds substantial carbon credits as a consequence of carbon intensive industrialization of more developed nations. To address historical climate damage and uphold the principle of "common but differentiated responsibilities," compensations could support East Africa’s transitional efforts in the timeframe 2022-2050.

This compensation could pave the way for future climate investments and serve as a progressive step towards addressing climate change.

The success of this transition hinges on fair access to technology, implementation means, debt relief, and affordable finance.
Risks’ perception jeopardizes East Africa’s attractiveness

2. What limited the RE growth
East Africa attracted $10.8 billion during the timeframe 2011-2021 with investments relatively equally distributed across technologies.

East Africa alone accounted for 15% of total investments in RES in Africa. Kenya accounted for 58% ($6.3 billion) of investment in the region during 2011-2021, followed by Ethiopia at 17%. Wind was the most attractive technology with 42% of investments, followed by solar and geothermal.

DATA: BNEF, 2023
Note: Data exclude investments in Large Hydro (>50MW)
When looking at the whole continent, it is evident that private investments are concentrated in a very little number of countries.

Independent Power Producers (IPPs) are becoming Africa’s fastest-growing solution to mobilise private investment in renewable energy. However, these procurement programmes from IPPs remain concentrated only in a few countries on the continent, corresponding to the most vibrant economies perceived as the most robust for each macro-region.

At the same time, IPPs procurement schemes require established regulatory and institutional frameworks, which are currently considered too weak in many Eastern African countries and whose inadequacy constitutes a significant barrier to investment in renewables.

Furthermore the lack of clarity on the region’s green growth priority tends to limit investors’ confidence in investing.

Source: UC/OECD, Africa’s Development Dynamics 2023: Investing in Sustainable Development, 2023
RISKS’ PERCEPTION JEOPARDIZES EAST AFRICA’S ATTRACTIVENESS

Domestic and external risks hampers the region’s ability to attract investments

Countries such Kenya, Ethiopia, Uganda, Rwanda and Tanzania established national energy strategies, updated regulations and engaged in regional energy trade, managing to expand and diversify their renewable energy markets (over 2017-2022 they received 66% of greenfield FDI capital expenditures for renewable energy projects in all of East Africa).

For Comoros, Djibouti, Eritrea, Somalia, and South Sudan, expanding energy access represents a crucial priority in terms of energy security. These countries continue to rely on combustible renewable energy (biofuels) and even fossil fuels where necessary to increase energy access, replacing polluting energy sources with clean ones wherever this is cost-effective and affordable. This results in greater obstacles and fewer opportunities for private investments in RES.

Source: African Development Bank, East Africa Economic Outlook 2023
Over the past decade, the region has clearly emerged a highly strategic destination of investment flows from major international players.

The Belt and Road Initiative launched in 2013, made the East African energy market one of the top destinations for Chinese investment, and its renewable sector the one where the highest level of Chinese capital flows are registered at the continent level.

The EU has equally channeled a significant level of investment into the region in the last decade through a variety of political and operational frameworks (Joint Africa-EU Strategy 2007, Global Gateway Initiative 2021), with a focus on infrastructure development.

IFIs such as AfDB have as well identified EA as an attractive market for energy investments, reaching $3.8 million in total commitment.

Despite current challenges, the EA energy market represents a strategic investment recipient.
3. The time to act is now
Renewable energy development can only happen by improving policies and mobilizing resources on multiple levels.

Building on the limited amount of public concessional finance to attract private investments, leveraging on innovative financing tools such as RE certificates, carbon credits, climate finance etc.

Address barriers that project developers face when in project’s early stage financing such as lengthy approvals.

Encourage investments in the off-grid market as catalyzer of universal access to electricity by removing import duties and other taxes on access equipment.

Adopt fiscal incentives for renewable energy development and cut subsidies to fossil fuels’ industries.

Improve the efficiency of the burdensome bureaucracy to facilitate the creation of a pipeline of bankable projects.

Despite investments being far from what is needed to reach SDG 7 goals, investments in RES in Africa grew 20-fold between 2010 and 2020, but not homogenously across the continent, with West and East Africa lagging behind. To ensure that no one is left behind, is crucial to address policy barriers and risks in under-invested countries with an unprecedented scale of resources.
The time to act is now

To achieve a full-fledged regional integration, market and infrastructure reforms need to be implemented

Enable the creation of a **domestic market** through rules’ harmonization, guidelines, network codes etc.

Adopt **regional plans** to streamline overarching countries’ cooperation in the achievement of SDGs and NDCs

Strengthen the existing **grid infrastructure** and expedite renewable generation projects to reduce risks of new project development

Establish **day-ahead and intra-day markets** to lay the foundations of a functioning regional electricity market

Improving **regional infrastructure** and develop regional value chains to facilitate trade, e.g. institution of the African Continental Free Trade Area (AfCFTA) and Single Electricity Market (AfSEM)

Limited domestic markets have long hindered productivity gains, and improvements can be achieved by expanding market access through **regional clustering and cooperation**. Power integration holds the promise of alleviating energy poverty and **ensuring energy security** for the countries in the region.
THE TIME TO ACT IS NOW

Building low carbon economies could help East Africa in crafting a robust position in the future energy business

- Improve **cost efficiency** of the existing resources while decarbonizing the industry sector could provide opportunities for the transition.

- Leverage on the **restoration of abundant natural ecosystems** to seize the opportunity of carbon abatement and design appropriate governance structures for shared and transboundary natural capital resources.

- Create an enabling environment for renewable energy and **emerging hydrogen and storage technologies** that have an attractive outlook for the near future growing electricity needs of the African population.

- Support the development of **geothermal energy resources and bioenergy**, which can further contribute to the renewable energy mix in several countries.

East Africa can carve out a robust and competitive position in the evolving energy market by harnessing its abundant natural resources, investing in clean energy technologies, and adopting policies in this sense. The **strategic shift towards low carbon economies** can not only enhance energy security but also open doors to investment, innovation, and international collaborations.
Put youth, employment and innovation on top of the agenda

- **Adopt innovative market labor reforms** to support firms and workers in the transition-related sectors.

- **Stimulate innovation** and the proliferation of the start-up ecosystem has a tool for the creation of jobs and entrepreneurial opportunities.

- **Establish local content requirements** (LCRs) and incentives to leverage the energy transition for industrial development and job creation by ensuring a demand for domestic products and services.

- **Structure partnerships** between the governments, universities and training centers to support the development of courses and trainings to reskill oil and gas workers.

The development of larger market access and the **localization of industrial value chains** have the potential to drive down costs and significantly boost productivity in East Africa and across the continent. This goes hand-in-hand with the construction of a business environment that enhances **innovation as a catalyst** for job creation.
African Development Bank, East Africa Economic Outlook 2023
African Development Bank, East Africa, Regional Overview 2022
AUC/OECD, Africa’s Development Dynamics: Investing in Sustainable Development, 2023
BNEF, 2023
BNEF, Climatescope, 2022
BROOKINGS, Africa Energy Portal, East Africa, 2019
CLIMATE POLICY INITIATIVE, Landscape of Climate Finance in Africa, 2022
EAPP, AIADB, A Roadmap for increasing Regional Power Trade in Eastern Africa, 2022
EAPP, Lebbi Changullah, Regional Electricity Interconnection in Eastern Africa: challenges and opportunities, 2019
EAST AFRICA CRUDE OIL PIPELINE, Official Website, 2023
EAST AFRICA DROUGHT WATCH, Mapviewer, 2023
EASTERN AFRICA ALLIANCE ON CARBON MARKETS AND CLIMATA FINANCE, Regional Carbon Market Profile, 2023
ENERDATA, Dataset, 2022
GOGLA, Global Off-Grid Solar Market Data, 2023
GOGLA, Global Off-Grid Solar Market Report Semi-Annual Sales and Impact Data, 2023
IEA, Clean Energy Transitions in the Greater Horn of Africa, 2022
IMF, World Economic Outlook, 2023
IRENA, Africa and its regions, 2022
IRENA, Planning and prospects for renewable power: Eastern and Southern Africa, 2021
IRENA, Renewable energy and Jobs: Annual review, 2022
IRENA, Renewable energy market analysis – Africa and its regions, 2022
IRENA, Tracking SDG 7: The Energy Progress Report, 2023
MCKINSEY, The future of African oil and gas: Positioning for the energy transition, 2022
MO IBRAHIM FOUNDATION, Ibrahim Index of African Governance, 2021
MORDOR INTELLIGENCE, East Africa Oil and Gas Market Size and Share Analysis – Growth trend and forecasts, 2023
MUHUMUZA EZRA RUBANDA, LIVINGSTONE SENYONGA, MOHAMMED NGOMA, MUYIWA S. ADARAMOLA, Energy market integration: Harmonizing tariff recourse policies in East Africa, 2023
N NDUNGU’N & T. AZOMAHOU, Keys to climate action chapter 8: challenges and opportunities of climate change: the case of East Africa, 2023
RISE, ESMAP 2010 - 2019, 2020
SEI, Climate Analytics, E3G, IISD, and UNEP, The Production Gap: Phasing down or phasing up? Top fossil fuel producers plan even more extraction despite climate promises, 2023
STATISTA, Human development index score of Africa by country, 2021
THE FUND FOR PEACE, Fragile States Index, Washington, 2023
THE GREEN POLITICAL FOUNDATION, EACOP oil pipeline: more of a curse than a blessing, Amann, A., Heinrich Boll Stiftung, 2022
UC/OECD, Africa’s Development Dynamics 2023: Investing in Sustainable Development, 2023
UNIVERSITY OF NOTRE-DAME, Country rankings in vulnerability and readiness, 2021
U.S. Energy Information Administration, Emerging East Africa Energy, 2023
USAID, Off-grid solar market assessments & additional resources, 2019
WORLD BANK, Access to electricity (% of population), 2023
WORLD BANK, and national accounts data and OECD National Accounts data files, 2023
WORLD BANK, Solar Mini Grids Could Sustainably Power 380 million People in Africa by 2030 – if Action is Taken Now, 2023
WORLD BANK, Worldwide Governance Indicators, 2011, 2016, 2021
Looking back at the past to face the present and plan for a sustainable and prosperous energy future for all.