

WHAT DOES IT TAKE TO ACCELERATE RES INVESTMENTS IN AFRICA:
PRIORITIES AND RECOMMENDATIONS

RES4AFRICA
RENEWABLE ENERGY SOLUTIONS FOR AFRICA
FOUNDATION



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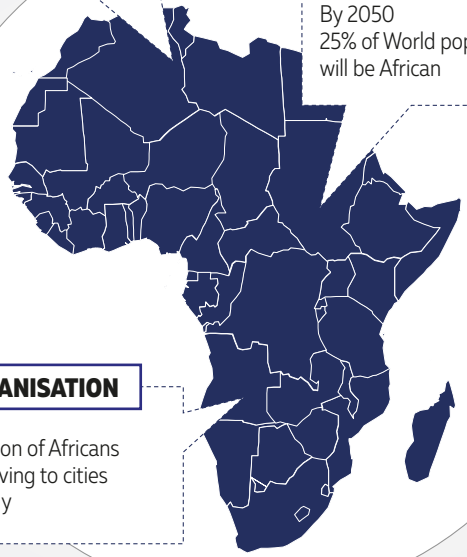
Africa is now ripe for stable socio-economic growth in the long term

ECONOMIC

By 2023 13 African economies will experience a GDP growth rate >6%

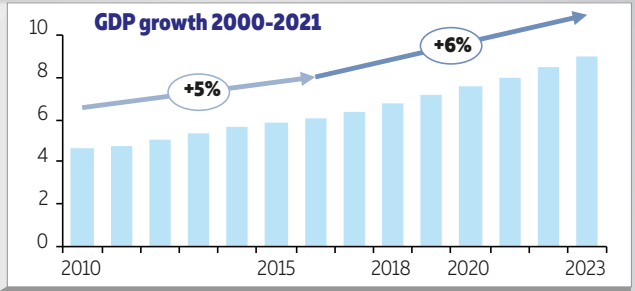
DEMOGRAPHIC

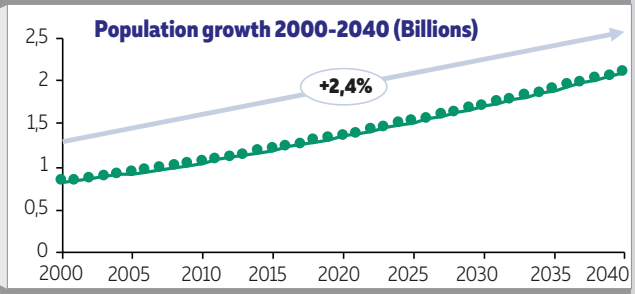
By 2050
25% of World population will be African

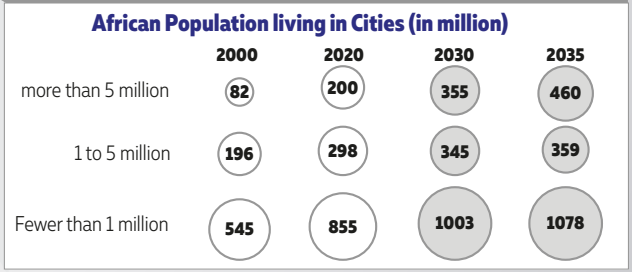


URBANISATION

65 million of Africans are moving to cities annually

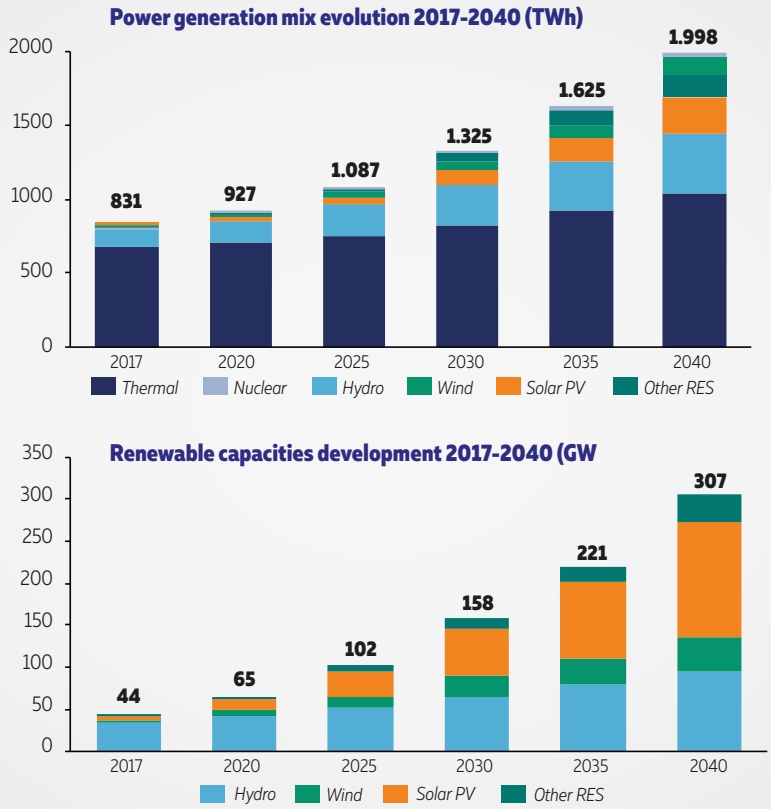






Sources: IMF, UNDESA

Electricity is needed to power Africa's socio-economic growth with renewables playing a leading role in future sector development

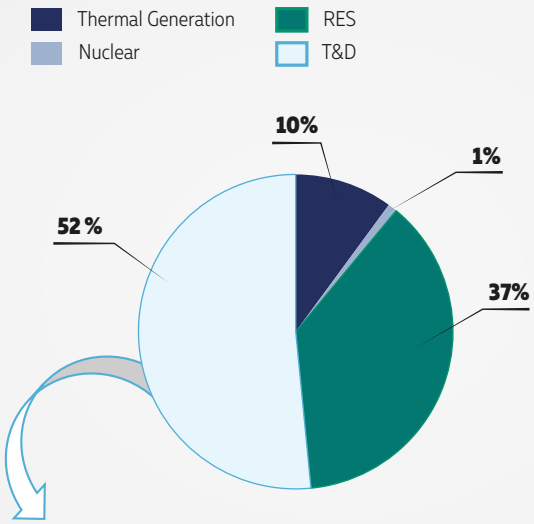


- Power demand is expected to grow by 4% CAGR between 2017-2040
- Thermal generation contribution to power mix will decrease from 82% in 2017 to 54% in 2040 in favor of RES increase
- Around 263 GW of RES capacities will be added in 2017-2040, representing 69% of total new added capacities
- Solar PV will become the leading power generation technology in Africa, representing 23% of total installed capacity in 2040

Sources: IEA, WEO 2018, New Policies Scenario

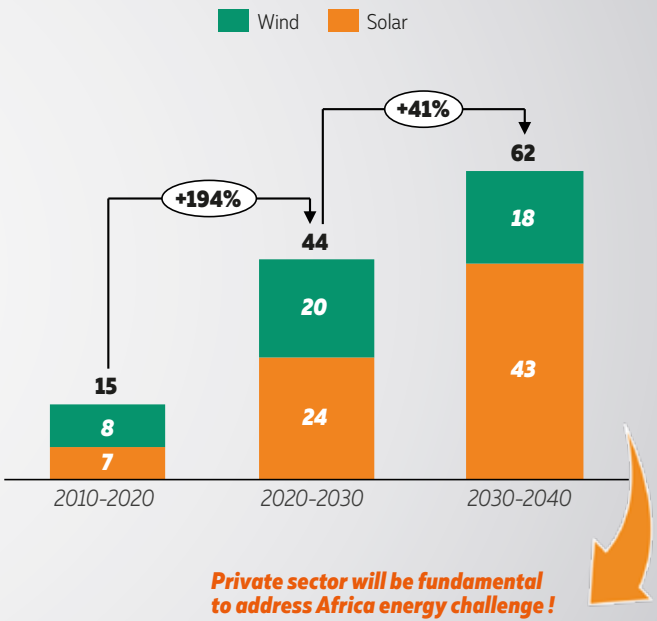
Africa's power sector will need around 1.5 trillion $ of investments in both generation and grid assets, requiring strong private sector contribution

Total investments in power sector 2018-2040 (B$)



1 of every 2 dollars invested into the African power sector will go towards T&D

Investments in wind and solar capacities (B$)

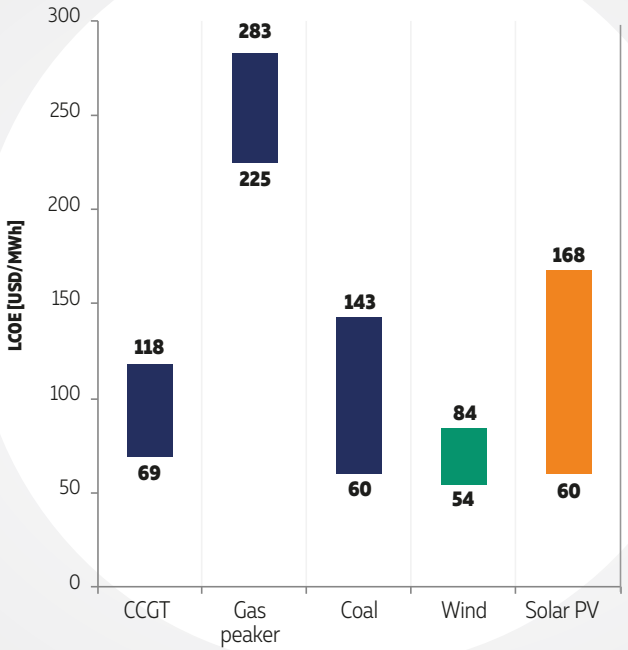


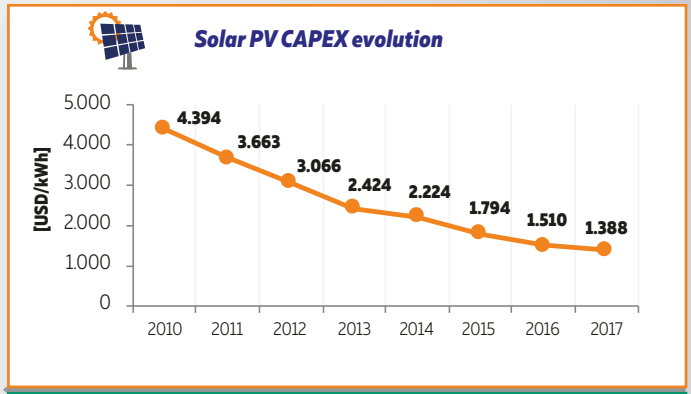
Private sector will be fundamental to address Africa energy challenge !

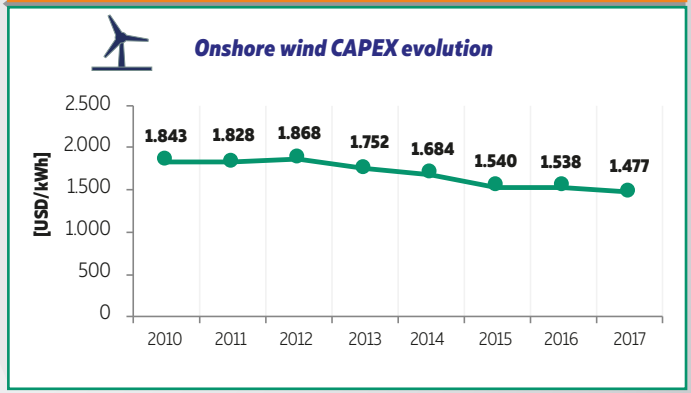
Sources: IEA (WEO 2018, New Policies Scenario), Pöyry analysis on public available data
RES – Renewable energy sources
T&D – Transmission and distribution

RES technologies are competitive today thanks to constant reductions in CAPEX for both Solar PV and Wind technologies and efficiency increases

LCOE ranges for different technologies (2018 data)



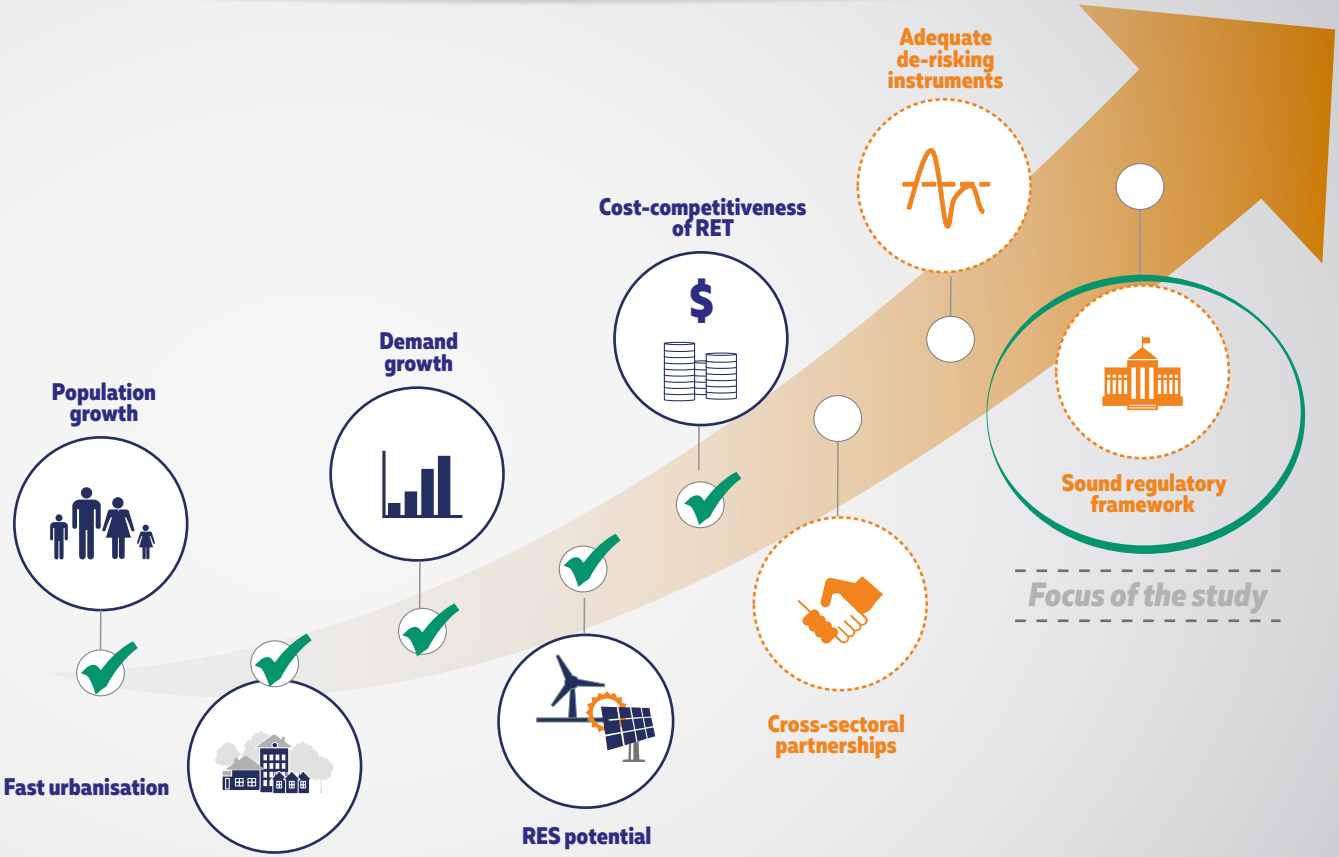




Note: LCOEs and CAPEX are not specific to African region

Sources: Lazard levelized cost of energy 2018, IRENA Renewable costs database
CCGT – Combined cycle gas turbine
LCOE – Levelized cost of electricity

What is missing today to unleash Africa's renewable potential and attract private investors is above all a sound regulatory framework



RES – Renewable energy sources
RET – Renewable energy technologies

RES4Africa Foundation supports its African partners in establishing an enabling framework for RES and increasing investors' market confidence

RES4AFRICA
RENEWABLE ENERGY SOLUTIONS FOR AFRICA
FOUNDATION

A unique and precise Mission: create an enabling environment for RES investments in Africa

PUBLIC-PRIVATE DIALOGUE

- Engage energy stakeholders in working together to walk the Africa energy revolution talk
- Facilitate dialogue between public and private actors to make PPPs in renewable sector happen

KNOWLEDGE & BEST PRACTICES EXCHANGE

- Take advantage of the diverse and complete set of knowledge of R4A members
- Showcase international best practices for effective RES policies & regulation

CAPACITY BUILDING & TRAINING

- Share practices based on field experiences and learn by example
- Enable skills and knowledge transfer that supports long-term RES market creation



...within this context, this analysis aims at spotting the key regulatory dimensions of sound and effective regulations for RES investments...

- The analysis aims to answer to the following questions

  - ***What is the current degree of performance of renewable energy investment frameworks in Africa?***

  - ***How have renewable energy investments been attracted by other countries worldwide?***

  - ***How could such best-practices be applied to Sub-Saharan markets and what could be the main high-level recommendations to policy makers?***

    - Taking the investor perspective the study relies on publicly accessible information and data to capture a snapshot of the regulation currently in force in the targeted countries

- The analysis performed aims to accelerate the building of constructive partnerships between public and private actors to accelerate Africa's energy transition

...and investigates the effectiveness of each regulatory topic in ensuring renewable investors' appetite of selected countries



Investor perspective

Regulatory Dimensions



1. Openness

Assess national commitment towards RES development and openness of renewable market to private sector investments

- Energy strategy
- Market framework and governance
- Investment regulation

2. Attractiveness

Assess supporting policies and instruments to promote the development of renewable energy sources and ensure attractiveness of renewable market for private investors

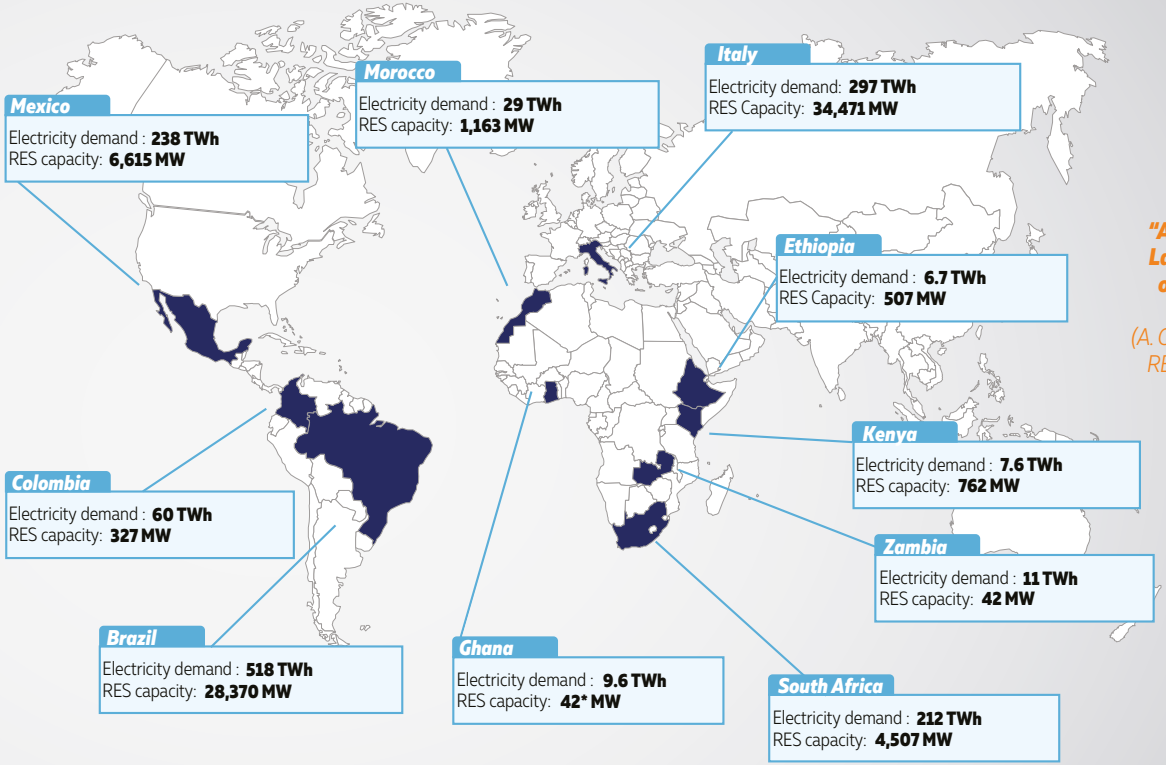
- Production-based supporting schemes
- Investment-based supporting schemes
- Cost reflective electricity prices

2. Readiness

Assess the readiness of national power market to efficiently integrate and manage increasing capacities of variable renewable generation

- Network development regulation
- Routes-to-market
- System Operation regulation
- Grid Connection regulation

Countries in scope have been selected to reflect RES4Africa's geographical coverage and best-in-class countries in terms of RES development



"Africa will be the next Latin America in terms of renewable energy development".
(A. Cammisecra, President of RES4Africa Foundation)

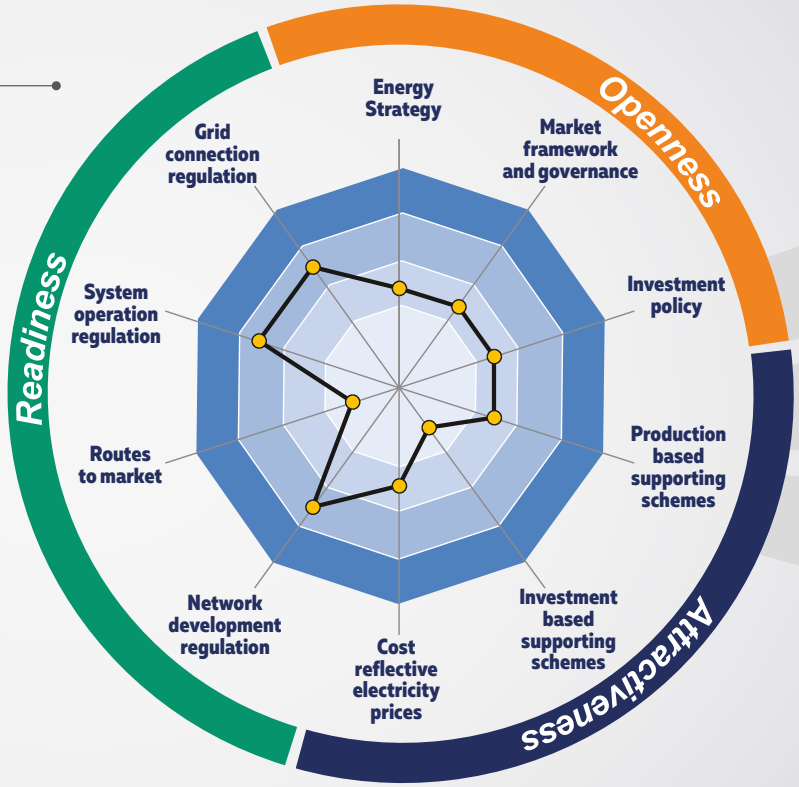
Note: RES capacity refers to 2017 and does not include hydro power
*data refers to 2019

Sources: Pöyry analysis on publicly available data

Regulatory reforms are on-going but improvements are necessary in planning, sector governance and opening of new routes-to-market

Ethiopia





LEGEND:

- *Lack of effectiveness*
- *Low effectiveness*
- *Moderate effectiveness*
- *High effectiveness*

IPP – Independent power producer PPA – Power purchase agreement RES – Renewable energy sources TSO – Transmission system operator

Openness

- Publicly available energy policy with specific RES targets for power generation but not formally adopted in national legislation
- Detailed and solid power sector masterplan not available
- Presence of IPPs and third-party access to grid ensured but no unbundling
- Equal treatment for foreign investors but limitation on equity
- Complex investment processes, no one stop shop nor guidance for authorization/permitting

Attractiveness

- Competitively awarded PPA system in place but a public schedule of auction rounds is not available
- Only tax reductions for local manufacturer are available as investment-based supporting schemes
- End-users tariffs remains subsidized and below cost-recovery levels

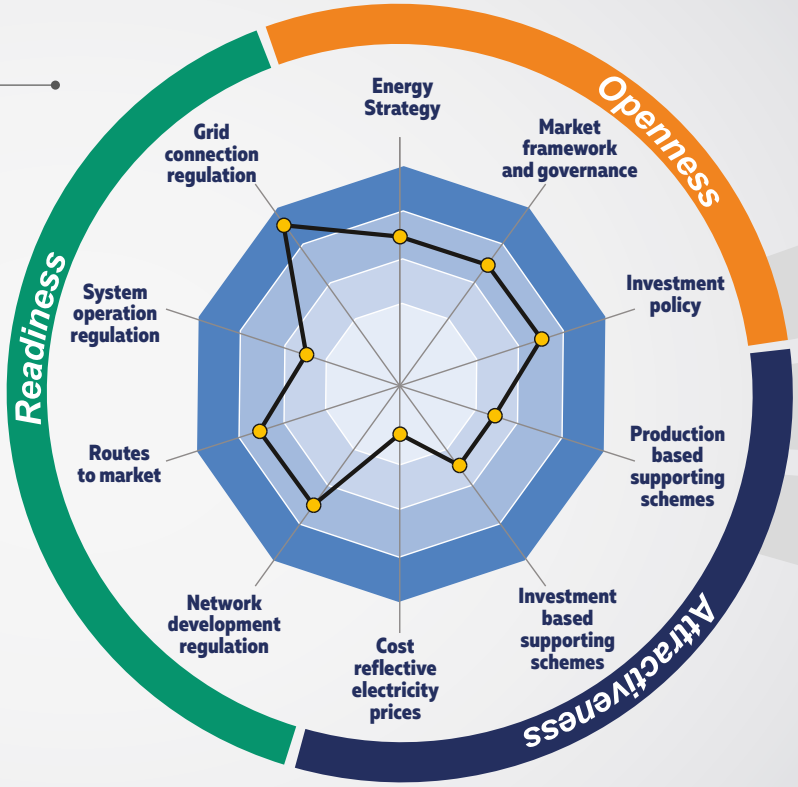
Readiness

- Public network development plan considering RES integration
- Unclear remuneration mechanism for TSO, not cost-based
- Only one route-to-market available (dedicated off-taker)
- Publicly available grid code, but still to be formally adopted
- No priority of dispatch but curtailment remuneration is considered by current PPAs
- Grid connection procedures defined by the draft grid code but priority access for RES is not considered

Regulatory framework is fairly advanced, however lack of adequate supporting policies for RES limits market attractiveness for RE-IPPs

Ghana





LEGEND:

- *Lack of effectiveness*
- *Low effectiveness*
- *Moderate effectiveness*
- *High effectiveness*

IPP – Independent power producer PPA – Power purchase agreement RES – Renewable energy sources
TSO – Transmission system operator VAT – Value added tax

Openness

- Publicly available energy policy with specific RES targets for power generation but not formally adopted in national legislation
- Detailed and solid power sector masterplan available
- Presence of IPPs and unbundling of transmission activities but not distribution
- No limitation on foreign equity and equal treatment for foreign investors
- No one stop shop nor clear rules for land access

Attractiveness

- Feed-in-Tariffs and RES quota obligations are in place but regulations are not fully enforced
- No formal auction program in place despite some tenders in the past
- Import duty and VAT tax exemptions in place on solar PV equipment, but no discounted financing or concessional grants
- Presence of substantial fossil fuel subsidies
- Electricity prices not cost reflective

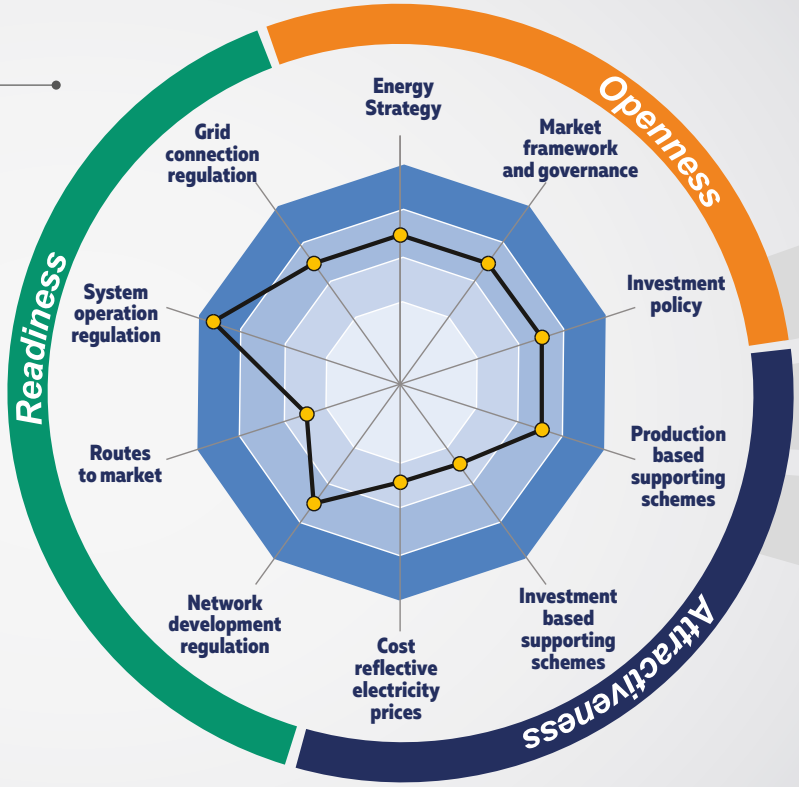
Readiness

- Public network development plan considering RES integration
- Unclear remuneration mechanism for TSO, not cost-based
- Multiple routes-to-market (Dedicated off-taker, PPAs and self-consumption)
- Publicly available grid code, no priority of dispatch, curtailment remuneration and protection for the imbalance risk
- Grid connection procedures and costs are defined and publicly available and include priority access for RES

A supportive regulation is in place but opening new routes-to-market and implementing cost-reflective tariffs would boost effectiveness

Zambia





LEGEND:

- *Lack of effectiveness*
- *Low effectiveness*
- *Moderate effectiveness*
- *High effectiveness*

IPP – Independent power producer PPA – Power purchase agreement RES – Renewable energy sources TSO – Transmission system operator

Openness

- Publicly available energy policy with specific RES targets for power generation but not formally adopted in national legislation
- Detailed and solid power sector masterplan available
- Presence of IPPs allowed but neither transmission nor distribution unbundling implemented
- No limitation on foreign equity and equal treatment for foreign investors ensured
- Missing one stop shop

Attractiveness

- Competitively awarded PPAs system with a public schedule of forthcoming tenders
- Import duties exemption in place for renewable energy equipment but no reduction on connection costs nor discounted financing
- Fossil fuel subsidies removed
- Electricity prices still not fully cost-reflective

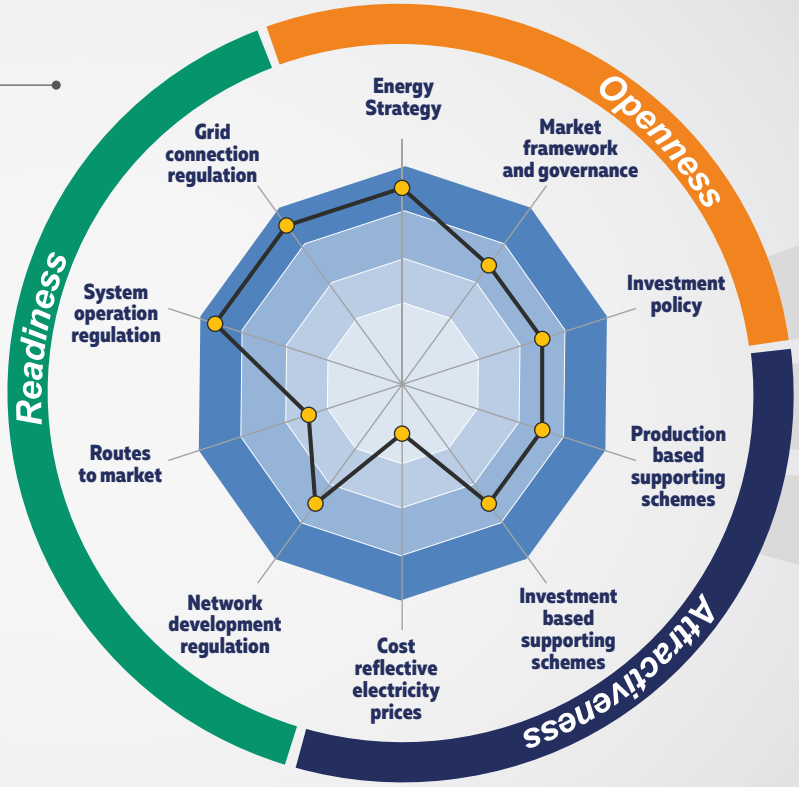
Readiness

- Public network development plan considering RES integration
- Unclear remuneration mechanism for TSO, not cost-based
- Routes-to-market limited to public dedicated off-taker and self-consumption models
- Grid code publicly available considering priority dispatch for RES, curtailment compensation and coverage from imbalance risk
- Grid connection procedures available but no priority access for RES

Clear commitment and supporting framework speed up RES deployment, to be sustained now by further market opening and fair competition

South Africa





LEGEND:

- *Lack of effectiveness*
- *Low effectiveness*
- *Moderate effectiveness*
- *High effectiveness*

IPP – Independent power producer PPA – Power purchase agreement RES – Renewable energy sources TSO – Transmission system operator

Openness

- Publicly available energy policy with specific RES targets for power generation formally adopted in national legislation
- Detailed and solid power sector masterplan available
- Presence of IPPs allowed but neither transmission nor distribution unbundling implemented
- No limitation on foreign equity but equal treatment for foreign investors not clearly ensured
- Missing one stop shop

Attractiveness

- Competitively awarded PPA system with a public schedule of forthcoming tenders
- Tax incentives and discounted financing available for RES
- Carbon Tax Bill recently adopted
- No reduction for connection costs for RES in place
- Coal production still subsidised with different mechanisms
- Electricity prices still not fully cost-reflective

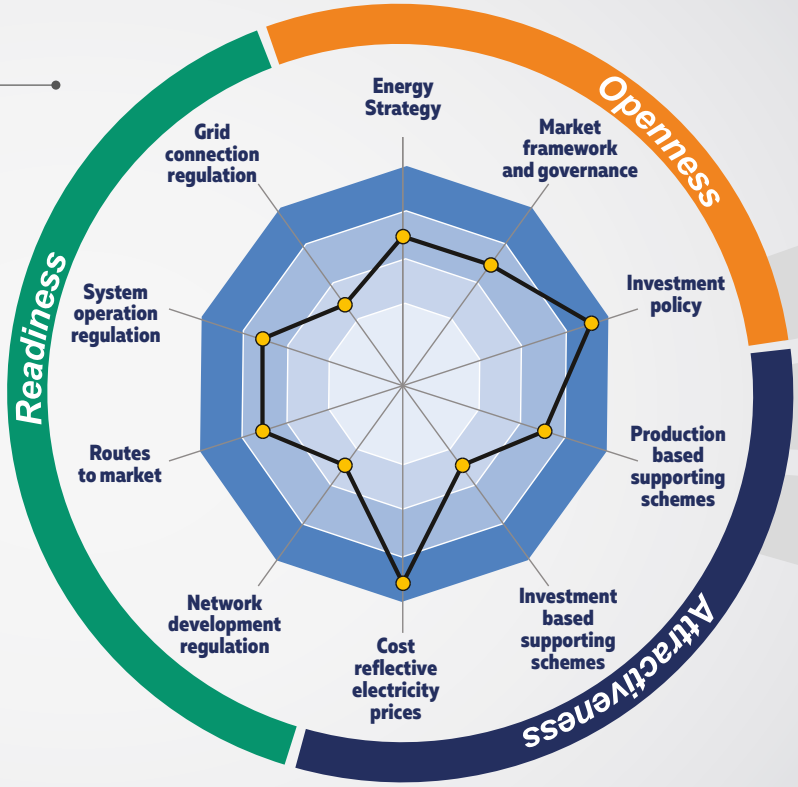
Readiness

- Public network development plan considering RES integration
- Unclear remuneration mechanism for TSO, not cost-based
- Multiple routes-to-market available (dedicated off-taker, PPAs and self-consumption) but strong limitations on wheeling agreements
- Grid code publicly available considering priority dispatch for RES, curtailment compensation and coverage from imbalance risk
- Grid connection procedures defined with priority access for RES

Investment-friendly regulations along with the absence of price distortion mechanisms attracted IPPs but transparency on grid aspects is required

Morocco





LEGEND:

- *Lack of effectiveness*
- *Low effectiveness*
- *Moderate effectiveness*
- *High effectiveness*

Openness

- Publicly available energy policy with specific RES targets for power generation formally adopted in national legislation
- Power sector masterplan not available
- IPPs presence allowed but neither transmission nor distribution unbundling implemented
- No limitation on foreign equity and equal treatment for foreign investors ensured
- Clear authorizations process and land access rules

Attractiveness

- Competitively awarded PPA system with a public schedule of forthcoming tenders
- Tax discounts and discounted financing available for RES
- No reduction for connection costs for RES in place
- Absence of subsidies to gasoline and fuel oil
- Cost-reflective electricity tariffs

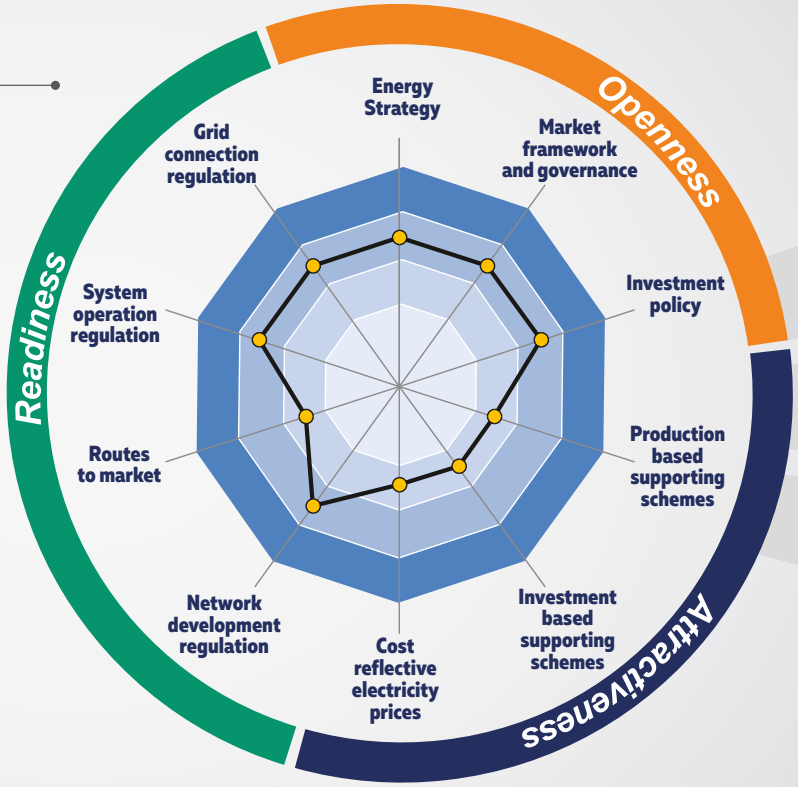
Readiness

- Network development plan not publicly available
- Unclear remuneration mechanism for TSO, not cost-based
- Multiple routes-to-market for RES in place (Dedicated off-taker, PPAs and self-consumption) but barriers on access to MV market
- Grid code not publicly available but priority of dispatch implemented on medium voltage grid
- Grid connection procedures not clearly defined, mandatory connection is not ensured and connection costs lack transparency

Market reforms attract IPP's interest but ineffective supporting policies and unclear market access rules hold back RES development

Kenya





LEGEND:

- *Lack of effectiveness*
- *Low effectiveness*
- *Moderate effectiveness*
- *High effectiveness*

IPP – Independent power producer PPA – Power purchase agreement RES – Renewable energy sources TSO – Transmission system operator

Openness

- Publicly available energy policy but no clear targets for RES
- Detailed and solid power sector masterplan available
- Presence of IPPs and unbundling of transmission but not of distribution
- No limitation on foreign equity and equal treatment for foreign investors ensured
- Missing one stop shop

Attractiveness

- Feed-in-Tariff regime in place but not efficiently enforced and currently under review
- Tax exemptions in place for Solar PV
- No discounted financing or concessional grants available
- Electricity prices still not fully cost-reflective

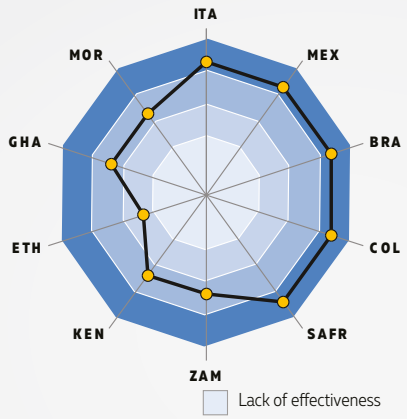
Readiness

- Public network development plan considering RES integration
- Unclear remuneration mechanism for TSO, not cost-based
- Multiple routes-to-market available (Dedicated off-taker, PPAs and self-consumption) but no clear implementation rules
- Publicly available grid code with priority dispatch and compensation for curtailment of RES
- Grid connection procedures publicly available but no priority access

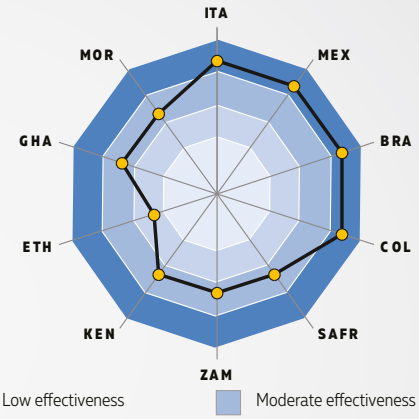
Improvements in the definition of clear energy targets, planning capacities, market structuring and governance are needed

OPENNESS

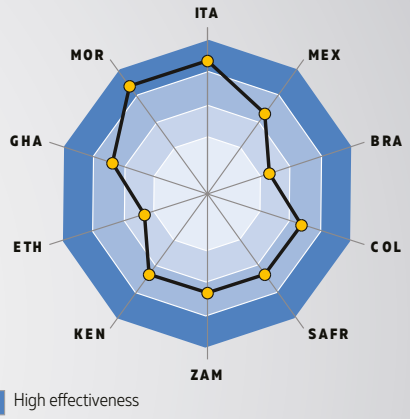
Energy strategy



Market framework and governance



Investments regulation



Lack of effectiveness | Low effectiveness | Moderate effectiveness | High effectiveness

BEST PRACTICES

- Detailed energy policy with clear RES-E targets and a formal procedure of targets' monitoring
- Targets formally adopted in national legislation
- Clear and transparent plan for RES capacity expansion
- Climate change targets in place and adopted in national legislation

BEST PRACTICES

- IPP presence allowed and market integration ensured through non-discriminatory grid access clauses
- Vertical unbundling of transmission and distribution activities implemented
- Free competition among market players authorized at wholesale level
- Independent regulatory authority created with clear and defined responsibilities

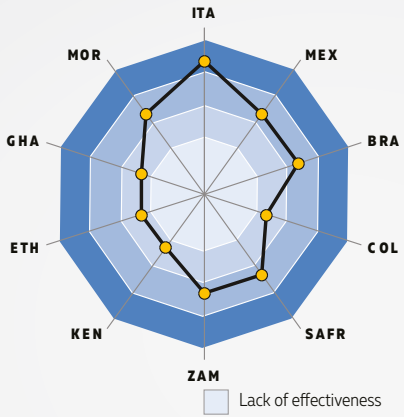
BEST PRACTICES

- Absence of limitations on foreign equity
- Equal treatment for foreign investors ensured
- Absence of operational restrictions for foreign investors
- Guidance for authorization/permitting available

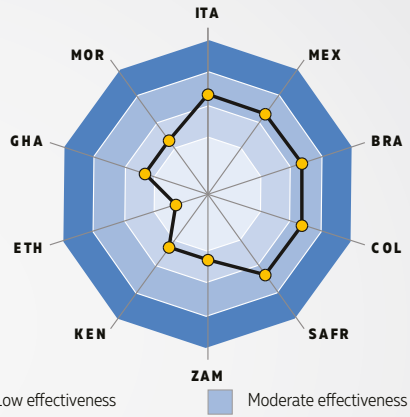
Proper implementation of production-based supporting schemes and cost reflective electricity prices are still to be ensured

ATTRACTIVENESS

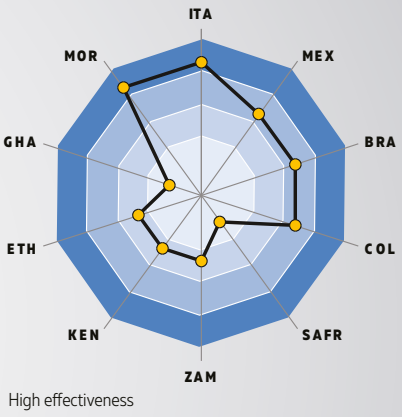
Production-based supporting schemes



Investment-based supporting schemes



Cost reflective electricity prices



BEST PRACTICES

- Well constructed production-based supporting schemes
- Transparency and enforceability of supporting schemes ensured
- Tariff inflation indexing or expression in hard currency to strengthen bankability of projects

BEST PRACTICES

- Investment-based schemes to reinforce investors' appetite
- Carbon price mechanisms to facilitate RES capacities development
- Net metering to support distributed RES
- Discount on connection or wheeling costs

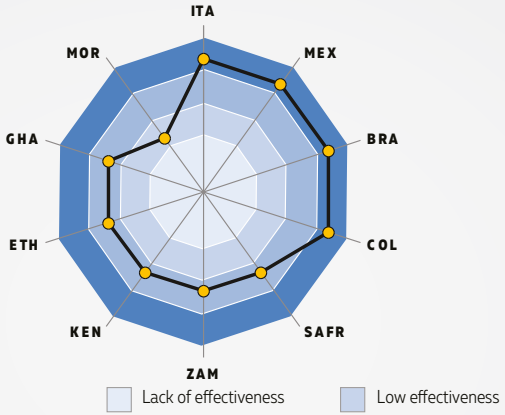
BEST PRACTICES

- Absence of price distortive mechanisms to ensure fair competition among energy technologies and providers

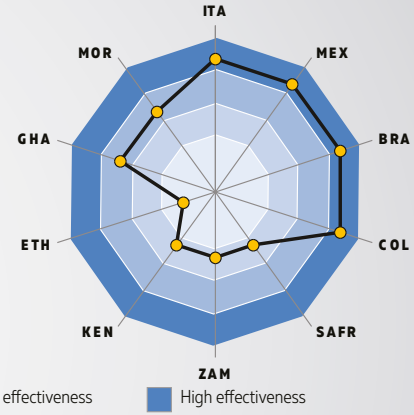
Multiple routes-to-market and proper regulation to ensure investments in network development are yet to be fully adopted...

READINESS

Network development regulation



Routes to market



BEST PRACTICES

- Network system development plans in place and publicly available
- Network system plan to consider renewable integration and flexibility grid needs
- Transparent, clear and cost based remuneration methodology for TSO

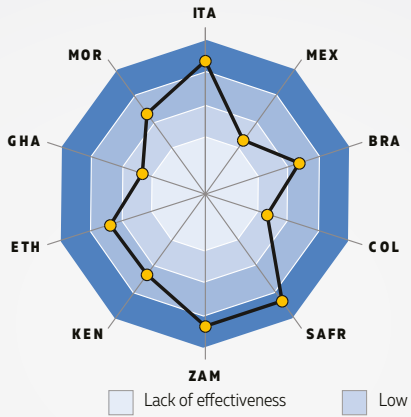
BEST PRACTICES

- Presence of multiple routes-to-market, both centralized and decentralized
- Contract standardization to reduce investors' risk exposure
- Wheeling permission allowed for the success of self-production and direct PPAs schemes

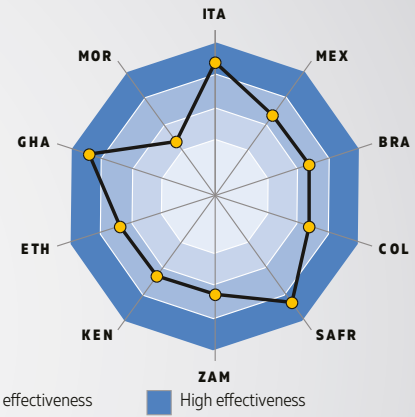
...while RES integration and connection aspects will need further adjustments accordingly with increasing RES share

READINESS

System operations regulation



Grid connection regulation



BEST PRACTICES

- Grid code publicly available and directly addressing variable generation
- Priority of dispatch for RES considered (at first stages of deployment)
- RES remunerated for the missed production if subject to curtailment

BEST PRACTICES

- Grid connection procedures available
- Priority grid access to RES projects considered (at first stages of deployment)
- Connection rules providing mandatory connection of third party plants by the TSO
- Clear grid connection cost rules available

Remarkable results have been achieved by African States in reforming RES regulation but space for improvements still remains



A clear market governance to ensure enforceability of targets and plans is fundamental for clear signals to investors

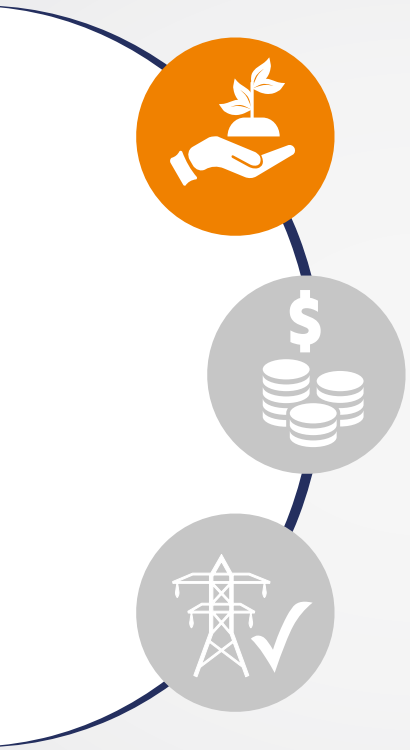


Cost-reflective prices and fair competition among technologies in the market must be ensured to benefit from RES competitiveness



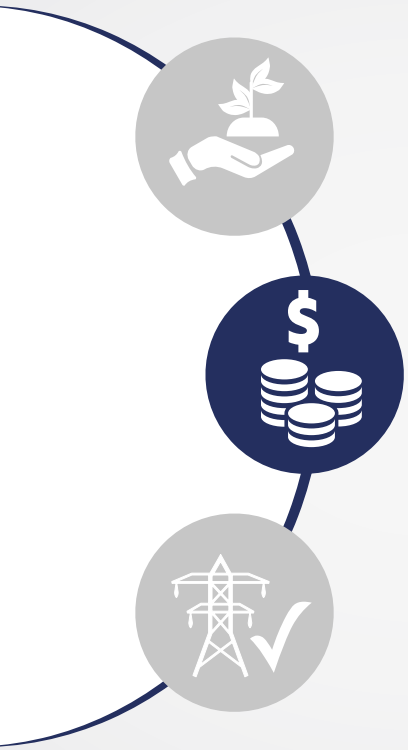
Technical regulations must ensure adequate grid development and flexibility, while viable routes-to-market are needed to facilitate RES IPPs integration

A clear market governance to ensure enforceability of targets and plans is fundamental for clear signals to investors



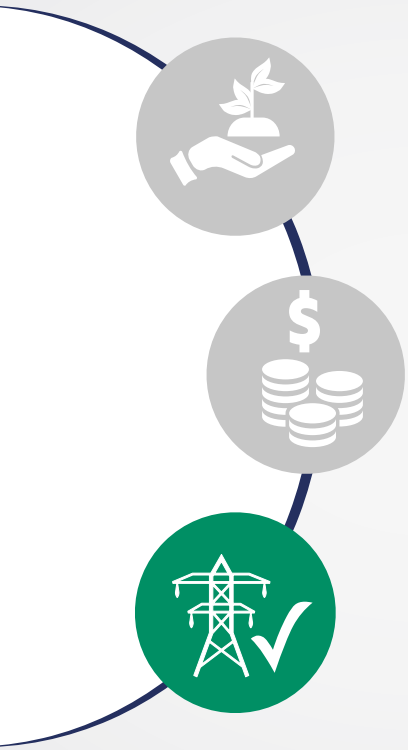
- The trustworthiness of the energy strategy is an essential condition to attract investors' interest . This is mainly driven by the following drivers:
  - *The adoption of the renewable energy targets within the national legislation*
  - *The integration of the renewable targets with an adequate planning/blueprint of capacity development*
  - *A monitoring of renewable deployment to evaluate targets achievement*
- A clear separation between the natural monopoly of T&D services and the competitive activities, such as generation, eases market access for potential renewable IPPs
- Clear non-discriminatory rules for network access is the first step for renewable IPPs development, whilst further market opening is the precondition for new business models (routes-to-market) for RES

Cost-reflective prices and fair competition among technologies in the market must be ensured to benefit from RES competitiveness



- Production based supporting schemes are a necessary condition for renewable development where RES technologies are not competitive so far. To date in Africa such incentives are no longer a necessary condition as renewables are already competitive from a technological perspective
- Within this context what is more important is to guarantee a fair competition among generation technologies. This is strictly dependent on two main conditions:
  - *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*

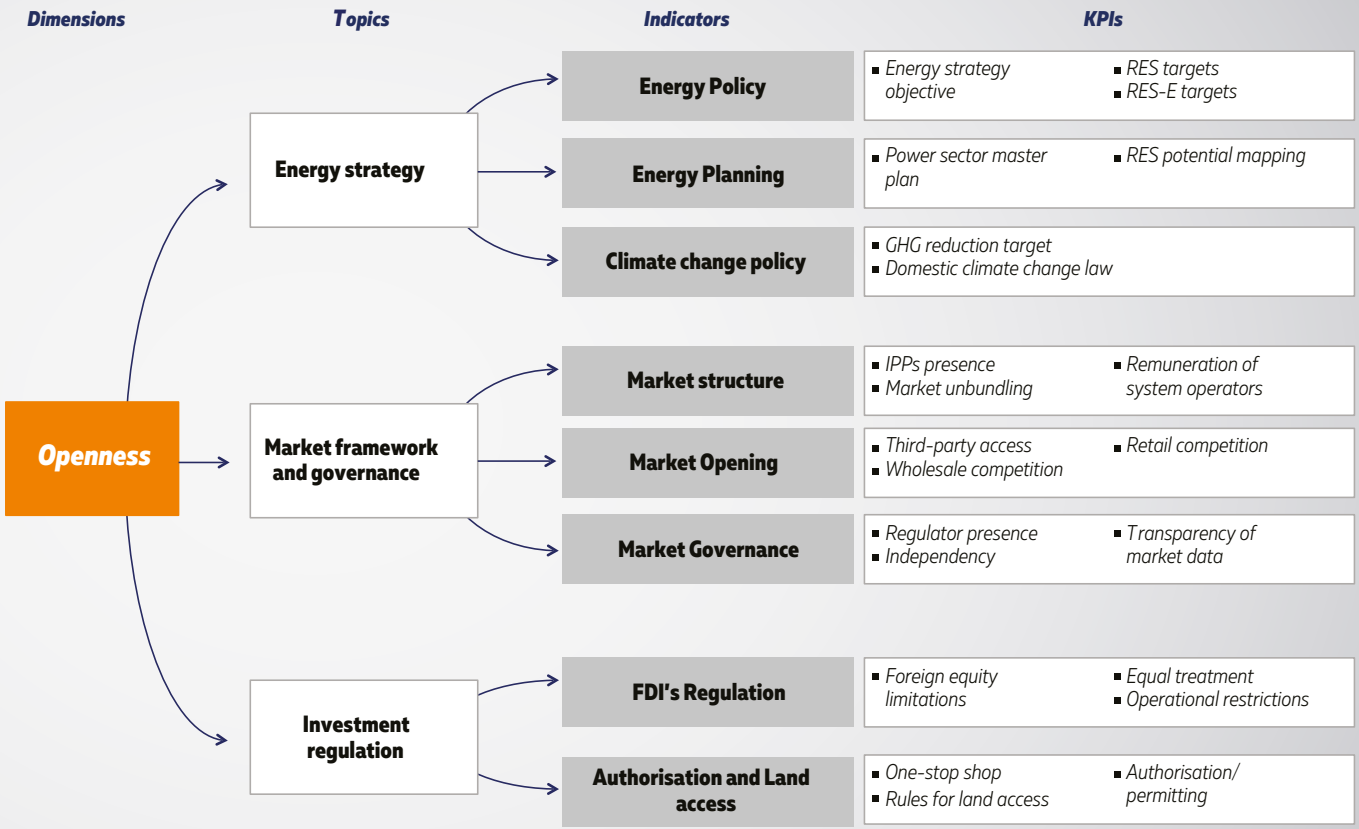
Technical regulations must ensure adequate grid development and flexibility, while viable routes-to-market should facilitate IPPs integration



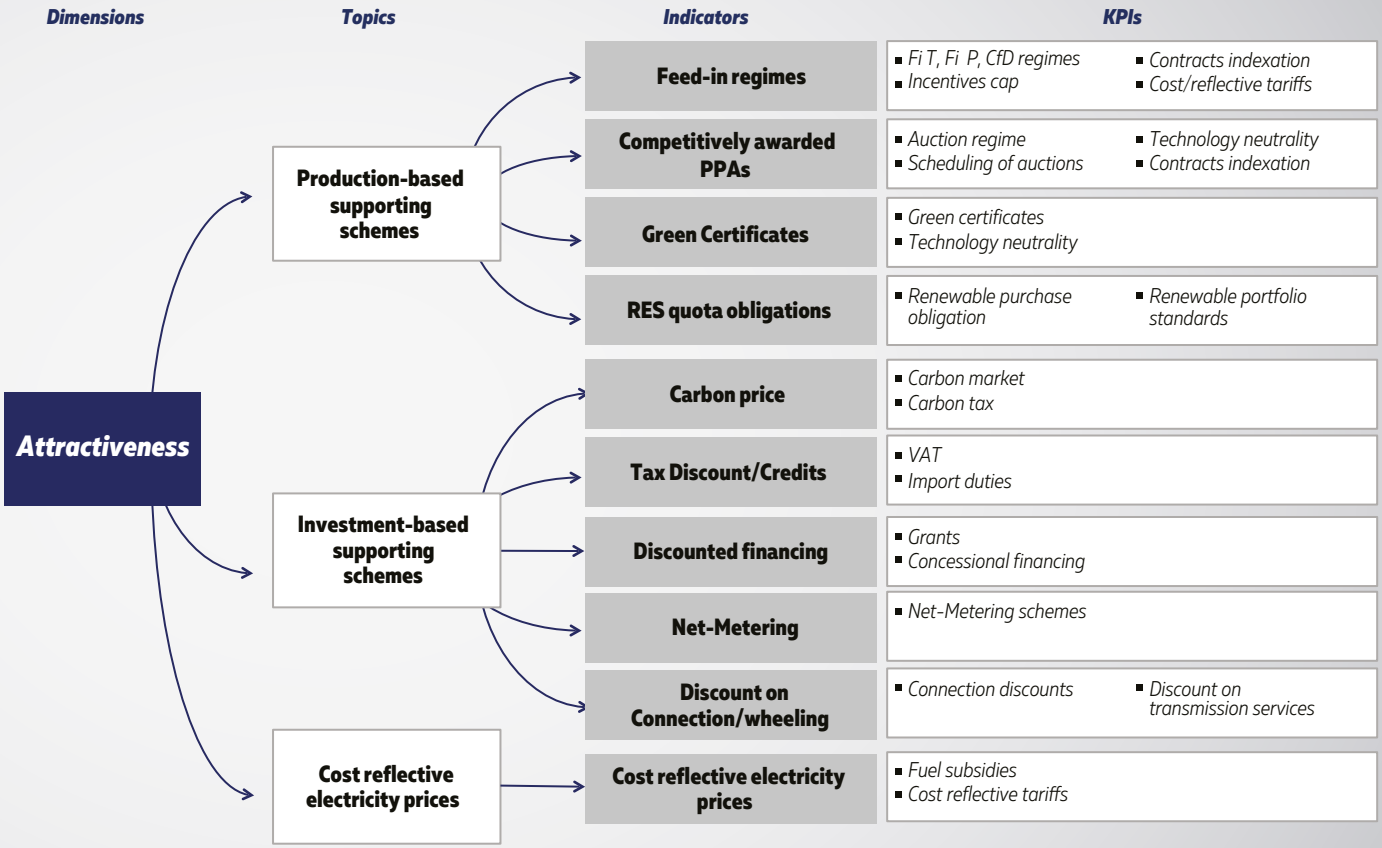
- Adequate network development has to be ensured to efficiently integrate renewables into the system. Two pillars are at the basis of a sound network development regulation :
  - *The definition of a structured network development plan to regularly monitor network adequacy needs and to supervise investments implementation*
  - *The establishment of a clear and cost-based remuneration system for the TSO, that will be incentivized to invest into the grid*
- The availability of multiple and viable routes-to-market for renewable energy is an essential element to avoid lock-in risk in RES development and enhance RE-IPPs market appetite. Within this context two factors are fundamental to attract investors:
  - *The allowance for renewable generators to freely sell their energy to end-users through a spot market or bilateral PPAs*
  - *The viability of each route-to-market should be ensured with appropriate secondary legislation and regulations*

ANNEXES

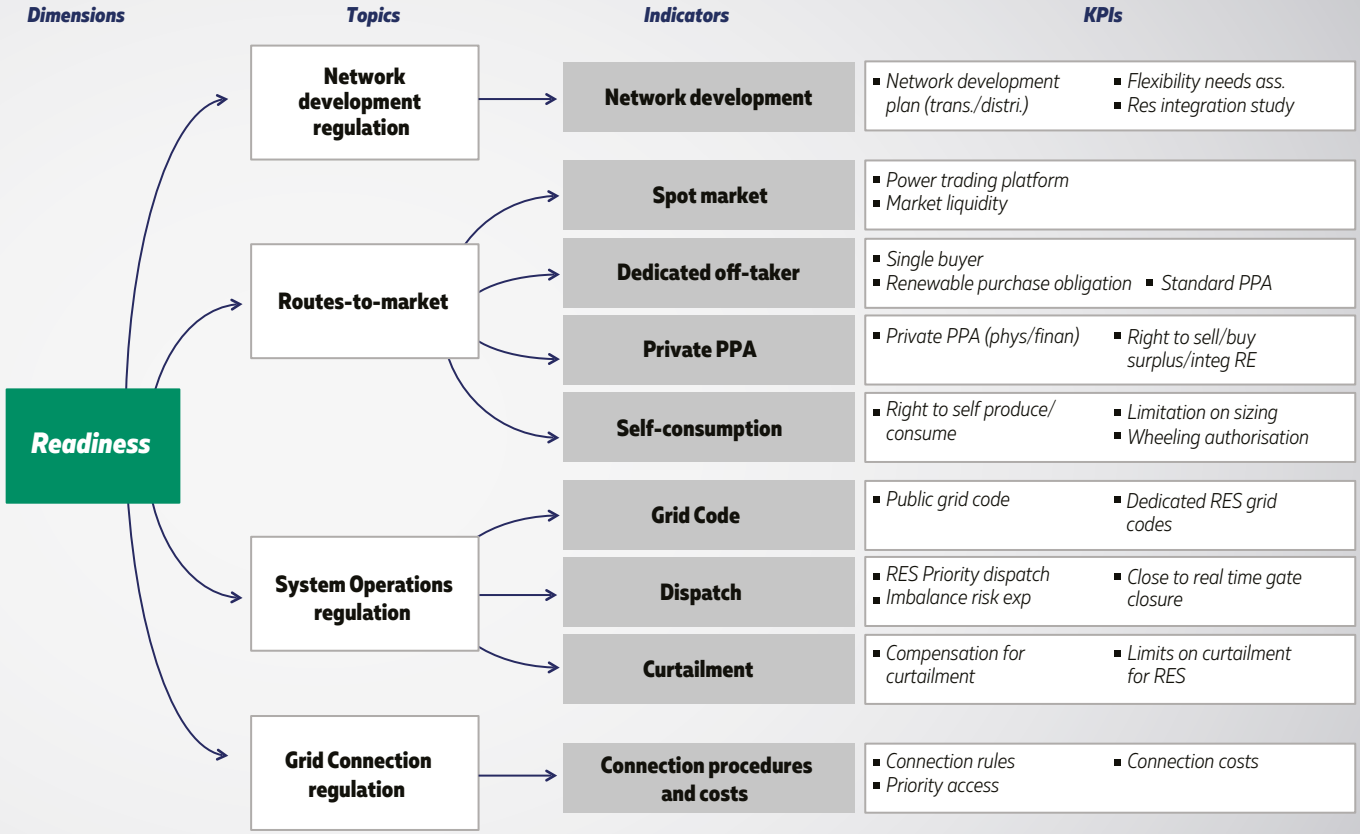
Market Openness dimension investigates 8 indicators to assess countries' commitment to RES development and openness to private investments



Market attractiveness dimension investigates 10 indicators to assess countries' supporting policies to renewable development



Market readiness investigates 9 indicators to assess power system ability to efficiently integrate RES capacities and evacuates produced energy



Overview of the scoring methodology

- The assessment matrix developed is based on YES/NO questions (KPIs) which investigate the three fundamental attributes of regulation:
  - *Implementation of regulation*
  - *Transparency of regulation*
  - *Enforceability of regulation*
- The quantitative result is obtained by summing the positive answers to the 80 detailed questions (KPIs)
- To reflect the variable relevance of particular KPIs under a certain Indicator and the relevance of a particular Indicator on its topic, those have been categorized following a scale system
- Such qualitative categorization serves the purpose of weighting the different components to reflect their impact in affecting investors' market appetite

KPIs

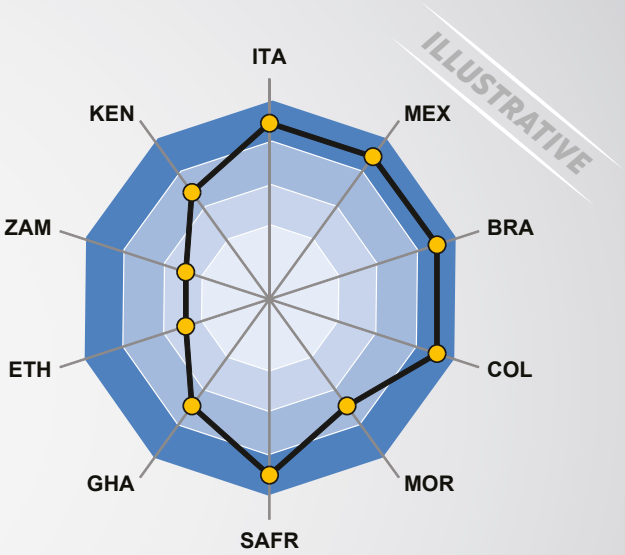
Score-range	Interpretation
■ ■ ■	**High relevance:** Regulatory element having a high impact on the efficiency of the regulation
■ ■ □	**Medium relevance:** Regulatory element having medium impact on the efficiency of the regulation
■ □ □	**Low relevance :** Regulatory element having low impact on the efficiency of regulation

Indicators

Score-range	Interpretation
■ ■ ■	**High relevance:** Regulatory option having the power to deeply affect investors willingness in entering into a new market
■ ■ □	**Medium relevance:** Regulatory option with moderate impact
■ □ □	**Low relevance :** Regulatory option with low or marginal impact

Construction of the regulatory effectiveness indexes

- Results have been normalized on a 1 to 4 scale in order to better illustrate the different levels of regulatory effectiveness among the countries
- For each country assessed final results are shown at the Topics level



High effectiveness: *regulatory framework is present and is effective in attracting renewable investors into the market*

Moderate effectiveness: *minor regulatory gaps which do not affect overall effectiveness of the framework*

Low effectiveness: *important regulatory gaps which undermine willingness to invest*

Lack of effectiveness: *regulatory options do not cover fundamental aspects related to renewable investments*

About RES4Africa Foundation

Who we are: *RES4Africa Foundation promotes the deployment of large-scale and decentralized renewable energy in African countries to meet local energy needs.*

Our work: *RES4Africa Foundation functions as a platform for members and partners of emerging markets to foster dialogue and partnerships, share knowledge and build capacity to advance sustainable energy investments in Africa.*

Our mission: *RES4Africa Foundation aims to create an enabling environment for renewable energy investments in emerging markets through 3 work streams:*

- *Acting as a connecting platform for* ***dialogue & strategic partnerships*** *between members and partners to exchange perspectives and foster cooperation;*
- *Providing* ***technical support & market intelligence*** *through dedicated studies and recommendations based on members' know-how to advance sustainable energy markets;*
- *Leading* ***capacity building & training*** *efforts based on members' expertise to enable skills and knowledge transfer that supports long-term sustainable energy market creation.*

This study was carried out by *Pöyry Management Consulting Italy*
and realized in collaboration with the *Enel Foundation*

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RENEWABLE ENERGY SOLUTIONS FOR AFRICA
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