RES4Africa Knowledge Platform

The state of African Networks and the Grids4Africa program

RES4Africa Foundation

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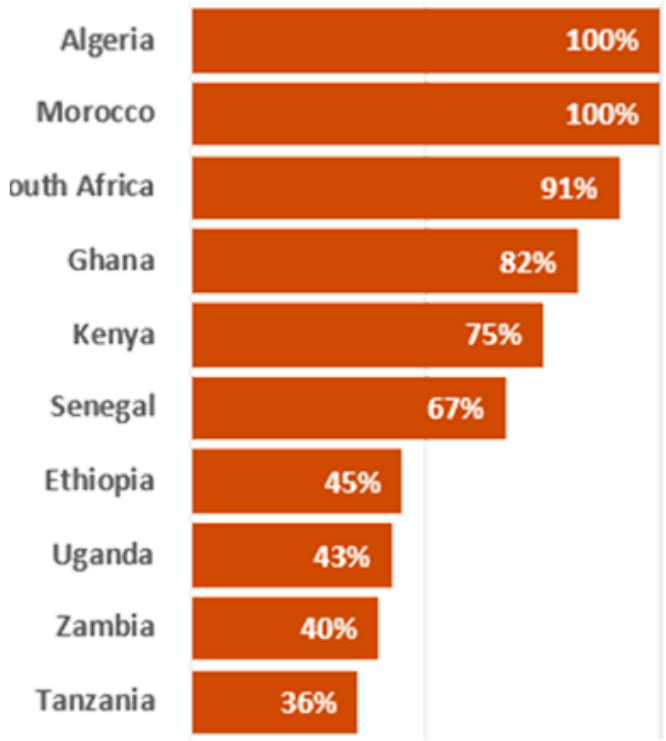
More than half of Africans have no access to electricity…

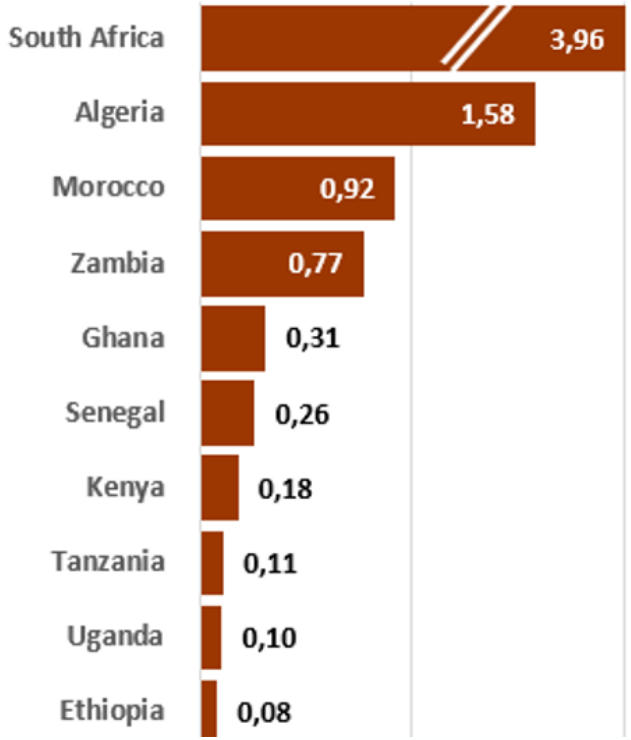
40%

is the African percentage of the access to electricity

Main African Countries Access to electricity, 2018 (%)



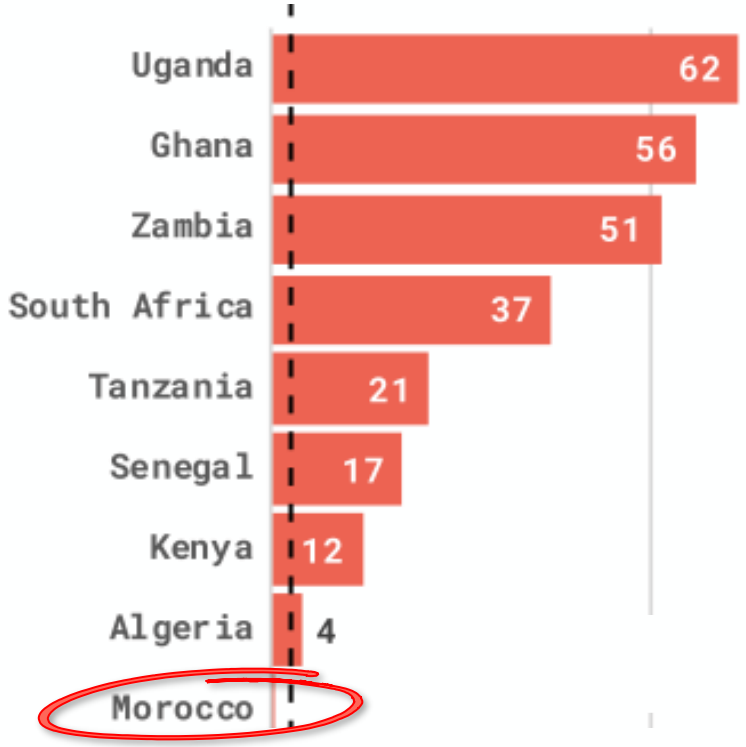
Main African Countries Electricity Consumption per capita, 2018 (MWh)



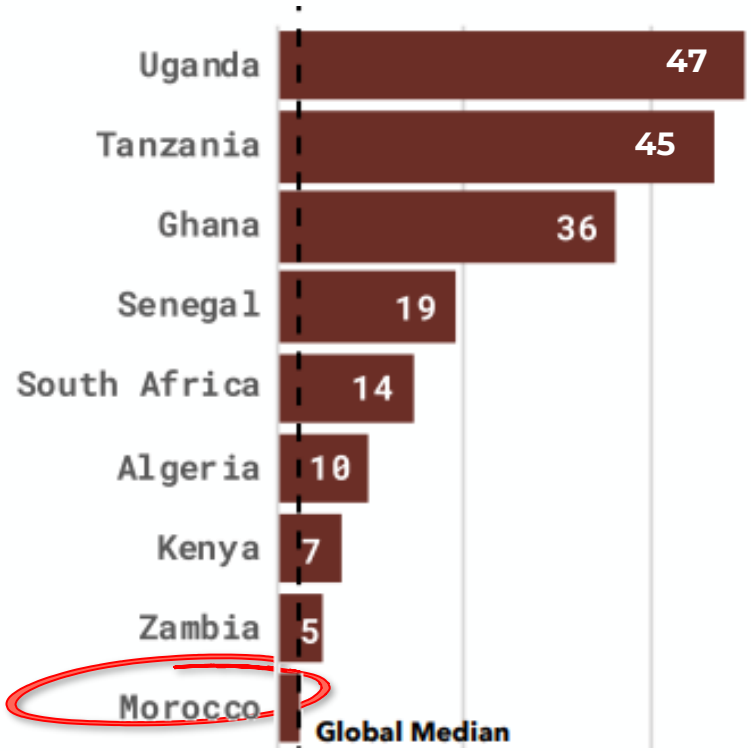
Source:: World Bank

...with a low quality of service

Main African Countries SAIDI, 2019 (hours/year)



Main African Countries SAIFI, 2019 (number/year)



Based on a selected sample of countries , only one country (Morocco) has better SAIDI and SAIFI than the world average

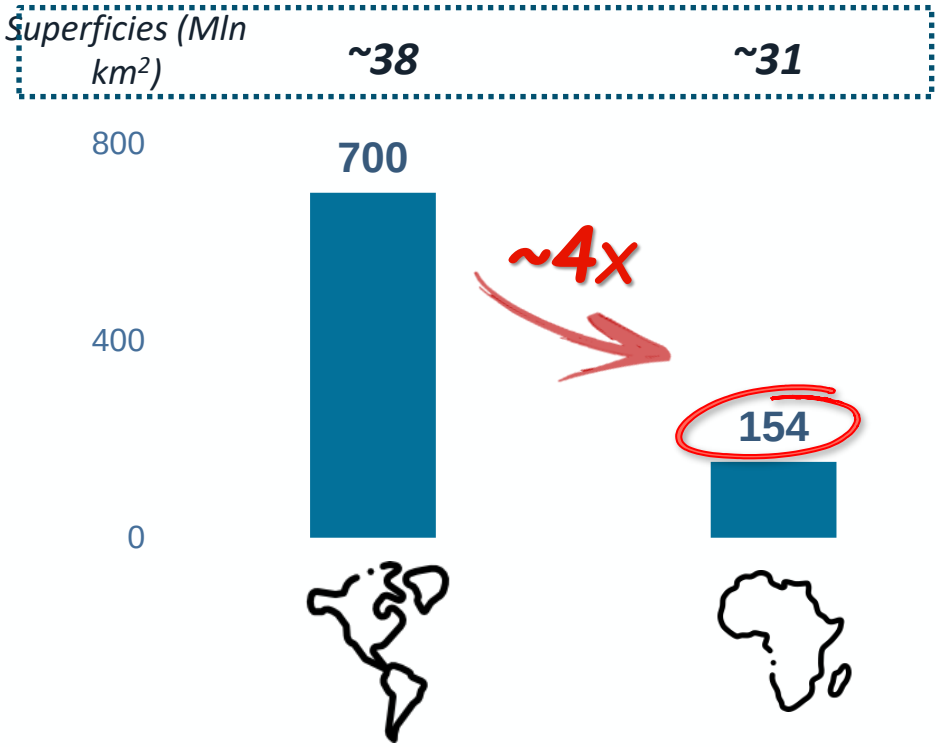
Source::1.:https://static1.squarespace.com/static/609a53264723031eccc12e99/t/61a62ae608493d4957f03347/1638279938110/Private+Sector+Participation+in+African+Grid+Development+-+RES4Africa+November+2021+%282%29.pdf

The development of African transmission is still too slow

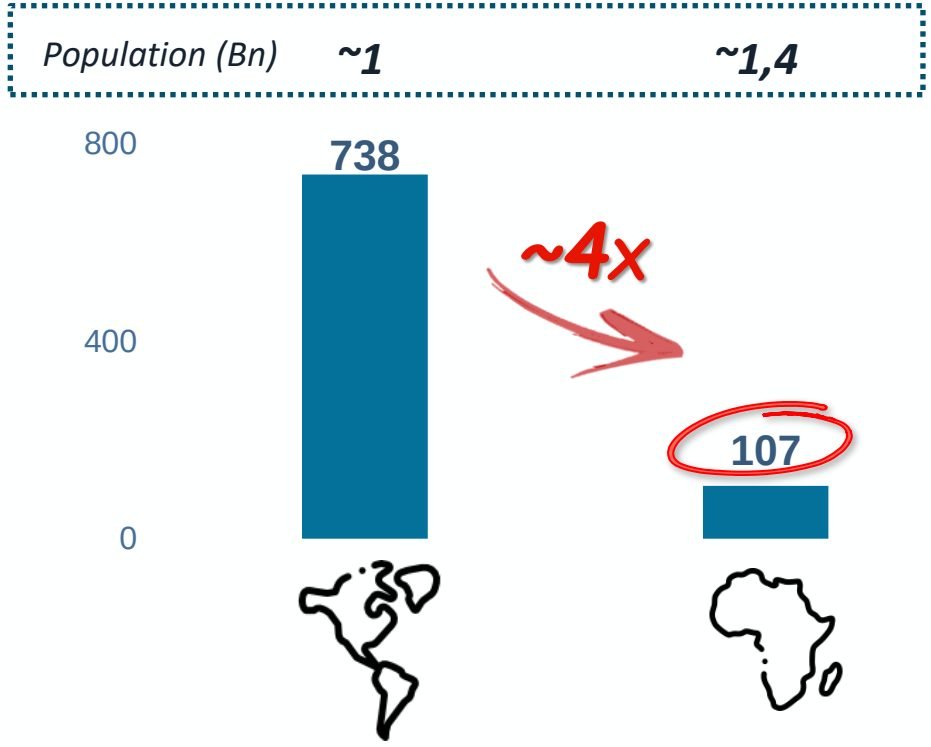
~4X

is the American development transmission rate compared to Africa

Length of transmission, Africa vs America[1], 2022 (K Km of transmission)

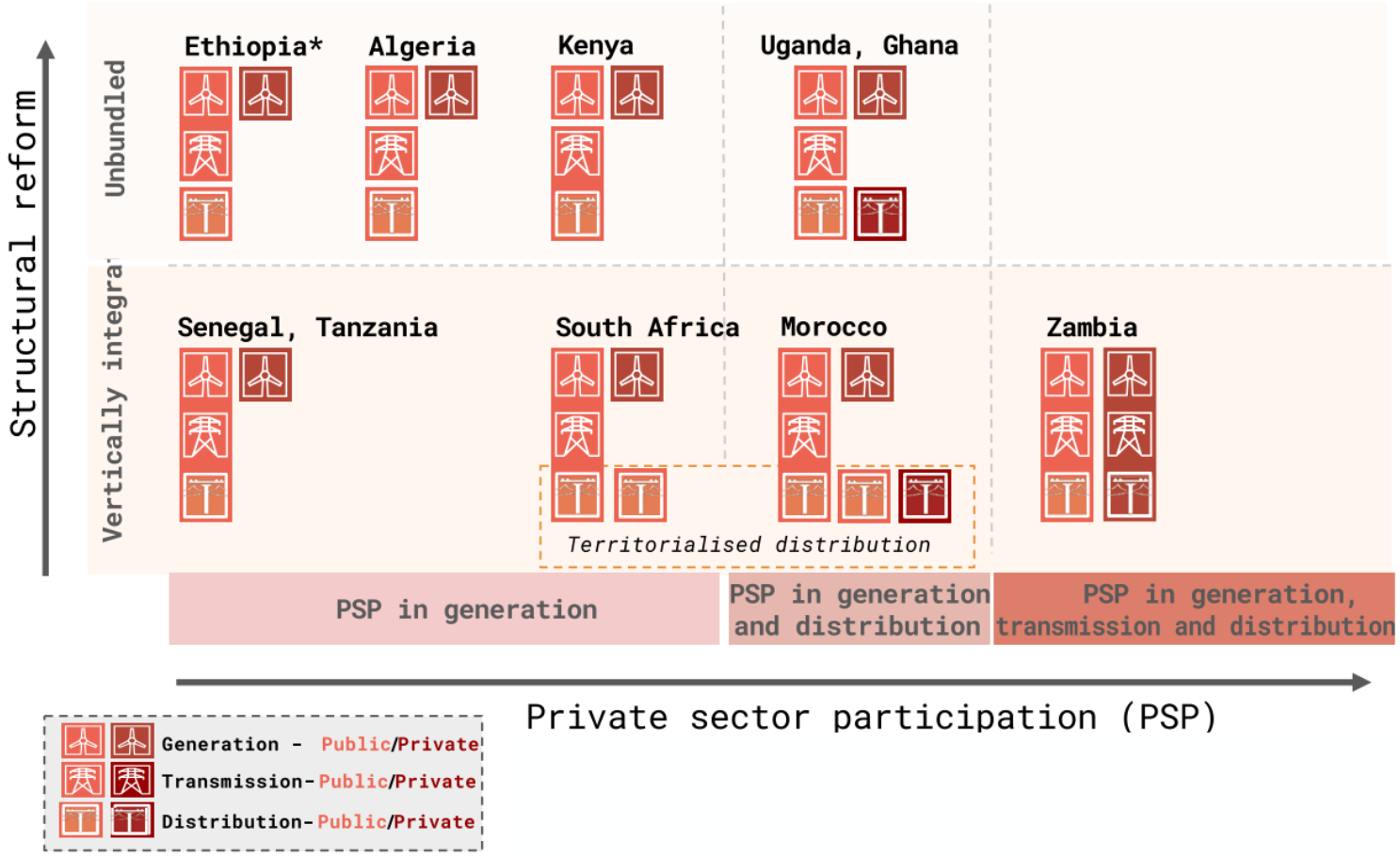


Length of transmission, Africa vs America, 2022 (Km per million people)



Note: America only includes Canada, USA, Argentina, Brazil, Chile, and Colombia

The development of African transmission is still too slow



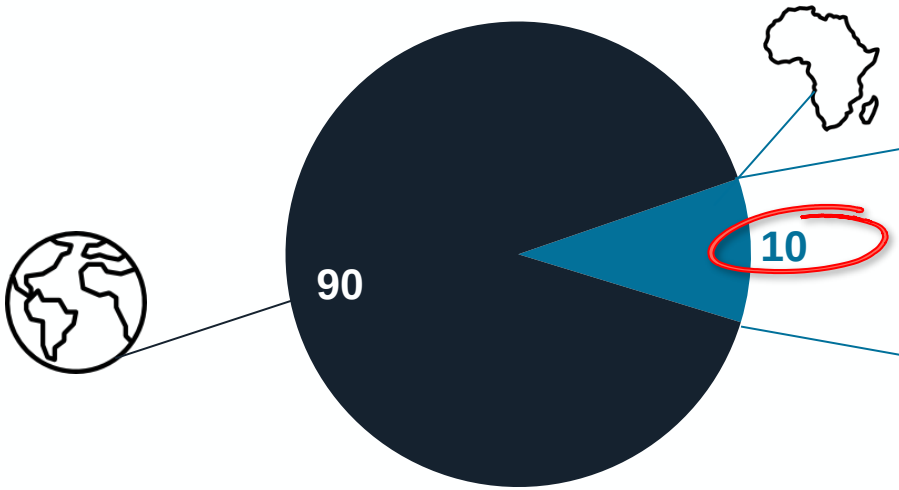
Based on a representative sample of the main African countries by area, it can be seen that:

- Only **Morocco, Ghana, Zambia** and **Uganda has private distribution companies**
- Only **Zambia has PSP in all three segments**
- **Unbundling is not a necessary** requirement to start private participation
- **The model** applied to generation **can also be replicated** in transmission and distribution

Source::https://static1.squarespace.com/static/609a53264723031eccc12e99/t/61a62ae608493d4957f03347/1638279938110/Private+Sector+Participation+in+African+Grid+Development+-+RES4Africa+November+2021+%282%29.pdf

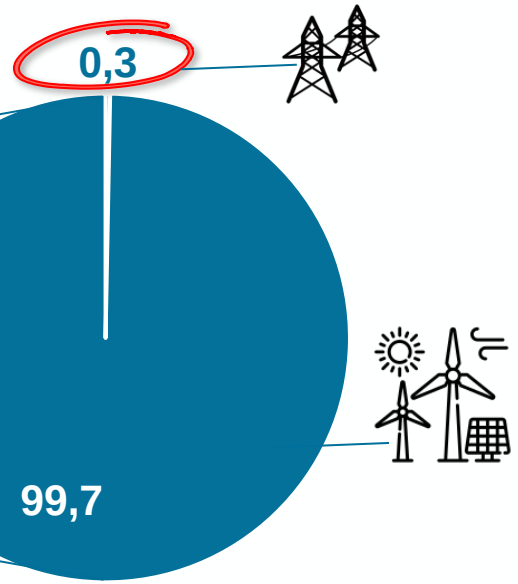
...with negative effects on investments

Private investment in the power sector, Africa vs Rest of the World, 2010 -2020 (%)[1]



■ Africa ■ Rest of the World

African Private investments in the power sector, RES vs Networks 2010-2020 (%)[2]



■ Networks Investments (TX & DX)

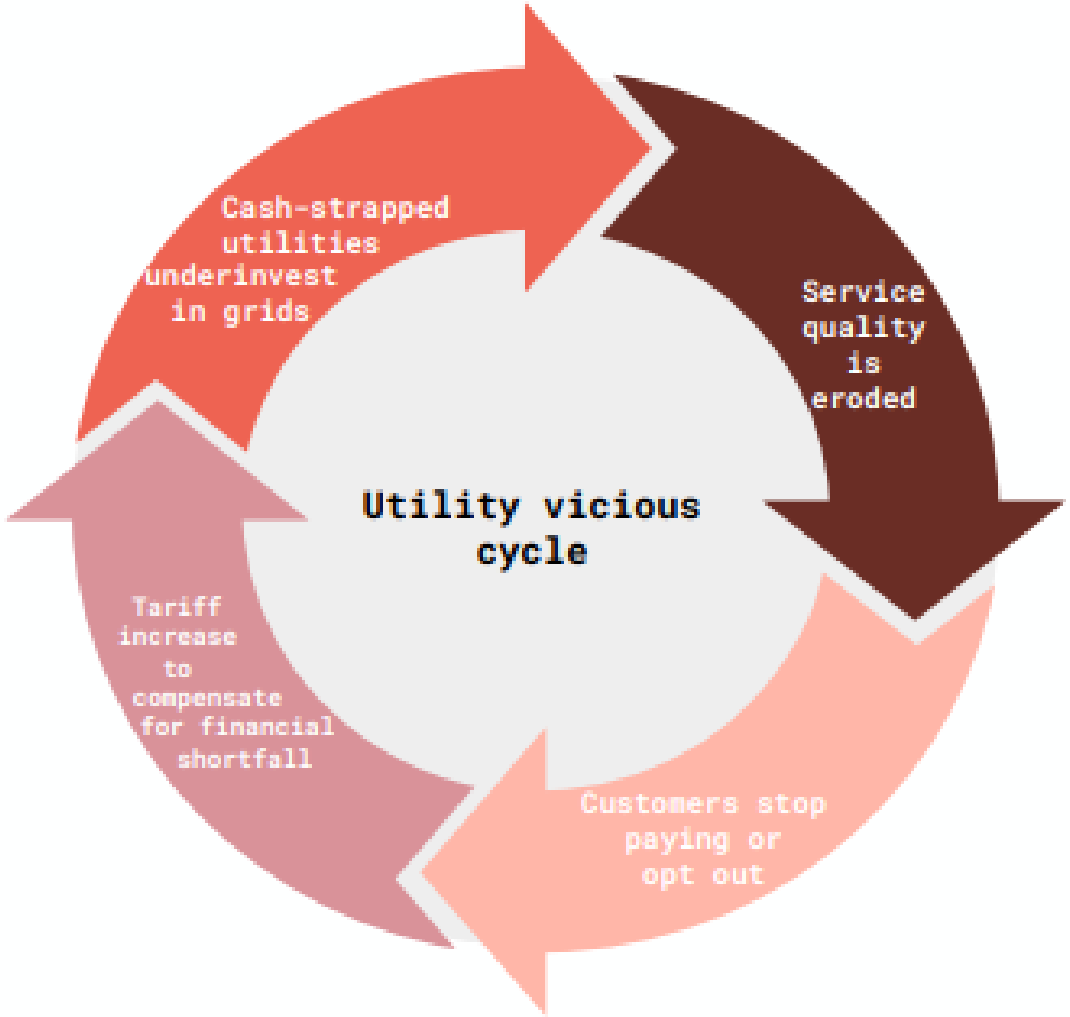
■ Generation Investments (Clean & fossil)

Africa is the region where less investment is made in renewables.
Much less investment in networks

Source:: 1.World banck https://ppi.worldbank.org/en/snapshots/sector/electricity
2.:https://static1.squarespace.com/static/609a53264723031eccc12e99/t/61a62ae608493d4957f03347/1638279938110/Private+Sector+Participation+in+African+Grid+Development+-+RES4Africa+November+2021+%282%29.pdf

Scarcity of investment is one of the causes of the utility vicious cycle

Capital assets are not managed with a view to the future: development plans are not followed through and insufficient funds are dedicated for preserving / replacing critical infrastructure



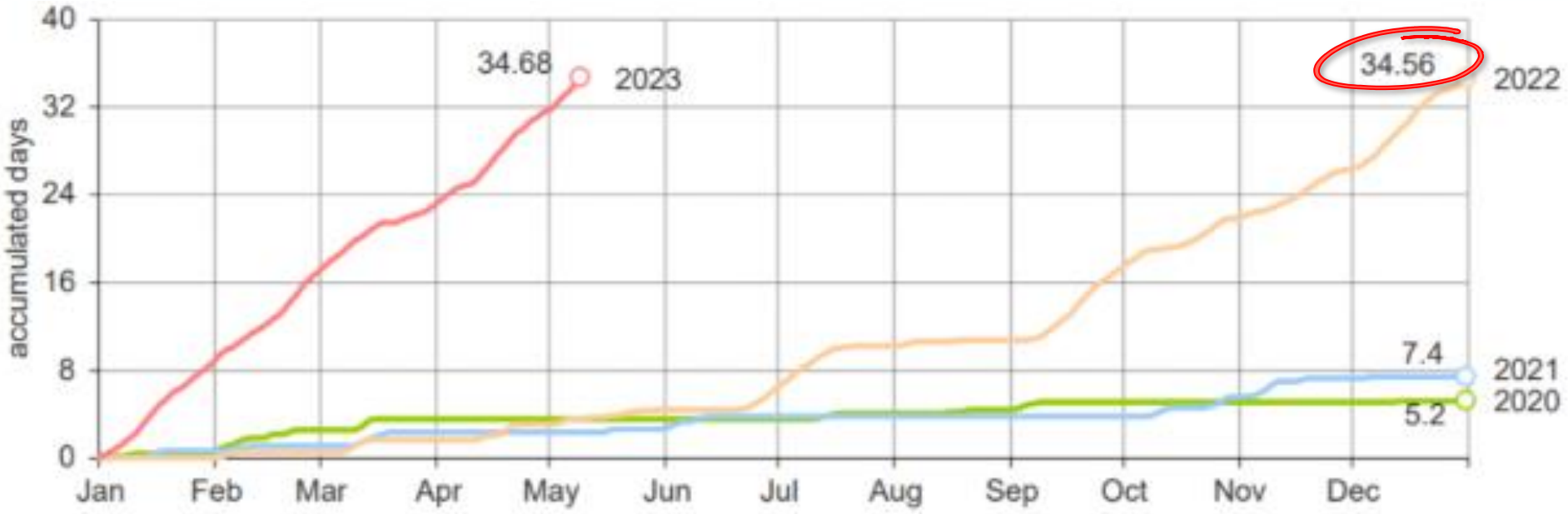
Electricity **tariffs tend to be set too low,** at levels that do not guarantee the recovery of the true cost of producing and selling electricity

Less investment means also unreliable networks: South Africa's glaring case

5%

is the percentage of South Africa's GDP lost in 2022 due to loadshedding

Accumulated Black Out , 2020 - 2023 (days)[1]



The 2022 record of 830 blackouts hours (35 accumulated days) was surpassed on 9 May 2023. South Africa spent 9.5% of 2022 and to date 27% of 2023 without utility power

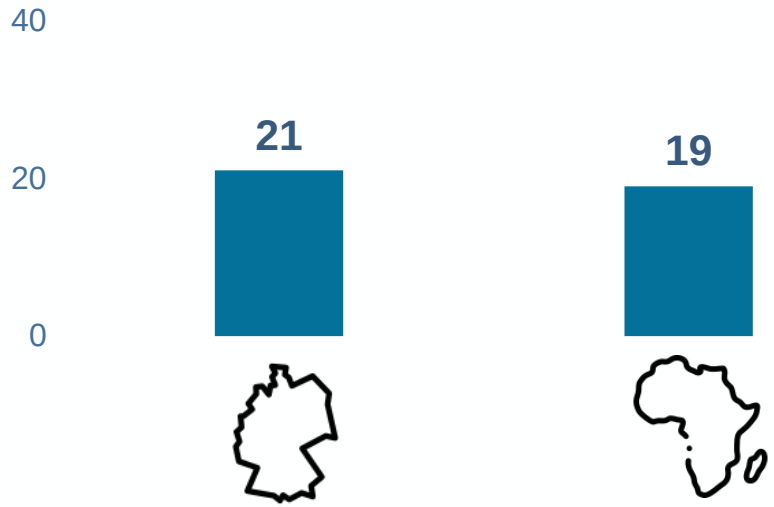
Source:: https://businesstech.co.za/news/energy/686709/south-africa-just-passed-a-bleak-load-shedding-milestone/

Interconnections could help but infrastructures and volumes at a first stage…

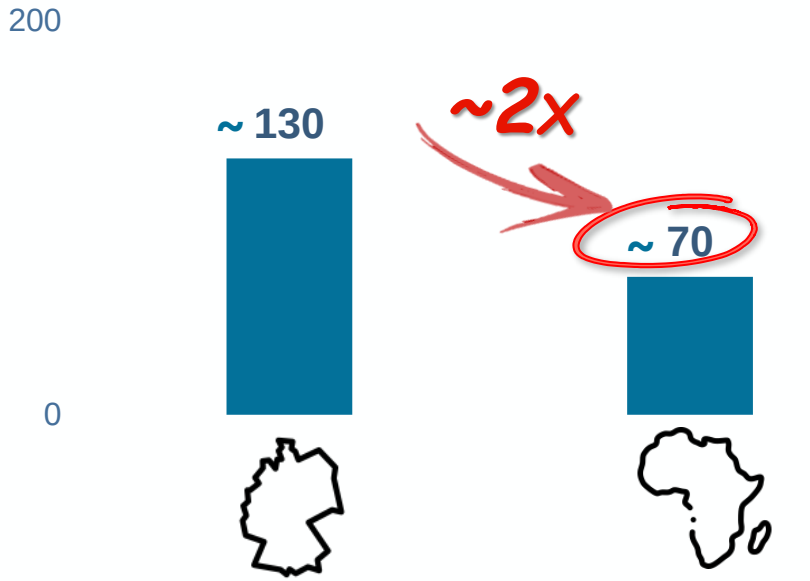
~2X

is the German power volume import/export rate compared to the whole Africa

Total Interconnection line Africa vs Germany, 2021 (GW)



Total Import/Export Power Volume Africa vs Germany, 2021 (TWh)

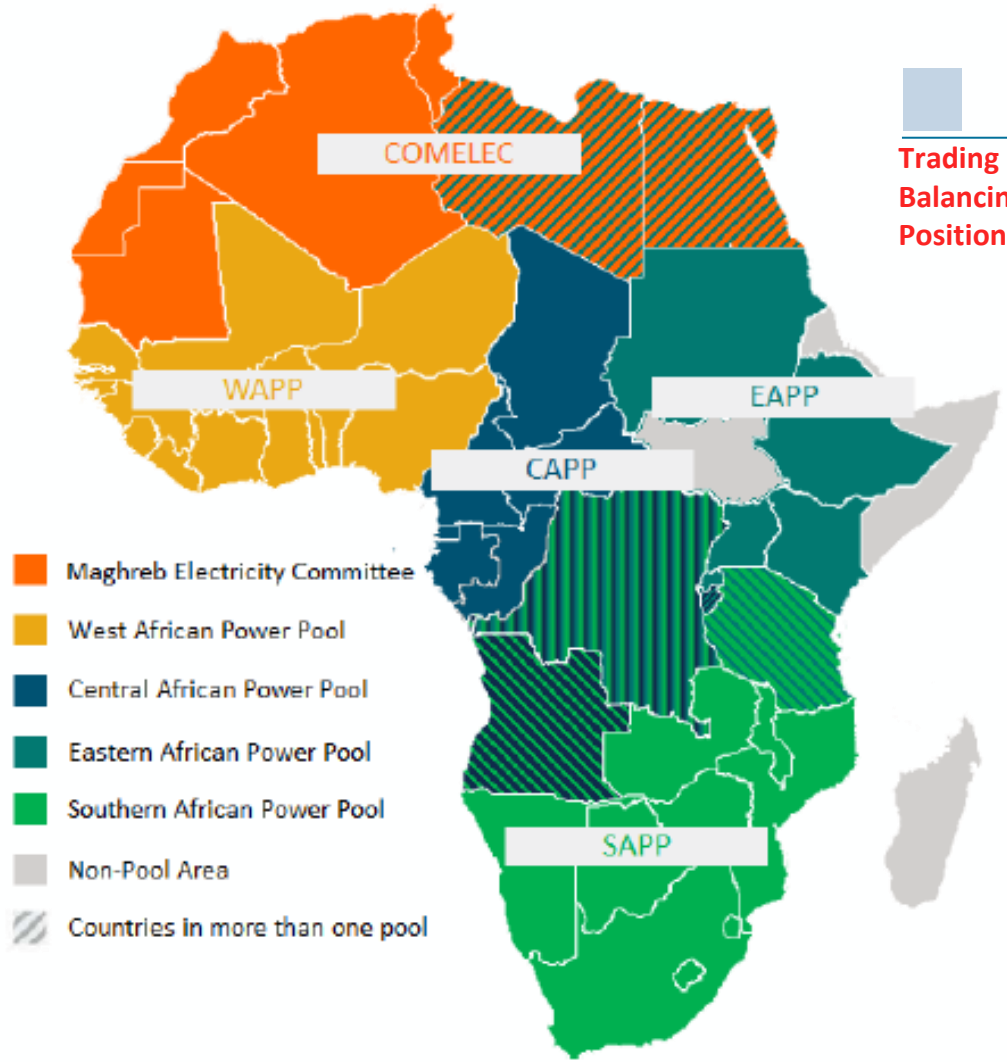


Although with the same level of interconnections, the African power import/export volumes are only half of those in Germany

Source: EEX. https://www.eex.com/en/newsroom/detail?tx_news_pi1%5Baction%5D=detail&tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Bnews%5D=6615&cHash=bbb9e3af056156333bf2b5f1404439a3#:~:text=Against%20279.9%20TWh%20in%20November,a%20volume%20of%20253.8%20TWh.

...in a power market under construction

The Status of the African Power Pool, 2022



WAPP

Trading platform: DAM, IDM, FPMW/M
Balancing Mechanism: is left to the different TSO
Position of Regulator: no regional regulator

CAPP

Trading platform: none
Balancing Mechanism: none
Position of Regulator: no regional regulator

Development Degree

Low — *High*

COMELEC

Trading platform: bilateral agreements
Balancing Mechanism: none
Position of Regulator: no regional regulator

EAPP

Trading platform: planned ADAM
Balancing Mechanism: none
Position of Regulator: the regional regulator, IRB, is internal to the pool governance structure

SAPP

Trading platform: planned DAM and ancillary services
Balancing Mechanism: none
Position of Regulator: the regional regulator, ERERA, is external to the pool governance structure

What have we seen so far? The avalanche of the African energy sector

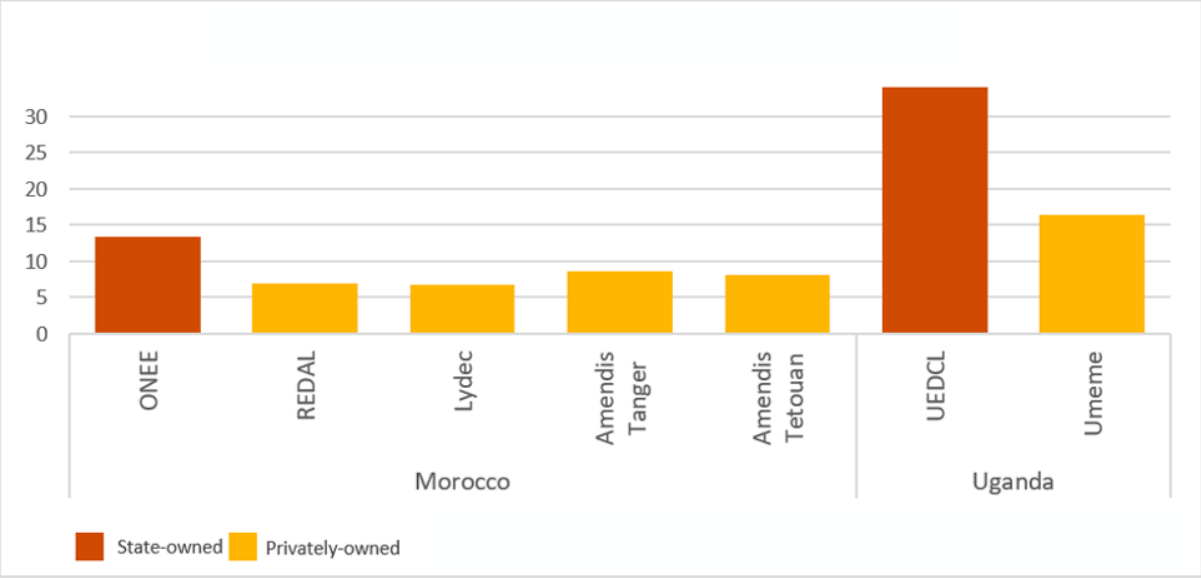
01 Population & urbanization growth

02 More reliable demand of power & infrastructure

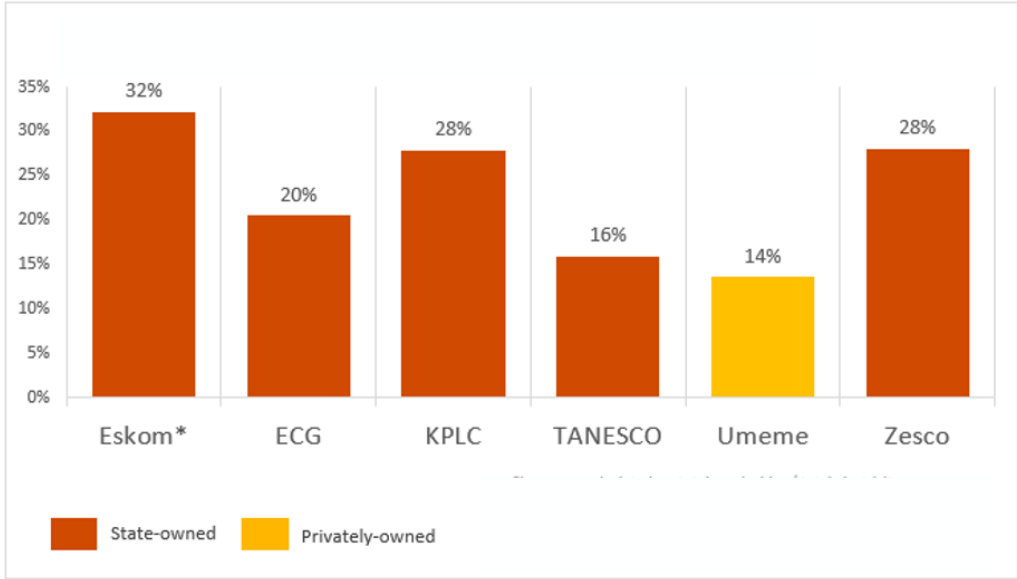
03 More infrastructure investments needs

Private participation as a solution to improve sector performance…

Distribution losses in selected African utilities, State-owned vs Privately-owned (%)[1], 2019



Share on unpaid bills in total revenue in selected African utilities, State-owned vs Privately-owned (%), 2019



Private operators are outperforming public utilities on technical, financial as well as commercial fronts

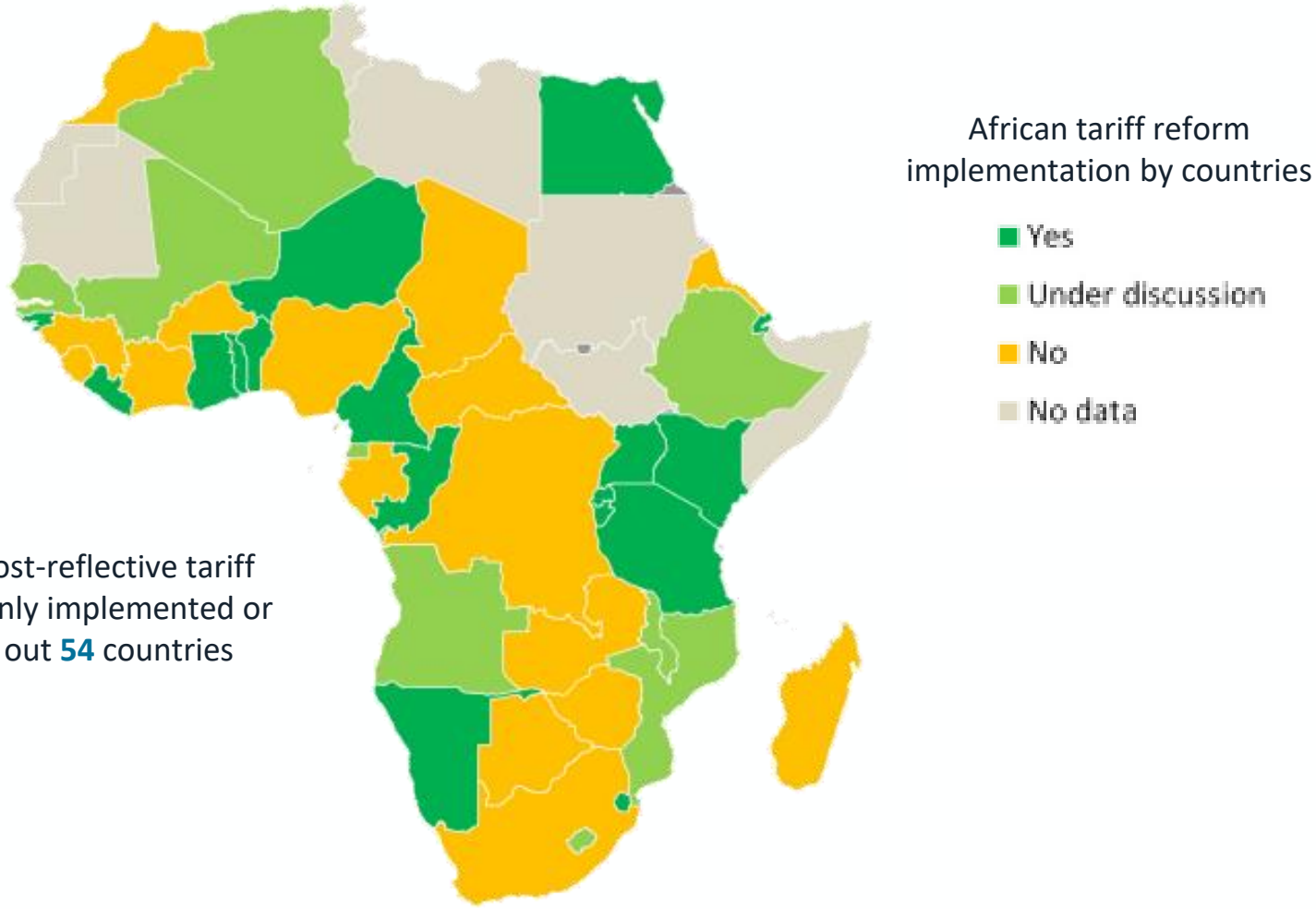
Source::1.:https://static1.squarespace.com/static/609a53264723031eccc12e99/t/61a62ae608493d4957f03347/1638279938110/Private+Sector+Participation+in+African+Grid+Development+-+RES4Africa+November+2021+%282%29.pdf

...associated with cost reflective tariff reform that is struggling to take off in the region

70%

is the savings share on operating losses in the event of a cost reflective tariff in the overall region

Status of cost-reflective tariff reform in selected African countries, 2021

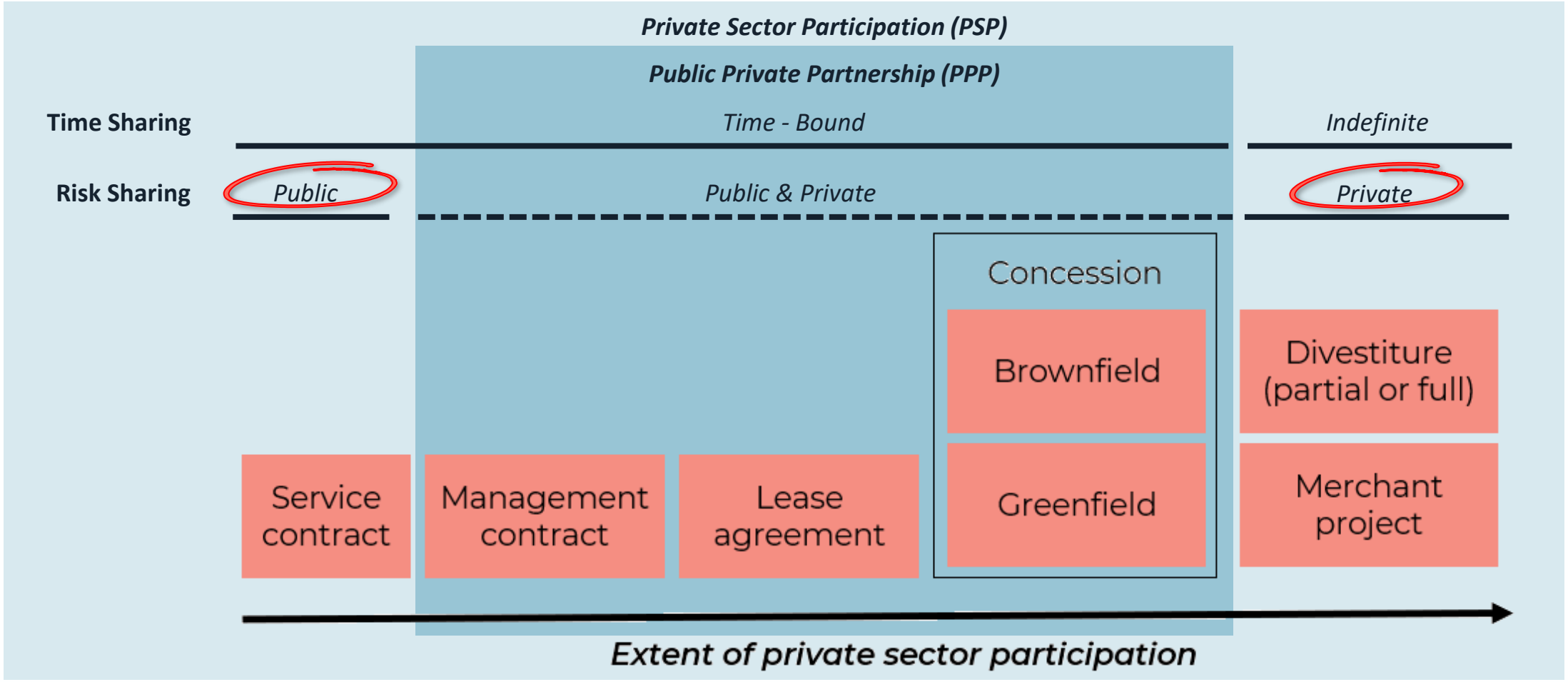


So far, in Africa cost-reflective tariff reform has been only implemented or underway in **24** out **54** countries

Source:: https://iea.blob.core.windows.net/assets/6fa5a6c0-ca73-4a7f-a243-fb5e83ecfb94/AfricaEnergyOutlook2022.pdf

Private sector participation can also mitigate the investment risks

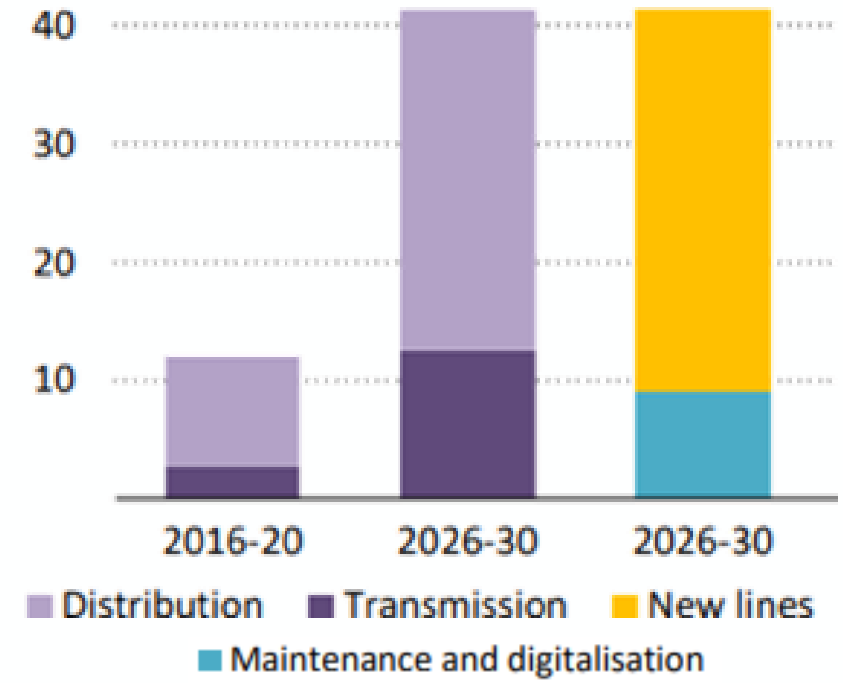
Private Sector Participation by contracts[1]



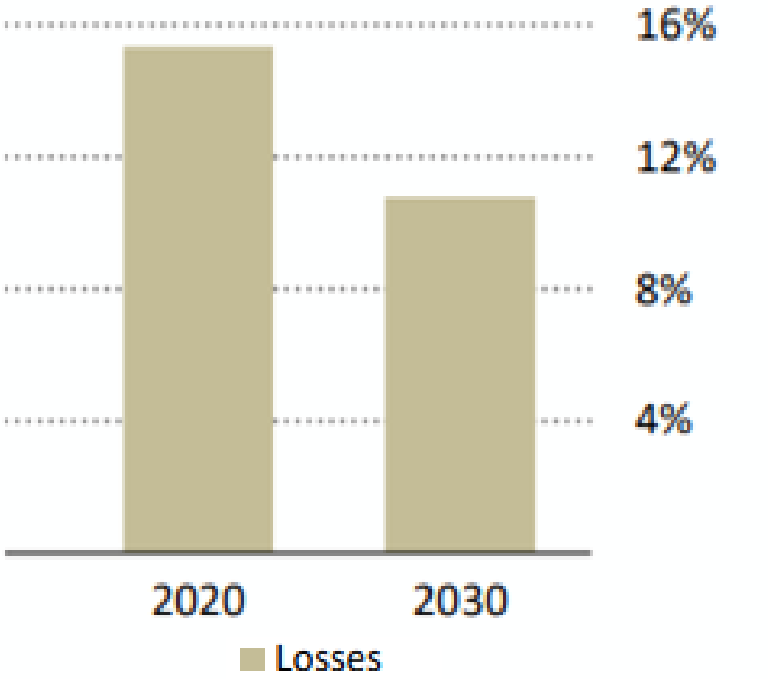
Source::https://static1.squarespace.com/static/609a53264723031eccc12e99/t/61a62ae608493d4957f03347/1638279938110/Private+Sector+Participation+in+African+Grid+Development+-+RES4Africa+November+2021+%282%29.pdf

…and fill the gap needed to reach higher standards…

Average annual investment in electricity grids in Africa - SAS IEA scenario ($Bn)[1,,] 2020



Network Losses in Africa - SAS IEA scenario (%)[1], 2020



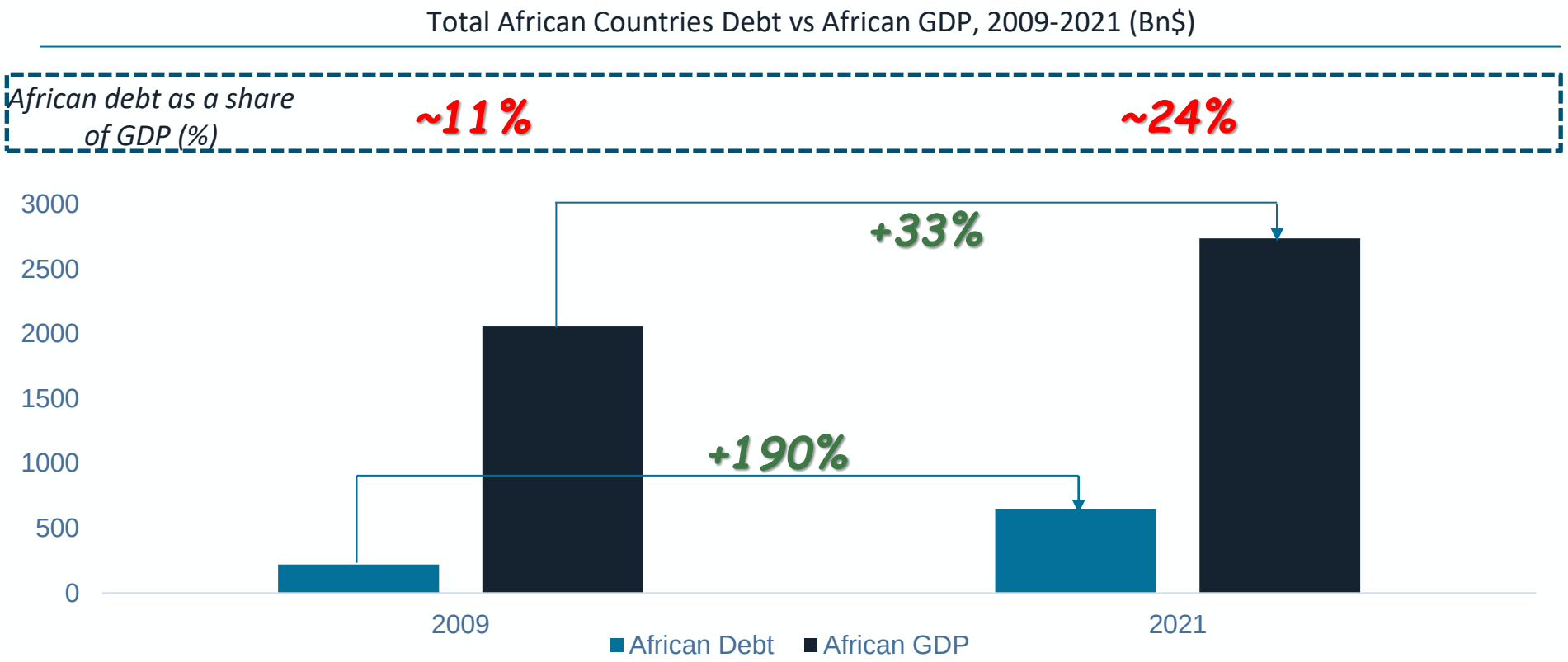
Network investment more than triples in the 2026-2030 period relative to 2016-2020 to meet rising demand, reduce losses and improve reliability

Source::1.:https://iea.blob.core.windows.net/assets/6fa5a6c0-ca73-4a7f-a243-fb5e83ecfb94/AfricaEnergyOutlook2022.pdf

...that is challenged by a worsening financial regional landscape

~3X

is the growth rate of African debt over the last decade



As a result of the latest macroeconomics and geopolitical events, African countries have had to take on even more debt, and now 21 countries are either bankrupt or at high risk of debt distress

Source: https://data.one.org/topics/african-debt/ ; www.statista.com

A path to follow: the Independent Power Transmission (IPT) concession model

• Purpose

- Concession-style contracts for rights for **a single or small number of transmission lines with a long-term Transmission Service Agreement (TSA)** similar to a PPA
- Awarded usually through tenders whereby winner is awarded based on lowest cost-of-usage charge
- **O&M costs locked in to TSA** so tariff paid by public entity remains stable
- Line **can function alongside existing grid without impacting it** and as a separate, independent venture, it can exploit external sources of funding.
- Adopted very successfully in South America and **now in Africa**

• Main countries where IPT has been successful to date

Peru

- Introduced in 1998
- 18 IPT tenders
- $1.8 billion raised

Chile

- Introduced in 1999
- 211 concessions
- 70,000km of lines

Brazil

- Introduced in 2006
- 7 tenders for 10 projects
- 1.2km of lines

Is the IPT model also the future for Africa's transmission grids? The Kenya and Uganda first step

Kenya

- **First African IPT announced**
- Public-Private Partnership between publicly-owned ***KETRACo*** and companies – ***Africa50*** and ***POWERGRID***
- Development, financing, contracting, and operation of 400kV (185km) & 200kV (72km) lines total estimated cost of $273 million
- Payment will be based on availability of the line and annual revenue requirements with **incentives also based on a 98% availability**
- **All risks are borne by the private company** except for Land Rights/wayleaves which will be shared

Uganda

- Public-Private Partnership between ***Government of Uganda*** and ***Gridworks***
- Model never before seen in Africa – brownfield IPT for substations
- Gridworks to provide $90 million equity funding
- Upgrade the transforming capacity of 4 high-voltage electricity substations at crucial nodes in the electricity network
- The contract will improve supply of electricity to industrial users and allow for greater RE penetration

Reform and Private Participation to stop the avalanche

01 Population & urbanization growth

02 More reliable demand of power & infrastructure

03 More infrastructure investments needs

Better regulation and private sector participation

Grids4Africa's purpose and activities, the RES4Africa program focused on the development of grids

• Purpose

Raise awareness about the importance of grid infrastructure and the challenges associated with grids in Africa

Support the development of public-private partnerships to attract private sector resources to transmission and distribution and boost progress towards sustainable development and energy goals

• Activities

Stakeholder engagement & awareness raising

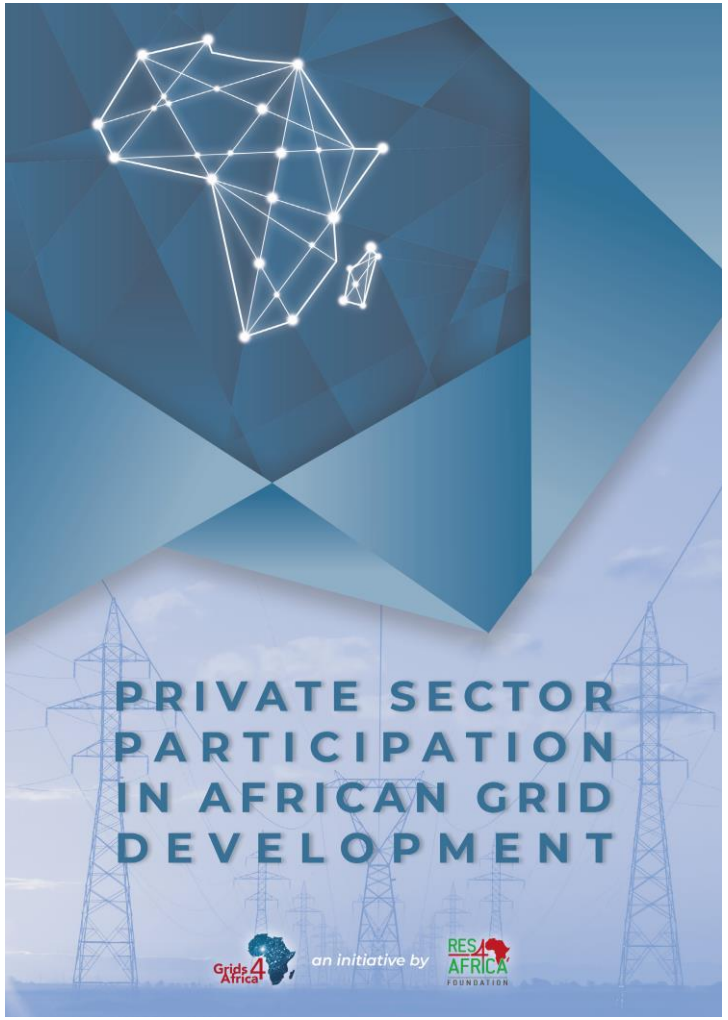
Strategic analyses & knowledge dissemination

Grid-focused training programme

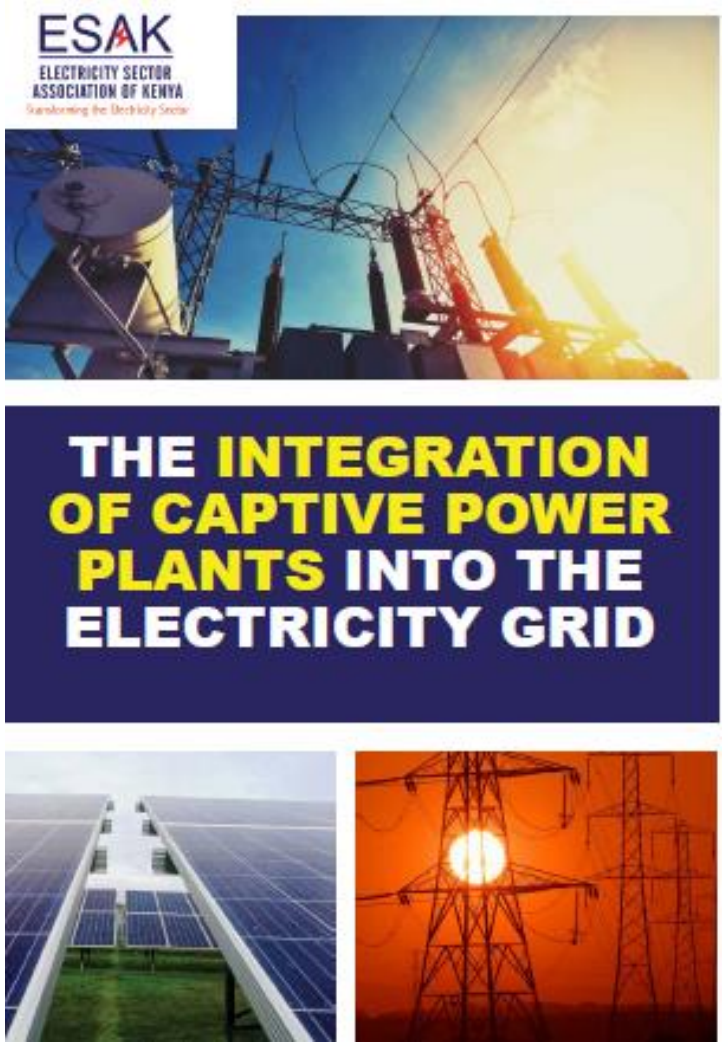
Some activities carried out to date

Launch Event & Position Paper

Private Participation Study



Kenya Event & Position Paper



South Africa Event

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