Electricity Regulatory Index

for Africa 2021

AFRICAN DEVELOPMENT BANK GROUP

ERI
Electricity Regulatory Index for Africa

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Acronyms

AEDC	Abuja Electricity Distribution Company (Nigeria)
AFUR	African Forum for Utility Regulators
ANARE-CI	Autorité Nationale de Régulation du secteur de l'Electricité de Côte d'Ivoire
ANRE	Autorité Nationale de Régulation du secteur de l'Electricité (Morocco)
AREM	Autorité de Régulation Multisectorielle (Mauritanie)
ARE	Autorité de Régulation du Secteur de l'Electricité (RDC)
ARE	Autorité de Régulation du Secteur de l'Electricité (Benin)
AREE	Autorité de Régulation des secteurs de l'Electricité et de l'Eau (Guinea)
ARENE	Mozambican Energy Regulatory Authority
ARSE	Autorité de Régulation du Secteur de l'Energie (Niger)
ARSE	Autorité de Régulation du Secteur de l'Energie (Togo)
ARSEE	Agence de Régulation du Secteur de l'Eau potable et de l'Energie Electrique (Gabon)
ARSEL	Agence de Régulation du Secteur de l'Electricité (Cameroun)
ARSEL	Agence de Régulation du Secteur de l'Electricité (Congo Republic)
BEDC	Benin Electricity Distribution Company PLC (Nigeria)
BERA	Botswana Energy Regulatory Authority
BPC	Botswana Power Corporation
CEB	Central Electricity Board
CEET	Compagnie Energie Electrique du Togo
CEO	Chief Executive Officer
CIE	Compagnie Ivoirienne d'Electricité
CoSS	Cost of Service Study
CREE	Commission de Régulation de l'Electricité et de l'Eau (Mali)
CRSE	Commission de Régulation du Secteur de l'Electricité (Senegal)
DSM	Demand-side management
EAC	East African Community
EC	Energy Commission (Ghana)
ECB	Electricity Control Board (Namibia)
ECG	Electricity Company of Ghana

ECOWAS	Economic Community of West African States
EDM	Energie du Mali
EDM	Electricidade de Mozambique
EDSA	Electricity Distribution and Supply Authority (Sierra Leone)
EEA	Ethiopian Energy Authority
EEC	Eswatini Electricity Company
EEP	Ethiopian Electric Power
EEU	Ethiopian Electric Utility
EKDC	Eko Electricity Distribution Company (Nigeria)
ENDE EP	Empresa Nacional de Distribuição de Electricidade (Angola)
ERA	Electricity Regulatory Authority (Uganda)
ERB	Energy Regulation Board (Zambia)
EPRA	Energy and Petroleum Regulatory Authority (Kenya)
ERI	Electricity Regulatory Index
ERIGS	Electricity Regulatory Index for Governance and Substance
ESCOM	Electricity Supply Corporation of Malawi Limited
ESERA	Eswatini Energy Regulatory Authority
EUCL	Energy Utility Corporation Limited (Rwanda)
EUT	End User Tariff
EWURA	Energy and Water Utilities Regulatory Authority (Tanzania)
GHG	Green House Gas
HVAC	Heating, Ventilation and Air Conditioning
IEA	International Energy Agency
IEDNO	Independent Electricity Distribution Network Operator
IPP	Independent Power Producer
IRSE	Instituto Regulador do Sector Eléctrico (Angola)
JEDC	Jos Electricity Distribution PLC (Nigeria)
KEDC	Kano Electricity Distribution Company PLC (Nigeria)
KfW	German Development Bank
KPI	Key Performance Indicator
KPLC	Kenya Power & Lighting Company Limited
LEC	Lesotho Electricity Company
LEC	Liberia Electricity Corporation
LERC	Liberia Electricity Regulation Commission
LEWA	Lesotho Electricity and Water Authority
MEPS	Minimum Energy Performance Standards
MERA	Malawi Energy Regulatory Authority

NARUC	National Association of Regulatory Utility Commissioners
NAWEC	National Water and Electricity Company Ltd (Gambia)
NERC	Nigerian Electricity Regulatory Commission
NIGELEC	Société Nigérienne d'Electricité (Niger)
ONEE	Office National de l'Electricité et de l'Eau Potable (Morocco)
PPA	Power Purchase Agreement
PSF	Private Sector Federation (Rwanda)
PURA	Public Utilities Regulatory Authority (Gambia)
PURC	Public Utilities Regulatory Commission (Ghana)
RE	Renewable Energy
RGI	Regulatory Governance Index
ROI	Regulatory Outcome Index
ROIu	Regulatory Outcome Index Power Utility Company
RSI	Regulatory Substance Index
RURA	Rwanda Utilities Regulatory Authority
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SBEE	Société Béninoise d'Energie Electrique
SCADA	Supervisory Control and Data Acquisition System
SENELEC	Société Nationale d'Electricité du Sénégal
SLEWRC	Sierra Leone Electricity and Water Regulatory Commission
SONABEL	Société Nationale d'Electricité du Burkina
TANESCO	Tanzania Electricity Supply Company
URA	Utility Regulatory Authority (Mauritius)
USAID	United States Agency for International Development
ZERA	Zimbabwe Energy Regulatory Authority
ZETDC	Zimbabwe Electricity Transmission and Distribution Company

Definitions[1]

Accountability	The ability of the regulated entity or other stakeholders, as set out in the primary legislation, to challenge the regulator's decision in the courts through an appeal to a commission or a specialized body.
Clarity of Roles and Objectives	The definition and codification of the regulator's functions and duties, including the regulated utility's obligations in primary or secondary legislation, license, or contract.
Economic Regulation	The aspect of the regulator's functions and duties which affect the financial and commercial viability of the utility company and long-term financial sustainability of the sector.
Electricity Regulatory Index	Refers to the final Electricity Regulatory Index which is obtained by aggregating the results of the Electricity Regulatory Index for Governance and Substance together with results from the Regulatory Outcome Index.
Electricity Regulatory Index for Governance and Substance	The index obtained by aggregating the scores for the Regulatory Governance Index and the Regulatory Substance Index.
Energy Labels	Informative labels affixed to manufactured products that indicate a product's energy performance (usually in the form of energy use, efficiency, and/or energy costs) in order to provide consumers with the data necessary for making more informed purchase decisions.
Independence of the Regulator	Institutional, financial, operational and decision-making autonomy from political authorities and stakeholders.
Legal Mandate	Primary (or secondary) legislation under which the regulatory body was established.
Micro-Grid	Mini-grids that operate at a smaller size and of generation capacity, ranging between 1 and 10 kW.
Mini-Grid System	Off-grid small-scale distribution network that provides electricity (usually from 10 kW to 10 MW), to one or more communities, from small generators using fossil fuel, renewable energy technology or a combination of the two.
Minimum Energy Performance Standards	The set of procedures and rules detailing the energy performance of manufactured products, sometimes prohibiting the sale of products less energy efficient than the minimum standard.

[1]The list of definitions is understood within the context of the Electricity Regulatory Index and its assessment – it is not the strict definitions of the terms.

Nascent Regulator	Regulators that have been operational for less than five years or have recently been restructured. These institutions often are at an early stage of organisational development, limited capacity, and leverage to develop and implement regulatory instruments and initiatives.
Off-Grid System	A decentralized or isolated power system, without connection, either directly or indirectly, to the distribution or transmission network. Off-grid systems can be categorized as mini-grid, micro-grid, or individual stand-alone systems.
Open Access to Information	A situation in which key regulatory instruments and documents including primary legislation, licences or contracts, consultation documents, regulators comments on consultation documents or tariff decisions are made available to the public, utilities and other stakeholders.
Participation	Stakeholder involvement via consultations prior to making regulatory decisions and processes via public hearings, as well as distribution of draft reports for comments to stakeholders.
Power Purchase Agreement	A contract between an off-taker or purchaser of electricity and a power producer. A PPA is tailored to the specific application relevant to the parties, and usually defines certain conditions such as the amount of power to be supplied, the negotiated prices, accounting, and penalties for non-compliance.
Predictability	A regulatory environment in which processes and procedures for making key regulatory decisions exist and are known to stakeholders, in addition to well-established public tariff review procedures.
Quality of Service Code	The document that establishes the requirements for regulated utilities to deliver an adequate level (within pre-defined thresholds) of quality and reliability in electricity service provided to customers.
Quality of Service Delivery (Commercial)	The non-technical aspect of power supply service that describes the relationship and interaction between power utilities and customers with respect to information on outages, meter readings and disputes, consumer account queries, response to consumer complaints, etc.

Quality of Service Delivery (Technical)	Refers to technical aspect of power quality issues, particularly ensuring continuity of supply, frequency control and voltage quality withing set standards and thresholds.
Regulatory Capture	A situation in which the regulated utilities or any of the sector stakeholders influence the decisions of the regulator by using various approaches or means to compromise a regulator's decision-making independence.
Regulatory Governance	the institutional and legal design of the regulatory system that defines the framework within which decisions are made by the regulator.
Regulatory Governance Index	The index obtained by aggregating the main indicator scores for Regulatory Governance.
Regulatory Outcome	The impact of regulator's decisions, actions and activities on the regulated entity, as well as on the entire sector in general.
Regulatory Outcome Index	The index obtained by aggregating the main indicator scores for Regulatory Outcome.
Regulatory Substance	Refers to the attributes of regulation linked to the actual actions or decisions of regulators that affect the performance of the regulated industry; the practical operation of regulatory practices and processes that have direct impact on regulatory outcomes.
Regulatory Substance Index	The index obtained by aggregating the main indicator scores for Regulatory Substance.
Stand-Alone Individual System	Refers to generation systems that are not connected to the distribution network and which range from household-sized systems of 30–100-watt peak, capable of powering a few bulbs, a fan and possibly a small television, to institutional sizes (100–500 watt peak) for use in schools, health centers, etc.
Technical Regulation	The aspect of a regulator's duties and functions that affects the quality and reliability of electricity supply to consumers.
Transparency	Full disclosure to relevant stakeholders of key regulatory documents, consultation responses, and regulator's comments and decisions on issues raised during the consultation process.

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Foreword

We are pleased to present the African Development Bank's fourth edition of the Electricity Regulatory Index for Africa (ERI). Since 2018, the goal of the ERI has remained the same: to highlight key areas of electricity regulation that need reforms, outline appropriate areas for interventions, and encourage action among stakeholders to address them.

Regulators across the continent have widely adopted the ERI to analyze the regulatory environment and initiatives required to close identified gaps. Investors use the index as a valuable source of information for investment decision making. It is a valuable resource for sector analysis and monitoring the evolution of regulatory frameworks across the continent.

The ERI continues to be a key source of information for the African Union Commission (AUC) and the European Union (EU) Technical Assistance Facility's initiative on monitoring the harmonization of electricity markets in Africa. With the publication of the 2021 ERI, the index will continue to provide important information/data to assist the AUC and EU as they monitor the progress on harmonization of regulatory and market frameworks in Africa.

For the first time since the ERI's inception and despite the ongoing challenges presented by the Covid-19 pandemic, a record 43 regulators and utilities participated in this year's assessment. This includes six new participating utilities and regulators. This makes this year's ERI the survey with the highest number of participants in a year. The African Development Bank's goal is to ensure the coverage of all African countries with autonomous regulatory institutions, and where possible, to support the creation of autonomous utilities and regulators to spur investments and access in the electricity industry.

The 2021 ERI showed that most countries have well-developed regulatory governance structures, have recorded improvements in technical regulation, and built requisite regulatory capacities in key areas of economic regulation and licensing framework. This has provided transparent processes for investors' entry into the electricity sectors of those countries. The African Development Bank has been working with countries and development partners to strengthen these efforts at both national and regional levels through several initiatives. They include supporting selected countries with digitization programs to strengthen national regulatory authorities with their technical regulation. Another is by establishing regional key performance indicators and tariff reviews with regional regulatory authorities to support the regional harmonization of regulatory activities. In collaboration with the National Association of Regulatory Utility Commissioners (NARUC) and the United States Agency for International Development (USAID), the Bank has developed guidelines to advance "Economic Regulation and Commercial Quality of Service Regulation in Africa's Power Sector" based on the recommendations of the ERI.

Based on the results of this year's ERI, we have made several recommendations to strengthen regulatory accountability and predictability; to enhance stakeholder, financial and decision-making independence, and to improve economic regulation, specifically regarding developing comprehensive tariff frameworks. It will also improve methodologies based on current cost of service studies. We encourage a wider adoption of the ERI as a resource for practical insights on regulatory developments and issues in African countries. We invite development partners and other sector stakeholders to collaborate with the African Development Bank for the joint implementation of the ERI's recommendations.

Wale Shonibare
Director
Energy Financial Solutions, Policy and Regulations


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Executive Summary

This report is the fourth edition of the Electricity Regulatory Index (ERI). It measures the level of development of electricity sector regulatory frameworks in African countries and the capacity of regulatory authorities to effectively carry out their relevant functions and duties. The report covers forty-three countries[2] , representing an increase of about 20% over the number of countries that participated in the 2020 edition. That edition involved thirty-six countries. The ERI is made up of three pillars or sub-indices: the Regulatory Governance Index (RGI); the Regulatory Substance Index (RSI); and the Regulatory Outcome Index (ROI).

ERI Survey

The ERI scores were calculated based on responses to comprehensive surveys distributed to electricity sector regulatory institutions, and utilities in African countries with confirmed regulatory authorities. Based on the responses to the surveys, each indicator in the sub-indices is assigned a score between 0.000 and 1.000. A score of 1.000 indicates that the regulator and/or the national regulatory framework conform(s) to international best practice regarding the relevant indicator. A score of 0.000 signifies a lack of alignment with international best practice.

ERI 2021 Key Findings

- **Uganda is the top performing country in this year's ERI**. Along with Uganda (0.823), Kenya (0.688), Tanzania (0.669) Namibia (0.663), and Egypt (0.609) are the top five performers of the ERI 2021.These countries have well-developed electricity regulatory frameworks, and their regulators have the capacity and do exercise the necessary regulatory oversight and authority on the regulated entities and on the sector and are, therefore, able to achieve measurable outcomes.

- **The electricity regulatory frameworks of African countries included in the sample, remain at an overall low level of development**. Despite relatively high RGI (average of 0.735) and RSI (average of 0.575), the average overall ERI was low because of the low ROI score, (average of 0.339), showing that the development of regulatory and policy frameworks does not necessarily result in tangible outcomes at the utility level.

- Regulatory Independence remains the weakest sub-indicator under RGI. Governments and stakeholders have influence on regulatory authorities in 93% of the countries surveyed.

- Performance in Economic Regulation (tariff setting and frameworks) and Licensing Framework sub-indicators were the lowest under RSI.

- Average performance in economic regulation continues to decline with new entrants to the ERI. Results showed that 33% of countries surveyed do not have tariff methodologies for the determination of tariffs, while 40% have tariff methodologies without the key requisite attributes.

- In 40% of the countries surveyed, there are no simplified frameworks or licensing procedures for off-grid and small-size systems.

- In 67% of countries surveyed, the average end-user tariffs are not in line with the costs of operations of the electricity utility companies.

- Accessing long term sustainable funds necessary to achieve universal access to electricity is a significant barrier for most countries.

[2]The Bank has identified that there are currently 46 operational regulatory authorities on the Continent

Evolution of the ERI since 2018

The African Development Bank is committed to continuously improving the relevance of the ERI indicators and aligning the methodology with emerging trends in the power sector. The ERI has evolved considerably from 2018, when only 15 countries participated in it. The number of countries participating in the ERI has grown to 43 in 2021.

An assessment of the trends of the performance across the ERI pillars, indicates that while the average RGI and RSI scores have remained in the same performance bands over the four-year period (green and yellow bands respectively), the average ROI and ERI scores fell from the yellow performance band in 2018 to the orange band in 2019 and further to the red band in 2020 and 2021.

Trends in Regulatory Governance Index (RGI)

RGI mirrors the spirit, letter and structure of the primary legislations establishing the regulatory authorities and takes a relatively long time to change. A change in legislation does not rest entirely with the regulator but involves the legislature and executive arms of government.

While the average scores and performance of countries across RGI indicators have been relatively high compared to RSI and ROI, the average scores for RGI have been **declining since 2019, in relation to the other indicators. As policy and legal structures within the sector do not change frequently, the observed trends in RGI are largely attributable to new countries entering the ERI survey** (Chapter II, section 1).

Trends in Regulatory Substance Index

Performance across RSI indicators is within the control of the regulators and can be improved with little or no involvement of the executive arm of government or the legislature. **Although continental average performance in RSI has always been lower than RGI, the average performance has been rising between 2019 and 2021** (Chapter II, section 2). This reflects the efforts being undertaken by regulatory authorities to develop new regulatory instruments and update existing ones to address identified gaps in key areas of the power sector.

Performance Trends in Regulatory Outcome Index (ROI)

While acknowledging that sector performance has many externalities outside the control of the regulator, the regulatory agencies have key roles to play in encouraging the development of the sector. ROI has been on a downward trend since 2018. This has been because of deteriorating financial performance and operational inefficiencies of power utilities.

Poor financial health of utilities and sector indebtedness is a key driver of the downward trends of regulatory outcomes (Chapter II, section 3). Tariffs are not cost reflective, and most regulators are unable to fully apply provisions of their tariff methodologies where they exist. This thereby denies the utilities the needed revenue to operate.

Weak networks, because of lack of adequate investments, have prevented regulators from applying the requisite quality of service standards. This is because these weak networks cannot meet the required standards.

Trends in Electricity Regulatory Index

The ERI is a construct of RGI, RSI and ROI. The indicators for Regulatory Governance (RGI) and Regulatory Substance (RSI) were used to construct the ERI for Governance and Substance (ERIgs), which provides an assessment of the level of regulation and the capacity of the regulatory authority in countries. It shows the following:

The trends in ERIgs correlates with the trend in RSI. The upward trend is therefore a measure of the intrinsic efforts and actions by the regulator to develop the requisite regulatory tools, instruments, and frameworks..

- ERI trends correlate with trends in ROI. The ERI is therefore a combined measure of both intrinsic regulatory developments and the sector outcomes.

Key Recommendations

Regulatory Governance	• Regulatory acts of 93% of countries surveyed will need to be amended to enhance regulatory independence while ensuring accountability of the regulator to stakeholders. • More than 30% of countries surveyed must regularly update their websites so that they provide useful and necessary information on the electricity sector, including license application requirements, procedures, tariff methodologies, and regulations.
Regulatory Substance:	• Regulatory authorities must develop properly documented tariff methodologies, which must include formulas for determining end-user-tariffs and automatic pricing and indexation mechanisms. • Regulatory authorities must develop regulatory frameworks that include Quality-of-Service Codes/standards, particularly those that monitor the supply quality of electrical energy, like System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) indicators. • Regulatory authorities should develop transparent frameworks and processes for licensing, including a separate light-handed framework for small and off-grid systems.
Regulatory Outcomes	• To ensure financial viability of utilities, the regulatory institutions must team up with the utilities and carry out cost-of-service studies, at regular intervals and implement them, to ensure that the tariffs granted to the electricity utilities are in line with the costs of operations of the utilities • Regulators should develop and agree with utilities transitional arrangements with milestones for achieving thresholds in the quality-of-service standards utilities. • Where governments are unable to provide all the funds for rural electrification, the tariffs must make room for the recovery of funds made on rural electrification to ensure the full recovery of such investment to encourage private sector participation in the sector

I. Methodology in Brief[3]

1.1. Definition

The Electricity Regulatory Index is a composite index that measures the level of development of electricity sector regulatory frameworks in African countries against international standards and best practice. It is composed of the following three pillars:

The Regulatory Governance Index (RGI)

assesses the extent to which the laws, procedures, standards and policies governing the electricity sector provide for a transparent, predictable and credible regulatory framework that meets international standards. The RGI thus assesses the institutional and legal design of the regulatory framework, within which regulatory decisions are made. It is composed of eight indicators.

The Regulatory Substance Index (RSI)

evaluates how well electricity sector regulators are carrying out their mandate and implementing the practices and processes that affect regulatory outcomes. The RSI assesses the content of the regulations and actual decisions implemented by regulators. It is made up of seven indicators. The RGI and the RSI together assess the effectiveness of the regulatory environment to support electricity sector performance, promote efficiency and fulfill national objectives.

The Electricity Regulatory Index for Governance and Substance (ERIgs)

is calculated by averaging the aggregate scores on the RGI and RSI. The RGI and the RSI together assess the effectiveness of a regulatory environment to support electricity sector reforms, promote efficiency and fulfill national objectives. The ERIgs provides important insight into national regulatory development, without recourse to the effects of the regulatory actions and decisions on the sector.

The Regulatory Outcome Index (ROI)

measures, from the perspectives of distribution utility companies and/or consumers, the degree to which the regulator has a positive or negative impact on the sector. The ROI assesses how regulatory actions and decisions can achieve the expected results for the sector. The ROI is calculated from an aggregation of survey responses from the electricity distribution utilities and power consumers. The ROI for utility comprises three sub-indicators. Figure 1 highlights the main thematic questions and considerations around which the RGI, RSI and ROI are constructed.

[3] Further information on the ERI methodology is included in the *Electricity Regulatory Index for Africa Detailed Methodology Note, AFDB, 2021*

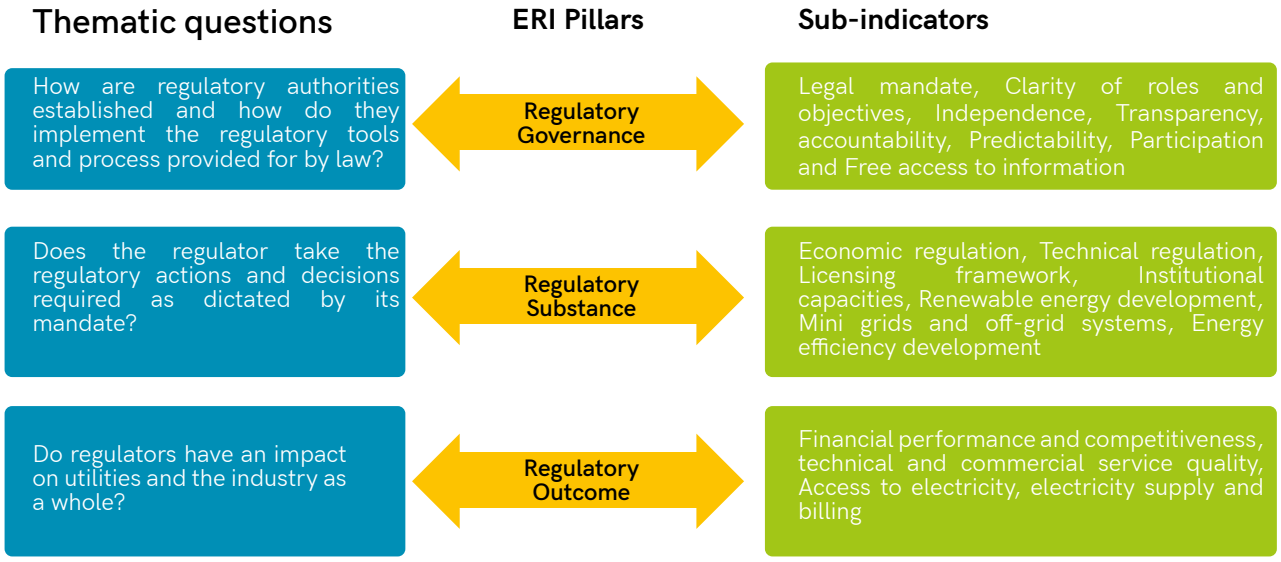


Figure 1: Main Indicators of the ERI 2021

1.2. Construction of the ERI

The ERI scores were calculated based on responses to comprehensive surveys distributed to electricity sector regulatory institutions, and utilities in 45 African countries with confirmed regulatory authorities. Out of the 45 countries surveyed, responses were received from 44 regulatory agencies, two from Ghana, bringing the number of countries from where valid responses were received to 43. Responses were also received from 45 regulated utilities from 40 countries. The data set from utilities from three[4] countries that participated in 2020, but which had not submitted responses by the close of the survey was used for ERI 2021. The resulting data and analysis are therefore based on a sample of 43 countries, for which the complete sets of data were available.

The indicators for Regulatory Governance and Regulatory Substance were used to construct the ERI for Governance and Substance (ERIGS) using primary data obtained from questionnaires sent to regulators. This preliminary calculation also provides important insights into national regulatory development, without considering the effects of regulatory action on the sector.

A regulatory outcome assessment was also carried out to ascertain the effect of each regulator's decisions and actions on the performance of the power utilities that it regulates and ultimately on the sector. The Regulatory Outcome Index (ROI) captures the results of this analysis. The ROI was based on primary information obtained from completed questionnaires submitted by power utilities. The results from ERIGS and ROI were combined, as indicated in Figure 4, below, to determine the ERI.

[4]Central African Republic, Gabon, Democratic Republic of Congo

The ERI for Governance and Substance (ERI_{gs}) was calculated by aggregating the results of RGI and RSI as follows:

$ERI_{GS} = (\alpha \times RGI) + (\beta \times RSI)$

Where:

ERI_{gs} = Electricity Regulatory Index (Governance and Substance)

α = Weight for RGI = 1/2

β = Weight for RSI = 1/2

RGI = Regulatory Governance Index

RSI = Regulatory Substance Index

The ERI was calculated by aggregating the results of ERI_{gs} and ROI using the geometric mean of the two values as follows:

$ERI = (ERI_{gs} \times ROI)^{1/2}$

Where:

ROI = Regulatory Outcome Index

Figure 2: Calculating the ERI

Based on the responses to the questionnaires, each indicator in the sub-indices is assigned a score between 0.000 and 1.000. A score of 1.000 indicates that the regulator and/or the national regulatory framework conform(s) to international best practice with regard to the relevant indicator. A score of 0.000 signifies a lack of alignment with international best practice. The RGI, RSI and ROI sub-indices are calculated based on a simple average of their underlying indicators. Given this, cumulative scores of the RGI, RSI and ROI, as well as the overall ERI score, which also range from 0.000 to 1.000, with the same implications given above. The figure below illustrates the classification of scores for ERI.

Color	Score range	Interpretation
	0.800 to 1.000	**High level of regulatory development** Most of the elements of a strong policy, regulatory, legal and institutional framework are in place.
	0.600 to 0.799	**Substantial level of regulatory development** Many elements of a supportive regulatory framework are established, atrhough with weaknesses that do not permit the regulator to have strong capacity, legal and instiy=tutional structures.
	0.500 to 0.599	**Medium level of regulatory development** Basic elements of a supportive regulatory framework are established with limited legal and institutional structures and capacity of the regulator.
	0.000 to 0.499	**Low level of regulatory development** Few or no elements of a supportive regulatory framework are in place. There are insufficient or nonexistent legal and institutional structures and capacity of the regulator

Figure 3: Classification of Scores

1.3. Changes in Methodology in 2021

The ERI methodology has evolved and strengthened over the years. Questions were elaborated and a few new additional questions were included in the ERI 2021 survey. Although the number of total indicators in the ERI remained 18 in ERI 2020 and ERI 2021 the following are the main changes between ERI 2020 and ERI 2021:

- Revision of the regulatory survey questionnaire to simplify questions to facilitate understanding of the respondents

- Expansion of the utility survey questionnaire to include similar questions from the regulatory authority questionnaire that enable comparison and confirmation of the level of development of the regulatory framework from the perspectives of both regulatory authorities and distribution utilities.

1.4. Limitations

The ERI for Africa is not an assessment of the level of development of the electricity sector of a country. As defined earlier, the ERI utilizes evidence of the existence of policy and regulatory frameworks to **measure the level of development of a country's regulatory environment**. Even though robust regulatory regimes catalyze sector development, these frameworks will not necessarily translate into sector developments without consistent enforcement and compliance by stakeholders among other various exogenous factors. While the existence of the requisite regulatory frameworks does not directly translate into strong sector development, similarly, a highly developed and vibrant electricity sector in a country does not necessarily indicate the existence of a robust regulatory regime. The performance of the sector depends on numerous factors ***in addition*** to the regulatory regime.

The purpose of the survey was to solicit information based on regulations, codes and protocols that have been approved by the relevant authorities and application of those regulations. Therefore, the responses to the same or similar questions were expected to be the same. However, changes in the composition of questions could lead to different interpretation by different respondents from year to year and, thus, introduce human errors, which in most cases would depend on the knowledge and experience of the respondent. The process of soliciting proof/evidence from individual respondents has led to achieving more clarity and consistency in the data provided.

The evolution of the ERI methodology, elaboration and streamlining of the questionnaire also results in the addition of a few new additional questions. Consequently, the weights of some scores within the sub-indices have changed to reflect their relevance in utility regulation and administration.

Expansion in the number of participating countries from year to year leads to swings and movements of countries as the number of countries change and countries with stronger or weaker regulatory frameworks are added to the sample. The ERI formula is based on a composite of the regulatory governance index, regulatory substance index and the regulatory outcome index (see the formula in Figure 2).

II. Evolution of Regulatory Performance in Africa 2018-2021

The African Development Bank is committed to continuously improving the relevance of the ERI indicators and aligning the methodology with emerging trends in the power sector. The ERI has evolved considerably from 2018 when only fifteen countries[5] participated, and it is growing. The number of countries participating in the index has grown to 43 in 2021.

The 2018 inaugural edition was successful in drawing attention to the significance of electricity sector regulation. It introduced the concept of an index that empirically measures the level of development of electricity sector regulation in Africa.

Performance Trends

Fourteen countries[6] have participated fully in all the ERI surveys since its inception in 2018. A review of the regulatory performance of countries across the four ERI editions (since inception in 2018) shows an evolving regulatory landscape in many countries. Africa is constantly evolving and the performance of countries on the index is subject to change, depending on the level of development of the regulatory framework in each country.

Although the manifestation of regulatory initiatives has long gestation periods, a review of the regulatory performance of countries across the four ERI editions since 2018 shows a gradually evolving regulatory landscape in many African countries. The observed varying trends are due to differences in the level of regulatory development in participating countries and how it manifests as new countries enter the survey.

An assessment of the trends of the performance across the ERI pillars indicates that while the average RGI and RSI scores have remained in the same performance bands over the four-year period (green and yellow bands respectively), the average ROI and ERI scores fell from the yellow performance band in 2018 to the orange band in 2019. And they fell further to the red band in 2020 and 2021. The changes in the scores reflect not only changes in the methodology over time, but also the impact of the implementation of various recommendations from the ERI since 2018. Table 1 shows the average scores for all the ERI pillars from 2018 to 2021.

Year	Mean RGI	Mean RSI	Mean RGSI	Mean ROIu	Mean ERI
2018	0,707	0,545	0,626	0,666	0,641
2019	0,808	0,511	0,56	0,505	0,572
2020	0,688	0,545	0,617	0,391	0,486
2021	0,736	0,575	0,656	0,339	0,454

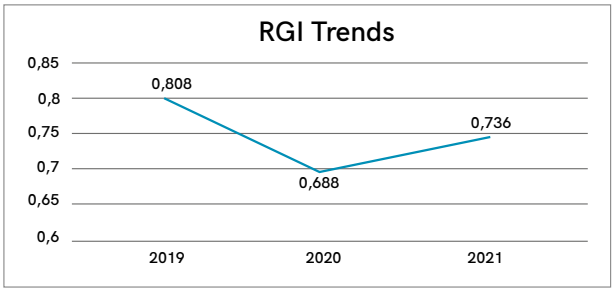
Table 1: Average Scores across ERI pillars from 2018 to 2021

The number of sub-indicators of the main ERI pillars used to assess the performance of regulatory authorities increased from 12 in 2018 to 15 in 2019. The numbers have remained the same since then. To ensure unbiased comparison, the trend analysis across ERI indicators is made from 2019 to 2021, a period over which the sub-indicators have remained the same.

[5]Cameroon, Gambia, Ghana, Ivory Coast, Kenya, Lesotho, Malawi, Namibia, Nigeria, Senegal, South Africa, Tanzania, Togo, Uganda, and Zimbabwe
[6]Cameroon, Gambia, Ghana, Ivory Coast, Kenya, Lesotho, Malawi, Namibia, Nigeria, Senegal, Tanzania, Togo, Uganda, and Zimbabwe

2.1 Trends in Regulatory Governance Index (RGI)

The RGI assesses structure of the primary legislations establishing the regulatory authorities. It takes a relatively long time to change. This is because a change in legislation does not rest entirely with the regulator but involves the legislature and executive arms of government.



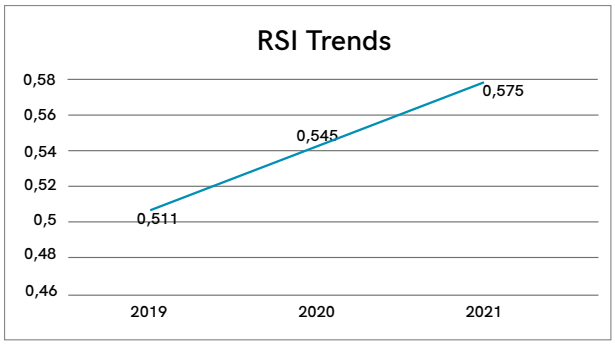
While the average scores and performance of countries across RGI indicators have been relatively high compared to RSI and ROI, the average scores for RGI have been declining since 2019, in relation to the other indicators . As policy and legal structures within the sector do not change frequently, the observed trends in RGI are largely attributable to new countries entering the ERI survey.

Since the inception of the ERI, Kenya is the only participating country that has reported a revision (in 2019) of the primary legislation that established the regulator. This revision resulted in a marginal increase in the already high RGI score of Kenya.

The primary legislations establishing the regulators in Cape Verde, Guinea and Morocco were presumably developed around legislations in other countries. They became operational in 2019, 2020 and 2021 respectively. Cape Verde and Morocco did not participate in ERI 2020 and their participation in 2021 contributed to a rise in the average RGI score in 2021.

2.2 Trends in Regulatory Substance Index (RSI)

Performance across RSI indicators is within the control of the regulators and can be improved with little or no involvement of the executive arm of government or the legislature.

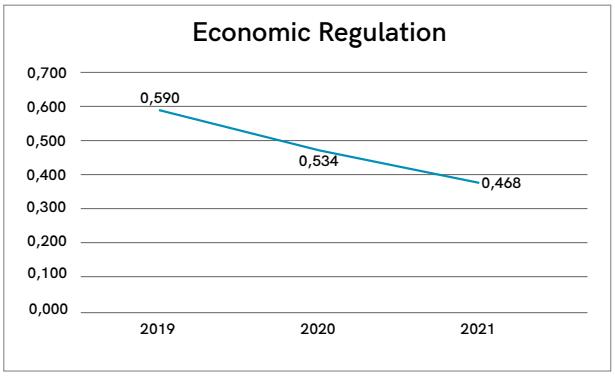


Although continental average performance in RSI has always been lower than RGI, the average performance has been on the ascendancy between 2019 and 2021. It signifies how regulatory authorities are making consistent efforts at developing new regulatory instruments and updating existing ones to address identified gaps in key areas of the power sector.
Improvements in RSI is a measure of efforts and actions of the regulator and ERI has been a trigger.

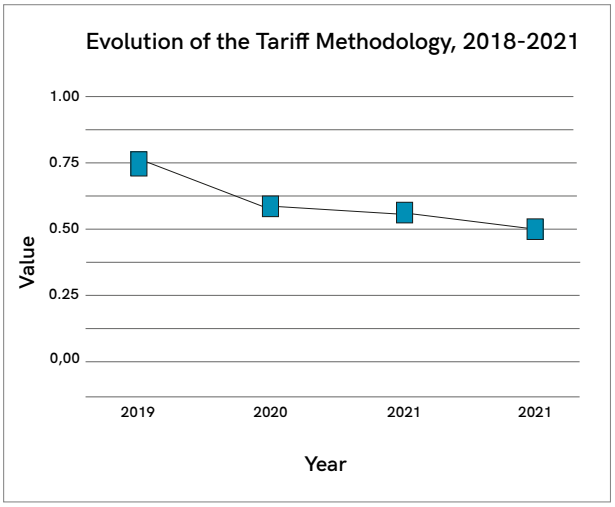
The sustenance of country performance in any RSI indicator in a particular year can decline in the subsequent year without any change in the survey questionnaire or methodology. This is because some regulatory instruments (like tariff methodologies and cost of service study reports) can become outdated with time and may need to be updated to be relevant. Other RSI sub-indicators like institutional capacity can also decline with attrition of key expertise in the organization. Therefore, the fact that positive trends in RSI has been sustained over a three-year window shows the consistency with which countries are addressing gaps in their regulatory frameworks, the ERI has highlighted. And they can change with time.

Performance trends in key RSI sub indicators

Economic regulation, technical regulation and licensing frameworks are key cross-cutting RSI indicators that transcend technologies and the electricity supply chain. While performance in economic regulation is on a downward trend, technical regulation and licensing frameworks are on an upward trajectory.



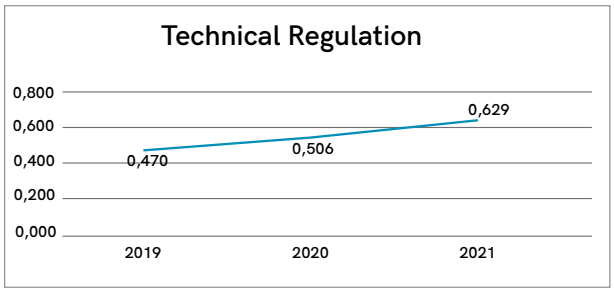
Key to the downward trajectory of economic regulation is tariff methodology. Although many countries have developed tariff methodologies, many of these tariff methodologies do not have all the requisite attributes of best practices like tariff indexation and automatic adjustments, schedules for major tariff reviews, and documented formulas for calculating end-user tariffs.



There has been progress in developing or updating tariff methodologies since the inception of the ERI and these gaps were highlighted.

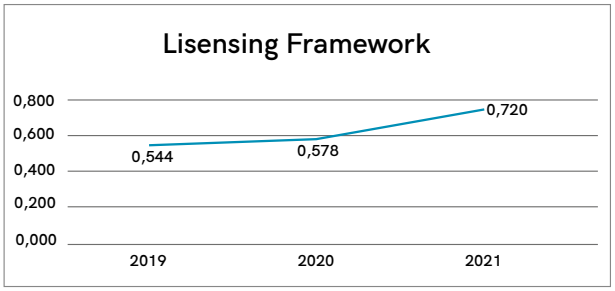
- Ghana developed a detailed tariff methodology in 2019 as part of the concession arrangements to introduce private sector participation in electricity distribution.
- Sierra Leone developed tariff methodology in December 2019
- Gambia developed tariff methodology in August 2019
- Ethiopia updated its tariff methodology in May 2020.

In ERI 2021, while 14 (32%) countries have tariff methodology with all the requisite attributes, 17 (40%) have tariff methodology which are short of these requisite attributes of best practices and 12 (28%) do not have any documented tariff methodology.



Countries are beginning to develop transmission and distribution grid codes, quality-of-service regulations/codes and are carrying out assessment of the quality-of-service performance indicators of the utilities.

Ethiopia developed a quality-of-service regulations/code in September 2019. Between 2020 and 2021, Algeria, Guinea, Seychelles reported developing grid codes, and Cabo Verde, Côte d'Ivoire, Malawi, Mali, Mozambique, and Niger reported developing quality of service codes

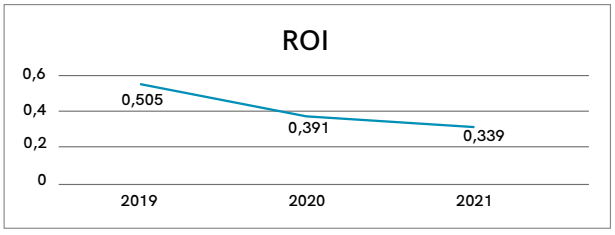


More countries are developing and publishing transparent procedures to guide investors in the acquisition of requisite licenses to enter the power sector. What lags is the development of separate light-handed licensing frameworks for off-grid and small sized systems to facilitate their deployment, although such systems could support rural electrification.

Between 2019 and 2021, eleven countries (Togo, Niger, Mozambique, Madagascar, Liberia, Botswana, Morocco, Guinea, Gambia, Burkina Faso, Angola) have developed licensing frameworks.

2.3 Trends in Regulatory Outcome Index (ROI)

While acknowledging that, sector performance has many externalities which are not within the control of the regulator, the regulatory agencies have key roles to play. The ROI survey questionnaire was structured to limit the assessment to sector and utility performances, which are directly linked to regulatory action and decisions. ROI has been on downward trend.



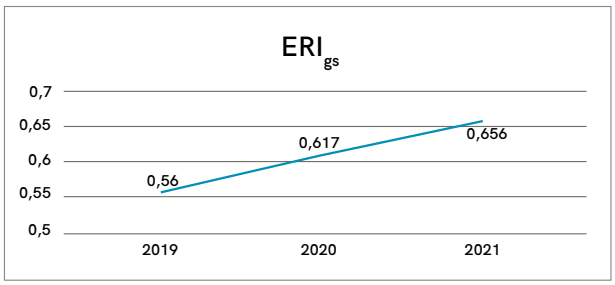
Poor financial health of utilities and sector indebtedness is a key driver of the downward trends of regulatory outcomes. Tariffs are not cost reflective, and most regulators are unable to fully apply provisions of their tariff methodologies where they exist and thereby denying the utilities the needed revenue to operate.

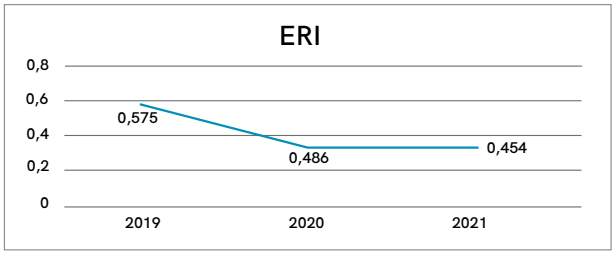
Weak networks because of lack of adequate investments have prevented regulators from applying the requisite quality of service standards knowing the weak networks cannot meet the standards.

2.4 Trends in Electricity Regulatory Index (ERI)

The ERI is a construction of RGI, RSI and ROI. To assess the intrinsic regulatory performance without recourse to outcomes on the sector, ERIgs is constructed, which is ERI without ROI. Although regulatory actions are expected to translate into measurable sector outcomes (ROI), those outcomes are sometimes impacted by externalities other than regulatory actions, hence the need for an intrinsic measure.

The performance trends in ERIgs and ERI are in contrast, indicating a clear disconnect between regulatory performance and sector outcomes, as ERIgs measures solely the regulatory environment and regulatory actions while ERI includes the measure of the impact of regulation on the sector as a whole.





The trends in ERIgs correlates with the trend in RSI. It is therefore a measure of the intrinsic efforts and actions by the regulator to develop the requisite regulatory tools, instruments, and frameworks.

The upward trend is an indication of consistent improvements in addressing identified regulatory gaps in accordance with ERI recommendations over the years.

ERI trends correlate with trends in ROI, which has been on a downtrend due to well established challenges in utility performance and financial sustainability. The ERI is therefore a complete measure of regulatory developments and sector outcomes.

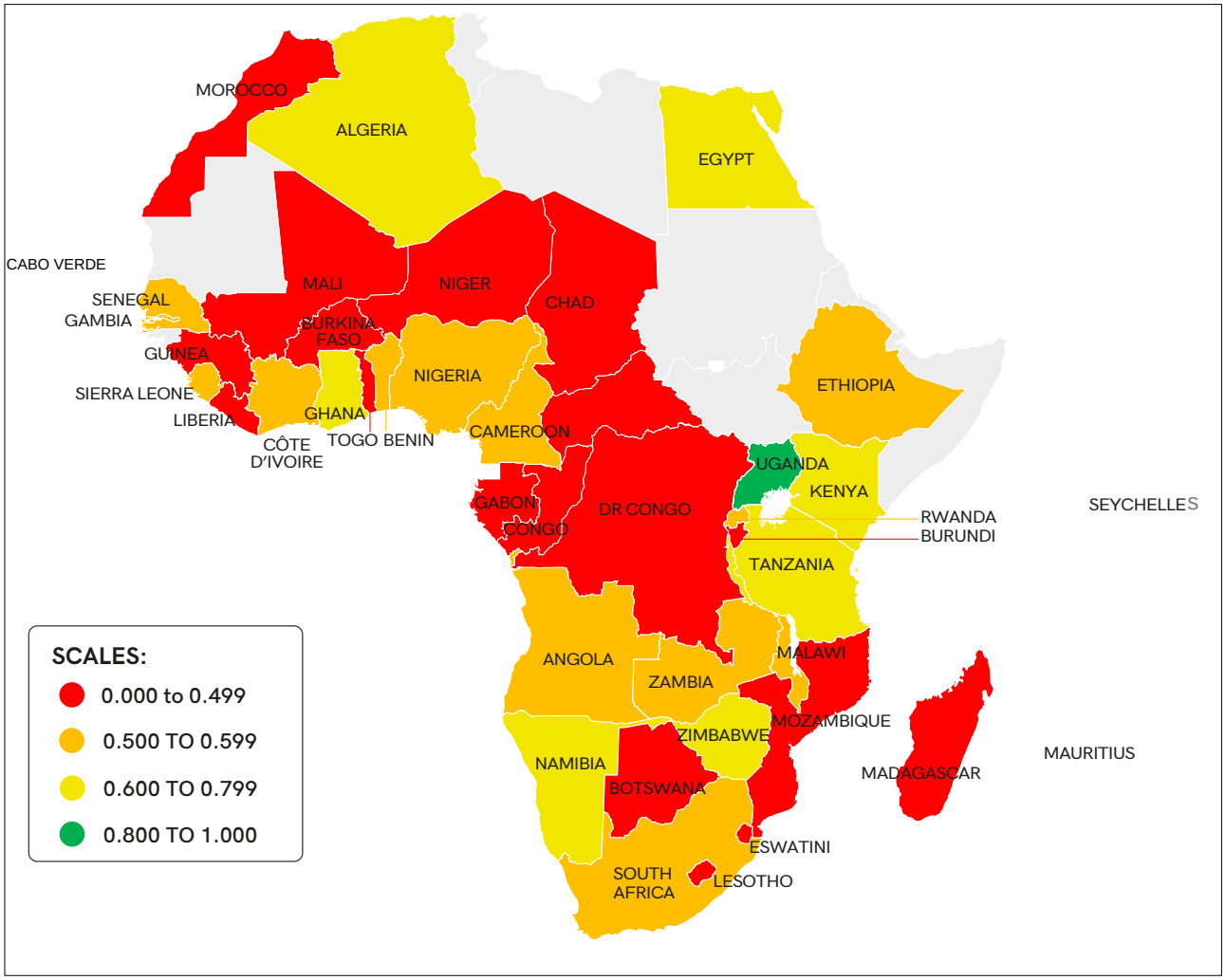
While regulators have more to do to translate their regulatory actions into sector outcomes, the externalities, and particularly the role of governments and utilities, must be kept in mind.

Overall, the main areas of action required by countries to address the identified weaknesses include the following:

- Development of requisite regulatory instruments where they do not exist.
- Review or update of existing frameworks and laws where necessary to make them relevant.
- Advocacy, implementation, monitoring, and evaluation of sector outcomes.

ERI implementation should be designed to focus on translating regulatory performance into measurable sector outcomes. It should involve regulators, utilities and government.

III. ERI 2021 Results



3.1. Overall Electricity Regulatory Index 2021 Results

The ERI 2021 shows that the average level of regulatory development of electricity regulatory frameworks of African countries included in the sample remains low (average ERI of 0.454 compared to 0.485 in 2020). They show that although some elements of a supportive regulatory framework have been established and remain strong, major weaknesses remain in regulators' capacity to implement their own regulatory frameworks or enforce their own regulations. While the level of development of the Regulatory Governance Index(RGI) an-d Regulatory Substance Index (RSI) frameworks are strong. Averages are 0.735 and 0.575 respectively. The outcome (ROI) in terms of utility performance is still extremely low, with an average of 0.339. The figure below shows the performance of the participating countries and their ranking.

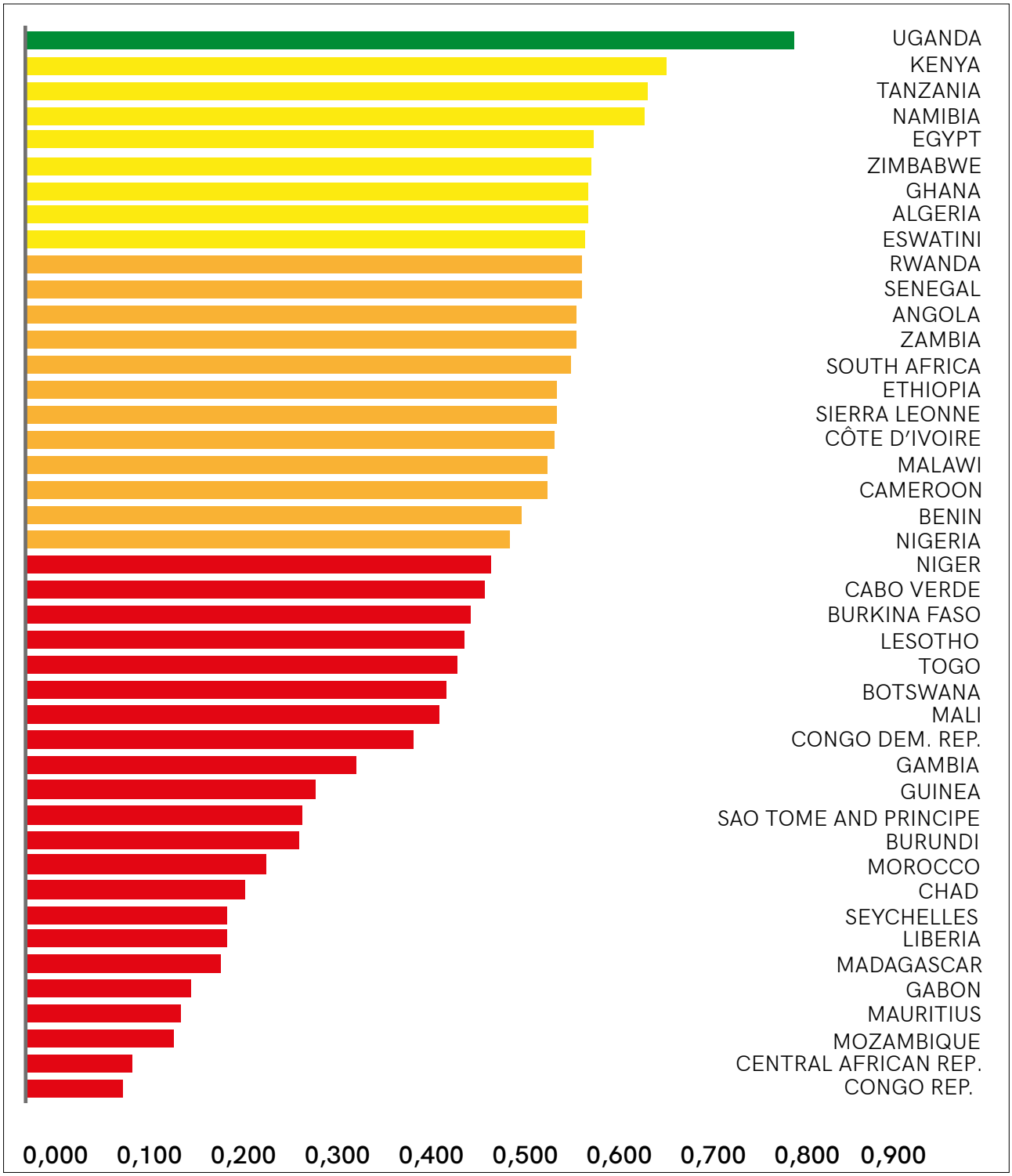


Figure 4: ERI 2021 Scores and Ranking

3.2. The Regulatory Governance Index

The Regulatory Governance Index (RGI) measures the institutional and legal framework within which regulators operate. It comprises eight indicators: *legal mandate, clarity of roles and objectives, independence, accountability, transparency, participation, predictability and open access to information*. These indicators are further divided into two groups: external regulatory governance indicators and internal regulatory governance indicators.

The RGI was the only one of the three pillars where the average score fell within the yellow band, demonstrating that the countries have put in place the necessary legal frameworks in the primary regulatory legislation to create independent regulators as part of sector-wide reforms.

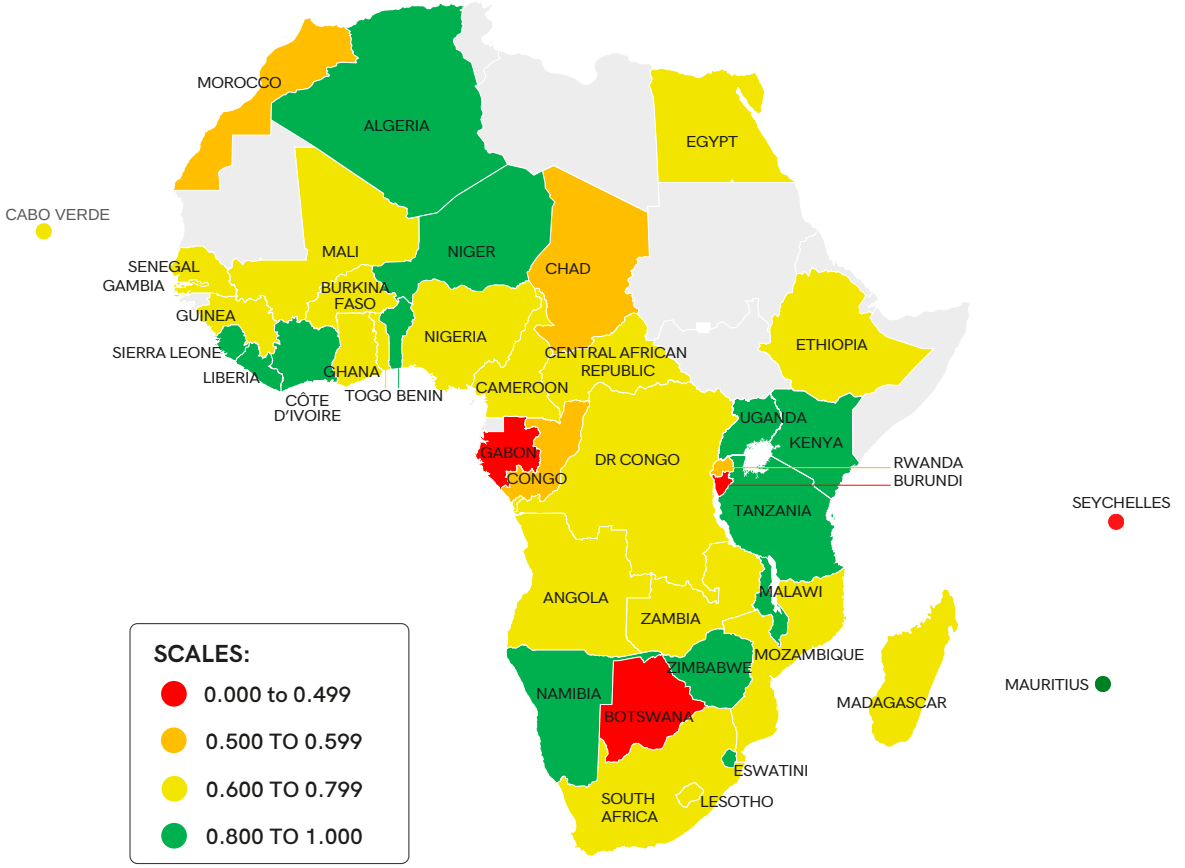


Figure 5: 2021 Regulatory Governance Index (RGI) Map

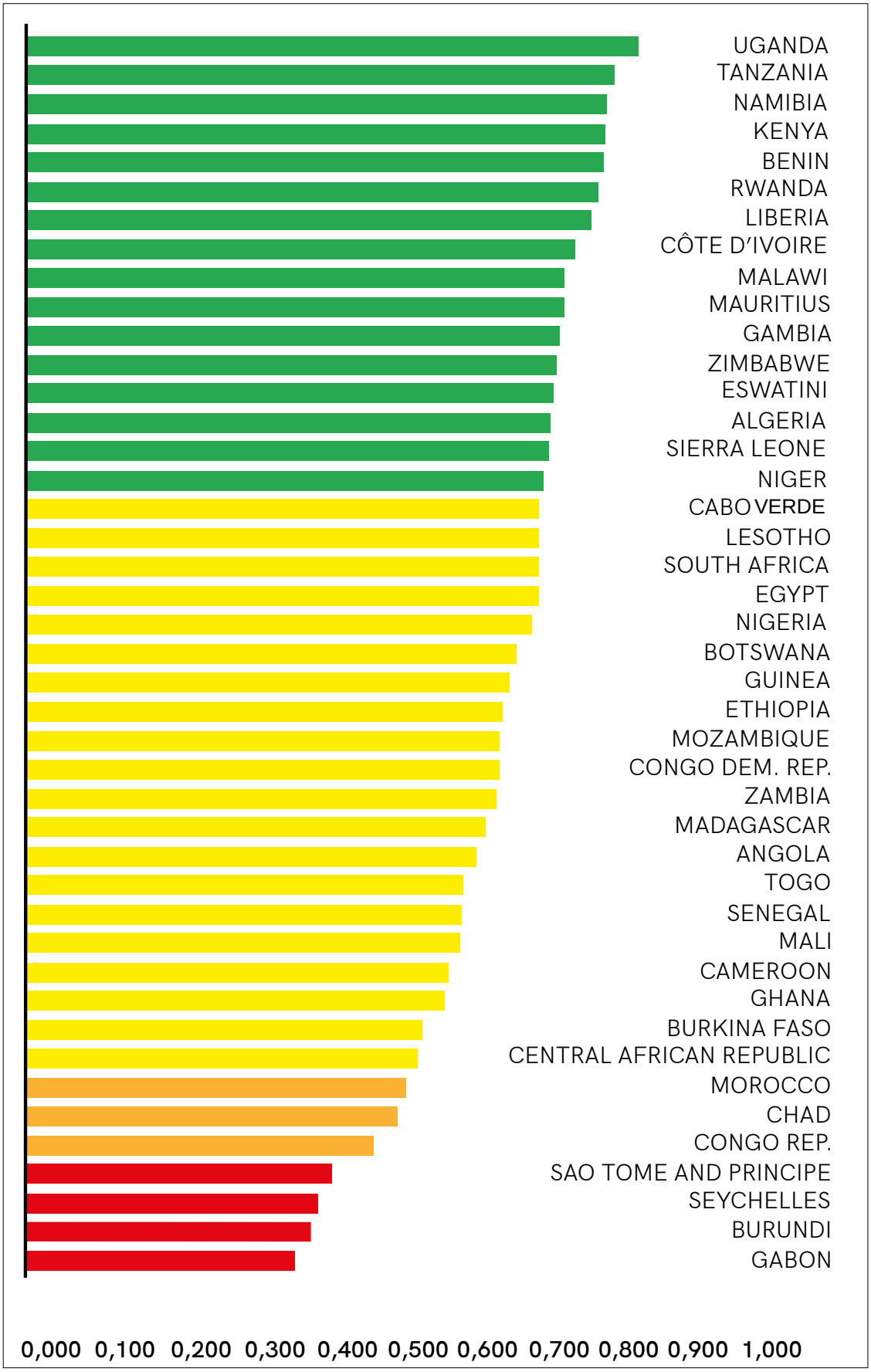


Figure 6: RGI Country Scores and Ranking

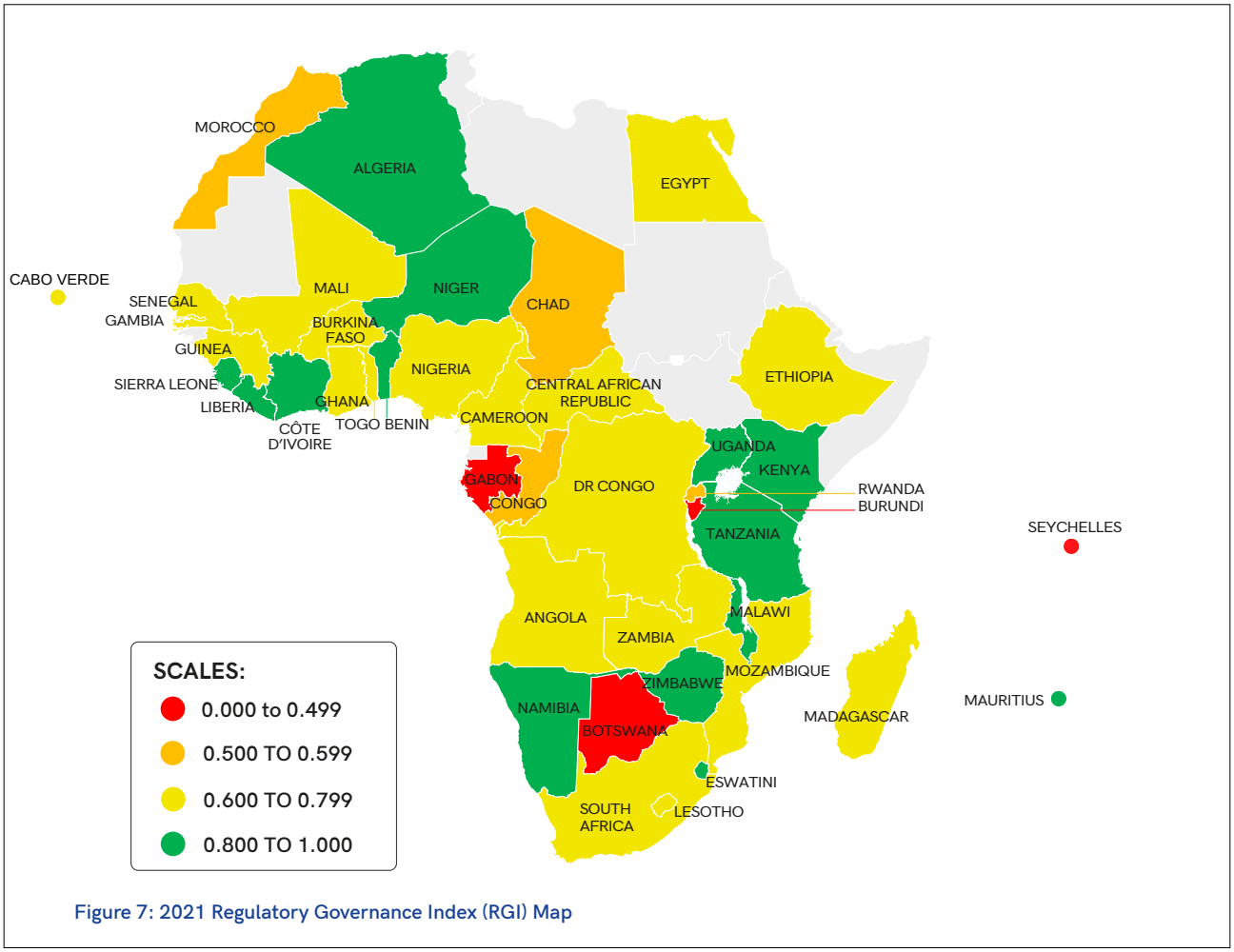


Figure 7: 2021 Regulatory Governance Index (RGI) Map

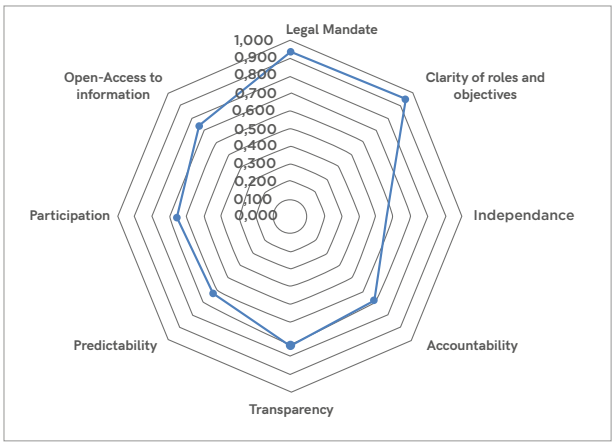


Figure 8: Components of the RGI 2021

Independence and Accountability are two sub-indices of RGI that need to be improved to enhance regulatory performance.

3.2.1 External Regulatory Governance

The Regulatory Governance Index (RGI) measures the institutional and legal framework within which regulators operate. It comprises eight indicators: legal mandate, clarity of roles and objectives, independence, accountability, transparency, participation, predictability and open access to information. These indicators are further divided into two groups: external regulatory governance indicators and internal regulatory governance indicators.

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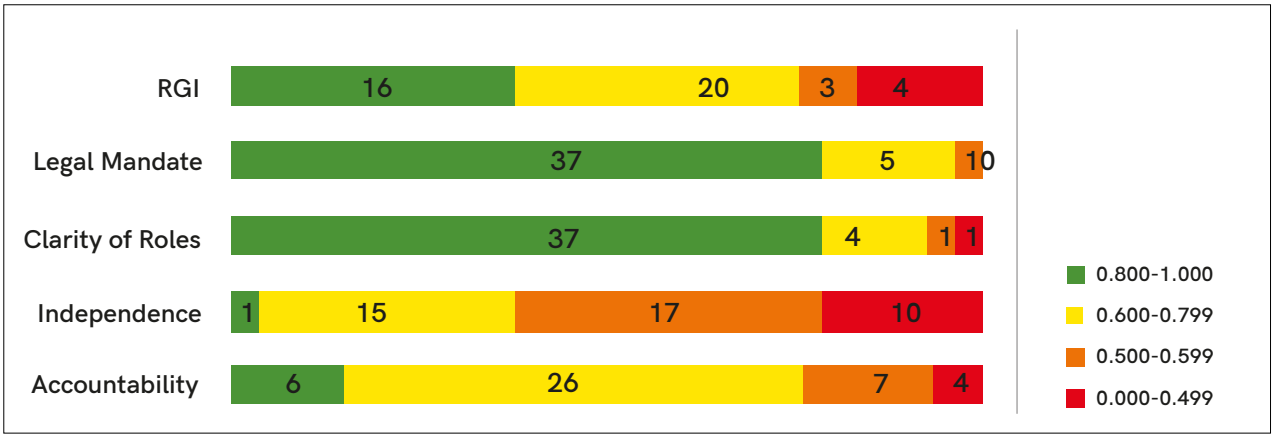

Figure 9: Country Performance Across External RGI Indicators and Number of Countries

3.2.2 Breakdown of External RGI Results

Legal Mandate

Legal Mandate is the most important indicator that establishes the reason or justification for the existence of the regulator. It measures the legal or regulatory force behind the institution. Specifically, it assesses how the institution was established – by the legislature through parliament or other legislative body or by another governmental act (order, decree). Regulatory authorities were established by an act of parliament in 37 out of 43 countries meeting best practice criteria.

Establishing a regulator by an act of the legislature alongside robust energy sector laws provides strong safeguards, ensures higher credibility and boosts investor confidence. It isolates the regulator from whimsical and capricious political decisions and mitigates the potential for new political leadership in a country to enact arbitrary changes in the regulatory framework. The regulatory authorities were established by decree in Angola, Burundi, Democratic Republic of Congo and Egypt and by ordinance in Central African Republic and Mali. According to the responses, there are no electricity sector laws in Ghana and Lesotho. The regulatory institutions in these countries were established by specific acts, which give them the mandate, among other functions, to regulate the energy/electricity sector.

Clarity of Roles and Objectives

With an average score of 0.949 *Clarity of roles and objectives* is the highest scoring indicator in the RGI. This indicator explores where the main regulatory functions of the regulators are defined, and where four key decision-making functions relating to licensing, determination of tariffs, control of the regulated functions and conflict resolution are defined. The results show that all but one of the countries have their roles and powers defined in primary legislation, and meet international best practice criteria. In addition, most countries have the decisions that the regulators can take defined in the primary law. Clearly defined roles and functions of the regulator remove possible sources of confusion and overlap between the regulator, the sector ministry and any other agency. There is always the need to spell out the functions and objectives of the regulator and utilities clearly to stakeholders. The obligations of regulated utilities are formally spelt out in regulatory documents except in Seychelles and Gabon.

In Ghana, the regulation of the electricity sector is performed by two regulatory institutions which split the licensing and tariff functions, contrary to best practice where one institution controls both.

In Cape Verde, as the respondent indicated, the functions of the regulator are not spelt out in the primary legislation, but in another legislation. Regulators in all countries in the sample provide inputs into policy except in Burkina Faso, Gabon, Liberia, Sao Tome & Principe and Togo. The regulator, being the link between consumers, investors and utilities, is always in a better position to offer advice on policy formulation.

Independence

Regulatory independence is assessed through four sub-indicators: (1) independence from government and the legislature; (2) independence from stakeholders and market players; (3) decision-making independence; and (4) financial and budgetary independence.

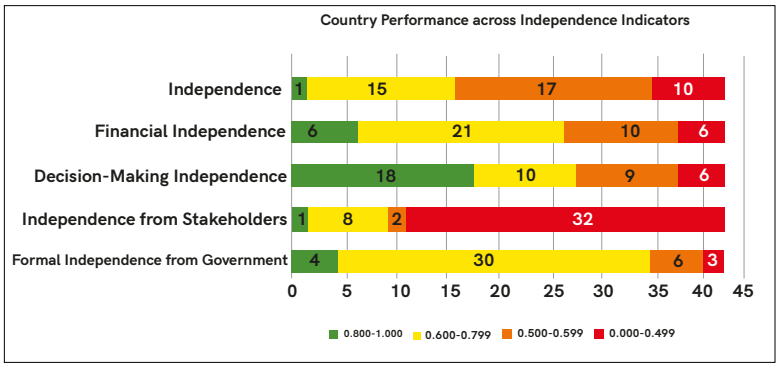

Figure 10: Country Performance across Independence Dimensions and Number of Countries

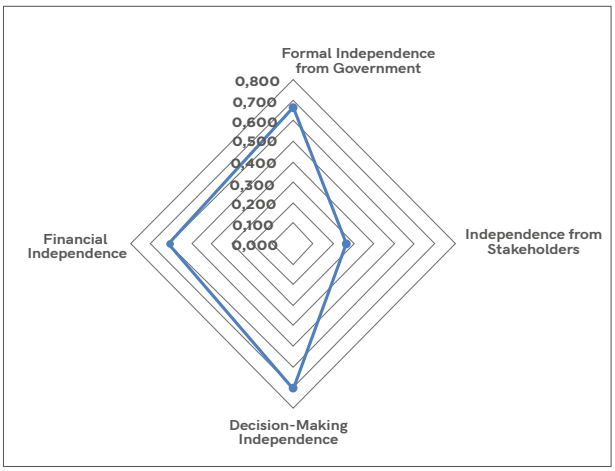

Figure 11: Illustration of the Performance in the various components of Independence

Lack of full independence, especially from stakeholders and governments, was identified as a continuing challenge for regulators. As figure 22 shows, Independence from Stakeholders, with an average of 0.262, is the weakest sub-index of the Independence indicator. This makes the leadership of regulatory institutions and the institutions themselves more susceptible to infiltration and influence from stakeholders, especially utilities. They are also susceptible to short-term political pressures, which detracts from their ability to ensure the long-term sustainability of the relevant country's electricity sector. This could lead to regulatory capture and loss of credibility for the regulator.

Independence from Government and Legislature

Laws in 18 countries require institutional representation on regulatory boards. The executive appoints boards and commissioners in 40 countries (93% of the sample) and chairpersons of boards in all countries except, Gabon, Mali and Togo where chairpersons are appointed by board members. This is best practice in corporate governance. A mixture of the executive and legislature appoints boards in Cape Verde, Morocco and Nigeria.

The duration of tenure of first boards is two to four years in 24 countries, between two to seven years in 17 countries, which meets best practice, and more than seven years in 2 countries (Algeria and Chad). The term of office of boards is renewable once in 34 countries but not renewable in five countries (Algeria, Burkina Faso, Chad, Congo Republic, Côte d'Ivoire, but is renewable many times in four countries (Angola, Namibia, Seychelles, South Africa).

Board members appoint the CEO in 12 countries, reflecting best practice. These countries are Benin, Cape Verde, Kenya, Liberia, Malawi, Mali, Mauritius, Namibia, Sierra Leone, Uganda, Zambia and Zimbabwe. In Nigeria the legislature appoints the CEO.

In 27 countries, the regulatory law or other national laws prohibit commissioners from holding other offices in government within the energy sector during their tenure. In 16 countries the prohibition is in the regulatory law, while in 11 countries the provision is in other national laws. In 21 countries the CEO is prohibited from holding other offices in government within the energy sector by regulatory law or other laws during his tenure in office. Staggering the terms of the commissioners to allow for institutional memory and transfer of regulatory knowledge to new commissioners is recognized as best practice. In 21 of the 43 countries surveyed, the terms of office of commissioners are staggered.

Independence from Stakeholders

Beyond the state's control over the governing bodies of the regulatory authority, in more than 90% of countries, there are no provisions in the legislation that prohibit the appointment of a manager of the regulatory body if the manager has previously held positions within a regulated entity. This leaves room for professional nomadism and conflicts of interest. Only seven countries have provisions in the regulatory law that prohibit the appointment of board members if any of them has previously held a position in a regulated utility. In some of the countries surveyed, there are legislative and regulatory frameworks to fight against conflicts of interest in state structures but changes in positions from the regulatory authority to electricity companies, or vice versa, are not regulated. These different uncontrolled movements of the different officials sometimes create underlying conflicts of interest and highlight an ethical problem that must be curtailed.

Decision- making Independence

Best practice requires that the regulator makes final independent decisions on licensing, tariffs and dispute resolution between regulated entities and general regulatory matters to ensure objectivity of activities in the sector. However, the survey found that 33% of regulators are obliged to seek approval of their draft decisions before their publication. The executive in six countries can overturn regulatory decisions of the regulator. The level of decision-making dependence is more pronounced in the approval of tariffs or the issuance of licenses where some regulatory authorities must request approval from the executive before the publication of tariff decisions and the issuance of licenses.

Financial Independence

A regulator requires a sustainable and independent source of funding to run the institution and implement its activities and initiatives. Funding from government compromises the independence of the regulator, while dependence on penalty fees is unsustainable and could compromise the objectivity of the regulator. Regulators in 31 countries indicated that fees levied on regulated utilities are part of their sources of funding.

The results of the ERI 2021 survey show that the executive exerts influence on the finances of the regulatory authority. Very often, the law that creates or establishes the regulator does not clearly indicate its sources of revenue. Sometimes the law subjects the regulator to subsidies from the state budget to carry out its duties, and for some regulators, the government must first agree to the daily expenses of the regulatory authority after the board of the authority has approved the budget. In some cases, even the salary levels of regulatory staff are set by the government. From a financial standpoint, this limits the action of the regulator and its independence.

Total independence of the regulator reassures the operators and investors, in the electricity sector of the regulator's objectivity. It also ensures an "arm's length" relationship with utilities, reducing the stakeholders' ability to influence the decisions of the regulator. The performance of the participating countries across the eight indicators of RGI showed that the only two indicators whose average scores fell within the green band were the legal mandate of the regulator and clarity of roles and objectives of the regulator.

Accountability

Regulators are duty-bound to report regularly on their activities to stakeholders. Mechanisms should be in place to help ensure that regulators behave in accordance with the legal mandate to which they were established. These mechanisms should also be able to hold regulators accountable if they deviate from their mandate. Investors are often more confident if there is an independent appeal mechanism for resolving disputes between the regulator and operators.

The assessment shows that regulators in all the 43 countries prepare and present annual reports to stakeholders through various agencies. In three countries, the regulator reports directly to parliament (best practice): Ghana – the Public Utilities Regulatory Commission (PURC), Liberia, Morocco. In 32 countries, the regulator reports to the executive (the minister) while in six other countries, Ethiopia, Ghana Energy Commission, Lesotho, Sierra Leone, South Africa, and Uganda, the regulator reports to Parliament through the sector minister.

In 26 countries annual reports are submitted to the executive, while in seven countries (Burundi, Gabon, Madagascar, Mozambique, Rwanda, Senegal, Seychelles), annual reports are submitted to parliament for scrutiny and adoption. Annual reports in seven countries are produced for information purposes only.

Another dimension of accountability is the possibility of contesting or challenging decisions of the regulator. Regulatory decisions can be challenged in all countries except Burundi. There are appellates in 13 countries that handle utility-regulator disputes. These countries are Eswatini, Kenya, Lesotho, Seychelles, Sierra Leone, Uganda, Zambia, Nigeria, Mozambique, Gabon, Central African Republic, Burundi, and Algeria.

3.2.3 Internal Regulatory Governance

Transparency, participation, predictability and open access to information are the indicators that show the degree of control maintained by the regulator, and shows that it is capable of promoting good regulatory governance. The indicators that constitute internal RGI are well developed in more than half of the regulatory institutions surveyed, with a significant number falling in the green and yellow bands. Open access to information, and predictability appear to be enhanced with the adoption and use of ICT for information dissemination and communication between the regulator and the public. Through information and communication technology, (ICT), reports are also released to the public through the regulators' websites.

The regulatory frameworks of many of the countries with regard to the internal RG indicators are well developed but Predictability and Participation need to be further enhanced.

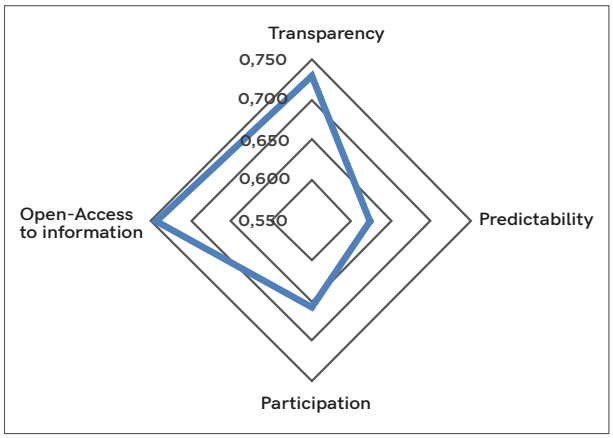

Figure 12: Components of Internal RGI 2021

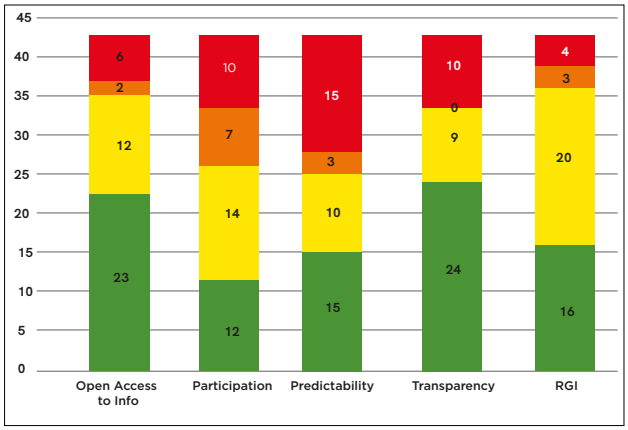

Figure 13: Country Performance across Internal RGI Indicators and Number of Countries

3.2.4 Breakdown of Internal RGI Results

Transparency

The *transparency* indicator assesses whether the decision-making process of the regulator is shared with, or accessible by its stakeholders. Overall, most of the regulators in the survey sample are transparent in their decision-making process. However, there is room for improvement.

Information on regulatory procedures is available online in 37 countries. In seven countries, Burundi, Cameroon, Central African Republic, Chad, Congo Republic, Sao Tome & Principe and Seychelles, an application must be filed to obtain information.

In 32 countries, regulatory decisions taken by the regulator are available to the public, while in two countries, Central African Republic and Chad, although regulatory decisions are generally available to the public, one must file a request to access them. All regulatory decisions cannot be accessed from regulators in 12 countries. These are Botswana, Burundi, Cameroon, Congo Republic, Gabon, Ghana (Energy Commission), Madagascar, Morocco, Sao Tome & Principe, Senegal, Seychelles, Zambia).

Where they are available, regulatory decisions are always supported by explanations in all but four countries, namely Gabon, Morocco, Ghana (Public Utilities Regulatory Commission), and Mozambique. Explanations to regulatory decisions are published in all but 12 countries.

Publication of Regulatory documents and decisions is mandatory in 63% of the countries. To enhance transparency, it should be mandatory for all regulators to publish and make accessible to stakeholders all regulatory decisions including the rationale behind those decisions. This will help the regulator gain the necessary stakeholder confidence, legitimacy and acceptance.

Participation

The *participation* indicator assesses how the regulator involves its stakeholders in their decision-making process.

Stakeholder consultation is required by law in 27 countries although 29 countries practice it. Stakeholder consultation is not required by law in Sao Tome & Principe and Senegal. It is not practiced in 14 countries. In 15 countries, comments received during stakeholder consultations are published. Regulators consider inputs made at stakeholder consultations before taking regulatory decisions in all countries except Gabon. Public consultation is achieved through ad-hoc meetings, submission of written comments and public hearings.

Predictability

The *predictability* indicator assesses whether the regulator has a clear and predictable transparent process to take regulatory decisions regarding reviews to electricity tariffs and issuance of licenses, among other things.

Thirteen countries do not have tariff methodologies for the determination of tariffs. These countries are Burkina Faso, Burundi, Central African Republic, Chad, Congo Rep, Gabon, Guinea, Mali, Morocco, Sao Tome & Principe, Senegal, Seychelles, and Togo. This can hamper investor confidence in these countries' electricity sectors. A predictable regulatory environment with clear mechanisms and

processes helps ensure gradual and predictable changes in regulatory methods and practices. This will assure investors and encourage them to commit to longer-term investments.

Regulators can change tariff methodologies in consultation with stakeholders in all but countries, namely Burkina Faso, Burundi, Democratic Republic of Congo, Republic of Congo, Egypt, Guinea, Mali, Mauritius, Mozambique, Niger, Sao Tome & Principe, Senegal, Seychelles and Togo. The tariff methodology sets out procedures for major tariff reviews in all except countries. These 13 countries are Botswana, Burkina Faso, Central African Republic, Chad, Republic of Congo, Ethiopia, Gabon, Mali, Morocco, Sao Tome & Principe, Senegal, Seychelles and Togo. Timetables for tariff reviews are in tariff methodologies in all except 21 countries. Thirty-four countries have procedures for applying and securing licenses. Of these, 30 countries have timelines for processing and issuing licenses.

Open Access to Information

Regulators in all 43 countries surveyed, except Chad, and Central African Republic and the Republic of Congo have public websites where key regulatory documents such as those dealing with primary legislation, licenses, consultations, tariff guidelines and methodology are published. All regulators who have websites also have information technology (IT) officers to man the websites. Exceptions are Burkina Faso, Eswatini, Lesotho, Mali, Seychelles, South Africa and Morocco.

The results show that at least 35% of the countries surveyed update the information on their websites regularly (at least once in a month). Open access to information reassures consumers and investors that the regulator follows clear guidelines in its decision-making processes. It also adds to predictability and contributes to the creation of a healthy regulatory regime.

3.3. The Regulatory Substance Index

The Regulatory Substance Index (RSI) measures the level of implementation of regulations. It is composed of the following seven indicators: (1) economic regulation; (2) technical regulation; (3) licensing frameworks; (4) institutional capacity; (5) renewable energy development; (6) mini-grid and off-grid systems; and (7) energy efficiency development. The average RSI score for all the sample countries was 0.575, which corresponds to a medium level of regulatory development.

Seven countries made it into the green band, while 14 were in the yellow and nine in the orange band. Regulatory substance is at a low level of development in thirteen countries. Uganda ranked first in RSI, scoring 0.939 while Sao Tome & Principe, a new entrant into ERI trailed with a score of 0.097. The average RSI score is lower than the RGI average of 0.735, which shows that the regulators still have a lot to do to improve in the performance of their mandate.

The results show that regulators are constrained by many challenges affecting the development and implementation of regulatory instruments and mechanisms. These are factors that can potentially undermine the quality, credibility, and impact of their regulatory decisions. Regulatory substance is also affected by the lack of skills and experience of the staff running and managing electricity sector regulatory institutions.

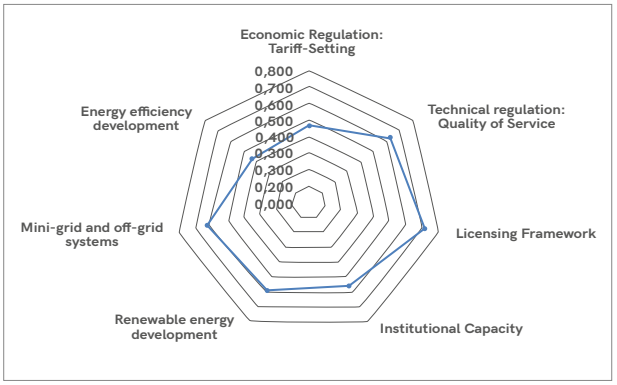

Figure 14: Components of RSI 2021

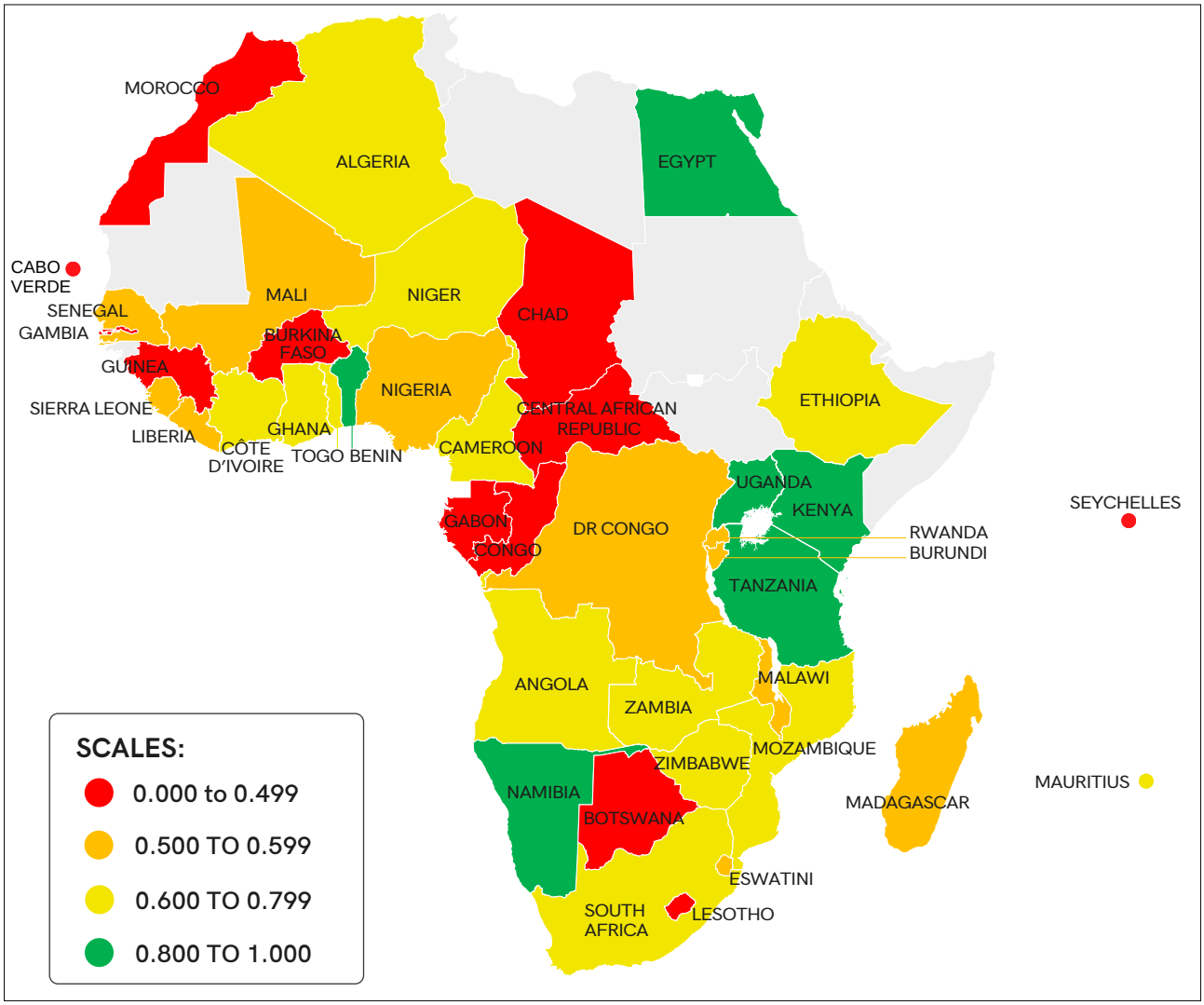

Figure 15: 2021 Regulatory Substance Index Map

The distribution of country performance across the ERI pillars reveals that the primary regulatory framework (RGI) of most of the participating countries falls between the high and substantial levels of regulatory development.

The RSI sub-components are those that are within the power of the regulator to influence. The regulator must therefore ensure that regulations are adhered to, applying sanctions when regulations are flouted. The performance in RSI, reflects how well the regulator has built on the power granted to it by the primary legislation. Except in countries where the regulator has taken proactive steps to build on the powers conferred on it by the primary legislation, the RSI is weaker than the RGI and negatively impacts the country's performance in the ERI.

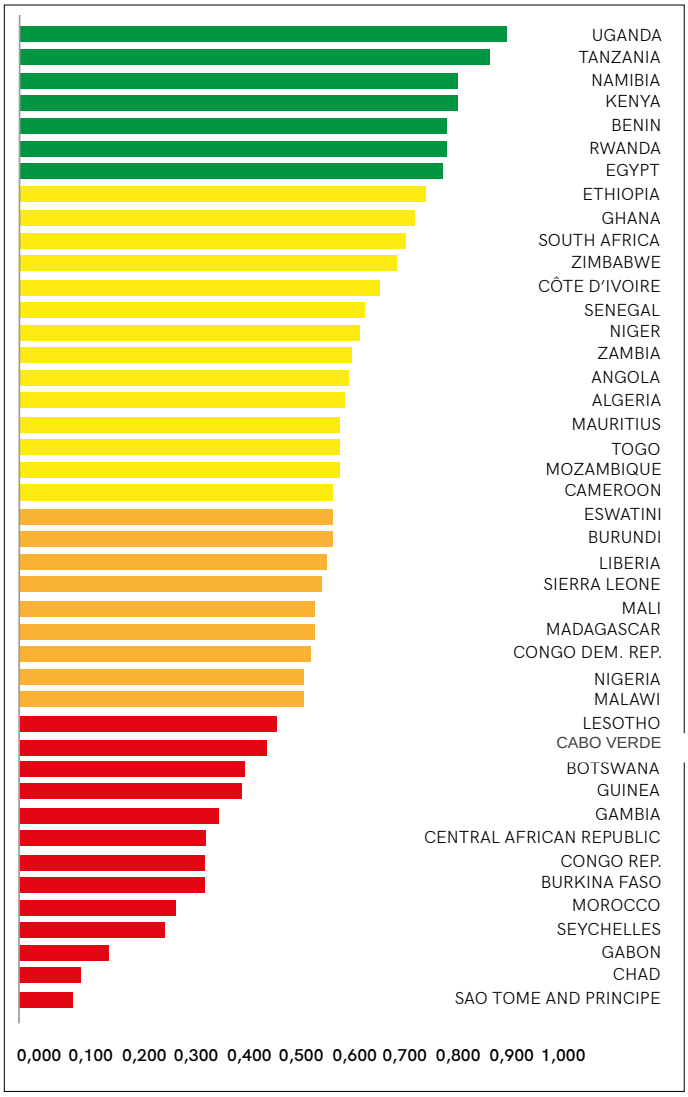

Figure 16: Country Ranking and Scores according to the Regulatory Substance Index

3.3.1 Breakdown of RSI Results

Figure 16 demonstrates the performance of countries by the RSI indicator. The number of countries scoring below 0.500 indicates that there is significant scope and need for improvement on the sub-indicators of the RSI.

Economic Regulation: Tariff Setting

The economic regulation indicator assesses whether the regulator has developed a comprehensive tariff guideline and methodology with the appropriate schedules for major and minor tariff reviews or indexations. It also gives advance notice to the regulated entities as to the information and reports that will be required of them periodically. The guidelines also give an indication of what kind of cost and expenditures are allowed through the tariffs at any time. Well-developed economic regulation supports transparency and credibility of the tariff setting regime. It encourages investors to make long-term investments. Well-developed economic regulation also incentivizes investors to make more commercially driven investments and encourages competition in the electricity sector. A good economic regulatory regime will also include the development of tariff guidelines for grid-connected renewable energy systems and off-grid systems.

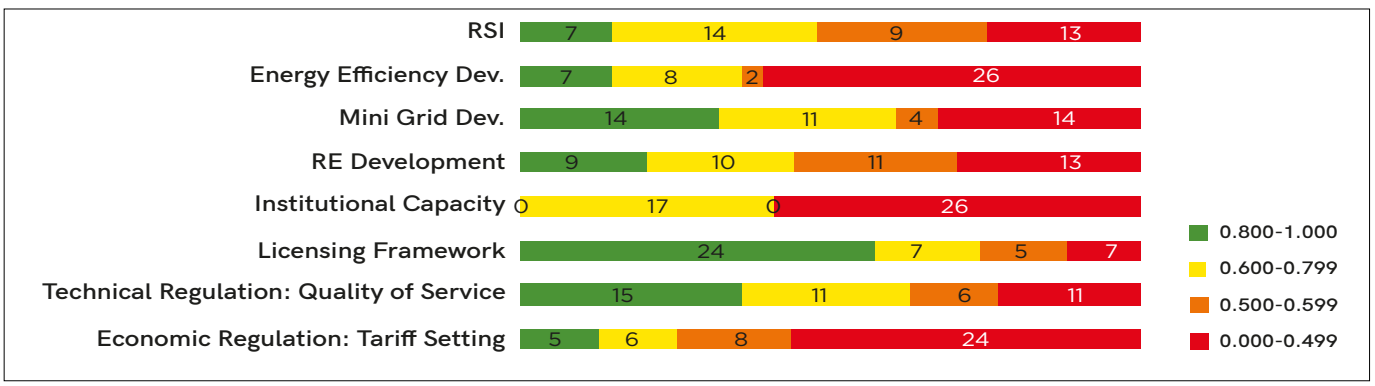

Figure 17: Country Performance by RSI Indicators and Number of Countries

Country	Well Doc. Tariff Methodology	Tariff Indexation in Formula	Tariff Methodology with Schedule for Major Tariff Review	Recent (less than 5 years) CoSS	Cost Reflective Tariff	Network Connection Policy
Algeria	Yes	No	Yes	Yes	No	Yes
Angola	Yes	No	Yes	Yes	No	No
Benin	Yes	No	Yes	Yes	Yes	Yes
Botswana	Yes	No	Yes	No	No	No
Burkina Faso	No	No	No	No	No	No
Burundi	Yes	Yes	No	Yes	Yes	No
Cabo Verde	Yes	Yes	No	No	No	Yes
Cameroon	Yes	Yes	Yes	Yes	Yes	No
Central African Republic	No	No	No	No	No	No
Chad	No	No	No	No	No	No
Congo Dem. Rep.	Yes	Yes	No	No	No	Yes
Congo Republic	No	No	No	Yes	Yes	No
Côte d'Ivoire	No	No	No	No	No	No
Egypt	Yes	Yes	Yes	Yes	Yes	Yes
Eswatini	Yes	No	No	Yes	Yes	Yes
Ethiopia	Yes	No	No	Yes	No	Yes
Gabon	No	No	No	No	No	No
Gambia	Yes	Yes	Yes	No	No	No
Ghana (PURC)	Yes	Yes	Yes	Yes	Yes	Yes
Guinea	Yes	Yes	Yes	No	No	Yes
Kenya	Yes	Yes	Yes	Yes	Yes	Yes
Lesotho	Yes	No	No	Yes	No	No
Liberia	Yes	Yes	Yes	Yes	Yes	Yes
Madagascar	Yes	Yes	Yes	No	No	Yes
Malawi	Yes	Yes	Yes	Yes	No	No
Mali	No	No	No	Yes	No	Yes
Mauritius	Yes	Yes	Yes	No	No	No
Morocco	No	No	No	No	No	Yes
Mozambique	Yes	Yes	Yes	Yes	No	Yes
Namibia	Yes	No	Yes	Yes	Yes	Yes
Niger	Yes	Yes	Yes	Yes	Yes	Yes
Nigeria	Yes	No	Yes	No	No	Yes
Rwanda	Yes	Yes	Yes	Yes	Yes	Yes
Sao Tome and Principe	No	No	No	No	No	No
Senegal	No	No	No	Yes	No	Yes
Seychelles	No	No	No	Yes	Yes	Yes
Sierra Leone	Yes	No	No	No	No	No
South Africa	Yes	No	No	No	No	Yes
Tanzania	Yes	Yes	Yes	Yes	Yes	Yes
Togo	No	No	No	Yes	Yes	No
Uganda	Yes	Yes	Yes	Yes	Yes	Yes
Zambia	Yes	Yes	No	No	No	No
Zimbabwe	Yes	Yes	Yes	No	No	Yes

Table 2. Components of Tariff Methodology across Participating Countries

The results of the survey show that the mean score was 0.473, meaning a lot more is needed to bring this sub-indicator up to the required standard from the current low level. Further details

- Thirty-two regulators have well documented tariff methodologies.
- Twenty-one regulators have automatic tariff adjustment /indexation mechanisms.
- Sixteen have confirmed schedules for major tariff reviews.
- Twenty-three regulators have written formulas for end user tariffs.
- Twenty-four countries have conducted a cost-of-service study within the last five years.
- Sixteen regulators report that they have cost reflective tariffs. These 16 regulators are in Benin, Burundi, Cameroon, Congo Republic, Egypt, Eswatini, Ghana, Kenya, Liberia, Namibia, Nigeria, Rwanda, Seychelles, Tanzania, Togo and Uganda.

Five countries – Uganda, Tanzania, Kenya, Egypt and Liberia – have achieved a high level of regulatory development in economic regulation and tariff setting. On the opposite side, 24 countries were found to be at a low level of regulatory development.

No *Cost-of-Service Studies* had been conducted in 19 countries within the last five years. In addition, only six out of 43 countries had a network connection policy as part of their tariff methodology or guidelines, while 16 had the network connection policy in other documents. Nineteen countries do not have network connection policies.

Technical Regulation

The technical regulation indicator assesses whether the regulator has defined standards for the following: technical and commercial quality of service: frequency and duration of outages; time for the provision of grid connection and restoration of supply; conditions and technical requirements for grid connection; the grid code for interconnected power systems and codes for the distribution system. The Quality-of-Service Standards details the attendant penalties if the rules are broken.

The results of the ERI 2021 survey show that the level of development of technical regulations is still low in many African countries. In most countries, the values of the SAIDI and SAIFI technical service quality indicators are not considered in tariff calculation. The survey shows that regulatory frameworks in nearly half of the countries surveyed do not impose penalties when the utility company fails to meet quality of service standards. In 58% of countries surveyed, there is no incentive law or regulatory framework that imposes sanctions on electricity companies for exceeding the SAIDI and SAIFI ceilings. Interruptions in the supply of electricity are not sufficiently controlled.

Quality of service codes have not yet been developed in more than 36% of the countries surveyed. This sometimes slows down the interconnection of small power production systems on the network. Most countries have not yet developed network codes for the distribution of electricity. Hence the delay observed in rural areas in terms of interconnections, where small-size systems can discharge their surplus generation onto the network. The absence of such a normative framework does not open any prospect for investors.

Where they exist, the contractual frameworks of licenses do not sufficiently require utility companies to report on performance indicators to the regulator. The result is that the regulatory authorities are not forced to conduct, for a fixed period, evaluations on the performance of operators and the quality of service provided by the utility. The absence in 40% of the countries surveyed, of simplified frameworks for licensing procedures for off-grid and small-size systems does not facilitate the development of renewable energy and the supply of electrical energy to localities with small populations. Utilities in 38 countries are required to provide performance reports to the regulator and in 22 countries, fines are imposed on utilities that fail to meet quality of service standards.

Licensing Framework

This indicator assesses whether the regulator has developed licensing frameworks for the power sector and the types of systems that the framework covers. As renewable energy and off-grid systems gain acceptability and prominence, it is important to develop procedures that will seamlessly enable integration of mini-grids and stand-alone systems into the national electricity grid for power supply and exchange. The survey results shows that many regulators do not have the appropriate simplified frameworks that can be flexible and meet the diverse needs of different developers and operators.

Regulators must streamline their licensing frameworks for the power sector by developing different models for large and small power plants, especially for isolated mini-grids and stand-alone systems. A different licensing regime for small power plants using light-handed regulations will reduce the regulatory processes involved in obtaining licenses or permits. It will also further reduce the cost of regulation for off-grid operators. However, a waiver of the requirement for a license must be avoided, as this could lead to a proliferation of sub-standard equipment, undermine accurate data collection, and jeopardize energy planning.

The results of the survey revealed that licensing frameworks exist in all countries except Gabon, Gambia and Sao Tome & Principe. In general, the Licensing Frameworks cover both Grid and Off grid systems except in Cape Verde, Egypt, Eswatini, Mauritius, Morocco, Mozambique and Zimbabwe where they cover only Grid systems. This indicator also assessed whether there is a separate simplified licensing framework specifically for off-grid systems. Twenty-four countries have simplified licensing frameworks for off-grid systems

Institutional Capacity

The *Institutional Capacity* indicator assesses whether the regulator has the capacity to assess, evaluate and conduct economic, econometric and technical analysis of the electricity supply system to aid in proper evaluation, regulation, planning and tariff setting. The economic regulation dimension of institutional capacity assesses the expertise and experience of the regulator's staff on financial, economic, technical and legal analysis issues. Generally, the capacity of the regulatory institutions was reported to be above average, with an average score of 0.557. Seventeen countries lead by Zimbabwe, came in the yellow band, with an average score of 0.758 while 26 recorded scores of 0.425, in the low level of development band. Once institutional capacity has been built, they must be retained and maintained.

Renewable Energy Development

Given the continent's abundant renewable energy resources ranging from hydro, solar, to wind, the development of grid-connected renewable energy is gradually but steadily entering the mainstream power supply industry in many countries. Grid-connected renewable energy is growing in many of the sample countries. Given the important role that decentralized or stand-alone power systems are capable of and will play in the acceleration of access to electricity and transition to green growth, weak performance in this dimension requires swift remedial attention. Fifteen countries have developed technology-specific model contracts or power purchase agreements for renewable energy supplies. Standardized technology-specific contracts are necessary to facilitate and accelerate the deployment of clean, renewable energy.

As part of the acceleration efforts to deploy large scale renewable energy generations projects, the African Development Bank and other partners are supporting countries in developing independent power producer (IPP) procurement programs that will establish the relevant policy, regulatory and technical frameworks to attract private investors into large scale IPP projects. In terms of general best practice, countries should consider publishing standard PPAs (with customized articles based on the technology) and Excel business models that regulators can use to evaluate the profitability of the business plans submitted by IPPs.

Of the 43 countries surveyed, there are renewable energy policies in 36 of them, while there are renewable energy laws in 25 countries. Renewable energy assessments have been conducted in 29 countries and there are specialized institutions to promote renewable energy in 37 countries.

Private sector participation is encouraged in 38 countries. There are no private sector participation arrangements in Seychelles, Sao Tome & Principe, Lesotho, Guinea and Chad.

Fifteen countries have technology-specific power purchase agreement models, and 32 countries have grid codes that grant access for renewable energy to the grid. Electricity generated from renewable energy and based on least-cost is given priority dispatch in 24 countries. These are countries where some of the regulators have the additional legal mandate of sector planning.

The average score was 0.588, in the medium level of regulatory development band. Nine countries appeared in the high level of development band and ten registered a substantial level of development band. Chad has the least developed renewable energy framework.

Mini-grid and Off-grid Systems

The lack of appropriate technical standards and regulatory frameworks for off-grid systems are among the reasons why most countries performed below average in this indicator. This indicator assesses the regulation of mini grids, the development and implementation of regulatory frameworks, as well as the expertise and experience of the regulators' staff in these areas. These elements are key determinants of the quality and sustainability of electricity networks, particularly in countries with gaps in access to electricity. Given the important role that decentralized or standalone power systems are capable of and will play in the acceleration of access to electricity and transition to green growth, weak performance in this dimension requires swift remedial attention.

The average score was 0.627 in the yellow band. There are mini-grid regulations in 26 countries and national programs in 28 countries to promote mini-grids. Twenty-two countries have national electrification plans that set out least-cost electrification pathways, but 15 countries do not have them. Twenty-two countries have regulatory policies that allow private mini grids to sell mini-grid electricity to the grid.

Incentives available include duty exemptions to support mini-grid development in 28 countries, capital subsidies in 18 countries, and grants in 21 countries. Standards have been developed for mini grids in 23 countries and there are connection codes in 24 countries. Mini grid specific licensing regimes are available in 21 countries.

There are national programs to support stand-alone systems in 24 countries. Incentives on offer include duty exemption for stand-alone systems in 21 countries, capital subsidies in 12 countries, and grants in 13 countries. There are quality standards for stand-alone systems in 22 countries. Installer certification is a requirement in 22 countries to ensure a high standard and safety of installations.

Energy Efficiency Development

The efficient use of electricity has become imperative in all African countries because of lack of generation capacity, high cost of generating electricity and the attendant greenhouse gas emissions associated with fossil fuel used in thermal power plants.

In half of the countries surveyed, national master plans for energy efficiency had not yet been developed. Distribution losses are high – more than 30%, in 15 countries. In 64% of the countries surveyed, there are no tax incentives for energy efficiency projects. Funding for the implementation of energy efficiency is not yet regulated to encourage businesses and other consumers to apply energy efficiency measures. Importation of electrical equipment remains

uncontrolled in 80% of countries. This allows energy inefficient electrical appliances to enter such countries, which reduces the availability of electricity for many households and services.

Minimum energy performance standards and labelling frameworks for at least one appliance exists in 19 countries. There are building codes in 16 countries and energy efficiency in buildings is a requirement in 12 countries. Thirty-eight countries are signatories of the Paris Agreement. Chad, Gambia, Morocco, Sao Tome & Principe and Zambia report that they are not signatories. There is a monitoring, reporting and verification mechanism for greenhouse gas emissions in 18 countries.

Delays have been observed in the implementation of all the commitments made during the 2015 Global Climate Summit or Conference of the Parties (COP) 21 in Paris on climate change.

3.4. Regulatory Governance and Substance Index

The Electricity Regulatory Index for Governance and Substance (ERIgs) is calculated by averaging the aggregate scores on the RGI and RSI. Table 3 and Figure 18 show the country rankings and results. The RGI and the RSI together assess the effectiveness of a regulatory environment to support electricity sector reforms, promote efficiency and fulfill national objectives. This preliminary calculation also provides important insight into national regulatory development, without recourse to the effects of the regulatory actions and decisions on the sector.

Country	RGI	RSI	RGSI	Ranking
Uganda	0.951	0.939	0.945	1
Tanzania	0.912	0.903	0.907	2
Kenya	0.899	0.839	0.869	3
Rwanda	0.889	0.840	0.865	4
Namibia	0.902	0.818	0.860	5
Benin	0.897	0.822	0.859	6
Egypt	0.784	0.816	0.800	7
Zimbabwe	0.826	0.721	0.773	8
Côte d'Ivoire	0.853	0.691	0.772	9
South Africa	0.792	0.739	0.766	10
Ethiopia	0.738	0.780	0.759	11
Liberia	0.879	0.590	0.734	12
Niger	0.802	0.651	0.727	13
Mauritius	0.834	0.618	0.726	14
Algeria	0.818	0.624	0.721	15
Eswatini	0.820	0.595	0.697	16
Ghana	0.650	0.762	0.706	17
Sierra Leone	0.812	0.581	0.697	18
Malawi	0.839	0.547	0.693	19
Zambia	0.731	0.637	0.684	20
Mozambique	0.734	0.612	0.673	21
Senegal	0.675	0.660	0.668	22
Nigeria	0.783	0.549	0.666	23
Angola	0.696	0.628	0.662	24
Congo Dem. Rep.	0.733	0.562	0.647	25
Togo	0.679	0.612	0.645	26
Lesotho	0.793	0.493	0.643	27
Madagascar	0.715	0.565	0.640	28
Cabo Verde	0.797	0.474	0.636	29
Cameroon	0.655	0.605	0.630	30
Mali	0.674	0.565	0.620	31
Gambia	0.827	0.382	0.605	32
Botswana	0.761	0.435	0.598	33
Guinea	0.750	0.425	0.588	34
Burundi	0.446	0.592	0.519	35
Burkina Faso	0.616	0.355	0.485	36
Central African Republic	0.608	0.357	0.483	37
Morocco	0.590	0.306	0.448	38
Congo Rep.	0.539	0.356	0.447	39
Seychelles	0.453	0.280	0.366	40
Chad	0.578	0.120	0.439	41
Gabon	0.421	0.170	0.296	42
Sao Tome and Principe	0.473	0.097	0.285	43
Mean	0.735	0.575	0.655	

Table 3. Regulatory Governance and Substance Index 2021

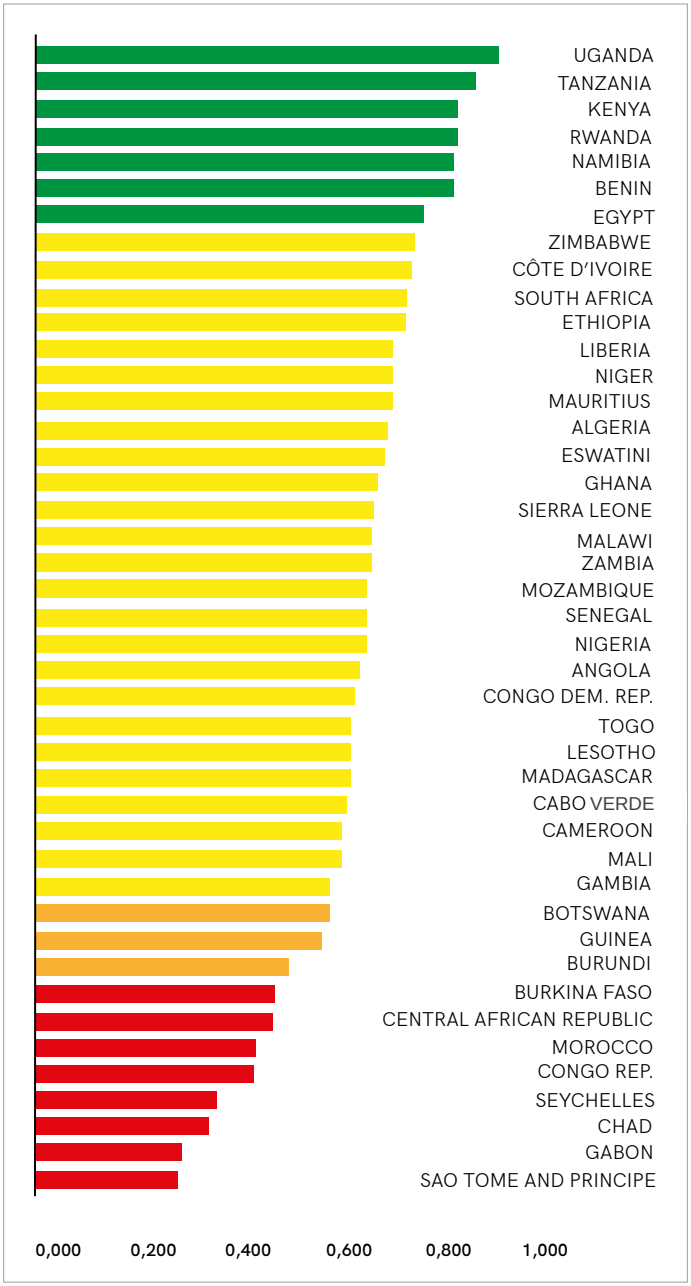

Figure 18: Regulatory Governance and Substance Index Country Rankings

3.5. The Regulatory Outcome Index

The Regulatory Outcome Index (ROI) for utilities measures how the regulator's actions and decisions impacts the utility and consequently the electricity sector. It comprises of three indicators: (1) Financial Performance and Competitiveness; (2) Quality of Service Delivery (commercial and technical); and (3) Facilitating Electricity Access. No country made it into the green band and only one country (Uganda) came in the yellow band. Nine countries, led by Kenya and including Senegal, Angola, Ghana, Namibia, Eswatini, Zambia and Algeria) came in the orange band, while the bulk of the countries (33) with Tanzania, in the lead, with a score of 0.493 were in the red band. The poor performance of countries can be attributed to an equally poor performance in all the sub-indicators namely Quality of Service Delivery (Technical and Commercial), Financial Performance and Competitiveness and Facilitation of Electricity Access. The average ROI score was 0.339, which falls within the red band. Figure 31 shows country performance on ROI and its indicators.

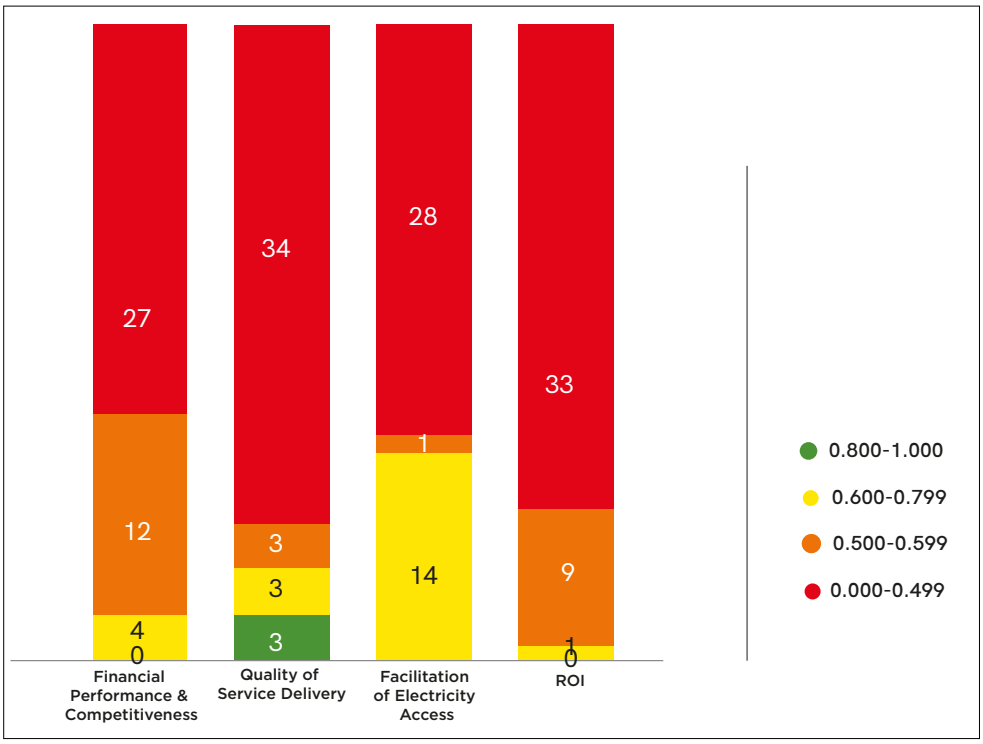

Figure 19: Country Performance by ROI Indicators and Number of Countries

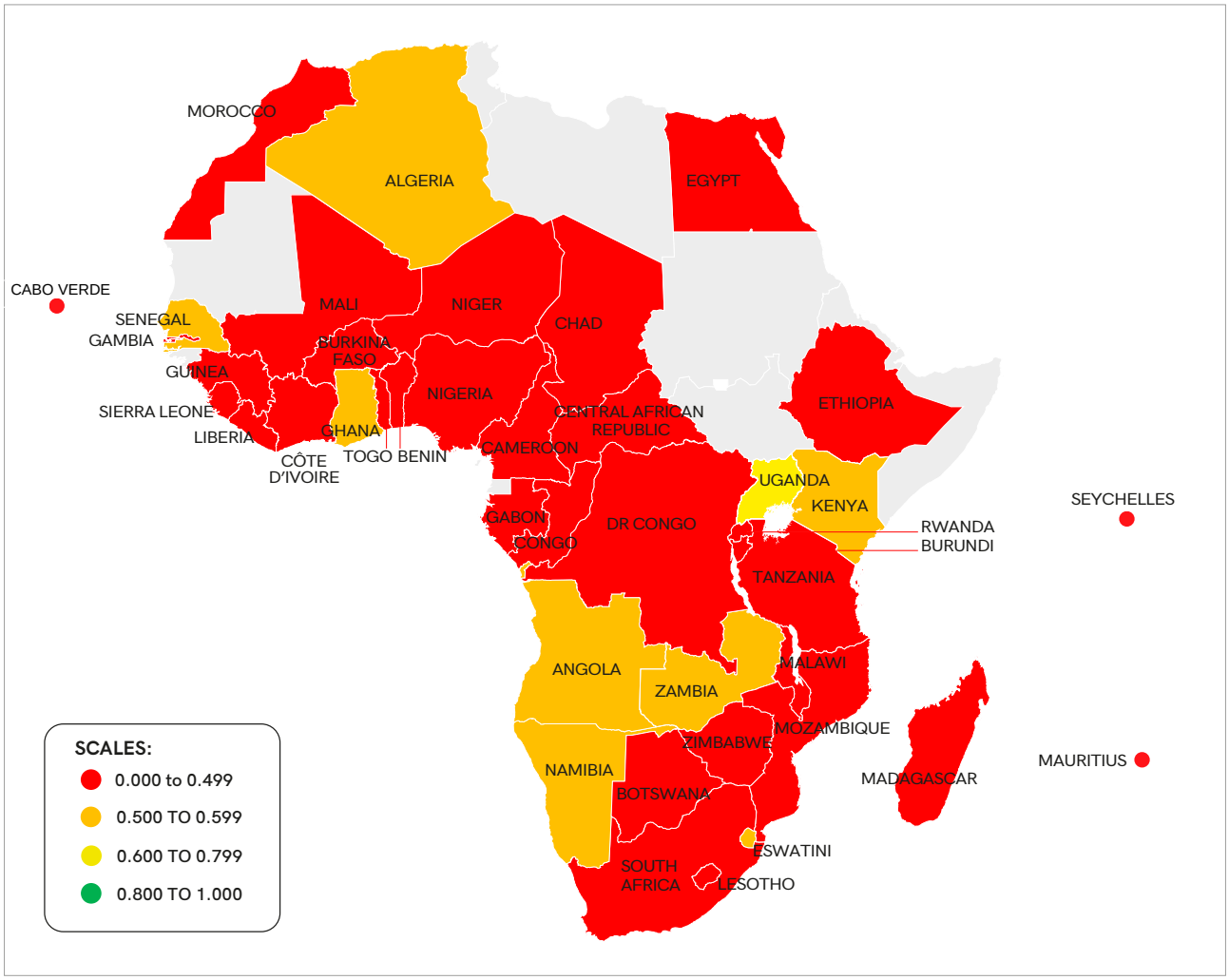

Figure 20: 2021 Regulatory Outcome Index Map

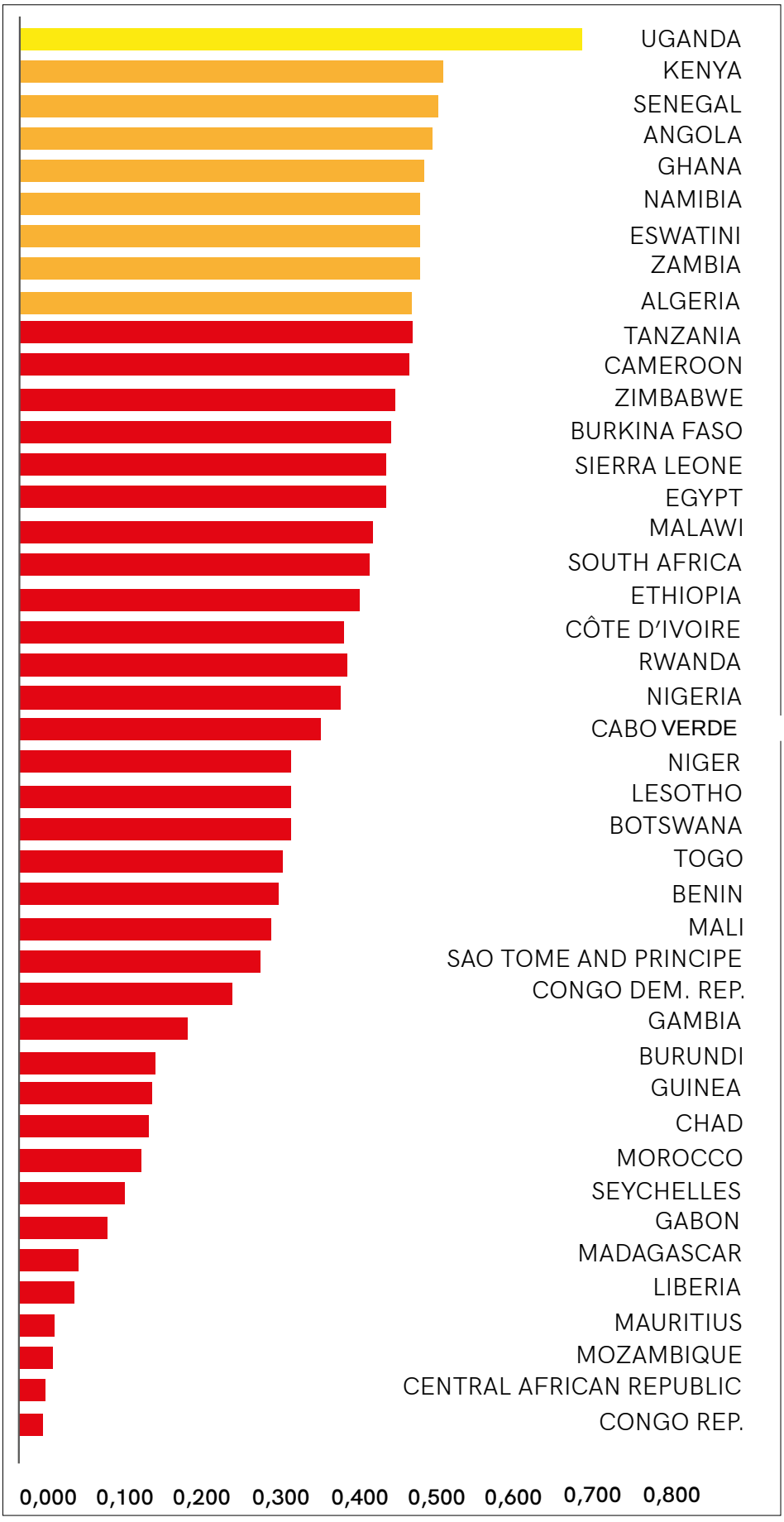

Figure 21: Country Ranking According to Regulatory Outcome Index

3.5.1. Breakdown of Results for the Regulatory Outcome Index for Utilities

The regulatory outcome index, from the utilities perspective (ROI), was assessed along three indicators: (1) financial performance and competitiveness; (2) quality of service delivery (commercial and technical); and (3) facilitation of electricity access.

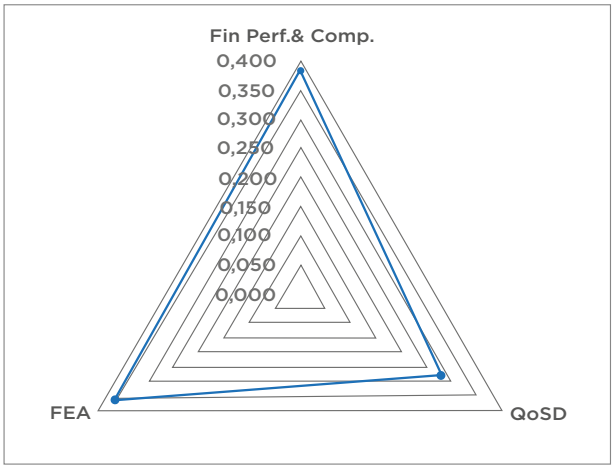

Figure 22: Components of ROI

Financial Performance and Competitiveness

The financial sustainability of a power distribution utility determines whether the electricity sector will be able to meet demand, provide a satisfactory quality of service and increase access to more consumers. Financial performance and sustainability are affected by the cost of service and by operational inefficiencies, like the level of technical and commercial losses and supply reliability. This is measured by the frequency and duration of outages and responsiveness of the utility to customer calls and complaints. Poor service delivery by the distribution utility can reduce financial flows into the system. Furthermore, in this era where the cost of renewable energy technologies has fallen and continues to fall, many customers who can afford to pay more for electricity can install renewable systems and either get off the grid or reduce electricity purchases from the utility.

Financial performance is the weakest dimension of the ROI, with an average score of 0.382. For the Democratic Republic of Congo, the ROI results have been obtained from data provided by the Société Nationale d'Electricité (SNEL) in 2020. SNEL is the incumbent operator, which has 91.1% of the country's subscribers. The sector is liberalized and has other operators who were unable to respond to the survey.

The results of the ERI 2021 survey show that in 29 out of 43 countries covered, the average end-user tariffs are not in line with the costs of operations of the electricity utility companies. In over 90% of cases, there is no transitional or roll-out plan to achieve full cost recovery of supplying power. Such a plan avoids the undesirable cycles of sector debt accumulation and commits both regulator and utility to take appropriate steps in tandem towards full cost recovery. No recovery is made, and the government does not provide financial support to the utilities. Furthermore, the infrastructure deteriorates, leading to poor service, and the sector is negatively affected.

Consequently, the performance of utility companies in the electricity sector is compromised, showing how difficult it is for utilities to be competitive. Improving the ROI is not the responsibility of the regulator alone but also of the utility, especially in terms of prudently incurred costs, which is one of the issues that regulators are struggling with in tariff setting.

Regulators struggle to know which costs should be allowed and which should be disallowed when setting tariffs. This is because of insufficient data from the utilities in a format that will allow for a prudence test by the regulator. This may have a negative impact on the utility's finances. Cost overruns on infrastructure projects are always a subject of disagreement between utilities and regulators and these impact utilities' financial performance.

Of the 48 utilities from the 43 countries surveyed, 19 utilities report the existence of cost-of-service studies conducted by the regulator or the utility and approved by the regulator.

Fifteen utilities reported that losses are not considered in their tariffs, an arrangement that could put the utility and the sector in serious financial difficulties.

On the acceptable loss level (technical and non-technical) by the regulator, 35 utilities provided ranges from 12-30%. Twenty-three utilities have agreed on an acceptable loss level with the regulator and ten have provided targets and year to be achieved. Seven provided targets only.

On the ratio between the rate of collection and average end-user tariffs, 10 utilities report a collection rate of more than 95%, four utilities collect between 75-85%, seven utilities collect between 85 and 95%, and the rest collect less than 75%. At the prevailing loss levels and collection rate, 14 utilities report full recovery of actual cost of operation. Fifteen utilities report that the current level of the average end-user tariff set by the regulator is in accordance with the utility's prudent cost of operation. Only seven of the remaining 33 utilities report that there is a transitional path or roll-out plan agreed between the utility and the regulator to attain cost-reflective tariffs over a specified period.

On whether the regulator approved their power purchase agreements before signature, twenty-five utilities reported that they have their power purchase agreements approved by the regulator before signature and that price adjustment clauses in the power purchase agreements are recognized by the regulator for tariff adjustments. Twenty-eight utilities report that the regulatory authority has formulated a transparent procedure for reviewing end-user tariffs.

Fifteen utilities report that the regulator always follows this procedure for tariff reviews while 22 report that there is a timetable for tariff review. However, only 11 utilities provide links to the reference. Only thirteen utilities report that the regulatory authority always follows the schedule for tariff review.

On electricity theft, 18 utilities, reported and described a regulatory mechanism that has been put in place to deal with the menace. Sixteen utilities report that there is a predictable mechanism used by the regulator to disallow cost considered unreasonable incurred by the utility, although only 10 utilities could describe the mechanism.

The regulator has an important role to play in supporting and monitoring the actions taken by the utility, including setting of distribution loss reduction objectives. Tariffs are a soft spot in political circles in Africa, and politicians are often inclined to keep them low, sometimes to the detriment of the financial health of the electricity sector.

Electricity utilities have existed for more than 50 years, in Africa, with some dating back to the 1920s. Regarding the regulatory authorities, Zambia, the oldest regulator in the survey sample, has been in existence for 26 years, while the most recent, Morocco, has been in operation for only two years.

Considering that utilities have been operating without regulators for a greater part of their operating lives, regulators need to develop justifiable regulations and cooperate with the utilities to implement them to meet consumer satisfaction requirements. Utility performance could also improve if governments dissociate themselves from the utilities to enable the regulators to perform their regulatory functions. There is room for improvement on collection and recovery rates. The use of prepaid meters and smart meters, in addition to enforcing disconnection for non-payment, can help improve revenue recovery. However, mass deployment of pre-paid meters could drive vulnerable consumers into bypassing the meter and cause more financial losses to the sector.

Quality of Service Delivery (Commercial and Technical)

The survey results show the average time required to: provide a service connection to a residential consumer; respond to a billing complaint; and restore a connection upon payment of outstanding bills after disconnection. It also assesses the average number of hours that it takes to respond to supply-related complaints. Long delays in connection time are a barrier to electricity access and increase illegal access. This will increase the losses to the utility company. Dire improvements are therefore needed in this area. Twenty-one countries have a ceiling on the number of days (30) that the utility must take to provide electricity connection to consumers after payment of the required fees.

Two internationally recognized indicators – the System Average Interruption Index (SAIDI) and the System Average Interruption Frequency Index (SAIFI) – are used to measure the technical quality of service of utilities. SAIDI is the average total duration of outages over the course of a year for each customer. SAIFI is the average number of service interruptions experienced by a customer in a year. This includes planned and unplanned outages, as well as load shedding. SAIFI and SAIDI are regulatory indices that must be established by the regulator. Scores above 100 hours per year for SAIDI and 100 outages per year for SAIFI are considered highly problematic.

The average ERI score for this indicator is very low at 0.280. Three countries, Algeria, Namibia and South Africa, came in the green band, while Cameroon, Zambia and Uganda came in the yellow band. Niger, Ghana, Sao Tome & Principe came in the orange band. The rest of the utilities came in the red band.

The regulator in 15 countries reported that it had a quality-of-service code and regulation and provided links to the most recent audit or valuation report. Only 8 utilities reported that it is a regulatory requirement for the utility to undertake periodic technical audits to establish the true state of their facilities. Six utilities reported and confirmed that it is a regulatory requirement for the utility to publish its SAIDI and SAIFI indicators. Twenty-eight utilities reported that the utility discusses the SAIDI and SAIFI reports with the regulator.

Nine utilities provided the regulatory ceiling, set by the regulator on SAIDI and SAIFI. Seven utilities reported that SAIDI and SAIFI values are factored into electricity tariff setting by the regulator. On how regulatory/financial sanctions are imposed by law or regulatory instrument, if the utility records SAIDI and SAIFI above the regulatory ceiling, seven utilities responded that the utility compensates consumers and two utilities indicated that the utility is fined.

On which areas of customer service with regard to connections and service delivery are covered in the quality of service /code, 30 utilities reported they had five or more, two have four, two have three, one has two, and twelve utilities have none.

Network reliability is an important element that industrial developers take into consideration in their decision to invest in a country. Despite the high uptake of the SAIFI measure, half the number of regulators do not set a target for the improvement of reliability and availability of the electricity network. While most African countries have now adopted SAIDI and SAIFI to measure their quality of technical service, the calculation methodology varies from one country to another. Some countries exclude load shedding and planned events, while others take them into account.

The regulator should regularly monitor the technical quality of electricity supply to consumers through periodic reporting by the utility. This should usually be done on a quarterly basis. This requires the implementation of an outage management system with automated data collection facilities. In addition to the SAIDI and SAIFI, the Customer Average Interruption

Duration Index (CAIDI) should form part of the quality-of-service performance reports submitted to the regulator.

Facilitation of Electricity Access

Access to electricity is an important aspect of human and economic development, crucial for job creation, poverty reduction and industrialization. African governments are committed to increasing electricity access rates, particularly in rural and underserved areas. However, there are still about 600 million people who are living without electricity in Sub-Saharan Africa.

The average score for this indicator is the highest of the three ROI indicators, at 0.363. Fifteen utilities achieved a score of 0.500 or higher. Thirty-six utilities reported that there are regulatory mechanisms in place aimed at providing access to electricity. However, only six provided links or reference. Thirty utilities report that there is a ceiling set by legislative or regulatory instrument on the number of days to provide electricity connection to a customer after making payments. Seventeen utilities reported that the regulator makes provision in the tariff for investment of non-governmental organizations (NGOs), governments, and customers.

Accessing the funds necessary to achieve the goal of universal electrification is a significant barrier for most countries in Sub-Saharan Africa. This is because of serious economic and budgetary constraints. Furthermore, most of the electricity companies in the region are insolvent and cannot expand access without budgetary support provided by their respective governments. This is often unavailable. Consequently, expanding access to electricity in Sub-Saharan Africa will require as a priority, strengthened regulation and commitment from governments. This includes setting cost-reflective tariffs first and determining the impact of cross-subsidization between cities and rural areas. Following these, support can be solicited from international development partners and institutions, as well as the private sector.

Regulatory reforms should therefore be designed to reduce barriers to investment and to attract both the foreign and domestic private sectors to provide electricity access to rural and isolated communities. This could be through mini grids and stand-alone systems. Examples of incentives could be mechanisms to buy out investments in mini grids, when grids are extended to off-grid areas before affected mini grid developers/investors have recouped their investments.

Disagreements between utilities and regulators on common regulatory issues

An analysis of responses to the same questions put to the regulator and the utility as part of the ERI 2021 has confirmed an earlier view that there are significant differences between the utility and regulator with regard to the regulatory framework. Only in seven countries did the regulator and utility provide the same responses to all identical questions.

IV. Recommendations

The ERI survey is designed to measure the state of development and implementation of regulation in the electricity sector in each African country, and to identify areas for improvement. On this basis, it allows a better understanding of the sector and its challenges. It offers African countries the opportunity to compare their current regulatory frameworks with international best practice, reconcile them with their immediate environment and address the challenges. They are able to strengthen their enabling environments to improve sector performance and sustainability.

The survey results provide a useful guide for future action by those in the electricity sector, in particular politicians and regulators.

The following are a series of recommendations for action by both governments and regulators to improve sector regulatory landscape and utility and sector performance.

4.1. Improving Regulatory Governance

THE INDEPENDENCE OF THE REGULATORY AUTHORITY

4.1.1 The independence of the regulatory authority vis-à-vis the public authorities

The results of the survey show that in 93% of the countries surveyed, the commissioners/board members of the regulatory authorities and their chairpersons are appointed by the executive and to whom they report. CEOs in 72% of countries are also appointed by the executive. This shows a stranglehold of public authorities on the regulatory institutions, which lose their decision-making independence vis-à-vis the political authorities who appoint them. This thus subjects the regulators to subtle and direct political pressure to skew key regulatory decisions towards the political leaning of the government in power. In 23% of countries, some decisions of the regulator can even be overturned by the government. This undermines the essence of the independence of the regulator, which is required to assure stakeholders, especially investors in the electricity sector.

Beyond the state's control over the governing bodies of the regulatory authorities, a review of the results of the independence from stakeholder's stakeholders sub-index shows that in more than 90% of cases, the legislations do not provide for the prohibition of the appointment of a person to the position of CEO/commissioner of the regulatory body if s/he has previously held positions within a regulated entity. This leaves room for conflicts of interest.

Recommendation 1

To empower and enable the regulator to carry out its missions with complete independence from political authorities, it is recommended that the recruitment and appointment of commissioners/board members and CEOs be based on well-established and well-known procedures. The commissioners and the CEO should be persons with knowledge, skills, and proven expertise to give credibility to the regulatory actions of the regulator. To remove any government interference in the activities of the regulatory authority, it is recommended that governments modify any provisions in the regulatory laws that allow the executives to override or change the decisions of the regulator.

Furthermore, tenure of the board/commissioners of two to four years, renewable once or for a single term not exceeding seven years for the members of the board of directors and the chief executive officer will guarantee stability of the

regulatory landscape. It will also ensure that the board/commissioners cannot be dismissed from office during the term of their mandate. Where the tenure of the boards of public institutions is co-terminus with the executive, the regulatory texts should be amended to exempt regulatory authorities from such provisions.

The terms of board members/commissioners should be staggered to ensure that not all members leave at the same time. This allows for institutional memory and expertise to be passed on to new members of the board.

4.1.2 Independence from the regulated sector

Beyond the state's control over the governing bodies of the regulatory authority, the analysis on independence from stakeholders shows that in more than 72% of countries, the legislation does not have provisions that prohibit the appointment of a CEO/commissioner to the regulatory body if s/he has previously held positions within a regulated entity. In 70% of countries, the law does not prohibit commissioners/CEO from accepting employment in a regulated entity after their tenure in the regulatory authority and vice versa. This uncontrolled movement of officials creates underlying situations of conflicts of interest and could undermine the integrity of the regulatory authority.

Recommendation 2

To curtail professional nomadism, which is unethical and detrimental to the electricity sector, the legal provisions in countries should be reviewed. Where they do not exist, it is recommended that conditions be introduced for movement of senior executive personnel between regulatory authority and utility and vice-versa. A cooling-off period of at least two years would be required before a CEO or commissioners and senior executives leave the electricity utility companies to go to the regulatory authority or vice versa. This will prevent interest-hedging in regulatory decisions. Such legal provisions would ensure that regulatory decisions taken are devoid of any future interests of persons who take them. Regulators should also consider compensation for the cooling-off period, as it might be difficult for ex-regulator board regulator board members or commissioners to find employment outside the energy sector after they have spent years with the regulator.

4.1.3 Decision-making independence

The executive in 14% of the countries surveyed can overturn regulatory decisions of the regulator. The survey results also showed that 33% of regulators are obliged to seek the approval of the executive on regulatory decisions before their publication. In 42% of the countries surveyed, the regulator is not the final decision maker on tariffs. In 53% of the countries, the regulator is not the final decision maker on licensing

Recommendation 3

The regulator in all instances should be the final decision-maker on issuing and amending licenses and on tariffs. Regulatory laws should be amended to ensure that the regulator is the final decision maker on licensing, tariffs setting and decision-making on conflicts between regulated entities. Provisions in regulatory laws that allow the executives to overturn regulatory decisions of the regulator are inimical to best practice. It is recommended that such provisions be expunged from regulations, where they exist. Such amendments to regulatory laws are likely to reassure investors, who need the assurance that entry and exit from the utility industry and tariffs are not subject to political pressure but objective analysis and in accordance with well-established predictable mechanisms and procedures.

4.1.4 Financial independence

An independent regulator requires constant flow of adequate funds to support the operations of the regulator, and this should be devoid of political and stakeholder interference. The results of the ERI 2021 survey show that the budgetary allocations of 26% of regulatory authorities are made by governments or a

combination of governments and the regulatory authorities. Seven percent of regulatory authorities rely entirely on government budgets for funds while the salaries of 9% are determined by government. International best practice requires that the regulatory authority be funded from predictable sources in the form of regulatory fees and levies and enshrined in law. Approval of the level of fees or levies by the legislature further isolates the regulator from whimsical and capricious political interventions that could expose the regulatory authority to potential regulatory capture.

Recommendation 4

It is recommended that the budgets of regulatory authorities be financed by charges levied on operators in the electricity sector and other taxes approved by the legislator. The activities of the regulator should not be financed directly from the state budget and the regulator must be free in the management of its budget and subject only to approval by its board without recourse to validation by the executive. However, post-expenditure audits must be performed regularly to ensure accountability from the regulatory authority. The salaries of regulatory authority staff should be set by the board of the authority and in line with salaries of regulated utilities but should not be less than those of the regulated utilities.

4.1.5 Strengthen Accountability of the Regulator and Participation

An independent regulator must know and exercise its rights and obligations. This includes the obligation to publish its annual report, preferably to parliament, to report on its activities during a fiscal year and submission to criticism of its actions and decisions taken to better improve its actions. The survey showed that only 7% of regulators in the surveyed countries report directly on their annual activities to parliament. In 30% of countries, specialized entities that are different from ordinary courts and outside the control of the regulatory authority, preside over disputes between the regulator and aggrieved entities. Only 14% of countries surveyed have specialized courts that are dedicated to resolving disputes between players in the electricity sector.

Recommendation 5

Wherever applicable, the legislation should be amended so that regulatory impunity is avoided. All regulators must submit annual reports to the legislature for scrutiny and approval. The executive must put in place a regulatory framework that obligates the regulatory authority to report on its decisions and on its activities. Legal remedies could be long and costly. To this end, legislators must put in place regulatory frameworks that allow the creation of independent structures responsible for dealing with regulatory disputes in the sector.

4.1.6 Strengthen Transparency in Decision-making

In 25% of the countries surveyed, the public did not have immediate access to key regulatory documents. Consequently, the decisions taken by the regulator remained inaccessible to the public, although they affect the public. There is sometimes total ignorance of the actions of the regulator by the public and some of the regulator's decisions are often not understood by the public. As a result, the absence of explanations or justifications for certain decisions of the regulator does not contribute to transparency in the sector.

Recommendation 6

Regulatory authorities must be obligated to make documents on regulatory decisions accessible to the public. The regulator should provide explanations to operators and consumers on regulatory decisions. Stakeholder contributions to decisions must also be made public. This transparency allows a symbiosis between the actors and avoids conflicts of misunderstanding that might be prejudicial to the good development of the sector.

4.1.7 Increase Predictability

In 13 countries out of the 43 surveyed, there is no tariff methodology. In 44% of the countries surveyed, there are no mechanisms to exclude costs that are deemed unreasonable in electricity tariff determinations. Twenty-one percent of countries do not have procedures and timelines for processing license applications. The absence of tariff procedures in certain regulatory frameworks gives no visibility to the organization and implementation of tariff mechanisms, a guarantee of financial security for operators. The lack of predictability negates any incentive to invest in the sector and creates distrust for potential investors.

Recommendation 7

As the tariff is a fundamental element of regulation, it is recommended that regulators develop tariff methodologies to permanently guide action on tariffs. This must be calculated based on procedures and timelines known to all regulated utilities. Each operator in year N should, based on well-established procedures, already have an idea of what the tariff would be in year N + 1 before going to the regulator. This way, the timing or tariff schedule must be known and in advance. The tariff framework must remain a constant concern because the tariff remains a key element of the regulation and therefore of the viability of the electricity sector. All regulators must publish requirements, procedures, and schedules for receiving, processing, and issuing licenses to prospective developers and investors.

4.1.8 Improve access to information

Only three countries out of the 43 surveyed do not have a website. This is an improvement over the previous year. However, in more than 30% of countries surveyed, the websites of regulators are not regularly updated to include new information likely to guide or inform any potential investor or any other user of the electricity. As a result, updated information on the electricity sector is not always available and the action of the regulator is not always visible.

Recommendation 8

All regulators must have well designed and active and secure websites. They must be open to the outside world to allow any potential investor to get information and find all the necessary information on the electricity sector, including license application requirements, procedures, tariff methodologies, and regulations. The information must be regularly updated so that it is always current. The regulator should prepare its activity report each year and publish it on its website.

IMPROVING REGULATORY SUBSTANCE

4.1.9 Improve Economic Regulation

Tariff calculation remains a key process of economic regulation. The survey showed weak regulatory development of tariff processes in various countries. Twenty-seven percent of the countries surveyed do not have well-documented tariff methodologies that can guide the regulator in the development of electricity tariffs. More than half of these countries do not have indexation mechanisms for automatic tariff adjustments. This forces the regulator to reformulate the said process whenever it is necessary to adjust the tariffs. In more than 51% of countries surveyed, there is no tariff calendar. Meanwhile, 62% of countries surveyed have not yet developed regulatory accounting principles, which should be a compass in the tariff calculation.

A cost-of-service study (CoSS) is the basis for determining the costs incurred by operators to provide good electricity service. It is essential for setting and implementing a cost reflective tariff. Only 56% of countries in the survey have conducted a CoSS and 37% have cost reflective tariffs. In more than 67% of countries, power utilities confirm that published tariffs do not cover their costs incurred to provide electricity of the required quality and in the required quantity. In 26 countries, there is no tariff compensation to allow electricity companies to recover the cost of assets stranded because of regulatory actions.

The lack of compensation is also noticeable in 60% of countries. In these countries, companies are obliged to invest in ancillary services to stabilize network parameters like frequency or voltage levels. International best practice requires that expenses incurred by a utility in the provision of ancillary services be compensated in tariffs.

Recommendation 9

Regulatory authorities must develop properly documented tariff methodologies. They must include formulas for determining end-user-tariffs and automatic pricing and indexation mechanisms. The tariff procedures must specify the timetables that allow operators to have visibility on the development of the tariffs. Regulators must respect these timetables to avoid tariff distortions. The existence of tariff formulas that show how end-user tariffs are to be calculated should provide reassurance to consumers. Regulators should work to develop regulatory accounts to properly calculate the weight of each activity (generation, transmission, distribution, and sale of electricity) in the tariff that is communicated to consumers.

Regulators must carry out a cost-of-service study at least once every five years. This will enable electricity companies to have reasonable tariffs that reflect operational costs incurred to provide adequate electricity supply service. Currently, more than 64% of countries recognize that these costs do not reflect the reality of the costs incurred. The regulatory framework must specify the methods of connection to the network. This facilitates access to the main network and evacuates the energy produced by secondary sources. It also increases the offer available to small, medium, or large consumers. The regulatory framework must also provide tariff policies and mechanisms to make tariffs affordable to support low-income consumers, especially the poor and vulnerable.

4.1.10 Develop technical regulations

The results of the ERI 2021 survey show that the level of development of technical regulations is still low in many countries. Quality of service codes have not yet been developed in more than 36% of the countries surveyed. In most countries, the values of the SAIDI and SAIFI technical service quality indicators are not factored into the tariff calculation. Regulatory frameworks in nearly half the countries surveyed do not impose penalties when the utility company fails to meet quality of service standards. Interruptions in the supply of electricity are not sufficiently controlled. In 58% of countries surveyed, there is no incentive or regulatory framework that imposes sanctions on electricity companies that exceed SAIDI and SAIFI ceilings.

Although 65% of countries have national grid codes that allow renewable energy connectivity to the national grid, most countries have not yet drawn up the network codes for the distribution sector. This sometimes slows down the interconnections of small electricity production facilities on the network. Hence the delay observed in rural areas in terms of interconnections. Meanwhile, small-size systems can supply their surplus generation onto the network. The absence of such a normative framework does not open any prospect for investors. The contractual frameworks of licenses do not sufficiently require power companies to report on performance indicators to the regulator. Consequently, the regulatory authorities are not forced to conduct, for a fixed period, evaluations on the performance of operators and the quality of service provided by the latter. In 40% of the countries surveyed, the absence of simplified frameworks for licensing procedures for off-grid and small-size systems does not facilitate the development of renewable energy and the supply of electrical energy to localities with a small population.

Recommendation 10

Regulatory authorities must develop regulatory frameworks that include quality-of-service codes/standards, particularly those that monitor the supply quality of electrical energy, like System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) indicators. The ceilings for the SAIDI and SAIFI should be set together with incentives and penalties for exceeding those ceilings. However, the regulator and the electricity utilities should agree on this. To make compliance with the thresholds for these indicators more enforceable, the penalties should be factored into the tariffs or a clear indication of the fines/sanctions should be made in the regulations.

Regulatory institutions should develop network codes for the transmission and distribution of electricity to facilitate the emergence of small-size generation. This should be done especially in rural areas, with facilities for discharging excess generation into the national grid. This can increase access to electricity in rural areas particularly and would be attractive to potential investors. Electricity utilities must produce reports on their performance in terms of quality of service, with an obligation to submit these reports to the regulator for control and audit. The regulator should consult consumers, who are the primary beneficiaries of the results of such an approach. This way, the regulator can corroborate the effect of performance on consumers' daily lives. The executive in these countries should set rules to allow regulators to develop simplified licensing procedures for off-grid and small-size systems.

4.1.11 Strengthen Institutional Capacities

The ERI 2021 survey shows a substantial level of development of human capacities of the regulatory authorities, who can perform analysis of financial, economic, and technical data. Increasingly, staff training and skills improvement in regulatory techniques is continuing although there are delays in capacity building in countries where regulatory authorities are nascent. On the other hand, it is observed that some countries like Côte d'Ivoire and Mozambique have improved their institutional capacities. capacities.

Recommendation 11

Regulatory authorities should organize capacity building for their staff on regulatory matters, especially in the areas of finance, economics, and technical monitoring of operators. Staff must learn tariff-setting techniques and how to control and audit technical performances of the operators, building on the skills of existing staff or learning from external consultants. Twining arrangements and study tours involving new and old regulatory institutions on the continent will ensure the exchange of experience between regulatory authorities with experience and those lacking it. Within the framework of institutional partnerships, regulators can seek funding for the financing of training for certain executives or a group of executives.

4.1.12 Develop renewable energy and mini grids

The development of renewable energy holds the future for electricity generation worldwide. The use of renewable energy instead of fossil fuels contributes to sustainable development, the protection of the environment and the reduction of greenhouse gas emissions. The results of the ERI 2021 survey show that the development of regulatory frameworks for renewable energy is at a medium level while mini-grid development is at a substantial level. More than 42% of the countries surveyed have not yet developed guidelines or general policy documents for the systematic development of renewable energy. Some countries have not yet carried out an assessment of their renewable energy potential to enable investors and other local private individuals decide on whether to invest in this subsector.

Specific contract models and tariffs for different technologies and plant sizes have not yet been fully developed in more than 64% of the countries covered in the survey. There is still work to be done to ensure that the appropriate policy and regulatory instruments are established to support the absence of such mechanisms. This would give visibility to the integration of utility-scale renewable energy generation into the countries' energy supplies. This may not have been done traditionally or might not feature where mini grids/off-grid systems are concerned. In tandem with developing grid-connected renewable energy projects, countries should also take advantage of deploying decentralized systems to increase access in remote locations.

Legislation is still lacking in some countries for the development of mini grids and off-grid systems. The non-existence of national programs for the development of mini grids and off-grid systems does not augur well for a bright future for communities that are far from the grid. In nearly 50% of the countries surveyed, there is no program to support the development of small, isolated power plants.

Recommendation 12

Governments are encouraged to establish regulatory frameworks with built-in incentives for the development of renewable energy, mini-grid, and off-grid systems. To allow investors to take an interest in this form of electricity generation, regulatory institutions should assess the potential of renewable energy and set up appropriate and attractive pricing mechanisms for this segment.

Appropriate network codes must be developed to allow interconnection with the national networks and to develop the corresponding tariffs. Fiscal incentives like customs duty waivers, capital grants and exemption from taxes, should be introduced to boost the development of renewable energy and mini grids.

4.1.13 Develop Energy Efficiency

In several African countries, there is a deficit in the generation of electric power, which often results in load shedding and prolonged interruptions in electricity supply. Energy efficiency is an effective option for optimizing the use of existing facilities for the supply of electrical energy. Energy efficiency avoids losses in generation, transmission, distribution and end-use.

The ERI 2021 survey showed that in half of the countries surveyed, national master plans for energy efficiency are yet to be developed. Distribution losses remain high, above 30%, in 15 countries. In 64% of the countries covered by the survey, there are no tax incentives for energy efficiency projects. Funding for the implementation of energy efficiency is not yet regulated to encourage businesses and other consumers to apply energy efficiency measures. There are no minimum energy performance standards and labels for electrical appliances labels in 56% of countries surveyed. The quality of imported electrical equipment remains uncontrolled in these countries. This allows energy inefficient equipment to enter such countries, which affects the supply of electricity for many households and services. Significant delays have been observed in the implementation of all the commitments made under the Paris Agreement on climate change.

Recommendation 13

It is recommended that countries establish legislation to improve energy efficiency. Regulatory frameworks should set national targets and master plans for implementing energy efficiency programs. Governments should provide funding and tax incentives to encourage industries and other large consumers of electrical energy to implement energy efficiency measures. Large energy consumers must be required to carry out periodic energy audits on their facilities with the aim of identifying opportunities for improving energy efficiency. Manufacturers and importers of electrical appliances should be required

to periodically report to the regulator on the energy efficiency levels of appliances that they manufacture or import or agency responsible for energy efficiency promotion.

In many countries, specialized agencies have been established to develop and implement renewable energy and energy efficiency promotion strategies and programs. In countries where such arrangements exist, it is important to clearly elaborate the structures and specify the role of the regulatory authority. What should also be clear is how the institutions can work together, as the regulator is responsible for overall monitoring of the sector.

IMPROVE THE EFFECTS OF REGULATION ON ELECTRICITY UTILITIES

4.1.14 Financial Performance and Competitiveness

The results of the ERI 2021 survey show that in 29 out of 43 countries surveyed, the average end-user tariffs are not in line with the costs of operations of the electricity utilities. Furthermore, no plans have been made to achieve cost-reflective tariffs in over 90% of these countries. More than two thirds of the utilities do not cover their costs if one considers the losses and the low rate of revenue collection. The performance of the electricity sector utilities is thus compromised. Cost-of-service studies have however begun and are being conducted in some countries.

Recommendation 14

To ensure financial viability of utilities, the regulatory institutions must team up with the utilities to carry out cost-of-service studies at regular intervals. This is to ensure that the tariffs granted to the electricity utilities are in line with their costs of operations. About tariffs, the regulator must formulate transparent procedures for reviewing end-user tariffs and ensure that unreasonable costs incurred by operators are not passed on to consumers in electricity tariffs. Regulators should also ensure that tariff adjustment schedules are contained in utility contracts, where applicable, when they are drawn up or revised. Tariff schedules must be communicated to the utilities.

4.1.15 The quality of commercial and technical service of the electricity supply

The results of the ERI 2021 survey show that in 44% of countries, quality of service codes have not been developed to regulate the quality of service provided by electricity utilities. In several countries, quality-of-service indicators, particularly SAIDI and SAIFI, are not published, either by the utility or the regulator. Their thresholds are not set by regulators to encourage electricity companies to improve the quality of electricity supply. The survey shows that only seven countries out of 43, namely Cameroon, Namibia, Senegal, South Africa, Togo, Uganda, and Zambia consider, factor in the values of SAIDI and SAIFI in the tariff calculation. Penalties for non-compliance with the thresholds of the indicators are not set by regulators in more than 85% of countries.

Recommendation 15

Regulators should focus on developing quality-of-service codes to strengthen the regulatory framework for monitoring the operational performance of electricity utilities. Technical audits must be carried out with operators at regular intervals to ensure the regular maintenance of installations and works dedicated to the supply of electricity. Regulations must evolve in all countries to set a normative framework for quality-of-service indicators. Regulators should set key performance indicators for all utilities with an appropriate monitoring plan for those indicators, which must include financial and technical performance indicators.

4.1.16 Improve access to electricity

Access to electricity remains low in Africa. About 600 million people live without access to electricity supply. Although more than 75% of countries have mechanisms in place to increase access to electricity, most rural electrification funds are provided by governments and NGOs. This underscores a lack of attraction for local and foreign investors in this segment. The low level of development of mini grids and off-grid services hinders the needed rapid increase in access to electricity.

Policies for the development of renewable energies remain primary and do not allow an increase in the rate of access to electricity in several countries. The fact that the regulator does not provide for a recovery of funds expended in rural electrification investments through the tariffs does not encourage electricity utilities to invest in rural electrification. In addition, the deadlines for connection to the network after payment for a connection are still long, going up to more than 30 days at low voltage levels in some countries.

Recommendation 16

Where governments are unable to provide all the funds for rural electrification, the tariffs must make room for the recovery of funds made on rural electrification. This ensures the full recovery of such investment to encourage private sector participation in the sector. The development of mini grids, off-grid and stand-alone systems can accelerate access to electricity in rural areas. Incentives and facilities must be granted to utilities and other promoters to encourage the development of isolated decentralized small-size electricity generation systems based on renewable energy and other forms of energy. This will enable them to supply off-grid communities at a lower cost.

Action Plan: Snapshot of Recommended Short-Term Interventions (1-2 years)

	Regulators' decisions and reasons should be accessible to the public	Develop documented procedures for obtaining a license for investor	Develop a model regulatory accounting framework for utilities in tariff applications	Carry out regular cost of service studies	Develop distribution grid code for distribution network	Carry out assessment on the quality-of-service performance of the utility	Develop specific model contracts for different renewable energy technology	Develop an action plan to reduce distribution network loses	Develop quality of service code
Algeria					●				
Angola				●		●			
Benin				●		●			
Botswana	●			●	●	●	●		●
Burkina Faso			●	●	●	●	●	●	●
Burundi	●	●	●	●	●	●	●	●	
Cabo Verde		●	●	●	●	●	●		●
Cameroun	●			●	●		●	●	
Central African Republic			●	●	●		●	●	
Chad		●	●	●	●	●	●	●	
Congo (RDC)			●	●	●	●	●	●	
Congo	●		●	●		●	●		
Côte d'Ivoire			●		●		●		
Egypte									
Eswatini			●						
Ethiopia			●				●		
Gabon	●	●	●	●	●	●	●	●	
Gambia				●	●	●		●	●
Ghana	●	●	●	●	●				
Guinée					●	●	●		●
Kenya						●			●
Lesotho			●		●	●	●	●	●
Liberia					●	●	●	●	●
Madagascar	●	●		●		●	●		●
Malawi				●	●		●		●
Mali			●		●	●	●		
Morocco	●	●	●	●	●	●	●	●	●
Mauritius				●		●	●		●
Mozambique				●	●	●	●		●
Namibie									
Niger		●			●		●		●
Nigeria							●		
Rwanda				●					
Sao Tomé and Principe	●	●	●	●	●	●	●	●	
Senegal						●	●		
Seychelles	●	●	●	●	●	●	●		●
Sierra Leone			●			●	●		
South Africa			●	●					
Tanzanie									
Togo			●	●	●		●		
Uganda									
Zambie	●		●	●				●	
Zimbabwe			●	●				●	●

Action Plan: Snapshot of Recommended Medium-Term Interventions (3-5 years)

	Prohibition for the regulator CEO from holding other offices in the government	Prohibition of the appointment of commissioners previously staff of a regulated company	Parliament to approve the level of the annual regulatory fees and levies charged by the regulator	Average level of salaries of regulator staff at least equal to those of utilities	Regulator to report directly to parliament	Establish a law on renewable energy	Establish a law on development of mini grid and off grid system	Establish a law on energy efficiency	Develop national energy efficiency action plan
Algeria	▼	▼	▼		▼	▼	▼		
Angola		▼	▼	▼	▼				
Benin	▼	▼	▼		▼				
Botswana		▼	▼		▼		▼		
Burkina Faso	▼	▼	▼		▼		▼		▼
Burundi	▼	▼	▼		▼		▼		▼
Cabo Verde	▼		▼	▼				▼	▼
Cameroon	▼	▼	▼	▼	▼		▼		
Central African Republic		▼	▼	▼	▼	▼		▼	▼
Chad	▼		▼		▼	▼	▼	▼	▼
Congo (RDC)		▼	▼		▼	▼		▼	▼
Congo Republic	▼	▼		▼	▼	▼	▼		▼
Côte d'Ivoire		▼	▼		▼	▼			
Egypte		▼	▼		▼				
Eswatini		▼	▼	▼	▼		▼		
Ethiopia	▼	▼	▼	▼					
Gabon		▼	▼	▼	▼	▼	▼	▼	▼
Gambia		▼			▼			▼	▼
Ghana	▼	▼		▼			▼		
Guinée		▼	▼		▼	▼		▼	
Kenya	▼	▼			▼				
Lesotho		▼	▼			▼		▼	▼
Liberia	▼	▼	▼	▼					
Madagascar		▼	▼		▼				▼
Malawi	▼	▼	▼	▼	▼	▼			▼
Mali	▼	▼	▼		▼	▼			
Morocco	▼	▼	▼	▼			▼	▼	▼
Mauritius			▼	▼	▼		▼		
Mozambique		▼	▼	▼	▼				
Namibie			▼		▼	▼		▼	▼
Niger		▼	▼		▼	▼			▼
Nigeria			▼		▼	▼			
Rwanda			▼		▼	▼			
Sao Tomé and Principe	▼	▼	▼	▼	▼	▼	▼	▼	▼
Senegal	▼	▼	▼		▼				
Seychelles	▼	▼	▼	▼	▼	▼	▼	▼	
Sierra Leone	▼	▼	▼			▼			
South Africa		▼	▼	▼					
Tanzanie		▼	▼		▼			▼	
Togo		▼	▼	▼	▼				
Uganda			▼						
Zambie	▼	▼	▼	▼	▼			▼	▼
Zimbabwe	▼	▼	▼		▼		▼		▼

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Annex 1: Detailed ERI 2021 Country Scores and Rank

Country	RGI	RSI	ERIGS	ROI	ERI	Rank
Uganda	0.951	0.939	0.945	0.717	0.823	1
Kenya	0.899	0.839	0.869	0.544	0.688	2
Tanzania	0.912	0.903	0.907	0.493	0.669	3
Namibia	0.902	0.818	0.860	0.512	0.663	4
Egypt	0.784	0.816	0.800	0.464	0.609	5
Zimbabwe	0.826	0.721	0.773	0.475	0.606	6
Ghana	0.650	0.762	0.706	0.513	0.602	7
Algeria	0.818	0.624	0.721	0.500	0.601	8
Eswatini	0.820	0.595	0.708	0.508	0.600	9
Rwanda	0.889	0.840	0.865	0.411	0.596	10
Sénégal	0.675	0.660	0.668	0.532	0.596	11
Angola	0.696	0.628	0.662	0.527	0.591	12
Zambia	0.731	0.637	0.684	0.504	0.587	13
South Africa	0.792	0.739	0.766	0.443	0.583	14
Ethiopia	0.738	0.780	0.759	0.426	0.569	15
Sierra Leone	0.812	0.581	0.697	0.464	0.569	16
Cote d'Ivoire	0.853	0.691	0.772	0.412	0.564	17
Malawi	0.839	0.547	0.693	0.448	0.557	18
Cameroon	0.655	0.605	0.630	0.492	0.557	19
Benin	0.897	0.822	0.859	0.326	0.529	20
Nigeria	0.783	0.549	0.666	0.406	0.520	21
Niger	0.802	0.651	0.727	0.343	0.499	22
Cabo Verde	0.797	0.474	0.636	0.383	0.493	23
Burkina Faso	0.616	0.355	0.485	0.469	0.477	24
Lesotho	0.793	0.493	0.643	0.342	0.469	25
Togo	0.679	0.612	0.645	0.333	0.463	26
Botswana	0.761	0.435	0.598	0.341	0.451	27
Mali	0.674	0.565	0.620	0.319	0.445	28
Congo Dem. Rep.	0.733	0.562	0.647	0.269	0.418	29
Gambia	0.827	0.382	0.605	0.209	0.356	30
Guinea	0.750	0.425	0.588	0.166	0.312	31
Sao Tome and Principe	0.473	0.097	0.285	0.307	0.296	32
Burundi	0.446	0.592	0.519	0.167	0.294	33
Morocco	0.590	0.306	0.448	0.150	0.259	34
Chad	0.578	0.120	0.349	0.160	0.236	35
Seychelles	0.453	0.280	0.366	0.131	0.219	36
Liberia	0.879	0.590	0.734	0.064	0.216	37
Madagascar	0.715	0.565	0.640	0.069	0.210	38
Gabon	0.421	0.170	0.296	0.108	0.179	39
Mauritius	0.834	0.618	0.726	0.039	0.169	40
Mozambique	0.734	0.612	0.673	0.038	0.160	41
Central African Republic	0.608	0.357	0.483	0.028	0.116	42
Congo Rep.	0.539	0.356	0.447	0.025	0.105	43
Mean	0.735	0.575	0.655	0.339	0.454	

Annex 2: List of Respondents

Regulatory Authorities

#	Country	Name of the commission/regulatory authority	Website
1.	Algeria	Commission de régulation de l'Electricité et du Gaz (CREG)	www.creg.dz
2.	Angola	Instituto Regulador dos Serviços de Electricidade e de Água (IRSEA)	www.irsea.ao
3.	Benin	Autorité de Régulation de l'Electricité du Benin (ARE)	www.are.bj
4.	Botswana	Botswana Electricity Regulatory Authority (BERA)	www.bera.co.bw
5.	Burkina Faso	Autorité de Régulation du Secteur de l'Energie (ARSE)	www.arse.bf
6.	Burundi	Autorité de Régulation des secteurs de l'Eau potable et de l'Energie (AREEN)	www.areen.bi
7.	Cameroun	Agence de Régulation du Secteur de l'Electricité (ARSEL)	www.arsel-cmorg
8.	Cabo Verde	Agencia Reguladora Multisectoral da Economia(ARME)	www.arme.cv
9.	Central African Republic	Agence autonome de Régulation du Secteur de l'Electricité en République Centrafricaine (ARSEC)	N/A
10.	Chad	Autorité de Régulation du Secteur de l'Energie Electrique (ARSE)	N/A
11.	Democratic Republic of Congo	Autorité de Régulation du Secteur de Electricité (ARE)	www.are.gouv.cd
12.	Egypt	Egyptian Electric Utility and Consumer Protection Regulatory Agency (EGYPT ERA)	www.egyptera.org
13.	Eswatini	Eswatini Energy Regulatory Authority (ESERA)	www.sera.org.sz
14.	Ethiopia	Ethiopian Energy Authority (AEE)	www.eea.gov.et
15.	Gabon	Agence de Régulation du Secteur de l'Eau potable et de l'Energie Electrique (ARSEE)	www.arsee-gabon.com
16.	Gambia	Public Utility Regulatory Authority (PURA)	www.pura.gm
17.	Ghana	Energy Commission of Ghana	www.energycom.gov.gh
18.	Ghana	Public Utilities Regulatory Authority (PURC)	www.purc.com.gh
19.	Guinea	Autorité de Régulation des secteurs de l'Electricité et de l'Eau (AREE)	www.aree-gn.com
20.	Côte d'Ivoire	Autorité Nationale de Régulation du Secteur de l'Electricité de Côte d'Ivoire (ANARE-CI)	www.anare.ci
21.	Kenya	Energy and Petroleum Regulatory Authority (EPRA)	www.epra.go.ke
22.	Lesotho	Lesotho Electric and Water Authority (LEWA)	www.lewa.org.ls
23.	Liberia	Liberia Electric Regulatory Commission (LERC)	www.lerc.gov.lr
24.	Madagascar	Office de Régulation de l'Electricité (ORE)	www.ore.mg

25.	Malawi	Malawi Electric Regulatory Authority (MERA)	www.mera.mw
26.	Mali	Commission de Régulation de l'Electricité et de l'Eau (CREE)	www.creemali.ml
27.	Mauritania	Autorité de Régulation Multisectorielle (ARE)	
28.	Mauritius	Utility Regulatory Authority (URA)	www.uramauritius.mu
29.	Morocco	Autorité Nationale de Régulation de l'Electricité (ANRE)	www.anre.ma
30.	Mozambique	Autoridade Reguladora de Energia (ARENE)	www.arene.org.mz
31.	Namibia	Electricity Control Board (ECB)	www.ecb.na
32.	Niger	Autorité de Régulation du Secteur de l'Energie (ARSE)	www.arse.gouv.ne
33.	Nigeria	Nigerian Electricity Regulatory Commission (NERC)	www.nerc.gov.ng
34.	Republic of Congo	Agence de Régulation du Secteur de l'Electricité(ARSEL)	N/A
35.	Rwanda	Rwanda Utilities Regulatory Authority (RURA)	www.rura.rw
36.	Sao Tome e Principe	Autoridade Geral de Regulaçao (AGER)	www.ager-stp.org
37.	Senegal	Commission de Régulation du Secteur de l'Electricité(CRSE)	www.crse.sn
38.	Seychelles	Seychelles Energy Commission	www.sec.sc
39.	Sierra Leone	Sierra Leone Electricity and Water Regulatory Commission (SLEWRC)	www.ewrc.gov.sl
40.	Tanzania	Energy and Water Utilities Regulatory Authority (EWURA)	www.ewura.go.tz
41.	Togo	Autorité de Régulation du Secteur de l'Electricité (ARSE)	www.arse.tg
42.	Uganda	Electricity Regulatory Authority (ERA)	www.era.go.ug
43.	Zambia	Energy Regulatory Board (ERB)	www.erb.org.zm
44.	Zimbabwe	Zimbabwe Energy Regulatory Authority (ZERA)	www.zera.co.zw

Power Utility Companies

#	Country	Name of Power Utility
1.	**Algeria**	Société Algérienne de Distribution d'Electricité et du Gaz (SADEG)
2.	**Angola**	Empresa Nacional de Distribuçao de Electricidade (ENDE-EP)
3.	**Benin**	Société d'Energie Electrique (SBEE)
4.	**Botswana**	Botswana Power Corporation (BPC)
5.	**Burkina Faso**	Société Nationale d'Electricité du Burkina (SONABEL)
6.	**Burundi**	REGIDESO
7.	**Cabo Verde**	ELECTRA Power Generator and Distributor
8.	**Cameroon**	ENEO
9.	**Central African Republic**	Energie Centreafricaine (ENERCA)
10.	**Dem. Rep. of Congo**	Société Nationale d'Electricité (SNEL)
11.	**Republic of Congo**	Energie Electrique du Congo (E2C)
12.	**Côte d'Ivoire**	Compagnie Ivoirienne d'Electricité (CIE)
13.	**Egypt**	Egyptian Electricity Holding Company (EEHC)
14.	**Eswatini**	Eswatini Electricity Company (EEC)
15.	**Ethiopia**	Ethiopian Electric Power (EEP)
16.	**Gabon**	Société d'Energie et d'Eau du Gabon (SEEG)
17.	**Gambia**	National Water and Electricity Company Ltd (NAWEC)
18.	**Ghana**	Electricity Company of Ghana
19.	**Guinea**	Electricité de Guinée (EDG)
20.	**Kenya**	Kenya Power and Lighting Company Limited (KPLC)
21.	**Liberia**	Liberia Electricity Corporation (LEC)
22.	**Madagascar**	Jiro Sy Rano Malagasy (JIRAMA)

23.	**Malawi**	Electricity Supply Corporation of Malawi Limited (ESCOM)
24.	**Mali**	Energie du Mali SA (EDM)
25.	**Mauritius**	Central Electricity Board (CEB)
26.	**Morocco**	Office National de l'Electricité et de l'Eau Potable (ONEE)
27.	**Mozambique**	Electricidade de Moçambique (EDM)
28.	**Namibia**	NamPower
29.	**Niger**	Société Nigérienne d'Electricité (NIGELEC)
30.	**Nigeria**	Abuja Electricity Distribution Company (AEDC)
31.	**Nigeria**	BEDC Electricity PLC
32.	**Nigeria**	Eko Electricity Distribution Company (EKEDC)
33.	**Nigeria**	Ikeja Electric PLC (IKEDC)
34.	**Nigeria**	Kano Electricity Distribution Company (KEDCO)
35.	**Nigeria**	Port Harcourt Electricity Distribution Company (PHEDC)
36.	**Rwanda**	Energy Utility Corporation Limited (EUCL)
37.	**Sao Tome & Principe**	Empresa de Agua et Electricidade (EMAE)
38.	**Senegal**	Société Nationale d'Electricité du Sénégal (SENELEC)
39.	**Seychelles**	Public Utilities Corporation (PUC)
40.	**Sierra Leone**	Electricity Distribution and Supply Authority (EDSA)
41.	**South Africa**	Eskom
42.	**Tanzania**	Tanzania Electricity Supply Company Limited (TANESCO)
43.	**Togo**	Compagnie Energie Electrique du Togo (CEET)
44.	**Uganda**	UMEME
45.	**Zambia**	Zambia Electricity Supply Corporation (ZESCO)
46.	**Zimbabwe**	Zimbabwe Electricity Transmission and Distribution Company (ZETDC)

About this Publication

The 2021 edition of the Electricity Regulatory Index – produced and published by the African Development Bank – is the fourth in a series of knowledge products covering issues relating to the development of effective and investor-friendly regulatory frameworks overseeing the electricity sectors in African countries. The Electricity Regulatory Index for Africa is a composite index that measures the level of development of the electricity sector regulatory frameworks of African countries against international standards and best practice. ERI scores, which are calculated from responses to a bespoke questionnaire distributed to African electricity sector regulators, power utilities and other critical electricity sector stakeholders, provides important insights on the strengths and weaknesses of electricity sector regulators and the overall regulatory frameworks in which they operate.

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